Office of the Vice President for Research

UNIVERSITY of HAWAI'I SYSTEM

8031-01
July 27, 2012

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OFC. OF ENVIRONMENTAL QUALITY CONTROL

AUG 08 2012

Mr. Gary Hooser, Director
State of Hawaii
Office of Environmental Quality Control
235 South Beretania Street, Room 702
Honolulu, Hawaii 96813

Subject: Environmental Assessment for the University of Hawaii Pacific Health Research Lab at Kalaeloa
Portion of Tax Map Key: 1-9-1-13:045
Kalaeloa, Oahu, Hawaii

Dear Mr. Hooser:

The University of Hawaii (UH) has prepared the attached Draft Environmental Assessment (DEA) for the subject project and anticipates a Finding of No Significant Impact. The DEA has been prepared pursuant to Chapter 343, Hawaii Revised Statutes and Chapter 11-200, Hawaii Administrative Rules. Please publish notice of this DEA in the August 8, 2012 issue of OEQC's *The Environmental Notice*.

We have enclosed one (1) each the following items:

- Hardcopy of the OEQC publication form and DEA; and
- CD including the DEA and OEQC publication form in pdf format.

Please do not upload to OEQC's website until August 8, 2012. Please contact our consultant, Mr. Earl Matsukawa at (808) 946-2277 if you have any questions.

Sincerely,

Keith Mattson
Project Manager
Pacific Health Research Laboratory
Office of the Vice President for Research
University of Hawaii

cc: Mr. Earl Matsukawa, Project Manager, Wilson Okamoto Corporation
Ms. Valerie Nottingham, Chief, Environmental Quality Branch, Division of Environmental Protection, Office of Research Facilities, National Institutes of Health

2800 Woodlawn Drive, Manoa Innovation Center
Honolulu, Hawai'i 96822
Telephone: (808) 956-7490
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An Equal Opportunity/Affirmative Action Institution

Agency Action EA
Chapter 343, HRS
Publication Form

Project Name Draft Environmental Assessment (DEA):
University of Hawai'i Pacific Health Research Laboratory at Kalaeloa

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QUALITY CONTROL

Island: Oahu

District: Ewa District

TMK: Portion of TMK 1-9-1-13:045

Permits:

- HCDA – Plan Review Use
- HCDA – Site Development Plan Submittal Process
- City & County of Honolulu – Building Permit
- City & County of Honolulu – Grading Permit
- City & County of Honolulu – Industrial Wastewater Discharge Permit
- State of Hawai'i Air Quality Permit (if required based on design elements)
- NPDES General Permit for Storm Water Control in Construction Activities
- State of Hawaii Permit for Import and Possession of Micro-organisms
- Federal Control of Select Agents – USDA and CDC
- Federal Rules on Transportation of Agents – DOT/IATA
- University of Hawai'i Radiation Equipment Licensure

Proposing/Determination Agency:

University of Hawaii
Office of the Vice Chancellor for Research
2500 Campus Road
Hawaii Hall 211
Honolulu, Hawaii 96822
Contact: Dr. Vassilis Syrmos
Telephone #: 808-956-7837

University of Hawaii
Office of Vice President for Research
Suite 201, 2800 Woodlawn Drive
Honolulu, Hawaii 96822
Contact: Mr. Keith Mattson
Telephone #: 808-956-6985

Consultant:

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii 96826
Contact: Mr. Earl Matsukawa, AICP
Telephone #: 808-946-2277

Status: 30 Day Comment Period

Summary:

NIH, through the National Institute of Allergy and Infectious Diseases, is providing a grant to the UH to partially fund the construction of the UH PHRL, a Regional Biosafety Lab. The proposed UH PHRL would be devoted to researching and detecting emerging infectious diseases, as well as developing rapid and more accurate diagnostic tests, drugs and vaccines for emerging and re-emerging infectious diseases in the Asia-Pacific region. This work is especially vital, given Hawaii's position as the gateway to the United States for travelers from throughout the Asia-Pacific region, making it vulnerable to the introduction of exotic pathogens.

The proposed project site encompasses an approximately two acre portion of Tax Map Key (TMK) parcel 1-9-1-13:045 in Kalaeloa, O'ahu --within the State of Hawaii Kalaeloa Community Development District.

The proposed facility would consist of a one-story, approximately 31,179-gross square foot (ft^2) standalone structure and would include BSL-2, BSL-3, and ABSL3 laboratories, a small lab animal facility for primarily rodents, an insectary, physical plant, and support space for research, administration, and building operations.

Revised February 2012

DRAFT ENVIRONMENTAL ASSESSMENT:
UNIVERSITY OF HAWAII PACIFIC HEALTH RESEARCH LABORATORY
KALAELOA, OAHU, HAWAII

PACIFIC HEALTH
RESEARCH LABORATORY

PREPARED FOR:

UNIVERSITY OF HAWAI'I
MĀLAMALAMA
1907
UA MAU KE EA O KA 'ĀINA I KA PONO

PREPARED BY:

WILSON OKAMOTO
C O R P O R A T I O N

ENGINEERS | PLANNERS | CONSULTANTS

JULY 2012

DRAFT
ENVIRONMENTAL ASSESSMENT

UNIVERSITY OF HAWAII PACIFIC HEALTH RESEARCH LABORATORY AT KALAELOA

Proposing Agency:
University of Hawaii
Office of the Vice President for Research

Accepting Agency:
University of Hawaii
Office of the Vice Chancellor for Research

Prepared by:
Wilson Okamoto Corporation

July 2012

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Appendix B	Documentation of Consultation, pursuant to Section 7 of the Federal Endangered Species Act
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Appendix D	Archaeological Literature Review and Field Inspection, Cultural Surveys Hawaii, Inc., June 2012
Appendix E	Traffic Impact Report, Pacific Health Research Lab, Wilson Okamoto Corporation. June 2012.
Appendix F	Pre-Assessment Consultation Letters

PREFACE

This Draft Environmental Assessment (EA) is prepared pursuant to Chapter 343, Hawaii Revised Statutes; Title 11, Chapter 200, Administrative Rules, Department of Health, State of Hawaii.

Proposed is the construction and operation of the University of Hawaii Pacific Health Research Laboratory (UH PHRL), in partnership with NIH on an approximately two acre portion of Tax Map Key (TMK) parcel 1-9-1-13:045 in Kalaeloa, Oahu. The site is located within the State of Hawaii Kalaeloa Community Development District, which is administrated by the Hawaii Community Development Authority.

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SUMMARY

Proposing Agency:	University of Hawaii Office of Vice President for Research Suite 201, 2800 Woodlawn Drive Honolulu, Hawaii 96822 Contact: Mr. Keith Mattson
Accepting Agency:	University of Hawaii Office of the Vice Chancellor for Research 2500 Campus Road Hawaii Hall 211 Honolulu, Hawaii 96822 Contact: Dr. Vassilis Syrmos
Authorized Agent:	Wilson Okamoto Corporation 1907 S. Beretania Street, Suite 400 Honolulu, Hawaii 96826 Contact: Mr. Earl Matsukawa, AICP
Project Location:	Kalaeloa, Ewa District, Oahu, Hawaii
Tax Map Key:	Portion of TMK 1-9-1-13:045
Area:	Approximately 2 Acres
Existing Use:	Hawaii Army National Guard Compound
State Land Use Designation:	Federal and Military
Zoning Designation:	F-1
Ewa Development Plan Designation:	Public
Proposed Action:	Proposed is the construction and operation of the Pacific Health Research Lab (UH PHRL), in partnership with the National Institutes of Health (NIH).
Impacts:	No significant impacts are anticipated.
Anticipated Determination:	Finding of No Significant Impact (FONSI)

Parties Consulted During Pre-Assessment:

Federal

Animal and Plant Health Inspection Service, Plant Protection and Quarantine, U.S. Department of Agriculture

Centers for Disease Control Honolulu Quarantine Station

U.S. Army Corps of Engineers

Department of the Navy, Navy Region Hawaii

U.S. Coast Guard, U.S. Department of Homeland Security

U.S. Department of Defense (DOD)

U.S. Environmental Protection Agency (EPA) Region IX

U.S. Fish & Wildlife Service, U.S. Department of the Interior

U.S. Geological Survey, U.S. Department of the Interior

National Guard Bureau (NGB)

State

Department of Accounting and General Services (DAGS)

Department of Agriculture

Department of Business, Economic Development, & Tourism (DBEDT)

State Land Use Commission, DBEDT

Office of Planning, DBEDT

Hawaii State Energy Office, DBEDT

Hawaii Community Development Authority, DBEDT

State of Hawaii Department of Defense (DOD)

Hawaii Army National Guard, DOD

Hawaii State Civil Defense, DOD

Department of Education (DOE)

Department of Hawaiian Home Lands (DHHL)

Department of Health (DOH)

Environmental Management Division, DOH

Clean Water Branch, DOH

Department of Human Services (DHS)

Department of Land & Natural Resources (DLNR)

Parties Consulted During Pre-Assessment: (Continued)

State (Continued)

Environmental Health Administration (DOH)
Environmental Planning Office, Environmental Health Administration (DOH)
Historic Preservation Division, DLNR
Office of Hawaiian Affairs (OHA)
Department of Transportation (DOT)
University of Hawaii Environmental Center

County

Department of Environmental Services
Department of Planning and Permitting
Department of Transportation Services
Department of Emergency Management
Board of Water Supply
Fire Department
Police Department
Emergency Services Department
Hawaii Community Development Authority, Kalaeloa Development District
Makakilo/Kapolei/Honokai Hale Neighborhood Board

Elected Officials

Councilmember Tom Berg
Council Chair Nestor Garcia
Senator Mike Gabbard
Representative Sharon Har

Utilities and Communications

Hawaiian Telcom
The Gas Company
Hawaiian Electric Company (HECO)
Oceanic Cable
Chevron USA
BHP Hawaii

LIST OF ACRONYMS USED:

ABSL:	Animal Biosafety Level
APITMID:	Asia-Pacific Institute of Tropical Medicine and Infectious Diseases
BMBL:	*Biosafety in Microbiological and Biomedical Laboratories*
BPNAS:	Barbers Point Naval Air Station
BRAC:	Base Relocation and Closure
BSC:	Biosafety Cabinet
BSL:	Biosafety Level
CEQ:	Council on Environmental Quality
CERCLA:	Comprehensive Environmental Response, Compensation, and Liability Act
CIP:	Campbell Industrial Park
CR:	Coral Outcrop
DAGS:	Department of Accounting and General Services
dBA:	Decibel weighted average
HHS:	Department of Health and Human Services
DNA:	Deoxynucleic acid
DOH:	Department of Health
DOT:	Department of Transportation
DPP:	City and County of Honolulu Department of Permitting and Planning
EPA:	Environmental Protection Agency
FEMA:	Federal Emergency Management Agency
GHG:	Greenhouse gases
HAAQS:	Hawaii Ambient Air Quality Standards
HCDA:	Hawaii Community Development Authority
HECO:	Hawaiian Electric Company
HEPA:	High Efficiency Particulate Air
HIARNG:	Hawaii Army National Guard
HAR:	Hawaii Administrative Rules
HRS:	Hawaii Revised Statutes
LAI:	Laboratory Acquired Infection
LBP:	Lead based paint
NAAQS:	National Ambient Air Quality Standards
NCSS:	National Cooperative Soil Survey
NEPA:	National Environmental Policy Act
NIH:	The National Institutes of Health
NIAID:	National Institute of Allergy and Infectious Diseases
OSHA:	Occupational Safety and Health Administration
PCB:	Polychlorinated Biphenyls
PHRL:	Pacific Health Research Laboratory
PHNWR:	Pearl Harbor National Wildlife Refuge
POL:	Petroleum, Oils, and Lubricants
RCRA:	Resource Conservation and Recovery Act
SCS:	Soil Conservation Service
SIH:	Standard Industrial Hazard
SSURGO:	Soil Service Geographic Database
SDWA:	Safe Drinking Water Act

LIST OF ACRONYMSS USED: (CONTINUED)

TMMMP:	Department of Tropical Medicine Medical Microbiology and Phamacology (University of Hawaii)
UH:	The University of Hawaii
USDA:	United States Department of Agriculture
USFWS:	United States Fish and Wildlife Service
WRCC:	Western Regional Climate Center
WRRC:	University of Hawaii Water Resource Research Center
WSRA:	Wild and Scenic Rivers Act

GLOSSARY:

Airborne transmission: in this type of transmission, infective agents are spread as aerosols, and usually enter a person through the respiratory tract.

Air pollutant: an airborne substance that could, in high concentrations, harm living things or cause damage to materials. From a regulatory perspective, an air pollutant is a substance for which emissions or atmospheric concentrations are regulated or for which maximum guideline levels have been established due to potential harmful effects on human health and welfare.

Animal Biosafety Level 1 (ABSL-1): suitable for work involving well characterized agents that are not known to cause disease in healthy adult humans, and that are of minimal potential hazard to laboratory personnel and the environment.

Animal Biosafety Level 2 (ABSL-2): builds on the practices, procedures, containment, equipment, and facility requirements of ABSL-1. Involves practices for work with those agents associated with human disease. It addresses hazards from ingestion as well as from percutaneous and mucuous membrane exposure.

Animal Biosafety Level 3 (ABSL-3): builds on the practices, procedures, containment, equipment, and facility requirements of ABSL-2. Involves practices for work with animals infected with indigenous or exotic agents that present the potential of aerosol transmission and of causing serious or potentially lethal disease.

Autoclave: an apparatus using superheated steam under high pressure for sterilization.

Bacterium: any of a group (as kingdom Procaryotae syn. Monera) of prokaryotic unicellular round, spiral, or rod-shaped single-celled microorganisms that are often aggregated into colonies or motile by means of flagella, that live in soil, water, organic matter, or the bodies of plants and animals, and that are autotrophic, saprophytic, or parasitic in nutrition and important because of their biochemical effects and pathogenicity.

Biohazardous materials: any microorganism, or infectious substance, or any naturally occurring, bioengineered, or synthesized component of any such microorganism or infectious substance, capable of causing: 1) death, disease or other biological malfunction in a human, an animal, a plant or another living organism; 2) deterioration of food, water, equipment, supplies, or material of any kind; or 3) harmful alteration of the environment. These include, but are not limited to:

- Certain bacteria, fungi, viruses, rickettsiae, protozoa, parasites
- Recombinant products
- Toxins of biological origin
- Alllergens
- Cultured human or animal cells and the potentially infectious agents these cells may contain
- Viroids and prions
- Other infectious agents as outlined in laws, regulations, or guidelines

Examples include all materials containing rDNA; transgenic animals or plants; human, animal or plant pathogens; biological toxins (such as tetanus toxin); human blood and certain human body fluids; select agents; high consequence livestock pathogens and toxins; and human or monkey cell structures. Specifically excluded are non-rDNA BSL-1 research activities.

Biological agents (or bioagents): organisms or the product of organisms that present a health risk to humans. These can be bacterial, fungal, parasitic, rickettsial, or viral agents, or prions.

Biological Safety Cabinets (BSCs): the most effective and commonly used devices in laboratories working with infectious agents and provides primary containment. Three general types are available, Class I, II, and III.

Biological toxins: toxic chemicals of biologic origin that are not self-replicating.

Biosafety Level 1 (BSL-1): suitable for work involving well-characterized agents not known to consistently cause disease in healthy adult humans, and of minimal potential hazard to laboratory personnel and the environment. The laboratory is not necessarily separated from the general traffic patterns in the building. Work is generally conducted on open bench tops using standard microbiological practices. Special containment equipment or facility design is neither required nor generally used. Laboratory personnel have specific training in the procedures conducted in the laboratory and are supervised by a scientist with general training in microbiology or a related science.

Biosafety Level 2 (BSL-2): similar to Biosafety Level 1 and suitable for work involving agents of moderate potential hazard to personnel and the environment. Differs from BSL-1 in that (1) laboratory personnel have specific training in handling pathogenic agents and are directed by competent scientists; (2) access to the laboratory is limited when work is being conducted; (3) extreme precautions are taken with contaminated sharp items; and (4) certain procedures in which infectious aerosols or splashes may be created are conducted in biological safety cabinets or other physical containment equipment.

Biosafety Level 3 (BSL-3): applicable to clinical, diagnostic, teaching, research, or production facilities in which work is done with indigenous or exotic agents which may cause serious or potentially lethal disease as a result of exposure by the inhalation route. Laboratory personnel have specific training in handling pathogenic and potentially lethal agents, and are supervised by competent scientists who are experienced in working with these agents. All procedures involving the manipulation of infectious materials are conducted within biological safety cabinets or other physical containment devices, or by personnel wearing appropriate personal protective clothing and equipment. The laboratory has special engineering and design features.

Biosafety Level 4 (BSL-4): required for work with dangerous and exotic agents that poise a high individual risk of aerosol-transmitted laboratory infections and life-threatening disease. Agents with a close or identical antigenic relationship to Biosafety Level 4 agents are handled at this level until sufficient data are obtained either to confirm continued work at this level, or to work with them at a lower level. Members of the laboratory staff have specific and thorough training in handling extremely hazardous infectious agents and they understand the primary and secondary containment functions of the standard and special practices, the containment equipment and the laboratory design characteristics. They are supervised by competent

scientists who are trained and experienced in working with these agents. Access to the laboratory is strictly controlled by the laboratory director. The facility is either in a separate building or in a controlled area within a building, which is completely isolated from all other areas of the building. A specific facility operations manual is prepared or adopted.

Within work areas of the facility, all activities are confined to Class III biological safety cabinets, or Class II biological safety cabinets used with one-piece positive pressure personnel suits ventilated by a life support system. The Biosafety Level 4 laboratory has special engineering and design features to prevent microorganisms from being disseminated into the environment.

Class II Biological Safety Cabinet: Class II BSCs are designed with inward air flow to protect personnel, HEPA-filtered downward vertical laminar airflow for product protection, and HEPA-filtered exhaust air for environmental protection. There are two types of Class II BSCs – Type A and Type B. Type A cabinets are suitable for microbiological research in the absence of volatile or toxic chemicals and radionuclides as the air within the cabinet is recirculated through a HEPA filter. Type B cabinets include sub-types B1, B2, and B3. Type B cabinets are hard-ducted to the building exhaust system and contain negative pressure plena. Type B cabinets are suitable for microbiological research with volatile or toxic chemicals and radionuclides because, with the exception of Type B1 where 30 percent of the air is recirculated through a HEPA filter, the air is not recirculated within the cabinet. Type B1 cabinets are suitable for radionuclides and toxic chemicals of low levels and volatility.

Direct transmission: the transfer of the infectious agent directly into the body. Different infectious agents may get into the body using different routes. Some routes by which infectious diseases are spread directly include personal contact (e.g. touching, biting) or by tiny droplets of spray directly into the conjunctiva or the mucus membranes of the eye, nose, or mouth.

Emissions: pollution discharged into the atmosphere from smoke stacks, other vents, and surface areas of commercial or industrial facilities, residential chimneys, and vehicle exhausts.

Endangered Species: Plants or animals that are in danger of extinction through all or a significant portion of their ranges and that have been listed as endangered by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service following the procedures outlined in the Endangered Species Act and its implementing regulations (50 CFR 424). Note: Some states also list species as endangered. Thus, in certain cases, a state definition would also be appropriate.

Environmental Justice: an identification of potential disproportionately high and adverse impacts on low-income and/or minority populations that may result from proposed Federal actions.

Hazardous waste: a category of waste regulated under the *Resource Conservation and Recovery Act* (RCRA). To be considered hazardous, a waste must be a solid waste under RCRA and must exhibit at least one of four characteristics described in 40 CFR 261.20-261.4 (i.e., ignitability, corrosivity, reactivity, or toxicity) or be specifically listed by the Environmental Protection Agency in 40 CFR 261.31-261.33.

High Efficiency Particulate Air (HEPA) filter: High Efficiency Particulate Air (HEPA) filters are one of the most widely known methods of air cleaning. A conventional HEPA filter consists of a

continuous sheet of a special paper-like, glass-fiber filter medium that is pleated into a "V" configuration with corrugated aluminum separators between the pleats. This forms the filter element, which is then bonded into a rigid frame using a special polyurethane compound. Standard filters are produced in a range of face dimensions in two standard depths of nominally 6 in (15 cm) and 12 in (30 cm).

Impacts (effects): an assessment of the meaning of changes in all attributes being studied for a given resource; an aggregation of all the adverse effects, usually measured using a qualitative or nominally subjective technique. In this EA, as well as in the Council on Environmental Quality regulations impact is used synonymously with the word effect.

Indirect impacts (effects): impacts caused by the action and are later in time or farther removed in distance, but still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

Infection: invasion of a host by an agent, with subsequent establishment and multiplication of the agent. An infection may or may not lead to disease.

Infectious agent: living or quasi-living organism or particle that causes an infectious disease. Bacteria, viruses, fungi, protozoa, helminthes, and prions are characterized as infectious agents.

Infectious disease: change from a state of health to a state in which part or all of a host's body cannot function normally because of the presence of an infectious agent or its products.

Mitigation: the alleviation of adverse impacts on environmental resources by avoidance through project design or project relocation, by protection, or by adequate scientific study.

National Environmental Policy Act (NEPA) (42 USC 4341): passed by Congress in 1969. The Act established a national policy designed to encourage consideration of influences of human activities (e.g., population growth, high-density urbanization, industrial development) on the natural environment. Congress also established the Council on Environmental Quality (CEQ) to oversee the NEPA process. NEPA procedures require that environmental information be made available to the public before decisions are made. Information contained in NEPA documents must focus on relevant issues in order to facilitate the decision making process.

Pathogen: a microscopic organism that causes infection and/or disease.

Personal protection equipment (PPE): clothing and devices such as safety glasses, ear plugs, lab coats, rubber gloves, and hard hats worn by workers to protect them from workplace hazards that are capable of causing injury or impairment in the function of any part of the body through exposure, absorption, inhalation, or physical contact.

Solid waste: in general, solid wastes are non-liquid, non-soluble discarded materials ranging from municipal garbage to industrial wastes that contain complex and sometimes hazardous substances. Solid wastes include sewage sludge, agricultural refuse, demolition wastes, and mining residues.

Threatened or endangered (T&E) species: animals, birds, fish, plants, or other living organisms threatened with extinction by manmade or natural changes in their environment. Requirements for declaring species endangered are contained in the Endangered Species Act of 1973.

Toxin: any of various poisonous substances that are specific products of the metabolic activities of living organisms, are colloidal substances related to proteins and usually are very unstable, and are notably toxic when introduced to the tissues, but are nearly destroyed by digestive juices, and are typically capable of inducing antibody formation in suitable animals.

Vector: living organism that transfers an infective agent from one host to another (e.g.. mosquito.

Vector-borne transmission: transmission of an infectious pathogen between hosts by way of a vector.

Vehicle-borne transmission: indirect transmission of an infectious agent occurs when a vehicle (or fomite) touches a person's body or is ingested. Examples of vehicles that can transmit diseases include cooking or eating utensils, bedding or clothing, toys, and surgical or medical instruments (like catheters). Water, food, drinks (like milk) and biological products like blood, serum, plasma, tissues, or organs can also be vehicles.

Virus: the causative agent of an infectious disease; specifically: any of a large group of submicroscopic infective agents that are regarded either as the smallest microorganisms or extremely complex molecules and are composed typically of a protein coat surrounding an RNA or DNA core of genetic material, that are capable of growth and multiplication only in living cells, and that cause various important diseases in man, animals, or plants.

Vivarium: a place, especially an indoor enclosure, for keeping and raising living animals and plants under natural conditions for observation or research.

1. INTRODUCTION

1.1 Background: NIH, NIAID, and the NIAID National Biodefense Program

National Institutes of Health

The NIH is the steward of medical and behavioral research for the Nation. Its mission is science in pursuit of fundamental knowledge about the nature and behavior of living systems and the application of that knowledge to extend healthy life and reduce the burdens of illness and disability. The goals of the agency are as follows: (1) foster fundamental creative discoveries, innovative research strategies, and their applications as a basis to advance significantly the Nation's capacity to protect and improve health; (2) develop, maintain, and renew scientific human and physical resources that will assure the Nation's capability to prevent disease; (3) expand the knowledge base in medical and associated sciences in order to enhance the Nation's economic well-being and ensure a continued high return on the public investment in research; and (4) exemplify and promote the highest level of scientific integrity, public accountability, and social responsibility in the conduct of science. The NIH is comprised of 27 health institutes, which includes NIAID, and centers.

National Institute of Allergy and Infectious Diseases

Established in 1948, the NIAID conducts and supports basic and applied research to better understand, treat, and ultimately prevent infectious, immunologic, and allergic diseases. For more than 50 years, NIAID research has led to new therapies, vaccines, diagnostic tests, and other technologies that have improved the health of millions of people in the United States and around the world (NIAID 2012). The FY 2013 NIAID budget is $4.5 billion.

The NIAID has broad experience, expertise, and success in developing medical tools to fight infectious diseases, and has greatly accelerated its biodefense research program. To meet the Nation's biodefense needs, NIAID, in consultation with other experts in the field, developed the NIAID Strategic Plan for Biodefense Research (NIAID 2002) for emerging infectious diseases and biodefense research. Key elements of the plan include:

- Support medical research on microbes and the human immune response to them.
- Apply such research to the discovery and development of vaccines, therapeutics, and diagnostic tests designed to protect the general population.
- Ensure that the United States has enough research facilities to carry out these activities.

NIAID's ultimate goal is to develop new and improved diagnostics, vaccines, and treatments for diseases caused by infectious agents. However, medical tools such as these can only be developed with a solid understanding of the biology of the disease-causing agents. Such research sometimes requires working with the actual microbes or their toxins.

Achievement of NIAID's research goals requires the construction and certification of biological containment laboratories with facilities and procedures for handling potentially lethal infectious agents. This research must be conducted in special biosafety laboratories and in accordance with the many laws, regulations, policies, and well-established guidelines

that govern research on these microbes and the design, management, and operation of these laboratories. All these provisions aim to protect not only the laboratory workers, but also the surrounding community from accidental exposure to infectious agents. Thus, NIAID's research agenda for biodefense and emerging infectious diseases includes plans to construct and renovate BSL-3 and BSL-4 laboratories around the country. To be the most effective, these laboratories must be located where established teams of researchers already work side-by-side on related scientific problems.

NIAID National Biodefense Program

The National Institute of Allergy and Infectious Diseases (NIAID) has accelerated its biodefense research program to meet nation-wide biodefense needs. NIAID expects that its basic and applied research programs will provide the essential elements to:

- Enhance our defenses against biological threats;
- Develop new tools in the fights against HIV/AIDS , Avian flu, and other infectious diseases; and,
- Improve therapies and management of immune-mediated diseases.

The ultimate goal of this research is to lay the groundwork for the development of broad-spectrum antibiotics and antivirals – drugs that can prevent or treat diseases caused by multiple types of bacteria or viruses – and multi-platform technologies that potentially could be used to more efficiently develop vaccines against a variety of infectious agents.

In February 2002, the NIAID, in consultation with an outside panel of experts, developed the *NIAID Strategic Plan for Biodefense Research* to target short- and long-term goals aimed at protecting the U.S. and the world population against bioterrorist attacks (NIAID 2002).

The *NIAID Strategic Plan for Biodefense Research* identified a critical need to expand the availability of research resources to support the implementation of NIAID's *Biodefense Research Agenda*. A major challenge in meeting the goals of the *Biodefense Research Agenda* is a serious shortage of high-level biocontainment laboratories to work on infectious disease pathogens. The purpose of biocontainment is to reduce or eliminate exposure of laboratory workers, other persons, and the outside environment to potentially hazardous biological agents.

The NIAID's response was to establish a fund that encompasses both grants and contract awards to aid in the development of the needed high-level biocontainment laboratory facilities. Additional components of the NIAID's biodefense plans encompass the establishment of a network consisting of Regional Centers of Excellence for Biodefense and Emerging Infectious Diseases Research, Regional Biosafety level (BSL) 3 Laboratories (RBLs), and National BSL-4 Laboratories (NBLs). The *NIAID Strategic Plan for Biodefense Research* emphasizes both basic research and its application to the development of products such as diagnostics, therapeutics, and vaccines.

Pursuant to the *Broad Agency Announcement BAA-NIH-NIAID-NCRR-DMID-03-36*, the NIH and the NIAID solicited grant applications and contract proposals for the establishment of RBLs and NBLs. These laboratories will work in concert with Federal, State, and local public

health efforts in the event of a bioterrorism or infectious disease emergency. NBL and RBL sites were selected based on multiple factors, primarily centering on the scientific and technical merit of the submitted applications and on the applicant's ability to contribute to the overall NIAID biodefense research agenda. The overall objective of the RBL construction program is to provide funding to design, construct, and commission comprehensive, state-of-the-art BSL-2, and BSL-3 laboratories, as well as associated research and administrative support space.

The University of Hawaii (UH) was awarded a grant of approximately $32.5 million dollars for the purpose of constructing a BSL-3 facility for biodefense and microbiological research related to serious emerging and re-emerging infectious diseases. The State of Hawaii and the UH will provide the remaining $15 million dollars needed to construct the University of Hawaii Pacific Health Research Laboratory (UH PHRL). The proposed facility is being designed as a regional facility with a special emphasis on diseases that spread from animals to humans, termed zoonotic diseases (diseases of animals that may be transmitted to humans under natural conditions).

Throughout this Environmental Assessment (EA), various terms will be used to describe the type of materials being studied in the UH PHR Lab, such as select agents, biological agents, biological material, agents, biological organisms, pathogens, bacteria, viruses, and infectious agents. Of these descriptors, the term 'select agents' are defined by regulations in 42 CFR Part 73, 9 CFR Part 121 and 7 CFR Part 331. The remaining terms are used as generic descriptors.

1.2 Elements of Biosafety Containment

Biocontainment facilities provide for the safe and secure handling and storage of infectious microorganisms and biological derived toxins. The U.S. Department of Health and Human Services (DHHS), Centers for Disease Control and Prevention (CDC), and NIH has identified four biosafety levels (BSL) of operation for biosafety facilities.

To familiarize the reader with biosafety concepts, the following sections provide a brief discussion of the considerations and requirements for biocontainment facilities. The three core elements of biosafety containment are:

1. Laboratory practice and technique;
2. Safety equipment; and,
3. Facility design.

The pathogens studied, the extent of their potential health hazard, and the type of research conducted on them within a biosafety facility determine the required elements of containment or BSL (DHHS 2007). The CDC/NIH guidelines, *Biosafety in Microbiological and Biomedical Laboratories* (BMBL), Fifth Edition, specifies four levels of safety and security required for laboratory facilities in which biological agents are studied (DHHS 2007). The BMBL distinguishes between BSL and animal biosafety level (ABSL) facilities. Four standard BSLs are designated based upon the types of activities occurring, the infectiousness of the microorganism, and the known or suspected route of transmission. The BSLs consist of combinations of laboratory practices and techniques, safety equipment, and laboratory

facilities. Such equipment and facilities include Biosafety Cabinets (BSC), which function as enclosed, ventilated laboratory workspace for safely working with materials containing (or potentially containing) pathogens requiring a defined biosafety level. These four BSLs are also designated for activities involving infectious diseases work with commonly used experimental animals. Each combination of laboratory practices and techniques, safety equipment and laboratory facilities is specifically appropriate for the operations performed, the documented or suspected routes of transmission, and the laboratory function or activity.

Primary containment, the protection of personnel and the immediate laboratory environment from exposure to infectious agents, is provided by both good microbiological technique and the use of appropriate safety equipment.

Secondary containment, is achieved through facility design and construction, and incorporates specialized ventilation systems, autoclaves, controlled access areas, and other features.

The use of animals requires the provision of facilities, staff, and established practices that reasonably ensure appropriate levels of environmental quality, safety, and care for the animals. As a general principle, the biosafety level recommended for working with infectious agents *in vivo* and *in vitro* are comparable (DHHS 2007). *In vivo* status diseases are living within a host, such as an animal, and *in vitro* status diseases are cultured outside of a host, such as in a Petri dish or solid agar medium.

The purpose of containment is to reduce or eliminate exposure of laboratory workers, other persons, and the outside environment to potentially hazardous biological agents. Primary containment, the protection of personnel and the immediate laboratory environment from exposure to infectious agents, is provided by both good microbiological technique and the use of appropriate safety equipment.

The general characteristics of the BSLs and ABSLs are summarized in Tables 1-1 and 1-2, shown on the pages 1-5 and 1-6.

1.3 History of the University of Hawaii

The UH was founded in 1907 as the College of Agriculture and Mechanic Arts in Honolulu. In 1912, it was renamed and moved to its present location in Oahu's Manoa Valley, and by 1920, the institution gained university status and was officially re-named the 'University of Hawaii.' Today, the UH consists of 10 campuses spread over four islands.

The John A. Burns School of Medicine includes the Department of Tropical Medicine, Medical Microbiology and Pharmacology (TMMMP). Faculty take a multidisciplinary approach to the study of infectious organisms and the diseases they cause. Research areas include immunology, ecology, epidemiology, diagnosis, prevention, control, treatment, socio-ecological systems, human ecology, microbial and vector ecology, as well as environmental change.

TABLE 1-1: SUMMARY RECOMMENDED BIOSAFETY LEVELS FOR INFECTIOUS AGENTS

BSL	AGENTS	PRACTICES	PRIMARY BARRIERS AND SAFETY EQUIPMENT	FACILITIES (SECONDARY BARRIERS)
1	Not known to consistently cause diseases in healthy adults	Standard Microbiological Practices	None required	Open bench and sink required
2	▪ Agents associated with human diseases ▪ Routes of transmission include percutaneous injury, ingestion, mucous membrane exposure	BSL-1 practice plus: ▪ Limited access ▪ Biohazard warning signs ▪ "Sharps" precautions ▪ Biosafety manual defining any needed waste decontamination or medical surveillance policies	Primary barriers: ▪ Class I or II BSCs or other physical containment devices used for all manipulations of agents that cause splashes or aerosols of infectious materials PPEs: ▪ Laboratory coats; gloves; face protection as needed	BSL-1 plus: ▪ Autoclave available
3	▪ Indigenous or exotic agents with potential for aerosol transmission ▪ Disease may have serious consequences	BSL-2 practice plus: ▪ Controlled access ▪ Decontamination of all waste ▪ Decontamination of laboratory clothing before laundering ▪ Lab worker baseline serum tests	Primary barriers: ▪ Class I or II BSCs or other physical containment devices used for all open manipulations of agents PPEs: ▪ Protective laboratory coats; gloves; respiratory protection as needed	BSL-2 plus: ▪ Physical separation from access corridors ▪ Self-closing, double-door access ▪ Exhaust air HEPA filtered and not recirculated within lab ▪ Negative airflow into laboratory ▪ Other requirements outlined in the BMBL
4	▪ Dangerous/exotic agents which pose high risk of life-threatening disease ▪ Aerosol-transmitted laboratory infections have occurred; or related agents with unknown risk of transmission	BSL-3 practice plus: ▪ Clothing change before entering ▪ Shower on exit ▪ All material decontaminated on exit from facility	Primary barriers: ▪ All procedures conducted in Class III BSCs or Class I or II BSCs in combination with full-body, air-supplied, positive pressure personnel suit	BSL-3 plus: ▪ Separate building or isolated zone ▪ Dedicated supply and exhaust, vacuum, and decontamination systems ▪ Other requirements outlined in the BMBL

TABLE 1-2: SUMMARY OF RECOMMENDED BIOSAFETY LEVELS FOR ACTIVITIES IN WHICH EXPERIMENTALLY OR NATURALLY INFECTED VERTEBRATE ANIMALS ARE USED

ABSL	AGENTS	PRACTICES	PRIMARY BARRIERS AND SAFETY EQUIPMENT	FACILITIES (SECONDARY BARRIERS)
1	Not known to consistently cause diseases in healthy adults	Standard animal care and management practices, including appropriate medical surveillance programs	As required for normal care of each species	Standard animal facility: ▪ No recirculation of exhaust air ▪ Directional air flow recommended ▪ Hand washing sink is available
2	▪ Associated with human disease ▪ Hazard: percutaneous exposure, ingestion, mucous membrane exposure	ABSL-1 practice plus: ▪ Limited access ▪ Biohazard warning signs ▪ "Sharps" precautions ▪ Biosafety manual ▪ Decontamination of all infectious wastes and of animal cages prior to washing	ABSL-1 equipment plus primary barriers: ▪ Containment equipment appropriate for animal species PPEs: ▪ Laboratory coats; gloves; face and respiratory protection as needed	ABSL-1 plus: ▪ Autoclave available ▪ Hand washing sink available ▪ Mechanical cage washer recommended
3	▪ Indigenous or exotic agents with potential for aerosol transmission ▪ Disease may have serious health effects	ABSL-2 practice plus: ▪ Controlled access ▪ Decontamination of clothing before laundering ▪ Cages decontaminated before bedding removed ▪ Disinfectant foot bath as needed ▪ All wastes are decontaminated before removal from facility	ABSL-2 equipment plus: ▪ Containment equipment for housing animals and cage dumping activities ▪ Class I, II, or III BSCs available for manipulative procedures (inoculation, necropsy) that may create infectious aerosols PPEs: ▪ Appropriate respiratory protection	ABSL-2 facility plus: ▪ Physical separation from access corridors ▪ Self-closing, double-door access ▪ Sealed lab penetrations ▪ Sealed windows ▪ Autoclave available in facility ▪ HEPA filtered exhaust air
4	▪ Dangerous/exotic agents that pose high risk of life threatening disease ▪ Aerosol transmission, or related agents with unknown risk of transmission	ABSL-3 practice plus: ▪ Entrance through change room where personal clothing is removed and laboratory clothing is put on; shower on exit	ABSL-3 equipment plus: ▪ Maximum containment equipment (i.e., Class III BSC or partial containment equipment in combination with full body, air-supplied positive-pressure personnel suit) used for all procedures and activities	ABSL-3 facility plus: ▪ Separate building or isolated zone ▪ Dedicated supply and exhaust, vacuum, and decontamination systems ▪ Other requirements outlines in the text

2. PURPOSE OF AND NEED FOR ACTION

2.1 Purpose of and Need for Action

The National Institutes of Health (NIH) network of biocontainment laboratories, including the proposed University of Hawaii Pacific Health Research Lab (PHRL), contributes to increasing the safety and security of the United States of America (U.S.), and the State of Hawaii. The PHRL would contribute to the development of knowledge of pathogens and their prevention and treatment. The geographic location of Hawaii increases the State's susceptibility to the introduction of exotic pathogens from travelers. Research at the PHRL would focus on exotic pathogens with Asia-Pacific origins, where many of the world's emerging infectious diseases originate.

The purpose of the PHRL is to directly support National Institute Allergy and Infectious Diseases (NIAID) and its goal of supporting basic and applied research leading to the development of medical countermeasures and diagnostic methods against biological agents. Research activities at the PHRL would focus on the development of rapid and more accurate diagnostic tests, drugs, and vaccines for emerging and re-emerging infectious diseases. UH would utilize the PHRL to conduct research with a focus on disease agents of the Asia-Pacific region that may be introduced to Hawaii by national and international travelers. The PHRL would provide research and diagnostics support to the UH, the State DOH, the U.S. Department of Defense, the NIH, the Federal Centers for Disease Control (CDC), the U.S. Federal Bureau of Investigation, and private biotech companies.

NIAID has recognized that there is a serious nationwide shortage of biological containment facilities equipped with the necessary laboratories and equipment for handling infectious agents that could threaten human health. This condition presents a significant impediment to research on infectious diseases, and poses a critical threat to national security.

Because of its strategic geographic location, Hawaii serves as a natural sentinel post from which to monitor the emergence and spread of infectious diseases in the Asia-Pacific region. Also, because of the heavy tourist traffic from Asia and elsewhere, and the substantial presence of military forces who are frequently deployed throughout the world, Hawaiʻi is at high risk for introductions of exotic infectious diseases. A multi-user, "state-of-the-art" biocontainment laboratory in Hawaiʻi is urgently needed to support biodefense and emerging infectious diseases research and surveillance.

The proposed PHRL will serve to fulfill NIAID's mission to develop a network of biocontainment laboratories to address regional needs for emerging infectious disease research and to serve as a regional resource for national emergencies. In addition, the PHRL will respond to needs of federal and state agencies within the State of Hawaiʻi, including UH, the State DOH, U.S. Pacific Command (PACOM), Tripler Army Medical Center (TAMC), the Navy Medical Research Unit 2 –Pacific (NAMRU-2), and the CDC.

2.2 Scope of this Document

As the proposed PHRL project will utilize State funds, this EA is subject to the environmental documentation requirements prescribed under Chapter 343, Environmental Impact Statements, Hawaii Revised Statutes (as amended) and Hawaii Administrative Rules Chapter 200, Title 11, of the State of Hawaii Department of Health (as amended).

The purpose of this Environmental Assessment (EA) is to evaluate potential impacts associated with the construction and operation of a RBL by the University of Hawaii in Kalaeloa, Hawaii.

3. PROJECT LOCATION

3.1 Project/Facility Location

The proposed project site is located on an approximately two-acre portion of the northeast corner of the 147 acre Hawaii Army National Guard (HIARNG) Compound at Kalaeloa, the former Barbers Point Naval Air Station (BPNAS) (see Figure 3-1). UH is working with the HIARNG to have the site removed from HIARNG's current license with the U.S. Army and subsequently leased to University of Hawaii (UH) for the proposed University of Hawaii Pacific Health Research Laboratory (PHRL).

3.2 Existing Uses

The lands within Kalaeloa are owned by various Federal, State, and County agencies. In 1993, the U.S. Department of Defense, through the Base Realignment and Closure (BRAC) process, designated BPNAS for closure. As part of the closure process, roughly 1,050 acres were retained by the Navy, 472 acres were declared as excess and transferred to other Federal agencies and the remaining 2,165 acres were declared as surplus, making them available for conveyance to State and local government agencies. Of the land retained by the Navy, approximately 675 acres have been set aside for transfer or brokered sale to support development at Ford Island in Pearl Harbor. As a former defense installation, Kalaeloa retains a military base atmosphere with several former U.S. Navy buildings being reused for other purposes.

The proposed site is a large but lightly used parking lot next to the Seafarer's Center, a merchant seaman training facility that leases property from the HIARNG. To the south of the site is HIARNG's Building 282, an aircraft hangar built by the Navy in 1958. HIARNG plans to renovate Building 282 and use it as an Aviation Resource Center to house firefighters, medical command, and other units related to the HIARNG's aviation mission. HIARNG's Civil Support Team (CST) is housed in a smaller, one story structure to the east of the structure identified by HIARND as "Building 282" (HIARNG, 2010). HIARNG plans to construct a new Brigade Resource Center, and an Army Aviation Support Facility on the extensive paved area surrounding Building 282 to the west and south. The area to the north of the site across Independence Avenue is private property owned by Carmel Partners, a real estate holding company based out of California. The lot immediately adjacent to the project site is vacant, however rental housing and a small daycare center are neighboring uses found further to the north. A HIARNG paved parking area used primarily during weekends by troops participating in drills lies east of the project site.

3.3 Surrounding Uses

The proposed project site falls within the Kalaeloa Community Development District, comprised of 3,695 acres in West Oahu, and is bounded by the Pacific Ocean and lands within Roosevelt, West Permiter, East Hansen, and Essex Roads in addition to four parcels within Campbell Industrial Park (see Figure 3-2).

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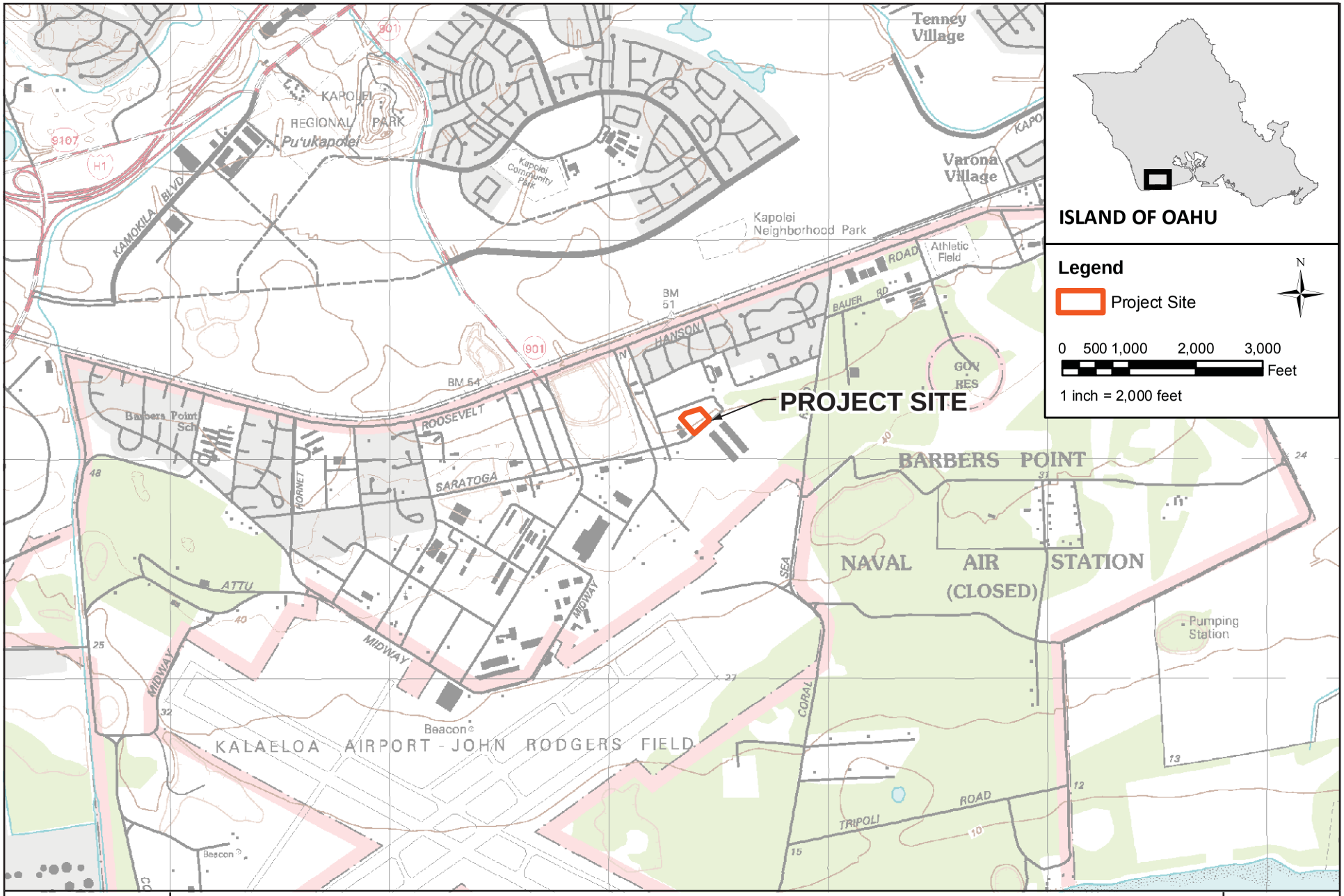


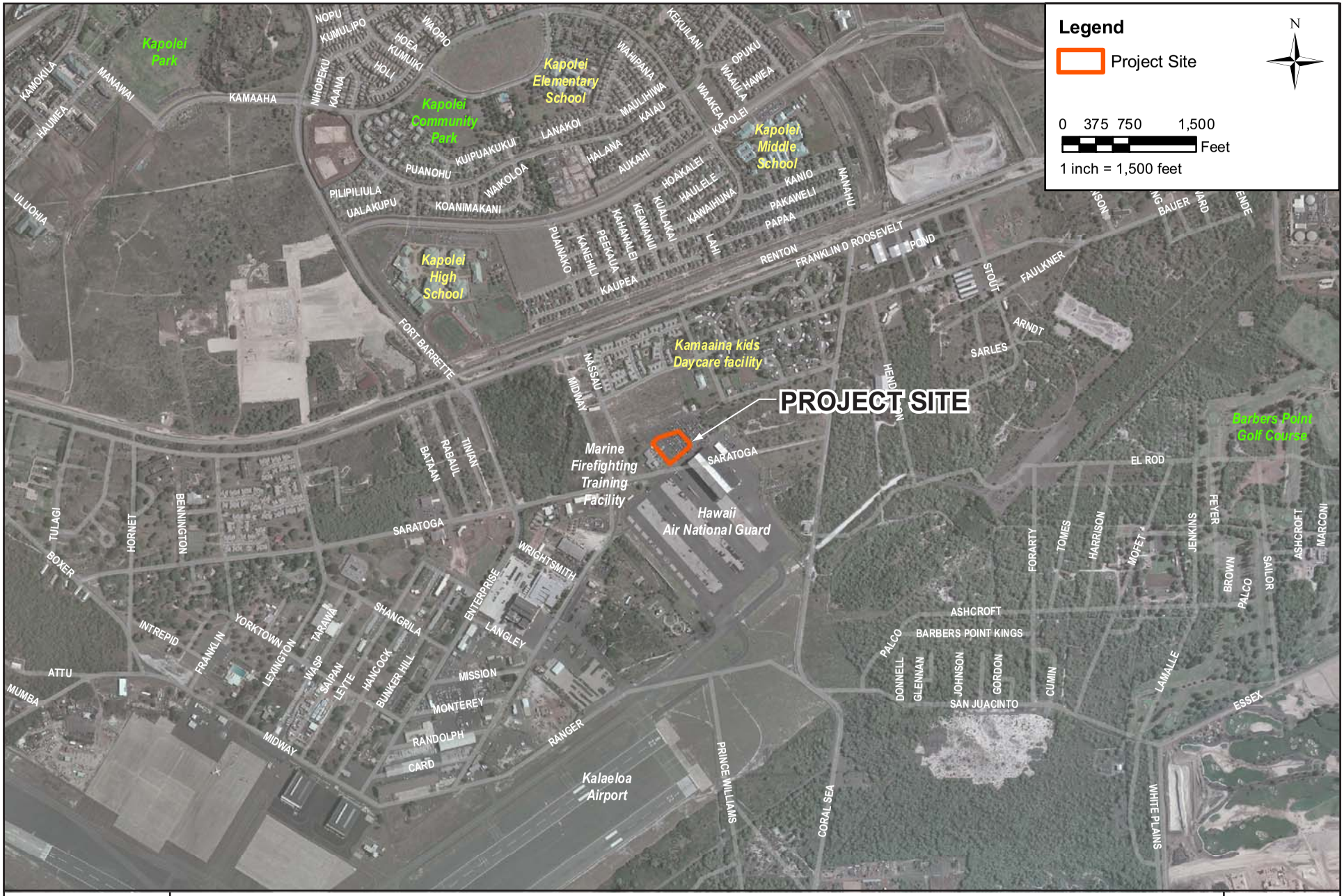
WILSON OKAMOTO CORPORATION
ENGINEERS • PLANNERS

UNIVERSITY OF HAWAI'I PACIFIC HEALTH RESEARCH LAB

LOCATION MAP

FIGURE 3-1

W:\8301-01\Planning\Graphics\Draft EA (343+NEPA)



WILSON OKAMOTO CORPORATION
ENGINEERS • PLANNERS

UNIVERSITY OF HAWAI'I PACIFIC HEALTH RESEARCH LAB

SURROUNDING LAND USE MAP

FIGURE 3-2

Nearby uses within 500 feet of the subject project site include a Marine Firefighting Training Facility, under the direction of the Seafarer's International Union, and a Preschool/Daycare center operated by Kamaaina Kids. Kapolei High School, the closest school campus operated by the State Department of Education, is situated approximately 2000 feet from the project site.

The Hawai'i Community Development Authority (HCDA), a state agency charged with overseeing redevelopment in different locations, administers Kalaeloa. HCDA envisions the future of Kalaeloa as a mixed-use urban development.

West Oahu and the community of Kapolei have experienced significant residential, commercial, and institutional growth over the past decade. The City and County of Honolulu has placed several government offices in this area, and UH is building a new West Oahu campus, intended to be a four-year collegiate educational institution that will offer several degree programs. A new rapid transit rail line is also being constructed to link this area with central Honolulu.

Future planned development in the Kalaeloa Community Development District encompasses a range of several large institutional development projects, including a new Tripler Army Medical Center outpatient clinic, a new 150,000 square foot Federal Bureau of Investigation (FBI) office and training center, a solar farm, and plans for a new Veterans' Administration clinic.

4. PROPOSED ACTION

4.1 Proposed Action

The University of Hawaii (UH), in partnership with the National Institutes of Health (NIH), proposes to construct and operate the University of Hawaii Pacific Health Research Laboratory (PHRL) on an approximately 2 acre site in Kalaeloa, Oahu. The PHRL would be part of a national network of regional labs devoted to research and detection of emerging infectious diseases.

Pathogen focus areas will include Dengue, West Nile, Avian Influenza, Japanese Encephalitis, Chikungunya, and various other zoonotic viruses. Research would also be done on *tuberculosis* and *streptococcus areus*. Most *in vivo* experiments will involve rodents.

4.2 Facility Location

The proposed site, shown in Figure 3-1, encompasses approximately two acres in the northeast corner of HIARNG's 147 acre compound at Kalaeloa. The proposed site currently encompasses a large, but lightly used parking lot next to the Seafarer's Center, a merchant seaman training facility that occupies land leased from the HIARNG. To the south of the site is HIARNG's Building 282, an aircraft hangar built by the Navy in 1958.

4.3 Facility Description

UH proposes to design, construct, commission, and operate an approximately 31,179 square feet biocontainment laboratory at the Kalaeloa Community Development District on the island of Oahu that meets all of the stated requirements of the NIH-RFA-AI-04-032.

The PHRL would be a stand-alone structure in a secure setting capable of fulfilling the University's infectious disease research agenda, its local and regional partners' needs for high-containment facilities, and the NIH's Biodefense Research Agenda. The project will be programmed in accordance with applicable County, State, and Federal codes and guidelines.

A conceptual site design and building design were prepared to assess the potential for the proposed site to accommodate the UH PHRL. These concepts were based on a previous set of designs being reviewed when the UH PHRL was being planned for Kakaako. The concepts presented do not represent the specific footprint or layout desired for the UH PHRL, but rather the approximate size and array of facilities envisioned for it.

The design concept provided includes 31,179 GSF with a one-story footprint of 21,072 GSF and 10,107-GSF mechanical penthouse above the main lab area. The design concept includes seven ABSL-3 labs (including four ABSL-3 holding rooms), four BSL-3 labs, and two BSL-2 labs. The design concept also includes a physical plant, animal care support facilities, an insectary, and administrative and storage areas.

4.4 UH PHRL Design and General Building Components

4.4.1 Animal Holding Facilities

The building would include a self supporting animal facility, which would serve and house the animals required for research. The animal space would include a small vivarium, four ABSL-3 animal holding rooms, and a quarantine holding room. The design, construction, and operation would comply with the *Animal Welfare Act* (9 CFR Subchapter A, Parts 1-4); the latest edition of the *Guide for the Care and Use of Laboratory Animal Resources*, for accreditation by the Association for Assessment and Accreditation of Laboratory Animal Care International (AAALAC), and the BMBL (University of Hawaii 2006b).

4.4.2 BSL-2 Laboratories

The BSL-2 laboratory space would be designed in accordance with the BMBL. BSCs would have High Efficiency Particulate Air (HEPA)-filtered exhaust. This space would primarily be used to support the BSL-3 laboratories for activities, such as glasswear washing, chemical dispensing and reagent storage, and package accessioning (University of Hawaii 2006b).

4.4.3 BSL-3 Laboratories

The BSL-3 laboratory space would be designed in accordance with the BMBL. The BSL-3 suite would include four BSL-3 laboratory rooms, a gown-in room, a change/shower out room, a vestibule, and a decontamination space for autoclaving. The layout would allow for decontamination of individual labs, if necessary.

4.4.4 ABSL-3 Laboratories

The ABSL-3 Suite would include seven ABSL-3 labs. Included within the suite would be two ABSL-3 animal holding rooms and two ABSL-3 animal holding/procedure rooms. The suite would also include two additional procedure rooms, and another room to support aerobiology procedures. The ABSL-3 suite would include a gowning/shower-in room, a change/shower-out room, and a decontamination area with two autoclaves. The ABSL-3 laboratories would be designed in accordance with the BMBL, and all exhaust air would be HEPA filtered.

4.4.5 Engineering and Logistics

The logistics area would be used for storage, waste removal, and shipment receiving for the UH PHRL. Storage would be provided for clean cages, refrigerated animal food storage, chemicals, bottled gases, linens, housekeeping, and supplies. A clean loading dock and soiled loading dock would be provided so that waste materials can be kept apart from clean materials (University of Hawaii 2006b). The Building Control Center (BCC) would be manned during normal hours of operation, during emergency events, and anytime that personnel are working within the containment laboratories. The BCC would monitor, control, and record the performance of the air systems, the scientific equipment (i.e., freezers, incubators, autoclaves), the fire alarm, utility production and distribution (i.e., power, steam and chilled water), and utility metering. It would also monitor the security systems (in addition to the security office). The logistical support team would work closely with the security office to monitor activity at the loading docks (University of Hawaii 2006b). The UH PHRL would have

redundant (backup) mechanical, electrical, and plumbing systems. All exhaust air from the BSL-3 and ABSL-3 labs would be HEPA-filtered to ensure that no harmful agents are released to the environment. The PHRL's air handling operations would include Heating Ventilation and Air Conditioning (HVAC) systems that are designed to provide for individual temperature and ventilation control zones (University of Hawaii 2006b). The HVAC system maintains proper air flow within the secondary barrier to prevent the release of airborne biological agents from the laboratories. Laboratory air flows from non-laboratory areas of the PHRL (e.g., lobby, offices, etc) to lab areas where manipulation of biological agents would occur (e.g., the BSL-3 and ABSL-3 laboratories), thus preventing movement of air from the laboratories to support areas. There would be no air recirculation from the BSL laboratories to other non-laboratory areas due to the deployment of directional ventilation with a HEPA exhaust filtration system (University of Hawaii 2006b). In addition, the Class II BSCs (where procedures involving infectious pathogens would occur within) would have independently–housed HEPA filters, adding a second mechanism for HEPA filtration in addtion to the PHRL exhaust HEPA filters. The ABSL3 labs will have three layers of HEPA filtration, including filters for each individual sealed cage, a second HEPA filter for the cage rack that holds the individual cages, and the third HEPA filter in the PHRL exhaust system.

The UH PHRL would include a Building Automated System (BAS) that provides control of building system environmental parameters and control set-points. All pressure relationships, temperature controls, filter loading, security, fire, lighting and associated alarms would be controlled and monitored via this central system. It would also be available for remote monitoring and control (University of Hawaii 2006b). The design would incorporate special engineering and design features to prevent microorganisms from being released into the environment and to protect workers in the PHRL. Windows would be sealed, and buildings would have special ventilation systems that keep microbes contained within the PHRL. All work in the BSL-2, ABSL-2, BSL-3 and ABSL-3 laboratories would first be approved by the Institutional Biosafety Committee (IBC) and reviewed and monitored by the UH Biosafety Officer.

The PHRL would include an entrance lobby where a security guard would monitor entrance to and exit from the lab, offices for dedicated PHRL workers, storage space for supplies, a secure loading dock, and a physical plant for the chillers, boilers, electrical panels, and other components of the mechanical, electrical, and plumbing systems.

4.4.6 Mechanical/Electrical Systems (Physical Plant)

Mechanical systems and equipment for this facility would be designed to satisfy all applicable Federal, State, local and UH standards as well as requirements for BSL-3 and ABSL-3 facilities, as documented in the latest versions of the CDC/NIH *Biosafety in Microbiological and Biomedical Laboratories* (BMBL) and *NIH Design Requirements Manual*. The mechanical design would include, but would not be limited to, the following containment practices:

- Each laboratory room would be provided with a hand washing sink with capability for hands-free operation.

- The containment area would be continuously maintained at a negative pressure relative to the adjacent areas. A visual monitoring system would be provided at the entrance to the containment space for verification of proper pressurization.
- All exhaust air from the BSL-3 and ABSL-3 spaces would be exhausted through HEPA filters prior to being released from the stacks.
- All mechanical penetrations into BSL-3 and ABSL-3 containment areas would be adequately sealed to ensure piping, ductwork, and controls penetrations are gas tight.
- Redundant mechanical systems for BSL-3 and ABSL-3 containment areas would be provided to ensure that continuous pressure and temperature control is maintained.
- All vacuum systems would be portable.

The electrical systems and equipment for this facility would be designed to satisfy all applicable Federal, State, local and UH standards as well as requirements for BSL-3 and ABSL-3 facilities as specified in the CDC/NIH *Biosafety in Microbiological and Biomedical Laboratories*, and *NIH Design Policy and Guidelines* documents.

Electricity is currently provided to the project site by the U.S. Navy, however once the HECO's Enterprise Energy Corridor project is completed, the site will be served by HECO.

A standby diesel generator would be provided to serve all life safety loads (e.g., egress lighting, fire alarm system), critical use loads (e.g., security and closed circuit TV system, access control system, voice and data communication systems, containment area lighting systems, select laboratory equipment, one autoclave, and sample freezers and refrigerators in laboratory areas), and critical heating, ventilation, and air conditioning (HVAC) and mechanical loads (e.g., HVAC control system, biocontainment area supply air handlers and exhaust systems, pumps to support building heating and cooling systems, HVAC controls, and fume hoods) in the event of a power outage. The generator would be capable of providing power to the facility for 48 hours at full load in accordance with the standby power standards required by the NIH.

4.4.7 Security Systems

An independent Facility Threat Risk Assessment (TRA) will be prepared to guide the PHRL design process and determine the appropriate physical and operational measures needed to ensure security. The TRA will address perimeter and internal building security, and recommend the appropriate system of biometric devices, video surveillance, employee and visitor screening, access control, and other measures for round-the-clock (24 hours a day, seven days a week, 365 days a year) security.

4.5 PHRL Operations

The over-riding functions of the PHRL are to:

- Conduct infectious diseases research. These studies would include the use of small animals, primarily mice, rats, and other rodents.
- Conduct aerosol challenge experiments for diseases transmitted via aerosolized particles, such as tuberculosis. In support of this research, a static-dynamic aerosol chamber would be located inside an ABSL-3 lab suite. This chamber is equivalent to Class III Biological Safety Cabinets (BSCs) designed for maximum containment.

- Create and test vaccines under strict biocontainment facilities and procedures. To conduct the experiments and test new vaccines, all hazardous operations would be strictly controlled inside enhanced containment facilities. The facilities would have HEPA filtered supply and exhaust, directional airflow and pressure gradients, tight construction of materials and seals, solid sterilization equipment, use of Class II and III (glove box) BSCs and procedures that control and maintain safety.

Chemical analysis will not be conducted in the UH PHRL. The only chemicals that will be used are those that are commonly used in microbiology laboratories, and those in very small amounts.

Solid wastes generated at the UH PHRL requiring decontamination would be autoclaved before leaving the biocontainment area, and sent to the H-Power solid waste incinerator at Campbell Industrial Park. Wastes generated from equipment usage would be disinfected using Chlorine Dioxide, formaldehyde, or vaporized hydrogen peroxide (VHP) gas.

Laboratories within the biocontainment zones would be designed with isolation valves and service penetrations and materials capable of withstanding gaseous decontaminations.

Approximately twenty staff would be employed at the UH PHRL.

All technical and maintenance staff would be trained in the safe operation of a BSL-3 laboratory.

The organizational structure of the UH PHRL is diagramed (see Figure 4-1).

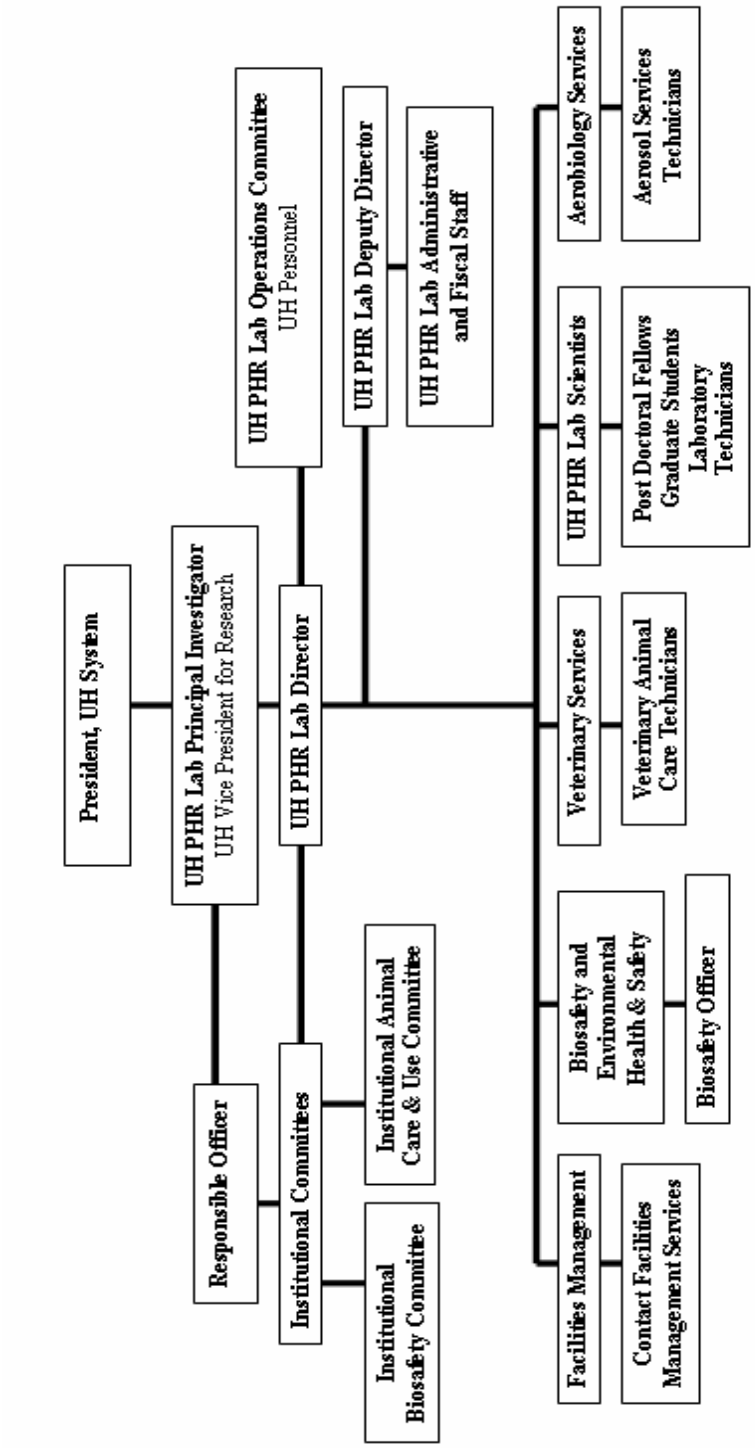
4.6 No Action Alternative

Under the No Action Alternative, the proposed PHRL at Kalaeloa would not be constructed. Existing biomedical research at the UH, including work performed in current BSL facilities, would continue depending upon research funding and work prioritization. However, the NIH's ability to counter the strategic national shortage of biological containment facilities, and Hawaii's ability to respond to a significant outbreak of infectious disease, would be compromised under the No Action Alternative.

4.7 Alternatives Eliminated from Detailed Consideration

Reasonable alternatives are those that may be feasibly carried out based on technical, economic, environmental and other factors, and meet the purpose and need for the proposed action. There were at least three adequate sites for the proposed PHRL ranging from previously developed land to available green space adjacent to existing research facilities. The proposed Kalaeloa site was selected for the UH PHRL as the result of a site evaluation and selection process after restraints were placed on the original grant application site at the University Of Hawaii John A. Burns School Of Medicine, as well as at Waimano, both discussed below (University of Hawaii 2006b). The following alternatives were considered and eliminated from detailed study.

Figure 4-1: UH PHRL Organizational Structure



4.7.1 University of Hawaii John A. Burns School of Medicine

The JABSOM Campus at Kakaako was dismissed after the UH's new Cancer Research Center of Hawaii (CRCH) 150,000 sq ft building was designated to be built at the Kakaako campus on an area intended for the PHRL. Planning and design work for the PHRL (previously called the PacRBL) at Kakaako had been underway during 2007 – 2008, however the State's fiscal crisis in 2008 prevented them from releasing $12.5 million of State funds appropriated for the project. The PHRL project was suspended until additional matching funds could be secured. In the meantime, the CRCH project needed to move ahead in order to not jeopardize the cigarette tax revenue that would support its construction. The Kakaako site was the only practical site under UH control for the CRCH project.

4.7.2 Waimano Ridge Site

This alternative site was dismissed due to lack of sufficient infrastructure on Waimano Ridge. The Waimano site would have required an estimated $38 million in infrastructure upgrades (i.e., new roadways, water, sewer and electrical improvements) before the UH PHRL could be built there (University of Hawaii 2006b; Ohira 2006). There was concern over whether the infrastructure work could be funded and completed in time for the UH PHRL to begin operations.

4.7.3 Tripler Army Medical Center

This alternative site was dismissed due to lack of sufficient electrical and sewer capacity at the Tripler Army Medical Center (TAMC). The costs of upgrading these systems are well beyond the budget of the PHRL and other sources of funding were not identified.

4.7.4 Manoa Campus of UH

The University of Hawaii at Manoa Campus was also dismissed as a potential site due to the lack of available space to construct the PHRL

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5. AFFECTED ENVIRONMENT AND ENVIROMENTAL CONSEQUENCES

This chapter describes the existing environment, potential project impacts, and the proposed mitigation for the development of the University of Hawaii Pacific Health Research Laboratory (PHRL). The discussion of environmental impacts includes direct, indirect, and cumulative impacts.

5.1 Topography, Geology, and Soils

5.1.1 Topography

Kalaeloa occupies a region approximately three (3) miles in length and two (2) miles in width, covering an area of approximately 3,700 acres just south of the City of Kapolei along the southwestern shore of Oahu on the Ewa plain, approximately 16 miles west of downtown Honolulu. Elevations fluctuate throughout Kalaeloa, varying from sea level along its southern coastal boundary to over 50 feet above sea level at its northern end. Kalaeloa is generally flat, with an average slope of roughly 0.5 percent.

Topographic features unique to Kalaeloa region are its sinkholes, or natural cavities formed in the emerged coralline reef upon which the region lies. These sinkholes were formed by centuries of groundwater movement, which has enlarged and altered the original reef structure underlying the region. No sinkholes, however, are present on the grounds of the project site.

Impacts and Mitigation Measures

Proposed Action: No significant impacts to topographic landforms found on or near the project site are anticipated to result from the development and operation of the proposed PHRL.

No Action Alternative: Under the No Action Alternative, the proposed PHRL would not be developed and regional topography would remain unchanged. Consequently, topographical resources would not be impacted.

5.1.2 Geology and Soils

The Ewa plain is composed of an ancient emergent coral-algae calcareous reef that was formed in the Pleistocene Period. Classified as Lualualei-fill land-Ewa Association, and shaped by a series of weathering factors to form a hard yet extremely permeable surface, the soil that covers the Ewa plain is generally reddish brown in color, and is characteristically accommodative of plant life. The underlying structure of the landform is rock, generally classified as coral limestone or coral limestone breccias, interlaid by alluvium, consisting of mud and clays.

Soil is scarce at Kalaeloa, accounting for a thin layer covering the coral outcrop, with sparse collections found in cracksand holes (USDA 1972). Below the soil and caprock is a layer of basal basalt formed by Waianae and/or Koolau volcanic activity.

The proposed project site is perched on a coral outcrop (CR) consisting of coral or cemented calcareous sand. CR makes up approximately 80 to 90 percent of the area. The remaining 10 to 20 percent consist of a thin layer of friable, dark red soil found within the cracks and depressions of the coral outcrop. This soil type is classified as mamala stony silty clay loam. Figure 5-1 depicts regional soil type distribution.

Information specific to onsite soils was obtained from the United States Department of Agriculture's (USDA) Soil Conservation Service (SCS) National Cooperative Soil Survey (NCSS) and Soil Service Geographic Database (SSURGO). There are two types of soils identified on and around the site:

- Coral Outcrop
  - Most common type found on and around the site.
  - The surface texture is bedrock.
  - The soils have clay-like qualities and may be shallow to an impervious layer.
  - Slow infiltration rates and may overlie a high water table.

- Fill land, Mixed
  - Gravelly sandy loam with moderately fine to fine textures and a high corrosion potential.
  - Slow infiltration rates and layers impending downward movement of water.
  - Top layer (0-5 inches) consists of gravelly sandy loam, 5-59 inches consists of fine sandy loam, and 59-70 inches is bedrock.

Impacts and Mitigation Measures

Proposed Action: No significant impacts to geological and soil resources found on or near the project site are anticipated as result of the development and operation of the proposed PHRL.

Construction of the PHRL will comply with or exceed all current building codes, regulations and standards, as applicable. The ability of the proposed facility to withstand seismic events and the associated potential for the proposed improvements to impact regional geology and soils would be evaluated and factored into the design of the PHRL.

Development of the subject property for use will require clearing existing structures and grading for lot preparation. All earthwork will comply with City and County of Honolulu grading regulations.

No Action Alternative: Under the No Action Alternative, the proposed PHRL would not be developed and regional geology, and soils would remain unchanged. Consequently, geological, and soil resources would not be impacted.

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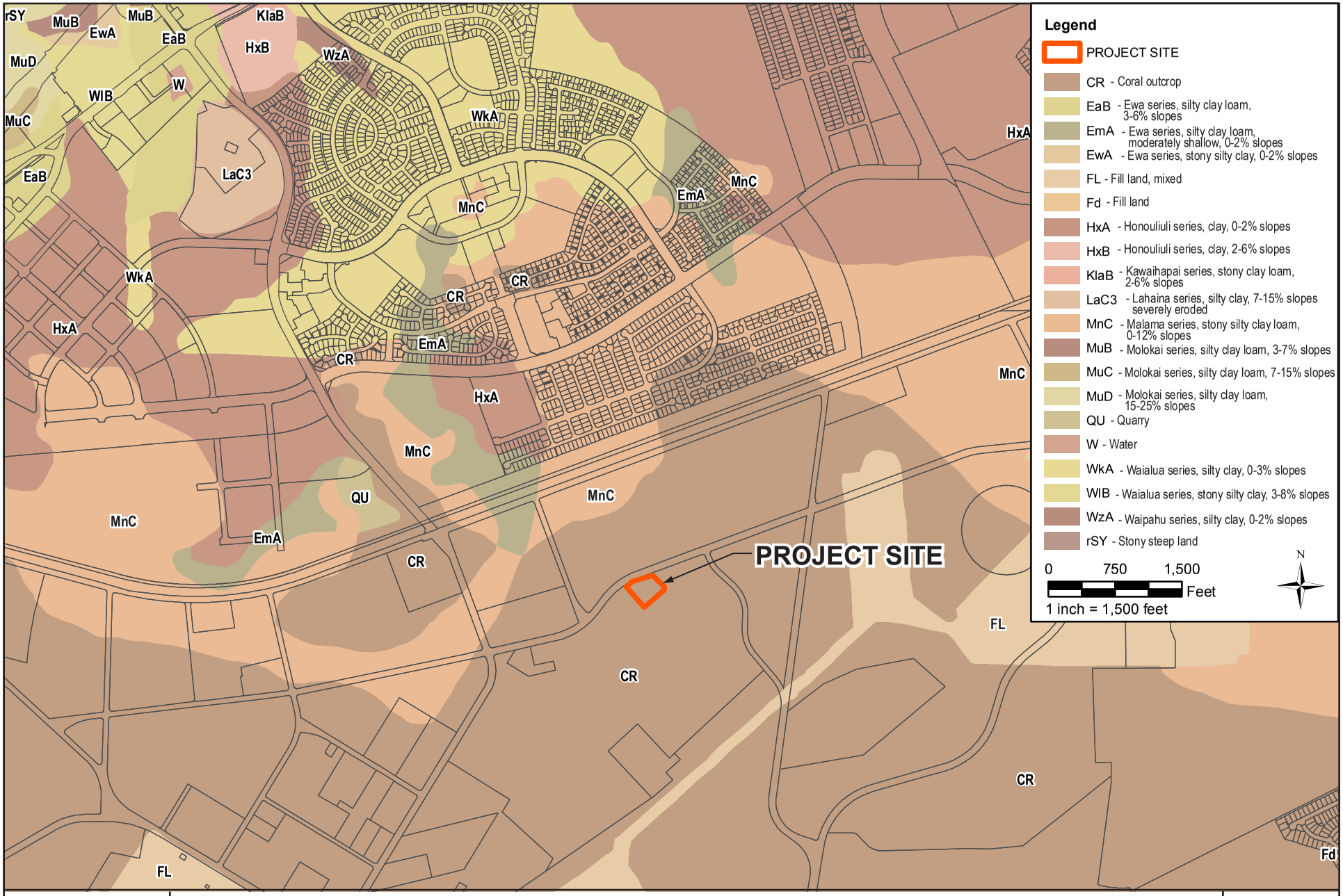

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SOILS MAP

FIGURE 5-1

5.2 Air Quality, Climate, and Greenhouse Gases

5.2.1 Air Quality

Air quality is defined as the ambient air concentrations of pollutants determined by the U.S. Environmental Protection Agency (EPA) to be of concern to the health and welfare of the general public. The State of Hawaii complies with the standards of the Clean Air Act of 1970, as well as the National Ambient Air Quality Standards (NAAQS) for the following designated criteria pollutants:

- ozone (O_3),
- carbon monoxide (CO),
- nitrogen dioxide (NO_2),
- sulfur dioxide (SO_2),
- particulate matter less than 2.5 microns in diameter ($PM_{2.5}$),
- particulate matter less than 10 microns in diameter (PM_{10}), and
- lead (Pb).

Air quality can be impacted by both stationary and mobile sources. Examples of stationary sources include combustion and industrial stacks. Mobile sources include vehicular traffic and aircraft. Areas that exceed ambient air quality standards are designated as nonattainment areas and areas that comply with ambient air quality standards are designated as attainment areas. Areas without data to determine whether they are in attainment or nonattainment status are considered unclassified and are assumed to be in attainment.

The DOH Clean Air Branch regulates stationary sources of air pollutants and issues permits. Permits limit emissions of pollutants and require monitoring. The State does not regulate mobile sources; however, these sources must meet NAAQS.

The EPA has classified Oahu as being in attainment of Federal Standards. Winds at the project site are generally northeasterly trade winds. The nearest air quality monitoring station run by the DOH Clean Air Branch is located in Kapolei, and measures CO, NO_2, PM_{10}, $PM_{2.5}$, and SO_2. The Kapolei area is in attainment with both the Hawaii Ambient Air Quality Standards (HAAQS) and NAAQS for all criteria pollutants.

<u>Sources of Emissions</u>: Existing emissions at Kalaeloa originate from mobile and stationary-type sources including engines, boilers, and generators. Also, Kalaeloa is situated to the west of Campbell Industrial Park (CIP), the largest industrial park in the State of Hawaii. Though stationary-source air pollutant emitters are concentrated in this area, the Department of Health (DOH) Clean Air Branch determined that the facilities found in this area meet Federal and State standards. CIP lies downwind of Kalaeloa during typical trade wind conditions, dispersing air pollution rapidly away from the proposed project site.

Impacts and Mitigation Measures

Proposed Action: Throughout the duration of site preparation and construction, the use and operation of heavy equipment, delivery trucks, and worker vehicles would generate short-term air emissions. These emissions would be brief and similar to those experienced during any other routine form of construction effort. Under normal trade wind conditions, dust and fumes would be dispersed away from the project site towards the ocean. During occasional Kona winds however, pollutants would be blown landward which would contribute to a temporary, but marginal decline in regional air quality.

Best management practices (BMPs) to control dust during construction would be required by County grading and grubbing permit conditions. BMPs include dust fences to keep the dust on-site, and watering to minimize the amount of dust produced. All construction activities would comply with regulations for fugitive dust control under HAR Section 11-60.1-33 that require reasonable precautions to prohibit visible fugitive dust beyond the property line. If electric power generators are utilized, a stationary source permit would be obtained from the DOH Clean Air Branch.

The implementation of proper operational procedures and engineering measures throughout the course of construction of the PHRL would greatly mitigate any foreseeable short-term air quality impacts. Consequently, no impacts to ambient air quality are anticipated.

All air leaving Bio Safety Level (BSL)-3 laboratories at the PHRL would exit through ductwork containing High Efficiency Particulate Air (HEPA) filters prior to emission through stacks on the building roof. Any biohazardous materials would be manipulated in a Biological Safety Cabinet (BSC), and all exhaust air from such BSCs would be HEPA filtered. Only small amounts of chemicals would be used to sterilize the interior of the PHRL facility and would not result in significant emissions.

The proposed PHRL would employ approximately 20 scientific, technical and support staff. Consequently, due to the limited scale of the actual PHRL staff, their derivative personal vehicle activity would have an extremely minimal effect on air quality.

Shipments to and from the PHRL would result in no discernible effect to air quality.

Emergency power generators would also contribute to localized particulate air emissions, but their sustained operation would not occur on a regular basis. The generators will however be tested on a regular basis to ensure their functionality, but their operation would result in a minimal contribution to air pollution.

No Action Alternative: Under the No Action Alternative, the proposed PHRL would not be developed and regional air quality would remain unchanged.

5.2.2 Climate and Greenhouse Gas Emissions

The warm and dry climate of the proposed project site is typical of the Ewa Plains. The Kalaeloa region experiences relatively small differences in day lengths, solar irradiance, and temperatures. Data from the Western Regional Climate Center (WRCC-2009) collected by the U.S. Magnetic Observatory (the closest climate monitoring station to the site) is available for the period of 1949 to 1960. Based on this data, the region's average annual maximum temperature is 83.7°F, and its average annual minimum temperature is 65.4°F. August is the warmest month with an average maximum temperature of 87.2°F while January is the coolest month with an average minimum temperature of 61.4°F.

The annual average precipitation in the region is 20.4 inches. Most of the precipitation at Kalaeloa occurs during the winter season, from October through March. January is the wettest month, with an average rainfall of 4.5 inches.

The winds at Kalaeloa follow seasonal patterns, with the dominant prevailing winds coming from the northeast or east-northeast direction (i.e., trade winds). These winds occur more than 70% of the time during the year. In the winter season, winds from the southwest (Kona winds) are generated from a low pressure center located northwest of the Hawaiian Islands. Kona winds tend to bring stormy conditions and rain. Variable winds typically range between 5 and 15 miles per hour in the area.

Greenhouse gases (GHG) are components of the atmosphere that trap heat relatively near the surface of the earth, and therefore, contribute to the greenhouse effect and global warming. Most GHG occur naturally in the atmosphere, but increases in their concentration result from human activities such as the burning of fossil fuels. Global temperatures are expected to continue to rise as human activities continue to add carbon dioxide, methane, nitrous oxide, and other greenhouse (or heat-trapping) gases to the atmosphere. Over the past two decades, the Earth's average surface air temperature has increased by about 1.2 to 1.4 degrees F. The extent of climate change effects, and whether these effects prove harmful or beneficial, will vary by region, over time, and with the ability of different societal and environmental systems to adapt to or cope with the change. Human health, agriculture, natural ecosystems, coastal areas and heating and cooling requirements are examples of climate-sensitivity systems.

Impacts and Mitigation Measures

Proposed Action: The construction of the proposed PHRL would constitute a short-term minor increase in the use of fossil fuel and associated GHG emissions during construction. GHG emissions would occur as the result of construction and operation, and would consequently result in the release of approximately 4.02 metric tons, and 1.09 metric tons of equivalent CO2 emissions respectively, as shown in Table 5-1.

TABLE 5-1: GREEN HOUSE GAS EMISSIONS									
Construction Phase									
	Distance/ Operation Miles	**No. Veh**	**Miles/day**	**Days**	**MPG**	**Gallons**	**kg/Gal**	**Kg**	**Metric Tons**
Construction Worker Commute	30	30	900	240	15	14,400	8.8	1,636.36	1.64
Construction Equipment Operation	4	3	0.05	240	100	24,000	10.1	2,376.24	2.38
								Total	4.02
Operations Phase									
PHRLStaff Commute	30	20	600	240	15	9,600	8.8	1,090.67	1.09
								Total	1.09

The Council on Environmental Quality (CEQ) has issued draft guidance on when and how federal agencies should consider GHG emissions and climate change. The draft guidance includes a presumptive effects threshold of 25,000 metric tons of CO2 equivalent emissions from an action (CEQ, 2010). The GHG emissions associated with the proposed construction of the PHRL fall well below the stated CEQ threshold, and would not contribute appreciably to climate change or global warming

No Action Alternative: Under the No Action Alternative, the PHRL would not be constructed and operated. Consequently, no appreciable contribution to climate change or global warming would occur.

5.3 Hydrology

According to the UH Water Resource Research Center's (WRRC) 1990 *Aquifer Identification and Classification for Oahu: Ground Water Protection Strategy for Hawaii* report, the subject project site overlies the Ewa aquifer system of the Pearl Harbor aquifer sector. Two aquifer types exist within this portion of the Ewa aquifer system (see Figure 5-2). The first contains groundwater that is basal and unconfined and found in sedimentary-type geology. Water from this aquifer is not used for drinking or ecological purposes, has a moderate salinity of 1,000 to 5,000 milligrams per liter (mg/l) of chloride, is replaceable, and has a high vulnerability to contamination. The second aquifer type contains groundwater that is basal and confined and found in flank-type geology. It is not used for drinking or ecological purposes, has a low salinity of 250 to 1,000 mg/l of chloride, is irreplaceable, and has a low vulnerability to contamination.

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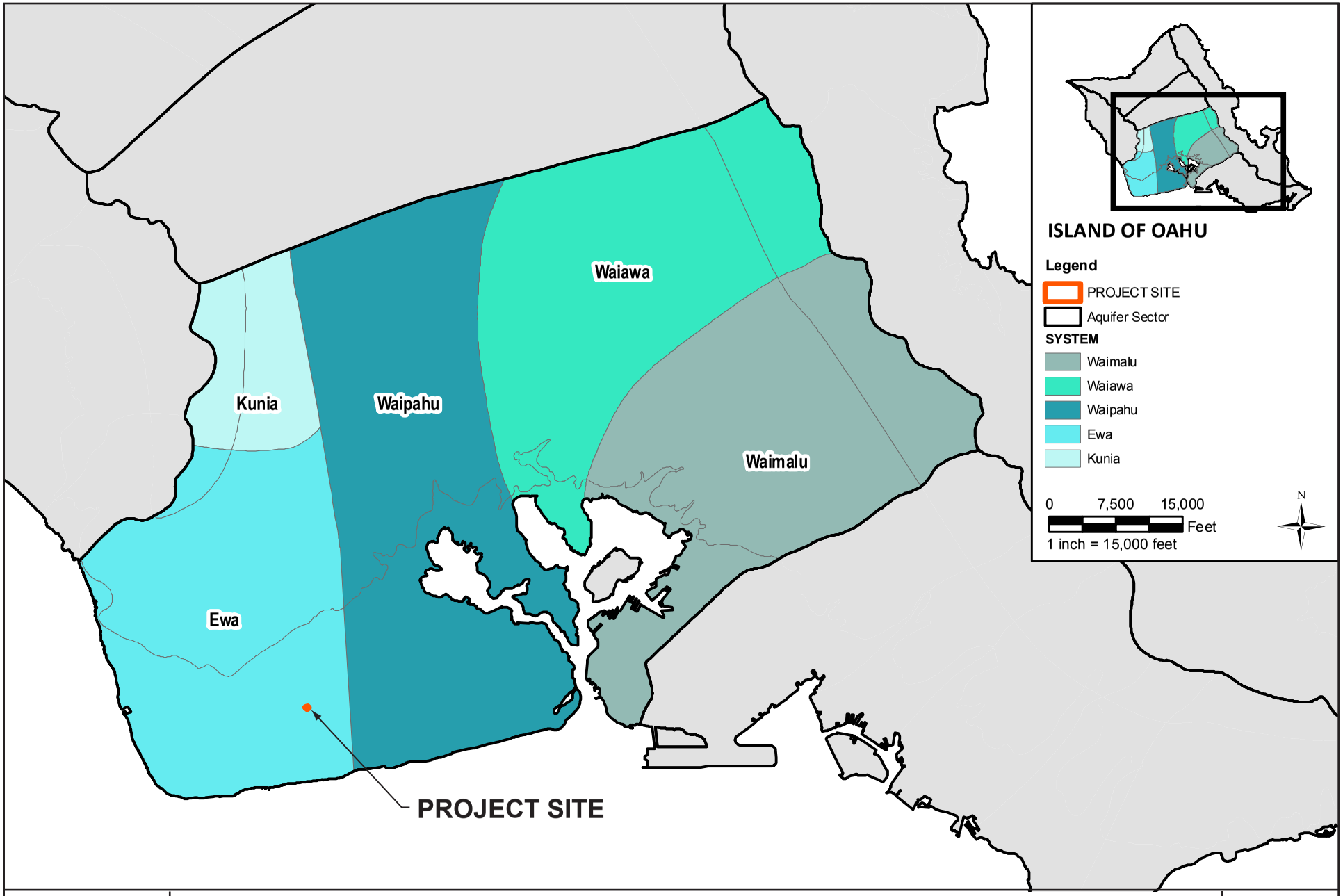

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AQUIFERS MAP BY DEPARTMENT OF HEALTH

FIGURE 5-2

5.3.1 Surface Water

Kalaeloa is near to the Honouliuli and Ewa Beach watersheds. The Honouliuli watershed consists mainly of agricultural and forested land. It drains to the Honouliuli Stream and eventually discharges into the West Loch of Pearl Harbor. Surface water from the Ewa Beach watershed also drains into Pearl Harbor. The low rainfall and high permeability of the soil and caprock allow water to easily infiltrate the ground. The proposed PHRL will be situated just over 6,000 ft from the ocean. Ordy Pond is a perennial pond created by a filled sinkhole, located to the southeast but not on the proposed HIARNG site (U.S. Department of Navy, 1999).

There are no perennial streams, ponds, or other surface water resources on or near the project site.

The annual average precipitation in the region is 20.4 inches (WRCC-2009). Most of the precipitation at Kalaeloa occurs during the winter season, from October through March. January is the wettest month, with an average rainfall of 4.5 inches.

Wetlands: According to Section 404 of the Clean Water Act wetlands are defined as, “areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances to support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.”

The proposed PHRL project site is not located within a floodplain or area designated as, or potentially characterized as a wetland.

The Wild and Scenic Rivers Act (WSRA) was passed on October 2, 1968 and has been amended periodically over the years. (16 U.S.C. §§ 1271-1287, October 2, 1968, as amended 1972, 1974-1976, 1978-1980, 1984, 1986-1994 and 1996.)

The WSRA established a National Wild and Scenic Rivers System for the protection of rivers with important scenic, recreational, fish and wildlife, and other values. Rivers are classified as wild, scenic or recreational. The Act also designated specific rivers for inclusion in the System and prescribes the methods and standards by which additional rivers may be added. The Act contains procedures and limitations for control of lands in federally administered components of the System and for disposition of lands and minerals under Federal ownership. Hunting and fishing are permitted in components of the System under applicable Federal and State laws.

There are no rivers in Hawaii designated as wild and scenic as part of the WSRA, nor are there any rivers or streams on, or nearby the project site. Consequently, the development and operation of the PHRL will not impact areas classified as wetlands.

Impacts and Mitigation Measures

Proposed Action: No adverse effects to surface water resources are anticipated to result from the construction and operation of the proposed PHRL facility. Throughout construction, any potential impacts to surface water resources would be minimized by implementing erosion control and storm water management measures.

No Action Alternative: Under the No Action Alternative, the PHRL would not be developed. Consequently, no adverse impacts to surface water resources would occur.

5.3.2 Coastal Waters

Coastal waters, located approximately one (1) mile to the south of the project site, are classified as Class A Open Marine waters by the State DOH. Class A waters are classified by the DOH with the objective that, "their use for recreational purposes and aesthetic enjoyment be protected" and that, "these waters shall not act as receiving waters for any discharge which as not received the best degree of treatment or control."

Impacts and Mitigation Measures

Proposed Action: Potential water quality impacts to near shore coastal waters during construction of the PHRL will be mitigated by adherence to State and County water quality regulations governing grading, excavation, and stockpiling. Mitigation measures will be instituted in accordance with site-specific assessments, and will incorporate appropriate Best Management Practices (BMPs).

No Action Alternative: Under the No Action Alternative, the PHRL would not be developed. Consequently, coastal waters would not be adversely impacted.

5.3.3 Ground Water and Sole-Source Aquifers

The groundwater beneath Kalaeloa region is found within aquifers that partially comprise the Ewa aquifer system of the Pearl Harbor aquifer sector. A confined aquifer is a deep layer of basalt, as well as a shallow unconfined aquifer in the overlying caprock, and is in direct hydraulic contact with the ocean. While this aquifer qualifies as a source of drinking water under the Federal Safe Drinking Water Act (SDWA), the State of Hawaii has much more stringent standards for salinity and does not recognize it as viable for potable use.

This groundwater in the confined aquifer is brackish with a chloride content ranging from 250 to 1,000 milligrams per liter and considered too deep to be contaminated from the surface. According to the SDWA, this aquifer qualifies as a source of drinking water. However, the State has a more stringent standard for salinity and does not consider this aquifer a source for potable water use.

The shallow aquifer at Kalaeloa is brackish with chloride content ranging from 1,000 to 5,000 milligrams per liter; the water is not suitable for consumption or irrigation without desalination. This aquifer is at approximately 50 feet below ground surface along the northern boundary

and at sea level along the shoreline. The aquifer is susceptible to contamination and no production wells have been developed.

Impacts and Mitigation Measures

Proposed Action: No adverse effects to groundwater resources and sole source aquifers are anticipated to result from the construction and operation of the proposed PHRL facility. Throughout construction, any potential impacts to ground water resources would be minimized through the implementation of applicable BMPs.

No Action Alternative: Under the No Action Alternative, the proposed PHRL would not be developed. Consequently, no adverse impacts to ground water resources and sole source aquifers would occur.

5.3.4 Flood Hazard

The proposed Kalaeloa project site lies within Federal Emergency Management Agency (FEMA) Flood Zone D as shown on the January 19, 2011 Flood Insurance Rate Map (FIRM) panel 15003C0310G (www.fema.gov accessed 4/12/2012) (see Figure 5-3). Flood Zone D is an area in which flood hazards are undetermined because no analysis of flood hazards has been conducted, but which lie outside of the 100-year floodplain. The Flood Insurance Program does not have any regulations for developments within Flood Zone D.

Impacts and Mitigation Measures

Proposed Action: The proposed development and operation of the PHRL will be minimally exposed to flood hazard risk, as the project site is situated outside of the 100-year floodplain. Facility construction is not anticipated to increase the risk of flood inundation or increase the potential for flooding at neighboring properties. Throughout the planning and design phase of development, flood mitigation measures will be implemented as appropriate. The PHRL facility will be designed to avoid, minimize and mitigate adverse impacts related to flood hazard potential, and will consider the construction of safe rooms as part of this mitigation effort.

No Action Alternative: Under the no action alternative, the proposed PHRL would not be developed. The project site, situated outside of the 100-year floodplain, would continue to function as a parking lot, per its existing use.

5.4 Land Use

In 1941, land owner James Campbell leased what eventually became the NASBP to the U.S. Navy (U.S. Navy 1992). NASBP was recommended for closure by the Base Realignment and Closure (BRAC) of 1993, and was officially decommissioned in 1999.

As of 2006, 25 percent (929 acres) of the former NASBP was retained by the Navy, 44 percent (1,621 acres) was conveyed to government or private owners, and 31 percent (1,146 acres) remained pending conveyance (HCDA 2006). In 2010 and 2011, approximately 100 acres of land was conveyed by the U.S. Navy to the HCDA through a public benefit conveyance. (HCDA 2011) The project site is located on a portion of TMK [1] 9-1-013:045

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Source:
Federal Emergency Management Agency, Flood Insurance Rate Map
Panel #: 15003C0310G
dated on 01/19/2011

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FLOOD INSURANCE RATE MAP

FIGURE 5-3

which is currently leased to the HIARNG by the U.S. Army. UH proposes to enter into a 30 year lease for the project site. After this period, a lease extension may be sought contingent upon the need for the PHRL vis a vis other lab capacity at that point in time. Should this lease not be extended, UH will restore the project site to its present environmental condition.

5.4.1 Regional Land Use

Following the closure of Barbers Point Naval Air Station (BPNAS) in 1999, plans were developed to guide future development in the area. In 2000, the Kalaeloa Redevelopment Plan – A Special Area Plan of the Ewa Development Plan, was prepared for the BNAS Redevelopment Commission (R.M. Towill, 2000) and is still in effect. In 2002 the Hawaii state legislature transferred responsibility for Kalaeloa to the Hawaii Community Development Authority (HCDA). HCDA prepared a Master Plan for redevelopment of Kalaeloa that was approved by the HCDA Board and the Governor in 2006 (HCDA 2006). The Master Plan was developed to further guide land use and coordinate Federal, state, government, and private developers with the community (HCDA 2006). The Master Plan envisioned areas of mixed use including residential, an airport, light industrial, eco-industrial, military, institutions, open space, parks, and recreation.

Areas surrounding Kalaeloa are mixed use industrial, commercial, residential and urban. CIP, the island's largest industrial area, is located west of Kalaeloa. In this area is also Barbers Point Harbor. Immediately adjacent to the southwestern portion of the subject site is the Kalaeloa Airport runway. To the south of the subject site the United States Coast Guard Reservation encompasses 44 acres. To the north and east, residential developments are present just beyond areas that may have had developed infrastructure in the past but are presently overgrown with vegetation.

Residential housing in the Ewa region has rapidly expanded since the closure of the Oahu Sugar Company in the early 1990's. Several former military housing developments are located within the former BPNAS boundary (HCDA 2006). Approximately 70,000 people currently reside just east of Kalaeloa, many of them along Fort Weaver Road (HCDA 2006) in the area historically used for sugar cane cultivation. Numerous housing developments are located to the north and east of the proposed Kalaeloa project site including the City of Kapolei and Villages of Kapolei to the North, and Ewa Villages, Ewa Gentry Makai, and Ocean Pointe to the east. Other developments in the vicinity include the Ko Olina Resort and Marina, as well as other municipal and private golf courses.

5.4.2 City and County of Honolulu Zoning

The proposed project site is designated by the City and County of Honolulu as F-1, apart of the Federal and Military Preservation District. Beyond the F-1, Federal and Military Preservation District, neighboring parcels are designated as a mixture of residential, commercial, and open space uses (see Figure 5-4).

Impacts and Mitigation Measures

Proposed Action: The proposed action is consistent with the F-1 land use designation provided for the property in the Kalaeloa Redevelopment Plan. Additionally, the proposed PHRL's development and operation is consistent with the goals and

objectives of the Hawaii State Plan, City and County of Honolulu General Plan, Kalaeloa Master Plan, and Ewa Development plan as noted in Chapter 6: Relationship to Plans and Policies.

No Action Alternative: Under the no action alternative, the proposed PHRL would not be developed. The project site would continue to function as a parking lot, per its current existing use.

5.4.3 Wilderness Areas/National Parks

The Pearl Harbor National Wildlife Refuge (PHNWR), originally established in 1972, is located approximately six (6) miles northeast of Kalaeloa and is situated along the Middle and West Loch of Pearl Harbor. The Kalaeloa Unit of the PHNWR, located at Long Point in Kalaeloa, was established in 2001 during military base closure proceedings (USFWS 2010a). Its supports a unique habitat of anchialine pools, sinkholes and salt water pools in the limestone coral reef that are connected to the ocean through cracks in the substrate. The site is closed to the public and located at the far southwestern corner of the BPNAS, approximately 2 miles from HIARNG facilities and is maintained by USFWS staff of PHNWR.

Impacts and Mitigation Measures

Proposed Action: The development and operation of the proposed PHRL will not adversely impact Wilderness Areas or National Parks, as the proposed project site is far removed from any such resources.

No Action Alternative: As the project site is far removed from any such Wilderness areas or National parks, such resources are not impacted by the scope of its present use, which would continue should the PHRL not be developed, under the no action alternative.

5.5 Visual Resources

The Coastal Review Study, conducted for the City and County of Honolulu in 1987, indicates no significant views near the proposed project site. There are no special scenic vistas or view planes within the vicinity of the Kalaeloa project site. Regional topography is relatively flat and there are no ocean views or views of other special land or architectural features from the proposed project site. In the distance to the north, one can observe the Waianae Mountains which rise to the highest point on Oahu at the summit of Mt. Kaala standing at 4025 ft.; however this view is generally available from virtually any vantage point across Southwestern Oahu. The project area is characterized as flat and open, and has been highly altered by development (see Figure 5-5).

Impacts and Mitigation Measures

Proposed Action: The proposed PHRL Facility will be structurally and aesthetically consistent with current uses surrounding the proposed project site. Consequently, while the construction of the proposed facility will temporarily visually impact the region, in the form of the present construction related equipment and materials, the

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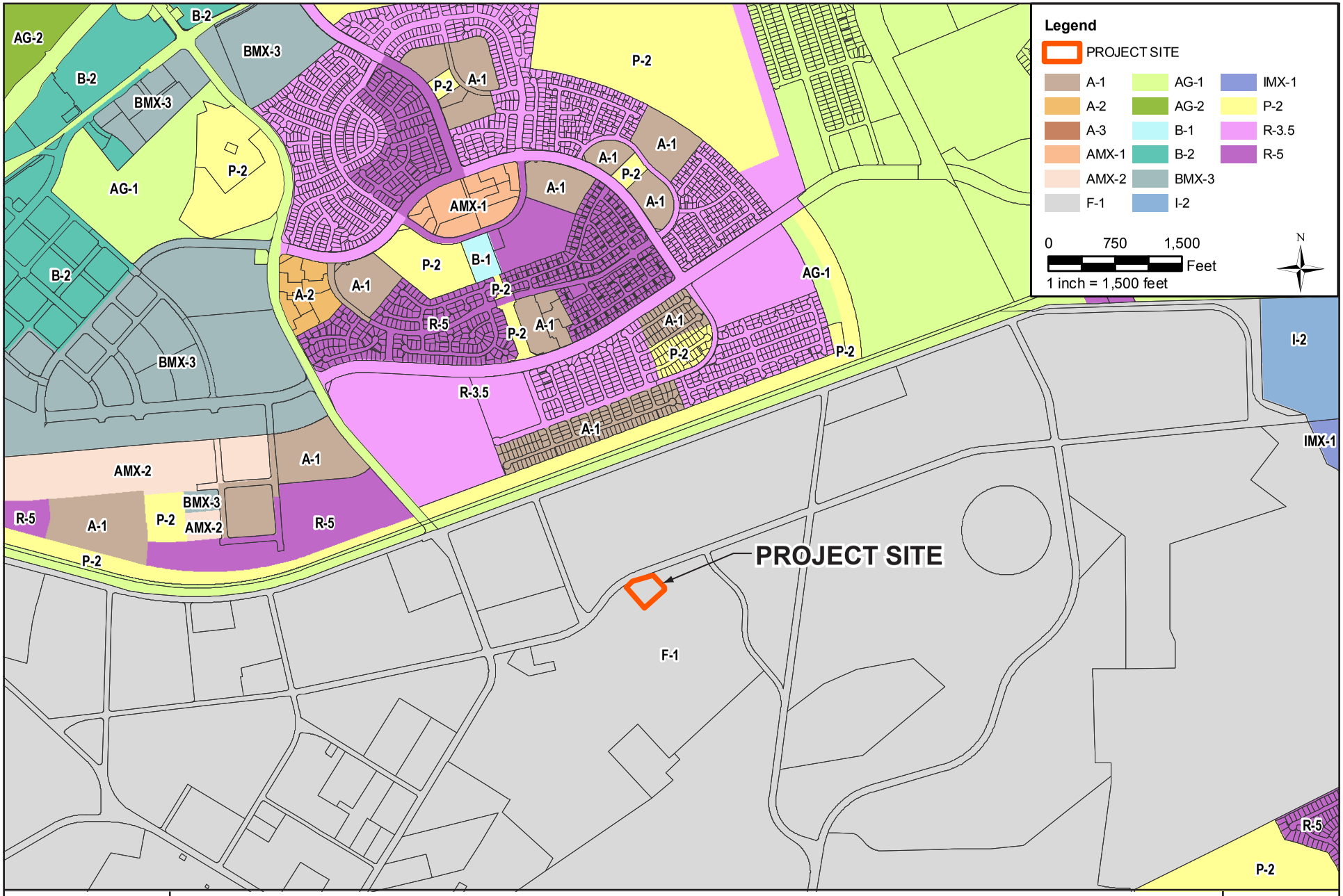

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COUNTY OF HONOLULU ZONING MAP

FIGURE 5-4

completed facility and its ongoing operation will not adversely impact visual resources.

No Action Alternative: Under the No Action Alternative, the PHRL would not be developed. Consequently, there would be no adverse impact to visual resources.

5.6 Biological Resources

Biological resources include living, native, or naturalized plant and animal species in addition to the habitats in which they occur. Plant associations are referred to as vegetation and animal species are referred to as wildlife. Although the existence and preservation of biological resources are intrinsically valuable, these resources also provide aesthetic, recreational, and socio-economic values to society. This analysis focuses on species that are important to the function of the ecosystem, of special societal importance, or are protected under Federal or state law or statute.

5.6.1 Flora

A biological assessment survey of the Project Site was conducted by Rana Biological Consulting, Inc. in March 2012. (See Appendix C)

Three plant species were recorded on the project site; garden spurge (*Euphoribia hirta*), swollen fingergrass (*Chloris barbata*), and Natal redtop (*Melinus reopens*). All three of these plants are naturalized alien species, and are commonly found in ruderal areas across the state.

No listed candidate or proposed threatened or endangered botanical species under either the Federal or State endangered species statutes were recorded during the survey.

Impacts and Mitigation Measures

Section 7 Consultation: Consultation was initiated with the USFWS, Pacific Islands Fish and Wildlife Office, pursuant to Section 7 of the Endangered Species Act of 1973, as amended, by NIH for the proposed project via letter dated April 5, 2012. NIH will render a determination of the project's effect on listed, candidate, or proposed threatened or endangered species under the Federal Endangered Species Act of 1973, as amended.

Proposed Action: As the project site does not provide a unique habitat, no significant impacts on botanical species are anticipated to result from the development and operation of the proposed PHRL. No listed, candidate, or proposed threatened or endangered botanical species under either the Federal or State endangered species statutes will be disturbed as result of the project.

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Univeristy of Hawaii Pacific Health Research Laboratory at Kalaeloa

VISUAL RESOURCES

FIGURE

5-5

No Action Alternative: Under the No Action Alternative, the PHRL would not be developed. Consequently, there would be no adverse impact to existing botanical species found on the premises of the project site.

5.6.2 Fauna

5.6.2.1 Terrestrial Biota

A biological assessment survey of the Project Site was conducted by Rana Biological Consulting, Inc. in March 2012. (See Appendix A)

No mammalian species were recorded on the site, however it is probable that several of the commonly occurring established alien mammalian species present on the Island of Oahu occasionally transit the site.

No birds were observed using resources on site, however ten avian species were recorded flying over the site or were heard calling from outside of the project disturbance area.

No listed, candidate or proposed threatened or endangered species under either the Federal or State endangered species statutes were recorded during the survey.

5.6.2.2 Aquatic Biota

While the proposed project site is situated approximately one mile north of the Pacific Ocean, no forms of discernable aquatic biota exist on or within the bounds of the site itself. Consequently, no listed candidate or proposed threatened or endangered botanical species under either the Federal or State endangered species statutes inhabit the proposed project site.

5.6.3 Threatened and Endangered Species

No listed candidate or proposed threatened or endangered botanical, aquatic or terrestrial species under either the Federal or State endangered species statutes were recorded during the survey.

Impacts and Mitigation Measures

Section 7 Consultation: Consultation was undertaken with the USFWS, Pacific Islands Fish and Wildlife Office, pursuant to Section 7 of the Endangered Species Act of 1973, as amended, for the proposed project. NIH, by letter dated April 5, 2012, informed the USFWS of its determination that the proposed project will have “no effect” on listed, candidate, or proposed threatened or endangered species under the Federal Endangered Species Act of 1973, as amended (see Appendix B). The USFWS, by letter dated XXXX XX, 2012, concurred with NIH’s determination that the proposed PHRL project is not likely to adversely affect listed, candidate, or proposed threatened or endangered species under the Federal Endangered Species Act of 1973, as amended.

Proposed Action: The Endangered Species act of 1973 (167 U.S.C. § 1531-1544, as amended) provides broad protection for species of fish, wildlife, and plants that are listed as threatened or endangered in the U.S. or elsewhere. The act mandates that Federal agencies seek to conserve endangered and threatened species and use their authorities in furtherance of the Act's purposes. Provisions are made for listing species, as well as for recovery plans and the designation of critical habitat for listed species.

The development and operation of the proposed PHRL is not anticipated to result in indirect impacts on aquatic and terrestrial fauna. Further, the project will not disturb any Federal or State listed endangered or threatened species.

No Action Alternative: Under the No Action Alternative, the PHRL would not be developed. Consequently, there would be no adverse impact to the existing regional faunal environment, and no Federal or State listed endangered or threatened terrestrial or aquatic species would be disturbed.

5.7 Noise

Noise is usually defined as unwanted sound, a definition that encompasses both the psychological and physical nature of the sound. Under certain conditions, noise may contribute to hearing loss, interfere with human activities at home and work, and affect human health and well-being. Different sounds have different frequency content, and the human ear is not equally sensitive to sound at all frequencies.

The primary sources of noise at Kalaeloa are aircraft operations. Aircraft noise levels are typically highest beneath the main approach and departure corridors and in the immediate vicinity of runways. As aircraft take off and gain altitude, their contribution to the surface noise environment decreases. Contingent upon the type of aircraft, the form of propulsion utilized to achieve lift, and current meteorological conditions, the altitude at which aircraft noise becomes indistinguishable from surface ambient noise levels varies. In recent years, however, aircraft traffic and airfield operations have been reduced.

The proposed project site encompasses a paved area currently used as a parking lot for nearby HIARNG, and Seafarer's Institute Facilities. Consequently, the existing use of the site has virtually no contribution to ambient surface noise levels, outside of routine personal vehicle operations by users.

Impacts and Mitigation Measures

Proposed Action: Construction activities such as grading, excavation and the erection of laboratory structure will generate audible noise in excess of static conditions over their duration. The types of equipment used for such construction activities typically include pick-up trucks, excavators, graders, rollers, backhoes, concrete delivery trucks, water tank trucks, hydraulic cranes, and forklifts. Noise generated by these vehicles will be limited to the period of their operation.

Impacts from construction noise are not anticipated to be significant as the project site and much of the surrounding land uses are considered airport or industrial

related. In addition, since construction will take place during day-time hours, evening activities in the surrounding areas will not be affected. Construction equipment and on-site vehicles or devices requiring an exhaust of gas or air are required to be equipped with mufflers.

The long-term operation of the proposed PHRL is anticipated to have an insignificant overall impact on ambient noise levels throughout the Kalaeloa region. The proposed project site's contribution to ambient surface noise levels would be comparable to the existing use of the site (parking lot). Increased noise levels could, however, result in the event that emergency backup generators are utilized; the use of such generators is anticipated to be infrequent and limited only to routine testing and emergency situations. Should the use of emergency backup generators be required, their use would be exempt from noise regulations.

No Action Alternative: Under the No Action Alternative, the proposed PHRL would not be developed. Consequently, there would be no impact to ambient noise pollution.

5.8 Archaeological, Historic and Cultural Resources

The NHPA defines *historic property* as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on the National Register…" (16 USC 470w). For the purposes of this EA, the terms "archaeological resources", "historic resources", and "cultural resources" are used synonymously. The two categories of historic properties considered in the EA are archaeological sites and historic buildings.

Factors considered in determining a significant impact to cultural resources include the extent or degree to which an alternative results in a change in the characteristics that qualify a historic property for listing on the National Register of Historic Places (NRHP).

In June of 2012, Cultural Surveys Hawai'i (CSH) conducted an Archaeological Site Inspection and Literature Review of the site. The field work for this archaeological assessment of the project area was conducted by CSH archaeologist, David W. Shideler, M.A., under the general supervision of Hallett H. Hammatt Ph.D, and consisted of a pedestrian inspection of the project area through systematic sweeps. The graded nature of the project site allowed for excellent visibility of the (paved) ground surface. Historical and archival research encompassed information obtained form the UH Manoa Hamilton Library, the State Historic Preservation Division Library, the Hawaii State Archives, the State Land Survey Division, and the Archives of Bishop Museum. Previous archaeological reports were reviewed, as were historic maps and primary and secondary historical sources.

Archaeological Resources: Archaeological resources include Hawaiian sites, ranching sites, early 20th century sites, and World War II sites. Hawaiian sites consist of habitation complexes, agricultural complexes, and sinkhole complexes. Human remains have been found associated with 13-sites at Kalaeloa, most of which are associated with Hawaiian habitation sites. Early 20th century sites consist of habitation sites, storage sites, and sisal walls. A number of World War II sites have been documented, encompassing anti-aircraft battery emplacements, roads, pads, walls, fortifications, pillboxes, a sentry post, and aircraft wreckage.

Numerous archaeological surveys have been conducted at the former 3,700-acre BPNAS, including the proposed project site. A 1998 survey of the area occupied by HIARNG found no archaeological sites on the property. Pre-contact Hawaiian archaeological sites have been identified in the southeast and northwest corners of BPNAS; however, these sites are well outside the proposed 2-acre PHRL site.

The primary observation of the known archaeological site distribution in the vicinity of the proposed PHRL is the very low density and the general absence of archaeological sites anywhere close by.

Should areas of known or inferred archaeological and traditional features be revealed, a more sensitive analysis may be conducted.

Historic Resources: Historic resources include buildings and structures at the former NBNPNAS encompassing a range of World War II and Cold War era resources. The IARII Phase I inventory survey, conducted in 1993 summarizes the results of previous Barbers Point historic building surveys (i.e. Spencer Mason Architects 1993; Yoklavich *et al.* 1995). The vast majority of historic buildings are World War II era. NRHP eligible pre-1950 historic buildings include aircraft revetments, Quonset huts, storage facilities, ready magazines, laundry building, captain's quarters, air operations and control tower, command center, and a theater.

The BPNAS Final Environmental Baseline Study, conducted in June of 1994, presents the best overview to an understanding of BPNAS historic properties. A number of specific architectural features are discussed as historic properties, but none are near to the proposed project site (see Figure 5-6).

Cultural Resources: Cultural resources encompass prehistoric and historic districts, sites, structures, artifacts, or any other physical evidence of human activity considered important to a culture or community for scientific, traditional, religious, or other reasons.

There are no known sacred sites or traditional cultural resources at the proposed project site at Kalaeloa or the former BPNAS. Previous investigations have not shown any evidence of prehistoric agricultural activity such as the production of dry land taro, or the growth of medicinal plants or any other activity associated with activities practiced by modern Native Hawaiians. There are no current cultural practices occurring at this location (HIARNG 2003a).

Impacts and Mitigation Measures

Section 106 Consultation: As defined in the implementing regulations for Section 106 of the National Historic Preservation Act (NHPA), impacts of an undertaking on significant cultural resources would be considered adverse if they "diminish the integrity of the property's location, design setting, materials, workmanship, feeling, or association" [36 C.F.R. §800.9(b)]. Examples of adverse effects include, but are not limited to, the following:

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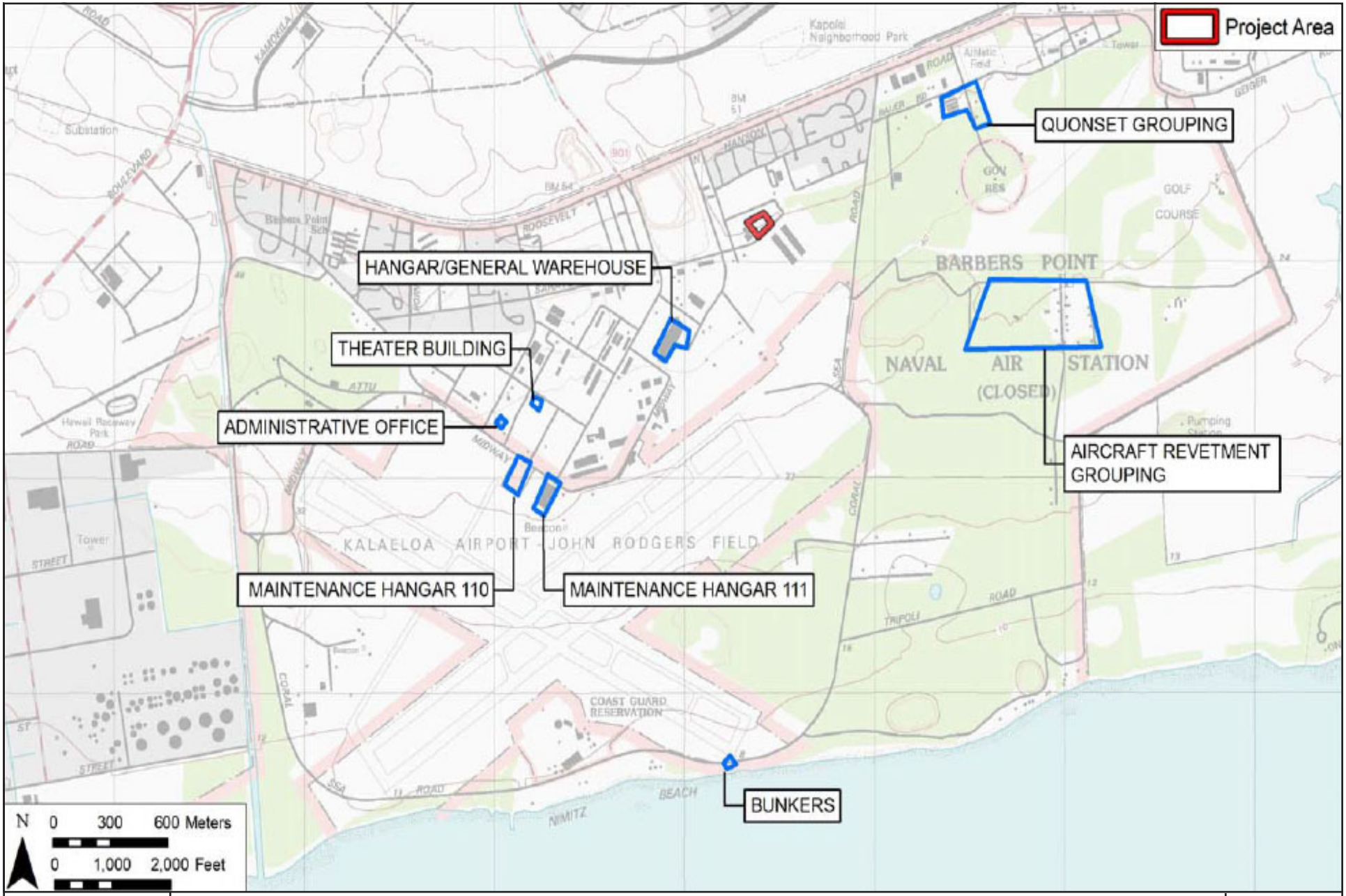

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HISTORIC STRUCTURE OF PRESERVATION CONCERN

FIGURE 5-6

- Physical destruction, damage, or alteration of all or part of the property;
- Isolation of the property from, or alteration of the character of, the property's setting when that character contributes to the properties qualification for listing on the NRHP;
- Introduction of visual, audible, or atmospheric elements that are out of character with the property, or alter its setting;
- Neglect of a property resulting in its deterioration or destruction; and Transfer, lease, or sale of the property [36 C.F.R. §800.9(b)].

Consultation pursuant to Section 106 of the NHPA has been conducted for the proposed project, and documentation is included in Appendix A. Based on the results of the Archaeological site inspection and literature review, and written comments received during the Section 106 consultation process, NIH will render a determination regarding the effect of the project on historic properties.

Should any previously unidentified burial, archaeological or historic sites be found during construction of the project, work will be halted in the immediate vicinity and SHPD will be notified immediately. The significance of these finds will then be determined, and appropriate mitigation measures will be approved by SHPD as appropriate. Subsequent work will then proceed after SHPD authorization has been received and approved mitigation measures have been implemented

Proposed Action: The development and operation of the proposed PHRL would have no affect on historic properties, within the Area of Potential Effect (APE), which includes those areas likely to be affected by the proposed project activities. Several agencies and Hawaiian organizations were requested to comment on the proposed project site due to their expertise in and knowledge of cultural, traditional and customary uses and practices specific to the region that may potentially impacted by the proposed construction and operation of the PHRL, as discussed below.

No historic buildings or structures exist within the APE. Furthermore, no surface archaeological resources, or unexplored sinkholes have been identified within the wider former NAS Barbers Point project area. It is not likely that subsurface remains exist, in that the proposed project area rests on a solid coral limestone surface.

Since the proposed PHRL project site contains no archaeological or historic resources, and customary practices would not occur at the proposed PHRL site under the scope of its operation, there would be no impact to historic and cultural resources.

No Action Alternative: Under the No Action Alternative, the proposed PHRL would not be built. Consequently, there would be no impact to cultural and historic resources.

5.9 Socio-Economic Characteristics

Population and Housing: The population of the State of Hawaii was 1,360,301 in 2010, which represents an average annual growth rate of 1.2% from 2000 to 2010 (US Census Bureau 2010). This compares with an average annual growth of 0.9% for the remainder of

the nation. The vast majority of Oahu neighborhoods lost population over the past decade; however, Ewa gained 34% which is third behind Kapolei/Makakilo at 37% and Mililani Mauka at 73%. The southwestern corner of the island of Oahu, near the proposed project site is a primary growth and employment center as result of planning the City's effort to direct growth to the Ewa Plain.

An overview of Kalaeloa's demographic makeup is shown in Table 5-2.

Table 5-2: Demographic Characteristics: 2010

Subject	Census Tract 85.02		Honolulu County	
	Number	Percent	Number	Percent
Total population	**2136**	**100**	**953,207**	**100**
AGE				
Under 5 Years	242	11.3	61,261	6.4
5 – 19 years	387	18.1	174,309	18.3
20 – 64 years	1453	68.0	579,147	60.8
65 years and over	36	1.6	138,490	14.4
Median age (years)	27.7	--	37.8	--
RACE				
White	675	31.6	198,732	20.8
Black or African American	168	7.8	19,256	2
American Indian and Alaska Native	11	0.5	2,438	0.3
Asian	197	9.2	418,410	43.9
Native Hawaiian and other Pacific Islander	423	19.8	90,878	9.5
Other	187	8.7	10,457	1.1
Two or more races	614	28.7	213,036	22.3
HOUSEHOLD (BY TYPE)				
Total Households	498	100	311,047	100
Family households (families)	349	70.3	217,842	70
Husband-wife family	256	51.4	161,172	51.8
With own children under 18 years	201	40.3	65,995	21.2
Female householder, no husband present	60	12.0	39,435	12.7
With own children under 18 years	43	8.6	15,027	4.8
Nonfamily households	149	29.9	93,205	30
Average household size	2.99	--	2.95	--
HOUSING OCCUPANCY AND TENURE				
Total Housing Units	539	100	336,899	100
Occupied housing units	498	92.4	311,047	92.3
Owner-occupied housing units	0	0	174,387	56.1
Renter-occupied housing units	498	92.4	136,660	43.9
Vacant units	41	7.6	25,852	7.7

Source: U.S. Census Bureau, Census 2010

According to data collected by the 2010 U.S. Census, the Kalaeloa region (census tract 85.02) offers limited housing options (rental options only), and has a limited residential population.

Social and Economic: Tourism is the most productive industry on the island of Oahu. Military, government and agriculture are also important sectors of Oahu's economy. Kalaeloa lacks tourist attractions drawing visitors to the site. Kalaeloa has historically been dominated by military and industrial use, with residential development now growing rapidly in the neighboring Kapolei and Ewa Beach area. The Ewa area is projected to provide people with up to 65,000 non construction jobs in 2030 (DPP 2008).

Impacts and Mitigation Measures

Proposed Action: Construction of the proposed PHRL would require approximately 254 construction jobs and would have short and long term positive impacts to employment and income in the Kalaeloa region. It is expected that most of the construction jobs would be filled by the existing labor force, so there will be no noticeable effect on the regional income, housing markets, or demand for community services. The period of construction is anticipated to commence in January of 2014 and is scheduled for completion by December of 2015.

The operation of the proposed PHRL would employ approximately 20 scientific, technical and support staff. Many of these employees have not been hired, so their residential locations are not yet known. The addition of approximately 20 new employees would not have a noticeable impact on regional income, housing markets, or demand for community services.

No Action Alternative: Under the No Action Alternative, the proposed PHRL would not be constructed. Consequently, the project site would remain undeveloped, and there would be no socioeconomic benefit to the region.

5.10 Human Health and Safety

5.10.1 Health and Safety

Operating procedures at the PHRL would follow the strict guidelines included in the Biosafety in Microbiological and Biomedical Laboratories (BMBL), a joint publication of the National Institutes of Health and the federal Centers for Disease Control and Prevention (CDC). The BMBL, currently in its fifth edition, has become the established code of practice for biosafety – the discipline addressing the safe handling and storage of infectious microorganisms. The fundamentals of biosafety include microbiological practices, safety equipment, and facility safeguards that protect laboratory workers, the environment, and the public from exposure to infectious microorganisms that are handled and stored in the laboratory. Biocontainment is an element of biosafety and entails processes, equipment, and facilities designed to keep biological organisms within a limited space or area. Risk assessment is the process that enables the appropriate selection of microbiological practices, safety equipment, and facility safeguards that can prevent laboratory-associated infections (LAI).

Only very small quantities (measured in milligrams and milliliters) of biological agents would be stored and handled in the PHRL. Generally, the biological agents handled in the PHRL

would be in a form that is not easily dispersible, such as gels or liquids. Due to the nature of the research envisioned for the PHRL, there is a potential that dispersible forms of pathogens may be used within the laboratory to accomplish specific research objectives. In these cases, specific procedures and protocols would be followed based on the physical form of the biological agent being studied

The PHRL would be designed to maintain biological containment and would comply with standards set forth by International Building Code, NIH criteria, and the BMBL. The PHRL would include shower-out facilities for laboratory workers to use before they leave the biocontainment zone, and autoclaves for waste sterilization before it leaves biocontainment. All BSL-3 and ABSL-3 laboratories would be operated under negative air pressure relative to the adjacent spaces to ensure that air will not flow out of the biocontainment zone into administrative spaces, offices, and corridors. All air leaving BSL-3 and ABSL-3 laboratories at the PHRL would exit through sealed ductwork containing HEPA filters prior to emission through stacks on the building roof. Infectious biological materials would only be manipulated within a BSC, and all exhaust air from such manipulations would be HEPA filtered first by the BSC HEPA filter, and second by the HVAC HEPA filter before being exhausted from the building. Rodents held within the ABSL-3 labs would housed in hermetically sealed cages, with individual HEPA filters. Exhaust air from the cages would be HEPA filtered a second time through the sealed cage rack ventilation system. Exhaust the air from the cage rack system would then pass through the sealed ductwork and another set of HEPA filters before being exhausted from the building. Small amounts of chemicals (such as bleach solutions, formaldehyde, and vaporized hydrogen peroxide) would be used to sterilize the interior of the PHRL.

The UH has developed comprehensive policies, guidelines, and standard operating procedures (SOPs) to minimize the potential for accidents involving use of biological, chemical, and radioactive materials in its research activities. PHRL operations would follow all applicable regulations to ensure safe and proper transport, storage, handling, and disposal of biological materials to prevent accidental exposures or releases. Policies, guidelines, and SOPs would include:

- University of Hawaii Bio Waste Guidelines
- Biological Sharps Quick Reference Guide
- University of Hawaii Spill Plan
- Select Agent Use at the University of Hawaii
- Chemical Hygiene Plan
- Chemical Storage Guidelines
- Safe Handling Procedures for Moving Chemicals
- Procedures for Isotope Shipments and Waste Disposal
- Hazardous Materials Management Program Manual
- Emergency Plans for PHRL will be drafted based upon existing Emergency Response Plans for the John A. Burns School of Medicine
- NBL/RBL Network Biosafety Group publication "Guidelines for Biosafety Training Programs for Workers Assigned to BSL-3 Research Laboratories"
- Guide for the Care and Use of Laboratory Animals

- USDA Animal Welfare Regulations Part 1
- USDA Animal Welfare Regulations Part 2
- USDA Animal Welfare Regulations Part 3
- USDA Animal Welfare Regulations Part 4
- AVMA Panel on Euthanasia 2007 Report
- Occupational Health and Safety Manual (OHSM)
- Guide for the Care and Use of Laboratory Animals (2010)

All PHRL personnel would receive training and retraining appropriate to their required tasks to enable them to implement these policies, guidelines, and SOPs.

The potential for exposure of PHRL workers and the community to infectious agents would further be reduced through the following design features of the PHRL:

- Enhanced physical security to allow only authorized people and materials into and out of the laboratory
- Placement of most building electrical, mechanical, and plumbing systems outside of the biocontainment zone (e.g., within a Mechanical Penthouse above the laboratories, or in other interstitial space) to allow for easier and safer maintenance
- Redundant electrical, mechanical, and plumbing systems with full backup generator power
- Rapid and thorough decontamination of BSL-2, BSL-3 and ABSL-3 laboratories using Chlorine Dioxide or vaporized Hydrogen Peroxide Gas

Preventing the Transmission of Infectious Agents

There are five potential transmission pathways for biological agents to leave biocontainment areas and affect human health. These pathways include: direct, vector-borne, vehicle-borne, airborne, and water-borne transmission. Each of these transmission pathways are described and addressed below.

Direct transmission: Transmission is the result of direct contact, by an individual, with the identified pathogen, resulting in a possible laboratory-acquired infection (LAI). This form of transmission requires contact with the skin, eyes, or mucous membranes to result in infection. PHRL operations, with required safety and security measures in place, would effectively minimize opportunities for direct transmission. All procedures involving the manipulation of infectious agents would occur within BSCs by appropriately trained and supervised personnel using the proper Personal Protective Equipment (PPE). Procedures involving the manipulation of higher-risk procedures using infectious agents would require two qualified laboratory workers to be present (Buddy System), thus minimizing the potential for accidents or the non-reporting of laboratory accidents. The potential for direct transmission to others would be reduced through decontamination of all materials and equipment prior to leaving BSL-3 or ABSL-3 laborator. The potential of LAI is further reduced through the use of effective vaccines or therapeutic measures (DHHS 2007). Every PHRL worker would be required to be entered into the Human Pathogen Medical Surveillance Program. This medical program would be compliant with the immunoprophylaxis policy per the guidance in the BMBL (DHHS 2007). Workers would receive annual blood draws and consultation regarding biological work hazards.

Vector-borne transmission: Vector-borne transmission is the ability of an intermediate agent to act as the mechanism by which an individual is exposed to the pathogen. Examples of vector-borne transmission include deer ticks (*Ixodes scapularis*) that can transmit the Lyme disease spirochete (*Borrelia burgdorferi*), mosquitoes that can transmit West Nile virus (Flavivirus), and fleas that can transmit the bubonic plague bacterium (*Yersinia pestis*). Each of these examples involves an intermediate agent (vector), typically insects, to complete the exposure pathway to an individual. The PHRL would be designed to severely limit the potential for possible vector-borne transmission. All floors, walls, ceiling penetrations, light fixtures, and junction boxes in the BSL-3 and ABSL-3 laboratories would be sealed. Laboratory animals would be isolated in sealed cages with HEPA filtered exhaust during research experiments. Multiple inter-locking doors would further prevent the escape of laboratory animals from the PHRL biocontainment zones. The use of pest control programs would limit the potential for transmission of infectious agents from animals to humans.

Vehicle-borne transmission: Vehicle-borne transmission refers to a situation in which a person or material (e.g., clothing, laboratory supply, etc.) acts as a vehicle for the transmission of a pathogen. An individual coming into contact with the vehicle could then be exposed to the pathogen. The primary concern for vehicle-borne transmission would be via a workers' clothing, skin or hair as all other materials leaving the PHRL must go through a sterilizing autoclave. The BMBL guidelines, which would be followed by the PHRL, are designed to reduce this potential method of transmission. Laboratory workers would wear disposable hair bonnets, laboratory gowns, and double latex gloves. Clean laboratory clothing would be provided to workers in the change room prior to entering the biocontainment zone, and they would change out of this clothing before leaving the biocontainment zone. The BSL-3 and ABSL-3 areas would have a shower where laboratory workers must wash off before leaving the biocontainment zone. This would substantially reduce any potential for a worker to unknowingly transport biohazardous materials from the PHRL.

Airborne Transmission: This mechanism of transmission is primarily characterized by exposure via inhalation, but may also encompass airborne pathogens coming into contact with skin, eyes, and mucous membranes. Manipulations of liquid suspensions of microorganisms could, under certain circumstances, produce aerosols and droplets that could remain airborne within the biocontainment zone.

The PHRL will include specially designed air handling and circulation systems to protect workers and prevent the release of airborne pathogens from the laboratory. First, all manipulations involving infectious pathogens will be conducted within Class II BSCs that prevent airflow out of the BSC that has not been HEPA filtered. Second, workers manipulating potentially aerosolized infectious agents must wear proper protective clothing and equipment, including specialized masks or respirators, and eye goggles. Third, BSL-3 and ABSL-3 laboratories are under negative pressure so that the air potentially containing airborne pathogens can only exit the laboratory through the HEPA filtered HVAC system.

HEPA filters, at a minimum, remove 99.97 percent of particulates with a diameter of 0.3 micrometers (or 0.00001 inches). Their efficiency is greater than 99.97 percent at particle sizes larger and smaller than 0.3 micrometers (NSC 1996). The majority of particles that would be encountered in operations at the PHRL would be larger than the 0.3-micrometer

size. The number of viable microorganisms present following HEPA filtration would be virtually zero, and most would not survive long in external conditions such as ultraviolet light (via the sun), dehydration, high temperatures, and the presence of free oxygen. HEPA filters at the PHRL would be tested using the dioctylpthalate (DOP) testing method, the industry standard for verifying HEPA efficiency. Magnahelic gauges and other sensors would constantly monitor the functionality of the HVAC system. HEPA filters would be replaced and safely disposed on a regular schedule.

Water-borne transmission: Water-borne transmission would occur if an individual came into contact with contaminated water. The potable water supply would not be affected by the operation of the PHRL. The PHRL plumbing system would adhere to uniform plumbing code requirements and include backflow preventers and other means to prevent intrusion into the potable water supply. No pathogen- contaminated liquids would be disposed in the sanitary sewer system without first undergoing decontamination.

Given the multiple and redundant safeguards mentioned above, the potential for transmission of an infectious disease to a PHRL worker or member of the general public is extremely low. PHRL operational protocols and procedures would be based upon those currently in practice at UH, with additional safeguards appropriate to the new facility.

5.10.2 Accidents and Natural Phenomena Events

Tsunamis**.** Hawaii's location in the middle of the Pacific Ocean makes it vulnerable to tsunamis generated by earthquakes around the Pacific Rim. Consequently, the State of Hawaiʻi has defined Tsunami Evacuation Zones along all shorelines to indicate the areas that would be evacuated in the event of a tsunami warning. The PHRL would be approximately 6,500 feet (1.23 miles) inland from the State Department of Civil Defense's Tsunami Evacuation Zone. The proposed site lies approximately 50 feet above mean sea level. Due to the distance from the inundation zone, the site elevation, and the presence of other structures between the PHRL and the shoreline, the estimated threat of tsunami damage to the PHRL is extremely low. Tsunami threats in Hawaiʻi are typically triggered by seismic events thousands of miles away, with several hours warning. This would allow ample time for an orderly shutdown of laboratory operations, including the safe and secure storage or destruction of all biological materials, as appropriate. Since the proposed PHRL site is outside the Tsunami Inundation Zone, the overall likelihood that a tsunami would impact the PHRL is extremely low. In addition, the PHRL will be built to withstand a Category 4 hurricane, meaning it would not likely be impacted by a tsunami wave.

Flooding. Flood hazard potential is addressed in Section 5.3.4. The PHRL would be outside the 100-year flood plain and unlikely to be inundated. In addition, the storage of biological samples in sealed containers within sealed freezers, refrigerators or other sealed storage devices would minimize the chance of a pathogen release in the unlikely event of flooding.

Hurricanes. Based on the basic wind speed for the region, importance factor based on use, exposure category, and the height of the building, the International Building Code as adopted by the City and County of Honolulu (the island of Oahu) will require the PHRL to withstand windspeeds of up to 120 mph – equivalent to a Category 4 hurricane, the maximum credible strength storm expected in Hawaii. The Central Pacific Hurricane Center (CPHC), a unit of the National Oceanic and Atmospheric Administration (NOAA) in Honolulu issues tropical

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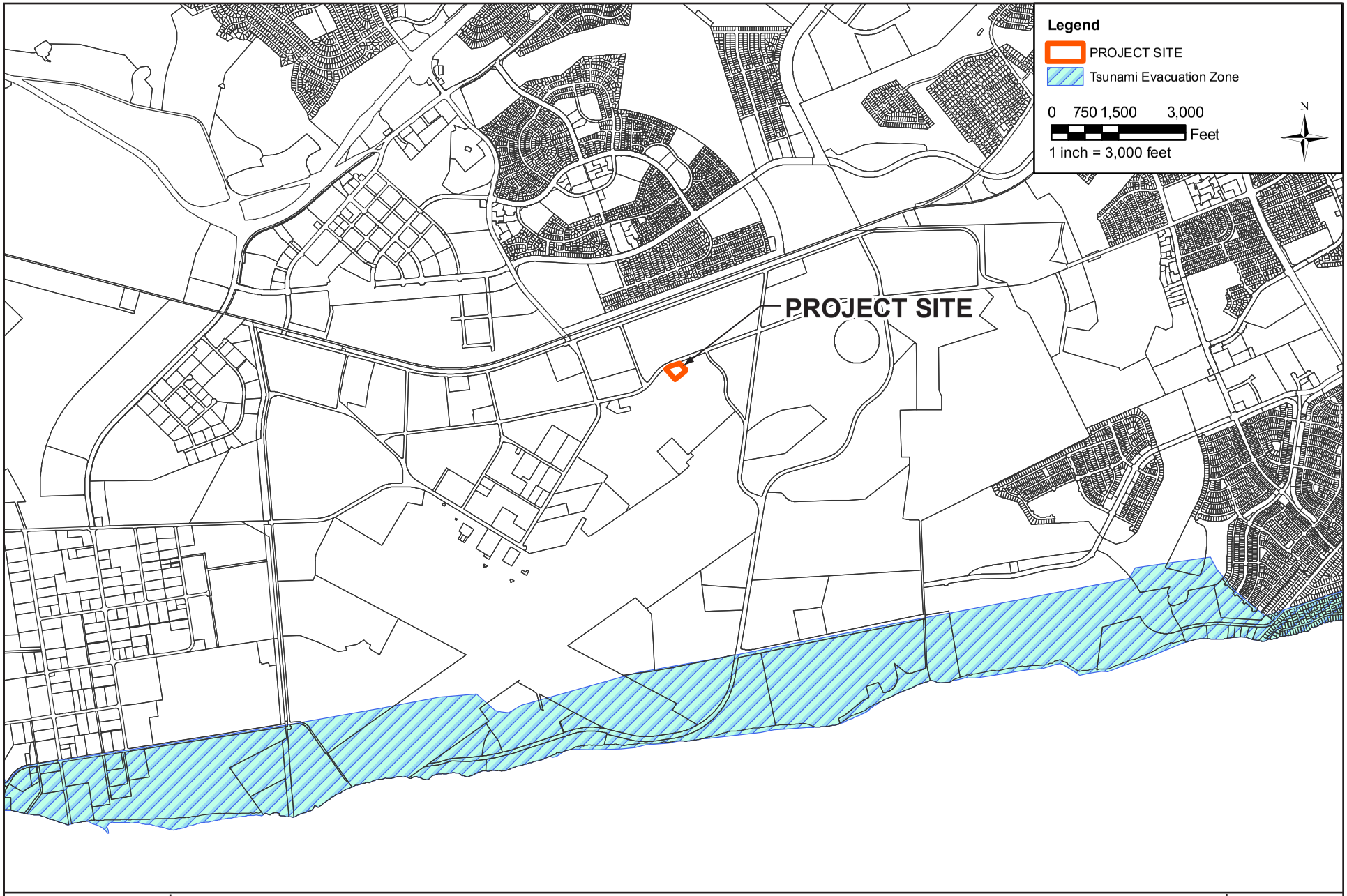

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TSUNAMI EVACUATION ZONE MAP

FIGURE 5-7

cyclone warnings, watches, advisories, discussions, and statements for tropical cyclones between 140 Degrees West Longitude to the International Dateline. During Central Pacific tropical cyclone events, bulletins are regularly scheduled every six hours. When significant changes take place and/or a tropical cyclone watch or warning is in effect, intermediate bulletins are issued with the latest positions and forecasts. As with other locations in the City and County of Honolulu, the early detection and warning systems of the CPHC would provide ample time for the orderly shutdown of laboratory operations, including the safe and secure storage or destruction of biological materials, as appropriate. The ability of the building to withstand hurricane destruction, coupled with the advance warning systems for hurricanes, make it highly unlikely for a hurricane to trigger a negative PHRL-related impact upon health and human safety.

Earthquakes. The Uniform Building Code (UBC) outlines provisions for seismic zones, ranging from 0 (no chance of severe ground shaking) to 4 (10% chance of severe shaking in a 50-year interval). The shaking is quantified in terms of g-force, the earth's grativational acceleration. Each zone classification correlates to a specified zone factor (or Z-factor) that corresponds numerically to the effective horizontal peak bedrock acceleration (or equivalent) velocity that is estimatted as a component of the design base shear calculation. As the island of Oahu is situated in a 2A seismic zone, the proposed project site should expect an earthquake-related effective peak bedrock acceleration of 0.1 times the force of gravity (Z-factor 0.1, correlating to ground motion values with a 10 percent probability of being exceeded in 50 years). Based on specific soil profiles, site classifications, seismic use group, and building configuration, the City and County of Honolulu will require that the PHRL be designed and built to these requirements. Similarly, mechanical and electrical systems equipment will be designed for the appropriate measures of seismic restraint.

Aircraft. The proposed site is within 3,000 feet of the nearest runway at Kalaeloa Airport. According to the Hawai'i Department of Transportation, there were 128,732 aircraft operations (flight takeoffs or landings) at Kalaeloa Airport in 2009, or an average of 353 daily operations. Approximately 80% of these were general aviation, largely propeller planes and the remaining 20% were military aircraft. The Hawai'i Department of Transportation reports no history of major aircraft incidents at Kalaeloa. Weather conditions there are also not conducive to formation of fog that could obscure views of the runways. Given the relatively small size of most aircraft using the Kalaeloa Airport, the lack of foggy conditions, and the history of safe operations, the risk associated with aircraft accidents is low. A small plane would be unlikely to cause major damage to the PHRL, which would be built to withstand major storms. In the highly unlikely event that a larger plane were to crash into the structure, the resulting fuel fire would likely incinerate the small amounts of biological materials within the PHRL.

Terrorism. The proposed site lies on the northeast perimeter of HIARNG's 147-acre base at Kalaeloa. The presence of active military personnel would be a deterrent to any terrorist activity. In addition, the Federal Bureau of Investigation's (FBI) new Hawaii headquarters is within 3,000 feet of the PHRL site. Access to the PHRL will be via a HIARNG security gate just past the intersection of Saratoga Street and Midway Street. After entering this gate, access to the PHRL will be along the existing Saratoga Street between the Seafarer's Training Center and HIARNG's Building 282. There would be no access to the PHRL via the realigned Saratoga Street north of the site. A combination of fencing and berms, trees, or

other landscape features along PHRL lot adjacent to the realigned Saratoga Road would prevent vehicles from entering from that approach. All other vehicle approaches to the PHRL would be within the HIARNG compound.

Access to the PHRL parking lot would only be provided via a gated entrance from Saratoga Street. Vehicular entrance would require proximity cards to raise traffic control arms and the gate would be monitored by security guards. Positive identification would result in the lowering of a tire shredder that would otherwise be raised to deter entry of unauthorized vehicles. There would be no other access to the parking area, which would be fenced off apart from the entry and exit lanes. Access to the secure loading dock would likewise be via entrance gate, following positive identification. Preliminary discussions with the HIARNG anti-terrorism office indicate that the PHRL would be required to have a minimum 20-foot setback from perimeter fencing. The design concept includes 50-foot setback from the site perimeter.

Given the extensive physical and operational security measures that would be in place, and the proximity of HIARNG and FBI personnel and facilities, the likelihood of a terrorist attack is extremely low.

Impacts and Mitigation Measures

Proposed Action: Human-health effects during site preparation and construction of the proposed PHRL would be similar to any construction project. Such effects would be localized and would affect only site workers or visitors to the site. Typical worker effects present in the construction industry would be expected from the construction of the proposed PHRL. Routine construction facilities have the potential to expose workers and site visitors to common hazards such as slips-trips-falls, electrical shock, heat stress, and fire/explosion hazards. Workers could be potentially exposed to high noise levels from various heavy equipment operations and activities such as metal or grinding operations. The likelihood of injuries as result of construction is contingent on the types of construction activities undertook, and the length of their active duration.

Construction accidents can be avoided through the implementation of and adherence to proper training and adequate safety measures as well as equipment. To promote, and ensure a safe working environment throughout construction, contractors would be required to fully comply with the Federal Occupational Safety and Health Administration (OSHA) regulations in addition to all applicable state and local construction safety standards. Full compliance with health and safety standards would effectively minimize potential adverse effects to worker health and safety throughout construction.

There are potential human-health impacts to PHRL workers directly involved in laboratory research. However, operations are very unlikely to impact human health of non-involved workers or the public at large. The type and rate of injuries and illnesses to the involved workers expected during the operation of the PHRL would be similar to those demonstrated for other Regional Biosafety Laboratories of similar scope and scale, as well as existing biological research laboratories operated by UH. In addition to handling infectious agents, the PHRL would have physical, electrical,

chemical, and low-level radiological hazards associated with its long-term operation. These hazards are well understood, and the PHRL would be designed in compliance with safety codes and contain the appropriate equipment to avoid or reduce risk of injury to its staff and the general public.

The PHRL would be designed and operated to maximize safety and reliability. Consequently, operation of the PHRL presents a minimal risk to the community. All technical and maintenance staff would be trained in the safe operation of the PHRL. The PHRL would be designed to incorporate built in redundancies for key mechanical, electrical, and plumbing systems necessary to meet the safety needs of its staff and the community. All exhaust air from the BSL-3, and ABSL-3 laboratories would be HEPA filtered and all research using infectious materials would be handled within BSCs to assure that no harmful agents are released to the environment. The overall conclusions are that the proposed operations of the PHRL present very low risks to PHRL workers directly involved in BSL-3 and ABSL-3 research activities, and extremely low risks to non-involved workers, the public, and the environment.

No Action Alternative: Under the No Action Alternative, the proposed PHRL would not be constructed. Without the proposed facility, there would be less BSL-3 and ABSL-3 laboratory space for conducting high-containment research activities/experiments and to test a large number of samples in the event of an emerging or re-emerging infectious disease outbreak or emergency. This would place Hawaii's population at greater risk for inadequately responding to such an outbreak or emergency, with potential loss of lives due to reduced response capacity. Potential risks to laboratory worker health and safety from exposure to infectious disease agents, physical, electrical, and chemical hazards would still exist, stemming from existing research facilities at UH.

5.11 Waste Management

Solid waste collection and disposal service is provided by the City Department of Environmental Services and numerous private companies. Solid waste from the existing BSL-3 labs at the John A. Burns School of Medicine in Kakaako is brought to the H-Power Incineration Plant at Campbell Industrial Park, after waste is autoclaved as discussed in Section 4.5. Waste from the PHRL will be disposed of in the same way. Wastewater disposal is provided by the City Department of Environmental Services. Wastewater flows are conveyed to the Honouliuli WWTP for processing.

5.11.1 Wastewater

Wastewater System: The existing wastewater collection system at Kalaeloa is currently owned by the Navy and is operated under license by the City and County of Honolulu Department of Environmental services. Presently, the system is in the process of being transferred to the Pural Water Specialty Company, Inc, a privately owned utility operator. The company is currently in the Public Utilities Commission process for acquiring the wastewater system. The system consists of:

- 15.3 miles (24.6 km) of gravity sewers that range in size from 6 inches (150 millimeters) to 30 inches (760 millimeters);
- 12 lift stations, and,
- 7.3 miles (11.7km) of force mains that range in size from 3 inches (100 millimeters) to 16 inches (400 millimeters).

Investigation of the existing system when BPNAS closed determined that sufficient flow cacpacity exists to support future development of the area (Gray et al. 1995). Moving forward, HCDA intends to upgrade and modernize the existing sewer system to support future growth and development in the Kalaeloa.

Wastewater generated in the project area is ultimately conveyed to the City and County of Honolulu's nearby Honouliuli WWTP (see Figure 5-8), which has a capacity of 56 million gallons per day (mgd). The current inflow to the Honouliuli WWTP from all sources is approximately 26 mgd.

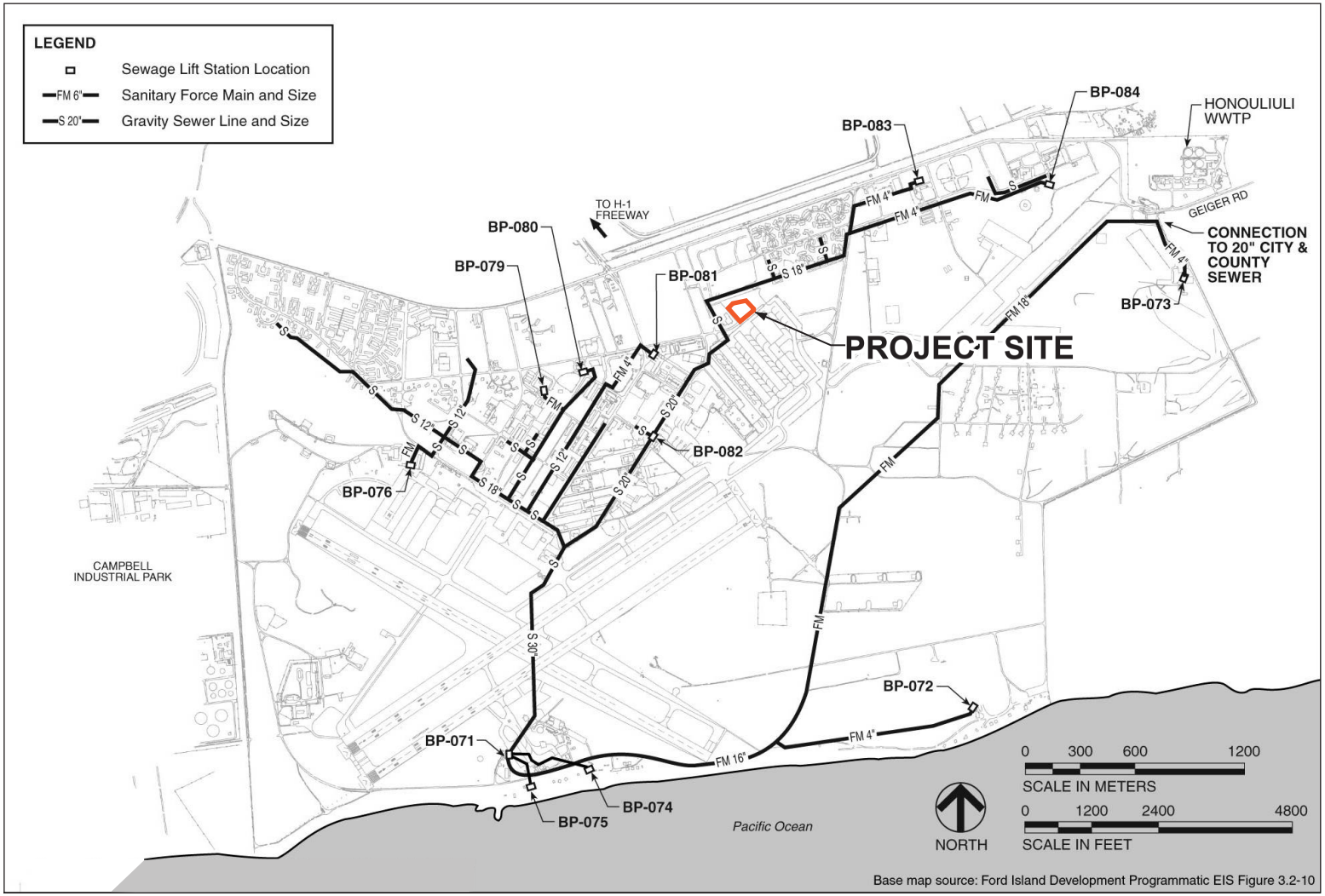
Under full operation, the PHRL is expected to generate approximately 8500 to 12000 gallons per day of waste water. Sewer lines at the HIARNG site (of which the proposed project site is a part of) have been determined sufficient to support future development (Earth Tech 1998b). The parcel on which the proposed project site lies has a design maximum watewater flow of 0.785 mgd, and a .950 mgd peak design maximum flow of the lines that serve the property (KIMPU 2010).

5.11.2 Hazardous Waste

Operations currently conducted at Kalaeloa require the use and storage of hazardous materials. These materials are primarily associated with vehicle maintenance and aircraft operations and typically include flammable and combustible liquids, acids, aerosols, batteries, corrosives, solvents, paints, and hydraulic fluids.

Hazardous Materials: Hazardous materials and waste include solid, liquid, contained gas, or sludge wastes that pose a threat to human health and safety or the environment. Hazardous wastes and materials may be subject to an array of Federal regulations, including the Resource Conservation and Recovery Act (RCRA), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Federal Water Pollution Control Act, Clean Air Act, Clean Water Act, Safe Drinking Water Act, Toxic Substances Control Act, Federal Insecticide, Fungicide and Rodenticide Act, Emergency Planning and Community Right-to-Know Act, and Pollution Prevention Act.

A hazardous material item is generally characterized as any item or agent (physical, chemical, or biological) which has the potential to cause harm to humans, animals, or the environment, either independently or through interaction with other factors. Toxic Materials are specific hazardous materials indentified in regulations. Hazardous wastes are specifically defined or determined as such based on their ignitability, corrosiveness, reactivity, and toxicity. The potential impacts hazardous materials and waste have on human health and the environment are largely dependent upon their types, quantities, toxicities, and management practices.



Source: Navy, EIS for the Disposal and Reuse of Naval Air Station Barbers Point, Hawaii, 1999

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WASTEWATER SYSTEM MAP

FIGURE 5-8

For the purposes of this EA, hazardous materials include: products used for various maintenance or repairs and identified as hazardous on manufacturer material safety data sheets; petroleum, oils, and lubricants (POL); antifreeze; and miscellaneous other waste streams.

Hazardous and Universal Wastes: RCRA, as amended by the Hazardous and Solid Waste Amendments (and corresponding state of Hawaii HARs), define hazardous waste as:

- A solid waste not specifically excluded from being classified as a hazardous waste under 40 CFR 261.4(b) that exhibits any of the characteristics (i.e., ignitability, corrosivity, reactivity, toxicity) described in 40 CFR 261; or
- Is listed in 40 CFR 261 Subpart D; or
- Is a mixture containing one or more listed hazardous wastes from 40 CFR 261 Subpart D.

Hazardous wastes may take the form of a solid, liquid, contained gas, or semi-solid. In general, any combination of wastes that poses a substantial present or potential hazard to human health or the environment that has been discarded or abandoned is a hazardous waste.

RCRA (and HARs) requires that hazardous waste be systematically tracked from cradle-to-grave. This hazardous waste tracking system mandates the collection and retention of key information including: the generator of the waste, how the waste is routed to the receiving facility, a description of the waste, the quantity of the waste, identification of the facility that receives the waste, and other relevant data.

EPA and Hawaii universal waste regulations streamline hazardous waste management standards for federally-designated "universal wastes," which include: batteries, pesticides and mercury-containing materials. Universal wastes are considered hazardous, however, they are subject to less restrictive waste disposal regulations than for hazardous wastes.

5.11.3 Radioactive Waste

PHRL operations may generate small quantities of radioactive waste from the use of small quantities of short-lived radioisotopes. Such radioisotopes are commonly used in research institutions, hospitals and clinics to create images within biological tissue and cells for diagnostic and treatment purposes. Commonly used isotopes at UH include are Phosphorus-32, Phosphorus-33, tritium (H-3), Carbon-14, Sulfur-35, Chromium-51, and Iodine-125.

Since 1971, the UH has possessed a broad scope license issued by the U.S. Nuclear Regulatory Commission (NRC) to receive and use nuclear materials for research purposes. The use of radioactive materials is regulated by the UH Radiation Safety Committee which sets policy for the University and enforces the regulations that are in the Federal Code of Regulations and in the UH Radiation Safety Manual. The UH Radiation Safety Program (RSP) oversees the use of radioactive materials, ensures that they are used safely and are following the regulations.

All UH personnel intending to use radioisotopes in their work must be authorized to do so by the RSP and must adhere to the procedures and regulations included in the RSP's Radiation Safety Manual.

Impacts and Mitigation Measures

Proposed Action: The incremental increase in waste resulting from construction and construction related activities throughout the development phase of the PHRL would be minimal with respect to the overall volume of waste regularly produced by UH. Construction debris would be the typical form of waste expected to be generated throughout the development of the proposed PHRL.

Construction debris (i.e., wood, plastics, and metals) and municipal solid waste generated by construction workers, such as disposable food containers and paper, would be transported to either the Waimanalo Gulch Sanitary Landfill or the H-Power plant for disposal. The construction contract may require that some construction materials (e.g. metals) be salvaged/recycled when economically feasible to decrease the amount of construction debris to be disposed. During construction, equipment would be washed down as necessary in a designated area with proper controls for collecting and managing the water used for washing as wastewater. This wastewater stream would then be disposed of in accordance with applicable permits and regulations. For any hazardous waste that is generated during construction, the general contractor would be responsible for disposing of the waste in accordance with all applicable regulations.

Waste generated by PHRL operations would be disposed of in accordance with applicable Federal, State, and local laws and regulations. Sanitary liquid waste (e.g. waste from sinks, showers, and toilets) would be processed at the Honouliuli Wastewater Treatment Plant. The Honouliuli Wastewater Treatment Plant has has sufficient capacity (56 mgd total capacity, 26 mgd currently used) to accommodate the small increase in wastewater (8500-12000 gallons per day) anticipated as result of the operation of the proposed PHRL. Furthermore, the scale of this wastewater contribution is insignificant considering the 0.950 mgd peak design flow of the line serving the proposed project site.

Solid waste from the BSL laboratories would be autoclaved and disposed of as sanitary solid waste through incineration at the H-Power plant. This includes any waste that came in contact with, or may have come in contact with, biohazardous materials. Liquid biohazardous waste is treated with bleach to render any residual biohazardous materials inactive, and is then disposed of as sanitary liquid waste. Hazardous waste and radioactive waste would be segregated and treated according to UH radiological, chemical and waste management procedures.

Solid waste will be generated in the offices and non-laboratory portions of the proposed PHRL, and would either be recycled or disposed of at the H-Power Incinerator. Potentially contaminated wastes, including sample packaging materials, culture materials, Petri dishes, personal protective equipment, and associated process wastes, would leave the PHRL only after being autoclaved and then double

bagged for transport to the H-Power Incinerator. Waste regulated as "infectious" biological waste would be segregated from other wastes at the point of generation and would undergo autoclaving to sterilize the materials, rendering them safe for transport to the H-Power Incinerator. Potentially biologically contaminated, liquid waste from BSL and ABSL laboratory would be properly sterilized and decontaminated using a combination of time, temperature, and concentrated chemicals in accordance with waste management procedures and then be discharged to the sanitary waste system.

Hazardous waste would be generated as the result of some of the functions of the PHRL's operations, i.e., when organic solvents (such as phenol, chloroform, and isoamyl alcohol) are used to lyse cells for DNA, ribonucleic acid (RNA), proteins, and lipids research. These operations are quite typical in biological research laboratories and would generate only small volumes of hazardous waste per year. The hazardous waste would be collected at the PHRL and then disposed of offsite at permitted commercial facilities in accordance with UH chemical and waste management procedures and *Resource Conservation and Recovery Act* requirements. Removal of waste containers from the BSL and ABSL laboratories would occur only after the exteriors of the containers were wiped off with disinfectants.

Laboratory operations could generate small quantities of radioactive waste from the use of small quantities of short-lived radioisotopes. The use and disposal of radioisotopes at the PHRL would follow the same procedures as are used at the John A. Burns School of Medicine at Kakaako and other UH labs. Radioactive wastes would be stored in suitable, safe containers at the PHRL until they would disposed of by the RSP according to the University's Radiation Safety Manual requirements and the regulations from the US Nuclear Regulatory Commission in the Code of Federal Regulations. Low-level waste would be stored at the PHRL to allow short-lived radionuclides to decay to background levels for disposal of by the RSP as non-radioactive solid or liquid waste. Longer-lived radioactive waste would be disposed of by the RSP by shipment to licensed mainland disposal companies in accordance with Federal, State, and local requirements.

No Action Alternative: Under the No Action Alternative, no waste would be generated; therefore, no environmental consequences or impacts would result.

5.12 Transportation and Traffic

Transport of Biological Agents: Regulations concerning transportation of packages of biological or other agents are intended to ensure that the public and workers in the transportation chain are protected from exposure to any agent in the package. Transportation of biological agents is regulated by the Public Health Service, U.S. Department of Transportation (DOT), U.S. Postal Service, the International Air Transport Association, and OSHA. Statistical data indicates that these regulations are effective in protecting both the contents of packages and the persons who come into contact with and/or handle these packages. As of November 2005, no cases of illness due to the release of a diagnostic specimen or infectious substance during transit were reported. Additionally, only 106 (0.002 percent) of the 4,920,000 primary containers shipped in 2003 to worldwide laboratories and other destinations were reported broken during transit. In each of the 106

reported breakages, absorbent materials in properly sealed and prepared packages contained leaking materials, and none of the secondary or outer containers held within were damaged (ASM 2011).

Hazardous materials, which include infectious substances (etiologic agents) are regulated by DOT Regulations (49 CFR 171, 172, 173, and 178) while in transit on the nation's highways and railways and also at airports. The DOT tracks and reports accidents, with a particular emphasis on hazardous materials related incidents. The DOT estimates that there are more than 800,000 hazardous materials shipments per day in the U.S. (DOT 1998). From 1997-2006, the number of vehicular accidents/derailments that involved hazardous materials ranged from 320 to 413 per year (DOT 2007a). Based on figures provided by DOT, the risk of any one shipment of hazardous materials being associated with a vehicular accident or derailment is approximately 1 of 8,100,000 and the risk of fatality as result of such an incidence is approximately 1 out of 26,000,000. Information from the DOT Hazardous Materials Information System (HMIS) on incidents occurring from 2002-2006 during any component of infectious substances transportation including loading and unloading demonstrates that infectious substance incidents ranged from an annual low of 34 incidents with four minor injuries to a high of 1,067 with no injuries (DOT2005a, b, c; DOT 2007a,b).

Traffic Impact Analysis Report (TIAR): A Traffic Impact Assessment Report (TIAR) was prepared by Wilson Okamoto Corporation to analyze the potential traffic-related effects of the proposed project. The prepared TIAR utilizes a level of service system to identify, evaluate, and describe street system operation conditions. Level of service is a report-card scale used to indicate the quality of traffic flow on roadway segments and at intersections. Levels of service range from Level A (free flow, little congestion) to Level F (forced flow, extreme congestion). A Level of Service D or better is considered as acceptable.

Traffic conditions were evaluated for intersections of Fort Barrette Road and Roosevelt Avenue as well as Fort Barrette Road and Kapolei Parkway for the following conditions: baseline traffic conditions, projected traffic conditions (year 2016), and projected traffic conditions without project conditions (year 2016). The results are summarized below in Table 5-3, and are included in Appendix E.

Table 5-3: Projected (Without and With Project) LOS Traffic Operating Conditions

Intersection	Critical Traffic Movement		AM		PM	
			Year 2016 w/out Proj	Year 2016 w/ Proj	Year 2016 w/out Proj	Year 2016 w/ Proj
Fort Barrette Rd/ Roosevelt Ave*	Eastbound	LT-TH-RT	C	C	B	B
	Westbound	LT-TH	C	C	B	B
		RT	A	A	A	A
	Northbound	LT-TH-RT	A	A	A	A
	Southbound	LT-TH-RT	B	B	B	B
Fort Barrette Rd/ Kapolei Pkwy	Eastbound	TH	D	D	D	D
	Westbound	LT	C	C	C	C
	Northbound	TH	C	C	D	D
	Southbound	LT	D	D	D	D

HCDA is coordinating the development of the transportation network at Kalaeloa with the City and County of Honolulu, the State Department of Transportation, and the U.S. Navy. HCDA's proposed roadway improvements are designed to attract and orient growth in Kalaeloa as an urban center. Moreover, these proposed transportation improvements are consistent and integral to Kapolei serving as Oahu's Second City.

Impacts and Mitigation Measures

Proposed Action: Based on the results of the TIAR, the proposed development and operation of the PHRL is not anticipated to result in significant impact to surrounding roadways, and traffic operations in the vicinity are expected to remain similar to without project conditions. The following are the recommendations outlined by the TIAR for the development and operation of the PHRL:

1. Maintain sufficient sight distance for motorists to safely enter and exit all driveways and roadways.

2. Provide adequate on-site loading and off-loading service areas and prohibit off-site loading operations.

3. Provide adequate turn-around area for service, delivery, and refuse collection vehicles to maneuver on the project site to avoid vehicle-reversing maneuvers onto public roadways.

4. Maintain sufficient turning radii at all driveways and roadways to avoid or minimize vehicle encroachments to oncoming traffic lanes.

No Action Alternative: Under the No Action Alternative, the proposed PHRL would not be developed and operated. Consequently, the project site would retain its current use (as a parking lot), and local traffic flow would not be impacted.

5.13 Infrastructure, and Utility Service

Excluding the roads that service the region, most of the infrastructure within the vicinity of the project site is currently owned by the US Navy. The wastewater collection system is being conveyed to the City and County of Honolulu (US Navy, 2008). The Hawaii Community Development Corporation (HCDA) is preparing an infrastructure master plan that would address roadways within and utility service to the region.

Electrical Service: The Hawaiian Electric Company (HECO) is a public utility that provides electricity to homes and businesses island-wide. Specifically, the Kahe Power Plant is the primary power generating facility for the island of Oahu and is located approximately four miles northwest of Kalaeloa. However, the Navy Public Works Center (PWC) owns and operates the existing electrical distribution system at Kalaeloa. The Kalaeloa Master plan recognizes that the existing electrical system in Kalaeloa needs to be upgraded, and anticipates that future electrical utility systems at Kalaeloa will be operated by HECO. Pursuant to this, the Navy PWC is working to divest its electrical system and collaborating with HECO to provide electrical service to the Kalaeloa area. HECO has begun to integrate and modernize neighboring electrical infrastructure, as demonstrated through the HCDA

funded Enterprise Energy Corridor project, an underground 12kv HECO line extension at Fort Barrette Road, continuing on to Enterprise Avenue and terminating at the intersection of Enterprise Road and Midway Street, fronting Kalaeloa Airport.

Electrical power is provided through a Hawaiian Electric Company (HECO) substation located near the main gate along the northern property line. Secondary substations reduce the 46-kilovolt (kV) power for local distribution stations. Substation A is closest to the project site and steps the power down to 11.5 kV. It is a back-up substation for emergency use (US Navy, 2008). The distribution is through a combination of 11.5 kV and 46 kV overhead and underground power lines.

Water Service: The current primary potable water source at the former BPNAS is the Barber's Point well located near Makakilo, several miles north of Kalaeloa (Earth Tech 1998b). This well was constructed in the early 1940's and is equipped with two deep well turbine pumps capable of pumping up to 6,000 gallons per minute (gpm) (2,800 gpm and 3,200 gpm each). Potable water storage is provided by two underground reinforced concrete reservoirs which were also constructed in the early 1940's. The potable water source and distribution system at Kalaeloa is currently owned and operated by the Navy and is considered a private water system. Pural Water Specialties Co. is, however, working through the Public Utilities Commission (PUC) process to acquire this system.

A 24 inch main is located along the north and east of the HIARNG site along Midway and Saratoga Avenue (Jacobs 2008). There are plans being considered to improve the general utility infrastructure in Kalaeloa for future development (Jacobs 2007, 2008). These plans may include special taxes or fees on a prorated basis to land owners. Where applicable, new water infrastructure would conform to Board of Water Supply standards. Water lines for the proposed PHRL would connect to the existing main unless a new line or other arrangements are available prior to construction, approval for this connectivity would need to be sought from the HIARNG.

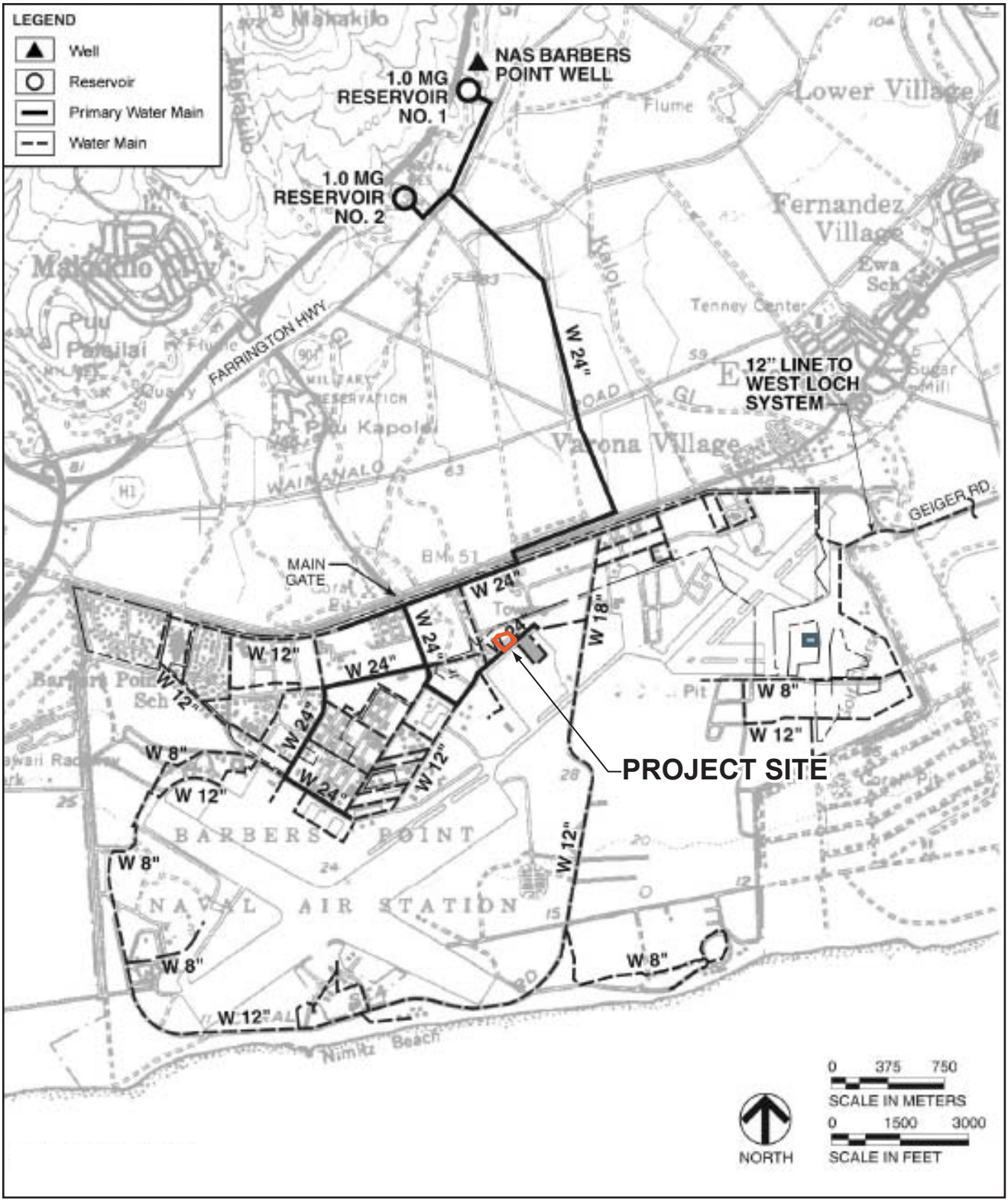
Kalaeloa's potable water system encompasses:

1. The NASBP well (owned by the Navy), pumping station, and two 1-million gallon (3,785-cubic meter) underground concrete reservoir tanks located about two miles (3.2 km) north of Kalaeloa near Makakilo; and

2. The distribution system, which includes 24-inch (600 millimeter), 18 inch (400 millimeter), 12-inch (300 millimeter), and 8-inch (200-millimeter) water distribution mains.

The general configuration of the Kalaeloa potable water system is shown in Figure 5-9. Water demand for firefighting is supplied by the two reservoir tanks.

Non-potable water is available in the form of reclaimed water from the City and County of Honolulu's Honouliuli WWTP (13 mgd of R-1 and R-0 water). Non-potable water distribution lines extend from the Honouliuli WWTP along the north and west boundaries of Kalaeloa, and provide non-potable irrigation water to the Barbers Point Golf Course.



Source: Navy, EA for Conveyance of Navy Retained Land and Utility Systems, Kalaeloa, Oahu, Hawaii 2008

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	POTABLE WATER DISTRIBUTION SYSTEM	5-9

Impacts and Mitigation Measures

Proposed Action: New infrastructural improvements, such as the Enterprise Energy Corridor project will ensure that sufficient electrical service is provided to the region to support future regional development. It is anticipated that the proposed UH PHRL will rely on this new Energy Corridor once it is operational. The operations and construction of the proposed PHRL are not anticipated to significantly impact Electrical Service to the Kalaeloa region, and the design of the PHRL would further incorporate energy efficient features, where practicable to further mitigate energy consumption.

Between 8500 and 12000 gallons per day of water is anticipated to be used by the PHRL under full operation and connectivity to the existing system would need to be sought from the HIARNG. This use (8500-12000 gallons per day) will minimally contribute to regional water consumption and will not restrict future development in Kalaeloa (In comparison, the HIARNG utilizes an estimated 96,000 gallons per day of potable water).

No Action Alternative: Under the no action alternative, the proposed PHRL would not be developed. Consequently, there would be no impact to regional utility service or infrastructure.

5.14 Environmental Justice

Pursuant to Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations,* environmental justice analyses identify and address any disproportionately high and adverse health effects on minority or low income populations. Adverse health effects may include bodily impairment, infirmity, illness and or death. Adverse environmental effects include socioeconomic effects, when those impacts correlate to impacts on the natural or physical environment.
Disproportionately high and adverse human health effects are identified by assessing these three factors:

- Whether the adverse health effects, which may be measured in risks or rates, are significant or above generally accepted norms. Adverse health effects may include bodily impairment, infirmity, illness or death.

- Whether health effects occur in a minority population or low-income population affected by cumulative or multiple adverse exposures from environmental hazards.

  Whether the risk or fate of exposure to a minority population or low income population to an environmental hazard is significant and appreciably exceeds or is likely to appreciably exceed the risk or rate to the general population or other appropriate comparison group.

In order to evaluate issues of environmental justice, data related to the distribution of race and poverty status must be examined. For purposes of this analysis, minority and low-income populations are defined as:

Minority Populations: Persons of Hispanic, African American, American Indian and Alaskan Native, Asian, Pacific Islander, or other non-white race (as reported in the 2000 census)

Low Income Populations: Persons living below the poverty level, based on a total annual income of $25,360 for a family of four persons in Hawaii (Federal Register 2009).

U.S. Census 2010 data for census tract 85.02, encompassing the broader area surrounding the project site, and the City and County of Honolulu were evaluated. Population distribution data for these are summarized in Table 5-4. Minorities comprise approximately 68.4% of the population in census tract 85.02 compared to 79.15% of the population in Honolulu County (USCB 2010). The percent of population living below the poverty level in census tract 85 was 11.43% compared to the City and County of Honolulu at 9.67% (USCB 2010).

Table 5-4 Minority and Low-Income Population Data

Geographic Area	Total Population (2010)	Minority (2010)		Below Poverty Level (2010)	
		Population	Percent of Total	Households	Percent of Total
Census Tract 85.02	2136	1461	68.40%	64	11.43%
Honolulu County	953207	754475	79.15%	20815	9.67%

Impacts and Mitigation Measures

Proposed Action: Limited residential uses exist within the Kalaeloa region. The nearest housing development is operated by Carmel Partners' and is located approximately 1000 feet from the subject project site. According to the 2010 census, no one in this housing development was living below the poverty level (USCB 2010). Other nearby residential uses include transitional housing for a limited number of homeless veterans. The percentages of residents in census tract 85.02 who fall under the classification of minority or low-income do not significantly deviate from the percentages found in the wider population sample offered by Honolulu County. In addition, there are no special circumstances that would result in disproportionately high and adverse impacts on minority or low-income populations from any exposure pathway, as discussed in section 5.10. Therefore, there would be no Environmental Justice impacts from the construction or operation of the proposed PHRL.

To help address environmental justice issues, local, county, state and Federal agencies have been contacted to provide comments on the proposed project.

No Action Alternative: As there are no disproportionately high numbers of minority or low-income residents in the Kalaeloa region, there is no discernable potential for health and/or environment risks to the public. Likewise, no Environmental Justice impacts would arise absent the development of the proposed PHRL.

5.15 Cumulative Impacts

Cumulative Impacts are impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future

actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can arise as result of individually minor but collectively significant actions that take place over a period of time (40 CFR 1508.7). The cumulative impacts analysis presented in this EA is based on the potential effects from the construction and operation of several proposed and new facilities in the Kalaeloa Region: the proposed PHRL Facility, future expansion of HIARNG operations and facilities, the development of a new 150,000 square foot Federal Bureau of Investigation (FBI) Complex, and the development of a 5 megawatt Solar Farm.

Impacts and Mitigation Measures

Proposed Action: Cumulative impacts from the Proposed Action, along with the previously identified future and planned developments would be minor or insignificant for all resource areas assessed. Notably, Findings Of No Significant Impact were issued for EA's prepared for the HIARNG and Solar Farm projects in Kalaeloa (HIARNG. 2003a, Kalaeloa Home Lands LLC 2012). Relative to the magnitude of recent and proposed developments in the region, the impacts of the proposed action on land use, air quality, noise, geology and soils, water resources, biological resources, cultural resources, socioeconomics, environmental justice, transportation, hazardous materials and wastes, utilities and public services, and visual resources would be insignificant. Combined with the anticipated insignificant impacts of future and planned developments, the cumulative impacts of the Proposed Action would have an insignificant impact on environmental resources in Kalaeloa.

No Action Alternative: Cumulative impacts for all resource areas assessed would be minor or insignificant under the No Action Alternative.

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6. RELATIONSHIP TO PLANS AND POLICIES

6.1 State of Hawaii

6.1.1 Hawaii State Plan

The Hawaii State Plan, adopted in 1978 and revised in 1988, establishes the themes, goals, objectives, and priority guidelines to guide the future long-range development of the State. The Hawaii State Plan provides a basis for determining priorities, allocating limited resources, and improving coordination of State and County Plans, policies, programs, projects, and regulatory activities. The plan establishes a set of themes, goals, objectives, and policies that are meant to guide the State's long-range growth and development activities. The proposed project is consistent with the following applicable objectives and policies:

Sec. 226-6 Objectives and policies for the economy – in general.

(a) Planning for the State's economy in general shall be directed toward achievement of the following objectives:

(1) Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawaii's people.

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

(1) Strive to achieve a level of construction activity responsive to, and consistent with, state growth objectives.

(2) Foster greater cooperation and coordination between the government and private sectors in developing Hawaii's employment and economic growth opportunities.

Discussion: The proposed project will create numerous short- and long-term employment and economic opportunities. Short-term employment and economic opportunities will be tied to the construction of the project, which will take approximately 2 years to build. Long-term opportunities will be associated with the operation of the facility and the consequent increase in regional economic activity. Through its operations, the project will create about 20 additional jobs. Long-term indirect and induced employment will also be generated by the proposed project.

Sec. 226-6 Objectives and policies for socio-cultural advancement– health.

(a) Planning for the State's socio-cultural advancement with regard to health shall be directed towards achievement of the following objectives:

(1) Fulfillment of basic individual health needs of the general public.

(2) Maintenance of sanitary and environmentally healthful conditions in Hawaii's communities.

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

(1) Provide adequate and accessible services and facilities for prevention and treatment of physical and mental health problems, including substance abuse.

(2) Encourage improved cooperation among public and private sectors in the provision of healthcare to accommodate the total health needs of individuals throughout the State.

(3) Encourage public and private efforts to develop and promote statewide and local strategies to reduce health care and related insurance costs.

(4) Foster an awareness of the need for personal health maintenance and preventive health care through education and other measures.

(5) Provide programs, services, and activities that ensure environmentally healthful and sanitary conditions.

(6) Improve the States capabilities in preventing contamination by pesticides and other potentially hazardous substances through increased coordination, education, monitoring, and enforcement.

Discussion: The proposed project is consistent with the aforementioned objectives and policies outlined. The proposed PHRL facility will serve to augment the biodefense capabilities of the state, thereby improving the State's ability to prevent as well as react to health hazards, as well as foster public and private efforts to accommodate the health needs of individuals throughout the State.

Sec. 226-12 Objectives and policies for the physical environment – scenic, natural beauty, and historic resources.

(a) Planning for the State's physical environment shall be directed towards achievement of the objective of enhancement of Hawaii's scenic assets, natural beauty, and multi-cultural/historical resources.

(b) To achieve the scenic, natural beauty, and historic resources objective, it shall be the policy of this State to:

1) Promote the preservation and restoration of significant natural and historic resources.

(7) Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.

Discussion: The proposed project will not impact the scenic, natural beauty of the islands, and will not compromise historic or cultural resources.

6.1.2 Kalaeloa Master Plan

In 1999, the Barbers Point Naval Air Station was closed, and the process of transferring the Navy lands to civilian control began. In 2000, the Kalaeloa Redevelopment Plan was prepared by the Barbers Point Naval Air Station Redevelopment Commission and accepted as the Kalaeloa Special Area Plan by the City Council (Res. 01-86, April 2001), In July 2002, Act 184 of the 2002 Hawaii State Legislature (SB 2702, SD2, HD2, CD1) transferred redevelopment responsibility for Kalaeloa from the Naval Air Station Barbers Point Redevelopment Commission to the Hawaii Community Development Authority (HCDA). HCDA assumed responsibility for redevelopment of Kalaeloa, overseeing remaining conveyances, contract administration, promulgation of administrative rules, and other tasks related to the Redevelopment Commission.

In March 2006, HCDA prepared the Kalaeloa Master Plan to outline the future redevelopment of Kalaeloa, the former Barbers Point Naval Air Station. This Master Plan is intended to serve as an amendment to the existing Kalaeloa Community Redevelopment Plan, prepared as part of the U.S. Navy's Base Realignment and Closure (BRAC) process. Doing so will allow the Kalaeloa Community Redevelopment Plan to retain its statutory function as the principal policy and planning document for HCDA's use in coordinating with federal, state, and county government agencies, developers, private landowners, and the community.

The proposed University of Hawaii Pacific Health Research Lab (PHRL) is consistent with the following core values and guiding principles of the Kalaeloa Master Plan:

- *Support the multiplicity of uses at Kalaeloa and encourage the achievement of excellence in many fields of endeavor, including: education, research, technology, defense, commerce, sports, culture and the arts*

- *Focus redevelopment resources to create both social and economic value by emphasizing community needs for education, open space, recreational facilities, and quality careers and jobs.*

- *Understand that realization of Kalaeloa as a Center for Excellence requires a sound fiscal strategy of public-private partnerships of successful businesses, meaningful careers, increased land values, and an increased tax base.*

- *Recognize that the vision for Kalaeloa cannot be achieved without meaningful community involvement, and commit to integrate community needs and interests into the redevelopment process.*

Discussion: Kalaeloa, aligned with the Kalaeloa Master Plan's vision for a new urban center in the Ewa Region, is uniquely situated to create a sustainable urban environment where a community can live, work, learn and play. The proposed

development and operation of the PHRL will facilitate this objective through harnessing emerging technologies, research, and ecologically sustainable development as a means of creating jobs and facilitating economic development. Moreover, the presence of a Regional Biosafety lab will hopefully serve to catalyze the growth of the local bio-tech industry, as well as site a number of high paying, extremely specialized professional fields within Kalaeloa. Specifically, the proposed PHRL will serve to pioneer the development of technology research and development in Kalaeloa, and offer the potential to help diversify Hawaii's economy and cultivate sectors of economic growth potential in partnership with the University of Hawaii and other government agencies, including the Centers for Disease Control, the National Institutes of Health, and the State Department of Health.

6.1.3 State Land Use District

The State Land Use Law, Chapter 205, HRS is intended to preserve, protect, and encourage the development of lands in the State for uses that are best suited to the public health and welfare of Hawaii's people. Under Chapter 205, HRS all lands in the State of Hawaii are classified by the State Land Use Commission (LUC) into four major categories referred to as State Land Use Districts. These districts are identified as the Urban District, Rural District, Agricultural District, and Conservation District. The project site is designated within the Urban District (see Figure 6-1).

6.1.4 Chapter 344 State Environmental Policy

The purpose of Chapter 344, State Environmental Policy is to "establish a state policy which will encourage productive and enjoyable harmony between people and their environment, promote efforts which will prevent of eliminate damage to the environment and the biosphere and stimulate the health and welfare of humanity, and enrich the understanding of the ecological systems and natural resources important to the people of Hawaii." This section discusses the project's consistency with the pertinent goals, policies, and guidelines described under Chapter 344, HRS.

Chapter 344,Section 3 Environmental Policy. It shall be the policy of the State, through its programs, authorities, and resources to:

(1) Conserve the natural resources, so that land, water, mineral, visual, air and other natural resources are protected by controlling pollution, by preserving or augmenting natural resources, and by safeguarding the State's unique and natural environmental characteristics in a manner which will foster and promote the general welfare, create and maintain conditions under which humanity and nature can exist in productive harmony, and fulfill the social economic, and other requirements of the people of Hawaii.

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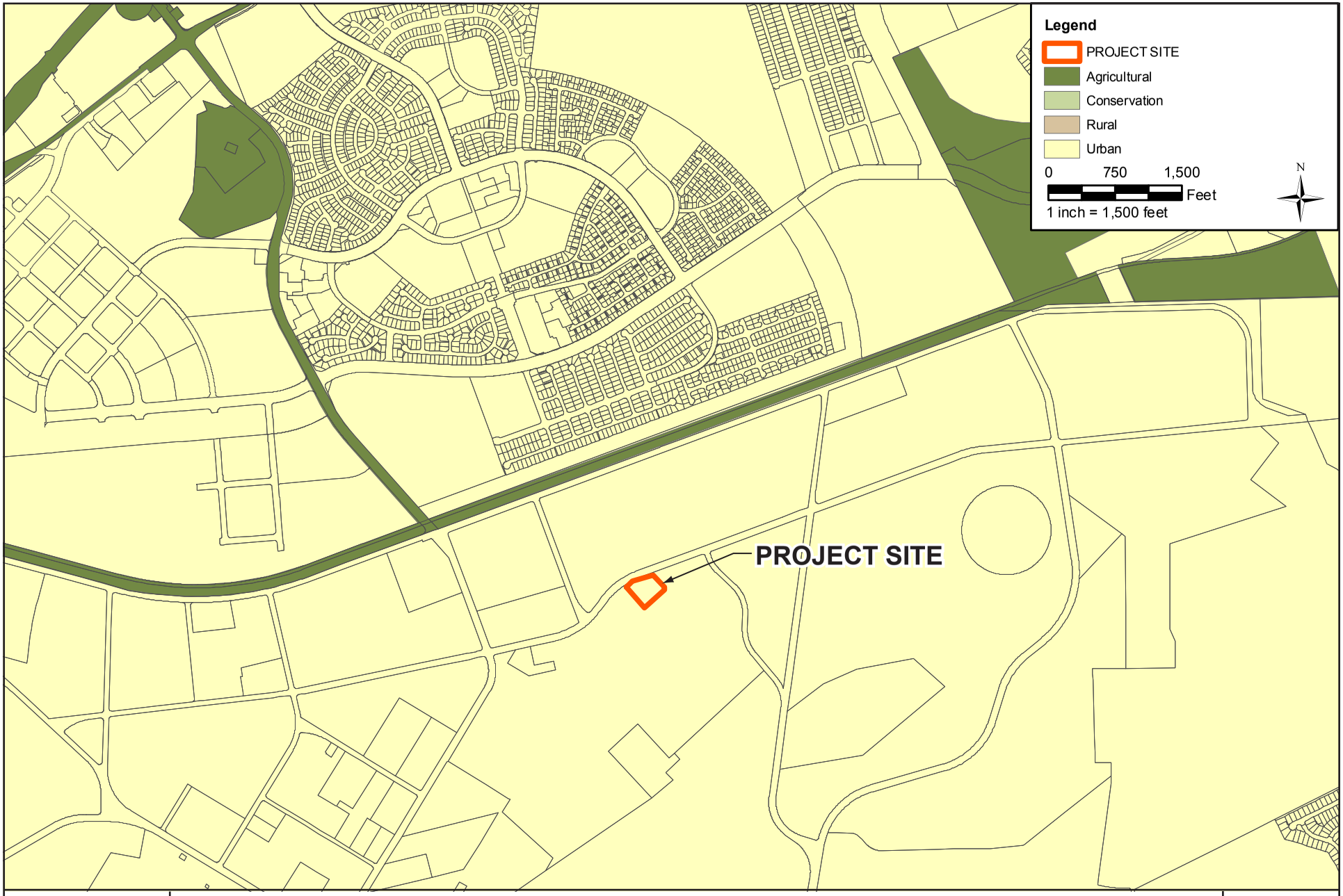

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STATE LAND USE DISTRICT MAP

FIGURE 6-1

(2) Enhance the quality of life by:

(A) Setting population limits so that the interaction between the natural and artificial environments and the population is mutually beneficial;

(B) Creating an opportunities for the residents of Hawaii to improve their quality of life through diverse economic activities which are stable and in balance with the physical and social environments;

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

(D) Establishing a commitment on the part of each person to protect and enhance Hawaii's environment and reduce the drain on nonrenewable resources.

Discussion: The development and operation of the proposed PHRL is consistent with the State's environmental policy, as outlined by Chapter 344, HRS. No significant land, water, mineral, visual, air, or other natural resources will be significantly impacted, and the State's unique and natural environmental characteristics will be unblemished by the proposed facility. Moreover, the PHRL will serve to augment and solidify the State's biodefense capabilities, further safeguard public health and welfare, catalyze economic activity in advanced fields of research, creating opportunities for the residents of Hawai'i to improve their quality of life through the pursuit of highly specialized career paths that would not otherwise exist, and enrich our understanding of pathogens through research.

6.1.5 Hawaii Coastal Zone Management Program

The National Coastal Zone Management Program was created through passage of the Coastal Zone Management Act of 1972. Hawaii's Coastal Zone Management (CZM) program, adopted in 1977 as Chapter 205A, HRS, provides a basis for protecting, restoring, and responsibly developing coastal communities and resources. The Hawaii CZM area includes all lands within the state and the areas seaward to the extent of the State's management jurisdiction. A discussion of the project's consistency with the objectives and policies of the CZM program is provided below.

6.1.5.1 Recreational Resources

Objective:

Provide coastal recreational opportunities accessible to the public.

Policies:

(1) Improve coordination and funding of coastal recreation planning and management.

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

(a) Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;

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

(c) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;

(d) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;

(e) Encouraging expanded public recreational use of county, State, and Federally owned or controlled shoreline lands and waters having recreational value;

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

(g) Developing new shoreline recreational opportunities, where appropriate, such as artificial reefs for surfing and fishing; and

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

Discussion: The proposed project is consistent with the aforementioned policies outlined by the Hawaii Coastal Zone Management Program and will not impact coastal recreational opportunities and resources.

6.1.5.2 Historic Resources

Objective:

Protect, preserve, and where desirable, restore those natural and man-made historic and pre-historic resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

Policies:

(1) Identify and analyze significant archaeological resources;

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

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

Discussion: The proposed project is consistent with the aforementioned policies outlined by the Hawaii Coastal Zone Management Program and, as previously discussed in Chapter 5, no historic properties will be affected by the proposed project.

6.1.5.3 Scenic and Open Space Resources

Objective:

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

Policies:

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

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

(3) Preserve, maintain and where desirable, improve and restore shoreline open space and scenic resources; and

(4) Encourage those developments that are not coastal dependent to locate in inland areas.

Discussion: The proposed project is consistent with the aforementioned policies outlined by the Hawaii Coastal Zone Management Program and will not impact scenic and open space resources.

6.1.5.4 Coastal Ecosystems

Objective:

Protect valuable coastal ecosystems from disruption and minimize adverse impacts on all coastal ecosystems.

Policies:

(1) Improve the technical basis for natural resources management;

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

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

(4) Promote water quantity and quality planning and management practices, which reflect the tolerance of fresh water and marine ecosystems and prohibit land and water uses, which violate State, water quality standards.

Discussion: The proposed project is consistent with the aforementioned policies outlined by the Hawaii Coastal Zone Management Program and will not impact coastal ecosystems

6.1.5.5 Economic Uses

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

Policies:

(1) Concentrate in appropriate areas the location of coastal dependent development necessary to the State's economy;

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

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

a) Utilization of presently designated locations is not feasible;

b) Adverse environmental effects are minimized; and

c) Important to the State's economy.

Discussion: The proposed project is consistent with the aforementioned policies outlined by the Hawaii Coastal Zone Management Program and will be designed and developed to minimize adverse social, visual, and environmental impacts in the coastal zone management area.

6.1.5.6 Coastal Hazards

Objective:

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

Policies:

(1) Develop and communicate adequate information on storm wave, tsunami, flood erosion, and subsidence hazard;

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

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

(4) Prevent coastal flooding from inland projects.

Discussion: The proposed project is consistent with the aforementioned policies outlined by the Hawaii Coastal Zone Management Program and will fully comply with

the requirements of the Federal Flood Insurance program and will be designed and will not otherwise increase the risk of coastal hazard.

6.1.5.7 Managing Development

Objective:

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

Policies:

(1) Effectively utilize and implement existing law to the maximum extent possible in managing present and future coastal zone development;

(2) Facilitate timely processing of application for development permits and resolve overlapping or conflicting permit requirements; and

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

Discussion: The proposed project is consistent with the aforementioned policies outlined by the Hawaii Coastal Zone Management Program and will fully comply with all required development permits. Moreover, this Environmental Assessment (EA) serves to communicate potential short- and long-term impacts of the proposed project.

6.1.5.8 Public Participation

Objective:

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

Policies:

(1) Maintain a public advisory body to identify coastal management problems and to provide policy advice and assistance to the coastal zone management program;

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

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

Discussion: The proposed project does not involve a program to promote public awareness, education or participation in coastal management.

6.1.5.9 Beach Protection

Objective:

Protect beaches for public use and recreation.

Policies:

(1) Locate new structures inland from the shoreline setback to conserve open space and to minimize loss of improvements due to erosion;

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

(3) Minimize the construction of public erosion-protection structures seaward of the shoreline.

Discussion: The proposed project is consistent with the aforementioned policies outlined by the Hawaii Coastal Zone Management Program. The proposed project is situated far from beaches actively used by the public for recreation, and does not encompass the construction of any erosion-protection structures.

6.1.5.10 Marine Resources

Objective:

Implement the State's ocean resources management plan.

Policies:

(1) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;

(2) Assure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;

(3) Coordinate the management of marine and coastal resources and activities management to improve effectiveness and efficiency;

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

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

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

Discussion: The proposed project is consistent with the aforementioned policies outlined by the Hawaii Coastal Zone Management Program. The proposed project does not impact marine resources.

6.2 City and County of Honolulu

6.2.1 City and County of Honolulu General Plan

The City and County of Honolulu General Plan is "a comprehensive statement of objectives and policies which sets forth the long-range aspirations of Oahu's residents and the strategies of actions to achieve them. It is a focal point of a comprehensive planning process that addresses physical, social, economic, and environmental concerns affecting the City and County of Honolulu." The revised 1992 edition of the General Plan is currently used by the City and County of Honolulu.

The General Plan is a guide for all levels of government, private enterprise, neighborhood and citizen groups, organizations, and individual citizens in 11 areas of concern. The General Plan objectives and polices applicable to the proposed PHRL are set forth below:

Objective A: To promote employment opportunities that will enable all the people of Oahu to attain a decent standard of living.

Policy 1: Encourage the growth and diversification of Oahu's economic base

Policy 2: Encourage the development of small businesses and larger industries which will contribute to the economic and social well-being of Oahu residents.

Policy 6: Encourage the continuation of a significant level of Federal employment on Oahu.

Objective F: To increase the amount of Federal spending on Oahu.

Policy 1: Take full advantage of Federal programs and grants which will contribute to the economic and social well-being of Oahu's residents.

Objective G: To bring about orderly economic growth on Oahu.

Policy 1: Direct Major economic activity and government services to the primary urban center and the secondary urban center at Kapolei.

Discussion: The proposed development and operation of the PHRL is aligned with the objectives and policies outlined above. The PHRL will provide numerous economic opportunities to the City and County of Honolulu throughout the course of its development, in the form of construction and construction related activity, and through its operation, in the form of specialized biodefense and research related activity. Further, the proposed project will create specialized career opportunities that would otherwise not exist. The proposed facility will be developed and operated by the University of Hawaii (UH) in participation with the National Institutes of Health (NIH), a federal agency, and will utilize federal funds in the form of a grant from the National Institute of Allergy and Infectious Diseases.

6.3 Ewa Development Plan

The Ewa Development Plan was created in August 1997 by the City and County of Honolulu Planning Department. It has since been updated with the most current version a public review draft (DPP 2008). The Ewa Development Plan guides land use in the greater area

surrounding Kalaeloa. The intent of the Ewa Development Plan is to provide for open space and regional and community parks and recreation, manage cultural resources, develop the City of Kapolei, and guide both residential and nonresidential development. The proposed action is consistent with the F-1 land use designation provided for the property in the Kalaeloa Redevelopment Plan. Additionally, the proposed PHRL's development and operation is consistent with the policies and guidelines of the plan as noted below:

3.7.4.2 Planning Principles: Kalaeloa (Barbers Point Naval Air Station – after it is returned to civilian use)

Regional Growth Pattern: Conversion of the base to civilian use should be used as an opportunity to integrate the circulation system and land use pattern of the Ewa Plain.

Discussion: The proposed development and operation of the PHRL is consistent with the Ewa Development plan and aligned with its policies and guidelines. The proposed facility will be environmentally and culturally sensitive to the site and greater region, and will encompass low-rise, non-visually intrusive development. The location of proposed project site will serve to integrate civilian and non-civilian uses throughout the Kalaeloa-Barbers Point Naval Air Station (BNPAS) region, as well as take advantage of inherent security advantages offered by close proximity to HIARNG facilities and operations.

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7. DETERMINATION AND COMPLIANCE

Based on analysis of the proposed action, significant impacts are not expected to occur as result of the proposed development of the University of Hawaii Pacific Health Research Laboratory (PHRL) at Kalaeloa.

The significance criteria to make this determination are set forth below and in Hawaii Administrative Rules Title 11, State of Hawaii Department of Health, Chapter 200, Environmental Impact Statement Rules.

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

The project site does not provide habitat for Federal or State of Hawaii listed or candidate threatened or endangered species of flora or fauna. The project site has been altered by historic and modern land uses, including grading, grubbing, and construction of the concrete aircraft parking apron. Further, there are no distinctive or unique natural features on the project site. Thus, development of the PHRL will not result in the irrevocable loss or destruction of natural resources.

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

The project site is located in an area zoned F-1 Military, and encompasses a paved parking lot. The development and operation of the proposed PHRL will be consistent with current zoning, adjacent land uses, and the overall industrial character of Kalaeloa. The agricultural lands classification for the project site is “unclassified”, indicating that they are not suited for high yield agriculture. Consequently, the development of the proposed PHRL will not curtail the range of beneficial uses of the environment.

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

Development of the PHRL will not conflict with long-term environmental policies, goals, and guidelines of the State of Hawaii. The potential adverse impacts are associated with short-term construction-related activities and can be mitigated through adherence to standard construction mitigation practices.

4. *Substantially affect the economic welfare, social welfare, and cultural practices of the community or state*;

The PHRL will be a significant resource for the State. Development of the PHRL would provide short-term benefits in the form of construction jobs. Further, the long term operation of the PHRL no adverse effects on the economy or social welfare of the community.

5. *Substantially affects public health*;

Development of the PHRL will significantly augment the State of Hawaii's biodefense capabilities. The design of the PHRL facility will comply with Federal, State, and City rules and regulations which will ensure that there are no adverse effects to public health. In addition, analysis has demonstrated that there no adverse noise or air quality impacts would result from the construction and operation of the proposed PHRL.

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

The construction and operation of the PHRL will not significantly contribute to population growth or to an increased demand for utility services. Consequently the development of the PHRL will not result in substantial secondary impacts, such as population changes or affect the need for public facilities.

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

Development of the PHRL is anticipated to result in minor short-term impacts to noise and air quality in the immediate vicinity of the project site during the period of construction. Much of this is consistent with the industrial and military base activities that normally occur on neighboring parcels. The long-term operation of the proposed PHRL will not significantly impact adjacent land uses.

The project site does not contain Federal or State listed or candidate threatened or endangered species of flora or fauna. The project site has been altered by historic and modern land uses, including construction of an asphalt/concrete parking lot. The project site has no distinctive or unique natural features.

Construction of the PHRL may result in potential impacts to storm water runoff over the existing project site. On-site drainage injection wells will be used to collect runoff so it can percolate into the subsurface and not affect surrounding land uses.

Based on the above findings, development of the PHRL will not result in the substantial degradation of environmental quality.

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

The project site will be used as a research facility. Development of the PHRL will not involve a commitment to any other development activity. As a result, development of the PHRL will not have a cumulative effect upon the environment or involve a commitment for larger actions.

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

The project site does not contain Federal or State listed, candidate threatened, or endangered species of flora or fauna. Thus, development of the PHRL will not affect threatened or endangered species.

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

Operation of construction equipment will increase noise and exhaust emission levels in the immediate vicinity of the proposed project site during the construction period. Since the project site is adjacent to aviation related and industrial-type of land uses, the area does not contain noise and emissions-sensitive land uses. Thus, there will be no adverse effects to these resources. Some short-term construction related impacts on air quality will be unavoidable but not detrimental. Construction activities must comply with provisions of Chapter 11-60.1, Hawaii Administrative Rules (DOH), "Air Pollution Control," and, with respect to fugitive dust, Section 11-60.1-33. Once operational, the project will contribute a slight increase in noise and air emissions to the local area.

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

The project site is located within the area covered by Flood Insurance Rate Map Panel 310, Map Number 15003C0310F and Panel 320, Map Number 15003C0320F, both dated September 30, 2004. According to these two maps, the project site located within Zone D, "areas which flood hazards are undetermined, but possible." Development of the PHRL will not cause damage to any environmentally sensitive area.

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

There are no scenic vistas or view planes that would be affected by development of the project site.

13. *Requires substantial energy consumption*.

The development and operation of the PHRL will not result in a substantial increase in energy consumption.

Based on these findings and the assessment of potential impacts from development of the PHRL, significant impacts are not expected to occur.

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8. LIST OF REQUIRED PERMITS

UH will conduct all the required land use planning and environmental assessment activities and will obtain relevant licenses, permits, and other approvals to comply with Federal, State, and local regulations. These include, but are not limited to the following items:

- HCDA – Plan Review Use
- HCDA – Site Development Plan Submittal Process
- City & County of Honolulu – Building Permit
- City & County of Honolulu – Grading Permit
- City & County of Honolulu – Industrial Wastewater Discharge Permit
- State of Hawaiʻi Air Quality Permit (if required based on design elements)
- NPDES General Permit for Storm Water Control in Construction Activities
- State of Hawaii Permit for Import and Possession of Micro-organisms
- Federal Control of Select Agents – USDA and CDC
- Federal Rules on Transportation of Agents – DOT/IATA
- University of Hawaiʻi Radiation Equipment Licensure

TABLE 8-1: SUMMARY OF REQUIRED PERMITS

TABLE 8-1: Summary of Potential Permits and Agency Approvals Required for the UH PHR Lab

ENTITY	REQUIREMENTS	PURPOSE
NIH/ CDC/ USDA	3rd Party Commissioning Report	Certification of biocontainment security and operational readiness
	Annual BSL-3 Facility and Procedures Re-Verification	Verification of biocontainment security and operational readiness
	BSL Permit	Operation of a BSL-3 laboratory
	Animal Holding Permit	Operation of an animal holding area for research
	USDA Import Permit, USDA License, Office of Laboratory Animal Welfare Assurance	Importation and humane care and use of vertebrate animals for research
	Vivarium Permit	Operation of a plant management area for research
	Select Agent Registration	Possession and use of select agents for research
State of Hawaii	National Pollutant Discharge Elimination System (NPDES)	Stormwater associated with construction activity, for construction activity dewatering, for hydrotesting water
	HCDA Development Permit	For development in HCDA management area
	Air Quality Permit	Permit for air quality emissions for construction
	Radiation Equipment Permit	Permit to operate radiation equipment for research
	Permit of Import and Possession of Micro-organisms	Permit for research with non-native micro-organisms
City and County of Honolulu	Building Permit	Construction of facility
	Demolition Permit	Construction of facility
	Excavation Permit	Construction of facility
	Grading Permit	Construction of facility
	Stockpiling Permit	Construction equipment and materials stockyard/staging area
	Industrial Wastewater Discharge Permit	Construction of Facility / Facility Operation
University of Hawaii	Radiation Equipment Licensure	Authorization to operate radiation equipment for research

9. LIST OF PREPARERS AND CONTRIBUTORS

This report was prepared for the University of Hawai'i (UH) and under the direction of the University of Hawai'i Research Corporation by Wilson Okamoto Corporation (WOC). Members of WOC professional staff and specialist sub consultants are listed below.

University of Hawaii

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Wilson Okamoto Corporation

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Cultural Surveys Hawaii

Brian Cruz, Cultural Research Specialist
Rebecca Choi, Cultural Research Specialist

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10. REFERENCES CITED

CDC and NIH (Centers for Disease Control and Prevention and National Institutes of Health), 2009, *Biosafety in Microbiological and Biomedical Laboratories*, 5th ed., U.S. Department of Health and Human Services, Public Health Service, Washington, D.C., December.

DPP (Department of Planning and Permitting, City & County of Honolulu). 2008. Public Review Draft, *Ewa Development Plan*. October 2008.

Earth Tech. 1998b. Final Conceptual Study for the Relocation of the Hawaii Army National Guard to Barbers Point Naval Air Station. Prepared for the Hawaii Army National Guard, State of Hawaii, Department of Defense.

Federal Register. 2009. Vol. 74, No. 14, January 23, 2009, pp. 4199-4201.

FEMA, 2011, "Flood Insurance Rate Map, City and County of Honolulu Panel 310 of 395, Map Number 15003C0310G," http://www.msc.fema.gov

Gray et. al. (Gray, Hong, Bills & Associates, Inc.), 1995. Baseline Study: Infrastructure Issues Associated with the Closure of Barbers Point Naval Air Station, Ewa District, Oahu, Hawaii. Prepared for Barbers Point Naval Air Station Redevelopment Commission under direction of Helber Hastert & Fee.

HIARNG. 2003a. Environmental Assessment for the Relocation and Consolidation of the Hawaii Army National Guard to Kalaeloa, Oahu, Hawaii: Including Construction and Renovation of New and Existing Buildings and Infrastructure. Prepared by the Hawaii Department of Defense Facilities Management Office. April 2003.

Jacobs. 2007. Project Planning Document Charrette, Readiness Center (RC), Kalaeloa, Oahu, Hawaii. Prepared for the Hawaii Army National Guard. July.

Jacobs. 2008. Project Planning Document Charrette, Army Aviation Support Facility (AASF), Kalaeloa, Oahu, Hawaii. Prepared for the Hawaii Army National Guard. January.

Kalaeloa Home Lands LLC 2012. Draft Environmental Assessment Kalaeloa Homelands Solar, LLC 5.0 MW Photovoltaic Park. Prepared for the State of Hawaii Department of Hawaiian Home Lands by North Shore Consultants, LLC. February 2012.

KIMPU 2010. Kalaeloa Master Plan – Infrastructure Master Plan Updates. October 2010 Draft. Prepared by Belt Collins Hawaii Ltd.

NIAID 2012, *NIAID Introduction*, June 22, 2012, http://www.niaid.nih.gov/about/whoWeAre/Pages/moreWhoWeAre.aspx, Accessed June 2012.

NSC 1996, National Safety Council (NSC), Fourth Edition: Fundamentals of Industrial Hygiene, B.A. Plog, Editor, 1996, Itasca, Illinois.

Ohira 2006. The Honolulu Advertiser, "UH Wants Federal Lab in Kaka'ako" Rod 176 Ohira, March 21, 2006.

Seafarer's Institute, *Environmental Assessment: Seafarer's Training Center Kalaeloa, O'ahu, Hawai'i.* Prepared by the Office of Naval Research, October 2003.

University of Hawaii 2006b. University of Hawaii, *Application for Federal Assistance for PacRBL ,Submitted to the U.S. National Institutes of Health*, NIH Construction, RFA-AI-04-032 Regional Biocontainment Laboratory, April 28, 2006.

University of Hawaii, *Request for Proposals to Prepare Complete National Environmental Policy Act (NEPA) Services and State of Hawai'i Environmental Assessment (EA) Services and/or Complete Threat Risk Assessment (TRA) Services for the Pacific Regional Biosafety Laboratory*, John A. Burns School of Medicine, University of Hawaii, proposed to be developed in Kaka'ako, Honolulu, Hawaii, requested by the University of Hawaii, Honolulu, Hawaii, January 17, 2007.

USCB (U.S. Census Bureau). 2000. http://factfinder.census.gov

United States Geological Survey (USGS), 1998 F. Klein, A. Frankel, C. Mueller, R. Wesson, and P. Okubo, *Documentation for Draft Seismic-Hazard Maps for the State of Hawaii*, U.S. Geological Survey, March 9, 1998.

11. CONSULTATION

11.1 Pre-Assessment Consultation for the Draft Environmental Assessment

The following agencies and organizations were consulted during the preparation of the Draft EA. Letters soliciting comments pursuant to the requirements of Chapter 343, HRS, and Title 11, Chapter 200, HAR, State DOH, were sent on March 30, 2012, and comments were requested by April 30, 2012. A total of 23 written comments were received. Those who formally replied are indicated by an asterisk (*). All written comments and responses are included in Appendix F.

<u>Federal</u>
Animal and Plant Health Inspection Service, Plant Protection and Quarantine, U.S. Department of Agriculture
Centers for Disease Control Honolulu Quarantine Station
*U.S. Army Corps of Engineers
*Department of the Navy, Navy Region Hawaii
U.S. Coast Guard, U.S. Department of Homeland Security
U.S. Environmental Protection Agency (EPA) Region IX
U.S. Fish & Wildlife Service, U.S. Department of the Interior
*U.S. Geological Survey, U.S. Department of the Interior

<u>State</u>
*Department of Accounting and General Services (DAGS)
Department of Agriculture
Department of Business, Economic Development, & Tourism (DBEDT)
State Land Use Commission, DBEDT
Office of Planning, DBEDT
Hawaii State Energy Office, DBEDT
Hawaii Community Development Authority, DBEDT
*Department of Defense (DOD)
Hawaii Army National Guard, DOD
Hawaii State Civil Defense, DOD
*Department of Education (DOE)
*Department of Hawaiian Home Lands (DHHL)
*Department of Health (DOH)
Environmental Management Division, DOH
*Clean Water Branch, DOH
*Department of Human Services (DHS)
*Department of Land & Natural Resources (DLNR)
*Environmental Health Administration (DOH)
Environmental Planning Office, Environmental

*Health Administration (DOH)
Historic Preservation Division, DLNR
Office of Hawaiian Affairs (OHA)
*Department of Transportation (DOT)
University of Hawaii Environmental Center

County
Department of Environmental Services
*Department of Planning and Permitting
*Department of Transportation Services
Department of Emergency Management
*Board of Water Supply
*Fire Department
*Police Department
Emergency Services Department
Hawaii Community Development Authority, Kalaeloa Development District
Makakilo/Kapolei/Honokai Hale Neighborhood Board

Elected Officials
*Councilmember Tom Berg
Council Chair Nestor Garcia
Senator Mike Gabbard
Representative Sharon Har

Utilities and Communications
*Hawaiian Telcom
The Gas Company
*Hawaiian Electric Company (HECO)
Oceanic Cable
Chevron USA
BHP Hawaii

APPENDIX A:

DOCUMENTATION OF CONSULTATION, PURSUANT TO SECTION 106 OF THE NHPA

Draft Section 106 Consultation Documentation for the Pacific Health Research Laboratory Project, Honouliuli Ahupua'a, 'Ewa District, O'ahu Island, Tax Map Key (TMK): [1] 9-1-013:045 por.

Prepared for:
Wilson Okamoto Corporation
Honolulu, HI
and
National Institutes of Health (NIH)
Bethesda, MD 20892

Prepared by:
Cultural Surveys Hawai'i (CSH)
Kailua, HI 96734

June 2012

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Section 1 Introduction

1.1 Proposed Undertaking

University of Hawai'i (UH) proposes the development of two acres in Kalaeloa comprising of a portion of Tax Map Key (TMK) parcel [1]-9-1-013:045 that is currently licensed to the Hawai'i Army National Guard (HIARNG) by the U.S. Army. The proposed UH PHR Lab facility would consist of a one-story, approximately 31,179-square-foot standalone structure (with a mechanical penthouse) situated in a secure setting capable of supporting UH's infectious disease research agenda, its local and regional partners' needs for high-containment facilities, and NIH's Biodefense Research Agenda. The facility will be programmed in accordance with applicable local, state, and federal codes and guidelines.

Biological research laboratories are classified into four categories, Biosafety Level (BSL)-1 through BSL-4. While various infectious diseases research is done in laboratories with BSL-1 and BSL-2 capabilities, a BSL-3 laboratory is required to provide a safe environment for work with more serious agents associated with human disease, especially those that can cause illness by spreading through the air. A BSL-3 laboratory is designed to protect researchers working on such agents and has special engineering and design features to prevent microorganisms from being transmitted into the environment.

The UH PHR Lab would include BSL-2 and BSL-3 laboratories, a small lab animal facility for primarily rodents, an insectary, physical plant, and support space for research, administration, and building operations. The UH PHR Lab will utilize stringent safety controls to ensure the safety and protection of the general public and the environment, and maintain the integrity of the biological materials contained within its grounds. The facility would be designed and built to withstand major storms and other natural phenomena events.

1.1.1 Project Background

NIH, through the National Institute of Allergy and Infectious Diseases, is providing a grant to the University of Hawai'i to partially fund the construction of the UH PHR Lab, a Regional Biosafety Lab. The proposed UH PHR Lab at Kalaeloa would be an integral component of NIH's Regional Biosafety Lab Network, and would be devoted to researching and detecting emerging infectious diseases, as well as the developing of rapid and more accurate diagnostic tests, drugs and vaccines for emerging and re-emerging infectious diseases in the Asia-Pacific region. This work is especially vital, given Hawai'i's position as the gateway to the United States for travelers from throughout the Asia-Pacific region, making it vulnerable to the introduction of exotic pathogens.

1.1.2 Federal and State Regulatory Framework

Due to NIH funding and involvement, as well as the proposed location of the UH PHR lab on two acres in Kalaeloa in the above mentioned parcel that is licensed to the Hawai'i Army National Guard (HIARNG) by the U.S. Army, this project is a Federal undertaking requiring

compliance with Section 106 of the National Historic Preservation Act (NHPA) and the National Environmental Policy Act (NEPA).

1.1.3 Environmental Assessment

As the proposed project will utilize State funds, an Environmental Assessment (EA) will be prepared, pursuant to Hawai'i Revised Statutes Chapter 343, and Hawai'i Administrative Rules Chapter 11-200. A traffic impact analysis report, botanical survey, faunal survey, and archaeological literature research and site inspection will be incorporated into the EA.

As the project will utilize funds from a NIH grant, the EA will also be prepared in accordance with the National Environmental Policy Act (NEPA). The National Guard Bureau will be a cooperating agency in the NEPA EA process.

In compliance with the Section 106 consultation requirements, a stakeholder engagement effort was initiated. As a part of this effort, consultation was initiated with a variety of stakeholders, including the Office of Hawaiian Affairs, the O'ahu Island Burial Council, Hui Mālama i Nā Kūpuna o Hawai'i Nei, 'Ahahui Siwila Hawai'i o Kapolei Hawaiian Civic Club and other Native Hawaiian Organizations (NHO) and traditional cultural practitioners. This document was prepared to serve as the guiding framework for managing the Section 106 consultation process for the proposed undertaking.

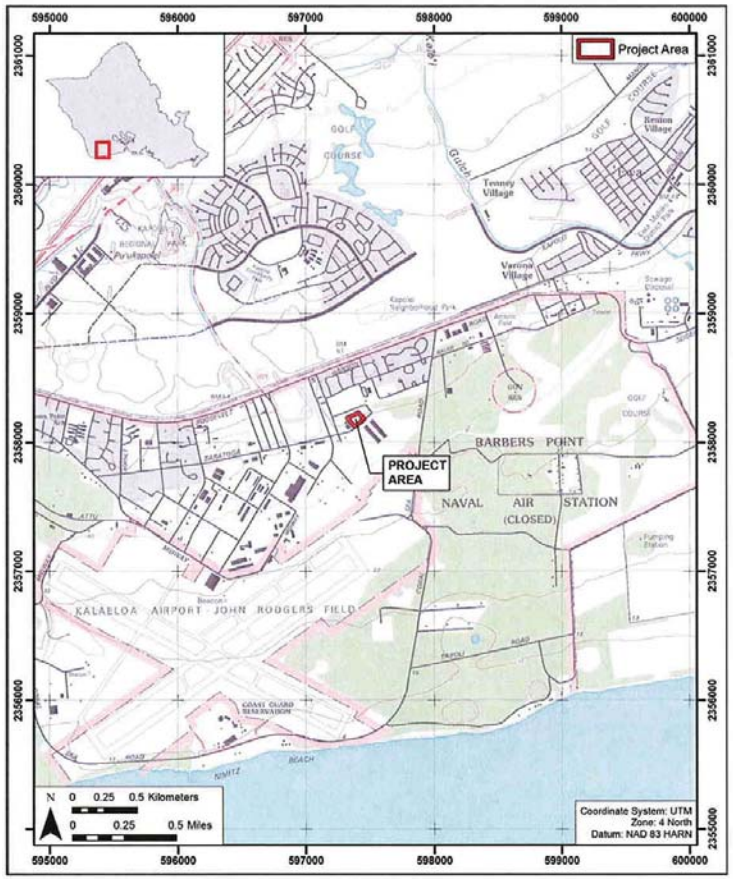


Figure 1. Portion of U.S. Geological Survey 7.5-Minute Series Topographic Map, 'Ewa Quadrangle (1998), showing the location of the project area

Table 1. Summary of Efforts for the Section 106 Consultation

Section 106 participant designation	Association	Name of Organization	Contact	Contact information	Context	Date Contacted/ Method of Contact	Comments received
Consulting Party	Native Hawaiian organization	Hui Mālama i Nā Kūpuna o Hawai'i Nei	Ayau, Halealoha	Post Office Box 190 Hale'iwa, Hawai'i 96711-0190 (808) 677-8130 Telephone/Facsimile halealoha@wave.hicv.net	Mr. Ayau was contacted as a representative of the Hui Mālama i Nā Kūpuna o Hawai'i Nei, a Native Hawaiian organization[1]	Letter initiating Section 106 consultation was mailed via email on May 5, 2012. Mr. Ayau replied on June 1, 2012	"No comments"

[1] The National Historic Preservation Act (NHPA) states that a Native Hawaiian organization is " any organization which serves and represents the interests of Native Hawaiians; has as a primary and stated purpose the provision of services to Native Hawaiians; and has demonstrated expertise in aspects of historic preservation that are significant to Native Hawaiians. The term includes, but is not limited to, the Office of Hawaiian Affairs of the State of Hawaii and Hui Malama I Na Kupuna O Hawai'i Nei, an organization incorporated under the laws of the State of Hawaii." 16 U.S.C. Section 470w(18). The NHPA defines Native Hawaiian as "any individual who is a descendant of the aboriginal people who, prior to 1778, occupied and exercised sovereignty in the areas that now constitutes the State of Hawai'i." 16 U.S.C. Section 470w(17)." (ACHP 2011).

1.2 Summary of Consultation

Pursuant to 36 CFR §800.2(c)(2), NHPA §101(d)(6)(B), and ACHP's Handbook regarding Consultation With Native Hawaiian Organizations (NHO) in the Section 106 Review Process (ACHP 2011), CSH has initiated consultation on behalf of NIH with Native Hawaiian Organizations (NHOs) regarding the proposed undertaking for the Pacific Health Research Laboratory Project.

CSH sent Section 106 letters to nine recognized NHOs on May 5, 2012. The nine NHO's included organizations such as Hawaiian Civic Clubs of 'Ewa and Kapolei, the O'ahu Island Burial Council, Nā Koa, Hui Mālama i nā Kūpuna o Hawai'i Nei and other NHOs that have traditional cultural connections to the ahupua'a (land division usually extending from the uplands to the sea) of Honouliuli.

Thus far, CSH has received responses from four of the nine NHOs, and these are comprised of the following:

1. Hui Mālama i nā Kūpuna o Hawai'i Nei, which stated that they have no comment.
2. Shad Kane of the O'ahu Island Burial Council, who stated that "the footprint of the project and the immediate area surrounding the project had been previously disturbed. The entire area had been graded by the military. The closest documented cultural resource is a short distance to the east of the project directly makai of a residential housing project makai of the Saratoga extension, west of Coral Sea Road."
3. The Boy's and Girl's Club of 'Ewa, which stated they would like to be invited to any public meetings concerning the project.
4. The Ahahui Sivila O Hawai'i o Kapolei Hawaiian Civic Club, which also stated that they would like to participate in any public meetings concerning the project.
5. The Office of Hawaiian Affairs was contacted by phone on June 21, 2012 the see if they would like to respond to the My 5, 2012 letter that was sent to them. They stated that they will send out an official response letter within a few days through the USPS.

The remaining five NHOs who did not respond were sent emails requesting a response or messages were left on the phones to contact CSH in order to submit an official response.

As new responses come in, they will be forwarded to Wilson Okamoto Corporation.

Table 1 below presents required and potential participants identified for involvement in the Section 106 consultation process for the proposed undertaking, in addition to their role in the execution of a Memorandum of Agreement (MOA) should one be required to resolve potential adverse effects on historic properties. While the list is not exhaustive, and may be augmented, it is a starting point to initiate a broad approach to Section 106 consultation.

Section 106 participant designation	Association	Name of Organization	Contact	Contact information	Context	Date Contacted/ Method of Contact	Comments received
				(808) 586-6081 repcabanilla@Capitol.hawaii.gov		phone message was left on June 21, 2012	
	Native Hawaiian organization	Hale O Na'auao	Eaton, Arlene,	5553 Cormorant Ave Ewa Beach, HI 96706 (808) 689-4858 (808) 499-6500 ext244 W	Ms. Eaton was contacted as a representative of the Hale O Na'auao, a Native Hawaiian organization	Letter initiating Section 106 consultation was mailed via email on May 5, 2012. After 48 days, a follow up phone message was left on June 21, 2012	No response as of this date
	Consulting Party	Office of Hawaiian Affairs	Crabbe, Kamana'opono, PhD	711 Kapi'olani Blvd., Suite 500, Honolulu, HI 96813		Letter initiating Section 106 consultation was mailed	Ms. Kamalani-Paikai acknowledged that OHA

Section 106 participant designation	Association	Name of Organization	Contact	Contact information	Context	Date Contacted/ Method of Contact	Comments received
	Native Hawaiian organization	'Ahahui Siwila Hawai'i o Kapolei Hawaiian Civic Club	Holden, Lance C.; Annelle Amaral	P.O. Box 700007, Kapolei, HI 96709-0007 (808) 681-5076	Mr. Holden was contacted as a representative of the 'Ahahui Siwila Hawai'i o Kapolei Hawaiian Civic Club, a Native Hawaiian organization	Letter initiating Section 106 consultation was mailed via email on May 5, 2012. After 48 days, a follow up phone call was done on June 21, 2012	Ms. Amaral stated that if there will be public meetings for this project, 'Ahahui Siwila Hawai'i o Kapolei Hawaiian Civic Club would like to attend
	Native Hawaiian organization	'Ewa Historical Society Inc.	Cabanilla, Rida	42nd Representative District Hawaii State Capitol, Room 442 415 South Beretania Street Honolulu, HI 96813 (808) 586-6080;	Ms. Cabanilla was contacted as a representative of the 'Ewa Historical Society Inc., a Native Hawaiian organization	Letter initiating Section 106 consultation was mailed via email on May 5, 2012. After 48 days, a follow up	No response as of this date

Section 106 participant designation	Association	Name of Organization	Contact	Contact information	Context	Date Contacted/ Method of Contact	Comments received
						June 21, 2012, and spoke to Mrs. Rivero	like to attend
	Native Hawaiian organization	'Ahahui Siwila Hawai'i O Kapolei Hawaiian Civic Club; O'ahu Island Burial Council	Kane, Shad			Letter initiating Section 106 consultation was mailed via email on May 5, 2012. After 48 days, CSH called and spoke to Mr. Kane. He also provided feedback via email on June 21, 2012	Mr. Kane stated the footprint of the project and the immediate area surrounding the project had been previously disturbed. T he entire area had been graded by the military. The closest documented cultural resource is a short

Section 106 participant designation	Association	Name of Organization	Contact	Contact information	Context	Date Contacted/ Method of Contact	Comments received
				(808) 594-0260 momilanil@oha.org		via email to Momilani Lazo, Dr. Crabbe's assistant on May 5, 2012. After 48 days, a CSH called OHA on June 21, 2012, and spoke to Ms. Laura Kamalani-Paikai	was in receipt of the Section 106 letter and promised to provide a response as soon as possible
	Native Hawaiian organization	Boys and Girls Club of 'Ewa: Hale Pono Ewa Beach Clubhouse	Rivero, Frances	91-884 Ft. Weaver Rd. 'Ewa Beach HI 96706 (808) 689-4182		Letter initiating Section 106 consultation was mailed via email on May 5, 2012. After 48 days, CSH called on	Mrs. Rivero stated that if there will be public meetings for this project, Boys and Girls Club of 'Ewa would

Section 106 participant designation	Association	Name of Organization	Contact	Contact information	Context	Date Contacted/ Method of Contact	Comments received
						phone message was left on June 21, 2012.	

Section 106 participant designation	Association	Name of Organization	Contact	Contact information	Context	Date Contacted/ Method of Contact	Comments received
							distance to the east of the project directly makai of a residential housing project makai of the Saratoga extension, west of Coral Sea Road
	Native Hawaiian organization	Hawaiian Civic Club of 'Ewa-Pu'uloa	Woode, Lawrence A., Jr., Pelekikena	91-221 Keaalii Way Ewa Beach, HI 96706		Letter initiating Section 106 consultation was mailed via email on May 5, 2012. After 48 days, a follow up	No response as of this date

Appendix A NIH Letter to SHPD Initiating Section 106 Consultation

DEPARTMENT OF HEALTH & HUMAN SERVICES Public Health Service

National Institutes of Health
Bethesda, Maryland 20892

Division of Environmental Protection/ORF
Bldg 13/2S11, MSC 5746
Phone: 301-496-7775
Fax: (301) 480-8656

April 05, 2012

Pua Aiu, Ph.D., Administrator
State Historic Preservation Division
Department of Land and Natural Resources
601 Kamōkila Boulevard,
Kākuhihewa Building, Room 555
Kapolei, HI 96707

Subject: Request to initiate consultation pursuant to Section 106 of the National Historic Preservation Act for the Pacific Health Research Laboratory Project, Honouliuli Ahupua'a, 'Ewa District, O'ahu Island, Tax Map Key (TMK): [1] 9-1-013:045 por.

Dear Administrator,

The National Institutes of Health (NIH), respectfully requests to initiate consultation pursuant to Section 106 of the National Historic Preservation Act for the proposed Pacific Health Research Laboratory (UH PHR Lab).

NIH, through the National Institute of Allergy and Infectious Diseases, is providing a grant to the University of Hawai'i to partially fund the construction of the UH PHR Lab, a Regional Biosafety Lab. The proposed UH PHR Lab at Kalaeloa would be an integral component of NIH's Regional Biosafety Lab Network.

UH proposes the development of two acres in Kalaeloa that comprising of a portion of TMK parcel [1]-9-1-013:045 that is currently licensed to the Hawai'i Army National Guard (HIARNG) by the U.S. Army. The proposed UH PHR Lab facility would consist of a one-story, approximately 31,179-square-foot standalone structure (with a mechanical penthouse) situated in a secure setting capable of supporting UH's infectious disease research agenda, its local and regional partners' needs for high-containment facilities, and NIH's Biodefense Research Agenda. The facility will be programmed in accordance with applicable local, state, and federal codes and guidelines.

As the proposed project will utilize State funds, an Environmental Assessment (EA) will be prepared, pursuant to Hawai'i Revised Statutes Chapter 343, and Hawai'i Administrative Rules Chapter 11-200. A traffic impact analysis report, botanical survey,

faunal survey, and archaeological literature research and site inspection will be incorporated into the EA.

As the project will utilize funds from a NIH grant, the EA will also be prepared in accordance with the National Environmental Policy Act (NEPA). The National Guard Bureau will be a cooperating agency in the NEPA EA process.

If you have other questions or require additional information regarding this request, please contact us via e-mail at nihnepa@mail.nih.gov or via standard mail at:

Environmental Quality Branch
Division of Environmental Protection, Office of Research Facilities
National Institutes of Health
B13/2W64, 9000 Rockville Pike, Bethesda, MD 20892
Attention: Valerie Nottingham, Chief

Thank you for your cooperation in this matter.

Sincerely,

Valerie Nottingham
Chief, Division of Environmental Protection, NIH

Enclosures

cc: Mr. Keith Mattson, Project Manager, University of Hawaii
cc: Mr. Maynard Young, Office of Capital Improvements, University of Hawaii System
cc: Mr. Brian Cruz, Section 106 Consultant, Cultural Surveys Hawaii
cc: Mr. Earl Matsukawa, Vice President, Director of Planning, Wilson Okamoto Corporation

UNIVERSITY OF HAWAII PACIFIC HEALTH RESEARCH LAB AT KALAELOA
Draft Environmental Assessment Pre-Assessment Consultation
Project Summary

March 2012

The University of Hawaii (UH) is proposing to construct and operate the Pacific Health Research Lab (UH PHR Lab), in partnership with the National Institutes of Health (NIH) on an approximately two acre portion of Tax Map Key (TMK) parcel 1-9-1-13:045 in Kalaeloa, Oahu. The site is located within the State of Hawaii Kalaeloa Community Development District, which is administrated by the Hawaii Community Development Authority.

Background
NIH, through the National Institute of Allergy and Infectious Diseases, is providing a grant to the UH to partially fund the construction of the UH PHR Lab, a Regional Biosafety Lab. The proposed UH PHR Lab at Kalaeloa would be an integral component of NIH's Regional Biosafety Lab Network, and would be devoted to researching and detecting emerging infectious diseases, as well as developing rapid and more accurate diagnostic tests, drugs and vaccines for emerging and re-emerging infectious diseases in the Asia-Pacific region. This work is especially vital, given Hawaii's position as the gateway to the United States for travelers from throughout the Asia-Pacific region, making it vulnerable to the introduction of exotic pathogens. Consequently, the UH PHR Lab will be available and prepared to assist national, state, and local public health efforts in the event of a bioterrorism or infectious disease emergency.

Project Site
The two acre project site in Kalaeloa comprises a portion of TMK parcel 1-9-1-13:045 which currently is licensed to the Hawaii Army National Guard (HIARNG) by the U.S. Army (see attached map). UH is currently working with the HIARNG to modify HIARNG's license so the site can be leased directly to UH. The HIARNG supports the UH PHR Lab project, and is working with the Department of Defense to coordinate this license transaction.

Previously, UH had planned to construct the proposed UH PHR Lab at the John A. Burns School of Medicine (JABSOM) Campus in Kakaako. The proposed Kalaeloa site, however, is advantageous due to its further distance from the coastline and tsunami evacuation zone. Moreover, the current site is larger, which can accommodate a single-story stand-alone laboratory. This provides an opportunity for construction cost savings and operational efficiencies over the previously proposed two-story facility in Kakaako. Furthermore, HIARNG's extensive presence in Kalaeloa also offers enhanced security for the UH PHR Lab.

Project Description
The proposed UH PHR Lab facility would consist of a one-story (including a mechanical penthouse), approximately 31,179-gross square foot (ft^2) standalone structure; the lab facility would be situated in a secure setting capable of supporting UH's infectious disease research agenda, its local and regional partners' needs for bio-containment facilities, and NIH's Biodefense Research Agenda. In addition, the facility would be programmed in accordance with applicable local, state, and federal codes and guidelines.

Biological research laboratories are classified into four categories, Biosafety level (BSL)-1 through BSL-4. While various infectious diseases research is done in laboratories with BSL-1 and -2 capabilities, a BSL-3 laboratory is required to provide a safe environment for work with more serious agents associated with human disease, especially those that can cause illness by spreading through the air. A BSL-3 laboratory is designed to protect researchers working on

1

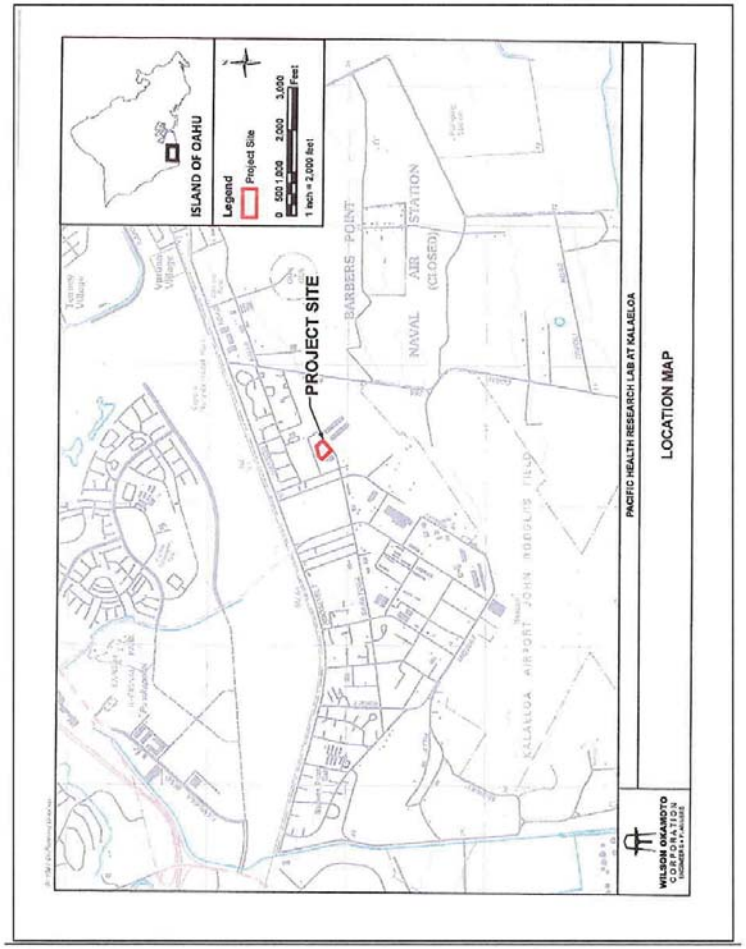
such agents and has special engineering and design features to prevent microorganisms from being transmitted into the environment.

The UH PHR Lab would include BSL-2 and BSL-3 laboratories, a small lab animal facility for primarily rodents, an insectary, physical plant, and support space for research, administration, and building operations. The UH PHR Lab will utilize stringent safety controls to ensure the safety and protection of the general public and the environment, and maintain the integrity of the biological materials contained within its grounds. The facility would be designed and built to withstand major storms and other natural phenomena events.

Environmental Assessment
An Environmental Assessment (EA) is being prepared pursuant to Chapter 343, HRS and Title 11, Chapter 200, HAR as the proposed project will involve the use of State funds. A traffic impact analysis report, botanical survey, faunal survey, and archaeological literature research and field inspection will be incorporated into the EA.

Additionally, since the project will be funded by a NIH grant, an EA pursuant to the National Environmental Policy Act (NEPA) will be required. The National Guard Bureau will be a cooperating agency in the NEPA EA process. In conjunction with the NEPA EA process, consultation pursuant to Section 7, Endangered Species Act, and Section 106, National Historical Preservation Act will be conducted.

2


ISLAND OF OAHU
Legend
Project Site
0 500 1,000 2,000 3,000
Feet
1 inch = 2,000 feet
PROJECT SITE
BARBERS POINT
NAVAL AIR STATION (CLOSED)
KALAELOA AIRPORT JOHN ROGERS FIELD
WILSON OKAMOTO CORPORATION
PACIFIC HEALTH RESEARCH LAB AT KALAELOA
LOCATION MAP

APPENDIX B:

DOCUMENTATION OF CONSULTATION, PURSUANT TO SECTION 7 OF THE ESA

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

National Institutes of Health
Bethesda, Maryland 20892

www.nih.gov

Division of Environmental Protection/ORF
Bldg 13/2S11, MSC 5746
Phone: 301-496-7775
Fax: (301) 480-8056

April 05, 2012

Dr. Loyal Mehrhoff, Field Supervisor
US Department of the Interior
Fish and Wildlife Service
300 Ala Moana Boulevard
Room 3-122, Box 50088

Subject: Request for Technical Assistance pursuant to Section 7 of the Endangered Species Act for the Pacific Health Research Laboratory Project, Honouliuli Ahupua'a, 'Ewa District, O'ahu Island, Tax Map Key (TMK): [1] 9-1-013:045 por.

Dear Mr. Mehrhoff,

The National Institutes of Health (NIH), respectfully requests technical assistance pursuant to Section 7 of the Endangered Species Act for the proposed Pacific Health Research Laboratory (UH PHR Lab).

NIH, through the National Institute of Allergy and Infectious Diseases, is providing a grant to the University of Hawai'i to partially fund the construction of the UH PHR Lab, a Regional Biosafety Lab. The proposed UH PHR Lab at Kalaeloa would be an integral component of NIH's Regional Biosafety Lab Network.

UH proposes the development of two acres in Kalaeloa that comprising of a portion of TMK parcel [1]-9-1-013:045 that is currently licensed to the Hawai'i Army National Guard (HIARNG) by the U.S. Army. The proposed UH PHR Lab facility would consist of a one-story, approximately 31,179-square-foot standalone structure (with a mechanical penthouse) situated in a secure setting capable of supporting UH's infectious disease research agenda, its local and regional partners' needs for high-containment facilities, and NIH's Biodefense Research Agenda. The facility will be programmed in accordance with applicable local, state, and federal codes and guidelines.

As the proposed project will utilize State funds, an Environmental Assessment (EA) will be prepared, pursuant to Hawai'i Revised Statutes Chapter 343, and Hawai'i Administrative Rules Chapter 11-200. A traffic impact analysis report, botanical survey, faunal survey, and archaeological literature research and site inspection will be incorporated into the EA.

As the project will utilize funds from a NIH grant, the EA will also be prepared in accordance with the National Environmental Policy Act (NEPA). The National Guard Bureau will be a cooperating agency in the NEPA EA process.

If you have other questions or require additional information regarding this request, please contact us via e-mail at nihnepa@mail.nih.gov or via standard mail at:

Environmental Quality Branch
Division of Environmental Protection, Office of Research Facilities
National Institutes of Health
B13/2W64, 9000 Rockville Pike, Bethesda, MD 20892
Attention: Valerie Nottingham, Chief

Thank you for your cooperation in this matter.

Sincerely,

Valerie Nottingham
Chief, Division of Environmental Protection, NIH

Enclosures

cc: Mr. Keith Mattson, Project Manager, University of Hawaii
cc: Mr. Maynard Young, Office of Capital Improvements, University of Hawaii System
cc: Mr. Reginald David, Section 7 Consultant, Rana Biological Consulting Inc.
cc: Mr. Earl Matsukawa, Vice President, Director of Planning, Wilson Okamoto Corporation

APPENDIX C:

BIOLOGICAL ASSESSMENT SURVEY

Rana Biological Consulting Inc.

Biological Assessment Survey Conducted for the University of Hawaii, Pacific Health Research Lab Portion of Tax Map Key: 1-9-1-13:045 Kalaeloa, O'ahu, Hawai'i

Prepared by:

Reginald E. David
Rana Biological Consulting, Inc.
P.O. Box 1371
Kailua-Kona, Hawai'i 96745

June 3, 2012

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Introduction and Background

The University of Hawaii (UH) is proposing to construct and operate the Pacific Health Research Lab (PHRL), in partnership with the National Institutes of Health (NIH) on an approximately two acre portion of Tax Map Key (TMK) parcel 1-9-1-13:045 in Kalaeloa, Oahu (Figure 1). The site is located within the State of Hawai'i Kalaeloa Community Development District, which is administrated by the Hawaii Community Development Authority.

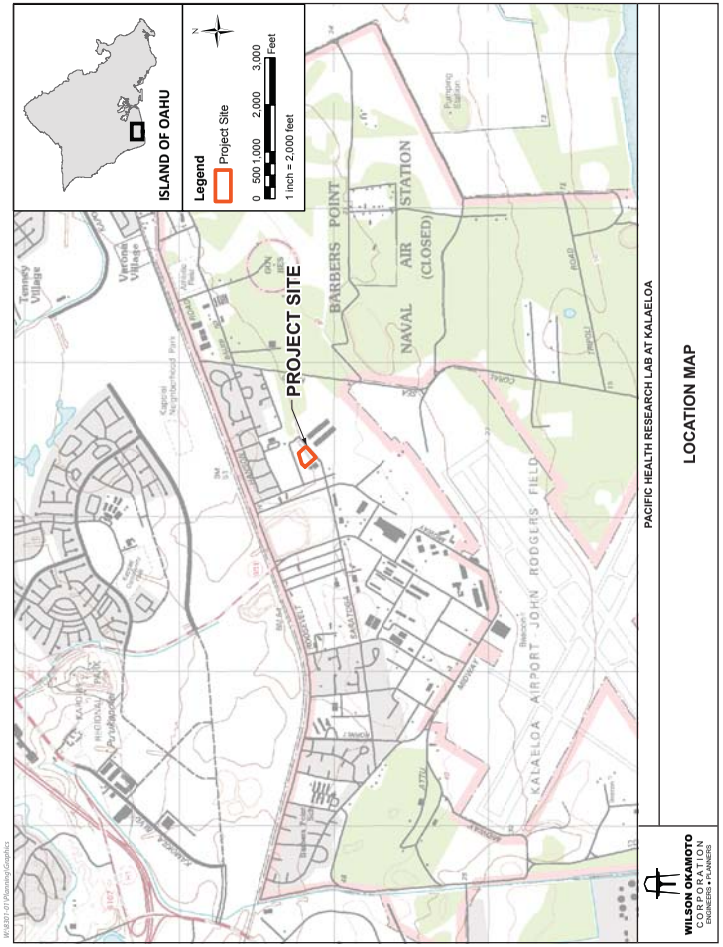
This report describes the methods and the results of a site visit which was conducted on March 19, 2012 to assess the biological makeup of the site.

Hawaiian and scientific names are italicized in the text. A glossary of technical terms and acronyms used in the document, which may be unfamiliar to the reader, are included at the end of the narrative text.

Site Description

The two-acre project site in Kalaeloa comprises a portion of TMK parcel 1-9-1-13:045, which is currently licensed to the Hawaii Army National Guard (HIARNG) by the U.S. Army (Figures 1 and 2). UH is currently working with the HIARNG to modify HIARNG's license so the site can be leased directly to UH.

A portion of the site is currently being used as a paved parking lot (Figure 2), while the remainder of the site has a seaman's training center on it (Figure 2 and4). As the area has been paved for decades, likely since before the 1960's. There is next to no vegetation on the site (Figures 2 and 3). The habitat is best characterized as a paved parking lot with attendant infrastructure with minimal ruderal weedy vegetation.



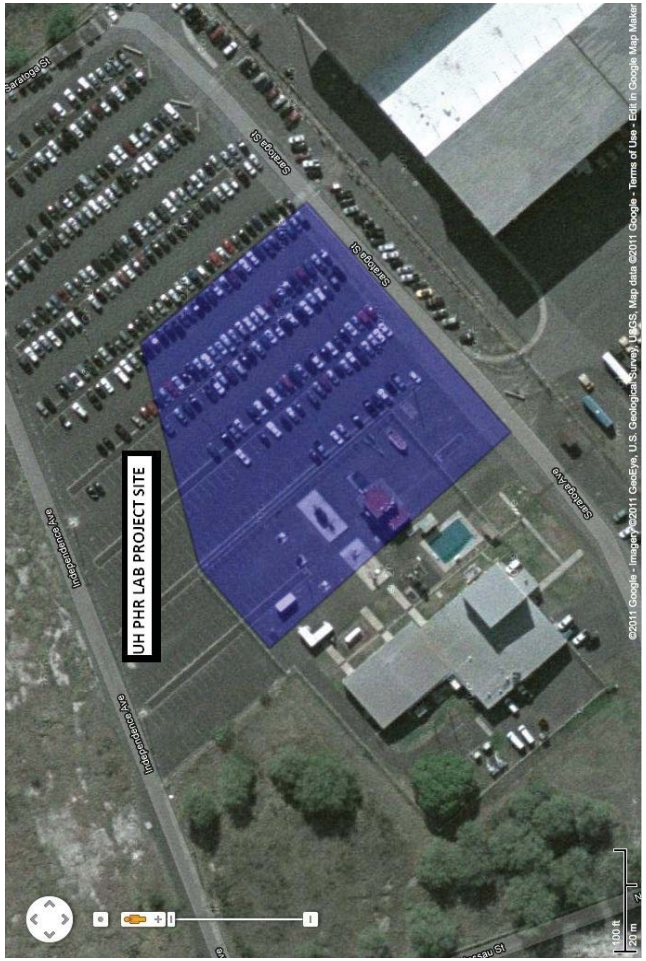


Figure 2 – Pacific Health Research lab project site showing paved parking lot and seaman`s training facility

Methods

I visited the site on the morning of March 19, 2012. After searching the site I was joined by Mr. Keith Mattson, Project Manager, Pacific Health Research Laboratory. As the site is paved no formal avian or mammalian count stations were counted, but rather a running tally of all avian and mammalian specie encountered on the site was collected. Notes were taken on the plants observed within the project footprint.

Results

Mammalian Resources

No mammals were recorded on the site. It is probable that several of the commonly occurring established alien mammalian species present on the Island of O'ahu occasionally transit the site. No native mammalian species were recorded, nor where any expected to be present on the site given the habitat available within the project site.

No mammalian species proposed for listing or currently listed as threatened or endangered under either the federal or State of Hawai'i endangered species statutes was detected on this site (DLNR, 1998; USFWS, 2012).

Avian Resources

No birds were observed using resources on the site. Ten avian species were recorded flying over the site or were heard calling from outside of the project disturbance area (Table 1). All of the avian species recorded are alien to the Hawaiian Islands.

No avian species proposed for listing or currently listed as threatened or endangered under either the federal or State of Hawai'i endangered species statutes was detected on this site (DLNR, 1998; USFWS, 2012).

Table 1 – Avian Species Detected Flying Over the UH/NIH PHC Site

Common Name	*Scientific Name*
	PELECANIFORMES
	ARDEIDAE - Herons, Bitterns & Allies
Cattle Egret	*Bubulcus ibis*
	COLUMBIFORMES
	COLUMBIDAE – Pigeons & Doves
Rock Pigeon	*Columba livia*
Spotted Dove	*Streptopelia chinensis*
Zebra Dove	*Geopelia striata*

Table 1 continued…

Common Name	*Scientific Name*
	PASSERIFORMES
	ZOSTEROPIDAE - White-eyes
Japanese White-eye	*Zosterops japonicus*
	STURNIDAE – Starlings
Common Myna	*Acridotheres tristis*
	CARDINALIDAE - Cardinals Saltators & Allies
Northern Cardinal	*Cardinalis cardinalis*
	FRINGILLIDAE – Fringilline and Carduleline Finches & Allies
	Carduelinae – Carduline Finches
House Finch	*Carpodacus mexicanus*
	PASSERIDAE - Old World Sparrows
House Sparrow	*Passer domesticus*
	ESTRILDIDAE – Estrildid Finches
	Estrildinae – Estrildine Finches
Java Sparrow	*Padda oryzivora*

Botanical Resources

Only three plant species were recorded on the project site; garden spurge (*Euphorbia hirta*), swollen fingergrass (*Chloris barbata*), and Natal redtop (*Melinus reopens*). All three of these plants are naturalized alien species, and are all commonly found in ruderal areas across the state.

No botanical species proposed for listing or currently listed as threatened or endangered under either the federal or State of Hawai'i endangered species statutes were detected on this site (DLNR, 1998; USFWS, 2012).

Critical Habitat

There is no federally delineated Critical Habitat present on or adjacent to the property. Thus the development and operation of the proposed PHRL will not result in impacts to federally designated Critical Habitat. There is no equivalent statute under state law.

Discussion

As is clearly shown in Figures 2, 3 and 4 the site is comprised of a paved parking lot and a portion of a seamen's training center. As the site has been paved for close to 60 years it is not surprising that no trust biological resources were encountered on the site – clearly non-would be expected to being resources on the site. Given the natural habitat, or more accurately the lack thereof on the project site it is expected that the development and operation of the proposed PHRL facility will not result in impacts to any botanical, avian or mammalian species that are proposed for listing or are currently listed as threatened or endangered under either the federal or State of Hawai'i endangered species statutes.

Figure 3 – UH-PRHL site showing the paved parking lot that covers the bulk of the site

Figure 4 – UH-PHRL site showing the paved seamen's training facility

Glossary

Endangered – Listed and protected under the Endangered Species Act of 1973, as amended (ESA) as an endangered species
Endemic – Native to the Hawaiian Islands and unique to Hawai'i
Ruderal – Disturbed, rocky, rubbishy areas, such as old agricultural fields and rock piles
Threatened - Listed and protected under the ESA as a threatened species.

DLNR – Hawai'i State Department of Land & Natural Resources
ESA - Federal Endangered Species Act of 1973, as amended.
HIARNG – Hawai'i Army National Guard
NIH - National Institutes of Health
TMK – Tax Map Key
UH – The University of Hawaii
USFWS – United State Fish & Wildlife Service

Literature Cited

Department of Land and Natural Resources (DLNR). 1998. Indigenous Wildlife, Endangered And Threatened Wildlife And Plants, And Introduced Wild Birds. Department of Land and Natural Resources. State of Hawaii. Administrative Rule §13-134-1 through §13-134-10, dated March 02, 1998.

U.S. Fish & Wildlife Service (USFWS) 2012. USFWS Threatened and Endangered Species System (TESS), online at: http://ecos.fws.gov/tess_public/StartTESS.do Last accessed on June 2, 2012.

APPENDIX D:

ARCHAEOLOGICAL LITERATURE REVIEW AND FIELD INSPECTION ASSESSMENT

Cultural Surveys Hawaii

	environment, and maintain the integrity of the biological materials contained within its grounds. The facility would be designed and built to withstand major storms and other natural phenomena events.
Project Acreage	The total project acreage is approximately 2 acres
Area of Potential Effect (APE) and Survey Area Acreage	For the purposes of this Archaeological Assessment study, the area of potential effect is considered to be the entire approximately 2-acre Project area. The survey area for the current study included the entire approximately 2-acre APE.
Document Purpose	The current investigation was completed for inclusion in an environmental assessment study for the proposed project. The purpose of the Archaeological Assessment study was to identify any surface archaeological features within the project area, evaluate the potential for subsurface historic properties, and to assess the potential for impact to such sites. The study was also made to identify any sensitive areas that may require further investigation or mitigation before the project proceeds. This document is intended to facilitate the project's planning and support the project's historic preservation review compliance. Based on the findings of the literature review and field inspection study, cultural resource management recommendations are presented. Because no new sites were identified or designated this study is termed an Archaeological Assessment as per HAR 13-284-5. The present archaeological assessment report was prepared per the requirements of Hawai‘i Administrative Rules HAR 13-276-5 and is intended for review and approval by the SHPD.
Fieldwork Effort	The fieldwork component of the Archaeological Assessment study was conducted on June 8, 2012 by CSH archaeologist, David W. Shideler, M.A., under the general supervision of Hallett H. Hammatt, Ph.D. The fieldwork required less than 1 person-day to complete.
Summary of Findings	The project area was observed to have been almost entirely, if not entirely, previously graded raised reef limestone hard pan. No surface historic properties were observed within or in the immediate vicinity of the project area. Despite the prior heavy land disturbance, the potential for sinkholes or in-situ soil, which could possibly contain human remains or other cultural deposits, was evaluated. No intact sinkholes, soil areas, or cultural material were observed within the project area.
Recommendations	No further archaeological work is recommended for the proposed Pacific Health Research Laboratory. If in the unlikely event that intact cultural resources, including but not limited to limestone sinkholes containing human remains or other significant cultural deposits, are encountered during the course of development activities, all work in the immediate area should stop and the State Historic Preservation Division should be promptly notified.

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Section 1 Introduction

1.1 Project Background

At the request of Wilson Okamoto Corporation, Cultural Surveys Hawai‘i, Inc. (CSH) completed this archaeological assessment study for the proposed Pacific Health Research Laboratory Project, Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu Island, TMK: [1] 9-1-013:045 por. The Pacific Health Research Laboratory property is located in coastal Kalaeloa, within the James Campbell Industrial Park. The project area and survey area are shown on a U.S. Geological Survey topographic map (Figure 1), an aerial photograph (Figure 2), and Hawai‘i State tax map plat [1] 9-1-013 (Figure 3) and [1] 9-1-014 (Figure 4).

The current archaeological assessment study was completed for inclusion in an environmental assessment study for the proposed project. The purpose of the archaeological assessment study was to identify any surface archaeological features within the project area, evaluate the potential for subsurface properties, and to assess the potential for impact to such sites. The study was also to identify any sensitive areas that may require further investigation or mitigation before the project proceeds. This document is intended to facilitate the project’s planning and support the project’s historic preservation review compliance. Because no new sites were identified or designated this study is termed an Archaeological Assessment as per HAR 13-284-5. The present archaeological assessment report was prepared per the requirements of Hawai‘i Administrative Rules HAR 13-276-5 and is intended for review and approval by the SHPD.

1.2 Environmental Setting

1.2.1 Natural Environment

The project area is located in the inland portion of the former Barbers Point Naval Air Station (closed) approximately 2 miles (3.2 kilometers) inland 120 m northeast of the intersection of Saratoga Avenue and Nassau Street, Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu Island. The terrain in this area is generally limestone and alluvial deposits, overlying flows of the Wai‘anae volcanic series (Macdonald et al. 1983:423). The project area is generally quite level, with an elevation of approximately 50 feet above mean sea level. Based on U.S. Department of Agriculture (USDA) soil survey data, sediments within the project area consist exclusively of Coral (limestone) Outcrop (CR) (Foote et al. 1972) (Figure 5).

The surface of the Pleistocene limestone outcrop, where not covered by alluvium or stockpiled material, has characteristic dissolution “pit caves” (Mylroie and Carew 1995), which are nearly universally, but erroneously, referred to as “sink holes” (Halliday 2005). These pit caves, or sinkholes, vary widely in extent and depth, with some of the more modest features comparable in volume to five-gallon buckets, while some of the larger features, although usually irregularly shaped, are several meters wide and several meters deep.

The project area is one of the driest areas of O‘ahu with most of the area averaging about 18 inches (460 mm) of rainfall annually (Juvik and Juvik 1998:56). In pre-contact Hawai‘i, the

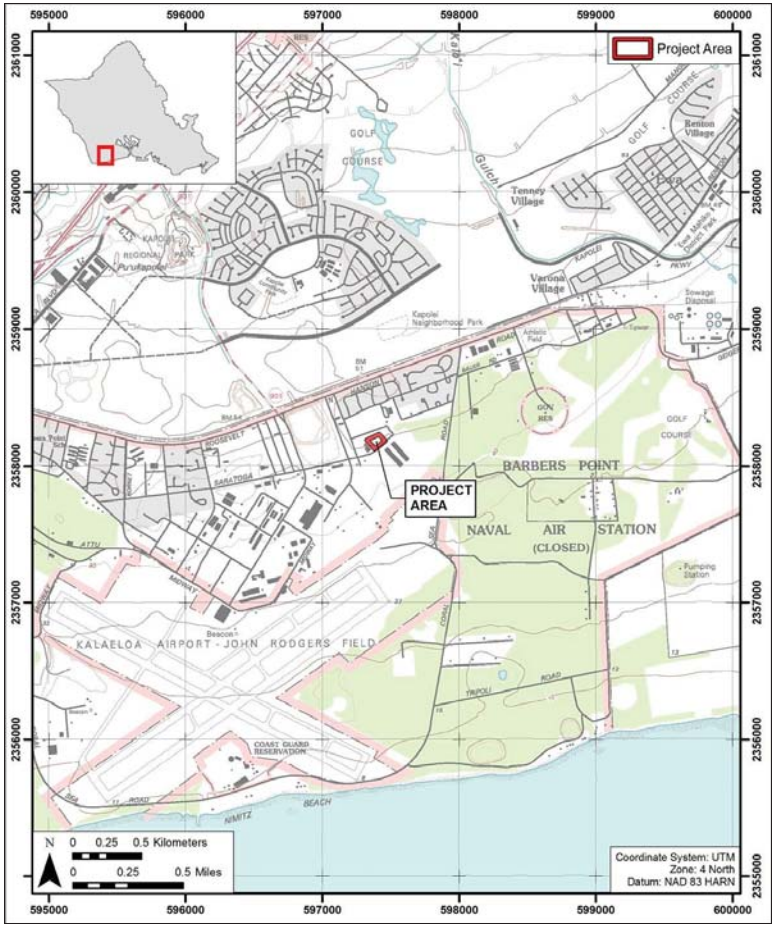

Figure 1. Portion of U.S. Geological Survey 7.5-Minute Series Topographic Map, ‘Ewa Quadrangle (1998), showing the location of the project area

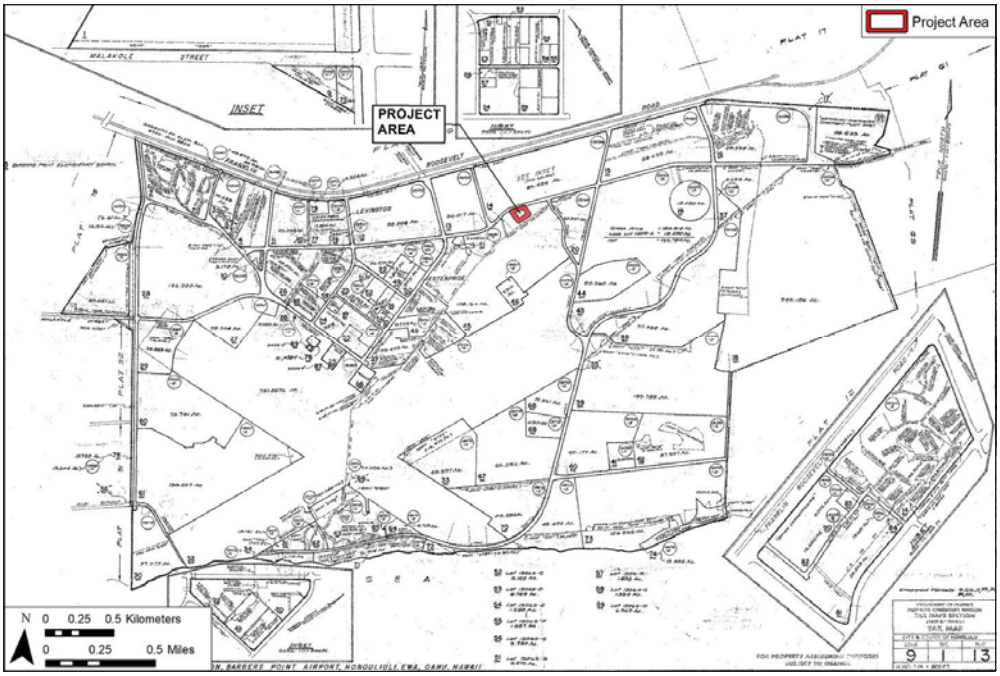

Figure 3. Hawai‘i Tax Map [1] 9-1-013, showing the location of the project area and survey area

Figure 2. Aerial photograph, showing the location of the project area (source: U.S. Geologic Survey Orthoimagery 2005)

Figure 5. Overlay of Soil Survey of the State of Hawai‘i (Foote et al. 1972), indicating coral outcrop within the project area (indicated in red)

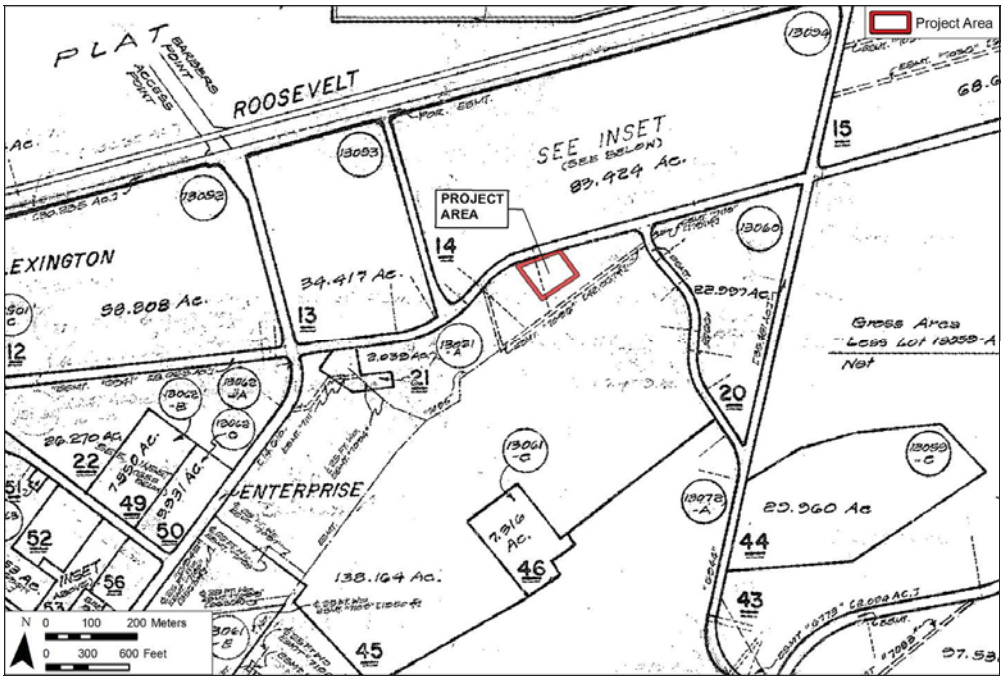

Figure 4. Portion of Tax Map Key 9-1-14, showing the location of the project area

vicinity of the project area would have been mostly lowland coastal dry shrub and grassland. However, this area has been extensively disturbed and transformed by human activity, with most of the land dominated by a variety of exotic grasses, weeds, and shrubs or graded and grubbed bare. These grasses and shrubs, along with pockets of *kiawe* (*Prosopis pallida*), castor bean (*Ricinus communis*), *klu* (*Acacia farnesiana*), *koa haole* (*Leucaena leucocephala*), and a few scattered ficus (*Ficus spp.*) trees are characteristic of the vegetation of the project vicinity. The present project area is almost entirely paved and only Spanish needle (*Bidens pilosa*) and other small exotic weeds were observed.

1.2.2 Built Environment

The project area is located on the eastern end of Saratoga Avenue, approximately 500 meters north of the Kalaeloa Airport runway in Barber’s Point. The project area is located in a modern, military developed area and immediate environs include a Seafarer’s training center for firefighters, a parking lot and a military hangar for the adjacent runway at Kalaeloa Airport. The project area is almost entirely paved (see Figure 2).

Section 2 Methods

2.1 Field Methods

The field work for this archaeological assessment of the project area was conducted on June 8, 2012 by CSH archaeologist, David W. Shideler, M.A., under the general supervision of Hallett H. Hammatt, Ph.D. The fieldwork required less than 1 person-day to complete. The pedestrian inspection of the less than 1 acre project area was accomplished through systematic sweeps. The graded nature of the project area made for excellent visibility of the (paved) ground surface.

2.2 Document Review

Historic and archival research included information obtained from the UH Mānoa Hamilton Library, the State Historic Preservation Division Library, the Hawai‘i State Archives, the State Land Survey Division, and the Archives of the Bishop Museum. Previous archaeological reports for the area were reviewed, as were historic maps and primary and secondary historical sources. Information on Land Commission Awards was accessed through Waihona Aina Corporation’s Māhele Data Base (<www.waihona.com>).

Section 3 Traditional Background

Honouliuli Ahupua‘a, as a traditional land unit, had tremendous and varied resources available for exploitation by early Hawaiians. Within Honouliuli Ahupua‘a, not only is there a long coastline fronting the normally calm waters of leeward O‘ahu, but there are also four miles of waterfront along the west side of the West Loch of Pearl Harbor. The “karstic desert” and marginal characterization of the limestone plain, which is the most readily visible terrain, does not do justice to the *ahupua‘a* as a whole. The following available resources contribute to the richness of this land unit:

1. 12 miles of coastline with continuous shallow fringing reef, which offers rich marine resources.
2. Four miles of frontage on the waters of West Loch (west side of Pearl Harbor, or Pu‘uloa) that offered extensive fisheries (mullet, *awa*, shellfish) as well as frontage suitable for development of fishponds (e.g., Laulaunui).
3. The lower portion of Honouliuli Valley in the ‘Ewa plain offered rich level alluvial soils with plentiful water for irrigation from the stream as well as abundant springs. This irrigable land would have stretched well up the valley.
4. A broad limestone plain which, because of innumerable limestone sinkholes, offered a nesting home for a large population of avifauna. This resource may have been one of the early attractions to human settlement.
5. An extensive upland forest zone extending as much as 12 miles inland from the edge of the coastal plain. As Handy and Handy (1972:469) have pointed out, the forest was much more distant from the lowlands here than on the windward coast, but it was much more extensive. Much of the upper reaches of the *ahupua‘a* contained biologically-diverse forest with *kukui*, *‘ōhia*, *‘iliahi* (sandalwood), *hau*, *tī*, banana, etc.

The political and cultural center of the *ahupua‘a* is understood to have been the relatively dense settlement and rich lands for irrigated taro cultivation at the *‘ili* of Honouliuli located where Honouliuli Stream empties into the north portion of West Loch (east of the present study area). The name of the *ahupua‘a*, translated as “dark bay” (Pukui et al. 1974:51) may refer to the nature of the waters of West Loch at the mouth of Honouliuli Stream. Early accounts and maps indicate a large settlement at the *‘ili* of Honouliuli and it may well be that the political power of this village was so great that it was able to extend its jurisdiction well to the northwest into an area which might have been anticipated to fall under the dominion of the Wai‘anae ruling chiefs.

3.1 Mythological and Traditional Accounts

The traditions of Honouliuli Ahupua‘a have been complied and summarized numerous times by Sterling and Summers (1978), Hammatt and Folk (1981), Kelly (1991), Charvet-Pond and Davis (1992), Maly and Rosendahl (1993), and Tuggle and Tuggle (1997). Some of the themes of these traditions include connections with Kahiki (i.e., Tahiti, thought to be one of the primary sources of major migrations to Hawai‘i in pre-Contact times) and the special character and relationship of the places known as Pu‘uokapolei and Kualaka‘i. There are several versions of

the chief Kaha‘i leaving from Kalaeloa for a trip to Kahiki; on his return to the Hawaiian Islands he brought back the first breadfruit (Kamakau 1991a:110) and planted it at Pu‘uloa, near Pearl Harbor in ‘Ewa (Beckwith 1940:97). Several stories associate places in Honouliuli to the gods Kāne and Kanaloa, with the Hawaiian pig god Kamapua‘a and the Hina family, and with the sisters of Pele, the Hawaiian volcano goddess, all of who have strong connections with Kahiki (Kamakau 1991a:111; Pukui et al. 1974:200). The locations of traditional places names for Honouliuli are illustrated in Figure 6. An overview follows with additional accounts in Appendix A.

Honouliuli, O‘ahu is associated with a number of legendary accounts. Many of these concern the actions of gods or demi-gods such as Kāne, Kanaloa, Māui, Kamapua‘a, the pig god, Maunauna, the shark deity, Ka‘ahupāhau, and the hero Palila. There are several references to chiefly lineages and to the ruling chiefs Hilo-a-Lakapu and Kūali‘i. Ko ‘Olina is reported to have been a vacationing place for Kākuhihewa.

3.1.1 The Naming of Honouliuli

Honouliuli is the largest *ahupua‘a* in the *moku* (district) of ‘Ewa. One translation of the name for this district is given as “unequal” (*Saturday Press* Aug. 11, 1883). Others translate the word as “strayed” and associate it with the legends of the gods, Kāne and Kanaloa.

> When Kane and Kanaloa were surveying the islands they came to Oahu and when they reached Red Hill saw below them the broad plains of what is now Ewa. To mark boundaries of the land they would throw a stone and where the stone fell would be the boundary line. When they saw the beautiful land lying below them, it was their thought to include as much of the flat level land as possible. They hurled the stone as far as the Waianae range and it landed somewhere, in the Waimanalo section. When they went to find it, they could not locate the spot where it fell. So Ewa (strayed) became known by the name. The stone that strayed. (Told to E.S. by Simeon Nawaa, March 22, 1954; cited in Sterling and Summers 1978:1)

Honouliuli has been translated as “dark water,” “dark bay,” or “blue harbor” and was named for the waters of Pearl Harbor (Jarrett 1930:22), which marks the eastern boundary of the *ahupua‘a*. The Hawaiian name for Pearl Harbor, “Pu‘uloa” is usually translated as long hill but could refer to a heaped mound. Another explanation for the names comes from the “Legend of Lepeamoa”, the chicken-girl of Pālama. In this legend, Honouliuli is the name of the husband of the chiefess Kapālama and grandfather of Lepeamoa (Thrum 1923:164-184). “Her grandfather gave his name, Honouliuli to a land district west of Honolulu . . .” (Thrum 1923:170). Westervelt (1963:209) gives an almost identical account.

It seems likely the boundaries of the western-most *ahupua‘a* of ‘Ewa were often contested with Wai‘anae people. The ‘Ewa people could cite divine sanction that the dividing point was between two hills at Pili o Kahe:

> Eventually the stone was found at Pili o Kahe. This is a spot where two small hills of the Wai‘anae Range come down parallel on the boundary between Honouliuli and Nānākuli (‘Ewa and Wai‘anae). The ancient Hawaiians said the hill on the

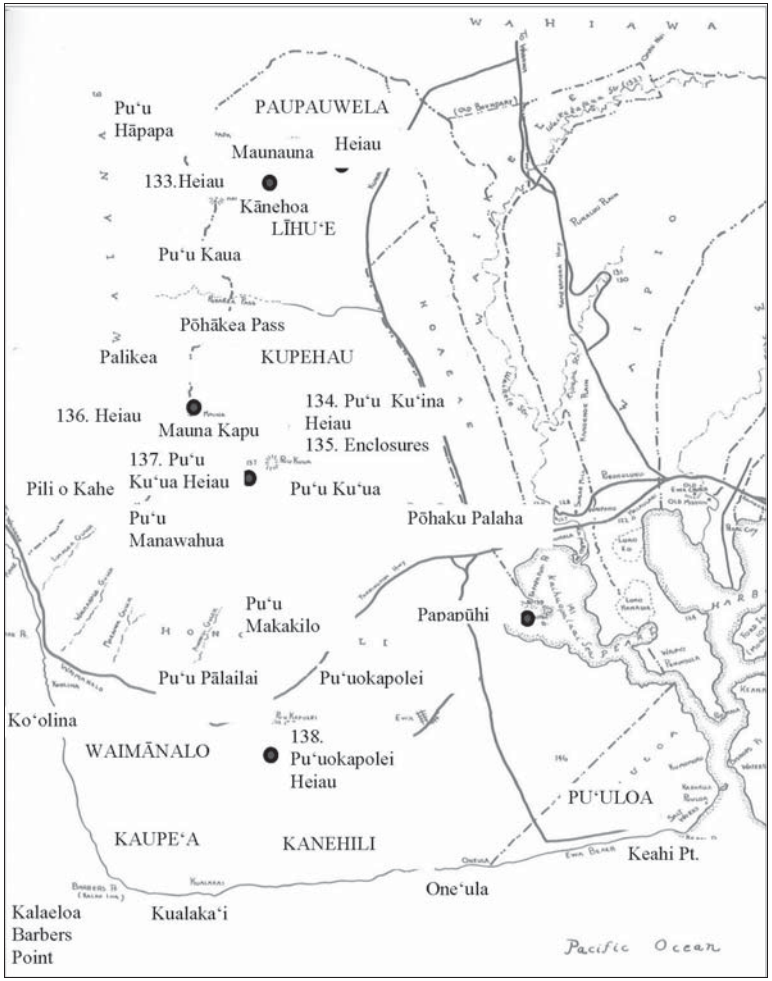

Figure 6. Place names of Honouliuli (adapted from Sterling and Summers 1978)

> ‘Ewa side was the male and the hill on the Wai‘anae side was female. The stone was found on the Waianae side hill and the place is known as Pili o Kahe.
>
> (Pili=cling to, Kahe=flow). The name refers, therefore, to the female or Waianae side hill. And that is where the boundary between the two districts runs. (Told to E.S. by Simeon Nawaa, March 22, 1954; cited in Sterling and Summers 1978:1)

3.1.2 The Pele Family at Honouliuli

Kapolei (literally “beloved Kapo”), specifically the 166-foot high cone of that name, is understood to have been named in reference to one of the volcano goddess Pele’s sisters, Kapo (Pukui et al. 1974:89). Pōhākea Pass is understood as one of the resting places of another of Pele’s sisters, Hi‘iaka, as she was returning from Kaua‘i with Pele’s lover Lohiau (Fornander 1919 Vol. V: 188 note 6). A considerable number of *mele* (songs) and *pule* (prayers) are ascribed to Hi‘iaka as she stood at the summit of Pōhākea (*Aluna au a Pōhākea, Kū au, nānā ia Puna,* in Emerson 1915:162-168). From this vantage point Hi‘iaka could see, through her powers of vision, that her beloved *lehua* groves and friend Hopoe at Puna, Hawai‘i Island had been blasted by her jealous sister Pele. She could also see that in her canoe, off the coast of Wai‘anae, Lohiau was seducing her traveling companion Wahine‘ōma‘o! A spring located at Kualaka‘i near Barbers Point was named Hoaka-lei (*lei* reflection) because Hi‘iaka picked *lehua* flowers here to make a *lei* and saw her reflection in the water.

3.1.3 Kamapua‘a

Kamapua‘a, the pig god, is associated with Honouliuli:

> Kamapua‘a subsequently conquered most of the island of O‘ahu, and, installing his grandmother [Kamaunuaniho] as queen, took her to Puuokapolei, the lesser of the two hillocks forming the southeastern spur of the Wai‘anae Mountain Range, and made her establish her court there. This was to compel the people who were to pay tribute to bring all the necessities of life from a distance, to show his absolute power over all. (Nakuina 1904:50)

Emma Nakuina goes on to note: “A very short time ago [prior to 1904] the foundations of Kamaunuaniho’s house could still be seen at Puuokapolei” (Nakuina 1904:50). Another account (*Ka Loea Kālai‘āina* January 13, 1900) speaks of Kekeleaiku, the older brother of Kamapua‘a, who also was said to have lived on Pu‘uokapolei.

3.1.4 The Traveling Mullet of Honouliuli (Fish Stories)

The story of (Ka) Ihuopala‘ai is also associated with the tradition of the *‘anae-holo* or traveling mullet (Thrum 1907:270-272):

> The home of the anae-holo is at Honouliuli, Pearl Harbor, at a place called Ihuopalaai. They make periodical journeys around to the opposite side of the island, starting from Puuloa and going to windward, passing successively Kumumanu, Kalihi, Kou, Kalia, Waikiki, Kaalawai, and so on, around to the

> Koolau side, ending at Laie, and then returning by the same course to their starting point.(Thrum 1907:271)

In Thrum’s account, Ihuopala‘ai is a male who possesses a Kū‘ula, or fish god, which supplied the large mullet known as *‘anae*. His sister lived in Lā‘ie and there came a time when there were no fish. She sent her husband to visit Ihuopala‘ai who was kind enough to send the fish following his brother-in-law on his trip back to Lā‘ie.

This story is associated with a poetical saying documented by Mary Kawena Pukui about Honouliuli:

> *Ka i‘a hali a ka makani*
>
> The fish fetched by the wind (Pukui 1983:145)

Pukui explains “The *‘anaeholo*, a fish that travels from Honouliuli, where it breeds, to Kaipāpa‘u on the windward side of O‘ahu. It then turns about and returns to its original home. It is driven closer to shore when the wind is strong.”

3.1.5 Pu‘uokapolei and the Reckoning of the Seasons (Kamakau)

Samuel Kamakau relates:

> …the people of O‘ahu reckoned from the time when the sun set over Pu‘uokapolei until it set in the hollow of Mahinaona and called this period Kau [summer], and when it moved south again from Pu‘uokapolei and it grew cold and the time came when young sprouts started, the season was called from their germination (*‘ōilo*) the season of Ho‘oilo [winter, rainy, season]. (Kamakau 1870:23)

3.1.6 Pu‘u Kapolei and the Plains of Kaupe‘a and Kānehili

There are several places on the ‘Ewa coastal plain that are associated with *ao kuewa*, the realm of the homeless souls. Samuel Kamakau (1991b:47-49) explains the Hawaiian beliefs in the afterlife:

> . . . There were three realms (*ao*) for the spirits of the dead . . . There were, first, the realm of the homeless souls, the *ao kuewa*; second, the realm of the ancestral spirits, the *ao ‘aumakua*; and third, the realm of Milu, *ke ao o Milu* . . .
>
> The *ao kuewa*, the realm of homeless souls, was also called the *ao ‘auwana*, the realm of wandering souls. When a man who had no rightful place in the *‘aumakua* realm (*kanaka kuleana ‘ole*) died, his soul would wander about and stray amongst the underbrush on the plain of Kama‘oma‘o on Maui, or in the *wiliwili* grove of Kaupe‘a on Oahu. If his soul came to Leilono [in Hālawa, ‘Ewa near Red Hill], there he would find the breadfruit tree of Leiwalo, *ka‘ulu o Leiwalo*. If it was not found by an *‘aumakua* soul who knew it (*i ma‘a mau iaia*), or one who would help it, the soul would leap upon the decayed branch of the breadfruit tree and fall down into endless night, the *pō pau ‘ole o Milu*. Or, a soul that had no rightful

> place in the *‘aumakua* realm, or who had no relative or friend (*makamaka*) there who would watch out for it and welcome it, would slip over the flat lands like a wind, until it came to a leaping place of souls, a *leina a ka ‘uhane* . . . (Kamakau 1991b:47)
>
> On the plain of Kaupe‘a beside Pu‘uloa [Pearl Harbor], wandering souls could go to catch moths (*pulelehua*) and spiders (*nanana*). However, wandering souls could not go far in the places mentioned earlier before they would be found catching spiders by ‘aumakua souls, and be helped to escape. . . . (Kamakau 1991b:49)

The breadfruit tree, Leilono, was said to have been located on the ‘Ewa-Kona border, above Āliamanu. In another section of his account of the dead, Kamakau calls the plain of wandering souls the “plain at Pu‘uokapolei.”

> There are many who have died and have returned to say that they had no claim to an ‘aumakua [realm] (*kuleana‘ole*). These are the souls, it is said, who only wander upon the plain of Kama‘oma‘o on Maui or on the plain at Pu‘uokapolei on Oahu. Spiders and moths are their food. (Kamakau 1991b:29)

This association of Pu‘u Kapolei and Kānehili with wandering souls is also illustrated in a lament on the death of Kahahana, the paramount chief of O‘ahu, who was killed by his father, Kahekili, after Kahahana became treacherous and killed the high priest Kaopulupulu.

Go carefully lest you fall dead in the sun,	*E newa ai o hea make i ka lā,*
The god that dwells on Kapolei hill.	*Akua noho la i Pu‘uokapolei.*
The sun is wailing on account of the women of Kamao,	*E hanehane mai ana ka lā i nā wahine o Kamao,*
A hiding god, blossoming ohai of the banks,	*Akua pe‘e, pua ‘ohai o ke kaha,*
Contented among the stones-	*I walea wale i ke a-*
Among the breadfruit planted by Kahai.	*I ka ulu kanu a Kahai.*
Thou hast spoken of by the oo-	*Haina ‘oe e ka oo-*
By the bird of Kanehili.	*E ka manu o Kānehili.*
(Fornander 1919, Vol. VI, Part 2:297)	

Fornander provides some notes on this lament. The god dwelling at Kapolei is the god Kahahana, stating that this is where his soul has gone. Kamao is one of the names of the door to the underworld. This lament draws an association with wandering souls and the place where the first breadfruit tree was planted by Kahai at Pu‘uloa (Fornander 1919, Vol. VI, Part 2:304).

Pukui (1983:180) offers this Hawaiian saying, which places the wandering souls in a *wiliwili* grove at Kaupe‘a.

> The wiliwili grove of Kaupe‘a *Ka wiliwili of Kaupe‘a.*
>
> In ‘Ewa, O‘ahu. Said to be where homeless ghosts wander among the trees.
>
> (Pukui 1983:#1666)

Beckwith (1940:154) has stressed that “the worst fate that could befall a soul was to be abandoned by its *‘aumakua* and left to stray, a wandering spirit (*kuewa*) in some barren and desolate place.” These wandering spirits were often malicious, so the places that they wandered were avoided.

In a chant by Hi‘iaka, the sister of the Hawaiian volcano goddess, Pele, several place names in ‘Ewa are mentioned as Hi‘iaka travels from Pu‘uokapolei towards the ‘Ewa coast. In the chant, Hi‘iaka is moving downhill from Kaupe‘a, probably the plains adjacent to Pu‘uokapolei, toward the coast, to the plains of Kānehili. The chant also refers to Pe‘e-kaua, which may be a variation of Kau-pe‘e or Kaupe‘a. Hi‘iaka sang this bitter chant addressed to Lohi‘au and Wahine-oma‘o, and it uses the association of the Plains of Kaupe‘a as a place for the wandering of lost souls. The name Kānehili also refers to wandering, as the word *hili* means “to go astray” (Emerson 1915:162).

Ku‘u aikana i ke awa lau o Pu‘uloa,
Mai ke kula o Pe‘e-kaua, ke noho ‘oe,
E noho kaua e kui, e lei i ka pua o ke kauno‘a,
I ka pua o ke akuli-kuli, o ka wili-wili;
O ka iho‘na o Kau-pe‘e i Kane-hili,
Ua hili au; akahi no ka hili o ka la pomaika‘i;
E Lohiau ipo, e Wahine-oma‘o,
Hoe ‘a mai ka wa‘a i a‘e aku au.

We meet at Ewa’s leaf-shaped lagoon, friends;
Let us sit, if you will on this lea
And bedeck us with wreaths of Kaunao‘a,
Of akuli-kuli and wili-wili,
My soul went astray in this solitude;
It lost the track for once, in spite of luck,
As I came down the road to Kau-pe‘a.
No nightmare dream was that which tricked my soul.
This way, dear friends; turn the canoe this way;
Paddle hither and let me embark.
(Emerson 1915:162-163)

3.2 Pre-Contact and Early History

Various Hawaiian legends and early historical accounts indicate that the *ahupua‘a* of Honouliuli was once widely inhabited by pre-Contact Hawaiian populations, including the Hawaiian *ali‘i*. This substantial population was supported by the plentiful marine and estuarine resources available at the coast, along which several sites interpreted as permanent habitations were located. Other attractive subsistence-related features of the *ahupua‘a* included irrigated lowlands suitable for wetland taro cultivation (Hammatt and Shideler 1990), as well as the lower forest area of the mountain slopes for the procurement of forest goods.

Exploitation of the forest resources along the slopes of the Wai‘anae Range - as suggested by Handy and Handy - probably acted as a viable subsistence alternative during times of famine:

> ...The length or depth of the valleys and the gradual slope of the ridges made the inhabited lowlands much more distant from the *wao*, or upland jungle, than was the case on the windward coast. Yet the *wao* here was more extensive, giving greater opportunity to forage for wild foods during famine time. (Handy and Handy 1972:469-470)

These upper valley slopes may have also been a significant resource for opportunistic quarrying of basalt for the manufacturing of stone tools. This is evidenced in part by the existence of a probable quarrying site (50-80-12-4322) in Makaīwa Gulch at 152 m (500 ft.) elevation, west of the current study area (Hammatt et al. 1991)

Honouliuli was not as densely populated as other parts of ‘Ewa; habitations and ceremonial sites were usually found along streams in the foothills where taro could be cultivated, such as at Kalo‘i Gulch and Pu‘u Ku‘ua. Another more populated area was Pu‘uloa, on the east side of the *ahupua‘a*, along the west loch of Pearl Harbor. The name of the *ahupua‘a* is, in fact, named for this loch, as Honouliuli means “dark water” (Jarrett 1930:22).

The Hawaiian *ali‘i* were also attracted to the region. One historical account of particular interest refers to an *ali‘i* residing in Ko ‘Olina, southwest of the current study area:

> Ko ‘Olina is in Waimānalo near the boundary of ‘Ewa and Wai‘anae. This was a vacationing place for chief Kakuhihewa and the priest Napuaikamao was the caretaker of the place. Remember Reader; this Koolina is not situated in the Waimānalo on the Koolau side of the island but the Waimānalo in ‘Ewa. It is a lovely and delightful place and the chief; Kakuhihewa loved this home of his. (Sterling and Summers 1978:41)

John Papa ‘Ī‘ī describes a network of Leeward O‘ahu trails (Figure 7), which in later historic times encircled and crossed the Wai‘anae Range, allowing passage from West Loch to the Honouliuli lowlands, past Pu‘u Kapolei and Waimānalo Gulch to the Wai‘anae coast and onward circumscribing the shoreline of O‘ahu (‘Ī‘ī 1959:96-98).

Other early historical accounts of the general region typically refer to the more populated areas of the ‘Ewa district, where missions and schools were established and subsistence resources were perceived to be greater. However, the presence of archaeological sites along the coral plains and coast of southwest Honouliuli Ahupua‘a, indicate that prehistoric and early historic populations also adapted to less inviting areas, despite the environmental hardships.

Honouliuli subsequent to western contact in the area, the landscape of the ‘Ewa plains and Wai‘anae slopes was adversely affected by the removal of the sandalwood and other trees, and the introduction of domesticated animals and new vegetation. Goats, sheep and cattle were brought to the Hawaiian Islands by Vancouver in the early 1790s, and allowed to graze freely about the land for some time after. L.A. Henke reports the existence of a longhorn cattle ranch in Wai‘anae by at least 1840 (Frierson 1972:10). During this time, perhaps as early as 1790, exotic plant species were introduced to the area. These typically included vegetation best suited to a terrain disturbed by the logging of sandalwood forest and eroded by animal grazing. The

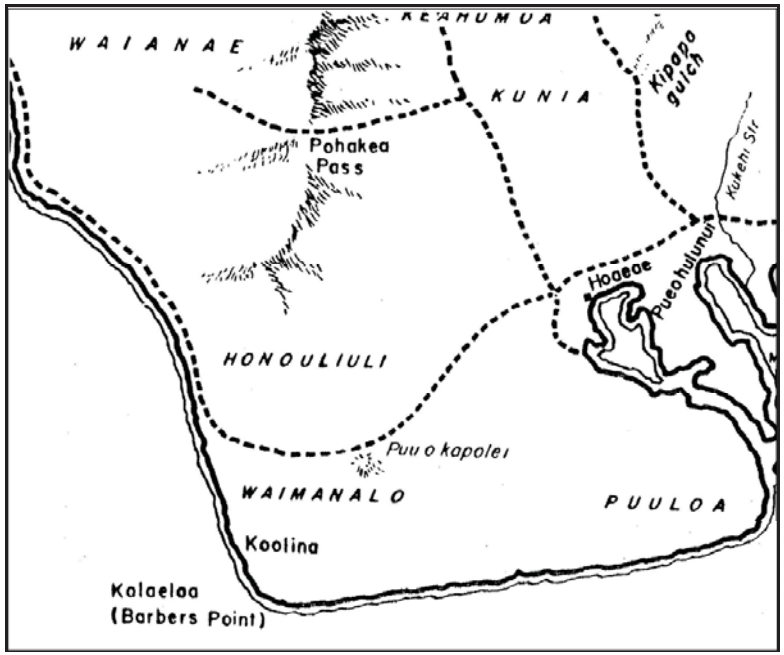

Figure 7. Trails of Leeward O‘ahu as described by John Papa ‘Ī‘ī (1959:96)

following dates of introduced vegetation are given by R. Smith and outlined by Frierson (1972:10-11):

1. “early,” circa 1790:
   Prickly pear cactus, *Opuntia tuna*
   Haole koa, Leucaena leucocephala
   Guava, *Psidium guajava*
2. 1835-1840:
   Burmuda [sic] grass, *Cynodon dactylon*
   Wire grass, *Eleusine indica*
3. 1858:
   Lantana, *Lantana camara*

The *kiawe* tree (*Prosopis pallida*) was also introduced during this period, either in 1828 or 1837 (Frierson 1972:11).

3.3 Honouliuli Settlement Patterns

Archaeological and traditional sources show a general pattern of three main areas of settlement within Honouliuli Ahupua‘a: a coastal zone, the Honouliuli taro lands, and inland settlement at Pu‘u Ku‘ua.

3.3.1 The Coastal Zone - Kalaeloa (Barbers Point)

Archaeological research at Barbers Point has focused on the areas in and around the Deep Draft Harbor (Barrera 1975; Davis and Griffin 1978; Hammatt and Folk 1981; McDermott et al. 2000). Series of small clustered shelters, enclosures and platforms show limited but recurrent use at the shoreline zone for marine-oriented exploitation. This settlement covers much of the shoreline, with more concentrated features around small marshes and wet sinks. Immediately behind the shoreline, under a linear dune deposit is a buried cultural layer believed to contain some of the earliest habitation evidence in the area.

The attraction of the area to early Hawaiians may have been the plentiful and easily exploited bird population. Particular evidence for taking of petrel occurs at SIHP No. -2763 (Hammatt and Folk 1981). Initial heavy exploitation of nesting seabirds and other species, in conjunction with habitat destruction, may have contributed to some avian extinctions.

There is some indication of limited agriculture in mulched sinkholes and limited soil areas. Considering rainfall, this activity would have been limited, but probably involved tree crops and roots (sweet potatoes). The archaeological content of the sites indicates a major focus on marine resources.

Davis and Griffin (1978) distinguish functional classes of sites based on surface area size, and argue that the Barbers Point settlement consists of functionally integrated, multi-household residence groups. Density contours of midden (by weight) and artifacts (by numbers) plotted for residence sites by Hammatt and Folk (1981) generally indicate narrowly defined spatial foci of discard, possibly indicating continuous use, or at least with no refurbishing or additions to the structures over time (Hammatt and Folk 1981). The focus is small habitation sites, typically lacking the full range of features found in large permanent residence complexes such as high platforms, complex enclosures, and conspicuous ceremonial sites.

3.3.2 Honouliuli Taro Lands

Centered around the west side of Pearl Harbor at Honouliuli Stream and its broad outlet into the West Loch are the rich irrigated lands of the *‘ili* of Honouliuli, which give the *ahupua‘a* its name. The major archaeological reference to this area is Dicks et al. (1987), who documented remnants of a once widespread wetland system (*lo‘i* and fishponds), as well as dry-land cultivation of the adjacent slopes.

According to Carol Silva’s “Historic Research Relative to the Land of Honouliuli” (in Dicks et al. 1987), the Honouliuli area bordering West Loch was clearly a major population center, a

logical response to the abundance of fish and shellfish resources in close proximity to a wide expanse of well-irrigated bottomland suitable for wetland taro cultivation. The earliest detailed map by Malden (from 1825) shows all the roads of southwest O‘ahu coalescing and descending the *pali* (cliff) as they funnel into the area of Honouliuli Village. Dicks et al (1987:78-79) conclude, on the basis of 19 carbon isotope dates and 3 volcanic glass dates, that “agricultural use of the area spans over 1,000 years.” Undoubtedly, Honouliuli was a locus of habitation for thousands of Hawaiians. Prehistoric population estimates are a matter of some debate, but it is worth pointing out that in the earliest mission census (Schmitt 1973:19) in 1831-1832, the land (*‘āina*) of Honouliuli contained 1026 men, women, and children. It is not clear whether this population relates to Honouliuli Village or Honouliuli Ahupua‘a, but the village probably contained the vast majority of the district’s population. The nature of the reported population structure for Honouliuli (less than 20% children under 12 years of age) and the fact that the population decreased more than 15% in the next 4 years (Schmitt 1973:22) suggests that the prehistoric population of Honouliuli Village may well have been significantly greater than it was in 1831-1832. A conservative estimate would be that tens of thousands of Hawaiians lived and died at Honouliuli Village.

3.3.3 Pu‘u Ku‘ua: Inland Settlement

Documentation of inland settlement in Honouliuli Ahupua‘a is more problematic in that there are relatively few documented archaeological sources. However, it is probable that the area around Pu‘u Ku‘ua, on the east side of the Wai‘anae Ridge, seven miles inland of the coast, was a Hawaiian place of some importance.

In 1899, the Hawaiian Newspaper “Ka Loea Kalaiaina” relates a story of Pu‘u Ku‘ua as “a place where chiefs lived in ancient times” and a “battle field,” “thickly populated.” The article summarizes:

1) This place was entirely deserted and left uninhabited and it seems that this happened before the coming of righteousness to Hawai‘i Nei. Not an inhabitant is left.

2) The descendants of the people of this place were so mixed that they were all of one class. Here the gods became tired and returned to Kahiki (Sterling and Summers 1978:33).

McAllister recorded three sites in this area, two *heiau* (134 - Pu‘u Kuina, and 137 -Pu‘u Ku‘ua, both destroyed) and a series of enclosures in Kukuilua which he calls “*kuleana* sites” (McAllister 1933). On the opposite side of the Wai‘anae range, along the trail to Pōhākea Pass, Cordy (2002) states “Kākuhihewa was said to have built (or rebuilt) Nīoi‘ula, a *po‘okanaka* [sacrificial] *heiau* (1,300 sq. m.) in Hālona in upper Lualualei, along the trail to Pōhākea Pass leading into ‘Ewa, circa A.D. 1640-1660” (Cordy 2002:36). There is no direct archaeological evidence available to the authors’ knowledge that intensive Hawaiian settlement occurred here, but it is considered as a place of high probability, based on the above indications. John Papa ‘Ī‘ī (1959) described a journey that Liholiho took which led him and an entourage through inland Honouliuli and over Pōhākea Pass. Geographically, the area receives sufficient quantities of water and would have had abundant locally available forest resources.

3.3.4 Summary

Based on the above summary of areas of Honouliuli settlement, the following general considerations are made to place the study area in the context of the *ahupua‘a* pattern.

1. There are three areas of Hawaiian settlement in the *ahupua‘a*; two are well documented and the inland settlement in the vicinity of Pu‘u Ku‘ua is less clear.
   a. The extensive limestone plain with recurrent use habitations for fishermen and gatherers, and sometime gardeners;
   b. The rich cultivated lands of Honouliuli ‘Ili for extensive wetland taro and clearly the *ahupua‘a* population center;
   c. The uplands around Pu‘u Ku‘ua for probable agriculture and forest resource utilization.
2. Honouliuli is designed as a unit to contain all the geographic elements of a typical Hawaiian valley *ahupua‘a*, except they are arranged geomorphically in an atypical relationship. The *ahupua‘a* is not organized around a single drainage network but shares the west portions of Waikele drainage in its upper reaches. A typical and highly advantageous characteristic for human subsistence is included in a vast coastline and fringing reef, an extensive limestone plain, which would support only limited agriculture, but would be excellent for bird catching in early times. The richest forestland for foraging for wood, birds, feathers, etc. would have been the east slope of the Wai‘anae Range. The *mauka/makai* route would have been up Honouliuli Gulch or up the Makakilo ridge, paralleling the coast from Honouliuli Gulch to Kahe. The most convenient route to *mauka* lands, even from the western end of the coast near Kahe Point, would have been *mauka* only to the base of the hills and then either up the Makakilo Ridge or northeast to a trail to Pu‘u Ku‘ua and Pōhākea Pass. The *makai* slope is the dry side of the ridgeline. Here, streams would respond to rainfall quickly but drain quickly leaving little available water for even short-term use. However, abundant springs may have provided adequate water for localized dryland cultivation.
3. The *makai* slope of the Wai‘anae Range (i.e., *mauka* of Ko‘Olina) was not a major thoroughfare. We can see some very limited evidence of part-time agriculture in and around gulches and two foci of sparse habitation with the first limited to *makai* portions of gulches and lava flats. This habitation is considered a *mauka* component or continuation of the Ko‘Olina coastal settlement rather than an independent focus. The second focus, separated from the first by a barren zone, is generally above the 800-foot elevation. This *mauka* habitat, which could have been supported by seasonal dryland planting and forest foraging, may be the lower portion of a thinly scattered but widespread zone of settlement. This zone stretches eastward and northeast along the east Wai‘anae Range slopes and may increase in intensity along the more watered lands forming the *mauka* western boundary of Honouliuli.
4. The central place of the *ahupua‘a* of Honouliuli in terms of population, as well as cultivated foods, was the *‘ili* of Honouliuli, near the West Loch of Pearl Harbor. There is good reason to assume, given the lack of intensive agricultural resources in other

locations during prehistoric times, that all other habitation zones were economically and socially co-dependent.

5. There is to date no archaeological evidence of high status residence in Honouliuli. Large residential structures are not present along the seashore where they would be expected. The late prehistoric occurrence of chiefs' houses is not apparent, perhaps because the ocean shoreline, although rich in marine resources, is uninviting for sport and unsuitable for fishponds. The chiefly focus of ‘Ewa District was Waipi‘o. Whatever activities of this class occurred in Honouliuli would have been in or near the rich lands fronting West Loch (the *‘ili* of Honouliuli) but to date there is no direct archaeological evidence of this. Concerning status associations with Honouliuli it is interesting to note the connection of the Pu‘u Ku‘ua settlement with pariah (*kauwā*), or "slaves," the lowest class of Hawaiians (Sterling and Summers 1978:33).

The proposed Pacific Health Research Laboratory Project area is well back from the coast (approximately 3.2 kilometers inland) and is not near any known sources of potable water. The rainfall in the project area (less than 20 inches per year) is insufficient for non-irrigated agriculture. Pre-Contact and early historic land use in this area is believed to have been very limited.

Section 4 Historical Background

4.1 Early 1800s

Barber's Point is named after Captain Henry Barber, whose ship ran aground on October 31, 1796. While there was clearly a major Hawaiian community at the Honouliuli Taro Lands where Honouliuli Stream enters the West Loch of Pearl Harbor and a surprising amount of Hawaiian activity scattered close to the coast the inland areas of the Ewa raised reef limestone plain with no potable water and low rainfall had little to recommend it for habitation or enterprise. Subsequent to western contact in the area, the landscape of the ‘Ewa plains and Wai‘anae slopes was adversely affected by the over-harvesting of the sandalwood forest, and particularly by the introduction of domesticated animals and exotic plant species.

4.2 Mid to Late 1800s

During the Māhele of 1848, 99 individual land claims in the *ahupua‘a* of Honouliuli were registered and awarded by King Kamehameha III. No *kuleana* claims (land claims by *maka‘āinana* or common people) were made for land within the current study area or vicinity. The vast majority of the Land Commission Awards (LCA) were located near the Pu‘uloa Salt Works and the taro lands of the *‘ili* of Honouliuli. The largest award (Royal Patent 6071, LCA 11216, *‘Āpana* 8) granted in Honouliuli Ahupua‘a was to Miriam Ke‘ahi-Kuni Kekau‘onohi on January 1848. Kekau‘onohi acquired a deed to all unclaimed land within the *ahupua‘a*, including a total of 43,250 acres. Samuel Kamakau (1961:208-209) relates the following about Kekau‘onohi as a child:

> Kamehameha's granddaughter, Ke-ahi-Kuni Kekau-‘onohi...was also a tabu chiefess in whose presence the other chiefesses had to prostrate and uncover themselves, and Kamehameha would lie face upward while she sat on his chest.

Kekau‘onohi was one of Liholiho's (Kamehameha II's) wives, and after his death, she lived with her half-brother, Luanu‘u Kahala‘i‘a, who was governor of Kaua‘i (Kamakau 1961:20). Subsequently, Kekau‘onohi ran away with Queen Ka‘ahumanu's stepson, Keli‘i-ahonui, and later became the wife of Chief Levi Ha‘alelea. Upon her death on June 2, 1851, all her property was passed on to her husband and his heirs. When Ha‘alelea died, the property went to his surviving wife, who in turn leased it to James Dowsett and John Meek in 1871 for ranching operations.

In 1877, James Campbell purchased most of Honouliuli Ahupua‘a for $95,000. He then drove off 32,347 head of cattle belonging to Dowsett, Meek and James Robinson and constructed a fence around his property (Bordner and Silva 1983:C-12). In 1879, Campbell brought in a well driller from California to search the ‘Ewa plains for water, and a significant untapped source was discovered. Following this discovery, plantation developers and ranchers drilled numerous wells in search of the valuable resource. By 1881, the Campbell property of Honouliuli prospered as a cattle ranch with "abundant pasturage of various kinds" (Briggs in Haun and Kelly 1984:45). Within 10 years of the first drilled well in ‘Ewa, the addition of a series of artesian wells throughout the island was supplying most of Honolulu's water needs.

In 1889, Campbell leased his property to Benjamin Dillingham, who subsequently formed the O‘ahu Railway & Land Co. (O.R. & L) in 1890. To attract business to his new railroad, Dillingham subleased all land below 200 feet elevation to William Castle who in turn sublet the area to the ‘Ewa Plantation Company for sugar cane cultivation (Frierson 1972:15). Dillingham’s Honouliuli lands above 200 feet elevation that was suitable for sugar cane cultivation were sublet to the O‘ahu Sugar Co.

‘Ewa Plantation Co. was incorporated in 1890 and continued in full operation up into modern times. The plantation grew quickly with the abundant artesian water. As a means to generate soil deposition on the coral plain and increase arable land in the lowlands, the ‘Ewa Plantation Co. installed ditches running from the lower slopes of the mountain range to the lowlands and then plowed the slopes vertically just before the rainy season to induce erosion (Frierson 1972:17).

The O‘ahu Sugar Co. was incorporated in 1897, and included lands in the foothills above the ‘Ewa plain and Pearl Harbor. Prior to commercial sugar cultivation, the lands occupied by the O‘ahu Sugar Co. were described as being “of near desert proportion until water was supplied from drilled artesian wells and the Waiahole Water project” (Conde and Best 1973:313). O‘ahu Sugar took over ‘Ewa Plantation lands in 1970 and continued operations into the 1990s.

Dillingham’s *mauka* lands in western Honouliuli that were unsuitable for commercial sugar production remained pasture for grazing livestock. From 1890 to 1892 the Ranch Department of the O.R. & L. Co. tapped plantation flumes and searched for alternative sources of water. Ida von Holt leaves this account of her husband Harry’s (Superintendent of the O.R. & L Ranch Dept.) search for water in the foothills of the Wai‘anae Range:

> One of those places is on the old trail to Pālehua, and had evidently been a place of which the Hawaiians had known, for its name is Kalo‘i (the taro patch), and even in dry weather water would be standing in the holes made by the cattle, as they tried to get a drop or two. (Von Holt 1985:136)

The spring was located along the upper slopes of the southern face of Kalo‘i Gulch. A second account is given of the discovery of spring water in an area over the ridge on the north side of Kalo‘i Gulch:

> Shouting to the men to come over with their picks and shovels, he [Harry von Holt] soon got them busy clearing away lots of small stones and earth. Almost at once they could see that there were evidences of a paved well, and at about three feet down they came upon a huge flat rock, as large around as two men could span with their arms. Digging the rock loose and lifting it to one side, what was their astonishment to find a clear bubbling spring! (Von Holt 1985:138)

Following the discovery, two old Hawaiians began to ask Von Holt about the spring:

> Finally he [Harry von Holt] got them to explain that the spring, called “Waihuna” (Hidden Spring) had been one of the principal sources of water for all that country, which was quite heavily populated before the smallpox epidemic of 1840…A powerful Kahuna living at the spring had hidden it before he died of the smallpox, and had put a curse on the one who disturbed the stone, that he or she would surely die before a year was out. (Von Holt 1985:138–140)

4.3 Early 1900s to Present

Much of the *mauka* lands in western Honouliuli, including ridges and deep gulches, were unsuitable for commercial sugar cultivation and remained pastureland for grazing livestock. By 1920, however, many of the lands of Honouliuli were used for commercial sugar cane cultivation (Frierson 1972:18). By 1919 a reservoir had been established just south of Pālehua Road. In the late 1920s, the main residential communities were at the northeast edge of the ‘Ewa Plain. The largest community was still at Honouliuli Village. ‘Ewa was primarily a plantation town, focused around the sugar mill, with a public school as well as a Japanese school. Additional settlement was in Waipahu, centered on the Waipahu sugar mill, operated by the O‘ahu Sugar Company. Historic maps of the Makakilo area indicate a lack of any other significant development in the area into the 1940s.

A 1919 map (Figure 8) shows a sisal plantation seemingly surrounded by a stone wall dominating the landscape immediately to the west and southwest of the project area. A U.S. Coast and geodetic Survey Station was located 500 m to the south (Figure 8). The O.R. & L. railroad alignment ran northeast/southwest 300 m inland (to the north). A significant community of approximately 9 houses is shown at the “Sisal” siding of the O.R. & L. The many indicated fence lines in the vicinity indicate that ranching was the major land use in the vicinity (other than the short lived sisal plantation).

A 1927/1928 map (Figure 9) suggests that the sisal plantation had already gone out of business with only the name of the “Sisal” siding, or station, of the O.R. & L. carrying on the memory (and the volunteer “daughter” sisal plants that still dot the general landscape today). The hamlet of the Sisal Station has largely disappeared with the collapse of the undertaking. The vicinity remains overwhelmingly undeveloped with just the O.R. & L. alignment and the U.S. Coast and Geodetic facility as signs of enterprise in the vicinity.

Major land use changes came to western Honouliuli when the U.S. Military began development in the area. Military installations were constructed both near the coast, as well as in the foothills and upland areas. Barbers Point Military Reservation (a.k.a. Battery Barbers Point from 1937–1944), located at Barbers Point Beach, was used beginning in 1921 as a training area for firing 155 mm guns (Payette 2003). Also in the vicinity were Camp Malakole Military Reservation (a.k.a. Honouliuli Military Reservation), used from 1939, and Gilbert Military Reservation, used from 1922–1944. Barbers Point NAS, in operation from 1942 into the 1990s, was the largest and most significant base built in the area. It housed numerous naval and defense organizations, including maritime surveillance and anti-submarine warfare aircraft squadrons, a U.S. Coast Guard Air Station, and the U.S. Pacific Fleet.

Fort Barrette (a.k.a. Kapolei Military Reservation and Battery Hatch), located atop Pu‘u Kapolei, was in use from 1931 to 1948 for housing four 3-inch anti-aircraft batteries (Payette 2003). In the 1950s, the site was used as a NIKE missile base. Pālailai Military Reservation, located atop Pu‘u Pālailai in Makakilo, was in service from 1921, housing Battery Pālailai and Fire Control Station B (Payette 2003). Fire Control Station A was located atop Pu‘u Makakilo. From 1942 to 1945 the Pu‘u Makakilo Training Area, including lands in and around Pu‘u Makakilo, was used for military training during WWII.

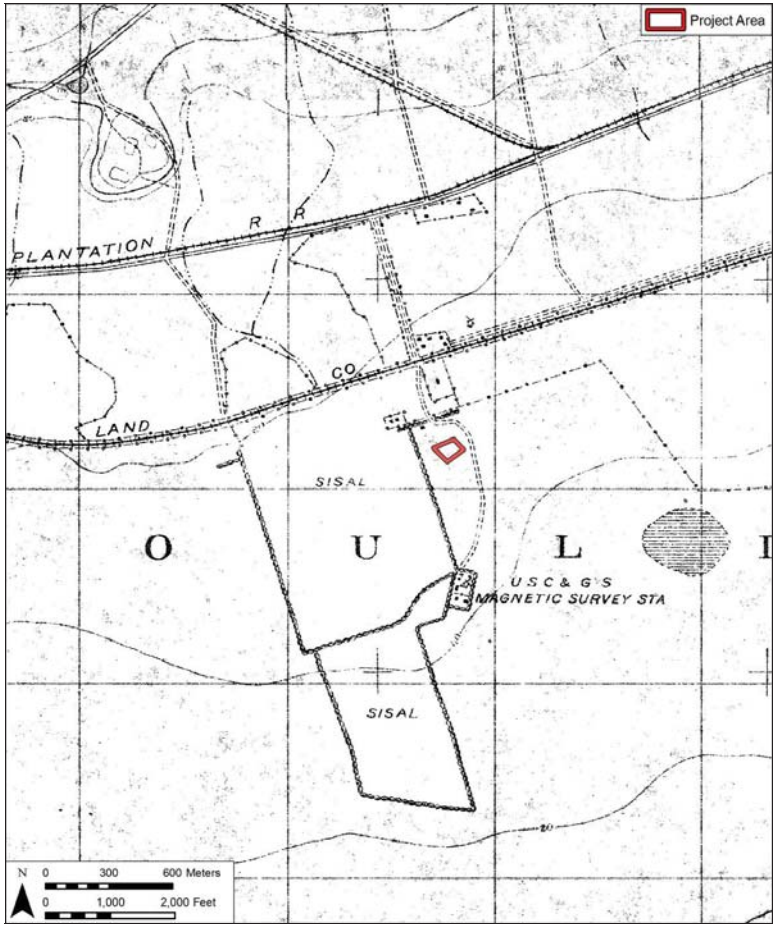

Figure 8. Portion of 1919 War Department Fire Control Barbers Point quad map showing the project area

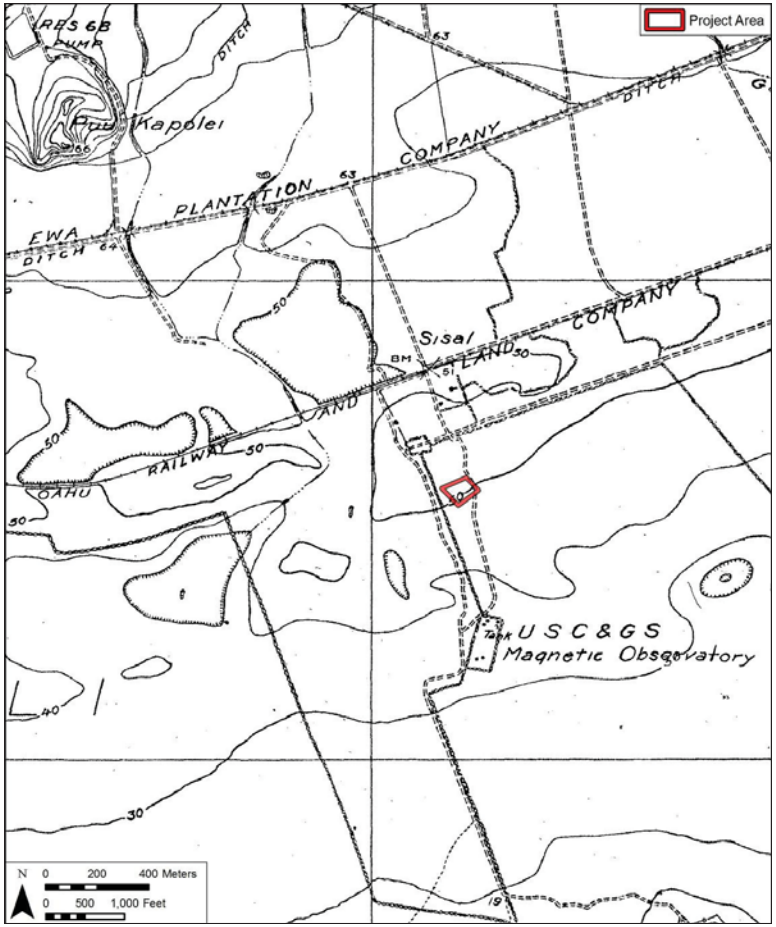

Figure 9. Portion of 1927/28 USGS ‘Ewa quadrangle map showing project area

The NAS Barbers Point Final Environmental Baseline Survey (1994) presents the following succinct history of the base:

> In 1930, the U.S. Navy leased 206 acres of land on the ‘Ewa Plain from the Campbell Estate for the purpose of building a mooring mast for the dirigible *Akron*. At the expiration of the lease in late 1939 or early 1940, the Navy acquired over 3,500 acres of land from the Estate. In 1941, the Marine Corps Ewa strip was completed on a portion of the land to serve as an auxiliary airfield for the Navy’s Ford Island Facility. The Ewa Marine Corps Air Station was extensively damaged during the Japanese attack on Pearl Harbor on December 4, [sic.] 1941. During World War II, the design capacity of the station was changed. The major construction of Barbers Point was completed from 1941 to 1945.

A 1943 War Department map (Figure 10) shows a radically transformed landscape of a complex of roads and buildings. The many H-shaped structures (including one in the project area per se) are thought to be brand new barracks hastily erected to meet the needs of America’s entry into WWII. The larger buildings 500 m to the southwest of the project area are understood to be offices and warehouses. A grid of streets has been developed just west of the present project area to accommodate further rapid development. A spur route extending to the southwest off of the O.R. & l. has been developed to move men and materiel into this area.

The 1953 Army Map Service map (Figure 11) shows a more developed military landscape with more structures to the south, southwest northwest, northeast and southeast of the project area that are believed to have been rapidly developed during the last years of WWII. While more development is clearly indicated from that shown in the 1943 map (Figure 10) it is also true that there has been considerable demolition. The grouping of approximately 14, H-shaped, structures shown in the immediate vicinity of the present project area in 1943 have been cut down to four by 1953. The H-shaped structure in the project area is gone but a new very small structure is shown in the north corner of the project area. It seems clear that very substantial development was thrown up immediately after that shown on the 1943 map but that many of these hastily-built structures had already been torn down by 1953. The “coral pit” landforms to the northwest and southeast of the project area are understood to have been open pit mines for aggregate used for creating the runways of the Barbers Point Naval Air Station runways to the south of the project area and other infrastructure. Together these 1943 (Figure 10) and 1953 maps (Figure 11) suggest virtually the entire project area vicinity was grubbed and graded during WWII.

Clearly grading and grubbing of the vicinity of the project area continued as the Barbers Point Naval Air Station continued operations after 1953. A 1977 aerial photograph (Figure 12) shows a very large airplane parking apron just to the south of the present project area. The parking lot with northwest/southeast trending medial strips that dominates the present project area is already in place at that time as is the huge warehouse-like military training facility just to the southeast. While a large residential community is indicated to the northeast most of the lands to the north and northwest, between Saratoga Avenue and Franklin D. Roosevelt Avenue, are back in *kiawe* and *koa haole* scrub. This pattern towards further residential community development in the vicinity clearly continues as shown in a comparison of the 1977 aerial (Figure 12) with a 2005 aerial (see Figure 2) that shows the relatively recent development of a housing complex 220 meters north of the present project area on the south side of Franklin D. Roosevelt Avenue.

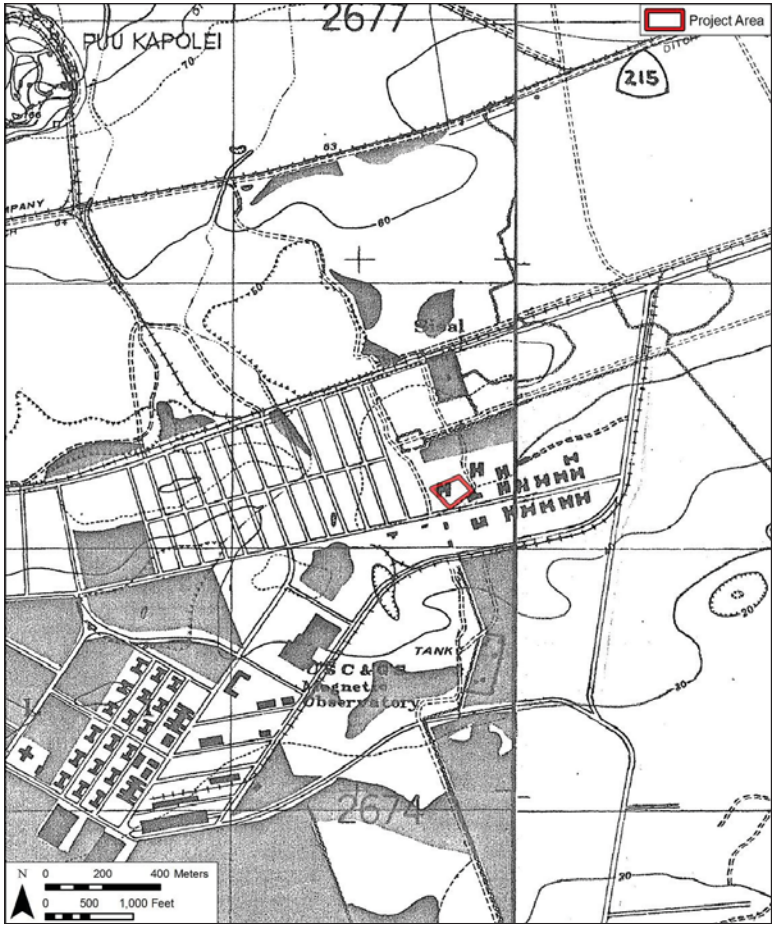

Figure 10. Portion of 1943 War Department Ewa Quad map showing the project area

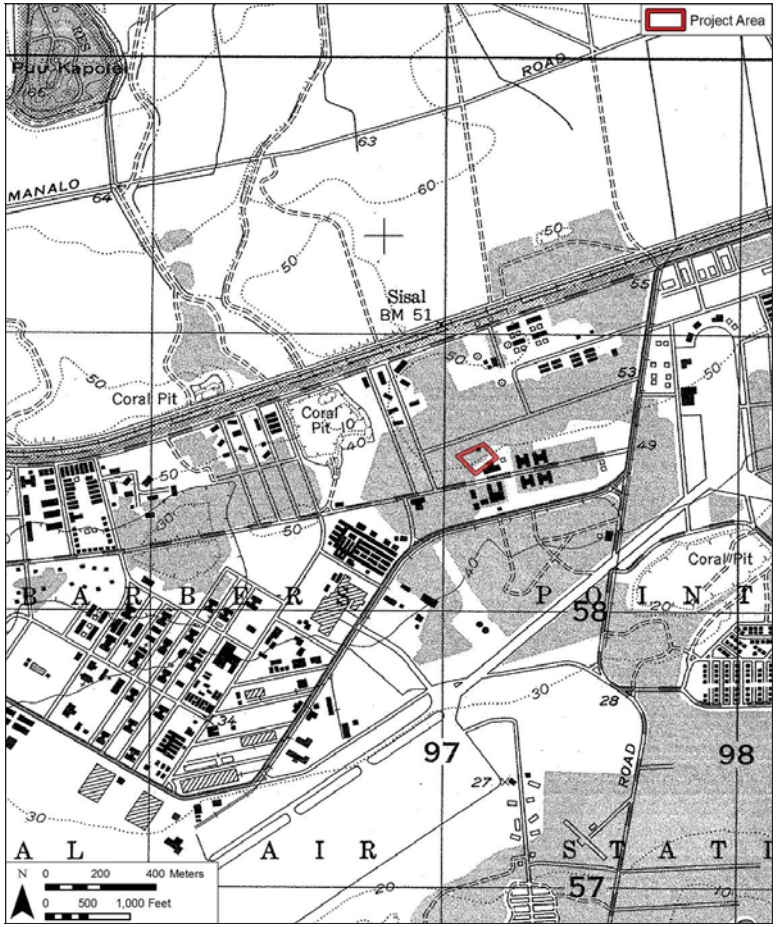

Figure 11. Portion of 1953 Army Map Service ‘Ewa Quad map showing the project area

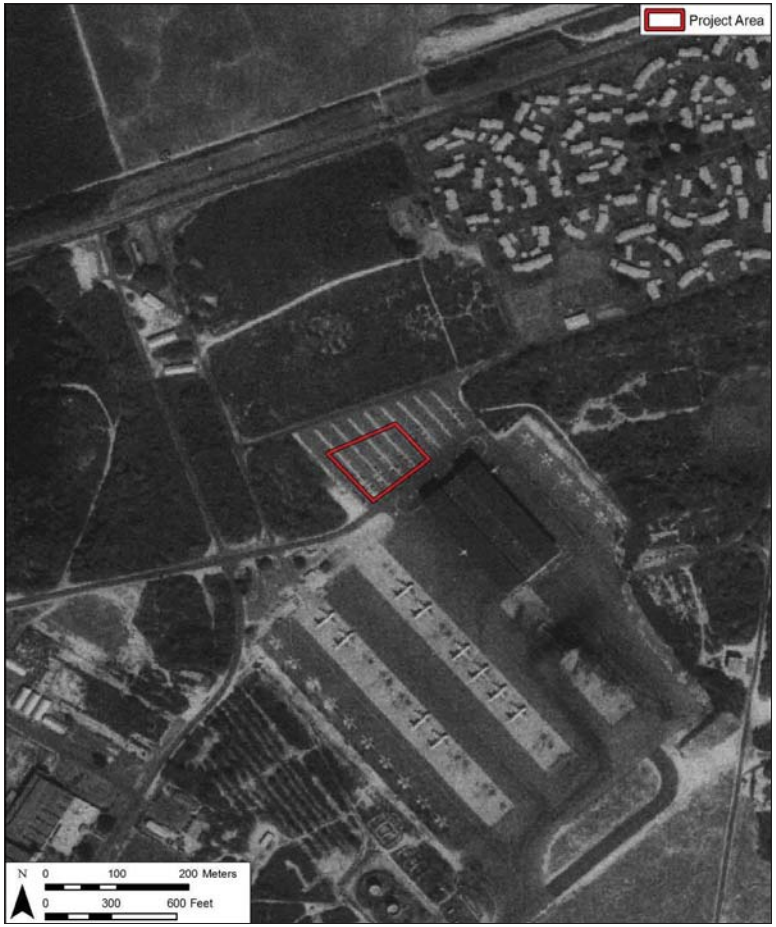

Figure 12. 1977 aerial photograph showing the project area

Section 5 Previous Archaeological Research

5.1 Overview of Archaeological Studies in Western Honouliuli

An overview of archaeological studies in the west half of Honouliuli Ahupua‘a is presented in Table 1 with archaeological studies in the vicinity of the proposed Pacific Health Research Laboratory Project area shown in Figure 13. An overview of archaeological findings in the west portion of the *ahupua‘a* follows and then a more detailed discussion of finds germane to the present project area.

Table 1. Archaeological and Related Studies in Western Honouliuli Ahupua‘a (in chronological order)

Reference	Nature of Study	General Location of Study
Thrum 1907	*Heiau* study	Hawaiian Islands
McAllister 1933	All island survey	O‘ahu Island
Kikuchi 1959	Site letter report	Barbers Point
Lewis 1970	Reconnaissance survey	Barbers Point (harbor area)
Frierson 1972	Study of land use & vegetation change	Honouliuli
Barrera 1975	Reconnaissance survey	Barbers Point (harbor area)
Clark and Connolly 1975	Reconnaissance survey	Barbers Point (harbor area)
Oshima 1975	Reconnaissance survey	Barbers Point
Sinoto 1976	Cultural resources survey	Barbers Point (harbor area)
Bordner 1977	Reconnaissance survey	Kalo‘i Gulch
Davis 1978	Scholarly paper	Barbers Point (harbor area)
Davis and Griffin 1978	Archaeological Survey	Barbers Point (harbor area)
Hawai‘i Marine Research Inc. 1978	Geoarchaeological reconnaissance	Barbers Point (harbor area)
Kirch 1978	Land snail study	Barbers Point (harbor area)
Sinoto 1978	Archaeological & Paleontological salvage	Barbers Point (harbor area)
Barrera 1979	Archaeological Survey	West Beach
Clark 1979	Reconnaissance survey	Barbers Point (harbor area)
Cleghorn 1979	Reconnaissance survey	Barbers Point
Davis 1979a	Emergency excavations	Barbers Point (harbor area)
Davis 1979b	Emergency excavations	Barbers Point (harbor area)
Davis 1979c	Emergency excavations	Barbers Point (harbor area)
Komori and Dye 1979	Archaeological testing	West Beach
Sinoto 1979	Cultural resources survey	Barbers Point (harbor area)
Davis 1980	Research design	Barbers Point
Kirch and Christensen 1980	Land snail study	Barbers Point (harbor area)
Christensen and Kirch 1981	Land snail study	Barbers Point (harbor area)

Reference	Nature of Study	General Location of Study
Hammatt and Folk 1981	Archaeological and Paleontological Investigation	Barbers Point (harbor area)
Davis 1982	Academic paper	Barbers Point
McCoy et al. 1982	Proposal for investigations	Barbers Point (harbor area)
Neller 1982	Scholarly study	Barbers Point
Olson 1982	Fossil avifauna study	Barbers Point
Ahlo and Homon 1983	Reconnaissance survey	Barbers Point
Bordner and Silva 1983	Reconnaissance survey	Waimānalo Gulch
Ahlo and Homon 1984	Test excavations	Barbers Point
Barrera 1984	Archaeological Status Report	West Beach
Hammatt 1984	Reconnaissance survey	Kahe Point
Haun and Kelly 1984	Research resign	Naval Air Station
Tuggle 1984	Survey report	Naval Air Station
Neller 1985	Review and evaluation	West Beach
Barrera 1986	Archaeological Investigations	West Beach
Davis and Haun 1986	Intensive survey and test excavations	West Beach
Davis et al. 1986 a and b	Research design	West Beach
Haun 1986a	Reconnaissance survey	Kapolei Town
Haun 1986b	Reconnaissance survey	Kapolei Town
Davis and Haun 1987 a and b	Intensive survey & test excavations	West Beach
Rosendahl 1987a	Reconnaissance survey	Kapolei Town
Rosendahl 1987b	Survey report	Kapolei Town
Welch 1987	Reconnaissance survey	Naval Air Station
Davis 1988	Reconnaissance survey	HECO Station Barbers Point
Bath 1989a	Petroglyph study	Waimānalo Gulch
Bath 1989b	Burial documentation	Kahe
Burgett and Rosendahl 1989	Subsurface archaeological testing	North of O.R.&L.
Davis 1989	Archaeological investigations	HECO Station Barbers Point
Hammatt and Shideler 1989a	Archaeological assessment	Barbers Point (harbor area)
Hammatt and Shideler 1989b	Reconnaissance survey	Kahe
Sinoto 1989	Letter report	Barbers Point
Carlson and Rosendahl 1990	Inventory survey	Kaomi Loop Subdivision
Cleghorn and Davis 1990	Archaeological and paleontological investigation	Barbers Point (harbor area)
Davis 1990b	Archaeological and paleontological investigation	Barbers Point (HECO area)
Davis 1990a	Archaeological and paleontological study (Ph.D. dissertation)	Barbers Point (harbor area)

Reference	Nature of Study	General Location of Study
Kawachi 1990	SHPD Burial Recordation	Canal at east end of Ōla‘i Street
Rosendahl 1990	Letter report	Kapolei Town
Kennedy 1991	Subsurface testing	Pu‘u o Kapolei
Folk 1991	Reconnaissance survey	Drainage channel
Hammatt et al. 1991	Inventory survey	Makaīwa Hills
Hammatt and Shideler 1991	Archaeological assessment	Barbers Point (harbor area)
Haun et al. 1991	Survey report	Naval Air Station
Burgett and Rosendahl 1992	Inventory survey	Barbers Point (harbor area)
Hammatt and Folk 1992	Subsurface testing	Barbers Point (drainage beach berm)
Glidden et al. 1993	Data recovery excavations	Paradise Cove
Jones 1993	Fossil coral reefs study (Ph.D. dissertation)	Hawaiian Islands
Landrum 1993	Reconnaissance and subsurface testing	Naval Air Station
Miller 1993	Data recovery	Barbers Point (harbor area)
Hammatt and Shideler 1994	Archaeological assessment	Barbers Point (harbor area)
Hammatt et al. 1994	Inventory survey	Barbers Point (harbor area)
Davis 1993	Archaeological and paleontological investigation	Barbers Point (harbor area)
Erkelens 1992	Archaeological survey	Naval Air Station
Hammatt and Shideler 1995	Data recovery plan	Barbers Point (harbor area)
Jourdane 1995	Burial documentation	Paradise Cove
O’Hare et al. 1996	Intensive survey and testing	Naval Air Station
Athens et al. 1997	Cultural resource inventory, paleoenvironmental investigation	‘Ewa Plain:Naval Air Station
Tuggle 1997a	Cultural resource inventory	Naval Air Station
Tuggle 1997b	Synthesis	‘Ewa Plain
Tuggle and Tomonari-Tuggle 1997	Cultural resource inventory survey	Naval Air Station
Wickler and Tuggle 1997	Cultural resource inventory, Inventory Survey	Naval Air Station
Wulzen and Rosendahl 1997	Subsurface testing & data recovery	Naval Air Station
McIntosh and Cleghorn 1999	Archaeological Archival Research	12 mile Water Reclamation Transmission Line
McDermott et al. 2000	Data recovery	Barbers Point (harbor area)
Sinoto and Titchenal 2002	Archaeological Inventory Survey	Desalination facility S of E end of Ōla‘i Street

Reference	Nature of Study	General Location of Study
Cordy and Hammatt 2003	Archaeological assessment	Barbers Point, North of O.R.&L.
O‘Hare et al. 2004	Documentation of Plantation Infrastructure	North of O.R.&L.
Terry et al. 2004	Archaeological Inventory Survey of Two Sinkholes	North of O.R.&L.
Hoffman et al. 2005	Archaeological Inventory Survey	South of O.R.&L.
McDermott, O’Leary and Tulchin, 2006	Archaeological Inventory Survey	Proposed 345-Acre Kapolei Harborside Center
Hammatt and Shideler, 2007a	Archaeological Inventory Survey (draft)	Proposed Kapolei Corporation Yard, Kalaeloa
Hammatt and Shideler, 2007b	Archaeological Literature Review and Field Inspection	For an Approximately 21.2-Acre Project Area at Ko‘olina, TMK: [1] 9-1-057:002 & 004
Hammatt, Tulchin and Shideler 2007	Archaeological Literature Review and Field Inspection	For a proposed Chevron Refinery fencing project, Kalaeloa, (TMK: [1] 9-1-014:010 por.)
Tulchin, T, O’Hare and McDermott 2007	Archaeological Assessment	For the 65.8-acre former Hawai‘i Raceway Park Property, (TMK: (1) 9-1-075: 044 and 050),
Hunkin, and Hammatt 2009	Archaeological Inventory Survey	62-acre Makakilo Drive Extension Project, (TMK: [1] 9-2-002:006, 9-2-003:079)
Thurman, et al. 2009	Archaeological Literature Review and Field Inspection Report	I C Sunshine Solar Energy Project, TMK: [1] 9-1-032:001
Tulchin, & Hammatt 2009	Archaeological Assessment	The Villas at Malu‘ohai, a 2-acre Parcel in Kapolei, TMK: [1] 9-1-016:064 por.
Groza, and Hammatt 2010	Archaeological Monitoring Report	For wastewater improvements at Kalaeloa City and County Beach Park (also known as Barbers Point Beach Park), TMK: [1] 9-1-026:027
Runyon, Borthwick and Hammatt 2010a	Archaeological Monitoring Report	For Phase 1B of the North-South Road Project, TMK: [1] 9-1-17: 4, 95, 96, 97, 98

Reference	Nature of Study	General Location of Study
Runyon, Borthwick and Hammatt 2010b	Archaeological Monitoring Report	For Phase 1C of the North-South Road Project, TMK: [1] 9-1-018:001,003,004,005; 9-2-002:001,006
Hammatt, and Shideler 2011	Archaeological Assessment	For a Board of Water Supply Fire Dip Tank Project at Pālehua, TMK: [1] 9-2-003: 088 por.
Hammatt, and Shideler 2011	Archaeological Assessment	For a Board of Water Supply Fire Dip Tank Project at Pālehua, TMK: [1] 9-2-003: 088 por.

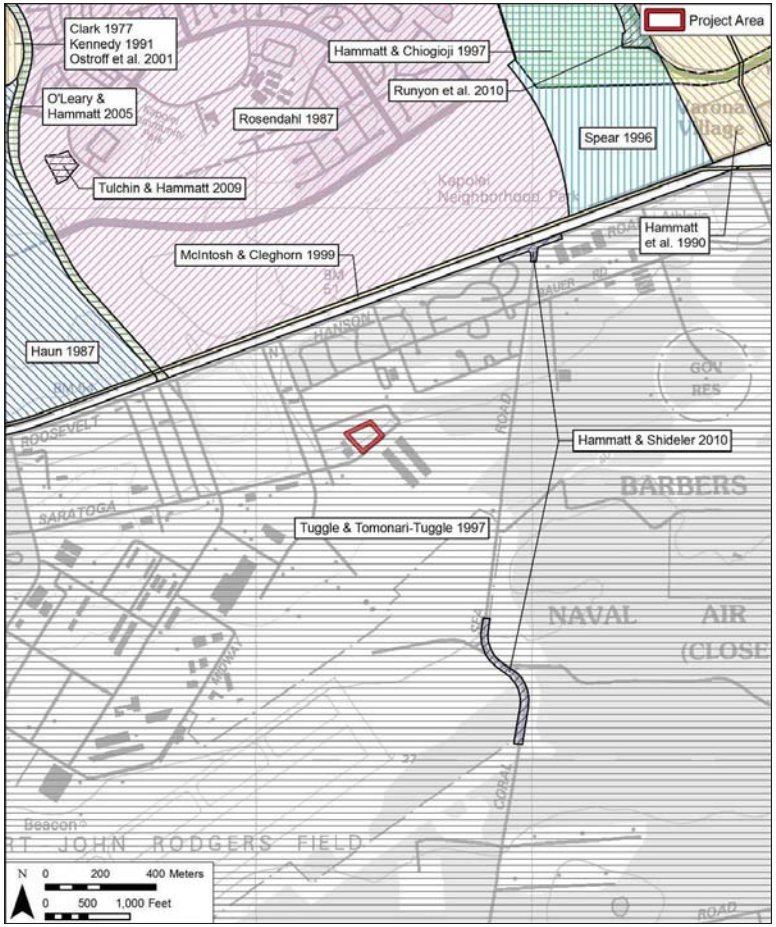

Figure 13. U.S. Geological Survey 7.5-minute series map, Ewa quadrangle (1998), showing archaeological studies in the vicinity of the proposed Pacific Health Research Laboratory Project area

The first effort to record archaeological sites in Honouliuli was by Thrum (1907:46), who references “a *heiau* on Kapolei hill, ‘Ewa - size and class unknown. Its walls thrown down for fencing.” The former *heiau* was on Pu‘u Kapolei, 5 kilometers northeast of the present study area.

In his 1930 surface survey of the island of O‘ahu, archaeologist J. Gilbert McAllister recorded the specific locations of important archaeological and cultural sites, and the general locations of some sites of lesser importance. McAllister (1933:107-108) recorded seven specific sites at Honouliuli (numbered 133-139) and these became the first seven sites in the Bishop Museum’s Site Numbering System (OA-B6-1 through OA-B6-7). The nearest of these specific sites to the present project area is McAllister Site 138, including the Pu‘u Kapolei *heiau* and an adjacent rock shelter approximately 2 kilometers to the northwest. McAllister (1933:109), however designated his Site 146 to include archaeological features covering a large but poorly defined area along the coast. His impressions of Site 146 are recorded as follows:

> ‘Ewa coral plains, throughout which are remains of many sites. The great extent of old stone walls, particularly near the Pu‘uloa Salt Works belongs to the ranching period of about 75 years ago [c. 1850s]. It is probable that the Hawaiians formerly used the holes and pits in the coral. Frequently the soil on the floor of larger pits was used for cultivation, and even today one comes upon bananas and Hawaiian sugar cane still growing in them. They afford shelter and protection, but I doubt if previous to the time of Cook there was ever a large population here

These archaeological sites of the ‘Ewa coral plains would be the subject of some 40 or so archaeological reports in the 1970s and 1980s with approximately a hundred studies to date.

From the period between McAllister’s 1930 study and the flurry of work that began in 1969, there are only a few sporadic pieces of poorly documented research. “In 1933, Dr. Kenneth P. Emory examined a well-preserved house site and a possible *heiau* in the western part of the coral plain; these sites were later destroyed by sugar-cane planting” (Sinoto 1976:1). In 1959, William Kikuchi removed a number of burials from a burial cave site (Bishop Museum Site OA-B6-10) at the Standard Oil Refinery, which was subsequently destroyed (Barrera 1975:1). Kikuchi recovered 12-16 incomplete primary and/or secondary burials cached in a sinkhole or crevice exposed during construction activities near the big bend in Malakole Road just south of the northeast end of the present fence line study corridor (Kikuchi 1959; Davis 1990:146, 147). Specific location data is not available but if this find was close to the big bend in Malakole Road then it would appear to have been within 200 m of the northeast end of the present fence line study corridor.

In 1960, Yoshi Sinoto and Elspeth Sterling made note of a house site (Bishop Museum Site OA-B6-8). “In 1962, Lloyd Soehren recorded another secondary human burial in a sinkhole at the Barber’s Point Naval Air Station” (Davis 1990a:147). In 1966 (per Sinoto 1960), Lloyd Soehren “carried out salvage excavations at BPBM Site # 50-OA-B6-13 (a possible fishing shrine.)” The site was reported as destroyed by construction (Barrera 1975:1) but Davis (1990a:148) relocated the shrine and performed additional excavations in 1982. In 1969, artifacts were recovered by Roger Green from a beach midden site (B6-14), south of the barge harbor.

These reports of a number of sites resulted in a number of visits by Dr. Sinoto and student volunteers in late 1969 and early 1970. A University of Hawaii graduate student, Ernest Lewis conducted a surface survey that located some 22 archaeological sites of the types that are typical for the Kalaeloa region, including various types of enclosures and mounds, as well as walls, made of the locally available stacked limestone cobbles and boulders.

In 1975 Neal Oshima carried out an archaeological reconnaissance survey of the then proposed drainage channel (at the east end of Ōla‘i Street) identifying walls, a platform, an enclosure near the east end of Malakole Road.

In 1975, William Barrera of the Bishop Museum, under contract with the U.S. Army Corps of Engineers (USACE), conducted an archaeological reconnaissance survey for the proposed Barber's Point Harbor. The USACE continued the archaeological research in 1976 by requesting another survey (Sinoto 1976) of the cultural remains in the area previously surveyed in 1970 (Lewis) and 1975 (Barrera). Sinoto's work included mapping of 68 new archaeological sites and more complete mapping of 30 previously recorded sites. In the course of this research, two excavations were conducted in the large, presently fenced, sinkhole Site 9545, located north of the barge harbor. This large sinkhole yielded archaeological remains and a radiocarbon date from a hearth feature, as well as bones of extinct bird species.

An important aspect of this first research (1976) by Sinoto was the identification of the presence of numerous avifaunal skeletal remains within limestone sinkholes, which led to the contacting of Storrs Olson, Associate Curator of Birds at the Smithsonian Institution. After a field inspection and a brief review of the recovered material he knew that many extinct endemic species, new species, and even new genera were present. Olson stated that:

> The various limestone sinks...contain probably the most extensive fossil avifauna in Hawaii with many new species endemic to the island. Such fossils have not and probably cannot be found anywhere else on the island. Furthermore, the nature of preservation is such as to insure that virtually complete skeletons can probably be assembled for most species. Thus, there is much highly significant and totally new biological and paleontological information that can be obtained at the Barbers Point site.
>
> Destruction of any of the potential fossil sinks would result in the loss of many specimens, some possibly unique, since one sinkhole might contain species absent in another. Also, the fauna of one sinkhole might not be coetaneous with that of another, the age of a deposit being determined by when a sinkhole first formed. Therefore, an investigation of the fauna of different sinks might show changes in species composition and changes in morphology within a species through time. Finally, it would also be desirable to retain some sinks intact as fossil "banks" should some new technique or different information be desired in the future. The fossil deposits at Barbers Point are a unique and irreplaceable resource. (Olson in Sinoto 1976:74)

In 1980, Storrs Olson extended the test pit of Aki Sinoto in the large sinkhole site # 9545 and conducted extensive excavation of this area in 1981 (Olson 1982:27).

In 1977, Aki Sinoto (1978) undertook salvage archaeological and paleontological excavations in the proposed barge harbor area. Sinoto's work for the Corps of Engineers (1978) included preliminary sampling and analytical studies of avifaunal remains and terrestrial gastropods (land snails) and a geological study of the emerged coral reef based on the excavation of one sinkhole.

In late 1977 and early 1978, archaeological survey was conducted by the Archaeological Research Center of Hawaii in the deep draft port facility area. (Davis and Griffin 1978)

In 1977, Barber’s Point Archaeological District was assigned Site # 50-80-12-2888 and listed on the National Register of Historic Places (based on the SHPD’s Hawai‘i/National Register web site, http://www.hawaii.gov/dlnr/hpd/hpgreeting.htm). This district lies well to the west of the present project area.

To complete the archaeological survey of the entire area to be affected by the harbor and support facilities, the USACE contracted for survey of the areas designated as Optional Area 1 and Study Area 1a (Davis 1978) and Area 1b (Sinoto 1978). Those surveys by Davis and Sinoto located numerous archaeological sites, as well as sinks of late Pleistocene to early Holocene age that are of considerable paleontological interest.

Sinoto's (1979) work shows that, although sinks containing remains of extinct species are dispersed throughout his study area, only 3 out of 19 sinks tested (or 16%) contained extinct species. However, this amounts to a considerable number of sinks as Sinoto estimated the total number of testable sinks in the 1979 study area as between 1,100 and 2,500 (Sinoto 1979:34). The majority of Sinoto's New Disposal Site Area has been utilized for chemical dumps and coral stockpiling. That portion which remains is the site of the proposed Sinkhole Reserve and Park, comprising approximately 7 acres located well to the west of the current project area.

In 1979, Bertell Davis carried out "emergency excavations" (Davis, 1979; a, b, c,) within the area he had previously designated as Area II, located east of the easternmost corner (the *mauka*, Diamond Head corner) of the present harbor open water. These excavations were carried out in advance of the quarry expansion operation (which preceded the harbor expansion) and it is believed that all sites in this area were salvaged or lost.

Also in 1979, an archaeological reconnaissance survey was conducted of a proposed waterline route down the east side of Kalaeloa Blvd. and then east along the north side of Malakole Road. "No archaeological sites were found along the proposed waterline route." and it was noted that: "this area is either presently in sugar cane cultivation or has been used for this purpose in the past" (Cleghorn 1979:5).

Hammatt and Folk (1981) undertook archaeological testing and salvage excavations in three adjoining parcels designated Study Areas 1A, 1B and Optional Area. Of 138 archaeological sites, 88 sites were tested and 26 were excavated. Associated paleontological studies show that the limestone solution sinks and surrounding terrain were a major habitat of many fossil birds. Appendix 1 of their report, by Storrs Olson and Helen James, lists over 30 species of extinct fossil birds identified at Barber's Point.

Hommon and Ahlo (1983, 1984) carried out two studies at a proposed solid waste processing and resource recovery facility project area, examining 2 sinkholes, 3 rectangular pits and a possible cultural deposit. Finds were minimal.

The most voluminous study (Cleghorn and Davis 1990) started in 1982 and concentrated in the area just northeast of the main bend of Malakole Road. A "final draft" (Davis 1993) report documents that research as did Bertell Davis’ Ph.D. dissertation (1990).

Lynn Miller (1993) produced a report on her findings in a 31-acre parcel located just to the southeast of the present Deep Draft Harbor. Her research covers some 20 features at two state sites (2710 and 2711) that included enclosures, sinkhole caves, and a single burial.

Extensive archaeological and paleontological research was conducted prior to development of West Beach (Ko‘olina). It is the second area of the ‘Ewa Plain in which major data recovery was accomplished. Barrera (1979, 1984, 1986) conducted preliminary surveys and Davis (1986) undertook intensive survey and data recovery. Over 600 sinkholes were identified in the area along with around 180 surface sites, many of them similar in function to those at Barber's Point.

In 1985, Haun reported on a survey of the Naval Air Station at Barber's Point (Haun 1985) including the present project lands.

In 1991, Hammatt et al. conducted an archaeological inventory survey on a 1,915-acre Makaīwa Hills project area located 5 km to the northwest, *mauka* of Farrington Highway, identifying 34 sites.

Haun’s (1986) archaeological reconnaissance survey for the ‘Ewa Town Center/Secondary Urban Center study covered an area of approximately 1,400 acres 4 km west of the present project area. A study by Burgett and Rosendahl (1989) involved the excavation of seventy-two backhoe test trenches in a 360-acre portion of the Haun study area. There were no significant finds.

A preliminary reconnaissance survey conducted by Haun (1986a) covered approximately 200 acres on the *mauka* side of Farrington Highway. Only one site was identified, an irrigation ditch that extended from the northwestern edge of his project area to a quarry at the northeastern edge. The ditch was described as “constructed of concrete and stone. Elevated flumes constructed of timbers and galvanized steel bridge the gulches” (Haun 1986a:3).

Haun’s (1986b) preliminary reconnaissance survey of a 1,400-acre parcel was conducted on both the *mauka* and *makai* side of Farrington Highway, and surrounded the 200-acre parcel surveyed earlier in 1986. One previously recorded site was known to have once been in the project area, a portion of the Oahu Railroad and Land Company right-of-way (Site 50-80-12-9714). The additional sites Haun (1986b) identified included an irrigation ditch (a portion of the same site –4341 identified during the 200-acre survey), a military structure, and a rock wall that paralleled the irrigation ditch.

In 1988 Shapiro and Rosendahl carried out sinkhole excavations at a 60-acre Camp Malakole industrial subdivision site. Some 500 sinkholes were identified and a 5% sample (25 sinkholes) was selected for testing but was later reduced to 15 sinkholes. Although some cultural use was indicated by the presence of shell midden, volcanic glass, coral abraders and a bone fishhook fragment the cultural value was suggested to be low. Although a fairly intact *Branta* species goose was recovered the paleontological value was also suggested to be low.

Bertell Davis carried out three studies (1988, 1989, 1990) at the location of a 20-acre parcel proposed for a HECO generating station on the north side of Ōla‘i Street approximately 600 m

east of the present study area. Some 15+ sinkholes were identified, 13 were recorded and tested and extensive excavation was undertaken at 4 of the sinkholes. Extinct bird bones were identified in all four of these sinkholes. A human burial was encountered in sinkhole site 4099-1 (Davis 1990:33-37). This burial was of particular interest as it was dated to AD 1422-1664 and appeared to show signs of syphilis (understood as a [post-contact disease).

Between 1989 and 1994 Hammatt and Shideler produced a number of archaeological assessments of the Barber's Point area. A detailed discussion of the creation of the preserve area that is centrally located along the north side of Malakole Road is included in the report (Hammatt and Shideler 1989:33-36).

Paradise Cove, Lanikūhonua, and West Beach have been the subject of numerous archaeological studies (Barrera 1979, 1984, 1986; Komori & Dye 1979; Neller 1985; Davis & Haun 1986, 1987; Glidden et al. 1993; and Jourdane 1995).

In 1990 Carol Kawachi documented a burial in a sinkhole near the east end of Ōla‘i Street approximately 1.5 km east of the present study area on the side of the large canal “in a sinkhole which was probably exposed and cross-sectioned during excavation for the storm drain (Kawachi 1990:2).

In 1993 Lynn Miller produced a report on her findings in a 31-acre parcel located just to the southeast of the present Deep Draft Harbor. Her research covers some 20 features at two state sites (2710 and 2711) that included enclosures, sinkhole caves, and a single burial from historic property 50-80-12-2711 Feature 28 an unmodified sinkhole.

To the west of the current project area Hammatt et al. (1994) and McDermott et al. (2000) conducted an archaeological inventory survey and a large archaeological data recovery project respectively in lands just south of the OR&L alignment. This work resulted in the creation of two archaeological preserve areas. SIHP site 50-80-12-9633 is a cave that was found to contain human remains and part of a wooden canoe (described in Hammatt et al. 1994:93-94). Because of its function as a burial site, the cave was not excavated and the remains were protected in the state in which they were discovered. Another sinkhole burial 50-80-12-4907D was identified during the McDermott et al. 2000 study. Just east of that fenced preserve is another smaller preserve area surrounding the very large sinkhole SIHP site 50-80-12-9545.

McIntosh and Cleghorn (1999) carried out archival research for the Honouliuli wastewater treatment plant including a 12-mile pipeline. They conclude the likelihood of encountering surface archaeological sites is low but that “there is the possibility of encountering subsurface resources in the form of sinkholes containing cultural materials and possibly human burials.” (McIntosh and Cleghorn 1999:i)

In 2002, Sinoto and Titchenal carried out an archaeological inventory survey of a 30-acre area south of the east end of Ōla‘i Street identifying three sites two cultural and one paleontological. Cultural features included a circular enclosure, a capped sinkhole, a cist-like structure and a lime kiln. A curious bone toggle artifact believed to be “probably human” was the only *iwi* recovered (Sinoto and Titchenal 2002:58). Thirteen species of birds including many extinct species were identified.

Cordy and Hammatt (2003) made a study of a land parcel west of the current project area, across the O.R.&L. Several sinkholes were noted as of potential archaeological interest. The study also documented the presence of a historic chicken farm as well as other twentieth century architectural remains, including a Quonset hut. Two follow-up studies of plantation infrastructure (O‘Hare et al. 2004) and two of these sinkholes (Terry et al. 2004) further addressed cultural resources north across the O.R.&L. alignment.

More recently, Hoffman (et al. 2005) identified several archaeological and historic sites as part of an archaeological inventory survey that covered portions of the northeast corner of the Barbers Point Harbor. This investigation noted that this northwest portion of that project area had been greatly affected by past land use; particularly the limestone quarry operation; however, there were still remnant archaeological features preserved within the less disturbed *kiawe* thickets. The types of features documented included sinkholes and stacked limestone wall segments and enclosures.

An Archaeological Inventory Survey for the proposed Kapolei Corporation Yard at Kalaeloa Point, (Hammatt and Shideler 2006) identified one historic property (SIHP # 50-80-12-6866) remnants of the Barbers Point Military Reservation established in 1921 and dating perhaps particularly during the period between 1937 and 1942 consisting of three designated features including two 155 mm “Panama Mount” artillery bases and an associated cement slab. In addition a number of sinkholes were observed with indications that one or more contained extinct bird bones. Testing and/or preservation of sinkholes and a monitoring program were recommended.

5.2 Overview of Findings Near the Proposed Pacific Health Research Laboratory Project Area

David Welch (1987) conducted a survey of the former Ewa Marine Corps Air Station lands at Barbers Point as part of a anti-aircraft missile project identifying two probable pre-Contact sites.

During preparation for beach cottage construction at Nimitz Beach an adult male skeleton in a traditional Hawaiian flexed position was discovered (Miller 1990).

The major archaeological study at Barbers Point Naval Air Station was Alan Haun’s survey in 1984 and 1985 that was produced in 1991 (Haun 1991). Haun surveyed a total of 1,310 acres identifying a total of 42 sites (SIHP #s 50-80-12-1717 through 50-80-12-1758. Two of these sites (50-80-12-1729 and 50-80-12-1745 were in the general vicinity of the proposed Pacific Health Research Laboratory Project area.

In 1991 an overview survey was conducted at Barbers Point that largely focused on the sites related to the military period of occupation (Yoklavich, Drolet and Drolet 1992).

Rosendahl, Haun and Davis (1992) conducted an archaeological survey and testing program at a 17-acre area at the western end of the Naval Air Station newly identifying 20 sites (50-80-12-4548 through 50-80-12-4567).

The International Archaeological Research Institute (IARII 1993) conducted an archaeological survey in the northwest corner of the Naval Air Station identifying 274

archaeological features. “Haun (1991) previously recorded only five sites in the same area, containing a total of 27 features” (NAS Barbers Point Final Environmental Baseline Survey June 1994:3-25).

Landrum and Schilz (1993) carried out an archaeological reconnaissance with limited subsurface testing in a 42-acre project area bounded by Roosevelt, Lexington, Saratoga, and Bataan Avenues located just to the west of the proposed Pacific Health Research Laboratory Project area. They identified six sites: 50-80-12-1728 previously identified by Haun 1991, and previously unrecorded sites 50-80-12-4649 through 50-80-12-4653. The four newly identified sites are between 700 and 850 m to the west of the present study area (see Table 2).

The NAS Barbers Point Final Environmental Baseline Survey June 1994 study presents the best overview to our knowledge of Barbers Point Naval Air Station historic properties. A number of specific architectural features are discussed as historic properties but none near the present study area (see Figure 14).

The primary observation of the known site distribution in the vicinity of the proposed Pacific Health Research Laboratory Project area is the very low density and the general absence anywhere close by as documented in Table 2. Only two sites are within 500 m (and none within 300 m): the O.R. & L. alignment (50-80-12-9714; paralleling the north side of Roosevelt Avenue) well to the north and a sinkhole (50-80-12-1729) posited to have evidence of pre-Contact use located 320 m to the ENE “used as a dump” circa 1985.

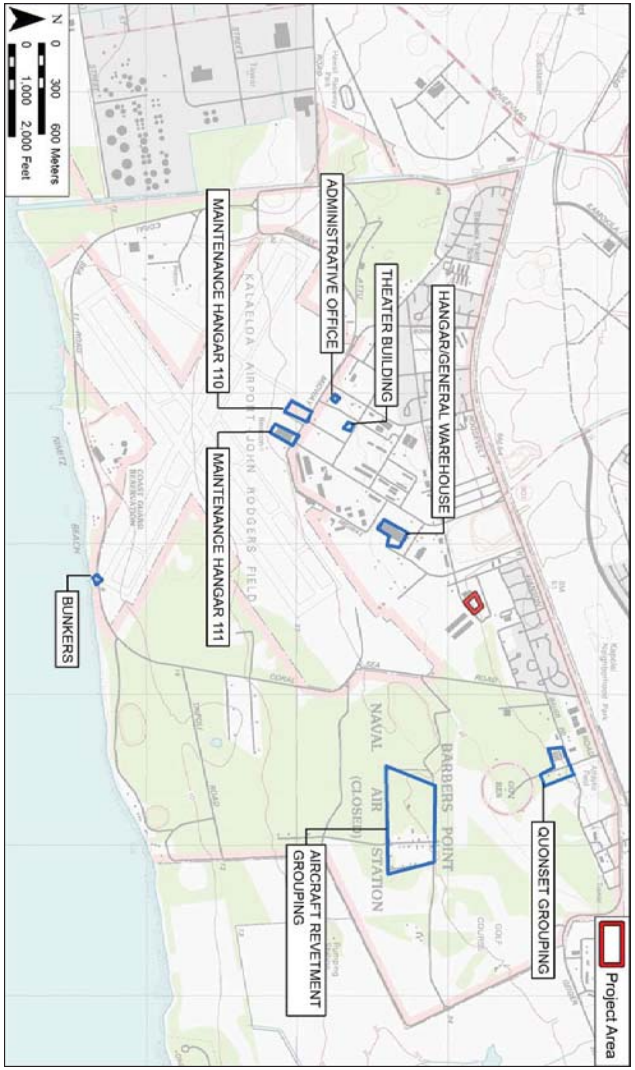

Figure 14. Map showing relationship of the proposed Pacific Health Research Laboratory Project area to known historic structures of preservation concern (adapted from NAS Barbers Point Final Environmental Baseline Survey June 1994 Figure 3-6 on page 3-26)

Table 2. NAS Barbers Point Known Cultural Resources Near Present Study Area (adapted from NAS Barbers Point Final Environmental Baseline Survey June 1994 Table 3-2 on page 3-22 to 3-23)

Site # (50-80-12-)	Distance to Present Project Area	Description	Comments
1729	320 m to ENE	Sinkhole (1 Feature)	Pre-Contact; disturbed condition; “Currently [circa 1985] used as a dump” (Source: Haun 1991)
1745	900 m to SE	Agricultural Site (2 Features)	Pre-Contact; fair condition (Source: Haun 1991)
3721	1200 m to East	Habitation complex (5 Features)	Pre-Contact; fair to poor condition; includes 2 enclosures, 1 alignment, a C-shape and an L-shape feature (Source: NAS Barbers Point Final Environmental Baseline Survey June 1994 Table 3-2)
3722	950 m to East	Boundary wall (1 Feature)	Post-Contact; poor condition; sisal plantation boundary wall (Source: NAS Barbers Point Final Environmental Baseline Survey June 1994 Table 3-2)
4649	825 m to West	Wall	Historic ca 1898 to 1930; poor to fair condition (Source: Landrum and Schilz 1993)
4650	800 m to West	Habitation complex (5 Features)	Pre-Contact; good to fair condition; 3 features intact (Source: Landrum and Schilz 1993)
4651	700 m to West	Site complex (2 Features)	Pre-Contact; good to fair condition; includes a terrace and a mound (Source: Landrum and Schilz 1993)
4652	850 m to West	Mounds (3 Features)	Timeframe unknown; good condition (Source: Landrum and Schilz 1993)
4653	1100 m to West	Wall (1 Feature)	Post-Contact; poor condition (Source: Landrum and Schilz 1993)
9714	350 m NNW	O.R. and L. alignment	This portion was placed on the National Register of Historic Properties (Source SHPD NRHP Inventory Nomination Form (1974)

Section 6 Results of Field Inspection

The field inspection consisted of pedestrian survey conducted on June 8, 2012 by CSH archaeologist, David W. Shideler, M.A., under the general supervision of Hallett H. Hammatt, Ph.D. The project area is basically a parking lot (Figure 15 to Figure 19). Access to the western 20% of the project area was restricted by a chain link fence surrounding the firefighting training area (Figure 17) but good views of the tarmac could be had from the north, east and south and confidence is high no historic properties were missed.

It appears the entire project area has been paved of long-standing – probably from long-before 1977 (see Figure 12).

An effort was made to explore two areas in the general vicinity where the ground surface was visible. In both cases the ground surface appeared to have been grubbed and graded many decades ago.

Figure 16. General view of central portion of the proposed Pacific Health Research Laboratory Project area from near the south corner, view to northeast

Figure 17. General view of firefighting training area (with helicopter mock-up) in the west side of the proposed Pacific Health Research Laboratory Project area, view to south

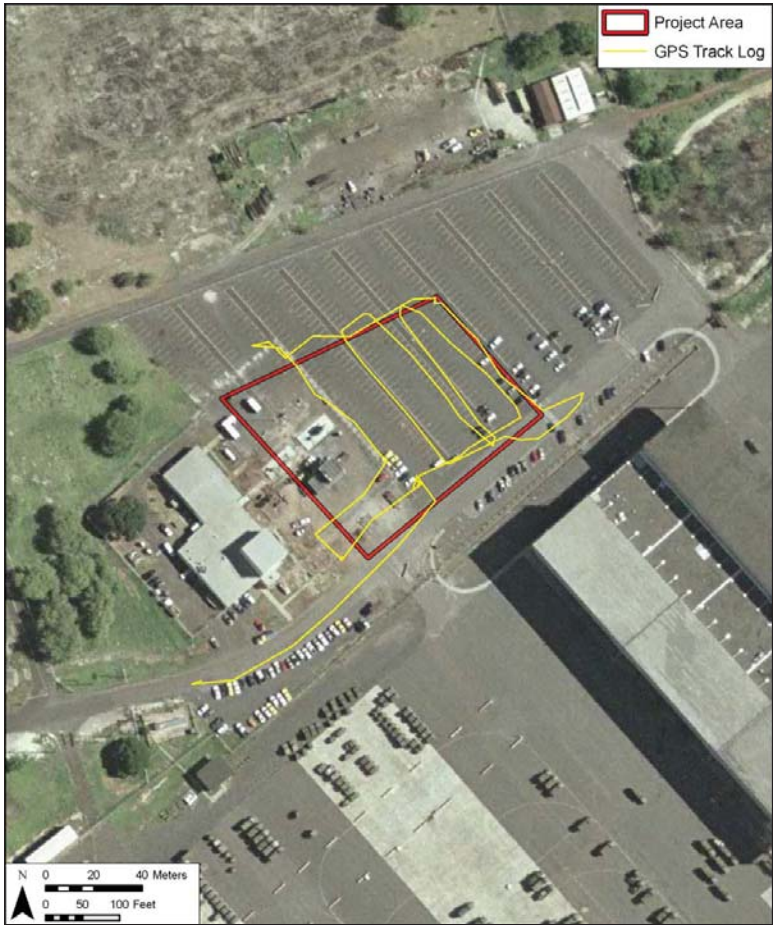

Figure 15. Track log of archaeologist’s pedestrian inspection of the proposed Pacific Health Research Laboratory Project area

Figure 18. General view of central portion of the proposed Pacific Health Research Laboratory Project area from near the north corner, view to southwest

Figure 19. General view of central portion of the proposed Pacific Health Research Laboratory Project area from east side, view to northwest (Makakilo area in southern Wai‘anae Mountains in background)

Section 7 Summary and Recommendations

7.1 Summary

To the best of our knowledge no sites have been formally reported in the immediate vicinity of the project area studied. The primary observation of the known site distribution in the vicinity of the proposed Pacific Health Research Laboratory Project area is the very low density and the general absence anywhere close by. Only two sites are within 500 m and none within 300 m (see Table 2): the O.R. & L. alignment (50-80-12-9714; paralleling the north side of Roosevelt Avenue) well to the north and a sinkhole (50-80-12-1729) posited to have evidence of pre-Contact use located 320 m to the ENE “used as a dump” circa 1985. This generally low site distribution in the vicinity is thought to be related to the distance from the coast (more than 2 kilometers), the distance to potable water, and the low rainfall that could not typically promote non-irrigated agriculture. An additional very significant factor was the extent of land alteration that occurred in the project area during and after WWII (see Figure 10, Figure 11, and related discussion).

The project area is evaluated as entirely previously graded raised reef limestone hard pan. The potential for pit caves (popularly called “sink holes”), which could possibly include burials and or other cultural deposits, was evaluated. Because of previous grading no undisturbed pit caves were observed in the project area or vicinity. To our knowledge no pit caves have ever been reported within 300 m of the project area and the probability of pit caves within the project area is evaluated as very low.

7.2 Recommendations

No further archaeological work is recommended for the proposed Pacific Health Research Laboratory. If in the unlikely event that intact cultural resources, including but not limited to limestone sinkholes containing human remains or other significant cultural deposits, are encountered during the course of development activities, all work in the immediate area should stop and the State Historic Preservation Division should be promptly notified.

Section 8 References Cited

Ahlo, Hamilton M., Jr., and Robert J. Hommon

1984 Archaeological Test Excavations at the Site of the Proposed Solid Waste Processing and Resource Recovery Facility, Honouliuli, ‘Ewa, O‘ahu, Prepared for: Belt Collins and Associates by Science Management, Inc., Honolulu

1983 An Archaeological Reconnaissance Survey of the Site of the Proposed Solid Waste Processing and Resource Recovery Facility, Honouliuli, ‘Ewa, O‘ahu, Prepared for: Belt Collins and Associates by Science Management, Inc., Honolulu.

Athens, J. Stephen, Jerome V. Ward, H. D. Tuggle and David J. Welch

1997 Environment Vegetation Change and Early Human Settlement on the ‘Ewa Plain: A Cultural Resource Inventory of Naval Air Station, Barbers Point, O‘ahu Hawai‘i, Part III: Paleoenvironmental Investigations IARII, Honolulu

Barrera, William M., Jr.

1986 *West Beach, O‘ahu Archaeological Investigations*, Prepared for West Beach Estates by Chiniago Inc., Honolulu.

1984 West Beach, Oahu: Archaeological Status Report. TMK: 9-1-14:2, 9-2-13:3,7,2 0-1-15:3,6,7,10,4." Prepared for: West Beach Authority by Chiniago Inc., Honolulu.

1979 *West Beach, Oahu: An Archaeological Survey*. Prepared for: West Beach Associates by Chiniago Inc., Honolulu.

1975 *A Report on the Archaeological Reconnaissance Survey of the Proposed Barber's Point Harbor Area*. Prepared for: U.S. Army Corps of Engineers, Pacific Ocean Division by BPBM Department of Anthropology, Honolulu. November.

Bath, Joyce

1989a Waimānalo Gulch Petroglyphs 80-12-4110, Waimānalo Gulch, Honouliuli, ‘Ewa, O‘ahu SHPD File # O-561

1989b Site File for State Site 50-80-12-4061, State Historic Preservation Division

Bordner, Richard M.

1977 Archaeological Reconnaissance of the Proposed Kalo‘i Gulch Landfill Site, ‘Ewa O‘ahu Island Archaeological Research Center Hawai‘i, Inc.

Bordner, Richard M. and Carol Silva

1983 Archaeological Reconnaissance and Historical Documentation: Waimanalo Gulch, Oahu, TMK:9-2-03:2,40,13 (por).

Burgett, Berdena D. and Paul H. Rosendahl

1992 Archaeological Inventory Survey, Contaminated Soil Stockpile/ Remediation Facility PHRI, Hilo, HI.

1989 Subsurface Archaeological Testing Ko Olina Resort Phase II Development Site Land of Honouliuli, ‘Ewa District, Island of O‘ahu PHRI, Hilo, HI.

Carlson, Arne K. and Paul H. Rosendahl

1990 Archaeological Inventory Survey, Campbell Industrial Park - Kami Loop Subdivision, PHRI, Hilo, HI.

Christensen, Carl C. and Patrick V. Kirch

1981 “Landsnails and Environmental Change at Barbers Point, Oahu, Hawaii,” *Bulletin of the American Malacological Union* 1981:31. Honolulu.

Clark, Stephan D.

1979 *Archaeological Reconnaissance Survey for Barbers Point Beach Park Improvements, Ewa, Oahu (TMK: 9-1-26:27)*. Prepared for: City and County of Honolulu, Department of Parks and Recreation by Kualoa Archaeological Research Project, Honolulu.

Clark, Stephan D. and Robert D. Connolly, III.

1975 *Archaeological Reconnaissance Survey for Honouliuli Sewage Treatment Plant and Barbers Point Outfall*. Prepared for: City and County of Honolulu, Department of Public Works by Kualoa Archaeological Research Project, Honolulu, February.

Cleghorn, Paul L.

1979 Archaeological Reconnaissance Survey of Water Systems Improvement Area, Park I, James Campbell Industrial Park, Oahu, Hawaii (TMK: 9-1-18). Prepared for: M & E Pacific Inc. by BPBM Department of Anthropology., Honolulu, June.

Cleghorn, Paul L. and Bertell D. Davis

1990 Archaeological Paleontological Investigations at the Barbers Point Deep Draft harbor, ‘Ewa, O‘ahu Applied Research Group Bishop Museum.

Cordy, Dominique and Hallett H. Hammatt

2003 Archaeological Assessment of an Approximately 100-Acre Project Area at Kapolei, Honouliuli ahupua‘a, ‘Ewa District, O‘ahu Cultural Surveys Hawai‘i, Kailua Hawai‘i

Davis, Bertell D.

1993 Archaeological and Paleontological investigations at Barbers Point at the Deep Draft Harbor, B.P. Bishop Museum, Honolulu, HI.

1990a Human Settlement in Pristine Insular Environments: A Hawaiian Case Study from Barbers Point, Southwestern O‘ahu, Ph.D. Dissertation, University of Hawaii, Honolulu.

1990b Archaeological and Paleontological Investigations at the Proposed HECO Barbers Point Generating Station, Honouliuli, ‘Ewa, O‘ahu Applied Research Group, Bishop Museum Honolulu.

1989 Report on Archaeological Investigations at the Proposed HECO Generating Station, Barbers Point, Honouliuli ‘Ewa, O‘ahu TMK 9-1-31 IARII

1988 Report on Archaeological Reconnaissance at the Proposed HECO Generating Station, Barbers Point, Honouliuli ‘Ewa, O‘ahu TMK 9-1-31 IARII

1982 “Horticultural Adaption and Ecological Change in Southwestern O‘ahu: Preliminary Evidence from Barbers Point,” pp. 51-59 in *Proceedings, Fourth Conference in Natural Sciences*, Hawaii Volcanoes National Park, Cooperative National Park Resources Study Unit, UH Mānoa and National Park Resources Study Unit, UH Mānoa and National Park Service.

1980 “A Research Design for the Study of Human Settlement and Environmental Change in southwestern O‘ahu: Re-evaluation of the Strategy Based on New Work,” pp. 77-86 in C.W. Smith (ed.), *Proceedings Third Conference in Natural Sciences*, Hawaii Volcanoes National Park, Cooperative National Park Resources Study Unit, UH Mānoa and National Park Service.

1979a Progress Report on Emergency Excavations at Barbers Point, O‘ahu: First Quarter (January-March), 1979. UH Mānoa, Department of Anthropology, Honolulu, March.

1979b Progress Report on Emergency Excavations at Barbers Point, O‘ahu: Second Quarter (April- June) 1979. UH Mānoa, Department of Anthropology, Honolulu, June.

1979c Progress Report on Emergency Excavations at Barbers Point, O‘ahu: Third Quarter (July-August) 1979. UH Mānoa, Department of Anthropology, Honolulu, August.

1978 “Human Settlement and Environmental Change at Barbers Point, O‘ahu,” pp. 87-97 in C.W. Smith (ed.) *Proceedings, Second Conference in Natural Sciences* Hawaii Volcanoes National Park. Cooperative National Park Resources Study Unit, UH Mānoa and National Park Service, Honolulu.

Davis, Bertell D. and Bion Griffin

1978 Studies in Natural History and Human Settlement at Barbers Point, Oahu, "Interim Report I: (eds), Archaeological Research Center Hawaii, Lāwa‘i, Kaua‘i, HI.

Davis, Bertell D. and Alan E. Haun

1987b Phase 2 ─ Intensive Survey and Test Excavations, West Beach Data Recovery Program, West Beach Resort, Honouliuli, Ewa, Island of Oahu, PHRI Inc., Hilo, HI.

1987a Interim Report: Phase 2) Intensive Survey and Test Excavations West Beach Data Recovery Program, Honouliuli, Ewa, Island of Oahu, PHRI Inc.

1986 Preliminary Report Upon Completion of Field Work: Phase 2 - Intensive Survey and Test Excavations, West Beach Data Recovery Program, West Beach Resort, Honouliuli, ‘Ewa, O‘ahu, Paul H. Rosendahl, Ph.D., Inc.

Davis, Bertell D., A.E. Haun and P.H. Rosendahl

1986a Phase 1) Research Design for Intensive Survey and Test Excavations, West Beach Data Recovery Program, West Beach Resort, Honouliuli, ‘Ewa, O‘ahu, Paul H. Rosendahl, Ph.D., Inc.

1986b Phase 3) Data Recovery Plan for Archaeological and Paleontological Excavations, West Beach Data Recovery Program, West Beach Resort, Honouliuli, ‘Ewa, O‘ahu, Paul H. Rosendahl, Ph.D., Inc.

Dean, Love

1991 The Lighthouses of Hawai`i, University of Hawaii Press, Honolulu, HI.

Department of the Navy

1994 “NAS Barbers Point Final Environmental Baseline Survey” In Environmental Impact Statement for the Disposal and Reuse of Naval Air Station Barbers Point, Hawaii

Erkelens, Conrad

1992 Interpretive Trail Development Study, Naval Air Station Barbers Point, Archaeological Survey of Site 1719, Draft IARII, Honolulu.

Fleischer, Robert C., Storrs L. Olson, Helen F. James, and Alan C. Cooper

2000 “Identification of the Extinct Hawaiian Eagle (Haliaeetus) by mtDNA Sequence Analysis” from *Auk* Volume 117, October 200

Folk, William

1991 Archaeological Reconnaissance of a Proposed Drainage Channel: Supplement to An Archaeological Assessment For the Proposed Kapolei Business/Industrial Park, Honouliuli, ‘Ewa, O‘ahu Cultural Surveys Hawaii

Foote, Donald E., E.L. Hill, S. Nakamura and F. Stephens

1972 *Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai and Lanai*, State of Hawaii, U.S. Dept. of Agriculture, U.S. Government Printing Office, Washington, D.C.

Frierson, Barbara

1972 *A Study of Land Use and Vegetation Change: Honouliuli, 1790-1925*, Manuscript prepared for Graduate Seminar in Geography (750), University of Hawaii, Honolulu.

Glidden, Catherine, Maurice Major and Boyd Dixon

1993 Results of Subsurface Data Recovery in Selected Areas of Paradise Cove, Honouliuli, ‘Ewa, O‘ahu, Anthropology Department, Bishop Museum,, Honolulu, HI.

Groza, Randy and Hallett H. Hammatt

2010 Archaeological Monitoring Report For Wastewater Improvements at Kalaeloa City and County Beach Park (also known as Barbers Point Beach Park), Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu, TMK: [1] 9-1-026:027 Cultural Surveys Hawaii, Kailua, HI.

Halliday, William R.

2005 Current Status of the ‘Ewa Karst, Honolulu County, Hawai‘i. *The Cave Conservationist*. February 1998. Electronic File maintained at http://www.caves.org/section/ccms/wrh/, accessed December 22, 2005.

Hammatt, Hallett H.
1984 *Archaeological Reconnaissance at HECO Kahe Point Power Plant* (Letter Report to Dames & Moore), Cultural Surveys Hawaii, Kailua, HI.

Hammatt, Hallett H. and William H. Folk
1992 Archaeological Subsurface Testing of a Beach Berm Within the Proposed Barbers Point Drainage Channel, Cultural Surveys Hawai‘i, Inc., Kailua, Hawaii

1981 Archaeological and Paleontological Investigation at Kalaeloa (Barber's Point), Honouliuli, ‘Ewa, O‘ahu, Federal Study Areas 1a and 1b, and State of Hawai‘i Optional Area 1, ARCH 14-115.

Hammatt, Hallett H., Jennifer Robins, Mark Stride and Matthew McDermott
1991 *An Archaeological Inventory* Survey for the Makaiwa Hills Project Site, Honouliuli, ‘Ewa, O‘ahu, Cultural Surveys Hawaii, Kailua.

Hammatt, Hallett H. and David W. Shideler
2011 Archaeological Assessment for the Board of Water Supply Fire Dip Tank Project at Pālehua, Honouliuli Ahupua‘a, ‘Ewa District, Island of O‘ahu TMK: [1] 9-2-003: 088 por. Cultural Surveys Hawai‘i, Kailua, HI.

2007a Archaeological Inventory Survey For the Proposed Kapolei Corporation Yard, Kalaeloa, Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu Island TMK: [1] 9-1-026:004, Cultural Surveys Hawai‘i, Kailua, HI.

2007b Archaeological Literature Review and Field Inspection For an Approximately 21.2-Acre Project Area at Ko‘olina, Honouliuli Ahupua‘a, ‘Ewa District, Island of O‘ahu TMK: [1] 9-1-057:002 & 004 Cultural Surveys Hawai‘i, Kailua, HI.

1995 Data Recovery Plan for Archaeological Sites in the Proposed Barber’s Point Expansion Area (TMK 9-1-14:2), Cultural Surveys Hawai‘i, Kailua, HI.

1994 An Archaeological Assessment for the Proposed Barber's Point Harbor Expansion (84 acres), Honouliuli, ‘Ewa, O‘ahu, (revised), Cultural Surveys Hawaii, Kailua, HI.

1991 An Archaeological Assessment for the Proposed Barbers Point Harbor Expansion, (140.4 acres), Honouliuli, ‘Ewa, O‘ahu, Draft, Cultural Surveys Hawaii.

1989a An Archaeological Assessment for the Proposed Kapolei Business/Industrial Park, Honouliuli, ‘Ewa, O‘ahu, Cultural Surveys Hawaii.

1989b Archaeological Reconnaissance of the Six-Acre Proposed HECO Kahe raining Facility (T.M.K. 9-1-3:27), Honouliuli, ‘Ewa, O‘ahu, Prepared for M and E Pacific, Inc., Cultural Surveys Hawaii, Kailua, HI.

Hammatt, Hallett H., David W. Shideler, Melody Heidel and Mark Stride
1994 Archaeological Inventory Survey of the Proposed Barbers Point Harbor Expansion (TMK 9-1-14:02), Revised Sept. 1994, Cultural Surveys Hawaii, Kailua, HI.

Hammatt, Hallett H., Todd Tulchin and David W. Shideler
2007 Archaeological Literature Review and Field Inspection For the Proposed Chevron Refinery Fencing Project, Kalaeloa, Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu Island (TMK: [1] 9-1-014:010 por.) Cultural Surveys Hawaii, Kailua, HI.

Handy, E.S. Craighill and Elizabeth G. Handy
1972 Native Planters in Old Hawaii: Their Life, Lore, and Environment, Bishop Museum Bulletin 233, Honolulu.

Haun, Alan E.
1991 An Archaeological Survey of the Naval Air Station, Barber’s Point, O‘ahu, Hawai‘i, Manuscript, Department of Anthropology, Bernice Pauahi Bishop Museum, Honolulu

1986a Preliminary Archaeological Reconnaissance Survey for Environmental Assessment (EA) Ewa Town Center/Secondary Urban Center Land of Honouliuli, Ewa, Island of Oahu, (TMK 9-1-15: Por. 4, 5, 17; 9-1-16:1, Por. 4, 6, 9, 16, 18, 24, 30; 9-2-19: por. 1), PHRI report # 275-111886, PHRI, Hilo, HI.

1986b Preliminary Archaeological Reconnaissance Survey for Environmental Assessment (EA) Ewa Town Center/Secondary Urban Center Land of Honouliuli, Ewa, Island of Oahu, (TMK 9-1-15:Por. 5, 17: 9-1-16:Por. 9), PHRI report # 320-090687, PHRI, Hilo, HI.

Haun, Alan E., Scott Williams, Marion Kelly and Maurice Major
1991 An Archaeological Survey of the Naval Magazine and Communications Area Transmission Facility, Lualualei, O‘ahu, HI, Department of Anthropology B. P. Bishop Museum, Honolulu.

Haun, Alan E. and Marion Kelly
1984 Research Design for an Archaeological Survey of Naval Communication Area Radio Transmission Facility, Lualualei; and Naval Air Station, Barbers Point, Oahu, Hawaii, Dept. of Anthropology, Bishop Museum, Honolulu.

Hawaii Marine Research Inc.
1978 “Appendix I: Geoarchaeological Reconnaissance of Barbers Point,” in Akihiko Sinoto, *Archaeological and Paleontological Salvage at Barbers Point, O‘ahu*. Prepared for: U.S. Army Engineer District by BPBM Department of Anthropology. Honolulu, March.

Hoffman, Tracy, Sallee D.M. Freeman, David W. Shideler, and Hallett H. Hammatt
2005 Archaeological Inventory Survey of Approximately 124 Acres at Kapolei, Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu TMK: 9-1-14:33 & 9-1-15:20 Cultural Surveys Hawai‘i, Kailua, Hawaii

Hunkin, Nifae and Hallett H. Hammatt
2009 Archaeological Inventory Survey for the Approximately 62-acre Makakilo Drive Extension Project, Honouliuli Ahupua‘a, ‘Ewa District, Island of O‘ahu (TMK: [1] 9-2-002:006, 9-2-003:079) Cultural Surveys Hawai‘i, Kailua, HI.

‘Ī‘ī, John Papa
1959 *Fragments of Hawaiian History* (Pukui translation), Bishop Museum Press, Honolulu.

International Archaeological Research Institute, Inc.
1993 Letter Report for the Phase I Archaeological Inventory Survey at Barbers Point Naval Air Station, Family Housing Project (H-208), Aviation Maintenance Training Building (P-261), and PATSWINGPAC Addition (P-255). IARII, Honolulu

Jones, Anthony
1993 Elevated Fossil Coral Deposits in the Hawaiian Islands: A Measure of Island Uplift in the Quaternary Ph.D. dissertation, Department of Oceanography, University of Hawai‘i at Mānoa

Jourdane, Muffet (Elaine)
1995 Inadvertent Discovery of Human Remains at Paradise Cove, Honouliuli, ‘Ewa, Oahu, State Site No. 50-80-12-4968, SHPD #762, SHPD, Honolulu, HI.

Juvik, Sonia P. and James O. Juvik, Editors, Chief Cartographer, Thomas R. Paradise
1998 *Atlas of Hawai‘i*, 3rd Edition, University of Hawaii Press, Honolulu, HI.

Kawachi, Carol T.
1990 *Recordation of Campbell Industrial Park burial, Honouliuli, Ewa, O‘ahu*, State Site No. 80-12-4209, Manuscript, SHPD/DLNR, Honolulu, HI.

Kennedy, Joseph
1991 Subsurface Testing at the Proposed Kapolei Park/Fort Barrette, Puu Kapolei, Island of O‘ahu, TMK:9-1-16:2,

Kikuchi, William K.
1959 *Standard Oil Refinery Site Letter Report*, plus maps and field notes on file, BPBM, Honolulu, HI.

Kirch, Patrick V.
1978 “Appendix II, Report on Recent and Subfossil Land Mollusca From Barbers Point, Oahu,” in Akihiko Sinoto (March, 1978), *Archaeological and Paleontological Salvage at Barbers Point, O‘ahu*, Prepared for: U.S. Army Engineer District, Pacific Ocean Division by BPBM Department of Anthropology, Honolulu, March.

Kirch, Patrick V. and Carl C. Christensen
1980 *Nonmarine Molluscs and Paleoecology at Barbers Point, O‘ahu*, Prepared for: Archaeological Research Center Hawaii by BPBM Department of Anthropology, Honolulu, July.

Komori, Eric K. and Thomas Dye
1979 Archaeological Testing at Lanikuhonua, West Beach, Ewa, Oahu, Hawaii, (TMK 9-1-13:por.10), Bishop Museum, Honolulu, HI.

Landrum, Jim and A. J. Schilz
1993 Archaeological Reconnaissance and Limited Subsurface Testing at the Proposed Family Housing Construction Area Project No. 34863, Barber’s Point Naval Air Station, Honouiliuli Ahupua‘a, ‘Ewa District, O‘ahu Island. Ogden Environmental and Energy Services Company, Inc., Honolulu

Lewis, Ernest
1970 *The Campbell Project: A Preliminary Report*. University of Hawaii, Honolulu, HI.

Macdonald, G.A., A. T. Abbott and Frank L. Peterson
1983 *Volcanoes in the Sea*, Second Edition, University of Hawaii Press, Honolulu, HI.

McAllister, J.G.
1933 *Archaeology of O‘ahu*, Bishop Museum. Bulletin 104, Honolulu, HI.

McCoy, Patrick C., Carl Christensen, and Bertell Davis
1982 A Proposal for Archaeological and Paleontological Investigations in Stockpile Area III at Barbers Point, Southwestern O‘ahu; Phase 1: Data Recovery and Preliminary Analysis, and Phase 2: Detailed Data Analysis, Pending, Honolulu, March.

McDermott Matthew, Owen O’Leary and Todd Tulchin
2006 Archaeological Inventory Survey for the Proposed 345-Acre Kapolei Harborside Center, Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu Island Cultural Surveys Hawai‘i, Kailua Hawai‘i

McDermott, Matthew, David Shideler, John Winieski and Hallett H. Hammatt
2000 Archaeological Data Recovery Report for the Archaeological sites in the Proposed Barber’s Point Harbor Expansion Area, Kalaeloa, Ahupua‘a of Honouliuli, District of ‘Ewa, Island of O‘ahu (TMK 9-1-14:2), Cultural Surveys Hawaii, Kailua, HI.

McIntosh, James and Paul Cleghorn
1999 Report of Archaeological Archival Research for the Honouliuli Wastewater Treatment Plant Water Reclamation Project, Island of O‘ahu Pacific Legacy, Inc.

Miller, Lynn
1993 Archaeological Data Recovery of State Sites 50-80-12-2710 and 50-80-12-2711 at Barbers Point, Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu Island, Bernice Pauahi Bishop Museum, Honolulu.

Mylroie, John E and James L. Carew
1995 Karst Development on Carbonate Islands. Chapter 3 in D. A. Budd and A. Saller, eds. *Unconformities and Porosity in Carbonate Strata*. American Association of Petroleum Geologists Memoir 63.

Neller, Earl
1985 A Preliminary Review and Evaluation of Archaeological Studies and Recommendations for the Proposed West Beach Estates at ‘Ewa, O‘ahu State Historic Preservation Office

1982 The Barbers Point Archaeological District, O‘ahu, Hawai‘i, Committee on Public Archaeology (COPA) Communications 5(3): 19021. Society for American Archaeology.

O'Hare, Constance R. and Thomas R. Wolforth, and Paul H. Rosendahl
1996 (Pre-final) Phase II Intensive Survey and Testing, Naval Air Station, Barbers Point, PHRI, Inc. Hilo, HI.

O'Hare, Constance R., Todd Tulchin and Hallett H. Hammatt
2004 Documentation of Plantation Infrastructure at Kapolei, Honouliuli Ahupua‘a, District of ‘Ewa O‘ahu TMK: (1) 9-1-015:004 Cultural Surveys Hawai‘i, Kailua

Olson, Storrs L., and Helen F. James
Ornithological Monographs No 45 “Descriptions of Thirty-two New Species of Birds from the Hawaiian Islands Part I. Non-Passeriformes” The American Ornithologist’s Union Washington D.C.

Olson, Storrs L., and Helen F. James
1982 Prodromus of the Fossil Avifauna of the Hawaiian Islands, Smithsonian Institution Press, Washington, D.C.

Oshima, Neal
1975 Archaeological Reconnaissance Survey of Proposed Drainage Channel at the Campbell Industrial Park Complex, Ewa, Island of O‘ahu. Prepared for: R.M. Towill Corporation by BPBM Department of Anthropology, Honolulu, June.

Rosendahl, Paul H.
1990 Archaeological Survey Kapolei Golf Course Addition Honouliuli, ‘Ewa District Island of O‘ahu, PHRI, Hilo, HI.

1987a Archaeological Reconnaissance Survey for Environmental Impact Statement: Kapolei Village Master Plan Project, Honouliuli, ‘Ewa District, Island of O‘ahu PHRI.

1987b Archaeological Reconnaissance Survey Ko Olina Resort Phase II Development Site, Honouliuli, Ewa, District, Island of O‘ahu, PHRI, Hilo, HI.

Rosendahl, Paul H., Alan Haun and Bertel D. Davis
1992 Archaeological Inventory Survey Contaminated Soil Stockpile/Remediation Facility, Naval Air Station Barbers Point, Oahu, Hawaii (TMK 9-1-13), P.H.R.I., Hilo.

Runyon, Rosanna, Douglas Borthwick and Hallett H. Hammatt
2010a Archaeological Monitoring Report for Phase 1B of the North-South Road Project, Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu TMK: [1] 9-1-17: 4, 95, 96, 97, 98 Cultural Surveys Hawai‘i Inc., Kailua, HI.

2010b Archaeological Monitoring Report for Phase 1C of the North-South Road Project, Honouliuli Ahupua‘a, ‘Ewa District, Island of O‘ahu TMK: [1] 9-1-018:001,003,004,005; 9-2-002:001,006 Cultural Surveys Hawai‘i Inc., Kailua, HI.

Shapiro, William A. and Paul H. Rosendahl
1988 Interim Report: Summary of Findings Sinkhole Test Excavations Camp Malakole Industrial subdivision Site, Land of Honouliuli, ‘Ewa District, Island of O‘ahu (TMK: 9-1-14: Por. 4 & 5)

Sinoto, Akihiko
1989 Letter to Mr. Walter Yoshimitsu, Administrator, Estate of James Campbell, dated March 8, 1989.

1979 *Cultural Resources Survey at New Dredged Material Disposal Sites at Barbers Point, O‘ahu*. Prepared for: Prepared for: U.S. Army Corps of Engineers, Pacific Ocean Division by BPBM Department of Anthropology, Honolulu.

1978 *Archaeological and Paleontological Salvage at Barbers Point, O‘ahu*. Prepared for: U.S. Army Corps of Engineers, Pacific Ocean Division by BPBM Department of Anthropology, Honolulu, March.

1976 *A Report on Cultural Resources Survey at Barbers Point, Island of O‘ahu*. Prepared for: U.S. Army Corps of Engineers, Pacific Ocean Division by BPBM Department of Anthropology, Honolulu, December.

Sinoto, Akihiko and Paul Titchenal
2002 An Archaeological Inventory Survey of the Proposed Desalination Facility Barbers Point, Honouliuli, ‘Ewa, O‘ahu (TMK: 9-1-31:28) Aki Sinoto Consulting

Sterling, Elspeth P. and Catherine C. Summers (compilers)
1978 *Sites of O‘ahu*, Dept. of Anthropology, B.P. Bishop Museum, Honolulu.

Terry, Daniel, Dominique Cordy, Tracy Hoffman and Hallett H. Hammatt
2004 Archaeological Inventory Survey of Two Sinkholes at Kapolei, Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu Island, Cultural Surveys Hawai‘i, Kailua

Thrum, Thomas G.
1907 Hawaiian Folk Tales, A Collection of Native Legends A.C. McClurg & Co., Chicago, IL.

Thurman, Doug, Trevor Yucha and Hallett H. Hammatt
2009 Archaeological Literature Review and Field Inspection Report for the I C Sunshine Solar Energy Project, Honouliuli Ahupua‘a, ‘Ewa District, O‘ahu TMK: [1] 9-1-032:001

Tuggle, H. David
1997a Archaeological Inventory Survey for Construction Projects at Naval Air Station Barbers Point, O‘ahu, Hawai‘i IARII, Honolulu, HI.

1997b “The ‘Ewa Plain,” *Hawaiian Archaeology*, Volume 6:8-36, Journal of the Society for Hawaiian Archeology. Honolulu, HI.

1984 *Report to File on Outlease Survey*, Pacific Division, Naval Facilities Engineering Command, Honolulu.

Tuggle, H. David and M. J. Tomonari-Tuggle
1997 A Cultural Resource Inventory of Naval Air Station Barbers Point, O‘ahu, Hawai‘i, Part I: Phase I Survey and Inventory Summary IARII, Honolulu, HI.

Tulchin, Jon & Hallett H. Hammatt
Archaeological Assessment for The Villas at Malu‘ohai, a 2-acre Parcel in Kapolei, Honouliuli Ahupua‘a, ‘Ewa District, Island of O‘ahu, TMK: [1] 9-1-016:064 por. Cultural Surveys Hawai‘i Inc., Kailua, HI.

Tulchin, Todd, Constance R. O’Hare and Matt McDermott
2007 Archaeological Assessment of the 65.8-acre former Hawai‘i Raceway Park Property, Honouliuli Ahupua‘a, ‘Ewa District, Island of O‘ahu (TMK: (1) 9-1-075: 044 and 050), Cultural Surveys Hawai‘i Inc., Kailua, HI.

Welch, David J.
1987 Archaeological Reconnaissance of Former ‘Ewa Marine Corps Air Station, Barbers Point Naval Air Station, O‘ahu, Hawai‘i, International Archaeological Research Institute, Inc. Honolulu

Wickler, Stephen and H. David Tuggle
1997 A Cultural Resource Inventory of Naval Air Station Barbers Point, O‘ahu, Hawai‘i Part II: Phase II Inventory Survey of Selected Sites IARI, Honolulu, HI.

Wilford, Glen and Terrance McGovern
2003 Defenses of Pearl Harbor and O‘ahu 1907-50

Wulzen, Warren and Paul H. Rosendahl
1997 Subsurface Testing and Data Recovery Excavations, Site 50-80-12-2220, Nimitz Beach, Naval Air Station Barbers Point PHRI, Hilo, HI.

Yoklavich, Ann K., K. R. Drolet, and P. Drolet
1992 Cultural Resources Management Overview Survey Naval Air Station, Barbers Point, Oahu, Hawaii, Ogden Environmental and Energy Company, Inc. Honolulu

Appendix A Expanded *Mo‘olelo*

LEGENDARY ACCOUNTS OF THE HONOULIULI REGION

A detailed historical-archival study has been presented in the Phase II(a) - Archaeological Data Recovery report (Maly IN Franklin, Goodfellow, and Wulzen 1995). The historical section of the report included a review of standard ethnographic resources, and also included narratives translated from Hawaiian by Kepā Maly. The translations, only recently available to the public, contain important information relevant to the interpretive program for the ‘Ewa Marina Community Project.

One of the translations concerns the epic account of Hi‘iaka-i-ka-poli-o-Pele (Hi‘iaka), the youngest sister of the goddess Pele, and her journey to Kaua‘i. Entitled *He Mo‘olelo Ka‘ao no Hi‘iaka-i-ka-poli-o-Pele* (A Legendary Tale of Hi‘iaka who is Held in the Bosom of Pele), it was originally published in the Hawaiian newspaper *Ka Hōkū o Hawai‘i* (September 18, 1924 to July 17, 1928). This legend, yet to be translated in its entirety, follows Nathaniel Emerson’s 1915 version of the story of "*Pele and Hi‘iaka*" closely, but it also contains many place names for the current study area and its vicinity. The story also mentions the famous *pipi* (pearl oyster) for which Pearl Harbor is named; mentions the native vegetation of the area; documents sweet potato cultivation; describes trails that cross Honouliuli; and gives accounts of how places came to be named. The texts also include many *mele* and *‘oli* (chants) that provide poetic descriptions of Honouliuli and the shore around the study area. The following provides a synopsis of the Hawaiian texts, with emphasis upon the main events of the narratives.

HE MO‘OLELO KA‘AO NO HI‘IAKA-I-KA-POLI-O-PELE*

The goddess Hi‘iaka journeyed from the island of Hawai‘i to Kaua‘i, stopping on Maui, Moloka‘i, and O‘ahu, as she went to fetch the chief Lohi‘au-ipo (Lohi‘au) from Hā‘ena and return with him to Pele’s domain at Kilauea, Hawai‘i. The following narratives come from the portion of the legend that describes the return journey to Hawai‘i:

...Aloha ka hau o Ka‘ala	Beloved is the dew of Ka‘ala
‘Oia hau halihali ‘a‘ala mau ‘u nēnē	That dew which bears the fragrance of the *nēnē* grasses
Honi ai ke kupa o Pu‘uloa	[fragrant dew which] Kissed the natives of Pu‘uloa
He loa ka imina e ke aloha e...	One searches far for love... (January 18, 1927)

Preparing to depart from the village of the chiefess, Makua, Hi‘iaka elected to travel overland through Wai‘anae, to the heights of Pōhākea, and across the plain of Honouliuli. Hi‘iaka made preparations for Lohi‘au and Wahine‘ōma‘o to travel by canoe from Pōka‘i to the landing at Kou (Honolulu). Before letting them depart, Hi‘iaka instructed her two companions. . .

> . . . As you travel, you will arrive at a place where a point juts out into the sea. That will be Laeloa [Barbers Point]; do not land there. Continue your journey forward. As you continue your journey, you will see a place where the ocean lies calmly within the land. That will be ‘Ewa; do not land there. As you continue your

*Translated by Kepā Maly

journey, you will reach a place where the mouth [of the land] opens to the sea (*hāmama ana ka waha i ke kai*). That is Pu'uloa, do not land there either. That is the entry way to 'Ewa... (January 25, 1927).

From the heights of Pōhākea, Hi'iaka looked to the shores of 'Ewa, where she saw a group of women making their way to the sea. The women were going down to gather *pāpa'ī* (crabs) and *limu* (seaweeds), and to gather the *mahamoe*, *'ōkupe* (both edible bivalves), and such things as could be obtained along the shore. Hi'iaka then began to chant about those ladies:

Ka makani kēhau o lalo o Wai'ōpua	The *Kēhau* breeze is there below Wai'ōpua
Ko ke kula na'ena'e la i ke kupukupu	Bearing the fragrance of the *kupukupu* ferns across the plain
Moe no i ke anu o ka mau'u	The coolness is laid upon the grasses
Moe aku la i ke kai o 'Ewa i ke anu	A coolness laid upon the sea of 'Ewa
Anu 'Ewa i ka i'a hāmau leo	'Ewa is made cold (unfriendly) because of the fish which hushes voices
E hāmau e, o ua makani nei	Be silent in that breeze.

Hi'iaka saw the women moving ahead to the shoreline, just like the cold Waikōloa wind that blew from the uplands of this place. And this was why Hi'iaka had chanted to them. Hi'iaka then turned towards the canoe on which her companion and the man [Lohi'au] were traveling. They were paddling and were no longer talking, for Hi'iaka had admonished them, warning—

Anu 'Ewa i ka i'a hāmau leo,	'Ewa is made cold because of the fish that hushes voices,
E hāmau ho'i e!	Be silent!

Now, the famous fish of 'Ewa in those days when the wind blew because of conversations, was the *pipi* (pearl oyster) [It was believed that talking would cause a breeze to blow that would, in turn, frighten the *pipi* [cf. Pukui and Elbert 1971]. Only when it was very calm could one go to catch the pipi. If anyone spoke while going to get the pipi, the breeze would cause rippling on the water's surface, and the pipi would be hidden from sight. In this way, Hi'iaka had instructed Wahine'ōma'o and Lohi'au to be quiet like the women of 'Ewa who were going fishing. If one spoke, the angry winds would blow and bring misfortune... (February 8, 1927)

...Turning her gaze towards the island of Hawai'i, she could see the flames of Pele in the *lehua* forest of Hōpoe, and she chanted out:

Nani Pālailai, he anaina kapu na ka wahine	Beautiful is Pālailai, sacred assembly of the woman
Ke kūkulu nei wau i ka pahu kapu ka leo	I set up the drum of the sacred voice
O ka leo o ke kai ka'u e ho'olono e	The voice of the ocean is what I hear
Ua lono aku la ke kupa	The natives hear it [The stormy ocean of Waialua, could reportedly be heard in
'Ewa]	
Ua inu iho la nā manu i ke koena wai noni	The birds drink the water caught in the noni leaves [traditionally, after storms, forest birds were could be seen in the

lowlands drinking water in this manner [cf. Sterling and Summers 1978:45]

Kūnewanewa a'e la nā 'ōpua i ka mālie	The billowy clouds pass in the calm
Pua o mai ke ahi o Hawai'i ia'u...	The fires of Hawai'i rise above me...

...Hi'iaka then departed Pōhākea, descending to the plain of Keahumoa [between Waipi'o and Honouliuli]. It was at this place that she saw several women gathering the blossoms of the *ma'o* (*Gossypium tomentosum*, an endemic yellow-flowered hibiscus that grows on the dryland plains) with which to string garlands for themselves. She then saw them sit down and begin to string and complete the garlands for themselves, so that they could adorn their necks. These women adorned themselves in the *ma'o* garlands and were really quite beautiful. Hi'iaka then felt her own neck, for she was without a *lei*. Hi'iaka then thought about what to say to the women regarding the garlands with which they had adorned themselves. She then thought within herself, I am going to ask them for a lei that they had been burdened with making. If they have *aloha* for me, then there is no kindness which they shall not have, but if they deny me, so it will be. Hi'iaka then offered a chant to the women who had strung their garlands upon the plain which is burned by the sun.

E lei ana ke kula o Keahumoa ka ma'o	The plain of Keahumoa wears the *ma'o* blossoms as its *lei*
'Ohu'ohu wale nā wahine kui lei o ke kanahele	Adorning the women who string garlands in the wild
Ua like no a like me ka lehua o Hōpoe	It is like the *lehua* blossoms of Hōpoe
Me he pua koili lehua ala i ka lā	Lehua blossoms upon which the sun beats down
Ka oni pua koai'a i ka pali	On the nodding *koai'a* flowers of the cliff
I nā kaupoku hale o 'Āpuku	On the rooftops of the houses at 'Āpuku
Ke ku no i ke alo o ka pali o Pu'uku'ua	Rising in the presence of the cliff of Pu'uku'ua
He ali'i no na'e ka 'āina	The land is indeed a chief
He kauwā no na'e ke kanaka	Man is indeed a slave
I kauwā no na'e wau i ke aloha	I am indeed a slave to *aloha*—love
Na ke aloha no na'e i kono e haele no māua	It is love which invites us two—come
E hele no wau a–	I come–

['Āpuku and Pu'uku'ua are both places situated on the upland plain of Honouliuli.]

Then one of the women answered her in a kindly manner, "Wait stranger, before you go on your way, here is your *lei*." It is true what you have said, "*He kauwā ke kanaka i ke aloha*" (Man is a slave of love or compassion), and it is *aloha* which beckons to us and moves us to come forth. The woman then moved forward and placed her *lei* upon Hi'iaka, and the other women did the same as well. The women then saw the true beauty of Hi'iaka and they urged her to join them for a meal at their home on the shore of 'Ewa.

Hi'iaka then spoke to them, "I am not hungry, for your kindness has satisfied me. Here are the words which I share with you—In your dwelling, if one of you should meet with trouble, or if one of the people for whom you have *aloha* is in need, offer the chant which I offered to you, asking without shame for garlands that you had

made. The chant is a prayer for the passing of troubles from you or your loved ones. Now come and kiss me, and I will depart from this long open plain.

All the women stepped forward to kiss Hi'iaka, and as they rubbed noses each one of them remembered the chant which Hi'iaka offered when she asked for their garlands of ma'o. Thus this chant became a prayer for those women in their days of trouble. Hi'iaka then departed from those women who strung garlands of *ma'o* on the plain and traveled towards the shore of 'Ewa, towards Pu'uloa. Turning towards the ocean of Honouliuli, Hi'iaka saw the expanse of Leinono* and she said within herself:

Say! I have not forgotten you Leinono, though perhaps you think I am no good because I don't know you. Therefore, I call to you Leinono with this chant:

Nōweo maka, ea i ka lā	Bright eye, the rising sun
Hoa kuilima laula o 'Ewa	Companion that travels arm-in-arm with the expanse of 'Ewa
Ka Amu āhua lepo a ka makani	The *Amu* wind that causes dust to mound up
He hiapō na ka Moa'e	Is the first born of the *Moa'e* wind
He keiki na ka 'Ewa-loa e hi'i mai la	A child that is embraced by the *'Ewa-loa* (breeze on the expanse of 'Ewa)
E Leinono e	Hail Leinono
Hoa aloha wale o kākou ho'i e	Our companion

Finishing her chant, Hi'iaka then turned and saw her companion and Lohi'au paddling their canoe. And her love welled up for her traveling companions. It was also then, that Hi'iaka came to understand that Lohi'au would be killed by Pele when they reached Hawai'i. Hi'iaka then turned and continued her journey along the path that crossed this unpeopled plain. While walking along, she saw two women who were busy stringing garlands of *'ilima* (*Sida fallax*) blossoms. The women were sitting alongside the trail upon which Hi'iaka was traveling. Now when these two women saw Hi'iaka, one said to the other, "Say, this is Hi'iaka who is descending along the path, we must depart with haste, lest she kill us."

The two women hastily departed, and reached a stone that was situated along the side of the trail which continued on to Wai'anae. It was at this stone that the two women transformed themselves into their supernatural *mo'o* (lizard) forms. One of the lizards then went and hid in a little space on the stone, and the other went near by. One *mo'o* said to her companion *mo'o*... (February 15, 1927) ... "It is fortunate that we have hidden ourselves at this place, so that we may escape being killed by Hi'iaka." Now from ancient times till recently, the place at which this stone was situated, was called "Pe'e-kāua" (We two hidden). Now that the road has been made, the stone at which these two *mo'o wahine* (lizard women) has been destroyed.

When Hi'iaka saw that these two women had fled and taken their *mo'o* forms to hide on the stone along the trail, she chanted out to them:

*Leinono may also be written as *Leilono*. It is an area in the midlands of Moanalua above Āliamanu, and is situated near the border of the districts of 'Ewa and Kona. At Leilono there was a supernatural *'ulu* (breadfruit tree) from which spirits of the deceased leapt and were either caught by welcoming *'aumākua* (ancestral deities) or they would fall into an endless night. From Leinono, the unfortunate spirits are said to have wandered hopelessly across the plain of Kaupe'a on Honouliuli and gone off into the sunset (Kamakau 1968: 47 & 49).

Aloha 'olua e nā wahine o ke kula	Greetings to you two women of the plain
'Oia kula ānea i ka lā	It is a barren plain in the sun
He lā hao wale ho'i nei	Where the sun bears forcefully down
O ka holo la a pe'e	Having gone to hide
O pe'e kāua i Pe'e Kaua	We two are hidden at Pe'e Kaua
Aloha nō 'olua	Aloha to you two
Eia nō wau ke hele nei	Here I am traveling on

Hi'iaka then continued walking towards the shore. Hearing Hi'iaka's chant of affection, these two *mo'o* women said to one another, "Say, this is truly remarkable, for we will not die, but have been saved by Hi'iaka. She has given us her *aloha* as she descends in the heat of the sun, and so it is that we shall remain upon this plain."

Descending to the flat lands of Honouliuli, Hi'iaka then turned and looked at Pu'uokapolei and Nāwahineokama'oma'o who dwelt there in the shelter of the growth of the *'ōhai* (*Sesbania tomentosa*), upon the hill, and where they were comfortably refreshed by the blowing breezes. Hi'iaka then said, "Pu'uokapolei and Nāwahineokama'oma'o, do not forget me, lest you two go and talk behind my back and without my knowing, so here is my chant of greeting to you:"

Aloha 'olua e Pu'uokapolei mā	Greetings to you two o Pu'uokapolei and companion
E Nāwahineokama'oma'o	O Nāwahineokama'oma'o
E nonoho mai la i noho wale la	Set there, and dwelling
I ka malu o ka 'ōhai	In the shade of the *'ōhai*
I ke kui lei kukui i ka lā	Stringing garlands of *kukui* in the day,
Lei aku la i ka pua o ka ma'oma'o	Adorning yourselves in the garlands of the *ma'oma'o*
Lei kauno'a i ke kaha o Ka'ōlino	*Kauno'a* (*Cuscuta sandwichiana*) is the *lei* of the shores of Ka'ōlino*
He 'olina hele e	There is joy in traveling

When Hi'iaka finished her chant, Pu'uokapolei said, "Greetings. Love to you, o Hi'iaka! So it is that you pass by without visiting the two of us. Lo, we have no food with which to host you. Indeed, the eyes roll dizzily with hunger. So you do not visit us two elderly women who have cultivated the barren and desolate plain. We have planted the *'uwala* (sweet potato) shoots, that have sprouted and grown, and have been dedicated to you, our lord. Thus as you travel by, pull the potatoes and make a fire in the *imu*, so there will be relief from the hunger. For we have no food, we have no fish, and no blanket to keep us warm. We have but one *kapa* (covering), it is the *pilipili-'ula* (the grass *Chrysopogon aciculatus*). When it blossoms, we go and gather the grass and plait it into coverings for us. But in the time when the grasses dry, and none is left on the plain, we two are left to live without clothing. The cold breeze blows in the night, the Kēhau and Waikōloa, the cold does not remain though, and when the grasses of the land which give us warmth, begin to grow again, our nakedness is covered, and we are a little better off than the flowers of the *ma'o*. It is because we are left without our covering of the *pilipili'ula* grass, that many people have come to say, "*Waiho wale iho ka mau'u o Kaiona*" (Kaiona is left exposed by the grasses) [It is so hot that the grasses have withered and dried, leaving everything exposed to be seen]." *Aloha* to you, and *aloha* be with you in your travels o Hi'iaka-i-ka-poli-o-Pele, our lord.

*Ka'ōlino (literally: the brightness) appears to be a variation of *Ko'olina* (interpretively translated as: Joyous).

Hi'iaka then turned and continued her walk in the stifling heat of the sun on the plain of Pu'uokapolei. Hi'iaka saw a *ma'o* blossom as she descended, and she picked it in the heat of the sun and chanted out:

Liua o Kona i ka lā loa o Makali'i	Kona is made dizzy in the long days of Makali'i (summer)
Māewa ka wiliwili hele i ka la'i	The *wiliwili* (Erythrina) trees sway, then comes the calm
Kulo'ia ka manu o Kānehili	The birds of Kānehili endure
Welawela ka lā o Pu'uokapolei	The sun is exceedingly hot on Pu'uokapolei
'Ukiki ka ma'o kula i kai	The *ma'o* growth is stunted on the seaward plain
Me he kapa halakea ala ka pua o ka nohu	The *nohu* (Tribulus cistoides) flowers are like a *halakea* (*kapa*) covering
Ka 'owaka, ka pua'ula i ke kaha o Kaupe'a la	The *pua'ula* (young *kūmū*) fish seem to flash along the shores of Kaupe'a
A he hoa	Striking,
E ho'ohoa aku ana i ka makani he Nāulu	Striking is the *Nāulu* wind
A he hoa—e	Striking forth

When Hi'iaka finished her chant, she continued toward the shore, and looking to the ocean, she saw the canoe of her friend and Lohi'au, and chanted:

Ku'u kāne i ke awa lau o Pu'uloa	My man on the many harbored sea of Pu'uloa
Mai ke kula o Pe'ekāua ke noho	As seen from the plain of Pe'ekāua
E noho kāua i ke kaha o ka 'ōhai	Let us dwell upon the *'ōhai* covered shore
I ka wiliwili i ka pua o ka lau noni	Where the *noni* blossoms are twisted together
O ka ihona i Kānehili la	Descending along Kānehili
Ua hili ho'i au—e	I am winding along

Hi'iaka then turned and looked back to Pu'uku'ua, Kānehoa, and Hale'au'au and said, "Do not forget me Pu'uku'ua *mā*. And so you do not think that I will forget you, here is a chant of endearment for you:

Owau e hele i ke kaha o Pu'uloa	It is I who travel along the shore of Pu'uloa
I ka 'ōhai a Kaupe'a la	Where the *'ōhai* is at Kaupe'a
I ka lā hōanoano e	In the awe-inspiring sun
Ua 'ike	It is seen
Ua 'ike aku la ka ho'i au	It has been seen by me
I ke kuahiwi mauna pali	At the mountain cliffs
O Pu'uku'ua i Hale'au'au	Pu'uku'ua at Hale'au'au
O ke oho o ke kukui ehu	The sprouting of the *kukui* growth
I ha'a i ka lā o Kānehoa	Dancing in the sun of Kānehoa
Aloha wale ho'i nā hoa e	Love to you o companions

...Upon finishing her chant, Hi'iaka continued down the trail and arrived at Kualaka'i. At Kualaka'i, the trail took her to a spring of cool water. Looking into the spring, she saw her reflection shining brightly upon the water's surface. Hi'iaka also saw two *lehua* trees (*Metrosideros polymorpha*) growing on each side of the spring. Now these two *lehua* trees were completely covered with blossoms. She then picked the *lehua* blossoms of these two trees and strung garlands for herself.

Hi'iaka strung four strands to her *lei*, she then removed the garlands of *ma'o* which had received when descending from Pōhākea, and set them aside. She then took the garlands which she had made, and adorned herself with them. Hi'iaka then heard the voice calling out from the area of Kānehili:

O Hi'iaka ka wahine	Hi'iaka is the woman
Ke 'ako la i ka pua o Hoakalei	Who picked the flowers of Hoakalei
Ke kui la, ke uo la i ka mānai	And with a needle strung and made them into
'Ehā ka lei, ka 'āpana lei lehua a ka wahine la	Four garlands, the sectioned *lei* of the woman
Ku'u pōki'i	O my younger sibling
Ku'u pōki'i mai ke ehu makani o lalo	My younger sibling who came from the place where the dusty wind rises from below
Lulumi aku la i ke kai o Hilo-one	Overturned in the sea of Hilo-one
No Hilo ke aloha	The *aloha* is for Hilo
Aloha wale ka lei e—	Love for the *lei*

That place, Hilo-one, which is mentioned in the *mele* (chant), is situated on the northern side of Kualaka'i, close to Kalaeloa. And the name of the spring in which Hi'iaka looked and saw her reflection was Hoakalei (Reflection of a *lei*). It was at this place that Hi'iaka saw the two *lehua* trees growing, from which she picked the blossoms too string her four garlands.

Hearing the chant, Hi'iaka turned toward where it had come from, and saw her older sister Kapo looking at her. Kapo had arrived at O'ahu from Maui, where she was teaching the practices of the *hula*. Seeing Kapo, Hi'iaka cried out with affection for her older sister [February 22, 1927; available in paper form only at the Hilo Public Library]:

O 'oe 'ia e Waialua-iki	So, it is you o Waialua-iki
E ka lā uli pali o Uli	Of the sun darkened cliff of Uli
Ua hele wale ia e Li'awahine	Li'awahine has gone traveling
E ka wahine kuhea pali	O woman that stands calling from the cliff
E lei au...	I am adorned with a *lei*
'Ae—ke lei nei au i nā lehua makanoe	Yes, I am wearing garlands of the misty-centered *lehua* blossoms
I nā lehua lihi wai o Hoakalei	The lehua that grows along the water's edge at Hoakalei,
Ku'u lehua i Hilo-one	My *lehua* of Hilo-one.
I nā kaha o Ka'olina me Kaupe'a	On the shores of Ka'olina and Kaupe'a
E lei au e—	I am adorned

The reason that Hi'iaka presented this chant to her elder sister Kapo, saying, "*kui pua lei, o Hoakalei*" (Stringing flower garlands of Hoakalei) was because in her chant, Kapo had inquired about Hi'iaka's picking the flowers from the spring of Hoakalei and making them into four garlands for herself... As it is seen in this *mele* (chant), Hilo-one is on O'ahu, there at Kualaka'i, near Kalaeloa.

Thus it is understood that through legends like this, we are given direction in knowing about the names of various places of the ancient people, and which are no longer known in this time...Hi'iaka then continued her journey toward the shore of Pu'uloa, and she thought about the words that she had earlier spoken to Wahine'ōma'o and Lohi'au, and she chanted:

A'ole au e hele i ke kaha o Kaupe'a	I will not travel to the shore of Kaupe'a
I nā 'ōhai o Kānehili i Kaupe'a	To Kaupe'a where the *'ōhai* of Kānehili are found
A ua hili au...	I will turn away...

...Hi'iaka then arrived at a place where many people were gathered together, and she overheard them talking about preparations for a journey to Kou, which is the old name for Honolulu. The people were preparing to go to the court of the chiefess Pele'ula, who was hosting *kilu** games (March 1, 1927; available in paper form only at the Hilo Public Library).

...Learning of the contest that was to be held at Kou, Hi'iaka had reservations about having Lohi'au stop at the court of the chiefess Pele'ula. So she chanted, calling to Lohi'au, telling him to bring the canoe to shore at Pu'uloa. When Hi'iaka chanted, everyone became quiet, because they were awed by the beauty of her chanting voice. One of the women in the group then called to Hi'iaka, "You are a stranger to us in appearance, but your chant indicates that you are very familiar with this shore, how is that so?." Hi'iaka confirmed that she was indeed a visitor, and yet familiar with the places of this land. She then said, "*Ua maika'i no kāu noi e ke kama'āina maika'i, akā, i Kou ho'i e hui aku ai nā maka*" (You have asked a good question, kind native, but, it is at Kou, that all the faces [eyes] shall meet).

Thus it is seen that when Hi'iaka responded to the woman of Pu'uloa, that this famous saying of the people of O'ahu came about, "*Hui aku nā maka i Kou*" (The faces shall meet at Kou)... Now, Lohi'au had heard the chant of Hi'iaka, and he drew the canoe to the shore. When Hi'iaka boarded the canoe, she bid farewell to the people of Pu'uloa and said, "*Hui aku o nā maka i Kou*" [i.e., we will meet again].

They then directed the canoe seaward, and went out of opening of Pu'uloa. Hi'iaka then turned and looked towards the land where she saw the dwelling places of Kinimakalehua, Leinono, and Keālia. She called out to them, "So you do not forget me, here is a chant for you:"

Polenaehu i ka ua Kinimakalehua	Reddish yellow are the rains of Kinimakalehua
Hoahoa Leinono ki'eki'e Pu'uloa makai	Leinono is the companion above, and Pu'uloa is shoreward
Ke hele ala i ke one kui-lima	The journey across the expansive sands of
laula o 'Ewa	'Ewa has been made arm-in-arm
Ma 'Ewa ho'i wau	I am at 'Ewa
E uwē ho'i wau iā 'oe e Leinono e	I greet you o Leinono
Hoa aloha wale ho'i kākou e	We are all companions

In this chant of Hi'iaka, she spoke the famous saying that is the pride of the descendants of 'Ewa; "*Ke one kui-lima laula o 'Ewa*" (The sands of 'Ewa, across which everyone joined hand-in-hand). These words of Hi'iaka are a famous saying of this land to this day. As the canoe continued toward Kou, passing the land of Kalihi, Hi'iaka looked again towards Leinono and Keālia, and she chanted:

Aloha 'oe e Leinono, e	Hail to you o Leinono,

*Kilu is a Hawaiian game in which a gourd, or a coconut shell, cut in half, is tossed at an opponent's pob [?] (something like horseshoes). The individual who successfully hits the pob that he or she had selected, was the winner and could claim a kiss or some other favor from the opponent (cf. Malo 1951:216)

Kinimakalehua,	o Kinimakalehua
E Keālia i lalo e, aloha	O Keālia who is below, *aloha*
Eia ke kānaenae ka mōhai	Here is the supplication, the offering
A ka mea hele la, he leo e	of the one who has traveled by. It is a voice or song,
He leo wale nō ho'i e—	Only a voice—

She then turned forward and they arrived at Nu'uanu...(March 8, 1927; available in paper form only, at the Hilo Public Library).

ADDITIONAL LEGENDARY ACCOUNTS AND SELECTED HISTORIC REFERENCES TO THE 'EWA-HONOULIULI REGION

The coastal coral plains of Honouliuli, which stretch behind Kualaka'i, Keahi, and One'ula (the project area) are thought to be the legendary "*kula o Kaupe'a*" (plain of Kaupe'a) which is said to be the realm of the *ao kuewa* or *ao 'auwana* (the homeless or wandering souls). Kaupe'a was the wandering place of those who died having no rightful place to go; the souls wandered "in the *wiliwili* grove" (Sterling and Summers 1978:36). According to 19th century Hawaiian historian Samuel Kamakau, the spirits who wandered "on the plain of Kaupe'a beside Pu'uloa...could go to catch *pulelehua* (moths or butterflies) and *nanana* (spiders)" in the hope of finding helpful *'aumakua* (family deity) who could save them (Kamakau 1964:47 and 49).

One of the native Hawaiian informants who recorded her recollections of the Honouliuli area was Hawaiian ethnographer and Bishop Museum employee, Mary Kawena Pukui. Pukui shared her personal experience with the ghosts on the plain of Kaupe'a around 1910:

> A wide plain lies back of Keahi and Pu'uloa where the homeless, friendless ghosts were said to wander about. These were the ghosts of people who were not found by their family *'aumakua* or gods and taken home with them, or had not found the leaping places where the could leap into the nether world. Here [on the plain of Honouliuli] they wandered, living on the moths and spiders they caught. They were often very hungry for it was not easy to find moths or to catch them when found.
>
> Perhaps I would never have been told of the plain of homeless ghosts if my cousin's dog had not fainted there one day. My cousin, my aunt and I were walking to Kalae-loa, Barber's Point, from Pu'uloa accompanied by Teto, the dog. She was a native dog, not the so-called poi dog of today, with upright ears and body and size of a fox terrier. For no accountable reason, Teto fell into a faint and lay still. My aunt exclaimed and sent me to fetch sea water at once which she sprinkled over the dog saying, "*Mai hana ino wale 'oukou i ka holoholona a ke kaikamahine. Uoki ko 'oukou makemake 'ilio.*" "Do not harm the girl's dog. Stop your desire to have it." Then with a prayer to her *'aumakua* for help she rubbed the dog. It revived quickly and, after being carried a short way, was as frisky and lively as ever.
>
> Then it was that my aunt told me of the homeless ghosts and declared that some of them must have wanted Teto that day because she was a real native dog, the kind that were roasted and eaten long before foreigners ever came to our shores (Pukui 1943:60-61).

McAllister's *The Archaeology of Oahu* (1933), describes how the coral plains around the project area may have been used in earlier times:

> Site 146. 'Ewa Plains, throughout which are remains of many sites. The great extent of old stone walls, particularly near Puuloa Salt Works, belongs to the ranching period of about 75 years ago. It is probable that the holes and pits in the coral were formerly used by the Hawaiians. Frequently the soil on the floor of the larger pits was used for cultivation, and even today one comes upon bananas and Hawaiian sugar cane still growing in them. They afford shelter and protection, but I doubt if previous to the time of Cook there was ever a large population here (McAllister 1933:109).

On the coast, a little west of the project area, there is a place called Kualaka'i, and there is a spring located there that is called Hoakalei. As noted above, the spring is associated in legend with Hi'iaka, the favorite sister of the fire goddess Pele. Additional information is found in the legendary series titled "*Nā Wahi Pana o 'Ewa*" (The Famous Places of 'Ewa), which ran in the Hawaiian Language Newspaper "*Ka Loea Kālai 'Āina*" (c. 1900), readers were told of two "strange" women who lived on the plain called Pukaua, beyond Pu'ukapolei, toward Wai'anae. Once, after going down to Kualaka'i on the coast to gather *'a'ama* crabs, *pipipi*, and *limu*, they failed to return home before morning light, and were turned into a single pillar of stone (Sterling and Summers 1978:39).

In 1898, Cameron (1898) noted that the *kiawe* forests of 'Ewa supplied much of the fuel for kitchen fires in Honolulu. Harvesting of *kiawe* wood continues to this day, although not on the scale that was undertaken during Cameron's time. Earlier this century, a few fishermen and some of their families built shanties by the shore where they lived, fished, and traded their catch for taro at 'Ewa (see also the interview notes with Mrs. Arline Eaton; March 4, 1997). Their drinking water was taken from nearby ponds, and it was so brackish that other people could not stand to drink it. Near Barbers Point there was a pond with fresh-water shrimp, which were assumed to have been brought down from inland streams and put in the pond to propagate (Herman Von Holt, interview April 6, 1970 IN Lewis 1970:16).

The family of the late Eli Williamson (former Bishop Museum staff member and companion of Hawaiian ethnographer, Mary Kawena Pukui, cited above), lived in the small community at Kualaka'i. Kelly (1985) reported on some of the recollections of Mrs. Williamson:

> In the Honouliuli area the train stopped among the *kiawe* (algaroba) trees and *malina* (sisal) thickets. We disembarked with the assorted food bundles and water containers. Some of the Kualaka'i *'ohana* met us to help carry the *'ukana* (bundles) along a sandstone pathway through the *kiawe* and *malina*. The distance to the frame house near the shore seemed long.
>
> When we departed our *'ukana* contained fresh lobsters, *limu* (algae), fish and *i'a malo'o* (dried fish)....*Tutu mā* (grandfolks and others) shared and ate the seafoods with great relish. (Williamson IN Kelly 1985:160)

Archaeological Assessment for the Proposed Pacific Health Research Laboratory Project, Honouliuli Ahupuaʻa, ʻEwa District, Oʻahu Island, TMK: [1] 9-1-013:045 por.

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(CSH Job Code: HONOULIULI 66)

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Management Summary

Reference	Archaeological Assessment for the Proposed Pacific Health Research Laboratory Project, Honouliuli Ahupuaʻa, ʻEwa District, Oʻahu Island, Tax Map Key: [1] 9-1-013:45 por.
Date	July 2012
Project Number	Cultural Surveys Hawaiʻi Inc. (CSH) Job Code: HONOULIULI 66
Investigation Permit Number	The fieldwork component of the Archaeological Assessment study was carried out under archaeological permit number 12-04, issued by the Hawaiʻi State Historic Preservation Division/Department of Land and Natural Resources (SHPD/DLNR), per Hawaiʻi Administrative Rules (HAR) Chapter 13-282.
Project Location	The property is located near Kalaeloa (Barber's Point) approximately 2 miles (3.2 kilometers) inland, just inland of the former Barbers Point Naval Air Station runways, just east of the intersection of Saratoga Avenue and Nassau Street, Honouliuli Ahupuaʻa, ʻEwa District, Oʻahu Island. This area is depicted on the 1998 U.S. Geological Survey 7.5-Minute Series Topographic Map, ʻEwa Quadrangle.
Land Jurisdiction	Military/Private
Agencies	State Historic Preservation Division/Department of Land and Natural Resources (SHPD/DLNR)
Project Description and Related Ground Disturbance	The proposed University of Hawaiʻi Pacific Health Research Lab (UH PHR Lab) facility would consist of a one-story building with a mechanical penthouse, approximately 31,179-square-foot standalone structure in a secure setting capable of supporting the University of Hawaiʻi infectious disease research agenda, its local and regional partners' needs for high-containment facilities, and the National Institute of Health's Biodefense Research Agenda. The project will be programmed in accordance with applicable local, state, and federal codes and guidelines. Biological research laboratories are classified into four categories, Biosafety Level (BSL)-1 through BSL-4. While various infectious diseases research is done in laboratories with BSL-1 and BSL-2 capabilities, a BSL-3 laboratory is required to provide a safe environment for work with more serious agents associated with human disease, especially those that can cause illness by spreading through the air. A BSL-3 laboratory is designed to protect researchers working on such agents and has special engineering and design features to prevent microorganisms from being transmitted into the environment. The UH PHR Lab would include BSL-2 and BSL-3 laboratories, a small lab animal facility for primarily rodents, an insectary, physical plant, and support space for research, administration, and building operations. The UH PHR Lab will utilize stringent safety controls to ensure the safety and protection of the general public and the

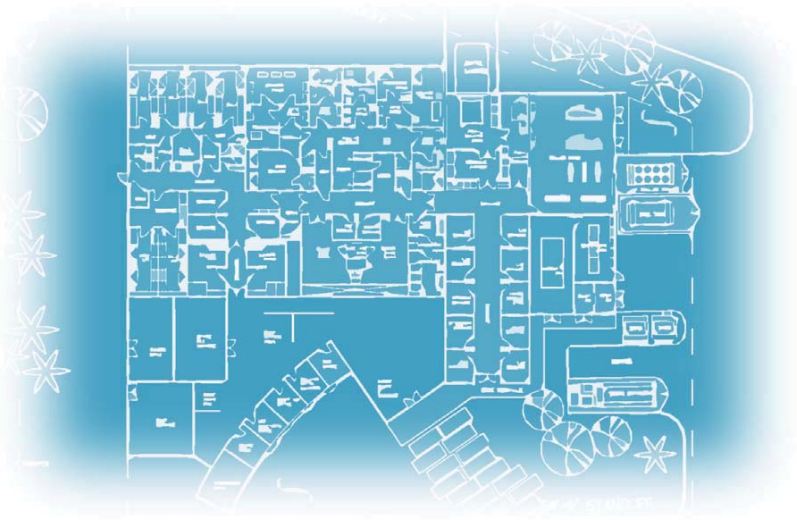
APPENDIX E:

TRAFFIC IMPACT ANALYSIS REPORT

Wilson Okamoto Corporation

Traffic Impact Report

Pacific Health Research Lab



Prepared for:
University of Hawaii

Prepared by:
Wilson Okamoto Corporation

June 2012

TRAFFIC IMPACT REPORT

FOR THE

PACIFIC HEALTH RESEARCH LAB

Prepared for:

University of Hawaii

Prepared by:

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1907 South Beretania Street, Suite 400
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WOC Ref: 8301-01

June 2012

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I. INTRODUCTION

A. Purpose of Study

The purpose of this study is to identify and assess the traffic impacts resulting from the proposed Pacific Health Research Lab located in Kalaeloa on the island of Oahu. The proposed facility would be devoted to researching and detecting emerging infectious diseases, as well as, developing rapid and more accurate diagnostic tests, drugs and vaccines for emerging and re-emerging infectious diseases in the Asia-Pacific region.

B. Scope of Study

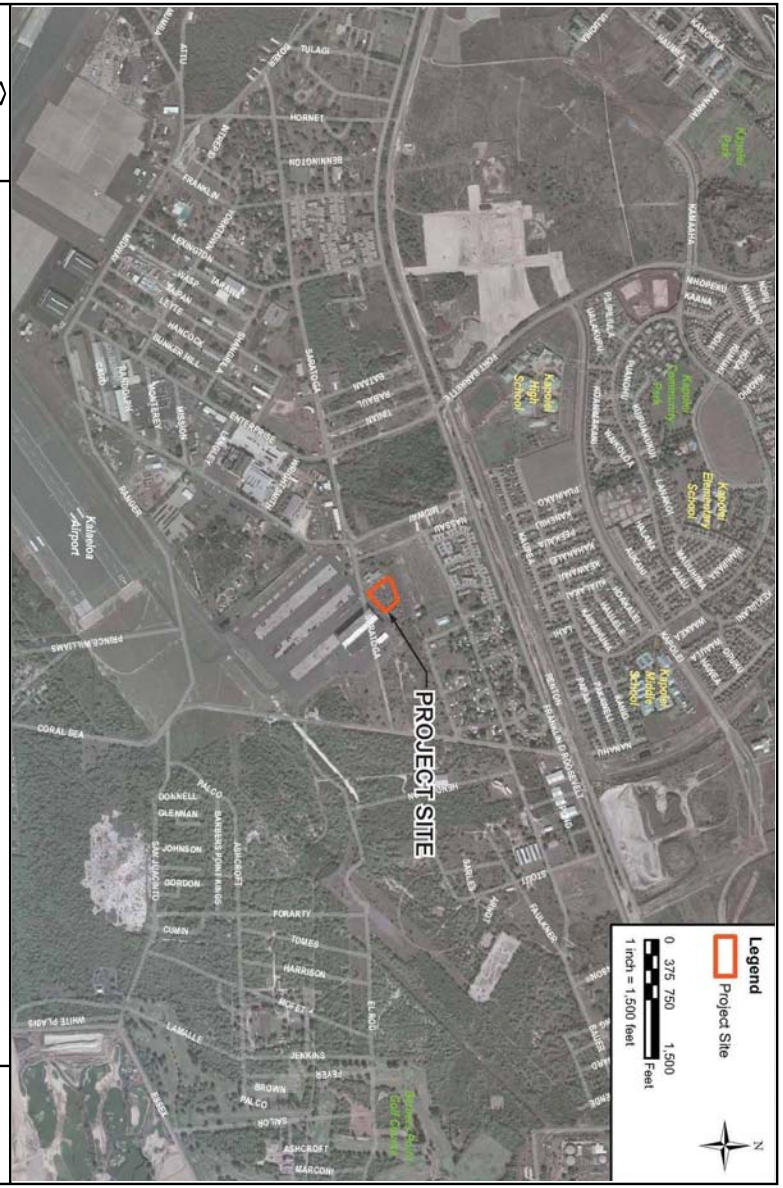
This report presents the findings and conclusions of the traffic study, the scope of which includes:

1. Description of the proposed project.
2. Evaluation of baseline roadway and traffic operations in the vicinity.
3. Analysis of future roadway and traffic conditions without the proposed project.
4. Analysis and development of trip generation characteristics for the proposed project.
5. Superimposing site-generated traffic over future traffic conditions.
6. The identification and analysis of traffic impacts resulting from the proposed project.
7. Recommendations of improvements, if appropriate, that would mitigate the traffic impacts resulting from the proposed project.

II. PROJECT DESCRIPTION

A. Location

The proposed Pacific Health Research Lab will be situated on approximately two acres of a parcel adjacent to Saratoga Avenue within Kalaeloa on the island of Oahu (see Figure 1). The project site is further identified as a portion of Tax Map Key 1-9-1-13: por. 045. Access to the proposed facility will be provided via an access controlled driveway off Saratoga Avenue.


Legend
Project Site
0 375 750 1,500
Feet
1 inch = 1,500 feet
N
PROJECT SITE
Kalaeloa Airport
Kapolei High School
Kapolei Elementary School
Kapolei Middle School
Kapolei Park
Barbers Point Golf Course
CORAL SEA
PRINCE WILLIAMS
SARATOGA
TULAGI
HORNET
BENNINGTON
FRANKLIN
WASP
LEXINGTON
ENTERPRISE
SAN JACINTO
DONNELL
GLENNAN
JOHNSON
GORDON
CUMIN
PALCO
BANNERS POINT PARKWAY
ABBOTT
FORARTY
TOMES
HARRISON
MOLETT
LAMALLE
JENKINS
FEVER
BROWN
SALOM
ASHCROFT
MARCONI
WHITE PLAINS
ELROD
HONO
KAPOLEI PARKWAY
FORT BARRETTE
MAKAKILO
KAMAKANA
KAMAKALA
KAPOLEI
MAKAKILO
HOAKALEI
HUALANI
MAKAHA

B. Project Characteristics

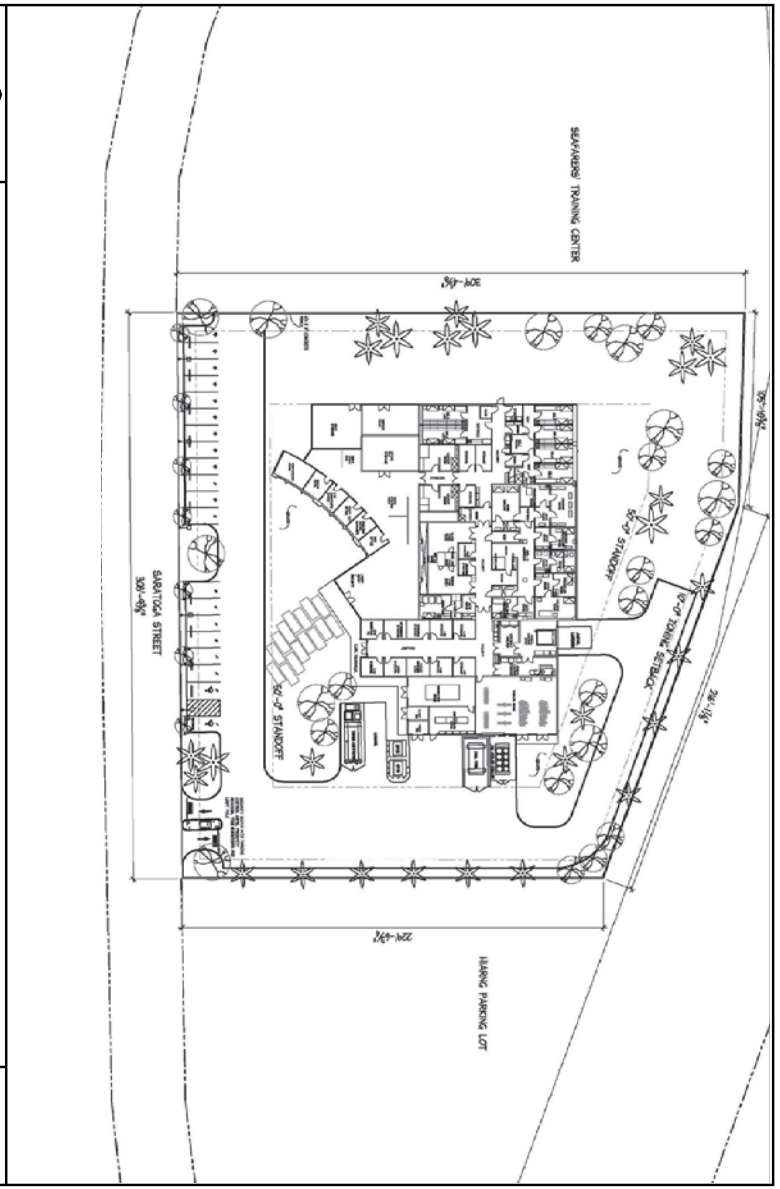
The University of Hawaii proposes to develop the Pacific Health Research Lab (UH PHR Lab) in partnership with the National Institutes of Health (NIH). The one-story facility will be devoted to research and development for emerging and re-emerging infectious diseases in the Asia-Pacific region. The proposed 31,179 square foot building will include Biosafety level (BSL) 2 and BLS-3 laboratories, a small lab animal facility primarily for rodents, insectary, physical plant, and support space for research, administration, and building operations. The proposed facility is expected to be completed by the Year 2016 and be staffed by 26 full-time employees. Vehicular access will be provided via a driveway off Saratoga Avenue. Figure 2 includes the proposed project site plan.

III. BASELINE TRAFFIC CONDITIONS

A. Area Roadway System

Primary access to the Kalaeloa Community Development District where the proposed UH PHR Lab will be located is provided via Fort Barrette Road and Roosevelt Avenue. Fort Barrette Road is a predominantly two-way, two-lane roadway located along the eastern edge of the City of Kapolei that serves as a north-south connector roadway to the Interstate H-1 Freeway. Northwest of the project site, Fort Barrette Road intersects Roosevelt Avenue. At this all-way stop-controlled intersection, both approaches of Fort Barrette Road have two lanes that serve all traffic movements. Roosevelt Avenue is a predominantly two-lane, two-way roadway generally oriented in the east-west direction that serves as an alternate connector roadway between Ewa and Kapolei. At the intersection with Fort Barrette Road, the eastbound approach of Roosevelt Avenue has one lane that serves all traffic movements while the westbound approach has a shared left-turn and through lane, and an exclusive right-turn lane.

Northwest of the intersection with Roosevelt Avenue, Fort Barrette Road intersects Kapolei Parkway. At this signalized intersection, the northbound approach of Fort Barrette Road has one through lane and exclusive turning lanes while the southbound approach has an exclusive left-turn lane and a shared through and



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PROJECT SITE PLAN

FIGURE 2

right-turn lane. Kapolei Parkway currently serves and an alternate east-west connector roadway between Ewa and Kapolei with other disconnected segments of this roadway located on the west side of the City of Kapolei. There are future plans to connect all segments of Kapolei Parkway to create a contiguous east-west roadway. At the intersection with Fort Barrette Road, the eastbound approach of Kapolei Parkway has one through lane and exclusive turning lanes while the westbound approach has an exclusive left-turn lane and a shared through and right-turn lane.

B. Traffic Volumes and Conditions

1. General

a. Baseline Traffic Count Data

The traffic count data utilized for this study was collected as a baseline for a regional Kapolei traffic model. The data consisted of turning movement count surveys in the project vicinity during the morning and afternoon peak commuter traffic periods. Surveys were conducted over the span of several months in 2008 between the morning peak hours of 6:00 AM and 9:00 AM, and afternoon peak hours of 3:00 PM and 6:00 PM. In addition, 24-hour mechanical count surveys were conducted along the major roadways throughout Kapolei. Supplemental surveys were conducted in the fall of 2010 and spring of 2011 to incorporate the completion of other developments in the vicinity.

b. Capacity Analysis Methodology

The highway capacity analysis performed in this study is based upon procedures presented in the "Highway Capacity Manual", Transportation Research Board, 2000, and the "Synchro", developed by Trafficware. The analysis is based on the concept of Level of Service (LOS).

LOS is a quantitative and qualitative assessment of traffic operations. Levels of Service are defined by LOS "A" through "F"; LOS "A" representing ideal or free-flow traffic operating conditions

and LOS "F" representing unacceptable or potentially congested traffic operating conditions.

"Volume-to-Capacity" (v/c) ratio is another measure indicating the relative traffic demand to the roadway carrying capacity. A v/c ratio of one (1.00) indicates that the roadway is operating at or near capacity. A v/c ratio of greater than 1.00 generally indicates that the traffic demand exceeds the road's carrying capacity. The LOS definitions are included in Appendix A.

2. Baseline Peak Hour Traffic

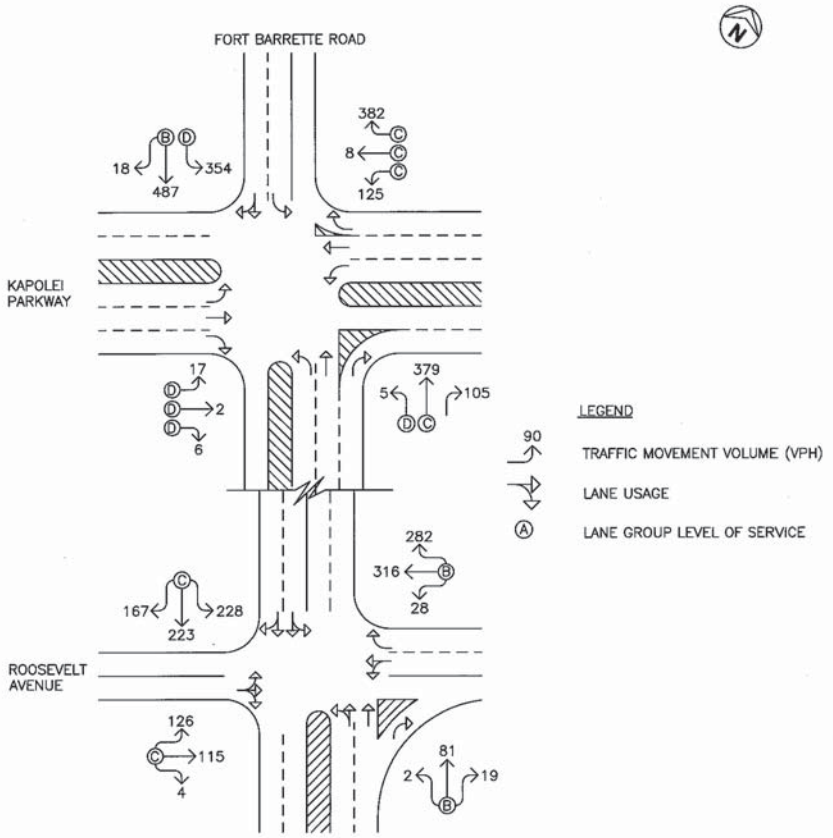
a. General

Figures 3 and 4 show the baseline AM and PM peak period traffic volumes and traffic operating conditions. The AM peak hour of traffic generally occurs between the hours of 7:00 AM and 8:00 AM. During the afternoon, the PM peak hour of traffic generally occurs between the hours of 4:00 PM and 5:00 PM. The analysis is based on these peak hour time periods for each intersection to identify the traffic impacts resulting from the proposed project. LOS calculations are included in Appendix B.

b. Fort Barrette Road and Roosevelt Avenue

At the intersection with Roosevelt Avenue, Fort Barrette Road carries 102 vehicles northbound and 618 vehicles southbound during the AM peak period. During the PM peak period, the overall traffic volume is higher with 323 vehicles traveling northbound and 501 vehicles traveling southbound. The northbound approach of Fort Barrette Road operates at LOS "B" and LOS "C" during the AM and PM peak periods, respectively, while the southbound approach operates at LOS "C" and LOS "D" during the AM and PM peak periods, respectively.

The Roosevelt Avenue approaches of the intersection carry 245 vehicles eastbound and 626 vehicles westbound during the AM peak



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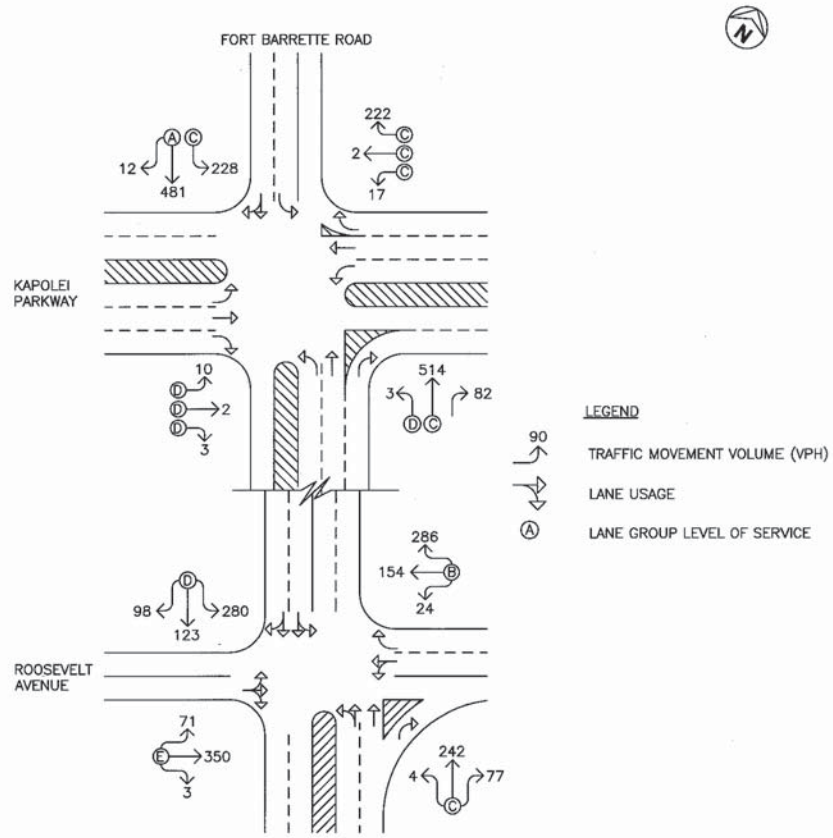
BASELINE AM PEAK HOUR OF TRAFFIC

FIGURE 3



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BASELINE PM PEAK HOUR OF TRAFFIC

FIGURE 4

period. During the PM peak period, the overall traffic volume is approximately the same with 424 vehicles traveling eastbound and 464 vehicles traveling westbound. The eastbound approach of Roosevelt Avenue operates at LOS "C" and LOS "E" during the AM and PM peak periods, respectively, while the westbound approach operates at LOS "B" during both peak periods.

c. Fort Barrette Road and Kapolei Parkway

At the intersection with Kapolei Parkway, Fort Barrette Road carries 489 vehicles northbound and 859 vehicles southbound during the AM peak period. During the PM peak period, the overall traffic volume is approximately the same with 599 vehicles traveling northbound and 721 vehicles traveling southbound. The critical traffic movement on the Fort Barrette Road approaches of the intersection is the northbound through traffic movement which operates at LOS "C" during both peak periods and the southbound left-turn traffic movement which operates at LOS "D" and LOS "C" during the AM and PM peak periods, respectively.

The Kapolei Parkway approaches of the intersection carry 25 vehicles eastbound and 515 vehicles westbound during the AM peak period. During PM peak period, traffic volumes are less with 15 vehicles traveling eastbound and 241 vehicles traveling westbound. The critical traffic movements on the Kapolei Parkway approaches are the eastbound through traffic movement which operates at LOS "D" during both peak periods and the westbound left-turn traffic movement which operates at LOS "C" during both peak periods.

IV. PROJECTED TRAFFIC CONDITIONS

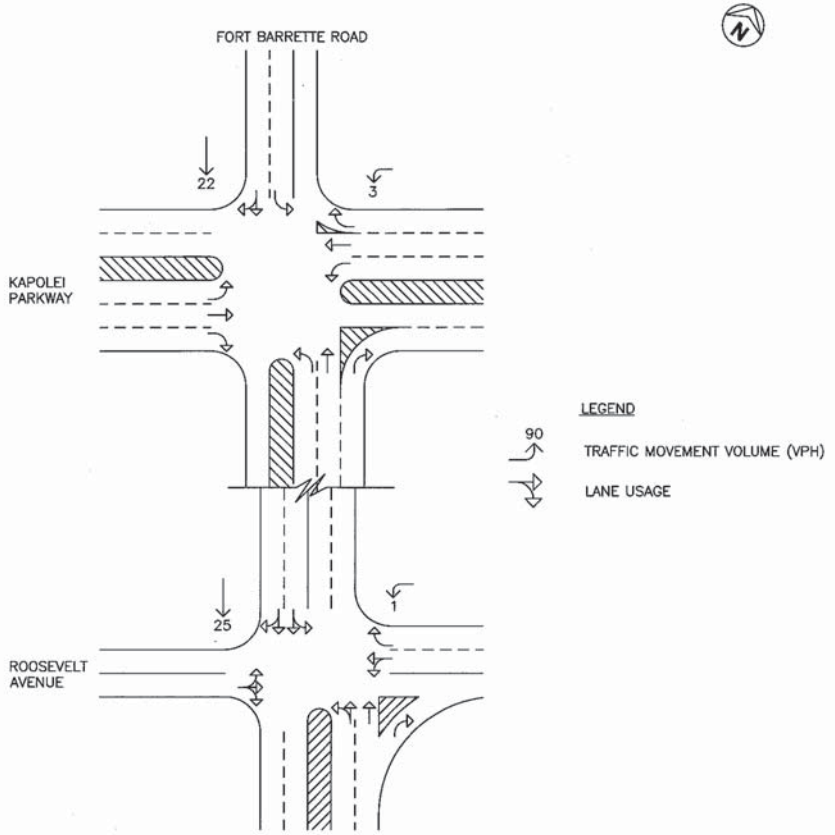
A. Site-Generated Traffic

The trip generation methodology used in this study is based upon generally accepted techniques developed by the Institute of Transportation Engineers (ITE) and published in "Trip Generation, 8th Edition," 2008. The ITE trip generation rates are developed empirically by correlating the vehicle trip generation data with various land use characteristics such as the number of vehicle trips generated per employee. For the purpose of this study, all full-time employees are conservatively assumed to enter during the AM peak period and exit during the PM peak period. Table 1 summarizes the project site trip generation characteristics applied to the AM and PM peak periods of traffic.

Table 1: Peak Hour Trip Generation

PACIFIC HEALTH RESEARCH LAB INDEPENDENT VARIABLE: Full-Time Employees = 26		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	26
	EXIT	0
	TOTAL	26
PM PEAK	ENTER	0
	EXIT	26
	TOTAL	0

Figures 5 and 6 show the distribution of site-generated vehicles during the AM and PM peak periods. Access for the proposed facility will be provided off Saratoga Avenue east of Fort Barrette Road. All site-generated vehicles are conservatively assumed to utilize Saratoga Avenue to travel to/from the main access roadway for Kalaeloa, Fort Barrette Road. The directional distribution of these trips was based upon the trip distribution percentages derived from the Oahu Metropolitan Planning Organization (OMPO) 2030 regional travel forecasting model, and the relative convenience of the available routes. Appendix C includes the trip distribution percentages.



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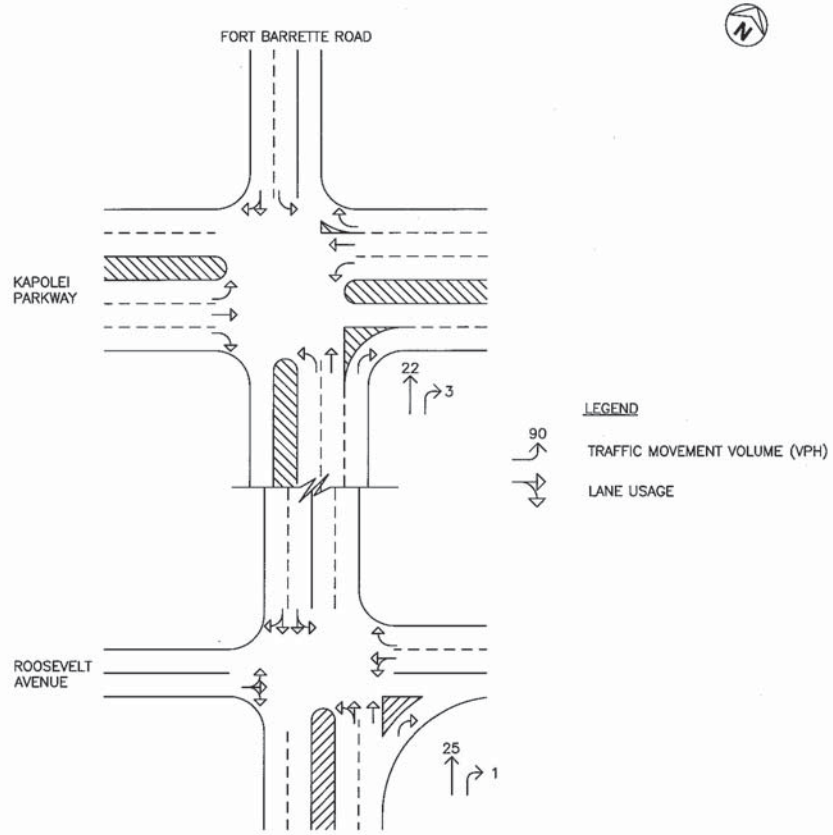
DISTRIBUTION OF SITE-GENERATED VEHICLES - AM PEAK HOUR OF TRAFFIC

FIGURE 5



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DISTRIBUTION OF SITE-GENERATED VEHICLES - PM PEAK HOUR OF TRAFFIC

FIGURE 6

B. Other Considerations

1. Kapolei Parkway Extension

There are currently segments of Kapolei Parkway in Ewa and Kapolei, but these segments are not currently continuous. However, there are future plans to connect all existing segments of Kapolei Parkway to create a contiguous east-west roadway. The new portion of the roadway between Fort Barrette Road and Kamokila Boulevard is currently under construction by the Kapolei Property Development LLC and is expected to be completed by the Year 2016. Traffic circulation and distribution in the vicinity of the proposed UH PHR Lab is expected to change as a result of the new alternate east-west route. As such, a portion of the traffic currently utilizing Roosevelt Avenue and Farrington Highway is assumed to utilize Kapolei Parkway instead with a portion of the existing turning traffic at the intersection of Kapolei Parkway and Fort Barrette Road assumed to travel through the intersection instead. In addition, the traffic signal timing and phasing at the intersection of Kapolei Parkway and Fort Barrette Road is expected to be modified to accommodate the anticipated changes in traffic circulation and distribution as a result of the extension.

2. Ewa FBI Building

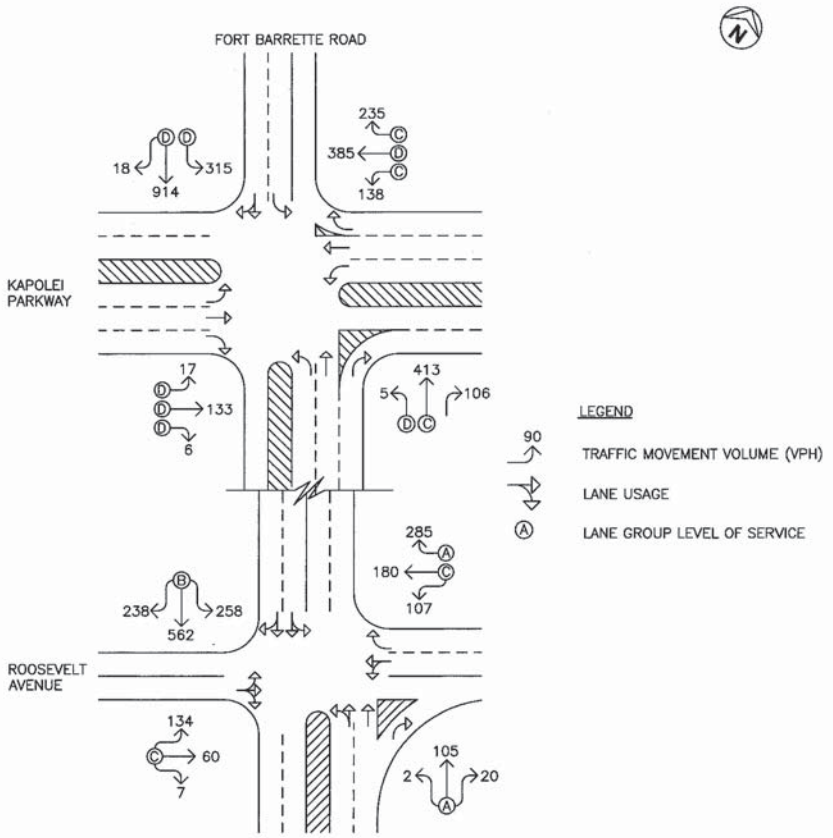
The Federal Bureau of Investigation (FBI) is currently constructing a new facility in Kalaeloa near the intersection of Roosevelt Avenue and Fort Barrette Road. As detailed in the "Ewa FBI Building Final TIAR," the proposed 137,000 square foot building is expected to generate a total of 145 trips and 90 trips during the AM and PM peak periods. These trips were distributed throughout the adjacent roadway network and incorporated into Year 2016 without project conditions.

3. Kalaeloa Hawaii Army National Guard Installation

The Hawaii Army National Guard (HIARNG) is proposing to relocate and consolidate its operations to a 150-acre site within Kalaeloa. The proposed installation would house the HIARNG Aviation Units currently housed at Wheeler Army Airfield, HIARNG Joint Forces Headquarters currently housed at Fort Ruger, Combined Support Maintenance Shop (CSMS) Army Aviation Support Facility, Brigade Readiness Center (RC), JFHQ-HIARNG RC, and Army Aviation RC. As detailed in the "Environmental Assessment for the Hawaii Army National Guard in Kalaeloa, Hawaii: Traffic Impact Analysis Memorandum," the proposed installation is expected to generate a total of 312 additional trips during the AM and PM peak periods. These trips were distributed throughout the adjacent roadway network and incorporated into Year 2016 without project conditions. In addition, a traffic signal system is expected to be installed at the intersection of Roosevelt Avenue and Fort Barrette Road in conjunction with this project. For the purpose of this report, this signal system is assumed to be installed prior to Year 2016.

C. Total Traffic Volumes Without Project

The projected Year 2016 AM and PM peak period traffic volumes and operating conditions without the proposed UH PHR Lab are shown in Figures 7 and 8, and summarized in Table 2. As previously mentioned, a traffic signal system is assumed to be installed at the intersection of Fort Barrette Road and Roosevelt Avenue by the Year 2016. The baseline levels of service are included for comparison purposes. LOS calculations are included in Appendix D.



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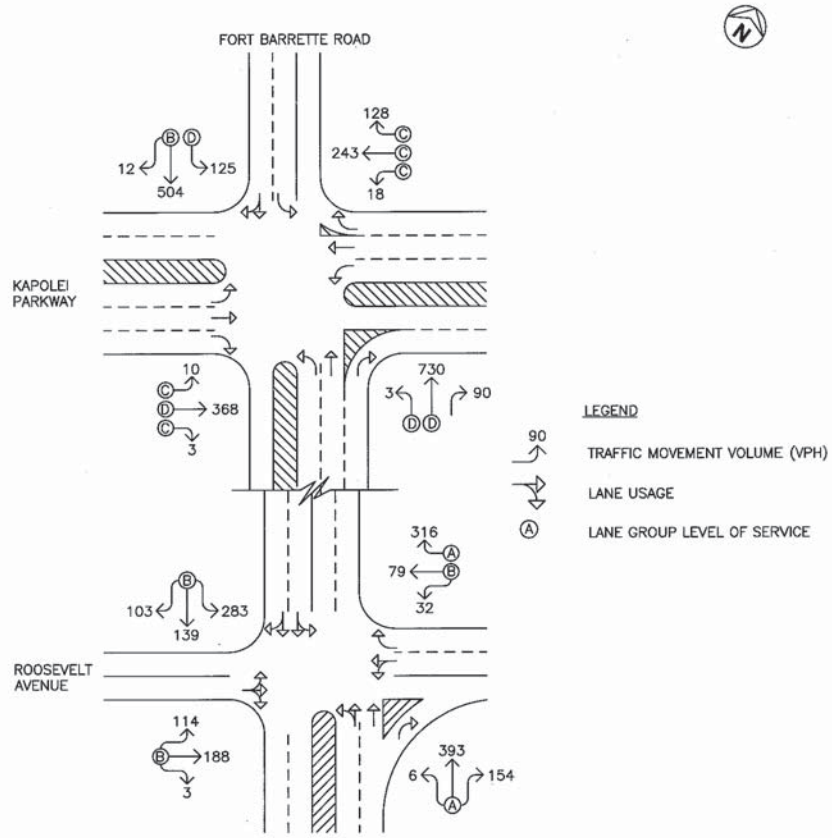
YEAR 2016 AM PEAK HOUR OF TRAFFIC WITHOUT PROJECT

FIGURE 7



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YEAR 2016 PM PEAK HOUR OF TRAFFIC WITHOUT PROJECT

FIGURE 8

Table 2: Baseline and Projected (Without Project) LOS Traffic Operating Conditions

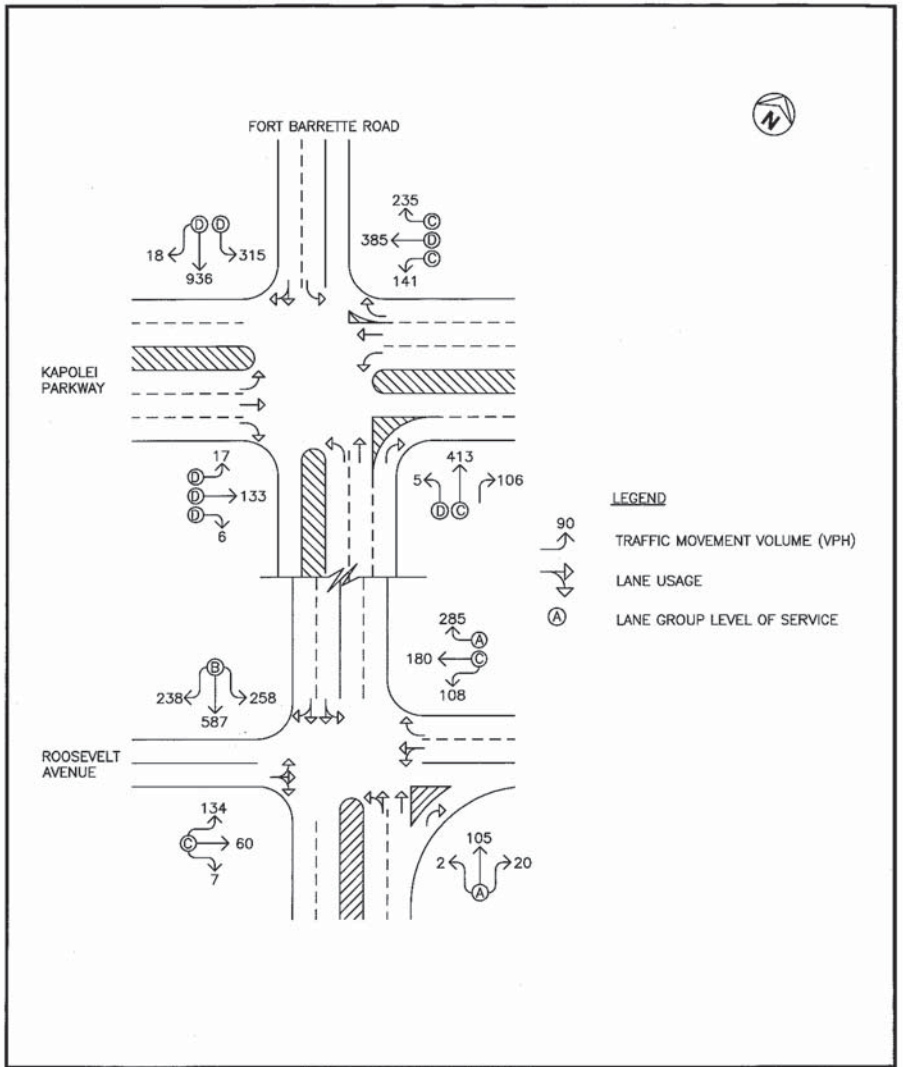
Intersection	Critical Traffic Movement		AM		PM	
			Base	Year 2016 w/out Proj	Base	Year 2016 w/out Proj
Fort Barrette Rd/ Roosevelt Ave*	Eastbound	LT-TH-RT	C	C	E	B
	Westbound	LT-TH	B	C	B	B
		RT		A		A
	Northbound	LT-TH-RT	B	A	C	A
	Southbound	LT-TH-RT	C	B	D	B
Fort Barrette Rd/ Kapolei Pkwy	Eastbound	TH	D	D	D	D
	Westbound	LT	C	C	C	C
	Northbound	TH	C	C	C	D
	Southbound	LT	D	D	C	D

*Traffic signal system installed.

Under Year 2016 without project conditions, traffic operations at the intersection of Fort Barrette Road and Kapolei Parkway are expected to deteriorate slightly from baseline conditions due the anticipated changes is traffic circulation and distribution as a result of the Kapolei Parkway extension, as well as, the development of other projects in the vicinity. The critical movements at that intersection are expected to operate at LOS "D" or better during both peak periods. At the intersection of Fort Barrette Road and Roosevelt Avenue, traffic operations are expected to improve primarily due to the installation of a traffic signal system at that intersection. The traffic movements at this intersection are expected to operate at LOS "C" or better during the AM peak period and LOS "B" or better during the PM peak period.

D. Total Traffic Volumes With Project

Figures 9 and 10 show the Year 2016 cumulative AM and PM peak hour traffic conditions with the development of the proposed UH PHR Lab. The cumulative volumes consist of site- generated traffic superimposed over Year 2016 projected traffic demands. The traffic impacts resulting from the proposed project are addressed in the following section.



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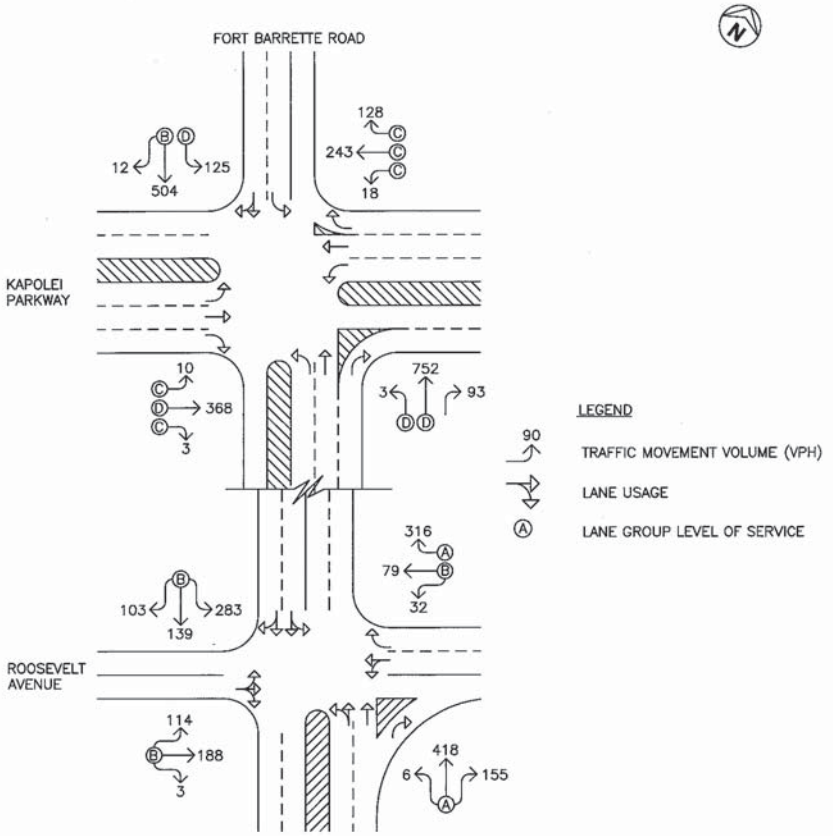
YEAR 2016 AM PEAK HOUR OF TRAFFIC WITHOUT PROJECT

FIGURE 9



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YEAR 2016 PM PEAK HOUR OF TRAFFIC WITHOUT PROJECT

FIGURE 10

V. TRAFFIC IMPACT ANALYSIS

The Year 2016 cumulative AM and PM peak hour traffic conditions with the proposed UH PHR Lab are summarized in Table 3. The projected Year 2016 (Without Project) operating conditions are provided for comparison purposes. LOS calculations are included in Appendix E.

Table 3: Projected (Without and With Project) LOS Traffic Operating Conditions

Intersection	Critical Traffic Movement		AM		PM	
			Year 2016 w/out Proj	Year 2016 w/ Proj	Year 2016 w/out Proj	Year 2016 w/ Proj
Fort Barrette Rd/ Roosevelt Ave*	Eastbound	LT-TH-RT	C	C	B	B
	Westbound	LT-TH	C	C	B	B
		RT	A	A	A	A
	Northbound	LT-TH-RT	A	A	A	A
	Southbound	LT-TH-RT	B	B	B	B
Fort Barrette Rd/ Kapolei Pkwy	Eastbound	TH	D	D	D	D
	Westbound	LT	C	C	C	C
	Northbound	TH	C	C	D	D
	Southbound	LT	D	D	D	D

Traffic operations under Year 2016 with project conditions are expected to remain similar to Year 2016 without project conditions during both peak periods. The eastbound approach and westbound left-turn and through traffic movement along Roosevelt Avenue at Fort Barrette Road are expected to continue operating at LOS "C" and LOS "B" during the AM and PM peak periods, respectively, while the westbound right-turn traffic movement is expected to continue operating at LOS "A" during both peak periods. Similarly, the northbound and southbound approaches of the intersection are expected to continue operating at LOS "A" and LOS "B," respectively, during both peak periods. At the intersection of Fort Barrette Road and Kapolei Parkway, the critical movements on the eastbound and southbound approaches are expected to continue operating at LOS "D" during both peak periods while the critical movement on the westbound approach is expected to continue operating at LOS "C" during both peak periods. On the northbound approach, the critical

traffic movement is expected to continue operating at LOS "C" and LOS "D" during the AM and PM peak periods, respectively.

VI. RECOMMENDATIONS

Based on the analysis of the traffic data, the following are the recommendations of this study associated with the development of the UH Pacific Health Research Lab:

1. Maintain sufficient sight distance for motorists to safely enter and exit all driveways and roadways.

2. Provide adequate on-site loading and off-loading service areas and prohibit off-site loading operations.

3. Provide adequate turn-around area for service, delivery, and refuse collection vehicles to maneuver on the project site to avoid vehicle-reversing maneuvers onto public roadways.

4. Maintain sufficient turning radii at all driveways and roadways to avoid or minimize vehicle encroachments to oncoming traffic lanes.

VII. CONCLUSION

The proposed University of Hawaii Pacific Health Research Lab will be devoted to researching and detecting emerging infectious diseases, as well as developing rapid and more accurate diagnostic tests, drugs, and vaccines for emerging and re-emerging infectious diseases in the Asia-Pacific Region. The proposed 31,179 square foot building will include laboratories and support space for research, administration, and building operations. With the implementation of the aforementioned recommendations, the proposed facility is not expected to have a significant impact on the surrounding roadways. Traffic operations in the vicinity are expected to remain similar to without project conditions. In addition, the total traffic volumes entering the study intersections are expected to increase by less than 2% during both peak periods. These increases in the total traffic volumes are in the range of daily volume fluctuations along Fort Barrette Road and represent a minimal increase in the overall traffic volumes.

APPENDIX A

LEVEL OF SERVICE DEFINITIONS

LEVEL OF SERVICE DEFINITIONS

LEVEL-OF-SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

Level of Service (LOS) for signalized intersections is defined in terms of delay, which is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. Specifically, level-of-service (LOS) criteria are stated in terms of the average control delay per vehicle, typically a 15-min analysis period. The criteria are given in the following table.

Table 1: Level-of-Service Criteria for Signalized Intersections

Level of Service	Control Delay per Vehicle (sec/veh)
A	≤10.0
B	>10.0 and ≤20.0
C	>20.0 and ≤35.0
D	>35.0 and ≤55.0
E	>55.0 and ≤80.0
F	>80.0

Delay is a complex measure and depends on a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group.

Level of Service A describes operations with low control delay, up to 10 sec per vehicle. This level of service occurs when progression is extremely favorable and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.

Level of Service B describes operations with control delay greater than 10 and up to 20 sec per vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of delay.

Level of Service C describes operations with control delay greater than 20 and up to 35 sec per vehicle. These higher delays may result from only fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. Cycle failure occurs when a given green phase does not serve queued vehicles and overflows occur. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.

Level of Service D describes operations with control delay greater than 35 and up to 55 sec per vehicle. At level of service D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

Level of Service E describes operation with control delay greater than 55 and up to 80 sec per vehicle. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent.

Level of Service F describes operations with control delay in excess of 80 sec per vehicle. This level, considered to be unacceptable to most drivers, often occurs with oversaturation, that is, when arrival flow rates exceed the capacity lane groups. It may also occur at high v/c ratios with many individual cycle failures. Poor progression and long cycle lengths may also contribute significantly to high delay levels.

LEVEL OF SERVICE DEFINITIONS

LEVEL-OF-SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

Level of Service (LOS) criteria are given in Table 1. As used here, control delay is defined as the total elapsed time from the time a vehicle stops at the end of the queue to the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position, including deceleration of vehicles from free-flow speed to the speed of vehicles in the queue.

The average total delay for any particular minor movement is a function of the service rate or capacity of the approach and the degree of saturation. If the degree of saturation is greater than about 0.9, average control delay is significantly affected by the length of the analysis period.

Table 1: Level-of-Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay (Sec/Veh)
A	≤10.0
B	>10.0 and ≤15.0
C	>15.0 and ≤25.0
D	>25.0 and ≤35.0
E	>35.0 and ≤50.0
F	>50.0

"Highway Capacity Manual," Transportation Research Board, 2000.

APPENDIX B

CAPACITY ANALYSIS CALCULATIONS
BASELINE PEAK HOUR TRAFFIC ANALYSIS

HCM Signalized Intersection Capacity Analysis
2: Ft Barrette & Kapolei

6/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	17	2	6	125	8	382	5	379	105	354	487	18
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1863	1961	1667	1863	1961	1667	1863	1961	1667	1863	1950	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1863	1961	1667	1863	1961	1667	1863	1961	1667	1863	1950	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	18	2	6	132	8	402	5	399	111	373	513	19
RTOR Reduction (vph)	0	0	6	0	0	342	0	0	0	0	1	0
Lane Group Flow (vph)	18	2	0	132	8	60	5	399	111	373	531	0
Confl. Peds. (#/hr)				382								
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Free	Prot	NA	
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8			Free			
Actuated Green, G (s)	2.3	2.3	2.3	12.7	12.7	12.7	0.7	28.1	85.8	22.7	50.1	
Effective Green, g (s)	2.3	2.3	2.3	12.7	12.7	12.7	0.7	28.1	85.8	22.7	50.1	
Actuated g/C Ratio	0.03	0.03	0.03	0.15	0.15	0.15	0.01	0.33	1.00	0.26	0.58	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	50	53	45	276	290	247	15	642	1667	493	1139	
v/s Ratio Prot	c0.01	0.00		c0.07	0.00		0.00	c0.20		c0.20	0.27	
v/s Ratio Perm			0.00			0.04			0.07			
v/c Ratio	0.36	0.04	0.00	0.48	0.03	0.24	0.33	0.62	0.07	0.76	0.47	
Uniform Delay, d1	41.0	40.7	40.6	33.5	31.3	32.3	42.3	24.4	0.0	29.0	10.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.4	0.3	0.0	1.3	0.0	0.5	12.7	1.9	0.1	6.5	0.3	
Delay (s)	45.4	41.0	40.7	34.8	31.3	32.8	55.0	26.2	0.1	35.5	10.5	
Level of Service	D	D	D	C	C	C	D	C	A	D	B	
Approach Delay (s)		44.0			33.3			20.9			20.8	
Approach LOS		D			C			C			C	

Intersection Summary				
HCM Average Control Delay	24.5	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.63			
Actuated Cycle Length (s)	85.8	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	63.3%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: Ft Barrette & Kapolei

6/15/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	2	3	17	2	222	3	514	82	228	481	12
Ideal Flow (vphpl)	1900	1900	1900	2000	1900	2000	1900	2000	2000	2000	2000	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1863	1863	1667	1770	1961	1667	1863	1953	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1863	1863	1667	1770	1961	1667	1863	1953	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	2	3	18	2	234	3	541	86	240	506	13
RTOR Reduction (vph)	0	0	3	0	0	210	0	0	0	0	1	0
Lane Group Flow (vph)	11	2	0	18	2	24	3	541	86	240	518	0
Turn Type	Split	NA	Perm	Split	NA	Perm	Prot	NA	Free	Prot	NA	
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8			Free			
Actuated Green, G (s)	2.0	2.0	2.0	7.9	7.9	7.9	0.5	31.5	77.0	15.6	46.6	
Effective Green, g (s)	2.0	2.0	2.0	7.9	7.9	7.9	0.5	31.5	77.0	15.6	46.6	
Actuated g/C Ratio	0.03	0.03	0.03	0.10	0.10	0.10	0.01	0.41	1.00	0.20	0.61	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	46	48	41	191	191	171	11	802	1667	377	1182	
v/s Ratio Prot	c0.01	0.00		0.01	0.00		0.00	c0.28		c0.13	0.27	
v/s Ratio Perm			0.00			c0.01			0.05			
v/c Ratio	0.24	0.04	0.00	0.09	0.01	0.14	0.27	0.67	0.05	0.64	0.44	
Uniform Delay, d1	36.8	36.6	36.5	31.3	31.0	31.5	38.1	18.6	0.0	28.1	8.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.7	0.4	0.0	0.2	0.0	0.4	13.0	2.3	0.1	3.5	0.3	
Delay (s)	39.4	36.9	36.5	31.5	31.1	31.8	51.1	20.8	0.1	31.6	8.4	
Level of Service	D	D	D	C	C	C	D	C	A	C	A	
Approach Delay (s)		38.6			31.8			18.1			15.8	
Approach LOS		D			C			B			B	

Intersection Summary				
HCM Average Control Delay	19.3	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.57			
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	57.8%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
13: Ft Barrette & Roosevelt

6/13/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	126	115	4	28	316	282	2	81	19	228	223	167
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	133	121	4	29	333	297	2	85	20	240	235	176

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	258	362	297	45	63	357	293
Volume Left (vph)	133	29	0	2	0	240	0
Volume Right (vph)	4	0	297	0	20	0	176
Hadj (s)	0.13	0.05	-0.57	0.06	-0.19	0.37	-0.39
Departure Headway (s)	6.9	6.5	3.2	8.0	7.7	7.2	6.5
Degree Utilization, x	0.49	0.66	0.26	0.10	0.13	0.72	0.53
Capacity (veh/h)	488	532	1112	393	401	485	544
Control Delay (s)	16.3	21.2	7.3	10.6	10.7	25.3	15.2
Approach Delay (s)	16.3	14.9		10.7		20.8	
Approach LOS	C	B		B		C	

Intersection Summary				
Delay		17.1		
HCM Level of Service		C		
Intersection Capacity Utilization	60.5%		ICU Level of Service	B
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
13: Ft Barrette & Roosevelt

6/13/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	71	350	3	24	154	286	4	242	77	280	123	98
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	75	368	3	25	162	301	4	255	81	295	129	103

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	446	187	301	132	208	359	168
Volume Left (vph)	75	25	0	4	0	295	0
Volume Right (vph)	3	0	301	0	81	0	103
Hadj (s)	0.06	0.06	-0.57	0.05	-0.24	0.44	-0.40
Departure Headway (s)	7.3	8.2	3.2	8.4	8.1	8.3	7.4
Degree Utilization, x	0.90	0.43	0.27	0.31	0.47	0.83	0.35
Capacity (veh/h)	487	408	1112	418	431	419	468
Control Delay (s)	46.4	17.2	7.4	13.8	16.7	39.6	13.2
Approach Delay (s)	46.4	11.1		15.6		31.2	
Approach LOS	E	B		C		D	

Intersection Summary				
Delay		26.6		
HCM Level of Service		D		
Intersection Capacity Utilization	67.2%		ICU Level of Service	C
Analysis Period (min)		15		

DISTRIBUTION OF VEHICLE TRIPS

		Percent of Trips for Land Use Types to/from Subareas and Cordon Entry/Exit Stations							
		Commercial		Residential		Recreation/Resort		Industrial/Harbor	
Subarea or Cordon Sta	Gate	AM	PM	AM	PM	AM	PM	AM	PM
H-1 Fwy West	1	9.0	9.0	3.0	5.0	4.0	18.0	11.0	11.2
H-1 Fwy East	2	19.0	17.0	33.0	28.0	28.5	35.0	24.6	18.2
Farrington Hwy East	3	9.0	9.0	4.0	5.0	4.2	7.5	3.1	3.8
Kapolei Pkwy East	4	11.0	13.0	14.0	12.0	2.4	2.0	5.2	6.5
Roosevelt East	5	4.0	3.0	0.0	0.8	1.8	1.0	7.1	2.8
Makakilo Dr	6	9.0	12.7	3.0	3.6	2.0	3.7	8.1	9.0
Kalaeloa Blvd South	7	6.0	8.1	10.0	13.4	5.5	3.0	20.0	22.3
Villages of Kapolei	8	13.0	9.0	0.6	0.1	4.0	2.0	8.0	6.8
Kalaeloa Redev	9	6.0	5.0	6.0	11.0	4.0	2.0	1.8	4.1
Ko Olina	10	1.0	3.7	5.0	4.6	31.0	15.0	7.3	7.4
Kapolei Shop Ctr Area (590)	11	6.0	1.0	6.0	4.0	3.6	3.0	1.0	2.0
Kapolei Office Core (592)	12	1.0	2.5	4.4	3.5	2.0	0.8	0.5	0.5
Kapolei Power Ctr Area (589)	13	2.0	1.0	4.0	3.0	2.5	2.0	1.0	2.0
Kapolei Government Office Core (593)	14	4.0	6.0	7.0	6.0	4.5	5.0	1.3	3.4
Total		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

APPENDIX C

TRIP DISTRIBUTION

APPENDIX D

CAPACITY ANALYSIS CALCULATIONS
PROJECTED YEAR 2016 PEAK HOUR TRAFFIC
ANALYSIS WITHOUT PROJECT

HCM Signalized Intersection Capacity Analysis
2: Ft Barrette & Kapolei

6/14/2012

Movement	SBL	SBT	SBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	17	133	6	138	385	235	5	413	106	315	914	18
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	0.84	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1863	1961	1667	1563	1961	1667	1863	1961	1667	1863	1955	
Flt Permitted	0.25	1.00	1.00	0.42	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	483	1961	1667	694	1961	1667	1863	1961	1667	1863	1955	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	18	140	6	145	405	247	5	435	112	332	962	19
RTOR Reduction (vph)	0	0	5	0	0	187	0	0	0	0	0	0
Lane Group Flow (vph)	18	140	1	145	405	60	5	435	112	332	981	0
Confl. Peds. (#/hr)				382								
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Free	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			Free			
Actuated Green, G (s)	17.9	16.5	16.5	33.4	27.0	27.0	4.1	38.3	110.5	23.8	58.0	
Effective Green, g (s)	17.9	16.5	16.5	33.4	27.0	27.0	4.1	38.3	110.5	23.8	58.0	
Actuated g/C Ratio	0.16	0.15	0.15	0.30	0.24	0.24	0.04	0.35	1.00	0.22	0.52	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	96	293	249	303	479	407	69	680	1667	401	1026	
v/s Ratio Prot	0.00	0.07		c0.05	c0.21		0.00	0.22		c0.18	c0.50	
v/s Ratio Perm	0.03		0.00	0.09		0.04			0.07			
v/c Ratio	0.19	0.48	0.00	0.48	0.85	0.15	0.07	0.64	0.07	0.83	0.96	
Uniform Delay, d1	39.5	43.1	40.0	30.0	39.8	32.7	51.4	30.3	0.0	41.4	25.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.9	1.2	0.0	1.2	12.9	0.2	0.4	2.0	0.1	13.1	18.2	
Delay (s)	40.5	44.3	40.0	31.2	52.7	32.9	51.8	32.3	0.1	54.5	43.2	
Level of Service	D	D	D	C	D	C	D	C	A	D	D	
Approach Delay (s)		43.7			42.6			25.9			46.1	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM Average Control Delay	41.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	110.5	Sum of lost time (s)	20.0
Intersection Capacity Utilization	89.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: Ft Barrette & Kapolei

6/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	368	3	18	243	128	3	730	90	125	504	12
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1863	1961	1667	1863	1961	1667	1863	1961	1667	1863	1954	
Flt Permitted	0.43	1.00	1.00	0.19	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	852	1961	1667	374	1961	1667	1863	1961	1667	1863	1954	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	387	3	19	256	135	3	768	95	132	531	13
RTOR Reduction (vph)	0	0	2	0	0	101	0	0	0	0	1	0
Lane Group Flow (vph)	11	387	1	19	256	34	3	768	95	132	543	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Free	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			Free			
Actuated Green, G (s)	25.7	25.0	25.0	26.9	25.6	25.6	4.2	44.0	101.1	10.8	50.6	
Effective Green, g (s)	25.7	25.0	25.0	26.9	25.6	25.6	4.2	44.0	101.1	10.8	50.6	
Actuated g/C Ratio	0.25	0.25	0.25	0.27	0.25	0.25	0.04	0.44	1.00	0.11	0.50	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	224	485	412	119	497	422	77	853	1667	199	978	
v/s Ratio Prot	0.00	c0.20		0.00	0.13		0.00	c0.39		c0.07	0.28	
v/s Ratio Perm	0.01		0.00	0.04		0.02			c0.06			
v/c Ratio	0.05	0.80	0.00	0.16	0.52	0.08	0.04	0.90	0.06	0.66	0.56	
Uniform Delay, d1	28.5	35.7	28.7	28.9	32.4	28.8	46.5	26.5	0.0	43.4	17.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	8.9	0.0	0.6	0.9	0.1	0.2	12.5	0.1	8.1	0.7	
Delay (s)	28.6	44.6	28.7	29.5	33.3	28.9	46.7	39.0	0.1	51.5	18.2	
Level of Service	C	D	C	C	C	C	D	D	A	D	B	
Approach Delay (s)		44.0			31.7			34.8			24.7	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	32.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	101.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
13: Ft Barrette & Roosevelt

6/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	134	60	7	107	180	285	2	105	20	258	562	238
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		5.0			5.0	4.0		5.0			5.0	
Lane Util. Factor		1.00			1.00	1.00		0.95			0.95	
Frt		1.00			1.00	0.85		0.98			0.97	
Flt Protected		0.97			0.98	1.00		1.00			0.99	
Satd. Flow (prot)		1889			1925	1667		3635			3556	
Flt Permitted		0.51			0.81	1.00		0.94			0.83	
Satd. Flow (perm)		996			1593	1667		3436			2979	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	141	63	7	113	189	300	2	111	21	272	592	251
RTOR Reduction (vph)	0	1	0	0	0	0	0	10	0	0	23	0
Lane Group Flow (vph)	0	210	0	0	302	300	0	124	0	0	1092	0
Turn Type	Perm	NA		Perm	NA	Free	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		Free	2			6		
Actuated Green, G (s)		22.8			22.8	68.8		36.0			36.0	
Effective Green, g (s)		22.8			22.8	68.8		36.0			36.0	
Actuated g/C Ratio		0.33			0.33	1.00		0.52			0.52	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		330			528	1667		1798			1559	
v/s Ratio Prot												
v/s Ratio Perm		c0.21			0.19	0.18		0.04			c0.37	
v/c Ratio		0.64			0.57	0.18		0.07			0.70	
Uniform Delay, d1		19.5			19.0	0.0		8.1			12.3	
Progression Factor		1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2		4.0			1.5	0.2		0.0			1.4	
Delay (s)		23.5			20.5	0.2		8.1			13.8	
Level of Service		C			C	A		A			B	
Approach Delay (s)		23.5			10.4			8.1			13.8	
Approach LOS		C			B			A			B	

Intersection Summary			
HCM Average Control Delay	13.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	68.8	Sum of lost time (s)	10.0
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
13: Ft Barrette & Roosevelt

6/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	114	188	3	32	79	316	6	393	154	283	139	103
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		5.0			5.0	4.0		5.0			5.0	
Lane Util. Factor		1.00			1.00	1.00		0.95			0.95	
Frt		1.00			1.00	0.85		0.96			0.97	
Flt Protected		0.98			0.99	1.00		1.00			0.97	
Satd. Flow (prot)		1922			1933	1667		3568			3521	
Flt Permitted		0.83			0.85	1.00		0.95			0.61	
Satd. Flow (perm)		1625			1666	1667		3389			2192	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	120	198	3	34	83	333	6	414	162	298	146	108
RTOR Reduction (vph)	0	0	0	0	0	0	0	39	0	0	21	0
Lane Group Flow (vph)	0	321	0	0	117	333	0	543	0	0	531	0
Turn Type	Perm	NA		Perm	NA	Free	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		Free	2			6		
Actuated Green, G (s)		15.9			15.9	45.3		19.4			19.4	
Effective Green, g (s)		15.9			15.9	45.3		19.4			19.4	
Actuated g/C Ratio		0.35			0.35	1.00		0.43			0.43	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		570			585	1667		1451			939	
v/s Ratio Prot												
v/s Ratio Perm		c0.20			0.07	0.20		0.16			c0.24	
v/c Ratio		0.56			0.20	0.20		0.37			0.57	
Uniform Delay, d1		11.9			10.3	0.0		8.8			9.8	
Progression Factor		1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2		1.3			0.2	0.3		0.2			0.8	
Delay (s)		13.2			10.4	0.3		9.0			10.6	
Level of Service		B			B	A		A			B	
Approach Delay (s)		13.2			2.9			9.0			10.6	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	45.3	Sum of lost time (s)	10.0
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX E

CAPACITY ANALYSIS CALCULATIONS
PROJECTED YEAR 2016 PEAK HOUR TRAFFIC
ANALYSIS WITH PROJECT

HCM Signalized Intersection Capacity Analysis
2: Ft Barrette & Kapolei

6/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	17	133	6	141	385	235	5	413	106	315	936	18
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	0.82	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1863	1961	1667	1533	1961	1667	1863	1961	1667	1863	1955	
Flt Permitted	0.21	1.00	1.00	0.45	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	418	1961	1667	733	1961	1667	1863	1961	1667	1863	1955	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	18	140	6	148	405	247	5	435	112	332	985	19
RTOR Reduction (vph)	0	0	5	0	0	186	0	0	0	0	0	0
Lane Group Flow (vph)	18	140	1	148	405	61	5	435	112	332	1004	0
Confl. Peds. (#/hr)				382								
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Free	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			Free			
Actuated Green, G (s)	21.3	19.8	19.8	34.5	28.0	28.0	4.0	39.6	113.9	24.8	60.4	
Effective Green, g (s)	21.3	19.8	19.8	34.5	28.0	28.0	4.0	39.6	113.9	24.8	60.4	
Actuated g/C Ratio	0.19	0.17	0.17	0.30	0.25	0.25	0.04	0.35	1.00	0.22	0.53	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	97	341	290	290	482	410	65	682	1667	406	1037	
v/s Ratio Prot	0.00	0.07		c0.04	c0.21		0.00	0.22		c0.18	c0.51	
v/s Ratio Perm	0.03		0.00	0.11		0.04			0.07			
v/c Ratio	0.19	0.41	0.00	0.51	0.84	0.15	0.08	0.64	0.07	0.82	0.97	
Uniform Delay, d1	38.6	41.9	38.9	31.0	40.8	33.6	53.2	31.1	0.0	42.4	25.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.9	0.8	0.0	1.5	12.5	0.2	0.5	2.0	0.1	12.1	20.3	
Delay (s)	39.6	42.7	38.9	32.5	53.3	33.8	53.7	33.1	0.1	54.5	46.1	
Level of Service	D	D	D	C	D	C	D	C	A	D	D	
Approach Delay (s)		42.2			43.4			26.6			48.2	
Approach LOS		D			D			C			D	

Intersection Summary				
HCM Average Control Delay	42.3	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.95			
Actuated Cycle Length (s)	113.9	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	90.4%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: Ft Barrette & Kapolei

6/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	368	3	18	243	128	3	752	93	125	504	12
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.0	5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1863	1961	1667	1863	1961	1667	1863	1961	1667	1863	1954	
Flt Permitted	0.43	1.00	1.00	0.18	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	841	1961	1667	359	1961	1667	1863	1961	1667	1863	1954	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	387	3	19	256	135	3	792	98	132	531	13
RTOR Reduction (vph)	0	0	2	0	0	101	0	0	0	0	1	0
Lane Group Flow (vph)	11	387	1	19	256	34	3	792	98	132	543	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Free	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			Free			
Actuated Green, G (s)	25.8	25.1	25.1	27.0	25.7	25.7	4.2	45.7	102.8	10.7	52.2	
Effective Green, g (s)	25.8	25.1	25.1	27.0	25.7	25.7	4.2	45.7	102.8	10.7	52.2	
Actuated g/C Ratio	0.25	0.24	0.24	0.26	0.25	0.25	0.04	0.44	1.00	0.10	0.51	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	218	479	407	113	490	417	76	872	1667	194	992	
v/s Ratio Prot	0.00	c0.20		0.00	0.13		0.00	c0.40		c0.07	0.28	
v/s Ratio Perm	0.01		0.00	0.04		0.02			c0.06			
v/c Ratio	0.05	0.81	0.00	0.17	0.52	0.08	0.04	0.91	0.06	0.68	0.55	
Uniform Delay, d1	29.3	36.6	29.4	29.6	33.3	29.5	47.4	26.6	0.0	44.4	17.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	9.7	0.0	0.7	1.0	0.1	0.2	13.0	0.1	9.4	0.6	
Delay (s)	29.4	46.2	29.4	30.4	34.3	29.6	47.6	39.6	0.1	53.8	17.9	
Level of Service	C	D	C	C	C	C	D	D	A	D	B	
Approach Delay (s)		45.7			32.5			35.3			24.9	
Approach LOS		D			C			D			C	

Intersection Summary				
HCM Average Control Delay	33.6	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.79			
Actuated Cycle Length (s)	102.8	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	75.1%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
13: Ft Barrette & Roosevelt

6/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	134	60	7	108	180	285	2	105	20	258	587	238
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		5.0			5.0	4.0		5.0			5.0	
Lane Util. Factor		1.00			1.00	1.00		0.95			0.95	
Frt		1.00			1.00	0.85		0.98			0.97	
Flt Protected		0.97			0.98	1.00		1.00			0.99	
Satd. Flow (prot)		1889			1925	1667		3635			3560	
Flt Permitted		0.50			0.81	1.00		0.94			0.83	
Satd. Flow (perm)		985			1589	1667		3436			2989	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	141	63	7	114	189	300	2	111	21	272	618	251
RTOR Reduction (vph)	0	1	0	0	0	0	0	10	0	0	22	0
Lane Group Flow (vph)	0	210	0	0	303	300	0	124	0	0	1119	0
Turn Type	Perm	NA		Perm	NA	Free	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		Free	2			6		
Actuated Green, G (s)		23.3			23.3	70.6		37.3			37.3	
Effective Green, g (s)		23.3			23.3	70.6		37.3			37.3	
Actuated g/C Ratio		0.33			0.33	1.00		0.53			0.53	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		325			524	1667		1815			1579	
v/s Ratio Prot												
v/s Ratio Perm		c0.21			0.19	0.18		0.04			c0.37	
v/c Ratio		0.65			0.58	0.18		0.07			0.71	
Uniform Delay, d1		20.1			19.6	0.0		8.1			12.6	
Progression Factor		1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2		4.4			1.6	0.2		0.0			1.5	
Delay (s)		24.5			21.1	0.2		8.2			14.0	
Level of Service		C			C	A		A			B	
Approach Delay (s)		24.5			10.7			8.2			14.0	
Approach LOS		C			B			A			B	

Intersection Summary			
HCM Average Control Delay	13.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	70.6	Sum of lost time (s)	10.0
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
13: Ft Barrette & Roosevelt

6/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	114	188	3	32	79	316	6	418	155	283	139	103
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		5.0			5.0	4.0		5.0			5.0	
Lane Util. Factor		1.00			1.00	1.00		0.95			0.95	
Frt		1.00			1.00	0.85		0.96			0.97	
Flt Protected		0.98			0.99	1.00		1.00			0.97	
Satd. Flow (prot)		1922			1933	1667		3574			3521	
Flt Permitted		0.83			0.85	1.00		0.95			0.60	
Satd. Flow (perm)		1625			1666	1667		3395			2159	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	120	198	3	34	83	333	6	440	163	298	146	108
RTOR Reduction (vph)	0	0	0	0	0	0	0	36	0	0	21	0
Lane Group Flow (vph)	0	321	0	0	117	333	0	573	0	0	531	0
Turn Type	Perm	NA		Perm	NA	Free	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		Free	2			6		
Actuated Green, G (s)		15.9			15.9	45.6		19.7			19.7	
Effective Green, g (s)		15.9			15.9	45.6		19.7			19.7	
Actuated g/C Ratio		0.35			0.35	1.00		0.43			0.43	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		567			581	1667		1467			933	
v/s Ratio Prot												
v/s Ratio Perm		c0.20			0.07	0.20		0.17			c0.25	
v/c Ratio		0.57			0.20	0.20		0.39			0.57	
Uniform Delay, d1		12.1			10.4	0.0		8.8			9.8	
Progression Factor		1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2		1.3			0.2	0.3		0.2			0.8	
Delay (s)		13.4			10.6	0.3		9.0			10.6	
Level of Service		B			B	A		A			B	
Approach Delay (s)		13.4			2.9			9.0			10.6	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	8.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	45.6	Sum of lost time (s)	10.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX F:

PRE-ASSESSMENT CONSULTATION LETTERS AND RESPONSES

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

REPLY TO
ATTENTION OF: CEPOH-EC-T

EM
KC

April 5, 2012

Civil Works Technical Branch

RECEIVED
APR 11 2012
WILSON OKAMOTO CORPORATION

Mr. Earl Matsukawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Matsukawa:

Thank you for the opportunity to review and comment on the Pre-Assessment Consultation dated March 30, 2012 for the University of Hawaii Pacific Health Research Lab, Kalaeloa, Oahu, Hawaii (Tax Map Key 9-1-13: 45).

According to the latest Flood Insurance Rate Map (FIRM), Panel No. 11500010310G, dated January 19, 2011, the project site is located in Zone D (areas where flood hazards have not been determined).

Should you require additional information, please contact Ms. Jessie Dobinchick of my staff at (808) 438-8876.

Sincerely,

Michael F. Wong, P.E.
Chief, Civil Works Technical Branch

Enclosure

WILSON OKAMOTO CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS
1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

8301-01
July 27, 2012

Mr. Michael Wong, Chief
U.S. Army Corps of Engineers, Honolulu District
Civil Works Technical Branch
Building 230
Fort Shafter, HI 96858

Subject: Environmental Assessment (EA) Pre-Assessment Consultation
University of Hawaii Pacific Health Research Lab
Portion of Tax Map Key: 1-9-1-13:045
Kalaeloa, Oahu, Hawaii

Dear Mr. Wong:

Thank you for your letter dated April 5, 2012. We acknowledge that the proposed project site is located in Zone D (areas where flood hazards have not been determined), according to the latest Flood Insurance Rate Map (FIRM), Panel No. 11500010310G, dated January 19, 2011. This information will be included in the Draft EA.

Your letter, along with this response, will also be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Thank you for your consideration in this matter.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Keith Mattson, Project Manager, University of Hawaii
Dr. Valerie Nottingham, Chief, Environmental Quality Branch, Division of Environmental Protection, Office of Research Facilities, National Institutes of Health

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

REPLY TO ATTENTION OF:

April 23, 2012

EM
KC

Regulatory Branch

POH-2012-00094

Wilson Okamoto Corporation
Attn: Mr. Earl Matsukawa, Project Manager
1907 S. Beretania St, Suite 400
Honolulu, HI 96826

RECEIVED
APR 27 2012
WILSON OKAMOTO CORPORATION

Dear Mr. Matsukawa:

We have received your request for the Department of the Army to review and comment on the proposed University of Hawaii Pacific Health Research Lab at Kalaeloa, O'ahu. We have assigned the project the reference number **POH-2012-00094**. Please cite this reference number in any correspondence with us concerning this project. We have completed our review of the submitted document and have the following comments:

Section 10 of the Rivers and Harbors Act of 1899 (Section 10) requires that a Department of the Army (DA) permit be obtained from the U.S. Army Corps of Engineers (Corps) prior to undertaking any construction, dredging, and other activities occurring in, over, or under navigable waters of the U.S. Navigable waters of the United States are those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Section 404 of the Clean Water Act (Section 404) of 1972 (33 U.S.C. 1344) requires that a DA permit be obtained for the discharge, or placement, of dredge and/or fill material into waters of the U.S., including wetlands. Fill material is any material that replaces a jurisdictional aquatic area with dry land or changes the bottom elevation of a waterbody. Fill may be temporary or permanent and often includes, but is not limited to, rock, sand, concrete, sandbags, etc.

Based on our review of the information provided in your letter dated March 30, 2012 it appears that the project location consists entirely of uplands and no navigable waters of the U.S. are present. As such, authorization under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act do not appear to be required for the proposed project.

If the project design should change and work is to be proposed in wetlands, streams, drainage ditches, the Pacific Ocean, or other aquatic resources, (whether or not water is present in that resource during project construction) we advise you to contact our office to request a jurisdictional determination. We can then determine if any regulatory requirements apply to work that may impact those resources.

Thank you for contacting us regarding this project. We look forward to working with you on this project as well as any future projects. Should you have any questions, please contact Kaitlyn Seberger, at (808) 438-0390 or via email at Kaitlyn.R.Seberger@usace.army.mil.

Sincerely,

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

WILSON OKAMOTO
CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS

1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

8301-01
July 27, 2012

Mr. George P. Young, P.E., Chief
U.S. Army Corps of Engineers, Honolulu District
Regulatory Branch
Fort Shafter, HI 96858-5440

Subject: Environmental Assessment (EA) Pre-Assessment Consultation
University of Hawaii Pacific Health Research Lab
Portion of Tax Map Key: 1-9-1-13:045
Kalaeloa, Oahu, Hawaii

Dear Mr. Young:

Thank you for your letter dated April 5, 2012 (POH-2012-00094). We appreciate your determination that authorization under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water act do no appear to be required for the proposed project, as it is currently described.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Thank you for your consideration in this matter.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Keith Mattson, Project Manager, University of Hawaii
Dr. Valerie Nottingham, Chief, Environmental Quality Branch, Division of Environmental Protection, Office of Research Facilities, National Institutes of Health

DEPARTMENT OF THE NAVY
COMMANDER
NAVY REGION HAWAII
850 TICONDEROGA ST STE 110
JBPHH, HAWAII 96860-5101

EM
KC

5090
Ser N45/0419
May 8, 2012

RECEIVED
MAY 14 2012
WILSON OKAMOTO CORPORATION

CERTIFIED MAIL NO. 7007 3020 0002 3045 3659

Mr. Earl Matsukawa
Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Matsukawa:

SUBJECT: ENVIRONMENTAL ASSESSMENT (EA) PRE-ASSESSMENT CONSULTATION, UNIVERSITY OF HAWAII PACIFIC HEALTH RESEARCH LAB, PORTION OF TAX MAP KEY: 1-9-1-13:045, KALAELOA, OAHU, HAWAII

On behalf of Rear Admiral Fernandez L. Ponds, we appreciate the opportunity to review and comment on the proposed University of Hawaii Pacific Health Research Lab at Kalaeloa, Oahu. The Navy does not have any comments at this time, but would like to continue to have the opportunity to review and comment on the EA and project as it progresses.

The Navy owns an adjoining property to the proposed Lab site that is under long-term lease to Kalaeloa Ventures, LLC. The Navy recommends they be contacted and given the opportunity to comment. Their point of contact Mr. Craig McGinnis can be reached at (808) 585-7900.

Please direct any further questions to Mr. David Sullivan of the Regional Environmental Coordination Office at (808) 473-4141 or david.m.sullivan1@navy.mil.

Sincerely,

J. Coronado

J. CORONADO
Captain, CEC, U.S. Navy
Regional Engineer
By direction of the
Commander

WILSON OKAMOTO CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS
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FAX: 808-946-2253
www.wilsonokamoto.com

8301-01
July 27, 2012

Captain J. Coronado
Department of the Navy
Navy Region Hawaii
850 Ticonderoga ST STE 110
JBPHH, Hawaii 96860-5101

Attention: Mr. David Sullivan

Subject: Environmental Assessment (EA) Pre-Assessment Consultation
University of Hawaii Pacific Health Research Lab
Portion of Tax Map Key: 1-9-1-13:045
Kalaeloa, Oahu, Hawaii

Dear Captain Coronado:

Thank you for your letter dated May 14, 2012 (5090, Ser N45/0419). We acknowledge that the Navy has no comments to offer at this time. Per your request, we will offer you the opportunity to review and comment on the EA and project as it progresses.

The University of Hawaii is in contact with Kalaeloa Ventures, LLC., and has notified them of the project.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Thank you for your consideration in this matter.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Keith Mattson, Project Manager, University of Hawaii
Dr. Valerie Nottingham, Chief, Environmental Quality Branch, Division of Environmental Protection, Office of Research Facilities, National Institutes of Health

United States Department of the Interior
U.S. GEOLOGICAL SURVEY
Pacific Islands Water Science Center
677 Ala Moana Blvd., Suite 415
Honolulu, Hawaii 96813
Phone: (808) 587-2400/Fax: (808) 587-2401

EM

April 13, 2012

RECEIVED
APR 16 2012
WILSON OKAMOTO CORPORATION

Mr. Earl Matsukawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Matsukawa:

Subject: Draft Environmental Assessment (DEA) Pre-Assessment Consultation Project Summary, University of Hawaii Pacific Health Research Lab, Portion of Tax Map Key: 1-9-1-13:045, Kalaeloa, Oahu, Hawaii

Thank you for forwarding the subject DEA Pre-Assessment Consultation Project Summary for review and comment by the staff of the U.S. Geological Survey Pacific Islands Water Science Center. We regret however, that due to prior commitments and lack of available staff time, we are unable to review this document.

We appreciate the opportunity to participate in the review process.

Sincerely,

Stephen S. Anthony
Center Director

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FAX: 808-946-2253
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8301-01
July 27, 2012

Mr. Stephen S. Anthony, Center Director
U.S. Department of the Interior
U.S. Geological Survey
Pacific Islands Water Science Center
677 Ala Moana Boulevard, Suite 415
Honolulu, HI 96813

Subject: Environmental Assessment (EA) Pre-Assessment Consultation
University of Hawaii Pacific Health Research Lab
Portion of Tax Map Key: 1-9-1-13:045
Kalaeloa, Oahu, Hawaii

Dear Mr. Anthony:

Thank you for your letter dated April 13, 2012. We acknowledge that your agency is unable to offer comments at this time.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Thank you for your consideration in this matter.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Keith Mattson, Project Manager, University of Hawaii
Dr. Valerie Nottingham, Chief, Environmental Quality Branch, Division of Environmental Protection, Office of Research Facilities, National Institutes of Health

NEIL ABERCROMBIE
GOVERNOR

DEAN H. SEKI
COMPTROLLER

STATE OF HAWAI'I
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P.O. BOX 119, HONOLULU, HAWAII 96810-0119

EM
KC

MAY 11 2012

(P)1096.2

Mr. Earl Matsukawa, AICP
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

RECEIVED
MAY 14 2012
WILSON OKAMOTO CORPORATION

Dear Mr. Matsukawa:

Subject: Pre-Assessment Consultation Environmental Assessment
Hanalei Plantation Resort, Hanalei, Kauai
TMK: (4) 5-4-004: 001 and 013

Thank you for the opportunity to provide comments for the subject project. The proposed project does not impact any of the Department of Accounting and General Services' projects or existing facilities, and we have no comments to offer at this time.

If you have any questions, please call me at 586-0400 or have your staff call Ms. Gayle Takasaki of the Public Works Division at 586-0584.

Sincerely,

DEAN H. SEKI
State Comptroller

WILSON OKAMOTO CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS

1907 South Beretania Street
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Honolulu, Hawaii, 96826 USA
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FAX: 808-946-2253
www.wilsonokamoto.com

8301-01
July 27, 2012

Mr. Dean H. Seki, State Comptroller
State of Hawaii
Department of Accounting and General Services
P.O. Box 119
Honolulu, HI 96810-0119

Subject: Environmental Assessment (EA) Pre-Assessment Consultation
University of Hawaii Pacific Health Research Lab
Portion of Tax Map Key: 1-9-1-13:045
Kalaeloa, Oahu, Hawaii

Dear Mr. Seki:

Thank you for your letter dated May 11, 2012. We acknowledge your determination that the proposed project does not impact any of the Department of Accounting and General Services' projects or existing facilities, and that your agency has no comments to offer at this time.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Thank you for your consideration in this matter.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Keith Mattson, Project Manager, University of Hawaii
Dr. Valerie Nottingham, Chief, Environmental Quality Branch, Division of Environmental Protection, Office of Research Facilities, National Institutes of Health

NEIL ABERCROMBIE
GOVERNOR
STATE OF HAWAII

ALBERT "ALAPAKI" NAHALE-A
CHAIRMAN
HAWAIIAN HOMES COMMISSION

MICHELLE K. KAUHANE
DEPUTY TO THE CHAIRMAN

STATE OF HAWAI'I
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

EM

April 24, 2012

RECEIVED
MAY 01 2012
WILSON OKAMOTO CORPORATION

Wilson Okamoto Corporation
Attn: Mr. Earl Matsukawa, Project Manager
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Subject: Environmental Assessment (EA) Pre-Assessment Consultation, University of Hawaii Pacific Health Research Lab, TMK: (1) 9-1-013:045 (portion), Kalaeloa, O'ahu, Hawai'i

Dear Mr. Matsukawa:

Thank you for the opportunity to provide pre-assessment comments prior to the Draft Environmental Assessment (DEA) for the University of Hawaii Pacific Health Research Lab project. The Department understands that this project is for a one-story, approximately 31,000 square foot stand-alone structure designed to serve as a secure facility for the University of Hawaii's infectious disease research program and will include bio-containment facilities and support for the National Institute of Health's Biodefense Research Agenda. The facility will include BSL-2 and BSL-3 laboratories, a small lab animal facility primarily for rodents, an insectiary, physical plant, and support space for research, administration and building operations.

As adjacent landowners engaged in our own planning processes, it is our responsibility to engage with other agencies and plan appropriately for the larger region. In addition, it is our priority to ensure that DHHL's plans are as consistent as possible with other plans for the area.

Please consider the following comments on the proposed project in the development of the Draft Environmental Assessment:

1. The Department of Hawaiian Home Lands (DHHL) owns approximately 997 acres in the DHHL Kapolei Regional Plan area, with a total of 2,412 housing units planned, under

construction or completed on 375 of those acres. Also in the Kapolei Regional Plan area are 622 acres of nonresidential, potentially income-producing lands, with 67 acres in East Kapolei and 555 acres in Kalaeloa. The 56-acre Kaupe'a Village 8, with 226 housing units, is the residential area of Hawaiian Home Lands closest to the project site, which is less than one third of a mile to the south. Please reflect the location of Hawaiian Homelands residential developments on the location and other maps. Development has been happening rapidly in the area, so please ensure that the maps reflect the most up to date roads and other development information.

2. Please include detailed hydrogeological information for the Kalaeloa area. There are sinkholes and other limestone karst-related geological formations in the area, therefore the presence of water moving underground as well as the potential porosity and instability of the soils may need to be a factor in the design and construction of the facility.

3. Please include a process of outreach and consultation with Hawaiian Homelands beneficiaries, whereby at least one community meeting is held, preferably coordinated with the homesteader organizations, to inform the homesteaders of the nature and purpose of the project, explanations of all safety and containment measures to be employed, and how they can comment on the Draft EA.

We thank you for the opportunity to provide preliminary comments as part of early consultation for preparation of a Draft Environmental Assessment. If you have any questions, please contact Nancy McPherson at our Planning Office via email at nancy.m.mcpherson@hawaii.gov or by phone at 808.620.9519.

Aloha and mahalo,

Albert "Alapaki" Nahale-a, Chairman
Hawaiian Homes Commission

WILSON OKAMOTO CORPORATION
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FAX: 808-946-2253
www.wilsonokamoto.com

8301-01
July 27, 2012

Jobie Masagatani, Director
State of Hawai'i
Department of Hawaiian Home Lands
Hawaiian Homes Commission
P.O. Box 1879
Honolulu, HI 96805

Subject: Environmental Assessment (EA) Pre-Assessment Consultation
University of Hawaii Pacific Health Research Lab
Portion of Tax Map Key: 1-9-1-13:045
Kalaeloa, Oahu, Hawaii

Dear Ms. Masagatani:

Thank you for your department's letter dated April 24, 2012 regarding the subject Draft EA pre-assessment consultation. Under context of the forthcoming Draft EA, the following responses are offered in the order of your comments:

1. The location of Hawaiian Homelands residential developments within close proximity to the proposed project site will be identified and properly labeled on the location and other figures.

2. Known hydrological/geological features, including sinkholes and other limestone karst-related geological formations in the vicinity will be discussed in the Draft EA. Potential porosity and instability of local soils and other sub-surface conditions that could effect the proposed project will be evaluated to determine appropriate structural engineering design.

3. The University of Hawai'i (UH), intends to reach out to, and consult with DHHL, and Hawaiian Homelands beneficiaries, to inform of the nature and purpose of the proposed project, as well as outline and provide explanation for the safety and containment measures to be employed. Comments on the Draft EA will be solicited as a part of this outreach effort.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Thank you for your consideration in this matter.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Keith Mattson, Project Manager, University of Hawaii
Dr. Valerie Nottingham, Chief, Environmental Quality Branch, Division of Environmental Protection, Office of Research Facilities, National Institutes of Health

EM

NEIL ABERCROMBIE
GOVERNOR

PATRICIA McMANAMAN
DIRECTOR

BARBARA A. YAMASHITA
DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF HUMAN SERVICES
Benefit, Employment & Support Services Division
820 Mililani Street, Suite 606
Honolulu, Hawaii 96813

April 18, 2012

Refer to 12:0216

Mr. Earl Matsukawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

RECEIVED
APR 20 2012
WILSON OKAMOTO CORPORATION

Dear Mr. Matsukawa:

SUBJECT: Environmental Assessment (EA) Pre-Assessment Consultation, University of Hawaii Pacific Health Research Lab, Portion of Tax Map Key: 1-9-13:045 Kalaeloa, Oahu, Hawaii

Thank you for your letter dated March 30, 2012 regarding the Draft of the Environmental Assessment Pre-Assessment Consultation Project Summary for the above named project. The Director of the Department of Human Services (DHS) has forwarded your letter to us for a response.

Your letter and attachments have been reviewed and DHS has no objections to the proposed plans as identified in your correspondence.

If you have any questions or need further information, please contact Ms. Marja Leivo, Child Care Program Specialist, at 586-7112.

Sincerely,

Scott Nakasone
Assistant Division Administrator

c: Patricia McManaman, Director

AN EQUAL OPPORTUNITY AGENCY

WILSON OKAMOTO CORPORATION

1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

8301-01
July 27, 2012

Mr. Scott Nakasone, Assistant Division Administrator
State of Hawaii
Department of Human Services
820 Mililani Street, Suite 606
Honolulu, HI 96813

Subject: Environmental Assessment (EA) Pre-Assessment Consultation
University of Hawaii Pacific Health Research Lab
Portion of Tax Map Key: 1-9-1-13:045
Kalaeloa, Oahu, Hawaii

Dear Mr. Nakasone:

Thank you for your letter dated April 18, 2012. We acknowledge that your agency has no objections to the proposed project.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Thank you for your consideration in this matter.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Keith Mattson, Project Manager, University of Hawaii
Dr. Valerie Nottingham, Chief, Environmental Quality Branch, Division of Environmental Protection, Office of Research Facilities, National Institutes of Health

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

April 30, 2012

Wilson Okamoto Corporation
Attention: Mr. Earl Matsukawa, Project Manager
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826 via email: ematsukawa@wilsonokamoto.com

Dear Mr. Matsukawa:

SUBJECT: University of Hawaii Pacific Health Research Lab, Environmental Assessment (EA) Pre-Assessment Consultation

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

At this time, enclosed are comments from (1) Land Division - Oahu District; (2) Engineering Division; and (3) Division of Forestry and Wildlife, on the subject matter. No other comments were received as of the suspense date. Should you have any questions, please feel free to call Supervising Land Agent Steve Molmen at 587-0439. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosures

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

April 10, 2012

MEMORANDUM

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

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: University of Hawaii Pacific Health Research Lab, Environmental Assessment (EA) Pre-Assessment Consultation
LOCATION: Kalaeloa, Oahu, Hawaii; Portion of TMK (1) 9-1-013:045
APPLICANT: Wilson Okamoto Corporation on behalf of the University of Hawaii

Transmitted for your review and comment on the above-referenced document. We would appreciate your comments on this document. Please submit any comments by April 26, 2012.

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

Attachments

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

Signed: TCha
Date: 4/11/2012

cc: Central Files

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

'12 APR 11 AM 11:06 ENGINEERING

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

April 10, 2012

MEMORANDUM

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

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: University of Hawaii Pacific Health Research Lab, Environmental Assessment (EA) Pre-Assessment Consultation
LOCATION: Kalaeloa, Oahu, Hawaii; Portion of TMK (1) 9-1-013:045
APPLICANT: Wilson Okamoto Corporation on behalf of the University of Hawaii

Transmitted for your review and comment on the above-referenced document. We would appreciate your comments on this document. Please submit any comments by April 26, 2012.

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

Attachments

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

Signed:
Date: 4/24/12

cc: Central Files

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/SteveMolmen
RE:EAPreConsultationUHHealthResearchLab
Oahu.886

COMMENTS

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

(X) **Please take note that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Flood Zone D. The Flood Insurance Program does not have any regulations for developments within Flood Zone D.**

( ) 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. Mario Siu Li at (808) 768-8098 or Ms. Ardis Shaw-Kim at 768-8296 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.

(X) **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.**

( ) 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: 4/24/12

→ NARS – Eng Plants

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

April 10, 2012

MEMORANDUM

RECEIVED
LAND DIVISION
2012 APR 26 A 10:08
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

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

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: University of Hawaii Pacific Health Research Lab, Environmental Assessment (EA) Pre-Assessment Consultation
LOCATION: Kalaeloa, Oahu, Hawaii; Portion of TMK (1) 9-1-013:045
APPLICANT: Wilson Okamoto Corporation on behalf of the University of Hawaii

Transmitted for your review and comment on the above-referenced document. We would appreciate your comments on this document. Please submit any comments by April 26, 2012.

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

Attachments

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

Signed: Ray Kommu RJC
Date: 4/20/12

cc: Central Files

WILSON OKAMOTO CORPORATION
ENGINEERS | PLANNERS | ECONOMISTS

1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

8301-01
July 27, 2012

Russell Y. Tsuji, Land Administrator
State of Hawaii
Department of Land and Natural Resources
Land Division
P.O. Box 621
Honolulu, HI 96809

Subject: Environmental Assessment (EA) Pre-Assessment Consultation
University of Hawaii Pacific Health Research Lab
Portion of Tax Map Key: 1-9-1-13:045
Kalaeloa, Oahu, Hawaii

Dear Mr. Tsuji:

Thank you for your letter dated April 30, 2012 regarding the subject Draft EA pre-assessment consultation. Under context of the forthcoming Draft EA, the following responses are offered in the order of your comments:

Engineering Division
We acknowledge that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Flood Zone D, and that the Flood Insurance Program has no regulations for developments within this zone. Also, a discussion of water demands and required infrastructure required to satisfy project needs will be included in the forthcoming draft EIS.

Division of Forestry and Wildlife
We acknowledge that you have no comments to offer at this time.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Thank you for your consideration in this matter.

Sincerely,

Earl R. Matsukawa

Earl Matsukawa, AICP
Project Manager

cc: Mr. Keith Mattson, Project Manager, University of Hawaii
Dr. Valerie Nottingham, Chief, Environmental Quality Branch, Division of Environmental Protection, Office of Research Facilities, National Institutes of Health

NEIL ABERCROMBIE
GOVERNOR

MAJOR GENERAL DARRYLL D. M. WONG
DIRECTOR OF CIVIL DEFENSE

DOUG MAYNE
VICE DIRECTOR OF CIVIL DEFENSE

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

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

EM

April 16, 2012

RECEIVED
APR 18 2012
WILSON OKAMOTO CORPORATION

Mr. Earl Matsukawa, AICP
Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Matsukawa:

Environmental Assessment (EA) Pre-Assessment Consultation
University of Hawaii Pacific Health Research Lab
Tax Map Key: 1-9-1-13-045 (por.), Kalaeloa, Oahu, Hawaii

Thank you for the opportunity to comment on this proposed project. The location of the proposed project lies within Flood Zone D, designated for areas with possible but undetermined flood hazards. We strongly recommend the implementation of flood mitigation measures as appropriate, during the planning and design phase of the development.

The incorporation of design elements to mitigate the effect of high-wind events on structures should also be considered for this development. We also strongly recommend the construction of safe rooms as part of the mitigation effort.

If you have any questions, please contact Ms. Havinne Okamura, Hazard Mitigation Planner, at (808) 733-4300, extension 556.

Sincerely,

EXECUTIVE OFFICER

FOR DOUG MAYNE
Vice Director of Civil Defense

WILSON OKAMOTO CORPORATION
ENVIRONMENTAL PLANNERS/ECONOMISTS

1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
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FAX: 808-946-2253
www.wilsonokamoto.com

8301-01
July 27, 2012

Mr. Doug Mayne, Vice Director of Civil Defense
State of Hawaii
Department of Defense
Office of the Director of Civil Defense
3949 Diamond Head Road
Honolulu, HI 96816-4495

Subject: Environmental Assessment (EA) Pre-Assessment Consultation
University of Hawaii Pacific Health Research Lab
Portion of Tax Map Key: 1-9-1-13:045
Kalaeloa, Oahu, Hawaii

Dear Mr. Mayne:

Thank you for your letter dated April 16, 2012. We acknowledge that the proposed project site lies within Zone D, designated for areas with possible but undetermined flood hazards. Mitigation measures and design elements respective to flood and high-wind events will be addressed in the forthcoming Draft EA.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Thank you for your consideration in this matter.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Keith Mattson, Project Manager, University of Hawaii
Dr. Valerie Nottingham, Chief, Environmental Quality Branch, Division of Environmental Protection, Office of Research Facilities, National Institutes of Health

NEIL ABERCROMBIE
GOVERNOR

KATHRYN S. MATAYOSHI
SUPERINTENDENT

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

OFFICE OF THE SUPERINTENDENT

RECEIVED
APR 27 2012
WILSON OKAMOTO CORPORATION

April 23, 2012

Mr. Earl Matsukawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawai'i 96826

Dear Mr. Matsukawa:

SUBJECT: Pre-Assessment Consultation, Regional Biosafety Lab
Kalaeloa, Oahu, TMK: 9-1-013: por. 045

The Department of Education (DOE) has reviewed the project summary for the University of Hawaii Pacific Health Research Lab (Lab). In the Draft Environmental Assessment (DEA) being prepared for the Lab, the DOE would like to see the physical distance between the proposed lab site and Barbers Point Elementary School. We would also like to see the physical distance between the Lab and the future school sites proposed in the Kalaeloa Master Plan, identified as parcels 2H, 1C, and the proposed Hawaiian cultural center, identified as parcels 3B and 3C. The DOE also needs to see the physical distance between the Lab and the future school sites proposed in the Kalaeloa Infrastructure Master Plan, parcels 46 and 12A.

We would like the DEA to explain the required distance that biological research laboratories in biosafety levels 1 through 4, must have from facilities that house children. We would like to know if such required distances include a calculation for prevailing winds and we would like to know the wind patterns between the proposed lab site, Barbers Point Elementary and the other possible school sites.

The DEA should explain the Lab's design features which would keep microorganisms from leaving the Lab. The DEA should also include a general description of the type of emergency plans that would be in place.

The DOE would also like to know if the Lab would have any other safety hazard impacts on a nearby future school, such as a requirement for a shelter-in-place facility.

The DOE appreciates an opportunity to share our concerns in this pre-assessment phase.

If you have any questions, please call Heidi Meeker of the Facilities Development Branch at 377-8301.

Very truly yours,

Kathryn S. Matayoshi
Superintendent

KSM:jmb

c: Randolph G. Moore, Assistant Superintendent, OSFSS

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

WILSON OKAMOTO CORPORATION
ENGINEERS · PLANNERS · CONSULTANTS

1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
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FAX: 808-946-2253
www.wilsonokamoto.com

8301-01
July 27, 2012

Ms. Kathryn S. Matayoshi, Superintendent
State of Hawaii
Department of Education
P.O. Box 2360
Honolulu, HI 96804

Attention: Heidi Meeker, Facilities Development Branch

Subject: Environmental Assessment (EA) Pre-Assessment Consultation
University of Hawaii Pacific Health Research Lab
Portion of Tax Map Key: 1-9-1-13:045
Kalaeloa, Oahu, Hawaii

Dear Ms. Matayoshi:

Thank you for your letter dated April 23, 2012 regarding the subject Draft EA pre-assessment consultation. Under context of the forthcoming Draft EA, the following responses are offered in the order of your comments:

- The forthcoming Draft EA will contain a discussion of the proposed project's proximity to existing and future school sites identified in your letter.
- Discussion of design features specific to containment, as well as an analysis of potential Accident, Abnormal, and Natural Phenomena events will be provided in the forthcoming Draft EA.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Thank you for your consideration in this matter.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Keith Mattson, Project Manager, University of Hawaii
Dr. Valerie Nottingham, Chief, Environmental Quality Branch, Division of Environmental Protection, Office of Research Facilities, National Institutes of Health

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

LORETTA J. FUDDY, A.C.S.W., M.P.H.
DIRECTOR OF HEALTH

In reply, please refer to:
File:

April 25, 2012

Mr. Earl Matsukawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, HI 96826

Dear Mr. Matsukawa:

This correspondence is in response to your request for comments to the pre-Environmental Assessment for the University of Hawaii Pacific Health Research Lab Project (Tax Map Key: (1) 9-1-13: 045), Kalaeloa, Oahu.

Project activities shall comply with the following Administrative Rules of the Department of Health:

- Chapter 11-46 Community Noise Control

Should you have any questions, please contact me at (808) 586-4701.

Sincerely,

Jeffrey M. Eckerd
Program Manager
Indoor and Radiological Health Branch

WILSON OKAMOTO CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS
1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

8301-01
July 27, 2012

Mr. Jeffrey Eckerd, Program Manager
State of Hawaii
Department of Health
Indoor and Radiological Health Branch
P.O. Box 3378
Honolulu, HI 96801-3378

Subject: Environmental Assessment (EA) Pre-Assessment Consultation
University of Hawaii Pacific Health Research Lab
Portion of Tax Map Key: 1-9-1-13:045
Kalaeloa, Oahu, Hawaii

Dear Mr. Eckerd:

Thank you for your letter dated April 25, 2012. The proposed project activities will comply with the guidelines set forth in Chapter 11-46 Community Noise Control of the Administrative Rules of the Department of Health.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Thank you for your consideration in this matter.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Keith Mattson, Project Manager, University of Hawaii
Dr. Valerie Nottingham, Chief, Environmental Quality Branch, Division of Environmental Protection, Office of Research Facilities, National Institutes of Health

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

LORETTA J. FUDDY, A.C.S.W., M.P.H.
DIRECTOR OF HEALTH

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

In reply, please refer to:
File:
12-226 FG

April 9, 2012

RECEIVED
APR 16 2012
WILSON OKAMOTO CORPORATION

Mr. Earl Matsukawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

SUBJECT: Comments from HEER for the Environmental Assessment (EA) Pre-Assessment Consultation, University of Hawaii Pacific Health Research Lab, Portion of Tax Map Key: 1-9-1-13:045, Kalaeloa, Oahu, Hawaii

Dear Mr. Matsukawa

The Hawaii Department of Health Hazard Evaluation and Emergency Response Office has no specific comments regarding the Environmental Assessment (EA) Pre-Assessment Consultation, University of Hawaii Pacific Health Research Lab Kalaeloa at this time. We look forward to reviewing the completed Draft Environmental Assessment, which should more fully explain the anticipated impacts of the project, and their potential effects on human health and the environment.

Sincerely,

Fenix Grange, Supervisor
Site Discovery, Assessment and Remediation Section
Hazard Evaluation and Emergency Response Office

WILSON OKAMOTO CORPORATION

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Honolulu, Hawaii, 96826 USA
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8301-01
July 27, 2012

Mr. Fenix Grange, Supervisor
State of Hawaii
Department of Health
Hazard Evaluation and Emergency Response Office
P.O. Box 3378
Honolulu, HI 96801-3378

Subject: Environmental Assessment (EA) Pre-Assessment Consultation
University of Hawaii Pacific Health Research Lab
Portion of Tax Map Key: 1-9-1-13:045
Kalaeloa, Oahu, Hawaii

Dear Mr. Grange:

Thank you for your letter dated April 9, 2012. We acknowledge that your agency has no comments to offer at this time.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Thank you for your consideration in this matter.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Keith Mattson, Project Manager, University of Hawaii
Dr. Valerie Nottingham, Chief, Environmental Quality Branch, Division of Environmental Protection, Office of Research Facilities, National Institutes of Health

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

LORETTA J. FUDDY, A.C.S.W., M.P.H.
DIRECTOR OF HEALTH

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

In reply, please refer to:
File:
12-086 Hanalei Plantation

May 3, 2012

Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826
ATTENTION: Mr. Earl Matsukawa, AICP

RECEIVED
MAY 08 2012
WILSON OKAMOTO CORPORATION

Dear Mr. Matsukawa:

SUBJECT: Pre-Assessment Consultation Environmental Assessment (EA)
Hanalei Plantation Resort, TMK: (4) 5-4-004: 001 and 013
Hanalei, Island of Kauai, Hawaii

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your letter, dated April 30, 2012. Thank you for allowing us to review and comment on the subject document. The document was routed to the various branches of the Environmental Health Administration. We have no comments at this time, but reserve the right to future comments. We strongly recommend that you review all of the Standard Comments on our website: www.hawaii.gov/health/environmental/env-planning/landuse/landuse.html. Any comments specifically applicable to this application should be adhered to.

The United States Environmental Protection Agency (EPA) provides a wealth of information on their website including strategies to help protect our natural environment and build sustainable communities at: http://water.epa.gov/infrastructure/sustain/ . The DOH encourages State and county planning departments, developers, planners, engineers and other interested parties to apply these strategies and environment principles whenever they plan or review new developments or redevelopments projects. We also ask you to share this information with others to increase community awareness on healthy, sustainable community design. If there are any questions about these comments please contact me.

Sincerely,

Laura Leialoha Phillips McIntyre, AICP
Environmental Planning Office Manager
Environmental Health Administration
Department of Heath
919 Ala Moana Blvd., Ste. 312
Honolulu, Hawaii 96814
Phone: 586-4337
Fax: 586-4370
laura.mcintyre@doh.hawaii.gov

WILSON OKAMOTO CORPORATION
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8301-01
July 27, 2012

Ms. Laura McIntyre, Manager
State of Hawaii
Environmental Health Administration
Environmental Planning Office
919 Ala Moana Boulevard, Room 312
Honolulu, HI 96814-4920

Subject: Environmental Assessment (EA) Pre-Assessment Consultation
University of Hawaii Pacific Health Research Lab
Portion of Tax Map Key: 1-9-1-13:045
Kalaeloa, Oahu, Hawaii

Dear Ms. McIntyre:

Thank you for your letter dated April 3, 2012. We acknowledge that your agency has no specific comments to offer at this time, but reserves the right to future comments. Per your recommendation, we have apprised the University of Hawaii of the Standard Comments posted as well as information available on the Environmental Protection Agency website.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Thank you for your consideration in this matter.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Keith Mattson, Project Manager, University of Hawaii
Dr. Valerie Nottingham, Chief, Environmental Quality Branch, Division of Environmental Protection, Office of Research Facilities, National Institutes of Health

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

LORETTA J. FUDDY, A.C.S.W., M.P.H.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
SAFE DRINKING WATER BRANCH
919 ALA MOANA BLVD., ROOM 308
HONOLULU, HI 96814-4920

In reply, please refer to:
File: SDWB
U of H Pacific Lab1.Doc

April 9, 2012

RECEIVED
APR 11 2012
WILSON OKAMOTO CORPORATION

EM
KC

Mr. Earl Matsukawa, AICP
Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, HI 96826

Dear Mr. Matsukawa:

SUBJECT: ENVIRONMENTAL ASSESSMENT PRECONSULTATION
UNIVERSITY OF HAWAII PACIFIC HEALTH RESEARCH LAB

We are in receipt of your letter and supporting documents dated March 30, 2012 addressed to Ms. Laura McIntyre of the Department of Health regarding the environmental assessment preconsultation for the proposed University of Hawaii Pacific Health Research Lab. We have reviewed the documents you have submitted, and are unable to provide comments on the proposed project without having specific information about the drinking water source and infrastructure that will serve the lab.

Due to the type of facility that a drinking water system could be serving, cross connection control must be seriously considered.

If there are any questions, please call Alain Carey of the Engineering Section at 586-4258.

Sincerely,

JOANNA L. SETO, P.E., CHIEF
Safe Drinking Water Branch
Environmental Management Division

AC:cb

c: Environmental Planning Office (via email)

WILSON OKAMOTO CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS

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Honolulu, Hawaii, 96826 USA
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8301-01
July 27, 2012

Ms. Joanna L. Seto
State of Hawaii
Department of Health
Safe Drinking Water Branch
919 Ala Moana Boulevard, Room 301
Honolulu, HI 96814-4920

Subject: Environmental Assessment (EA) Pre-Assessment Consultation
University of Hawaii Pacific Health Research Lab
Portion of Tax Map Key: 1-9-1-13:045
Kalaeloa, Oahu, Hawaii

Dear Ms. Seto:

Thank you for your letter dated April 9, 2012 (File: SDWB U of H Pacific Lab1.Doc). We acknowledge that you are unable to provide comments on the proposed project without having specific information regarding drinking water sourcing and infrastructure that will serve the lab. These will be discussed in the forthcoming Draft EA. Cross connection controls will be incorporated in the design phase of the project and implemented during construction.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Thank you for your consideration in this matter.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Keith Mattson, Project Manager, University of Hawaii
Dr. Valerie Nottingham, Chief, Environmental Quality Branch, Division of Environmental Protection, Office of Research Facilities, National Institutes of Health

NEIL ABERCROMBIE
GOVERNOR

GLENN M. OKIMOTO
DIRECTOR

Deputy Directors
JADE T. BUTAY
FORD N. FUCHIGAMI
RANDY GRUNE
JADINE URASAKI

IN REPLY REFER TO:

STP 8.0827

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

May 3, 2012

RECEIVED
MAY 08 2012
WILSON OKAMOTO CORPORATION

Mr. Earl Matsukawa, AICP
Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Matsukawa:

Subject: University of Hawaii Pacific Health Research Lab (UH PHR Lab)
Pre-Assessment Consultation for Draft Environmental Assessment

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

DOT understands the UH PHR Lab proposes to construct a one-story 31,179 square foot structure on two acres within the Kalaeloa Community Development District.

Due to the project location in proximity to Kalaeloa Airport and the flight path to Honolulu International Airport, the project will be exposed to occasional aircraft overflights and aircraft single-event noise. The UH PHR Lab should be made aware of the potential for impact from such occurrences.

DOT appreciates the opportunity to provide comments. If there are any questions, please contact Mr. Garrett Smith of the DOT Statewide Transportation Planning Office at (808) 831-7976.

Very truly yours,

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

WILSON OKAMOTO CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS

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Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
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8301-01
July 27, 2012

Mr. Glenn M. Okimoto, Ph.D., Director of Transportation
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813-5097

Subject: Environmental Assessment (EA) Pre-Assessment Consultation
University of Hawaii Pacific Health Research Lab
Portion of Tax Map Key: 1-9-1-13:045
Kalaeloa, Oahu, Hawaii

Dear Mr. Okimoto:

Thank you for your letter dated May 3, 2012. We acknowledge that the proposed project location's proximity to Kalaeloa Airport and the flight path to Honolulu International Airport will result in potential exposure to occasional aircraft overflight and aircraft single-event noise. This will be discussed in the forthcoming Draft EA.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Thank you for your consideration in this matter.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Keith Mattson, Project Manager, University of Hawaii
Dr. Valerie Nottingham, Chief, Environmental Quality Branch, Division of Environmental Protection, Office of Research Facilities, National Institutes of Health

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

April 4, 2012

PETER B. CARLISLE, MAYOR

RANDALL Y. S. CHUNG, Chairman
MAHEALANI CYPHER, Vice Chair
THERESIA C. McMURDO
DUANE R. MIYASHIRO
ADAM C. WONG

WESTLEY K.C. CHUN, Ex-Officio
GLENN M. OKIMOTO, Ex-Officio

ERNEST Y. W. LAU, P.E.
Manager and Chief Engineer

ELLEN E. HIRAYAMA, P.E.
Deputy Manager and Chief Engineer

EM
KC

RECEIVED
APR 10 2012
WILSON OKAMOTO CORPORATION

Mr. Earl Matsukawa, AICP
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Matsukawa:

Subject: Your Letter Dated March 30, 2012 Requesting Comments on the Environmental Assessment Pre-Assessment Consultation for the University of Hawaii Pacific Health Research Lab in Kalaeloa, TMK: 9-1-13: 45

Thank you for the opportunity to comment on the proposed development.

We do not have a water system serving this area. Water service should be provided for by the private water system serving this area.

If you have any questions, please contact Robert Chun at 748-5443.

Very truly yours,

SUSAN UYESUGI
Program Administrator
Customer Care Division

WILSON OKAMOTO CORPORATION
ENGINEERS | PLANNERS | CONSULTANTS

1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

8301-01
July 27, 2012

Ms. Susan Uyesugi, Program Administrator
City and County of Honolulu
Board of Water Supply
630 South Beretania Street
Honolulu, HI 96843

Subject: Environmental Assessment (EA) Pre-Assessment Consultation
University of Hawaii Pacific Health Research Lab
Portion of Tax Map Key: 1-9-1-13:045
Kalaeloa, Oahu, Hawaii

Dear Ms. Uyesugi:

Thank you for your letter dated April 4, 2012. We acknowledge that your agency has no comments at this time, and are aware that water service for the proposed project should be provided by the private water system serving the area.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Thank you for your consideration in this matter.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Keith Mattson, Project Manager, University of Hawaii
Dr. Valerie Nottingham, Chief, Environmental Quality Branch, Division of Environmental Protection, Office of Research Facilities, National Institutes of Health

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
TELEPHONE: (808) 768-8000 • FAX: (808) 768-6041
DEPT. WEB SITE: www.honoluludpp.org • CITY WEB SITE: www.honolulu.gov

PETER B. CARLISLE
MAYOR

DAVID K. TANOUE
DIRECTOR

JIRO A. SUMADA
DEPUTY DIRECTOR

LM

2012/ELOG-650 (hs)

May 7, 2012

Mr. Earl Matsukawa, AICP
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawai'i 96826

RECEIVED
MAY 10 2012
WILSON OKAMOTO CORPORATION

Dear Mr. Matsukawa:

Subject: Pre-Assessment Consultation
for the University of Hawai'i Pacific Health Research Lab
TMK: 1-9-1-13: 045

In response to your letter of March 30, 2012 requesting comments on the above project, we provide the following:

1. The EA must discuss how the project will comply with the General Plan, the 'Ewa Development Plan, and the 'Ewa Connectivity Study recommendations.

2. The Hawai'i Community Development Authority (HCDA) has not yet adopted (Final) rules for the Kalaeloa Community Development District. Therefore, at this time the proposed use and site is subject to the Land Use Ordinance (LUO). Once the rules are adopted, the land use and development standards are under the HCDA jurisdiction.

   The underlying zoning is F-1 Military and Federal Preservation District, but the site has been removed from Federal jurisdiction. Thus, the LUO permitted uses and development standards for the P-2 General Preservation District apply to the site today.

   The proposed UH PHR Lab is considered a "public use" for LUO purposes; therefore the University of Hawai'i (UH) is eligible to apply for a zoning waiver if the proposed facility cannot meet P-2 development standards.

3. The proposed project must address how it fits with the Kalaeloa Sewer Master Plan and should indicate if the UH intends to obtain sewer capacity from Ford Island Ventures.

4. The need for street frontage improvements and possible road widening along Saratoga Avenue should be addressed.

Should you have any questions, please contact Hal Senter of my staff at 768-8055.

Very truly yours,

David K. Tanoue, Director
Department of Planning and Permitting

DKT:bkg
933607

cc: Mr. Keith Mattson, Project Manager, University of Hawai'i

WILSON OKAMOTO
CORPORATION
ENGINEERS | PLANNERS | ECONOMISTS

1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
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FAX: 808-946-2253
www.wilsonokamoto.com

8301-01
July 27, 2012

Mr. David K. Tanoue, Director
City and County of Honolulu
Department of Planning and Permitting
650 S. King St., 3rd Floor
Honolulu, HI 96813

Attention: Mr. Hal Senter

Subject: Environmental Assessment (EA) Pre-Assessment Consultation
University of Hawaii Pacific Health Research Lab
Portion of Tax Map Key: 1-9-1-13:045
Kalaeloa, Oahu, Hawaii

Dear Mr. Tanoue:

Thank you for your letter dated May 7, 2012 regarding the subject Draft EA pre-assessment consultation. We acknowledge your comments and will address each of them in the forthcoming Draft EA.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Thank you for your consideration in this matter.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Keith Mattson, Project Manager, University of Hawaii
Dr. Valerie Nottingham, Chief, Environmental Quality Branch, Division of Environmental Protection, Office of Research Facilities, National Institutes of Health

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 3RD FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8305 • Fax: (808) 768-4730 • Internet: www.honolulu.gov

PETER B. CARLISLE
MAYOR

WAYNE Y. YOSHIOKA
DIRECTOR

KAI NANI KRAUT, P.E.
DEPUTY DIRECTOR

EM

TP4/12-460633R

May 8, 2012

RECEIVED
MAY 10 2012
WILSON OKAMOTO CORPORATION

Mr. Earl Matsukawa, Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Matsukawa:

Subject: Pre-Consultation for Environmental Assessment Draft (DEA)
University of Hawaii Pacific Health Research Lab; Kalaeloa,
Oahu, Hawaii; Portion of Tax Map Key (TMK): 1-9-1-13: 045

This responds to your letter of March 30, 2012, requesting our comments concerning this proposed project.

Our Traffic Engineering Division (TED) has the following comments.

- The DEA should include a traffic impact assessment report (TIAR) that should discuss traffic impacts on the surrounding City roadways, as a result of the project, including short-term impacts during construction and proposed mitigating measures.

- The area Neighborhood Board, as well as the area residents, businesses, etc., should be kept apprised of the details of the proposed project and the impacts, particularly during construction, the project may have on the adjoining local street area network.

We reserve further comment pending submission of the DEA and TIAR.

Thank you for the opportunity to review this matter. Should you have any further questions, please contact Michael Murphy of my staff at 768-8359.

Very truly yours,

for WAYNE Y. YOSHIOKA
Director

WILSON OKAMOTO
CORPORATION
ENGINEERS • PLANNERS • ENVIRONMENTALISTS

1907 South Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii, 96826 USA
Phone: 808-946-2277
FAX: 808-946-2253
www.wilsonokamoto.com

8301-01
July 27, 2012

Mr. Wayne Y. Yoshioka, Director
City and County of Honolulu
Department of Transportation Services
650 S. King St., 3rd Floor
Honolulu, HI 96813

Subject: Environmental Assessment (EA) Pre-Assessment Consultation
University of Hawaii Pacific Health Research Lab
Portion of Tax Map Key: 1-9-1-13:045
Kalaeloa, Oahu, Hawaii

Dear Mr. Yoshioka:

Thank you for your letter dated May 7, 2012 regarding the subject Draft EA pre-assessment consultation. The forthcoming Draft EA will include a Traffic Impact Assessment Report discussing traffic impacts resulting from the construction and operation of the University of Hawaii Pacific Health Research Laboratory (UH PHR Lab).

The University of Hawaii has presented the projected to Neighborhood Board # 34 (Makakilo/Kapolei/Honokai Hale), and has approached area residents and businesses.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Thank you for your consideration in this matter.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Keith Mattson, Project Manager, University of Hawaii
Dr. Valerie Nottingham, Chief, Environmental Quality Branch, Division of Environmental Protection, Office of Research Facilities, National Institutes of Health

HONOLULU FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU
636 South Street
Honolulu, Hawaii 96813-5007
Phone: 808-723-7139 Fax: 808-723-7111 Internet: www.honolulu.gov/hfd

PETER B. CARLISLE
MAYOR

KENNETH G. SILVA
FIRE CHIEF

EMMIT A. KANE
DEPUTY FIRE CHIEF

EM

April 20, 2012

RECEIVED
APR 27 2012
WILSON OKAMOTO CORPORATION

Mr. Earl Matsukawa, AICP
Project Manager
Wilson Okamoto Corporation
Suite 400, Artesian Plaza
1907 South Beretania Street
Honolulu, Hawaii 96826

Subject: Environmental Assessment Preassessment Consultation
University of Hawaii Pacific Health Research Lab
Tax Map Key: Portion of 9-1-013: 045

In response to your letter of March 30, 2012, regarding the above-mentioned subject, the Honolulu Fire Department (HFD) reviewed the material provided and requires that the following be complied with:

1. Fire department access roads shall be provided such that any portion of the facility or any portion of an exterior wall of the first story of the building is located not more than 150 feet (46 m) from fire department access roads as measured by an approved route around the exterior of the building or facility. (National Fire Protection Association [NFPA] 1; Uniform Fire Code [UFC]™, 2006 Edition, Section 18.2.3.2.2.)

   A fire department access road shall extend to within 50 ft (15 m) of at least one exterior door that can be opened from the outside and that provides access to the interior of the building. (NFPA 1; UFC™, 2006 Edition, Section 18.2.3.2.1.)

2. A water supply approved by the county, capable of supplying the required fire flow for fire protection, shall be provided to all premises upon which facilities or buildings, or portions thereof, are hereafter constructed, or moved into or within the county. When any portion of the facility or building is in excess of 150 feet (45 720 mm) from a water supply on a fire apparatus access road, as measured by an approved route around the exterior of the facility or building, on-site fire hydrants and mains capable of supplying the required fire flow shall be provided when required by the AHJ [Authority Having Jurisdiction]. (NFPA 1; UFC™, 2006 Edition, Section 18.3.1, as amended.)

3. Submit civil drawings to the HFD for review and approval.

Should you have questions, please contact Battalion Chief Socrates Bratakos of our Fire Prevention Bureau at 723-7151 or sbratakos@honolulu.gov.

Sincerely,

for KENNETH G. SILVA
Fire Chief

KGS/SY:bh

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8301-01
July 27, 2012

Kenneth G. Silva, Fire Chief
City and County of Honolulu
Honolulu Fire Department
636 South Street
Honolulu, HI 96813-5007

Attention: Battalion Chief Socrates Bratakos

Subject: Environmental Assessment (EA) Pre-Assessment Consultation
University of Hawaii Pacific Health Research Lab
Portion of Tax Map Key: 1-9-1-13:045
Kalaeloa, Oahu, Hawaii

Dear Chief Silva:

Thank you for your letter dated April 20, 2012 regarding the subject Draft EA pre-assessment consultation. Under context of the forthcoming Draft EA, the following responses are offered in the order of your comments:

- The proposed Project will fully comply with the NFPA (1) Uniform Fire Code regarding Fire Department access roads and water supply for fire protection, as referenced in your letter.

- Civil drawings will be submitted to the Honolulu Fire Department for review and approval.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Thank you for your consideration in this matter.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Keith Mattson, Project Manager, University of Hawaii
Dr. Valerie Nottingham, Chief, Environmental Quality Branch, Division of Environmental Protection, Office of Research Facilities, National Institutes of Health

POLICE DEPARTMENT

CITY AND COUNTY OF HONOLULU

801 SOUTH BERETANIA STREET · HONOLULU, HAWAII 96813
TELEPHONE: (808) 529-3111 · INTERNET: www.honolulupd.org

PETER B. CARLISLE
MAYOR

LOUIS M. KEALOHA
CHIEF

DAVE M. KAJIHIRO
MARIE A. McCAULEY
DEPUTY CHIEFS

OUR REFERENCE BH-LS

EM

April 12, 2012

Mr. Earl Matsukawa, AICP
Project Manager
Wilson Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Matsukawa:

This is in response your letter dated March 30, 2012, requesting comments on the Pre-Assessment Consultation, Environmental Assessment, for the University of Hawaii Pacific Health Research Lab project.

This project should have no significant impact on the facilities or operations of the Honolulu Police Department.

If there are any questions, please call Major Raymond Ancheta of District 8 (Kapolei) at 723-8400.

Sincerely,

LOUIS M. KEALOHA
Chief of Police

By
BART S. HUBER
Assistant Chief
Support Services Bureau

Serving and Protecting With Aloha

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8301-01
July 27, 2012

Chief Louis M. Kealoha, Police Chief
City and County of Honolulu
Honolulu Police Department
801 S. Beretania Street

Honolulu, HI 96813

Subject: Environmental Assessment (EA) Pre-Assessment Consultation
University of Hawaii Pacific Health Research Lab
Portion of Tax Map Key: 1-9-1-13:045
Kalaeloa, Oahu, Hawaii

Dear Chief Kealoha:

Thank you for your letter dated April 12, 2012. We acknowledge you determinate that the proposed project should have no significant impact on the facilities or operations of the Honolulu Police Department.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Thank you for your consideration in this matter.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Keith Mattson, Project Manager, University of Hawaii
Dr. Valerie Nottingham, Chief, Environmental Quality Branch, Division of Environmental Protection, Office of Research Facilities, National Institutes of Health

CITY COUNCIL

CITY AND COUNTY OF HONOLULU
530 SOUTH KING STREET, ROOM 202
HONOLULU, HAWAII 96813-3065
TELEPHONE: (808) 768-5010 • FAX: (808) 768-5011

TOM BERG
COUNCILMEMBER
HONOLULU CITY COUNCIL • DISTRICT I
PH: (808) 768-5001
FAX: (808) 768-5011
EMAIL: tberg@honolulu.gov

April 10, 2012

Earl Matsukawa
William Okamoto Corporation
1907 South Beretania Street, Suite 400
Honolulu, HI 96826

Dear Mr. Matsukawa,

Thank you for your letter dated March 30, 2012 on behalf of the University Of Hawaii regarding the proposed Hawaii Pacific Health Research Lab at Kalaeloa, Oahu and the work William Okamoto Corporation will be doing in preparation of a Draft EA required under the requirements prescribed Chapter 343 in HRS and HARs Chapter 200, Title 11, of the State of Hawaii Department of Health.

I have been advised that the Makakilo, Kapolei, Honokai Hale Neighborhood Board #34 has contacted you of their inability to meet with your staff any earlier than May 2012. Therefore, inasmuch as I have not had any input from the community whether for or against this project, I would like to reserve any comment until the Neighborhood Board has conducted their Planning and Zoning Committee meeting and reached an opinion regarding the proposed Draft EA. It will be their decisive conclusion and vote that will be adapted by this office. Until that is completed, though, I will be regretfully against the project's location in the Kalaeloa area.

With that being said, I respectfully ask that the deadline of May 30, 2012 for comments from me, be extended to which time the Neighborhood Board and the collective community has had time to express their support or not of the proposed University of Hawaii Pacific Health Research Lab.

You are always welcome to call my office at 768-5001 at any time should you want to speak with me for further discussion.

Aloha,

Tom Berg

TOM BERG
Councilmember – District 1
Ewa Beach, Kapolei, Waianae Coast

Clarify: extended to, or does he ~~[illegible]~~ have the impression that MAY 30 is the submitted date?

TB:es

WILSON OKAMOTO CORPORATION
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8301-01
July 27, 2012

Mr. Tom Berg, Councilmember
City and County of Honolulu
Honolulu City Council District I
530 S. King St., Room 202
Honolulu, HI 96813-3065

Subject: Environmental Assessment (EA) Pre-Assessment Consultation
University of Hawaii Pacific Health Research Lab
Portion of Tax Map Key: 1-9-1-13:045
Kalaeloa, Oahu, Hawaii

Dear Councilmember Berg:

Thank you for your letter dated April 10, 2012 regarding the subject Draft EA pre-assessment consultation. We acknowledge your comments. Your concerns will be addressed in the forthcoming Draft EA.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Thank you for your consideration in this matter.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Keith Mattson, Project Manager, University of Hawaii
Dr. Valerie Nottingham, Chief, Environmental Quality Branch, Division of Environmental Protection, Office of Research Facilities, National Institutes of Health

Hawaiian Telcom

April 21, 2012

EM

RECEIVED
APR 24 2012
WILSON OKAMOTO CORPORATION

Wilson Okamoto Corporation
1907 S. Beretania Street
Artesian Plaza, Suite 400
Honolulu, Hawaii 96826
Attention: Mr. Earl Matsukawa, Project Manager

Dear Mr. Matsukawa:

Subject: **Environmental Assessment (EA) Pre-Assessment Consultation**
University of Hawaii Pacific Health Research Lab
Portion of Tax Map Key: 1-9-1-13:045
Kalaeloa, Oahu, Hawaii

Thank you for the opportunity to review and comment on the environmental assessment pre-assessment consultation phase for the subject project.

In response to your letters dated March 30, 2012 that were addressed to Gerald Noda and Winslow I. Tanabe, Hawaiian Telcom does not have any comments to offer at this time.

Please submit future correspondence to:

Jon Uychara
Senior Manager – OSP Engineering
Network Engineering & Planning
P.O. Box 2200
Mail Code: HIA10
Honolulu, HI 96841

If you have any questions or require assistance in the future on this project, please call me at 546-7761.

Sincerely,

Les Loo
Network Engineer – OSP Engineering
Network Engineering & Planning

cc: File [Barbers Point]

WILSON OKAMOTO CORPORATION
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8301-01
July 27, 2012

Mr. Les Loo, Network Engineer
Hawaiian Telcom
P.O. Box 2200
Honolulu, HI 97841

Subject: Environmental Assessment (EA) Pre-Assessment Consultation
University of Hawaii Pacific Health Research Lab
Portion of Tax Map Key: 1-9-1-13:045
Kalaeloa, Oahu, Hawaii

Dear Mr. Loo:

Thank you for your letter dated April 21, 2012. We acknowledge that Hawaiian Telcom has no comments to offer at this time. We will also revise our correspondence list as advised.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Thank you for your consideration in this matter.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Keith Mattson, Project Manager, University of Hawaii
Dr. Valerie Nottingham, Chief, Environmental Quality Branch, Division of Environmental Protection, Office of Research Facilities, National Institutes of Health

EM

Hawaiian Electric Company
Engineering Department
PO Box 2750 • Honolulu, HI 96840

April 30, 2012

RECEIVED
MAY 01 2012
WILSON OKAMOTO CORPORATION

Mr. Earl Matsukawa
Project Manager
Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
Honolulu, HI 96826

Dear Mr. Matsukawa:

Subject: **Environmental Assessment Pre-Assessment Consultation**
University of Hawaii Pacific Health Research Lab
TMK 1-9-1-13:045
Kalaeloa, Oahu, Hawaii

Thank you for the opportunity to comment on the proposed project. Hawaiian Electric Company, Inc. (HECO) has no objections or comments at this time to the proposed project. Should HECO have existing easements and facilities on the subject property, we will need continued access for maintenance of our facilities.

We appreciate your efforts to keep us apprised of the subject project in the planning process. As the UH Pacific Health Research Lab project comes to fruition, please continue to keep us informed. Further along in the design, we will be better able to evaluate the effects on our system facilities.

If you have any questions, please call me at 543-7245.

Sincerely,

Rouen Q. W. Liu
Permits Engineer

WILSON OKAMOTO CORPORATION
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8301-01
July 27, 2012

Rouen Q.W. Liu, Permits Engineer
Hawaiian Electric Company
Engineering Department
P.O. Box 2750
Honolulu, HI 96840

Subject: Environmental Assessment (EA) Pre-Assessment Consultation
University of Hawaii Pacific Health Research Lab
Portion of Tax Map Key: 1-9-1-13:045
Kalaeloa, Oahu, Hawaii

Rouen

Dear ~~Mr. Liu~~:

Thank you for your letter dated April 30, 2012 regarding the subject Draft EA pre-assessment consultation. We acknowledge that you have no objections or comments at this time. Continued access to any of your existing easements and facilities on the project site, will be ensured.

Your letter, along with this response, will be reproduced and included in the forthcoming Draft EA. We appreciate your participation in the pre-assessment consultation review process.

Thank you for your consideration in this matter.

Sincerely,

Earl Matsukawa, AICP
Project Manager

cc: Mr. Keith Mattson, Project Manager, University of Hawaii
Dr. Valerie Nottingham, Chief, Environmental Quality Branch, Division of Environmental Protection, Office of Research Facilities, National Institutes of Health

WILSON OKAMOTO
C O R P O R A T I O N

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