# Hawai‘i Pacific University Hawai‘i Loa Campus Expansion

Kāne‘ohe, O‘ahu, Hawai‘i

## Draft Environmental Assessment

**Applicant:**
Hawai‘i Pacific University
1166 Fort Street Mall, Suite 200
Honolulu, Hawai‘i 96813

**Agent:**
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawai‘i 96813

**July 2010**

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**TMK (1) 4-5-035:10**
**Kāne‘ohe O‘ahu, Hawai‘i**

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This environmental document is prepared in accordance with the requirements of Chapter 343, HRS and Hawai‘i Administrative Rules, Title 11, Department of Health.


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# 1.0 INTRODUCTION

# 1.0 INTRODUCTION

This Draft Environmental Assessment (DEA) has been prepared in accordance with the requirements of Chapter 343, HRS and Hawaiʻi Administrative Rules, Title 11, Department of Health, which set forth the requirements for the preparation of environmental assessments.

## 1.1 PROJECT INFORMATION SUMMARY

| | |
|---|---|
| **Type of Document:** | Environmental Assessment (EA) |
| **Project Name:** | Hawaiʻi Pacific University Hawaiʻi Loa Campus Expansion |
| **Applicant:** | Hawaiʻi Pacific University |
| **Accepting Authority:** | State of Hawaiʻi Department of Land and Natural Resources<br>Office of Conservation and Coastal Land<br>Kalanimoku Building<br>1151 Punchbowl Street<br>Honolulu, HI 96813 |
| **CH. 343, HRS Trigger:** | Use of Lands in Conservation District Under the State Land Use Commission |
| **Project Location:** | 45-045 Kamehameha Highway<br>Kāneʻohe Oʻahu, Hawaiʻi 96744 *(Figure 1-1)* |
| **Tax Map Key:** | (1) 4-5-035:10 |
| **Fee Landowner:** | Hawaiʻi Pacific University<br>1166 Bishop Street, Suite 200<br>Honolulu, HI 96813 |
| **Project Area:** | 132.46 Acres |
| **State Land Use District:** | Conservation District *(Figure 1-3)* |
| **Conservation District Subzone:** | Special Subzone (Educational Use) *(Figure 1-3)* |
| **City & County of Honolulu Zoning:** | P-1 Preservation (Restricted) *(Figure 1-4)* |
| **City & County of Honolulu Development Plan:** | Koʻolaupoko: Open Space/Preservation Areas |
| **Special Design District:** | none |

| | |
|---|---|
| **Special Management Area:** | Outside SMA *(Figure 1-5)* |
| **Flood Zone:** | Zone D (An area of undetermined but possible flood hazards) *(Figure 1-6)* |
| **Anticipated Determination:** | Finding of No Significant Impact (FONSI) |

## 1.2 PROJECT SITE

The project site is located on Hawaiʻi Pacific University's (HPU) Hawaiʻi Loa Campus (HLC) on the windward side of the island of Oāhu, in Kāneʻohe, about eight miles northeast of the urban center of Honolulu *(Figure 1-1)*. Considered to be the flagship of HPU's campuses, it has been part of HPU since the merger of Hawaiʻi Loa College with HPU in 1992. The campus currently has only one ingress and egress point from Kamehameha Highway, directly across the Pali Municipal Golf Course entrance with Pali Highway.

The HPU campus is relatively dispersed over its approximately 132 acres, but a large cluster of buildings is concentrated in the lower central part of the site, closer to Kamehameha Highway. The HPU expansion will include construction of new buildings and relocation of the existing soccer field adjacent to the existing tennis courts to accommodate more parking in closer proximity to a new academic center, multi-purpose gym, and performing arts center.

## 1.3 OVERVIEW OF THE PLANNED PROJECT

Strategic planning for the Hawaiʻi Loa Campus expansion, which is anticipated to be implemented over five years, began in 2007 when an executive level committee assessed requirements needed to accommodate the current and anticipated enrollment growth of both the Nursing and Science programs. The Hawaiʻi Pacific University, Hawaiʻi Loa Campus expansion will enhance the quality of HPU's education and scholarship and will create a vibrant campus community with a residential life component that supports excellence in teaching and learning. The two main thrusts driving HPU's campus expansion are to: 1) add 400 additional on-campus housing units and 2) accommodate the growth of the two academic programs based at the Hawaiʻi Loa Campus, nursing and natural sciences.

The existing campus is beautiful with breathtaking views of the *Koʻolau* Mountains and a well-maintained landscape on a large site that can accommodate future development. Existing buildings and facilities on the campus include:

- An Academic Center, or the "Amos Starr and Juliette Montague Cooke Memorial Academic Center," built in 1969
- A Dining Commons, built in 1970
- Six Residential Halls, built in 1970
- Two Modular Buildings
- A Maintenance Building
- Parking, for approximately 470 spaces

The project proposes to add additional parking and on-campus housing, to construct a new performing arts center, multi-purpose gymnasium, a new academic building, and a student center. Expected enrollment will be over 2,800 students by the Fall of 2012, with 948 undergraduate and graduate students in the Natural Science program and 1,900 students in the School of Nursing.

The Hawaiʻi Pacific University Hawaiʻi Loa Campus will be a sustainability model for higher education facilities and be HPU's marker in environmental stewardship. The project will

incorporate design strategies to limit the project's environmental footprint and will be designed with a fully integrated approach to meet the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) certification criteria.

## 1.4 PURPOSE OF THE ENVIRONMENTAL ASSESSMENT

In accordance with the requirements of Chapter 343, Hawai'i Revised Statutes, this Draft EA is being prepared as the proposed project utilizes lands designated Conservation District under the State Land Use Commission. The Draft EA will be published in the Office of Environmental Quality Control (OEQC) Environmental Notice, which will commence a 30-day public review period.

This Draft EA is presented in eight sections and includes the following: a detailed summary and project description; a list of necessary approvals; a description of the environmental setting; a section that identifies potential impacts and proposed mitigative measures on identified natural, cultural, and socioeconomic resources as well as existing infrastructure; a description and analysis of alternatives; a discussion of the project's relationship to State and County land use designations and regulations; the anticipated determination and reasons for its believed outcome; an updated list of agencies, organizations, and individuals that participated in the pre-consultation phase of the Draft EA; and a list of references cited or used in developing the Draft EA.

After the 30-day review period of the Draft EA has concluded, public comments received will be considered and addressed to the extent feasible within the project scope and evaluation. A Final EA will then be prepared, highlighting key areas of the document that were revised, updated, or modified based upon information received during the public comment period.

Upon acceptance of the Final EA, a Finding of No Significant Impact (FONSI) is anticipated.

## 1.5 PERMITS AND APPROVALS REQUIRED

In addition to the acceptance of the Final EA/FONSI by the Department of Land and Natural Resources (DLNR), a Conservation District Use Permit (CDUP) will be needed from the Board of Land and Natural Resources (BLNR).

### 1.5.1 Other Permits Required for Construction

Several other approvals will be required from the County and State to implement the proposed action, some of which will include:

- Building Permits (Buildings, Electrical, Plumbing), and Sidewalk/Driveway Work (DPP)
- Grading, Grubbing, Trenching and Stockpiling Permits (DLNR/DPP)
- Sewer Connection Permits (DPP)
- National Pollutant Discharge Elimination System (NPDES) Permit – Construction Storm Water (State Department of Health)
- Sign Permits (DLNR)

## 1.6 AGENCIES, ORGANIZATIONS, AND INDIVIDUALS CONTACTED DURING THE PRE-CONSULTATION PROCESS

A Pre-Consultation Memo and Participant Letter were sent in November 2009 to initiate the environmental review process. These are included as *Appendix A.*

A list of agencies and other parties that were presented notice of the proposed project or were contacted during the pre-consultation period of the Draft EA is provided in *Section 8.0* of this document. Additionally, a listing of those agencies that will be provided an opportunity to review the Draft EA is also provided in *Section 8.0*.

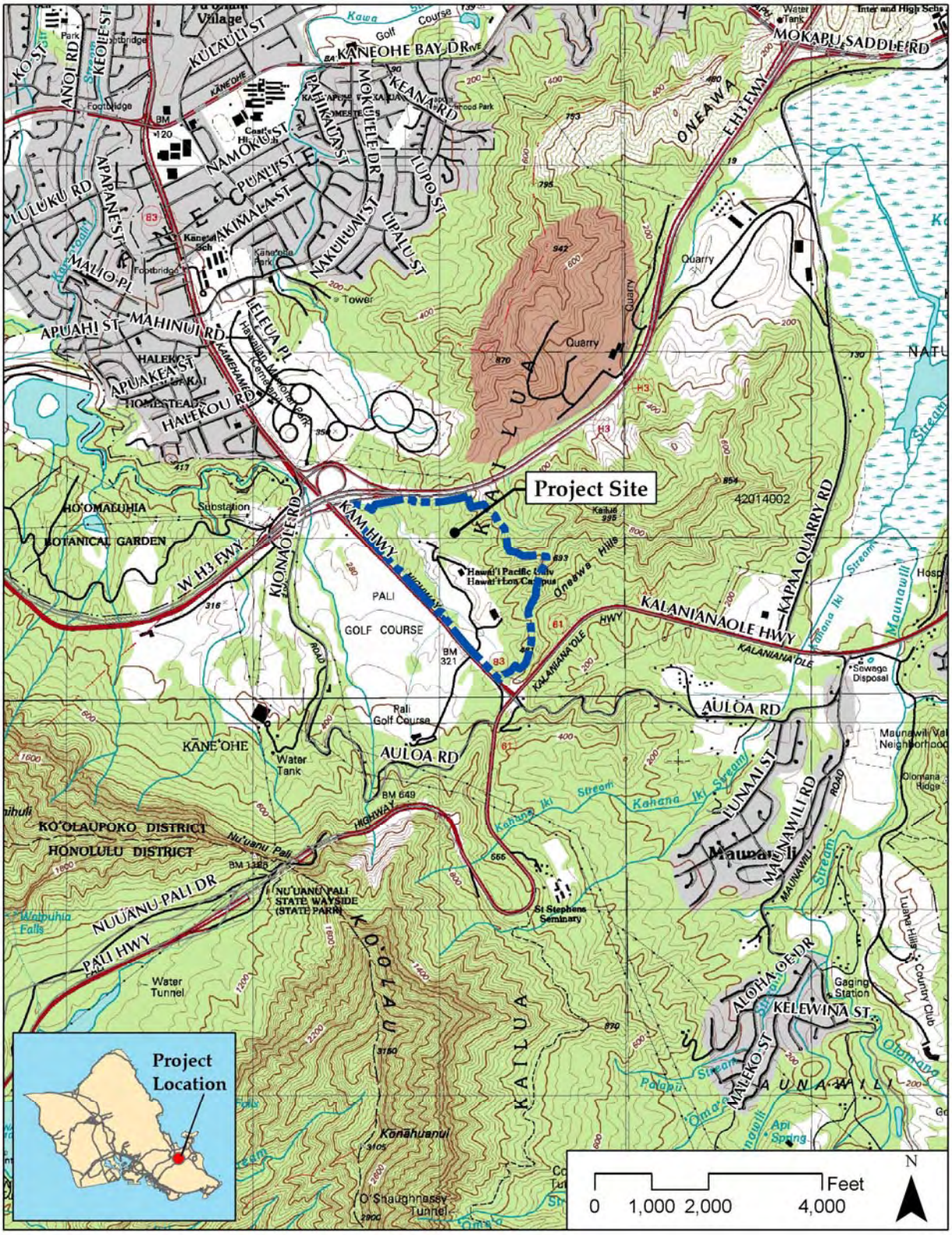


**Figure 1-1 Project Location**

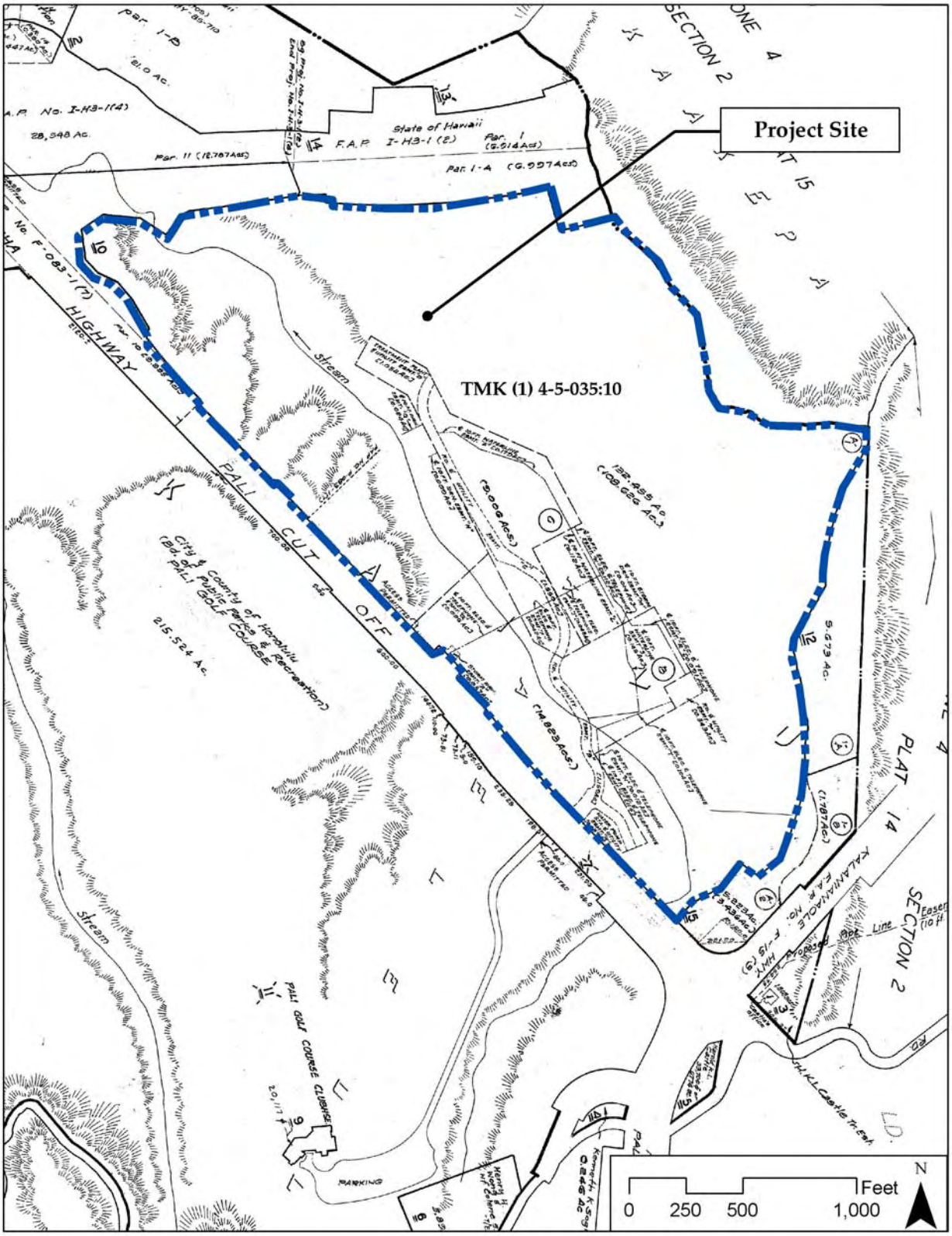


**Figure 1-2 Tax Map Key**

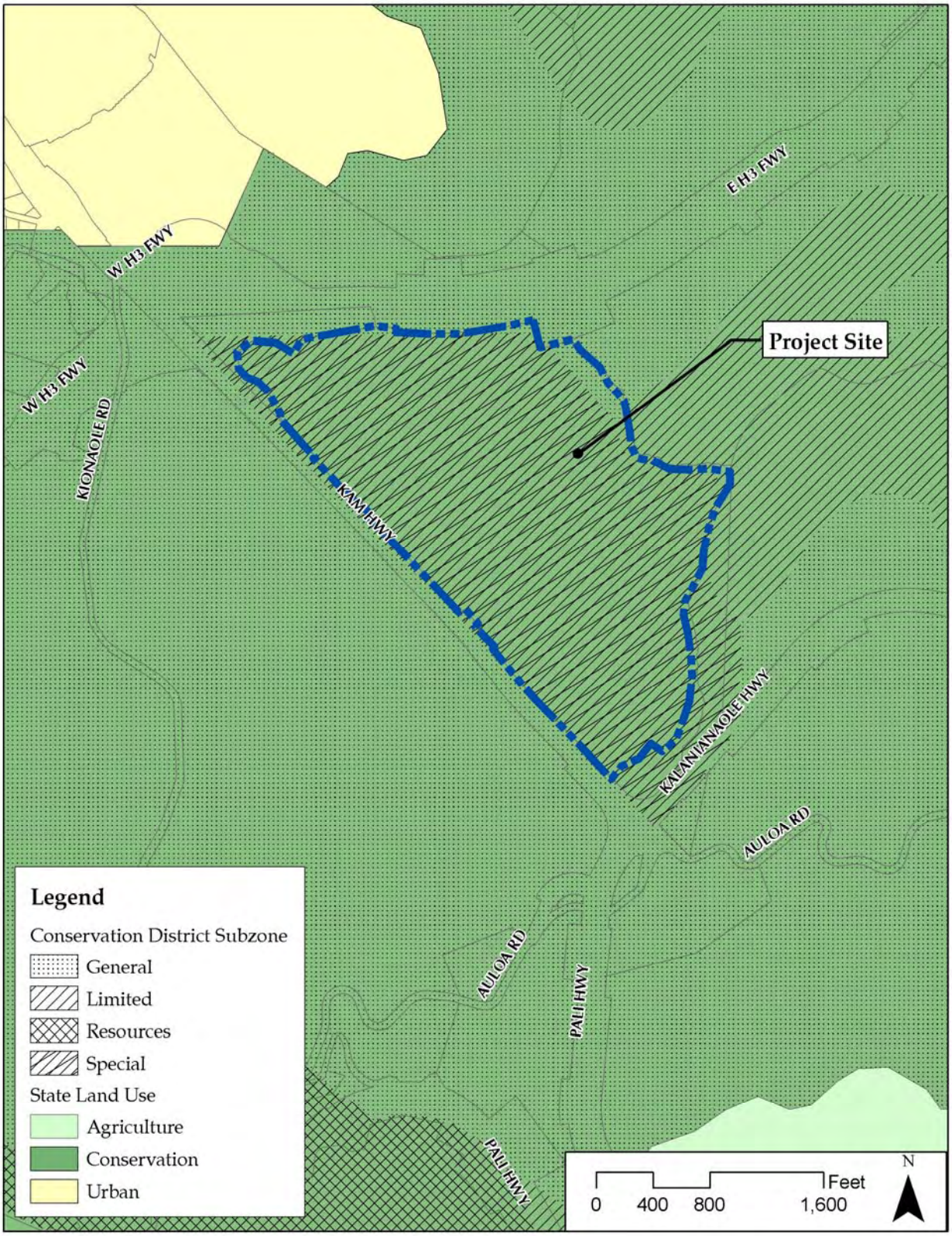


**Figure 1-3 State Land Use Designation Map**

**Figure 1-4 City and County of Honolulu Zoning Map**

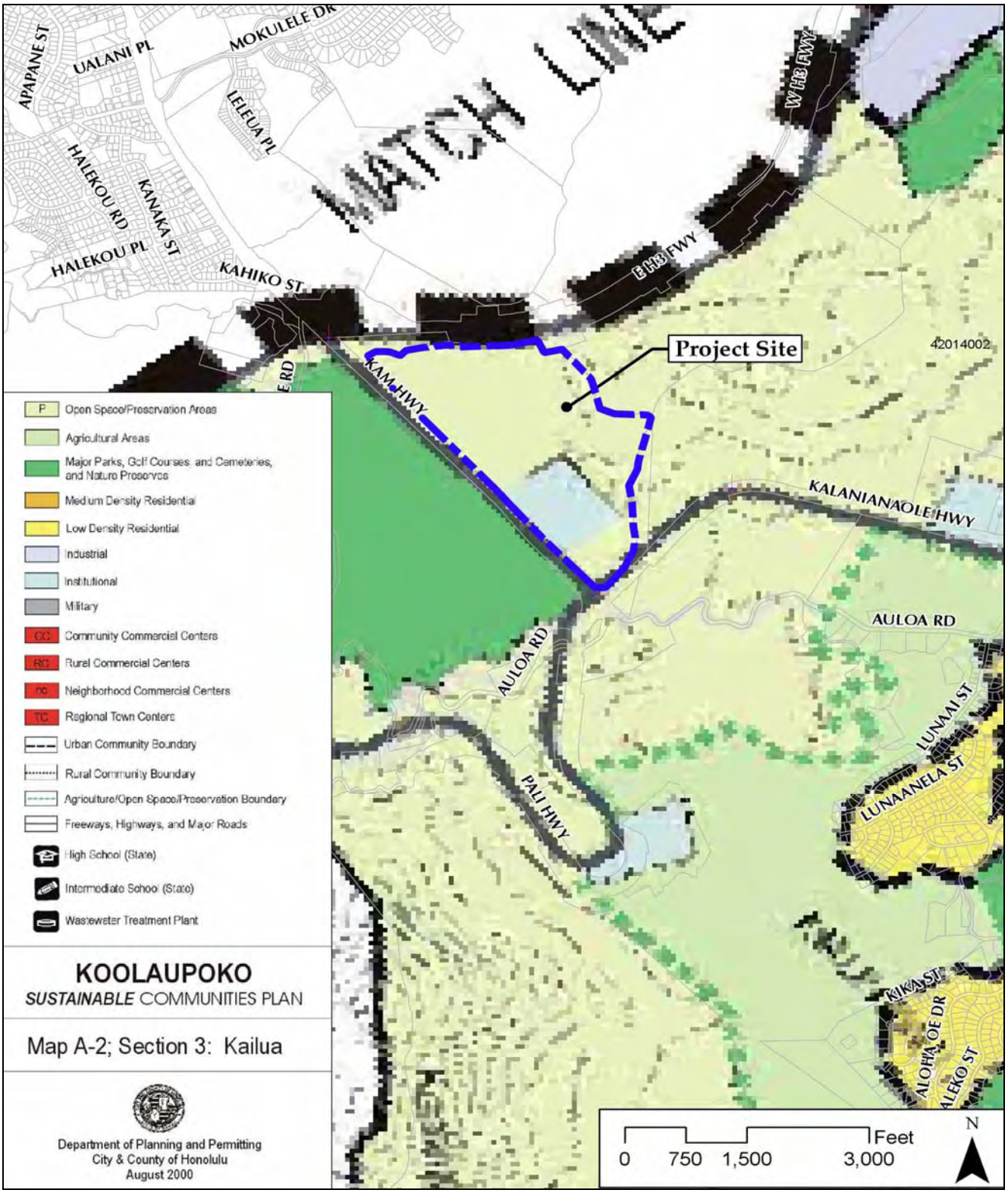


**Figure 1-5 City and County of Honolulu Koolaupoko Sustainable Communities Plan**

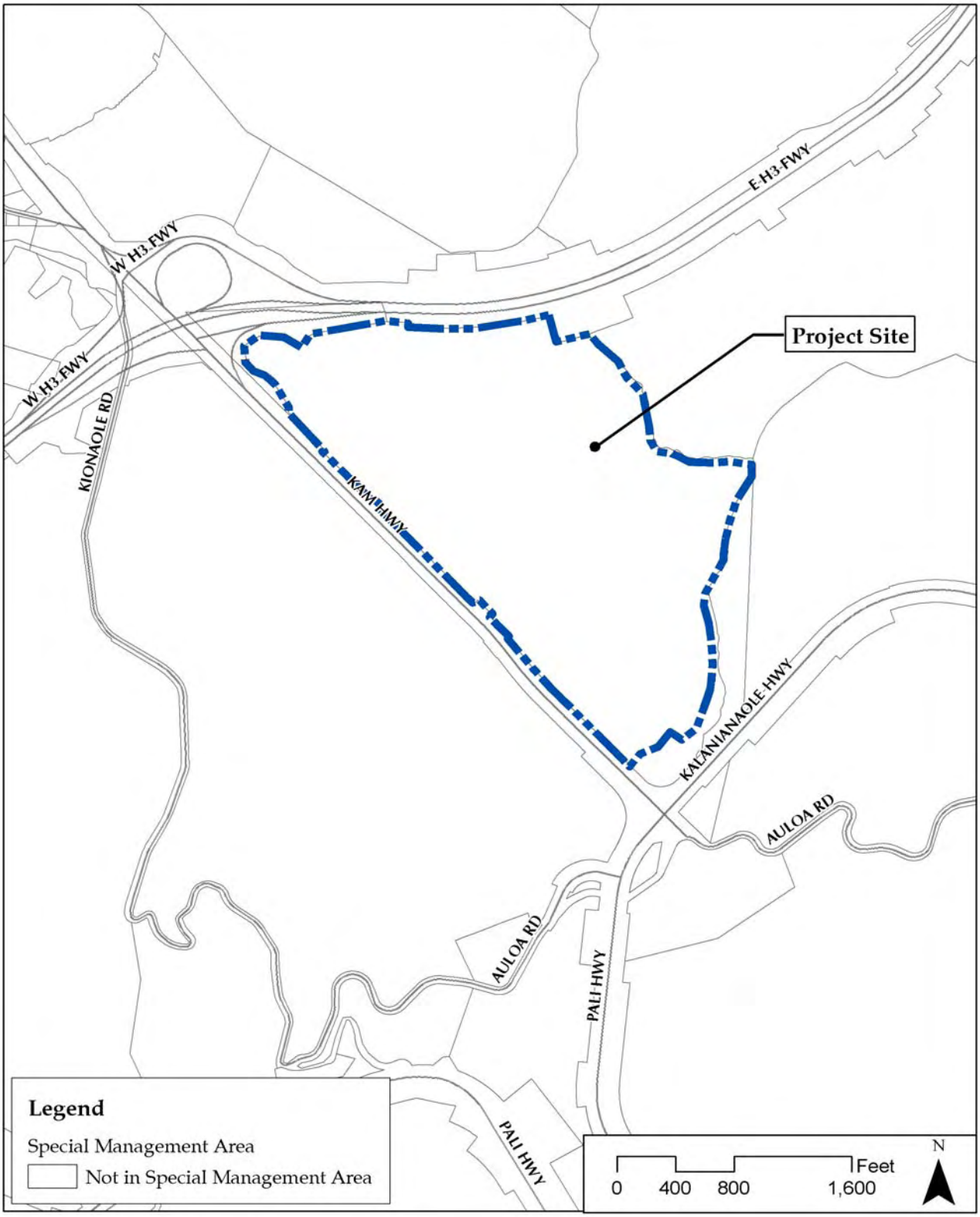


**Figure 1-6 City and County of Honolulu Special Management Area Map**

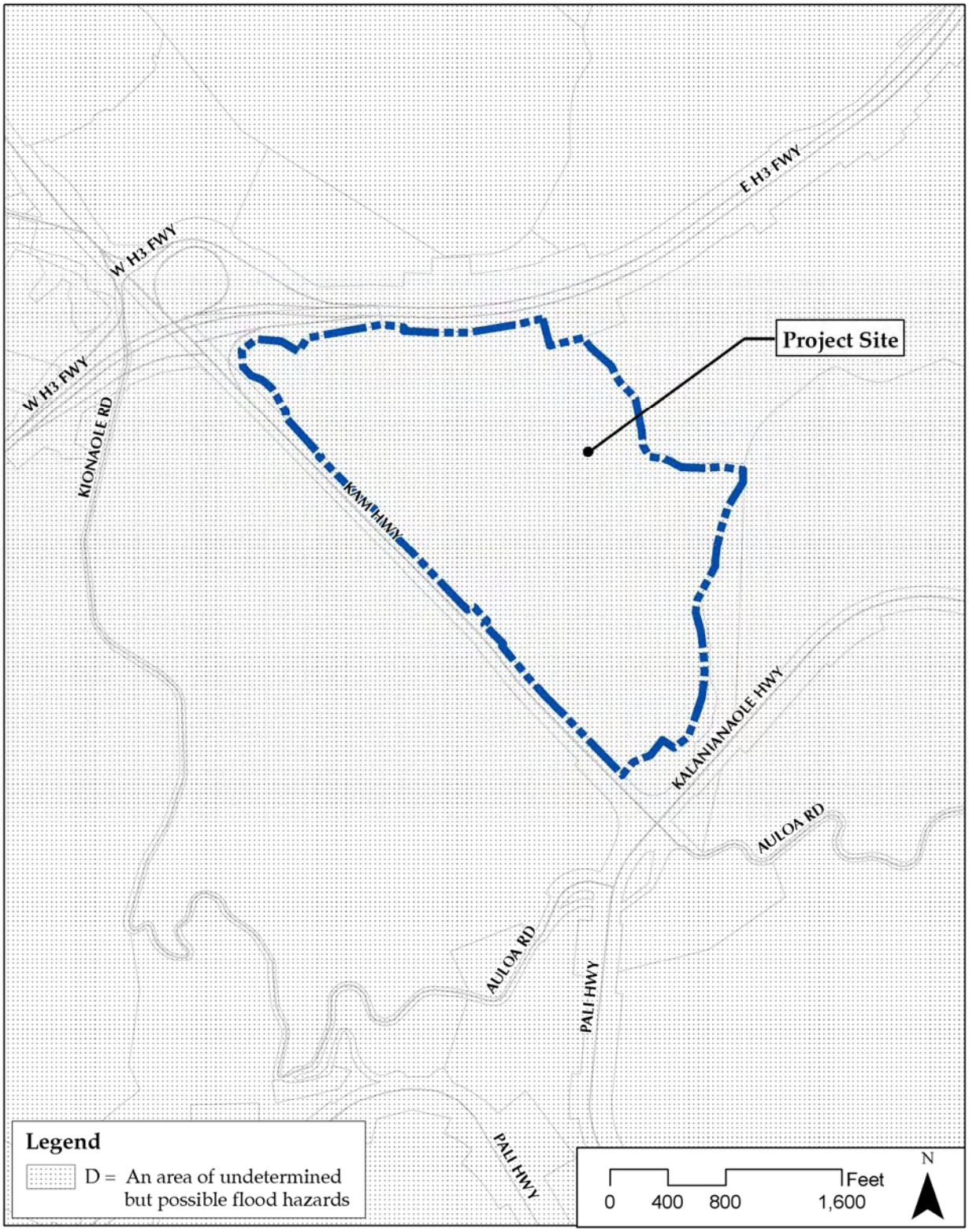


**Figure 1-7 Flood Insurance Rate Map**

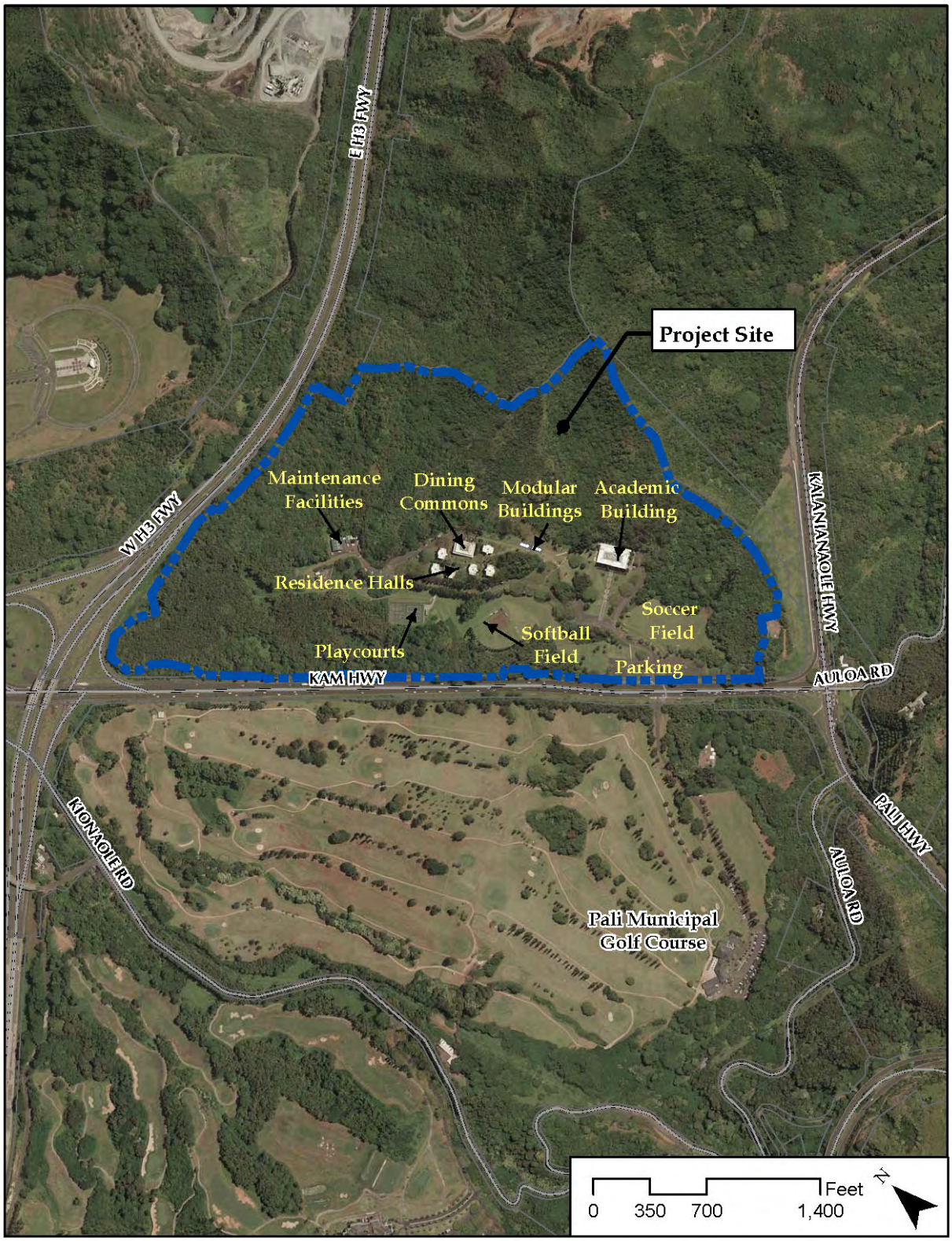


**Figure 1-8 Existing Site Conditions**

# 2.0 DESCRIPTION OF THE PROPOSED ACTION

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**BACKGROUND**

Strategic planning for the proposed expansion began in 1964 when William L. Pereira & Associates designed a campus Master Plan. The Plan never materialized, but many of the concepts have been retained in this proposal, including: a major pedestrian mall laterally connecting buildings with the Academic Center as its center, a performing arts complex and expanded on-campus housing to accommodate a projected increase in student enrollment.

In 2008, about 20 HPU administrators, faculty members, students, alumni and board members engaged in a facilitated Master Plan Charrette. The Charrette was a focused envisioning process designed to produce foundational concepts to guide the planning process to ensure that the campus will retain its relevance for decades.

Five major themes resulted from the Charrette: 1) HPU will be an international learning community; 2) HPU will be student centered; 3) The campus will be an aggregate of gathering places which reflect the aesthetic and multi-cultural qualities of Hawaiʻi; 4) The campus will be a community that embodies a sense of home; and 5) The campus will be based on environmentally sustainable principles and employ sustainable design strategies in its planning and design.

The major themes resulted in a conceptual Master Plan, whose proposed implementation is the focus of this assessment.

## 2.1 PROJECT LOCATION AND CHARACTERISTICS

***Location***

The Hawaiʻi Pacific University Hawaiʻi Loa Campus is located in the ahupuaʻa of Kāneʻohe (*Figure 2-1*). The project site is contained within 132.455-acres (TMK 4-5-035:10). The City and County of Honolulu's Pali Golf Course is located across Kamehameha Highway from the site. The campus is located on the beautiful "Windward" side of the island, set in a lush, well-manicured landscape with stunning panoramic views of the Koʻolau Mountains. While the site is large and able to accommodate future development, it contains dramatic terrain and steep slopes that would make development challenging and costly.

***Ownership***

The project site is owned by Hawaiʻi Pacific University.

***Adjacent Land Uses***

The project site is situated primarily in a State Conservation District and bounded by Pali Highway and more conservation lands to the east, the H-3 to the north and beyond that the Hawaiʻi Memorial Park, and Kamehameha Highway to the west and beyond that the Pali Municipal Golf Course.

**Figure 2-1 Ahupua'a Boundary Map**

***Existing On-Site Land Uses***

Currently, the entire site is utilized by the Hawai'i Pacific University's Hawai'i Loa Campus. The approximately 132-acre site contains 11 buildings which were constructed since 1969. The various facilities include an Academic Center, dining commons, six residence halls, two modular buildings that contain faculty and administrative offices, a maintenance building and parking areas for approximately 500 vehicles located down-slope from the buildings (*Figure 2-2*). The site is also landscaped with a multitude of shrubs and mature trees.

The campus currently has only one ingress and egress point to/from Kamehameha Highway directly across from the Pali Municipal Golf Course, which is difficult to negotiate and will probably not be sufficient with the increases anticipated in the Plan. Therefore, the proposed project would likely include a signalized intersection at this existing entry. Furthermore, an alternate egress/ingress point is envisioned in the future towards the west end of the project site. Additional parking will be accommodated through the planned relocation of the existing soccer field and construction of a landscaped parking area.

## 2.2 PURPOSE OF THE PROPOSED PROJECT

The goal of the proposed Hawai'i Pacific University's Hawai'i Loa Campus expansion is to enhance the quality of HPU's education and scholarship and create a vibrant campus community with a residential life that supports excellence in teaching and learning. Studies have demonstrated, and parents have echoed, that freshman retention is highly dependent on offering students an engaging live-learn college experience. Therefore, the two main thrusts driving this project are to: 1) add 400 additional on-campus housing designed to help recruit and retain students; and 2) expand academic spaces to accommodate the growth of the Nursing and Natural Sciences programs based at the Hawai'i Loa Campus,. A new performing arts center, multi-purpose gym, and Academic Center also help HPU attain its goal of recruiting and retention of students. Planning for the project will allow maximum flexibility for the University to implement the project in phases as determined by existing internal and external factors.

The Hawai'i Pacific University Hawai'i Loa Campus will be a sustainability model for higher education facilities and be HPU's marker in environmental stewardship. The project will incorporate design strategies to limit the project's environmental footprint and will be designed with a fully integrated approach to meet the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) certification criteria.

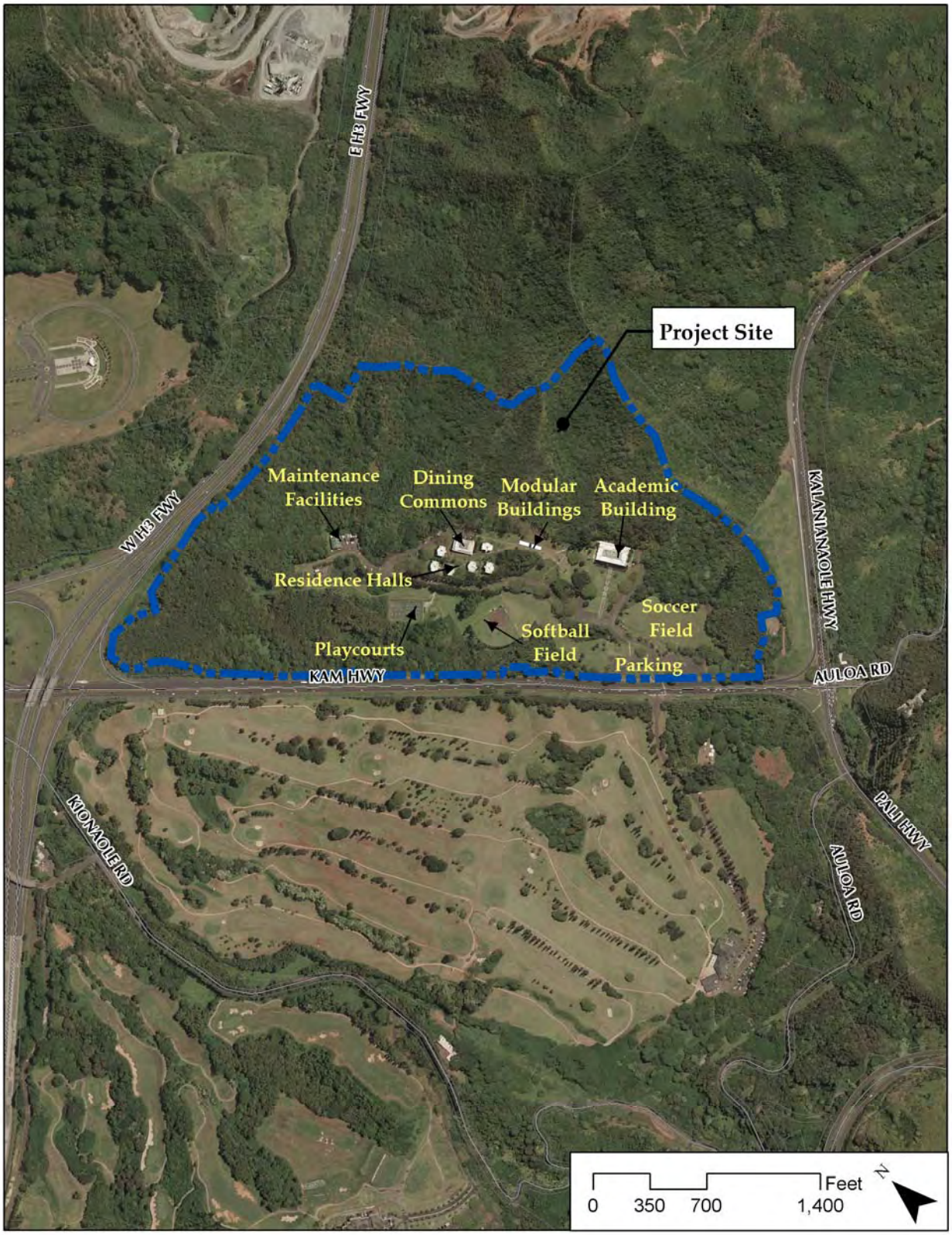


**Figure 2-2 Existing HPU Site Plan**

## 2.3 DESCRIPTION OF PROPOSED PROJECT

Strategic planning for the Hawai'i Loa Campus expansion, which is anticipated to be implemented over five years, began in 2007 when an executive level committee assessed requirements needed to accommodate the current and anticipated enrollment growth of both the Nursing and Science programs. The Hawai'i Pacific University, Hawai'i Loa Campus expansion will enhance the quality of HPU's education and scholarship and will create a vibrant campus community with a residential life component that supports excellence in teaching and learning. The two main thrusts driving HPU's campus expansion are to: 1) add 400 additional on-campus housing and 2) accommodate the growth of the two academic programs based at the Hawai'i Loa Campus, Nursing and Natural Sciences.

Proposed master plan improvements are anticipated to be constructed in two phases. Phase 1 includes construction of new buildings (Residences, a Student Center, Academic Center II, and Central Plant); relocation of the soccer field; mass grading of the new parking lot; and paving of a portion of the parking lot. The modular buildings will be removed in this phase. Phase 2 includes construction of a new Performing Arts Center and Multi-Purpose Gymnasium; and paving the rest of the parking lot.

The project proposes to add 400 additional parking and 400 on-campus housing beds, to construct a new 600-seat performing arts center, multi-purpose gymnasium, a new academic center building, and a Student Center. Expected enrollment will be over 2,800 students by the Fall of 2012, with 948 undergraduate and graduate students in the Natural Science program and 1,900 students enrolled at the School of Nursing.

The resulting Master Plan integrates the campus into the natural contours of the site, using elevation 336' above mean sea level as the organizing level, at which major gathering areas such as the Library, Bookstore/Café, and Residential Commons are linked. All other related spaces are one to two levels up or down. An on-grade and accessible pedestrian path will connect all facilities from the parking area to the existing Residences and Dining Commons. It will take only 10 minutes to walk from one end of the campus to the other. During inclement weather, a good portion of the walk, especially in the academic areas, will be protected. Additional parking will be accommodated through the planned relocation of the existing soccer field and construction of a landscaped parking area.

The campus currently has only one ingress and egress point to/from Kamehameha Highway directly across from the Pali Municipal Golf Course. It can be difficult to negotiate and will probably not be sufficient with the increases anticipated in the Plan. Therefore, the proposed project would likely include a signalized intersection at this existing entry. Furthermore, an alternate egress/ingress point is envisioned in the future towards the west end of the project site.

The Hawai'i Pacific University Hawai'i Loa Campus will be a sustainability model for higher education facilities and be HPU's marker in environmental stewardship. The project will incorporate design strategies to limit the project's environmental footprint and will be designed with a fully integrated approach to meet the U.S. Green Building Council's Leadership in

Energy and Environmental Design (LEED) certification criteria. The overarching plan for each resource should follow the following basic principles:

1. Reduce demand;
2. Efficient systems
3. On-site generation (e.g. power, water); and
4. Offset off-site resources needs and impacts.

Examples of key sustainability strategies that could be incorporated during the early stage of the proposed project's expansion planning and design process include:

**Energy Savings Strategies**

1. Incorporate on-site renewable energy generation system(s);
2. Use solar water heater for on-site needs (sinks, showers);
3. Design for flexibility and personal controls;
4. Provide good use of natural light;
5. Provide natural ventilation where applicable; and
6. Incorporate proper building orientation and building envelope design to minimize heat gain (e.g. green roofs, green walls, etc.).

**Water Savings Strategies**

1. Recover, treat, and reuse water;
2. Utilize rainwater catchment system for on-site irrigation and for use in building systems operation and maintenance;
3. Reduce stormwater run-off by incorporating bioswales; and
4. Incorporate low-flow fixtures and appliances.

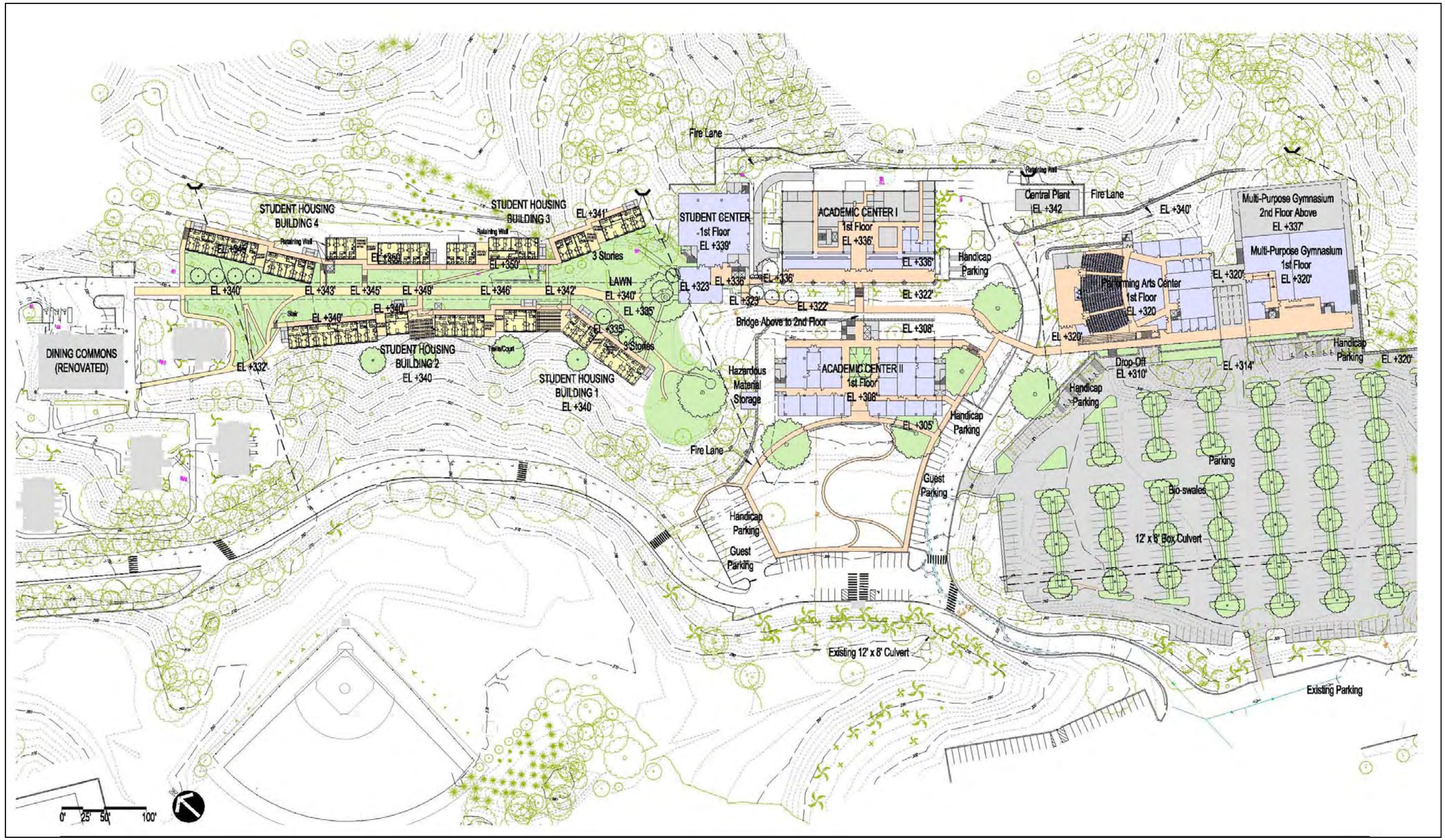


**Figure 2-3 Proposed Hawai'i Pacific University Hawai'i Loa Campus Site Plan**

**Table 2-1 Proposed Site Space Program for Hawai'i Pacific University Hawai'i Loa Campus**

| Academic Center I | Proposed Area | Proposed Quantity | Proposed Total Area |
|---|---|---|---|
| **First Floor** | | | |
| Student Lockers | 1,296 | 1 | 1,296 |
| Science Students Lounge | 516 | 1 | 516 |
| Nursing Students Lounge | 960 | 1 | 960 |
| Study Group | 456 | 1 | 456 |
| **TOTAL N.S.F.** | | | 3,228 |
| **Circulation and Support Areas** | | | 360 |
| **TOTAL G.S.F.** | | | 3,588 |
| **Third Floor** | | | |
| Science Faculty Lounge/Meeting Room | 476 | 1 | 476 |
| Nursing Faculty Lounge/Meeting Room | 668 | 1 | 668 |
| **TOTAL N.S.F.** | | | 1,144 |
| **Circulation and Support Areas** | | | NA |
| **TOTAL G.S.F.** | | | 1,144 |
| | | | |
| **Building G.S.F.** | | | **4,732** |
| | | | |
| **Academic Center II** | **Proposed Area** | **Proposed Quantity** | **Proposed Total Area** |
| **First Floor** | | | |
| General Purpose Science Laboratories | 1,200 | 2 | 2,400 |
| Field Science Laboratory | 624 | 1 | 624 |
| Science Prep Room | 858 | 1 | 858 |
| Research Labs | 396-480 | 12 | 5,052 |
| Internal Support Prep Rooms | 336 | 2 | 672 |
| Science Graduate – 4 Student Suites | 192 | 1 | 192 |
| Science Graduate – 6 Student Suites | 288 | 1 | 288 |
| Internal Science Storage Area | 396 | 1 | 396 |
| External Science Storage Area | 400 | 1 | 400 |
| **TOTAL N.S.F.** | | | 10,882 |
| **Courtyard** | | | 1,125 |
| **Circulation and Support Areas** | | | 6,560 |
| **TOTAL G.S.F.** | | | 18,567 |

| | | | |
|---|---|---|---|
| **Second Floor** | | | |
| High Tech Classrooms | 894-1,012 | 14 | 14,028 |
| **TOTAL N.S.F.** | | | 14,028 |
| **Courtyard** | | | 1,125 |
| **Circulation and Support Areas** | | | 4,816 |
| **TOTAL G.S.F.** | | | **19,969** |
| **Third Floor** | | | |
| Relocated Library | 9,389 | 1 | 9,389 |
| Library Work Area and Restrooms | 940 | 1 | 940 |
| Relocated Audio Visual Center | 748 | 1 | 748 |
| New Data Center | 2,341 | 1 | 2,341 |
| **TOTAL N.S.F.** | | | 13,418 |
| **Courtyard** | | | 945 |
| **Circulation and Support Areas** | | | 3,692 |
| **TOTAL G.S.F.** | | | 18,055 |
| | | | |
| **BUILDING G.S.F.** | | | **56,591** |
| | | | |
| **Performing Arts Center** | **Proposed Area** | **Proposed Quantity** | **Proposed Total Area** |
| **First Floor** | | | |
| Paul & Vi Loo Multi – Use Theatre/Stage/Sound – 600 seats | 6,631 | 1 | 6,631 |
| Administrative Office | 150 | 1 | 150 |
| Box Office | 212 | 1 | 212 |
| Costume Closets | 315 | 1 | 315 |
| Dressing Rooms | 500 | 2 | 1,000 |
| Carpentry Area | 1,040 | 1 | 1,040 |
| Music Practice Rooms | 150-180 | 5 | 780 |
| Music Rehearsal Room and Storage | 1,580 | 1 | 1,580 |
| **TOTAL N.S.F.** | | | 11,708 |
| **Circulation and Support Areas** | | | 11,170 |
| **TOTAL G.S.F.** | | | **22,878** |
| **Second Floor** | | | |
| Music Library | 2,454 | 1 | 2,454 |
| **TOTAL N.S.F.** | | | 2,454 |
| **Circulation and Support Areas** | | | 144 |
| **TOTAL G.S.F.** | | | 2,598 |

| | | | |
|---|---|---|---|
| **BUILDING G.S.F.** | | | **25,476** |
| | | | |
| **Multi-Purpose Gymnasium** | **Proposed Area** | **Proposed Quantity** | **Proposed Total Area** |
| **First Floor** | | | |
| Athletic Fitness Center | 5,676 | 1 | 5,676 |
| Lockers, Restrooms, Showers | 3,108 | 1 | 3,108 |
| Storage | 755 | 1 | 755 |
| Administrative Offices | 400 | 1 | 400 |
| **TOTAL N.S.F.** | | | 9,939 |
| **Circulation and Support Areas** | | | 2,016 |
| **TOTAL G.S.F.** | | | 11,955 |
| **Second Floor** | | | |
| Sports Courts and Bleachers | 17,080 | 1 | 17,080 |
| **TOTAL N.S.F.** | | | 17,080 |
| **Circulation and Support Areas** | | | 3,901 |
| **TOTAL G.S.F.** | | | 20,981 |
| | | | |
| **BUILDING G.S.F.** | | | **32,936** |
| | | | |
| **Student Center** | **Proposed Area** | **Proposed Quantity** | **Proposed Total Area** |
| **Basement** | | | |
| Computer Center (Relocation and 300 s.f. expansion) | 1,609 | 1 | 1,609 |
| A Testing Center | 630 | 1 | 630 |
| **TOTAL N.S.F.** | | | 2,239 |
| **Circulation and Support Areas** | | | 1,088 |
| **TOTAL G.S.F.** | | | 3,327 |
| **First Floor** | | | |
| Bookstore, Retail and Rentals | 6,338 | 1 | 6,338 |
| **TOTAL N.S.F.** | | | 6,338 |
| **Lanai** | | | 1,439 |
| **Circulation and Support Areas** | | | 1,717 |
| **TOTAL G.S.F.** | | | 9,494 |
| **Second Floor** | | | |
| Fitness Center and Aerobics Room | 2,496 | 1 | 2,496 |
| Student Health Center | 92-100 | 6 | 584 |
| Student Meeting Rooms | 150-300 | 6 | 1,179 |

| | | | |
|---|---|---|---|
| Student Affairs Offices | 116 | 6 | 851 |
| **TOTAL N.S.F.** | | | 5,110 |
| **Circulation and Support Areas** | | | 2,904 |
| **TOTAL G.S.F.** | | | 8,014 |
| **Third Floor** | | | |
| President | 375 | 1 | 375 |
| Vice-President | 160 | 2 | 320 |
| Conference Room | 285 | 1 | 285 |
| Reception | 555 | 1 | 555 |
| Work Room | 98 | 1 | 98 |
| **TOTAL N.S.F.** | | | 1,633 |
| **Circulation and Support Areas** | | | 971 |
| **TOTAL G.S.F.** | | | 2,604 |
| | | | |
| **BUILDING G.S.F.** | | | **23,439** |
| | | | |
| **Residences** | **Proposed Area** | **Proposed Quantity** | **Proposed Total Area** |
| Quad Single Bed Units | 936 | 11 | 10,296 |
| Double Bed Units | 312 | 57 | 17,784 |
| Double Double Bed Units | 624 | 37 | 23,088 |
| Triple Bed Units | 702 | 17 | 11,934 |
| Graduate Suite (1 Bedroom) | 312 | 22 | 6,864 |
| Hall Director: 1 Bedroom | 312 | 12 | 3,744 |
| Kitchen and Laundry | 312 | 6 | 1,872 |
| **TOTAL N.S.F.** | | | 75,582 |
| **Circulation and Support Areas** | | | 27,622 |
| **TOTAL G.S.F.** | | | 103,204 |
| | | | |
| | | | |
| **PROJECT G.S.F. (New Area Added)** | | | **246,378** |

*Level 3: Elevation – 336'*
**This is the Unifying Level of the Campus**
The Library on the third floor of the Academic Center II connects to the first floor of the Cooke Academic Center and to the first floor of the Student Center Bookstore. The Residential Common area and the primary entry levels of the new Residences are approximately at this elevation.

*Level 2: Elevation – 332'*
This is the elevation of the second floor of the Academic Center II and approximately the second level of the Multi-Purpose Gymnasium (319'). The pedestrian path rises to this elevation between the new and existing Academic Center buildings. The first floors of the *mauka* component of the new Residences are at this level, as is the existing Dining Commons.

*Level 1: Elevation – 308'*
This is the general base level of the Master Plan Campus, with the exception of the athletic fields. This is the level of the new parking area and the first level of the Academic Center II, as well as the first level of the Multi-Purpose Gymnasium (306'). The campus-wide pedestrian path begins at this level, extends to the Academic Center II, and rises to the elevation of the first level of the Performing Arts Center (315'). Most of the existing Residential Commons have their first floors at approximately this elevation.

*Level 5: Elevation – 362'*
This is the top level of the campus and is also the third floor of both the Student Center and the Cooke Academic Center. The vacated library space in the Cooke Academic Center may be remodeled to accommodate various new Nursing labs, faculty offices, and conference rooms.

*Level 4: Elevation – 349'*
This is the second level of the Student Center, which may house a fitness gym, student health spaces, offices, and student lockers. It is also the second floor level of the Cooke Academic Center which houses existing offices and classrooms. The roof of the new Academic Center II, at this level, is visible from the upper floors of both adjacent buildings and is proposed to be a "green" vegetated roof, designed to drain and collect water for recycling. This roof, landscaped with ground cover and not shrubs or trees, is lightweight and designed to be watertight.

### 2.3.1 Proposed Design Elements and Themes of the Hawai'i Pacific University Hawai'i Loa Campus Expansion

In November 2008, approximately 20 HPU administrators, faculty members, students, alumni, and board members engaged in a facilitated Master Plan Charrette. The Charrette was a focused envisioning process designed to produce foundational concepts to guide the planning process. The Charrette was key in providing a "life-style vision" of a future HPU that will guide the planning process to ensure that the campus will retain its relevance for decades.

Five major themes resulted from the Charrette: 1) HPU will be an international learning community; 2) HPU will be student centered; 3) The campus will be an aggregate of gathering places which reflect the aesthetic and multi-cultural qualities of Hawai'i; 4) The campus will be

a community that embodies a sense of home; and 5) The campus will be based on environmentally sustainable principles and employ sustainable design strategies in its planning and design.

Currently, approximately one-third of students come from Hawai'i, one-third come from the Mainland U.S., and the balance come from as many as 100 countries spanning the globe. This strength of diversity and multi-culturalism is fostered by accommodating an additional 400 on-campus student residents, the incorporation of major gathering areas such as the Library, Bookstore/Café, and Residential Commons. The Campus's design and scale will be compact, intimate, and personal, lending to a sense of "belonging." The addition of new classrooms, laboratories, a library, performing and visual art spaces, and other intellectual and physical activities will foster student growth both in and out of the classroom.

#### 2.3.1.1 Sustainable Design

Hawai'i Pacific University Hawai'i Loa Campus will also practice a sustainable lifestyle. It will serve as a sustainability model for higher education facilities and a source of new knowledge relating to sustainable practices and technologies. The new Hawai'i Loa Campus will be HPU's marker in environmental stewardship. The project will incorporate key energy and water saving design strategies to limit the project's environmental footprint and will be designed with a fully integrated approach to meet the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) certification criteria. The overarching plan for each resource should follow these basic principles: 1) Reduce demand; 2) Efficient systems; 3) On-site generation (e.g. power, water); and 4) Offset off-site resources needs and impacts.

Some examples of key sustainability strategies include:
Energy Saving Strategies:

- Incorporate on-site renewable energy generation system(s)
- Use solar water heater for on-site needs (sinks, showers)
- Design for flexibility and personal controls
- Provide good use of natural light
- Provide natural ventilation where applicable
- Incorporate proper building orientation and building envelope design to minimize heat gain (green roofs, green walls)

Water Saving Strategies:

- Recover, treat, and reuse water
- Utilize rainwater catchment system for on-site irrigation and for use in building systems operation and maintenance
- Reduce stormwater run-off by incorporating bioswales
- Incorporate low-flow fixtures and appliances

## 2.4 PROJECT UTILITIES AND INFRASTRUCTURE

A Preliminary Engineering Report and Drainage calculations for the Hawai'i Pacific University Hawai'i Loa Campus project were completed by Belt Collins Hawai'i, Ltd., and is provided as *Appendix B*. Overall existing conditions, impacts, and mitigation measures for utilities are discussed in *Section 3.0* of this document.

The existing project site has water and electric services, sewer connections, and solid waste collection services. The following section describes the physical characteristics of these site utilities with the addition of the new facility.

### 2.4.1 Water Supply and Gas

Improvements to the campus water service connection were done within the last four years, with a new 12″ water line, water meter and backflow preventer installed. No reports of on-campus water line breaks or pressure problems were received during information gathering sessions.

The HPU Campus is presently connected to the Honolulu Board of Water Supply (BWS) for domestic and fire protection water service. An 8x2 FM meter connected into the BWS 12-inch diameter main on Kamehameha Highway supplies the campus. A new 12-inch water line will be installed downslope of the new Academic Center II to reroute the existing water line around the new buildings. A new water line will be installed to provide service to the proposed Performing Arts Center and Multi-Purpose Gymnasium. The new line will branch from the 12-inch diameter main line in the Academic Center driveway. Fire hydrants will be added in accordance with HFD requirements to provide fire protection coverage for the new buildings.

Gas service will be required for the new Student Center and Academic Center II. Once the demands are identified for these new buildings, it can be determined if the existing gas tanks can be used or if additional tanks will be needed.

### 2.4.2 Wastewater

Campus flows are conveyed to the City's system by a new sewage pump station and associated force main that was completed in November 2009. The point of connection for the pumping station force main to the City's system is the Halekou sewage pumping station on Kamehameha Highway at Kahiko Street. The new force main consists of an 8″ sewer pipe inside a 12″ sleeve.

Previous to the installation of the pump station, the campus was served by an on-site wastewater treatment plant. It is intended for the plant to be abandoned in the coming months.

### 2.4.3 Drainage System

Runoff through the HPU campus generally contributes to Māmalahoa Stream, which flows near the western edge of campus and exits from the north end of campus, downhill of the

abandoned wastewater treatment plan. Runoff from the southern end of campus collects in the existing soccer field, which then crosses the existing driveway through a 12'x8' drain arch to what is considered as the upstream end of Māmalahoa Stream. Runoff from the upper portions of the campus is captured by drainage structures and piped to either directly outlet into or surface flow toward the stream. The goals for drainage are for compliance with City requirements and to accommodate existing flows and drainage structures. The goals for grading are to balance earthwork quantities over all of the campus improvements. In addition, the natural look of the slopes will be maintained as much as practical.

### 2.4.4 Solid Waste Disposal

Solid waste from the project site will be disposed of at an approved City and County of Honolulu refuse disposal site by a private refuse collection company. The proposed project will generate solid waste during construction. To the extent possible, the construction solid waste will be distributed within the immediate project area for possible reuse. Recycling programs will also be encouraged on the proposed project site.

### 2.4.5 Other Utilities

The project will require other standard utility provisions such as telephone and internet.

### 2.4.6 Access, Roadways, and Parking

Access to Hawai'i Pacific University is only through one ingress and egress point to/from Kamehameha Highway, directly across from the Pali Municipal Golf Course and near the intersection with Pali Highway. This intersection will likely incorporate a signal and an alternative egress/ingress point is envisioned in the future on the west end of the project site.

Parking lots for approximately 500 vehicles is limited, distant, and down-slope from the buildings. Visitors and students have to walk along the entrance road to the main entrance walkway of the campus. This long, uncovered walkway is difficult to physically challenged users and provides no protection during inclement weather. The current soccer field is proposed to be developed as a landscaped parking area, holding over 500 new spaces. The alternative, a parking structure, would be too costly and take away from the scenic view of the campus. Existing parking lots will remain and the soccer field will be moved to a new location.

## 2.5 CONSTRUCTION CHARACTERISTICS

### 2.5.1 Landscape Management

One of the greatest assets of the Hawai'i Loa Campus is its natural setting—dramatic views of the Ko'olau Mountains, mature canopy trees, and the surrounding lush conservation land. The existing landscape functions as a unifying element where buildings are meant to harmonize with the natural setting and respect the majestic Pali

The goal of the Hawai'i Loa—Campus for the Future, Phase One Planning Report, 2007 is to create at "memorable and uplifting campus that demonstrates Hawaiian sense of place and

serves the highest purposes of learning…" The campus will "protect and enhance the natural environment and resources of the land, air and sea…"

To help achieve this goal, the landscape master plan seeks to respect the natural setting, while emphasizing the use of native Hawaiian and Polynesian-introduced plants to promote sustainability and create a Hawaiian place of learning.

The Hawai'i Loa Campus received approximately 60"-70" of rainfall annually. The lawn areas are irrigated by a quick coupler system that was installed in the 1970's and is operated manually. There are about 5 irrigation points of connection instead of one dedicated backflow prevention device for the entire irrigation system.

The landscape design phase is the ideal time to make decisions that can greatly reduce maintenance costs. Maintenance can be reduced through the selection of appropriate landscaping material, siting, and installation. The following are some design concepts that will help minimize the amount of maintenance required:

- Install high-quality plant material of the appropriate size
- Use plants that are native, micro-climatically adapted, low maintenance, and pest-resistant whenever possible
- Plant groundcover or install mulch at slopes and shady areas where grass will not grow

The landscape plan is found in Figure 2-4, and the landscape master plan report is included as Appendix H.

**Figure 2-4 Overall Landscape Master Plan**

### 2.5.2 Excavations

The project site is large with steep slopes and dramatic terrain. Modification to the topography to accommodate the project will not be minimal. Substantial excavation activity is anticipated. The approximate earthwork quantity for HPU's Hawai'i Loa Campus is 86,000 cy of excavation and 146,000 cy of fill. Excess material will be hauled offsite.

### 2.5.3 General Construction

The construction of the facility will include the formation and placement of concrete foundations, the installation of mechanical equipment and electrical wiring and equipment, general carpentry work, painting and many other trades and work associated with typical construction activities.

## 2.6 SUMMARY OF PROJECTED COSTS

Costs for the Hawai'i Pacific University Hawai'i Loa Campus Expansion project are estimated at approximately $125 million for civil and construction costs for both Phase I and II. The costs will likely be met primarily through private endowments, donations and fundraising. Since the project is at the master planning phase at this time, a specific funding program has not yet been developed.

# 3.0 DESCRIPTION OF THE ENVIRONMENTAL SETTING, POTENTIAL IMPACTS AND MITIGATION MEASURES

# 3.0 DESCRIPTION OF THE ENVIRONMENTAL SETTING, POTENTIAL IMPACTS, AND MITIGATION MEASURES

This section describes the existing environmental setting and identifies possible impacts of the proposed project. Strategies to mitigate those potential impacts are also identified.

## 3.1 TOPOGRAPHY

***Existing Conditions***
The site slopes upwards in an easterly direction at approximately 10 percent. Ground elevations range from approximately 309 ft. above mean sea level at the existing parking lot to 336 feet at the Academic Center. The area around the proposed central plant is approximately 342 feet above MSL. *(Figure 3-1.)*

In 1965, Dames & Moore conducted a geotechnical report for the original Hawai'i Loa College campus. It found that the site is suitable for the intended use, provided care is exercised in the location of structures upon the site. The report also found that natural slopes appeared stable but that care should be taken in siting and site grading to insure that no great changes in natural conditions occur that might cause the slopes to become unstable.

***Anticipated Impacts and Mitigation Measures***
Considerable grading will be required to implement the proposed master plan. Graded slopes or retaining walls along the back of the campus will be required to accommodate the new buildings. The general concept is to excavate and bench the slopes following local grading ordinances, with cutoff drainage channels installed as required to intercept upslope flow. The decision between retaining walls and graded slopes will need to be made during building design with consideration for access, waterproofing, structural and cost requirements. Grading activities not associated with buildings along the upper portion of the campus will be separated into phases, taking account balancing earthwork quantities with each phase.

Best Management Practices will be implemented pursuant to the required Grading Permit to mitigate any potential impacts of soil erosion and fugitive dust during any grading or excavation. Grading plans will be prepared by a licensed civil engineer to ensure slope stability and mitigate potential erosion and storm water runoff.

## 3.2 SOILS

***Existing Conditions***
Soil types within the project site are identified in the U.S. Department of Agriculture, Natural Resources Conservation Service, 2007 (formerly known as the Soil Conservation Service), Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawai'i, (August 1972). As depicted in *Figure 3-2*, the site consists of four different types of soils: The highest regions of the site consist of Halemano Silty Clay, 30% to 90% slopes, and Alaeloa Silty Clay, 3% to 7% slopes. Alaeloa consists of well-drained soils which are gently sloping to very steep. They also exhibit moderate rapid permeability, medium runoff, and moderate erosion hazards. The Halemano series consists of very deep, well-drained soils on gulch sides with slopes of 30% to

90%. These soils are well-drained and exhibit rapid or very rapid runoff, and moderately rapid permeability.

The Land Study Bureau classifies the project area as Conservation District Subzone and assigns all levels of overall Productivity rating except for A, the highest.

***Anticipated Impacts and Mitigation Measures***

The proposed project will not change the overall soil composition at the site. However, due to grading and leveling, some soil will be redistributed on the site. Earth moving activities during construction (e.g., grading, clearing, excavation) have potential to impact air quality through fugitive dust and water quality through storm water runoff. These impacts are addressed in *Section 3.6 Air Quality* and *Section 3.8.3 Storm Drainage*. Best management practices will be implemented as described in these sections to mitigate potential adverse impacts.

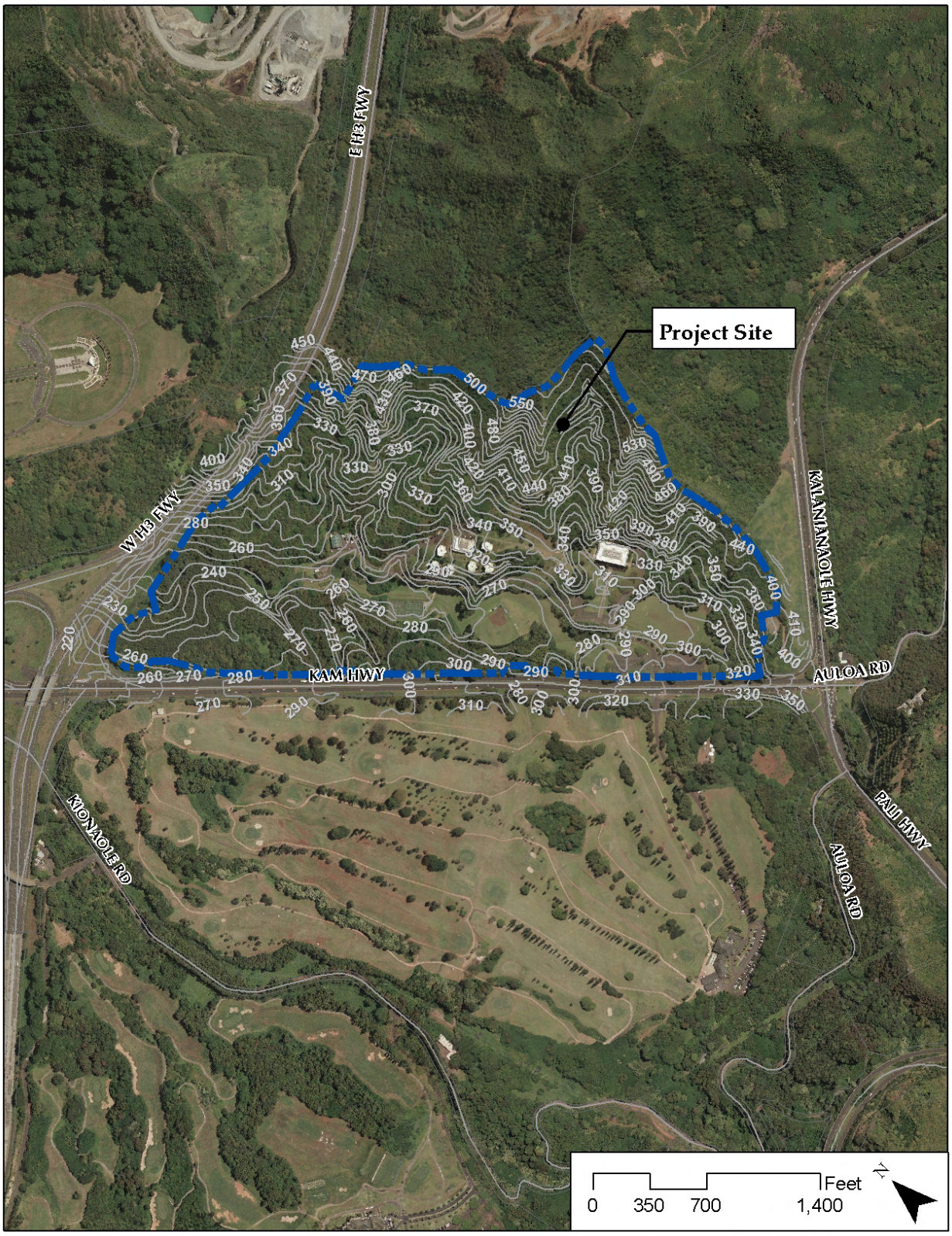


**Figure 3-1 Topography Map**

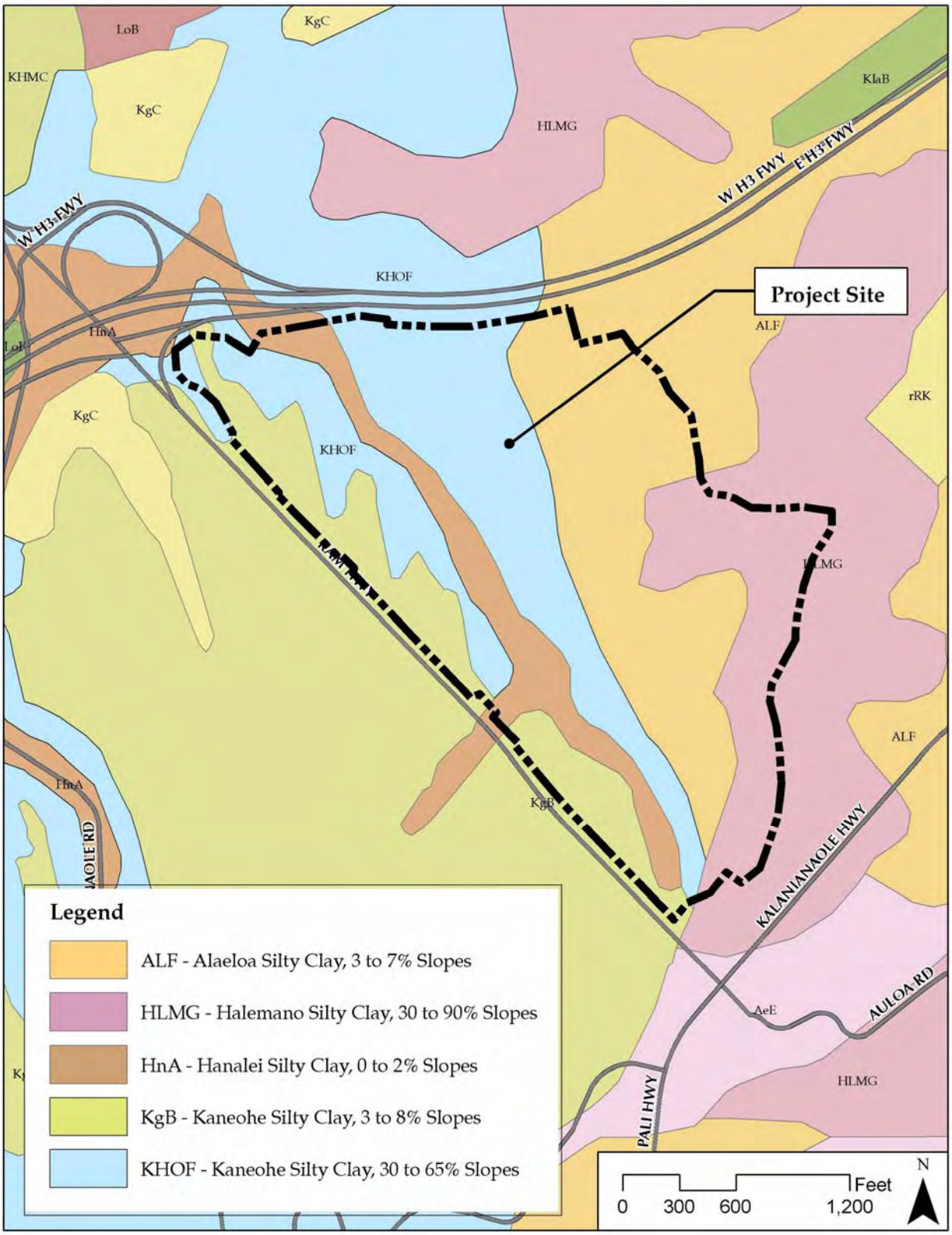


**Figure 3-2 USDA NRCS Soils Map** (U.S. Department of Agriculture, Natural Resources Conservation Service, 2007)

## 3.3 CLIMATE

***Existing Conditions***

Climate on O'ahu can be characterized as having low day-to-day and month-to-month variability. Differences in the climates of various areas are generally attributable to the island's geologic formation and topography creating miniature ecosystems ranging from tropical rain forests to dryer plains along with corresponding differences in temperature, humidity, wind, and rainfall over short distances (Dept. of Geography, 1998). Annual and daily variation in temperature depends to a large degree on elevation above sea level, distance inland, and exposure to trade winds.

Winds are predominantly "trade winds" from the east-northeast except for occasional periods when "Kona" storms may generate strong winds from the south, or when the trade winds are weak and land breeze to sea breeze circulations develop. Wind speeds typically vary between about 5 and 20 miles per hour providing relatively good ventilation much of the time. Lower velocities (less than 10 mph) occur frequently and the usual northeasterly trade winds tend to break down in the Fall giving way to more light, variable wind conditions through the Winter and on into early Spring.

The project area's temperatures generally have small seasonal variations between the warmest months (August and September) and the coolest months (January and February). The climate in Kāne'ohe is warm during summer when temperatures tend to be in the 70's, and warm during winter when temperatures tend to also be in the 70's. Temperature variations between night and day tend to be fairly limited during summer with a difference that can reach 10 degrees Fahrenheit, and fairly limited during winter with an average difference of 11 degrees Fahrenheit.

The warmest month of the year is September with an average maximum temperature of 83.40 degrees Fahrenheit, while the coldest month of the year is January with an average minimum temperature of 66.10 degrees Fahrenheit.

Rainfall in general is highly variable depending upon elevation and location with respect to the tradewinds. The annual average precipitation at Kāne'ohe is 50.93 Inches. Rainfall in is fairly evenly distributed throughout the year. The wettest month of the year is November with an average rainfall of 6.35 Inches.

***Anticipated Impacts and Mitigation Measures***

The proposed action will have no effect on climatic conditions, and therefore no mitigation measures are required.

## 3.4 NATURAL HAZARDS

***Existing Conditions***

Based on the Federal Emergency Management Agency's *Flood Insurance Rate Map, FIRM Community Panel No. 15003C0370F*, effective November 30, 2004, the project area is located in "Zone D," which is outside of the 500-year floodplain. As depicted in *Figure 1-7*, the flood Zone D designation indicates an area of undetermined but possible flood hazards.

No hurricanes have significantly impacted the project area in recent history, however the potential for tropical storms to cause future damage cannot be dismissed.

The majority of earthquakes in Hawai'i are directly related to volcanic activity on the Island of Hawai'i. The entire City and County of Honolulu lies in a seismic zone designated as 2A. Under the International Building Code (IBC) seismic provision, a Zone 2A area could experience seismic activity between .75 and .10 of the earth's gravitational acceleration (g-force).

***Anticipated Impacts and Mitigation Measures***
Because the project area is located well away from the coastal area, the project area is secure from coastal inundation. Māmalahoa Stream, a natural drainage channel that collects all of the water from the watershed from the Pali, across the Pali Golf Course, and under Kamehameha Highway through existing culverts, stretches across the HPU Campus. To prevent ponding or localized flooding resulting from storm run-off, existing drainage infrastructure will be maintained, while new infrastructure will be designed and constructed to meet applicable standards. Furthermore, because this drainage course is subject to periodic flooding due to heavy rainfall, the buildings are located above the high water elevation.

All construction will necessarily conform to relevant building codes to mitigate the risk of wind and seismic damage.

## 3.5 FLORA AND FAUNA

**Botanical**
***Existing Conditions***
A survey, *Biological Surveys Conducted for the Proposed Hawai'i Pacific University, Hawai'i Loa Campus Expansion Project, Kāne'ohe, O'ahu,* was conducted on the entire HPU Hawai'i Loa Campus in November/December 2009 and is included as *Appendix G*. A majority of the project area is highly disturbed from a botanical perspective—the natural vegetation has been replaced with a highly manicured and maintained, park-like setting. The vegetation on this campus site is an eclectic and complex combination of ornamental plantings within areas that are currently developed, while other areas have been planted, but allowed to assume a more natural condition. Areas of natural forest surround the developed campus on nearly all sides.

**Avian**
***Existing Conditions***
A total of 371 individual birds of 17 different species, representing 13 separate families, were recorded during station counts. One of the species recorded, Pacific Golden-Plover (*Pluvialis fulva*) is an indigenous migratory shorebird species that nests in the high Arctic during the late spring and summer months, returning to Hawai'i and the Tropical Pacific to spend the fall and winter months each year. Plover usually leave Hawai'i for their trip back to the Arctic in late April or the very early part of May each year. The remaining 16 avian species detected are all considered to be alien to the Hawaiian Islands. No avian species currently listed, or proposed for listing under either the federal or State of Hawai'i endangered species statutes was detected during the course of this survey.

**Mammalian**

***Existing Conditions***

Mammalian species detected during the survey included humans (Homo sapiens) and three small Indian mongooses, which is in keeping with the nature of an actively maintained busy university campus. No mammalian species currently listed, or proposed for listing under either the federal or State of Hawai'i endangered species statutes, was detected during the course of this survey.

***Anticipated Impacts and Mitigation Measures***

It is not expected that the expansion and operation of the Hawai'i Pacific University, Hawai'i Loa Campus will result in deleterious impacts to any botanical, avian, or mammalian species currently listed or proposed for listing under either the federal or State of Hawai'i endangered species statutes. No protected species of plants were located and none are anticipated to occur in this area. Larger and mature trees will be preserved as necessary and practicable, but there are no plants in the survey area that deserve special attention.

The occurrence of native species on the slopes behind (north of) the campus suggests this area still supports remnants of the original vegetation. The closest occurrence of *'ōhi'a* and *'akia* plants upslope of the campus maintained landscape ranges from about 30 feet on the east to 150 feet on the west. No impacts are planned for the area behind the main Academic Center where these plants are found closest to the developed campus. Grading and construction of a drainage basin are proposed for the slope area to the west, and here these plants are mostly if not entirely beyond the impact area as shown on planning maps. That is, few if any plants would be impacted.

There are no anticipated adverse impacts to the area's wildlife or habitat. It is recommended that native species be replanted in areas that are disturbed during construction where practicable.

***Hawaiian Petrel and Newell's Shearwater***

Although not detected during the survey, the principal potential impact that expansion and operation of the proposed school poses to Hawaiian Petrels and Newell's Shearwaters is the potential increased threat that birds may be downed after becoming disoriented by lights associated with the project during the nesting season.

***Recommendations***

If nighttime construction activity or equipment maintenance is proposed during the construction phases of the project, all associated lights should be shielded. When large flood/work lights are used they should be placed on poles that are high enough to allow the lights to be pointed directly at the ground.

If permanent streetlights, facility lighting, or other lighting required for the project are installed in conjunction with the school, it is recommended that lights be shielded to reduce the potential for interactions of nocturnally flying Hawaiian Petrels and Newell's Shearwaters with external lights and man-made structures (Reed et al. 1985, Telfer et al. 1987).

## 3.6 AIR QUALITY

***Existing Conditions***

Vehicle emissions are currently the most common type of pollution generated at the 133-acre project site. Air quality is very good since the highest number of cars entering and exiting the project site occurs only during morning and afternoon peak traffic hours and overall volumes are relatively low. Once construction starts, air quality may be affected by the generation of fugitive dust, and construction equipment and worker vehicle emissions.

***Anticipated Impacts and Mitigation Measures***

The traffic that is generated by the proposed project will be minimal. It is expected to comprise of 4.6 percent (AM) and 6.8 percent (PM) of peak hour traffic at the intersection of the HPU driveway and Kamehameha Highway. (*See Section 3.13* for in-depth discussion on traffic impacts.)

During construction, dust conditions will be controlled by frequent watering of roadways, and other soil management measures. Equipment will be maintained in proper working order to minimize emissions. These impacts are mostly temporary in nature.

## 3.7 NOISE

***Existing Conditions***

The primary source of noise in the vicinity of the site is from traffic on Kamehameha Highway. Except for evening uses at the new performing arts center, most noise will be limited to normal waking hours and is expected to be within reasonable levels. There are no surrounding residential uses in addition to the on-campus residential facilities. Since the proposed improvements are not expected to result in a significant increase in noise levels over existing levels, there will be minimal impact on these residential facilities, especially since they are located on the northern part of campus, on the opposite end of the proposed performing arts center. Classroom and facility spaces will be air conditioned to further mitigate noise impacts.

***Anticipated Impacts and Mitigation Measures***

There will be noise impacts as a result of building construction. Proper mitigation measures will be implemented. Construction will occur only during daylight hours. All project activity will comply with the State Department of Health's Administrative Rules, Chapter 11-46, "Community Noise Control".

## 3.8 UTILITIES AND INFRASTRUCTURE

Belt Collins Hawai'i, Ltd., prepared a preliminary engineering report and drainage calculations for the proposed project in March 2010 *(Appendix B)*.

### 3.8.1 Water System

***Existing Conditions***

***Water Supply***

The HPU campus is connected to the BWS system for domestic and fire protection water service. The service is from the BWS Luluku and Maunawili Reservoirs with the service elevation at 500 feet above mean sea level. Based on the reservoir elevation, the service pressure in the upper portions of the campus would be about 65 pounds per square inch, which is within the BWS Standards and plumbing code requirements.

According to BWS record plans dated November 2006, an 8x2 FM meter connected into the BWS 12-inch diameter main on Kamehameha Highway supplies the campus. A BWS reduced pressure backflow preventer is also in place after the meter.

After the backflow preventer, a 12-inch diameter line, generally following the driveway to the Academic Center, serves as the primary campus distribution line. This line was installed at the same time as the connection to the BWS system with plans dated November 2006. The 12-inch diameter line replaced an 8-inch diameter line installed in 1969.

An 8-inch diameter branch just below the Academic Center extends through the open campus area to the upper campus driveway near the Residences. From the driveway intersection below the Residences, a 6-inch diameter line extends to the maintenance facility and wastewater treatment plant. Above the junction of the 12- and 8-inch diameter lines, a 6-inch diameter branch extends upslope to the Academic Center.

***Domestic Water Service***
Domestic water service for the campus buildings is provided through laterals off the water distribution lines. The Residences, Dining Commons, and modular buildings are serviced by laterals off the 8-inch diameter line in the upper campus driveway. Based on information from HPU officials, the pressure reducer valves for the Residences are not functional. The Academic Center is serviced by a lateral off the 6-inch diameter branch in the driveway to the Academic Center.

***Fire Protection System***
The existing fire protection water system is comprised of six on-site fire hydrants within the campus, and one off-site hydrant near the campus driveway at Kamehameha Highway. Honolulu Fire Department (HFD) criteria require a hydrant within 150 feet of a building.

***Gas***
Gas service to the campus is supplied from on-site gas tanks. Based on record drawings from the Gas Company and from information provided by an HPU official, a 2,000-gallon tank serves the existing Dining Commons and Residences and serves as a back-up to the electrical system that powers the pump. A 120-gallon tank serves science laboratories in the Academic Center building. Additionally, a 300-gallon propane tank is installed at the new force main pump and serves as a back up to the electrical system that powers the pumps.

***<u>Probable Impacts and Mitigation Measures</u>***

***Water Supply***
Water supply improvements will provide domestic service and fire protection to the new buildings. A new 12-inch water line will be constructed to reroute the existing 8-inch water line from the upper campus driveway around the new Student Center and Academic Center II. The

new water line will be reconnected to the 12-inch water line in the Academic Center driveway on the downhill side of Academic Center II. Two new water lines will be constructed to provide service for the new Performing Arts Center and Multi-Purpose Gymnasium. The new water lines will both branch off the existing water line in the Academic Center driveway, and will extend along the uphill and downhill sides of the buildings.

According to the BWS letter response regarding pre-consultation for the Draft Environmental Assessment for Hawai'i Pacific University Hawai'i Loa Campus Expansion to Mr. George Atta, dated December 18, 2009, "the existing water system is presently adequate to accommodate the proposed domestic demands for the proposed University expansion." However, it should be noted that the BWS will not commit to water service for any facility until the building permit application is submitted. As stated in the same BWS letter response, "the Board of Water Supply reserves the right to change any position or information… until the final approval of [the] building permit application."

An assessment of the existing and master planned water demands will need to be completed to verify that the existing water meter can continue to serve the ultimate campus development. Payment of water system facilities charges will also need to be made as the new buildings are occupied. In order to receive facilities charge credit for plumbing fixtures removed, such as hose bibbs at the wastewater treatment plant to be abandoned, drawings or plans indicating the location, number and type of plumbing fixture will need to be submitted to BWS when the demolition or building permit is routed

***Domestic Water Service***
Domestic water service for the new Residences, Student Center, and Academic Center II will be provided by laterals from the existing and rerouted 8-inch and 12-inch diameter water lines extending from the upper campus driveway to the Academic Center driveway.

The proposed Performing Arts Center and Multi-Purpose Gymnasium will be serviced by laterals from the new water line in the parking lot downhill of the buildings.

The Central Plant will be serviced by a lateral off the existing water line in the Academic Center driveway.

***Fire Protection System***
Fire hydrants will be added in accordance with HFD requirements to provide fire protection coverage for the new buildings. Separate water line taps for fire department connections and sprinkler systems are not shown in the conceptual utility plan, but can be added as needed to support the new buildings. Also, due to the lengths of the water lines and associated pressure losses, verification of water line sizes to meet fire flows and pressure, needs to be done during preliminary design.

For the new Residences and Student Center, fire hydrants will be added along the new walkway between the Residences, serviced from the existing 8-inch diameter water line.

Three additional hydrants will also be added for coverage of the new Academic Center II. These hydrants will be serviced from the rerouted 12-inch diameter water line, and from the existing 12-inch diameter water line along the Academic Center driveway.

Hydrants will be added in the new parking lot for coverage of the new Performing Arts Center and Multi-Purpose Gymnasium. The new water line installed on the uphill side of the new buildings will service fire hydrants along the fire lane.

***Gas***
Gas service will be required for the new Student Center and Academic Center II. Once the demands are identified for these new buildings, it can be determined if the existing gas tanks can be used or if additional tanks will be needed. As a public utility, the Gas Company will undertake improvements, upgrades and expansion of the synthetic natural gas system for projects as requested to accommodate the demands, recovering costs through their tariff structure.

### 3.8.2 Wastewater

***Existing Conditions***
Campus flows are conveyed to the City's system by a new sewage pump station and associated force main that was completed in November 2009. The point of connection for the pumping station force main to the City's system is the Halekou sewage pumping station on Kamehameha Highway at Kahiko Street. The new force main consists of an 8" sewer pipe inside a 12" sleeve.

Previous to the installation of the pump station, the campus was served by an on-site wastewater treatment plant. It is intended for the plant to be abandoned in the coming months.

A 10-inch diameter sewer line connects at a manhole to the new pump station. The 10-inch diameter line extends along the lower campus driveway to the parking lot below the Academic Center. The four down slope Residences discharge to this line, with no additional connections between this junction and the parking lot. At the parking lot, a 6-inch diameter line extends service to the Academic Center. The 10-inch diameter line along the lower driveway was apparently sized in anticipation of campus expansion.

At the Residences driveway intersection, an 8-inch diameter line branches from the 10-inch diameter sewer line and extends along the upper driveway to the Dining Commons. The upper two Residences discharge to this line. A 4-inch diameter sewer line extends service to the modular buildings beyond the Dining Commons.

***Impacts and Mitigation Measures***
New sewer lines will be installed as needed to service the proposed buildings. The alignment of the new sewer lines will be set with consideration of the finish grades around the new buildings to minimize the cover over the pipes. In addition, grade differences between buildings in close proximity, such as the elevation difference up to 9 feet between the two levels of the new Residences, will be accommodated and taken into account in the preliminary design.

The proposed master plan development was considered in the sizing of the wet well and force main. Replacement of the pumps with larger units may be needed at some point as flows to the station increase.

A wastewater facility charge would only be required for the new buildings constructed on campus if the water meter is upsized, which is not anticipated at this time.

New sewer lines will be constructed to service the new residences, Student Center, Academic Center II, and Central Plant, as well as to reconnect the service for existing Academic Center I. A new 8-inch diameter sewer line will be constructed to service three of the seven new residences, connecting to the existing sewer line in the upper campus driveway. The rest of the residences and Student Center will be serviced by new 8-inch and 10-inch diameter sewer lines that connect to the main at the lower campus driveway. An 8-inch diameter branch from these lines will be constructed between Academic Center I and II, and continue uphill to service the new Central Plant. The branch will also provide service for Academic Center I, replacing its existing lateral located in the footprint of Academic Center II. Another 10-inch sewer line, connecting to the main at the lower campus driveway, will provide service to Academic Center II.

The 10-inch sewer line below Academic Center II will be extended along the uphill side of the parking lot to service the new Performing Arts Center and Multi-Purpose Gymnasium.

### 3.8.3 Storm Drainage

***Existing Conditions***

Runoff from the HPU campus generally contributes to Māmalahoa Stream, which flows near the western edge of campus and exits from the north end of campus, downhill of the existing treatment plant. Runoff from the southern end of campus collects in the existing soccer field. From the soccer field, runoff crosses the existing driveway through a 12'x8' drain arch to what is considered as the upstream end of Māmalahoa Stream. Runoff from the upper portions of the campus is captured by drainage structures and piped to either directly outlet into or surface flow toward the stream. In addition, runoff from the Pali Golf Course across Kamehameha Highway discharges into the campus at various locations, and adds to the intermittent stream flow.

Record drawings show that all of the pipe culverts crossing Kamehameha Highway existed at the time of initial site development in 1969. It is noted that the record DOT drawings do not show any easements for culvert improvements extending into the campus beyond the Kamehameha Highway right-of-way. However, an easement for one of the culverts, a 12'x10' double box culvert that outlets near the existing softball field, was noted in the topographic survey.

***Around Softball Field***

Runoff from the Pali Golf Course across Kamehameha Highway is conveyed into the campus through a 12'x10' double box culvert, along with runoff collected in catch basins along the highway by 24-inch and 36-inch diameter pipes. The runoff outlets along the western edge of the campus near the existing softball field and flows around both the north and south sides of the softball field to join Māmalahoa Stream.

***Dining Commons/ Residences***

Runoff from the northern portion of the campus crosses the lower campus driveway to the area above the tennis courts and discharges to Māmalahoa Stream. Runoff from Oneawa Hills above the existing Residences and Dining Commons is captured by a concrete-lined drainage channel (Photo 1). The collected runoff is conveyed beneath the lower campus driveway through a 36-inch diameter pipe culvert. Record drawings also show another 24-inch diameter culvert on the east side of the intersection with the upper campus driveway, with a third

crossing by an approximate 6-ft x 4-ft pipe arch by the maintenance facility. Also, a set of drainage pipes was observed on site which appears to convey runoff through a berm near the tennis courts (Photo 2); record drawings of these pipes were not provided.

***Between Residences and Academic Center***
To the north of the Academic Center, runoff collects in a valley and is conveyed by 42-inch and 48-inch diameter pipes to outlet below the lower campus driveway just north of the main driveway.

***Existing Soccer Field***
The existing soccer field collects most of the runoff south of the Academic Center. Hillside runoff from above the existing Academic Center is captured by a concrete-lined cut-off ditch (Photo 3). From this drainage structure, runoff is discharged to the south of the Academic Center under the driveway, and surface flows into the soccer field. Runoff from the area below the Academic Center south of the main staircase, as well as from the existing parking lot west of the field, are also directly piped to the soccer field.

In addition to the flows originating from and above the campus, three culverts convey runoff from and across Kamehameha Highway into the soccer field. A 42-inch diameter pipe headwall discharges water from the Pali Golf Course onto the soccer field. This headwall is located about midway along the west side of the field. Runoff conveyed in a 24-inch diameter pipe and 10'x10' box culvert both outlet just east of the highway, but continue to surface flow towards the soccer field.

In general, the soccer field gently slopes towards the northwestern corner. An 18-inch diameter pipe and channel along the west edge also diverts runoff towards the northwest corner (Photo 4). At this corner, runoff is discharged into a 12' x 8' culvert (Photo 5). The culvert outlets to a grassed channel on the east side of the softball field.

***Probable Impacts and Mitigation Measures***
Final design of the grading and drainage for the proposed buildings will be based on several objectives. The goal for grading will be to balance earthwork quantities. In addition, the natural look of the slopes will be maintained as much as practical. The goals for drainage will be to protect buildings from flooding, complying with City requirements, and using the existing drainage facilities to minimize construction costs.

Balancing the earthwork will be done to minimize the amount of earthwork materials needed for import and export. Clayey silts were noted in some of the available boring logs for the original design of the campus. A geotechnical investigation for the new facilities should be completed prior to the start of construction documents to address specific site soil conditions and ensure the onsite soils are suitable intended uses. The investigative report will also provide recommendations for grading and building site preparation such as surcharging to provide proper soil stability in construction.

In order to maintain the existing look for the campus, the use of retaining walls will be minimized. Slopes will be graded at a maximum of 2:1 (horizontal to vertical), with benches for slopes over 15 feet in height in accordance with City ordinances. Actual grading will be based on the geotechnical report findings and recommendations.

For drainage, the City requires that runoff under proposed conditions be less than or equal to the amount generated under existing conditions and that the runoff is discharged in the same location. Because the new buildings are anticipated to generate more runoff than under existing conditions, a detention basin approximately 190′ x 80′ x 6′ deep near the new parking lot will be constructed to detain the additional runoff quantity during storm events.

Since there are several large existing drainage structures which convey runoff towards Māmalahoa Stream, the existing drainage structures will continue to be utilized to the extent practicable. The new drainage systems will convey runoff to the existing drainage structures within the same drainage basins as under existing conditions. In addition, runoff coming from and across Kamehameha Highway will be accommodated in the drainage improvements.

Grading and drainage concepts proposed at each area are discussed in more detail below.

***Māmalahoa Stream***
By maintaining the existing drainage structures and flows contributing to Māmalahoa Stream, it is anticipated that the drainage design will not impact the stream. Avoiding work within the stream area would allow HPU to avoid associated permitting issues.

Although not anticipated, if work within Māmalahoa Stream should become required as the master plan continues to develop, a U.S. Army Corps of Engineer (USACE) determination would be needed to see if they have jurisdiction over work within the stream. The USACE requires a permit for any filling of the waters of the United States of America (Section 404, Clean Water Act). If a Section 404 Permit is required, then Section 401, Water Quality Certification, is also required. The DOH is the regulatory authority for Section 401. A field evaluation to document evidence of a stream and/or wetlands in the project area would be needed for the USACE jurisdictional determination. If the USACE determines they do not have jurisdiction, then no USACE permit or Section 401 Certification would be required.

Regardless of whether work within the stream is needed, a Stream Channel Alteration Permit (SCAP) from the State Department of Land and Natural Resources will not be required. Based on the information provided by Belt Collins to the Commission on Water Resource Management (Commission), a SCAP will not be required to be submitted for the proposed conceptual planning for HPU because the Commission has determined that Māmalahoa Stream is an intermittent stream where aquatic resources have not been identified.

***New Soccer Field***
The new soccer field will be located to the northwest of the existing softball field and directly west of the existing play courts. The elevation of the new soccer field will be set to keep storm water from entering the field and play courts. As mentioned in the discussion for the existing softball field, runoff from culverts crossing Kamehameha Highway flows between the softball field and play courts. To prevent runoff from overflowing onto the new soccer field, the elevation of the field will be built above the existing softball field. Based on this elevation, excavation will be needed on the west side of the field, and an embankment will be added on the east side. On the excavated side, the field will include a lawn seating area sloping up towards Kamehameha Highway at a 4:1 slope. A retaining wall will be needed to support the rest of the elevation difference from the field to the existing ground at the highway. In the embankment area on the southeast side, retaining walls will be required to provide the grade difference needed to raise the field above the existing flow channel. Access to the field will

include a ramp adjacent to the play courts up to the field for pedestrians and maintenance vehicles.

***Residences***
The new Residences will be located on the hillside between the existing Dining Commons and Academic Center I. The existing fire lane from the Dining Commons to existing modular buildings will be extended and used as the main walkway and fire lane between two levels of new Residences. A portion of the existing concrete-lined channel in the area, as well as the modular buildings, conflict with the location of the new Residences, and will be demolished and removed prior to the construction. The runoff flowing into the portion of the channel to be demolished will be captured by a new concrete cut-off ditch above the new Residences.

The Residences will have finish floor elevations ranging from 340′ at the lower level buildings, up to 350′ at the upper level. The elevation differences between adjacent buildings and the walkway vary from 0 to 9 feet. These differences will be accommodated with graded slopes or with retaining walls where space is limited.

Above the upper level of Residences, a 2:1 slope will be constructed to meet existing grade. Hillside runoff will be captured by a concrete cut-off ditch located along the top of the graded slope. This ditch will convey runoff into the existing channel further downstream of the demolished portion. Between the upper level Residences and the graded slope, surface runoff will be captured by drain inlets and will be conveyed with roof drainage to the existing channel.

The main walkway and fire lane will be graded with a high point near the middle of the new Residences. Swales next to the walkway will convey runoff from the high point directed either to the north or to the south.

Between the walkway and the lower level Residences, graded slopes and retaining walls will be used to accommodate the grade differences. Surface runoff and roof drainage will be conveyed through underground pipes to the drain line at the south end of the Residences. On the downhill side of the lower level Residences, retaining walls up to 6′ tall will be used as needed, and grading will be done to create a uniform slope on the downhill side. Surface runoff will continue to flow downhill as under existing conditions.

***Student Center/ Academic Center II***
The new Student Center and Academic Center II will be located directly to the north and west of the existing Academic Center I, respectively. The existing 42-inch and 48-inch diameter pipes that convey runoff from the north of the existing Academic Center I will be rerouted around the new Student Center and Academic Center II. This drainage system will continue to serve the same drainage basin and will be reconnected above the existing outlet to Māmalahoa Stream.

The existing valley north of Academic Center I, above the southern Residence in the upper level and Student Center, will be regraded to accommodate the new building grades. The inlet to the existing 42-inch diameter pipe will be relocated farther uphill, so that the exterior grades at the Residence and Student Center have sufficient area to slope towards the inlet.

The slope behind the new Student Center will be regraded to minimize the retaining wall height. The soil will be retained directly by the wall of the new Student Center up to

approximately 12.5 feet. Hillside runoff above the Student Center will be conveyed towards the relocated inlet to the north.

As mentioned above for emergency vehicle access, the fire and service lane behind Academic Center I will be extended between the Student Center and Academic Center I. The north end of the existing retaining wall and cut-off channel behind Academic Center I will be removed and rebuilt to incorporate the new fire lane with a retaining wall up to 12 feet high. The retaining wall will also extend the existing channel above Academic Center I.

***Existing Academic Center I***
As noted above, runoff from the existing channel crosses the Academic Center driveway through underground pipes to an outlet just uphill of the new Performing Arts Center, and eventually flows into the existing soccer field (see Grading and Drainage Plans 3 and 4). The drain line will be intercepted by a new drainage structure, which will continue to convey runoff downhill and be incorporated into the drainage system in the new parking lot.

***Central Plant***
The Central Plant will be accessed from the existing driveway just south of Academic Center I. The uphill and side building walls of the Central Plant will act as retaining walls. Hillside runoff will be captured by inlets and will be connected to the new drainage structure for Academic Center I.

***New Performing Arts Center/ New Multi-Purpose Gymnasium***
The Performing Arts Center and Multi-Purpose Gymnasium will be built into the hillside south of existing Academic Center I. To minimize the height of retaining walls on the uphill sides of the buildings, the walls of both buildings will act as retaining walls.

Both buildings will have access doorways on the uphill side of the buildings. The access for the Performing Arts Center will include a stairwell from the finish floor elevation to a higher elevation just outside the building. A retaining wall will be needed between the pathway from the access stairway and the fire lane uphill of the Performing Arts Center. At the Multi-Purpose Gymnasium, the downhill side of the building will be 2 stories tall. On the uphill side, only the second floor will continue to extend into the hillside. The access to the Multi-Purpose Gymnasium will be at the northeast corner of the second floor. The fire lane will also connect to the second floor elevation at this access location.

The elevation of the fire lane and access behind the Performing Arts Center and Multi-Purpose Gymnasium will be set with consideration to the grades above and below the fire lane. From the connection to the existing driveway, the fire lane will go up in elevation to minimize the height of the retaining wall on the uphill side. As the lane continues to the Multi-Purpose Gymnasium, the elevation will go down to match the second floor elevation at the northeast corner. After the fire lane ends, a pathway will be graded to allow access for emergency personnel. The pathway elevation will rise at the southeastern corner to meet existing grade in order to minimize grading.

A cut-off channel above the Performing Arts Center will serve to capture runoff from the hillside above. The runoff in the channel will connect to the new drainage structure constructed for Academic Center I.

The area behind the Multi-Purpose Gymnasium will be graded to slope away from the building, and will create a low spot in the existing valley. Runoff accumulating in the low spot will enter an inlet and will be conveyed towards the location of the existing soccer field where it will be incorporated into the drainage system in the new parking lot.

Around the south side of the Multi-Purpose Gymnasium and along the east edge of the new parking lot, swales will intercept the hillside runoff. Runoff from the swales will be captured by inlets and connected to pipe to the south of the Gymnasium.

***New Parking Lot***

The new parking lot will be constructed by filling the existing soccer field. Ultimately, all of the surface drainage flowing in the existing soccer field will need to be conveyed in a new underground system with drain manholes and inlets. The system will continue to outlet through the existing 12′ x 8′ arch culvert for ultimate discharge to Māmalahoa Stream.

The new detention basin will be designed to detain the net increase in runoff. The detention basin will be located at the southwestern corner of the new parking lot in an existing valley, into which off-site runoff flows from an existing 10′x10′ box culvert. Because of the natural shape of the valley, excavation for the detention basin will be kept to a minimum, and grading will primarily be done on the new parking lot side of the basin. In addition to detaining the amount of additional runoff, the basin serves to improve storm water quality by allowing debris carried from across Kamehameha Highway to settle before flowing across the campus. A maintenance road will be graded to the bottom of the basin to allow vehicle access for cleaning debris that accumulates in the basin. Also, since the detention basin will not be intended to permanently hold runoff, a small diameter pipe will be installed from the detention basin to allow the basin to slowly drain after storm events.

A new 12′x8′ box culvert will be constructed to convey the runoff not detained in the detention basin to the existing 12′x8′ arch culvert. The box culvert will be designed with minimal cover across the parking lot. The box culvert will also accommodate the drainage for the new parking lot. Grassed biofiltration swales (bioswales) will be utilized in the parking lot aisles, with inlets located directly over the box culvert. The bioswales will improve stormwater quality, by removing silt and other pollutants from the parking lot runoff. Allowing runoff to drop directly into the box culvert will eliminate the need for inlet structures and additional pipes.

To accommodate underground connections to the arch culvert, a new drainage structure will be built at its inlet. In addition to the box culvert, drain lines that convey runoff directly into the existing soccer field will be intercepted and piped to the new structure. The drain line that conveys runoff from below Academic Center I to the existing soccer field will be rebuilt at a higher elevation to minimize the cover at the new parking lot. A manhole will be constructed at the end of the new drain line to redirect runoff into the new arch culvert drainage structure. Runoff from the 42-inch diameter pipe and 24-inch diameter pipe crossing Kamehameha Highway will also be intercepted on the west side of the new parking lot and conveyed to the new drainage structure.

Drain lines capturing runoff from above the Performing Arts Center and Multi-Purpose Gymnasium will also be connected to the new parking lot drainage system. Runoff from above the Performing Arts Center will be connected to the new manhole serving the area below

Academic Center I. The drain line from the Multi-Purpose Gymnasium will connect into the 12′x8′ box culvert.

**Other Issues**
Some of the new residences are proposed at the same location of the existing modular buildings. These modular buildings will need to be demolished before construction of the new buildings. The new fire lane behind the Performing Arts Center will require relocation of existing electrical poles.

No significant storm drainage impacts are anticipated.

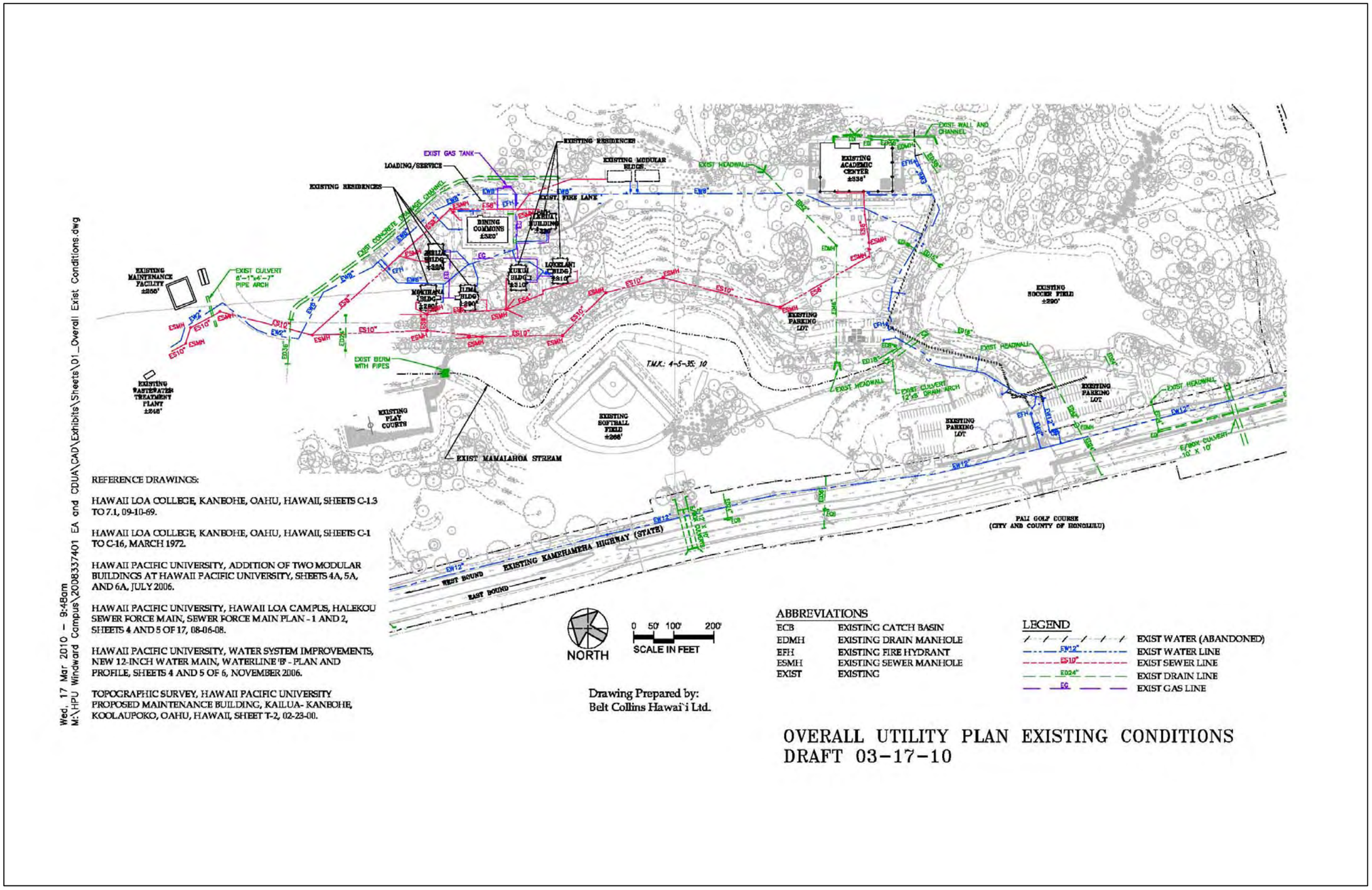


**Figure 3-3 Existing Overall Utility Plan**

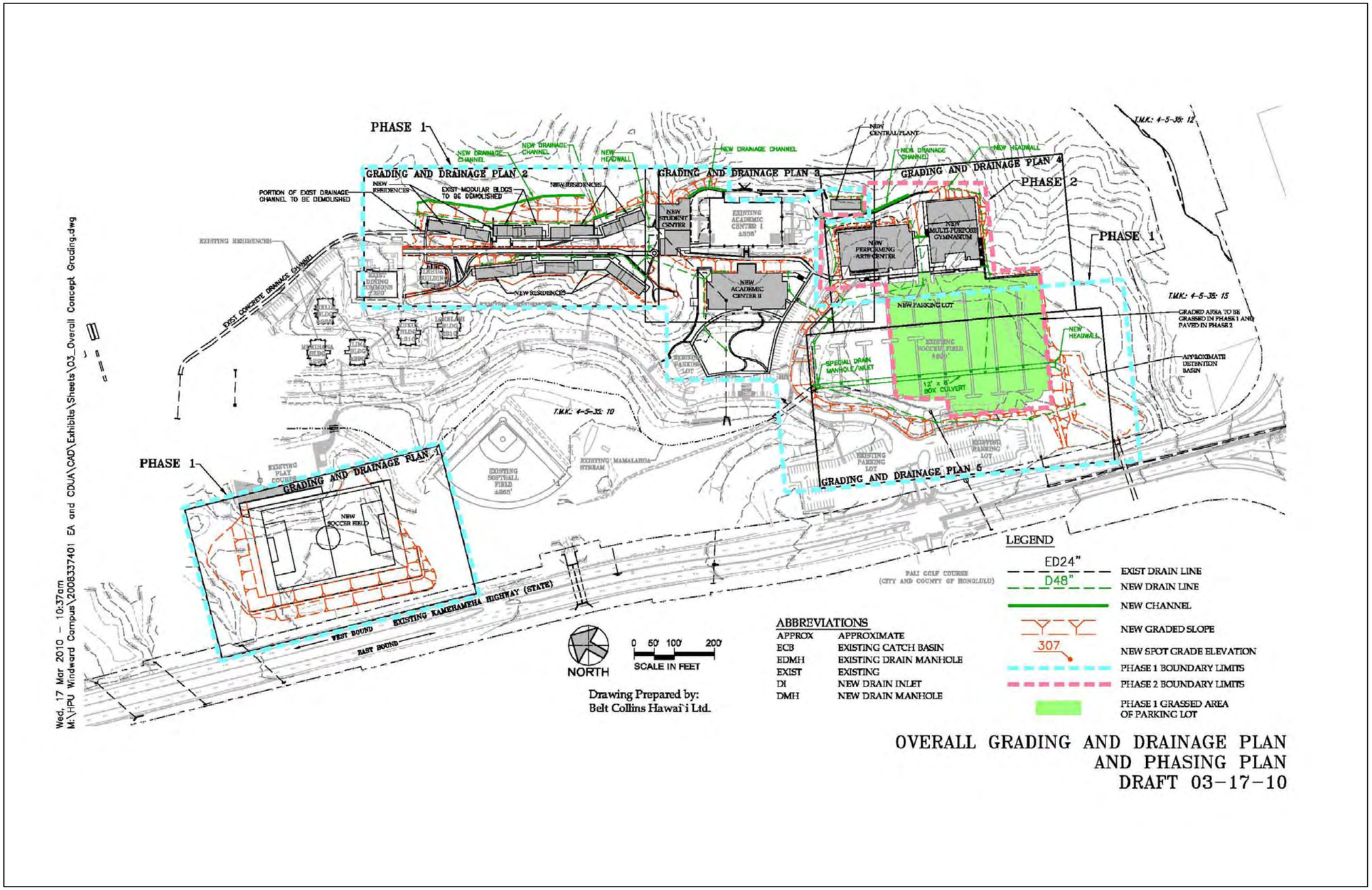


**Figure 3-4 Overall Grading, Drainage, and Phasing Plans**

## 3.9 HAZARDOUS WASTE

***Existing Conditions***
Hazardous waste is defined as having a chemical composition or containing other properties that make it capable of causing illness, death, or some other harm to humans and other life forms when mismanaged or released into the environment (EPA, 2005).

There are no current onsite concerns regarding hazardous waste contamination or spills.

***Anticipated Impacts and Mitigation Measures***
No significant impacts related to hazardous waste from the construction of the project are anticipated. As necessary, any studies will be prepared in conformance with procedural guidelines provided in ASTM E 1527-00, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment.

## 3.10 ELECTRICAL AND COMMUNICATIONS

***Existing Conditions***

An *Electrical and Mechanical Systems Assessment for the Hawai'i Pacific University Master Plan Project* was completed by Lincolne Scott in March 2009 for the proposed project area and is included as *Appendix D.*

**Electrical Service Distribution**
Electrical service for the project area is from Hawaiian Electric Company (HECo). The existing primary electrical system serving the existing Academic Center and Dining Commons are at the end of its service life and is in need of replacement in the short term.

Equipment replacement has recently been required for the Academic Center primary switch with future replacements being considered for the Academic Center transformer and Dining Commons primary switch and transformer that show signs of major enclosure corrosion.

Telecommunication services are served from the same service points as the electrical system described above.

***Anticipated Impacts and Mitigation Measures***
The majority of the existing underground ductline will be affected by the site footprints of the new dormitory buildings and student center that will require relocation. The proposed distribution will begin underground along the new Academic Center and Sculpture Garden. and will convert back into an overhead system and continue along the existing campus roadway. A partial overhead system is being proposed initially for cost feasibility, but can be converted in the future to underground lines that follow the same route along the roadway.

The new telecommunication distribution system would also be served from the same overhead route as the electrical service. The campus local area network will also need an infrastructure system. The proposed underground infrastructure system would initially link the new Academic Center where the new data center is located, to both the existing Academic Center

and the new Student Center. Stub out provisions for expansion to link the other buildings will also be included.

The buildings will utilize sustainable strategies to maximize daylighting, use of energy ultra high efficient lighting and power, and renewable energy through photovoltaic panels and wind turbines.

## 3.11 BUILDING SYSTEMS AND INFRASTRUCTURE

***Existing Conditions***

***Mechanical Systems***
The existing air conditioning system serving the Academic Center is at the end of its service life and is in need of replacement within the next few years. The existing air conditioning system serving the Dining Commons is in better shape and could operate another 3-5 years.

***Electrical Systems***
The existing primary electrical system serving the existing Academic Center and Dining Commons are at the end of its service life and is in need of replacement in the short term. Hawai'i Pacific University Hawai'i Loa Campus receives power from Hawaiian Electric Company (HECo). The campus is generally served by an incoming overhead 12.47kV high voltage power that is distributed underground throughout the campus. The primary distribution system consists of two high voltage feeders that service the campus structures. The upper campus feeder serves the Academic Center and the lower campus feeder serves the modular buildings, Dining Commons, and Residences.

***Anticipated Impacts and Mitigation Measures***

***Mechanical Systems***
The air conditioning load for the Academic Centers, Student Center, and Performing Arts Center is estimated at 500 tons. No air conditioning is planned for the Residences and the Multi-Purpose Gymnasium. With a concentrated load at the Academic Centers, the use of chilled beams for cooling and outside air pretreatment using desiccants for superior energy-efficiency is recommended. Further, a displacement ventilation system is recommended for the Performing Arts Center for higher energy efficiency and improved indoor air quality.

For the buildings without air conditioning, maximizing thermal comfort by optimizing the building envelope to reduce heat gain is recommended, as well as incorporating technique to maximize air movement through cross-ventilation and ceiling fans.

Plans will also include minimizing water consumption and wastewater discharge by use of ultra-high efficiency plumbing fixtures, and minimizing energy use with thermal solar water heating systems.

***Electrical Systems***
The majority of the existing underground ductline will be affected by the site footprints of the new dormitory buildings and student center. They will require relocation. The proposed

redistribution route will be along the existing campus roadway. The proposed distribution line will begin underground along the new Academic Center and Sculpture Garden. The distribution will convert back into an overhead system and continue along the existing campus roadway. A partial overhead system is being proposed initially for cost reasons. However, the overhead lines can be converted in the future to underground lines that follow the same route along the roadway.

## 3.12 PHASING

Planning for the project will allow maximum flexibility for the University to implement the project in phases as determined by existing internal and external factors. However, proposed improvements are anticipated to be constructed in two phases. Phase 1 includes: constructing new buildings including the new Residences, Student Center, Academic Center II, and Central Plant; renovation of the existing Academic Center and the Dining Commons; a sculpture garden; relocation of the soccer field; mass grading for the new parking lot; and paving of a portion of a new parking lot. Phase 2 includes a new Performing Arts Center and Multi-Purpose Gymnasium, and paving the rest of the new parking lot. Approximate phasing limits are shown on the conceptual site utility plans and grading and drainage plans, which are included at the end of the civil engineering analysis. We anticipate Phase I beginning in calendar year 2012 or early 2013, and to be completed within two years after start. We anticipate Phase II to commence about 2-3 years after the completion date of Phase I. Completion for Phase II is anticipated to be 24-36 months after start

Site work and infrastructure will be constructed in support of the new buildings. Emergency vehicle accesses and utilities will be phased to ensure service for improvements within each phase. Similarly, the portion of the parking lot paved in Phase 1 will include the number of stalls needed to support the facilities constructed in that phase.

Site work in Phase 1 will also be designed with consideration for Phase 2 construction. The Phase 1 utilities will be constructed in their permanent locations with no temporary connections required. The utilities will incorporate future Phase 2 finish grades and anticipated demands. As construction of Phase 2 will most likely utilize the parking lot area directly in front of the new Performing Arts Center for staging and construction work, this area will be identified to be grassed in Phase 1.

The proposed concept grading is to balance the cut and fill earthwork quantities within each phase. Earthwork quantities estimated for construction of the new Performing Arts Center and Multi-Purpose Gymnasium in Phase 2 were found to be relatively close to balancing cut and fill with 7,500 cubic yards for embankment and 9,300 cubic yards for excavation. In order to maintain this earthwork balance in Phase 2, all other major earthwork will be done in Phase 1.
The largest earthwork quantities will be needed for filling the new parking lot, and for excavating the soccer field. Therefore, in addition to the earthwork needed for the infrastructure of Phase 1, the entire parking lot will be mass graded to future subgrade levels in Phase 1. Based on the current grading plans, estimated earthwork quantities for Phase 1 are 142,600 cubic yards for embankment and 118,800 cubic yards for excavation. Adjustments will be made during the design phase to balance the earthwork quantities, such as lowering the soccer field to provide more material for embankment.

Since the parking lot will be mass graded in Phase 1, redirection of runoff flowing into the existing soccer field will also be addressed. Runoff from below Academic Center I, as well as the off-site runoff from across Kamehameha Highway will be intercepted and directed to Māmalahoa Stream. Surface runoff discharging to the existing soccer field from above the new parking lot elevation, such as the outlet from existing Academic Center I, will not be impacted by the mass grading. Improvements for these drainage areas will be constructed in Phase 2.

### 3.13 Traffic and Roadways

***Roadways***

The campus is accessed from Kamehameha Highway. The highway in the area is under the jurisdiction of the State Department of Transportation (DOT). The campus driveway is located at the eastern side of the campus, directly opposite the driveway to the City and County of Honolulu (City) Pali Golf Course. Into the campus, the driveway intersection is channelized with a left turn lane from east-bound lanes, and a right turn lane from the west-bound lanes. There is also a channelized lane to exit the campus in the west bound direction.

The on-site campus driveways provide access to the parking lots and buildings for loading/service areas. Emergency vehicle access is also provided by the existing driveways. A paved fire lane provides emergency vehicle access to the existing modular buildings from the Dining Commons.

The driveway pavements were observed to be in good condition. Tree roots appeared to be well controlled with no associated pavement damage observed. Speed bumps and crosswalks are in place for traffic safety. From the observations made drainage of the driveways appears to be adequate, with only minor areas of ponding observed.

*Emergency Vehicle Access*

The current design criteria for emergency vehicle access are as follows:

| Item | Criteria | Basis |
|---|---|---|
| Width | 20′ minimum | Uniform Fire Code (UFC) |
| Turning Radius | 42′ minimum | Honolulu Fire Department (HFD) |
| Back-up Distance | 150′ maximum | UFC |
| Vertical Clearance | 13′-6″ minimum | HFD |
| Surfacing | Concrete/asphalt/grass cell | HFD |
| Fire Lane/Hydrant Location | 150′ from building | HFD |
| Fire Lane Slope | 19% maximum | HFD |
| Fire Department Connection | 20′ from the fire lane and 25 to 40 feet from fire hydrant | HFD |

In support of the new buildings in each phase, proposed improvements include internal driveways as needed for emergency vehicle access. In addition to vehicular access, pedestrian access around the exterior of buildings for emergency personnel will be provided. Existing fire lanes and accesses will be utilized in their existing conditions. Fire lanes will be stabilized with grass cell pavers wherever practical. The use of grass cell pavers creates a pervious surface

which can support traffic loading and allow for infiltration of stormwater runoff. Signs will be added to identify fire lanes and to prohibit obstructions to their access.

Emergency access proposed for the various campus improvements are discussed in more detail in the following sections.

*Residences*
A 20-foot wide fire lane will be added along the walkway between the new Residences. This walkway will extend the existing fire lane south of the Dining Commons with vehicular use designated for emergency vehicles only. While the walkway in the middle of the fire lane will be concrete, the rest of it will be stabilized by grass cell pavers. A turnaround area will be provided for emergency vehicles near the Student Center. Pedestrian pathways will also be provided between the Residences to allow fire department personnel access to the back of the buildings within 150′ from the fire lane.

*Student Center/ Academic Center I*
The lane behind the existing Academic Center (referred to in the proposed improvements as Academic Center I) will be extended to the south side of the Student Center to serve as both a fire and service lane and will be asphalt concrete paved. The lane will require demolition and reconstruction of the wall and ditch at the northeastern side of Academic Center I. A turnaround for emergency vehicles will be provided between Academic Center I and the Student Center.

*Academic Center II*
A fire lane will be added on the north side of the new Academic Center II and will be accessed from the existing parking lot northwest of the building. The lane will be stabilized with grass cell pavers. Approximately four parking stalls located on the northeastern corner of the parking lot will be removed to accommodate the fire lane. In addition to emergency vehicle access, the lane will also be used to access storage for laboratory materials used in the new Academic Center. A turnaround will be provided at the northwest corner of the building.

*Performing Arts Center/ Multi-Purpose Gymnasium*
Emergency vehicle access to the front of the Performing Arts Center and Multi-Purpose Gymnasium will be provided by the new parking lot. For the back of the buildings, a fire lane will be added that will be accessed from the existing Academic Center driveway. The fire lane will be intended for emergency vehicles only, with a turnaround provided above the Performing Arts Center. Grass cell pavers will be used for the fire lane. Also, a pedestrian pathway with stairs along the south side of the Gymnasium will provide emergency personnel access around the exterior of the building.

***Traffic***
A *Traffic Impact Assessment Report (TIAR)* for the proposed Hawai'i Pacific University Hawai'i Loa Campus Master Plan was prepared by the Traffic Management Consultant (TMC) in April 2010 *(Appendix C).* It evaluates the potential impacts of the proposed project on existing roadways and traffic conditions. The existing HPU intersection with Kamehameha Highway will be evaluated to determine if any improvements are needed to support the proposed master plan.

*Capacity Analysis Methodology*
The highway capacity analysis, performed for this study, is based upon procedures presented in the Highway Capacity Manual (HCM), published by the Transportation Research Board. HCM defines Level of Service (LOS) as "a quality measure describing operational conditions within a traffic stream". Several factors may be included in determining LOS, such as: speed, travel time, freedom to maneuver, traffic interruptions, driver comfort, and convenience. LOS's "A", "B", and "C" are considered satisfactory Levels of Service. LOS "D" is generally considered a "desirable minimum" operating level of service. LOS "E" is an undesirable condition, and LOS "F" is an unacceptable condition. Intersection LOS is primarily based upon delay. The LOS delays at signalized intersections are longer than at non-signalized intersections, because motorists will tolerate more delays at signalized intersections, which accommodate higher traffic volumes.

"Volume-to-capacity" (v/c) ratio is another measure of effectiveness (MOE) indicating the relative traffic demand to the roadway's capacity. HCM defines capacity as "the maximum number of vehicles that can pass a given point during a specified period under prevailing roadway, traffic flow, and traffic control conditions." A v/c ratio of 0.50 indicates that the traffic demand is utilizing 50 percent of the roadway's capacity.

*Trip Generation Methodology*
The trip generation methodology is based upon generally accepted techniques that were developed by the Institute of Transportation Engineers (ITE) and published in Trip Generation, 8th Edition. ITE university/college trip rates were developed by correlating the total vehicle trip generation data with various activity/land use characteristics, such as the vehicle trips per hour (vph) per student and vph per employee. The observed trip generation characteristics of the existing Hawaiʻi Loa Campus also were analyzed for comparison purposes.

***Existing Conditions***
*Roadways*
Kamehameha Highway is a four-lane, divided arterial highway between Pali Highway/Kalanianaʻole Highway and Interstate Route H-3. The posted speed on Kamehameha Highway is 45 miles per hour (mph) in the vicinity of the proposed project. Kamehameha Highway carries about 41,000 vehicles per day, total for both directions.

Kamehameha Highway is non-signalized at its intersection with the HPU/Pali Golf Course Driveways. The HPU Driveway provides a shared through/left-turn lane and an exclusive right-turn lane with an acceleration lane on northbound Kamehameha Highway. Kamehameha Highway intersects Pali Highway/ Kalanianaʻole Highway, opposite Auloa Road, at a fully-channelized signalized intersection.

Pali Highway is a four-lane divided arterial highway. Pali Highway intersects Kamehameha Highway at a signalized intersection and continues as Kalanianaʻole Highway east of Kamehameha Highway.

**Existing Peak Hour Traffic Volumes and Operating Conditions**

***Existing A.M Peak Periods***

The AM peak hour of traffic occurred between 7:15 AM and 8:15 AM. Kamehameha Highway carried about 3,000 vph, total for both directions. The existing project site generated 165 vph, entering and exiting the HPU Driveway, during the existing AM peak hour of traffic. Six (6) pedestrians were observed crossing the south leg of Kamehameha Highway during the existing AM peak hour of traffic.

The left-turn/through movement from the HPU Driveway onto Kamehameha Highway operated at LOS "F", during the existing AM peak hour of traffic. The Pali Golf Course Driveway also operated at LOS "F". Southbound Kamehameha Highway traffic occasionally queued back from Pali Highway/Kalaniana'ole Highway intersection to the HPU Driveway intersection.

The intersection of Kamehameha Highway and Pali Highway/Kalaniana'ole Highway operated at LOS "F". The left-turn movements on Pali Highway and on Kalaniana'ole Highway operated at LOS "F". Both Kamehameha Highway and Auloa Road also operated at LOS "F".

***Existing P.M. Peak Periods***
The PM peak hour of traffic occurred between 4:30 PM and 5:30 PM. Kamehameha Highway carried over 3,600 vph, total for both directions, during the existing PM peak hour of traffic. The existing project site generated 232 vph, entering and exiting the HPU Driveway, during the existing PM peak hour of traffic. Fifteen (15) pedestrians were observed crossing the south leg of Kamehameha Highway during the existing PM peak hour of traffic.

During the existing PM peak hour of traffic, the shared left-turn/through movement and the right-turn movement from the HPU Driveway operated at LOS "F" and LOS "D" respectively, at Kamehameha Highway. The Pali Golf Course Driveway also operated at LOS "F". Southbound Kamehameha Highway traffic again queued back from the Pali Highway/Kalaniana'ole Highway intersection to the HPU Driveway intersection.

The median on Kamehameha Highway was wide enough to shelter one vehicle, turning left from the HPU Driveway, and enabled it to execute the movement in two stages: (1) cross the northbound lanes on Kamehameha Highway and stop in the median; and (2) merge into the southbound lanes of Kamehameha Highway. The traffic signals at the intersection of Kamehameha Highway and Pali/Kalaniana'ole Highway facilitated the two-stage left-turn movement by creating gaps in northbound traffic to cross the northbound lanes, and slow-moving "stop-and-go" queues in the southbound direction to merge into southbound traffic.

The intersection of Kamehameha Highway and Pali Highway/Kalaniana'ole Highway operated at LOS "F", during the existing PM peak hour of traffic. The Kalaniana'ole Highway, Kamehameha Highway, and Auloa Road approaches operated at LOS "F", while the Pali Highway approach operated at LOS "E".

**Anticipated Impacts and Mitigation Measures**

***Year 2020 A.M. Peak Hour Traffic Analysis Without Project***
During the Year 2020 AM peak hour of traffic without the proposed project, The HPU Driveway and Pali Golf Course Driveway are expected to continue to operate at LOS "F" under

non-signalized conditions. The left-turn movements from Kamehameha Highway are expected to operate at LOS "C".

The intersection of Kamehameha Highway and Pali Highway/Kalaniana'ole Highway also is expected to continue to operate at LOS "F", during the Year 2020 AM peak hour of traffic without the proposed project. The Pali Highway and Kalaniana'ole Highway approaches are expected to operate at LOS "E". Both the Kamehameha Highway and Auloa Road approaches are expected to operate at LOS "F".

***Year 2020 P.M. Peak Hour Traffic Analysis Without Project***
During the Year 2020 PM peak hour of traffic without the proposed project, the left turn/ through movement and the right-turn movements from the HPU Driveway are expected to operate at LOS "F" and LOS "E" respectively, at Kamehameha Highway. The Pali Golf Course Driveway also is also expected to operate at LOS "F". The left-turn movement on southbound Kamehameha Highway is expected to operate at LOS "D".

The intersection of Kamehameha Highway and Pali Highway/Kalaniana'ole Highway is expected to operate at LOS "F", during the Year 2020 PM peak hour of traffic without the proposed project. The Kalaniana'ole Highway, Kamehameha Highway, and Auloa Road approaches are expected to continue to operate at LOS "F", while the Pali Highway approach is expected to continue to operate at LOS "E".

***A.M. Peak Hour Traffic Analysis With Project***
The intersections in the study area are expected to operate at the same Levels of Service with or without the proposed project. The increases in the AM peak hour traffic, attributed to HPU, will comprise 4.6 percent and 0.9 percent of the total traffic at the Kamehameha Highway intersection at HPU Driveway, and at Pali Highway/Kalaniana'ole Highway, respectively. Figure 9 depicts the AM peak hour traffic with the proposed project, and the results of the capacity analysis.

***P.M. Peak Hour Traffic Analysis With Project***
The right-turn movement from the HPU Driveway onto Kamehameha Highway is expected to operate at LOS "F", while the left-turn movement from southbound Kamehameha Highway into the HPU Driveway is expected to operate at LOS "D". The other traffic movements at the intersection are expected to operate at the same Levels of Service without the proposed project.

During the PM peak hour of traffic with the proposed project, the intersection of
Kamehameha Highway and Pali Highway/Kalaniana'ole Highway are expected to operate at the same Levels of Service without the proposed project. The increases in the PM peak hour traffic, attributed to HPU, will comprise 6.8 percent and 1.0 percent of the total traffic at the Kamehameha Highway intersections at HPU Driveway, and at Pali Highway/Kalaniana'ole Highway, respectively.

***Recommendations***
The existing left-turn lane on southbound Kamehameha Highway at the HPU Driveway is sufficient in length to accommodate the existing and projected left-turn traffic demands with and without the proposed project. An extension of the left-turn lane on southbound Kamehameha Highway at the HPU Driveway is not recommended at this time.

While the delays on the left-turn movement from HPU Driveway may be excessive, operating at LOS "F", the left-turn volume may not meet the traffic signal warrants, established in Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) for a one lane approach on the minor street. The MUTCD states that "right turn traffic should not be included if the movement enters the major street with minimal conflict", which is case under existing conditions. However, under the future traffic conditions with the proposed project, the right-turn movement from the HPU Driveway is expected to experience longer delays, operating at LOS "F". Therefore, the combined left-turn and right-turn volumes may satisfy one or more warrants for the installation of traffic signals. A traffic signal warrant analysis should be conducted in the future, as necessary.

The traffic impact analysis of special events held at the performance arts center or at the multi-purpose gymnasium is beyond the scope of this study. Consideration should be given to scheduling special events at the Hawai'i Loa Campus during the off-peak periods of traffic. During special events, special duty police officers should be stationed at the HPU Driveway and within the campus to monitor and control pedestrian and vehicular traffic, as necessary.

## 3.14 PARKING & LOADING

***Existing Conditions***

The Hawai'i Pacific University Hawai'i Loa Campus currently has 472 parking stalls on-site. Most of the parking is in an open parking lot at the entrance to the University. The main parking lot is distant and located down-slope from the buildings. A smaller parking lot fronts the Academic Center and parking spaces line the streets traversing through the campus. Other parking areas support the residential halls and the maintenance facility on the distant end of campus. All existing parking lots will remain.

***Probable Impacts and Mitigation Measures***

The HPU Hawai'i Loa Campus will require additional parking to be provided on-site. A new parking lot will be constructed by converting the existing soccer field into a landscaped parking area, holding 521 new parking spaces.

Overall, the total number of stalls provided (993 stalls) will exceed the total number of stalls required (987), yielding a net of 5 stalls over the necessary amount required. *Table 3-1* provides a detailed breakdown of the parking for the proposed project.

ADA stalls for handicapped users is and will continue to be provided on the project site. ADA parking will be provided for the new buildings.

During construction, there will be minor impacts to parking. However, appropriate mitigation measures will be carried out to minimize any disruption to parking and traffic flow within the project site. No mitigation measures are required for the parking related to the HPU expansion project once construction of the project is completed.

**Table 3-1**
**Proposed Parking for the HPU Hawai'i Loa Campus**

| | Required Parking | Provided Parking |
|---|---|---|
| Existing Buildings | 228 stalls | 472 stalls |
| New Buildings | 760 stalls | 521 stalls (Proposed) |
| **Total** | **988** | **993** |

The figures above include 20 required accessible parking spaces and 2 required van accessible parking spaces.

## 3.15 SOCIO-ECONOMIC CHARACTERISTICS

***Existing Conditions***
The project site is located in the traditional *moku* of Koʻolaupoko and the *ahupuaʻa* of Kāneʻohe on the island of Oʻahu. The campus is located on the western face of the Oneawa hills and it fronts Kamehameha Highway, directly across the highway from the City and County of Honolulu's Pali Golf Course. The adjacent residential communities are stable neighborhoods, the area is generally considered a very desirable place to live, and home values are above market averages.

The existing Hawaiʻi Pacific University has been an economic contributor to the City and County of Honolulu, and the State as a whole, generating over $88 million annually. In addition to generating revenues that benefit and diversify the State's economic base, Hawaiʻi Pacific University (both campuses) also employs over 1,100 employees.

***Anticipated Impacts and Mitigation Measures***
Expansion of HPU's HLC is not expected to adversely impact property values in the area. The site is bounded and not adjacent to private residences or commercial properties.

The project will create short-term economic benefits as a result of design and construction employment. Upon completion, the proposed improvement will have beneficial long-term social and economic impacts including increased opportunities for the University to provide an enhanced educational opportunity through a digital high-tech media program. In addition, the project will provide increased employment opportunities in the teaching areas of nursing and biological sciences. No specific socio-economic mitigation actions are recommended.

## 3.16 PUBLIC FACILITIES AND SERVICES

This section discusses the project's probable impact on public facilities and services of the project site and surrounding area.

### 3.15.1 Educational Facilities

***Existing Conditions***
HPU is the largest private university in the state of Hawaiʻi. Total school enrollment, for both the Hawaiʻi Loa and Downtown campuses, is over 8,000 students.

***Anticipated Impacts and Mitigation Measures***
No adverse educational impacts are anticipated. On the other hand, numerous beneficial impacts, including a local workforce trained in nursing and natural sciences, with increased employment opportunities are expected to result from the project.

### 3.15.2 Police

***Existing Conditions***
The project site is located in District 4 of the Honolulu Police Department, and is served from the District police station in Kāne'ohe, approximately 3.2 miles away. A security guard service provides additional protection to HPU.
***Anticipated Impacts and Mitigation Measures***
This project should have only a limited and minimal impact on the police department's operations or ability to provide adequate protection services to the surrounding community. District 4 police protection, combined with on-site private security guards, should be adequate for the proposed project. No adverse impacts or mitigation have been specified.

### 3.15.3 Fire

***Existing Conditions***
Primary fire protection to HPU is provided by either the Kāne'ohe Fire Station No. 17, about 3.1 miles away, or the Olomana Fire Station No. 39, also about 3.1 miles away. Each station is approximately 3 – 5 minutes away from the site.

***Anticipated Impacts and Mitigation Measures***
This project is expected to have minimal impact on the Fire Department's operations or ability to provide fire protection services to the project area and surrounding community. The planned structures will be designed to meet fire and building code requirements. This will include providing necessary hydrants and meeting fire flow requirements for water system improvements. Appropriate design plans will also be coordinated with the Fire Department for their review during the project's design phase.

### 3.15.4 Medical Emergencies

***Existing Conditions***
Numerous major hospitals and clinics are in relative proximity to the HPU site. Prompt attention is available to patients in medical emergencies. The nearest emergency hospital, Castle Medical Center, is located approximately 1.6 miles from the project site, taking an average response time of 5-8 minutes.

***Anticipated Impacts and Mitigation Measures***
The proposed project will not impact the handling of medical emergencies. The Castle Medical Center will continue to function in its present locations and will be accessible to HPU's site. No mitigation is proposed.

### 3.15.5 Solid Waste Management

***Existing Conditions***

Solid waste is collected in three standard commercial bins that are hauled away by private contractors three times per week. The Hawai'i Pacific University Expansion project will generate additional solid waste; however, recycling efforts will be made. An existing campus recycling program is only limited to paper, but will likely expand as the project moves forward.

***Anticipated Impacts and Mitigation Measures***
Additional trash bins will be provided for the Hawai'i Loa Campus to accommodate increased use. No mitigation is proposed but recycling programs should reduce overall levels of generation.

### 3.14.6 Accessibility for Persons with Disabilities

***Existing Conditions***
The project site currently complies with existing Americans with Disability of Act (ADA) standards. The project will create accessible routes that connect to all parts of the Hawai'i Pacific University Hawai'i Loa Campus.

***Anticipated Impacts and Mitigation Measures***
During construction, temporary ADA accessibility will not be required as the project area is not located near other buildings that require accessibility. Existing ADA parking stalls in the project site will be minimally impacted during construction; however, the remaining ADA stalls located on the HPU campus will be maintained. The project will be in conformance with the provisions of the ADA Act, which has been incorporated into the City's Building Code. Project design will include parking and elevators for individuals requiring assistance to access the building.

## 3.17 ARCHAEOLOGICAL RESOURCES

***Existing Conditions***
The project area is located within the windward O`ahu district of Ko`olaupoko, and is situated in the *ahupua`a* (traditional land division) of Kāne`ohe. Kāne`ohe is a large *ahupua`a* of approximately 11,000 acres, extending from the windward crest of the Ko`olau Range to include most of the Mōkapu Peninsula. Kāne'ohe Ahupua'a is bordered by the ahupua'a of He'eia to the west and Kailua to the east.

A *Draft Archaeological Assessment for the Hawai'i Pacific University Master Plan Project* was completed by Cultural Surveys Hawai'i, Inc. (CSH, December 2009) for the proposed project area and is included as *Appendix E*. For this study, the Area of Potential Effect (APE) included an approximately 47-acre portion of the overall 132-acre project area. No historic properties were identified within the APE.

The study included references to two proposed trail extensions behind the HPU Campus, which were being considered at the commencement of the study. However, the trail extensions are no longer being considered at the present time.

The archaeological assessment was prepared to support the proposed project's historic preservation review under Hawai'i Revised Statutes (HRS) Chapter 6E-42 and Hawai'i Administrative Rules (HAR) Chapter 13-13-284. In consultation with SHPD/DLNR, the

archaeological inventory survey investigation was designed to fulfill the State requirements for an archaeological inventory survey per HAR Chapter 13-13-276. Through document research and cultural consultation efforts, the report provided preliminary information that was applicable to the assessment of the Hawaiʻi Pacific University Hawaiʻi Loa Campus Expansion project and its potential impacts to cultural practices. SHPD accepted the *Archaeological Assessment for the Hawaiʻi Pacific University Master Plan* on January 21, 2010, which met the minimum requirements for compliance with the HAR 13-13-276, *Governing Standards for Archaeological Inventory Studies and Reports*. The acceptance letter from SHPD is also found in *Appendix E*.

Previous Archaeological Research in the Vicinity

Previous archaeological projects around HPU HLC are shown on *Figure 3-5* and summarized in *Table 3-2*. Pre-contact and post-contact historic properties have been found in the vicinity, including several heiau, dry land agricultural terraces, several prehistoric and historic firepits and kilns, stone mounds, and lithic activity areas.

Previous Study in the Project Area

No previous studies of the project area were found.

A review of background research has indicated that land modification and development associated with pineapple cultivation, military infrastructure, and the early construction during the late 1960's and early 1970's of Hawaiʻi Loa College have likely destroyed or severely impacted any previously existing historic properties within the current project area. Therefore, no historic properties are expected to be located within the current project area.

In 2007, a Conservation District Use Application (CDUA OA-3391) for the HPU Hale Kou Force Main. In that application, the State Historic Preservation District stated that the project should have "no effect" on historical resources due to previous ground disturbances during the construction of the H-3 and Kamehameha Highway interchange.

Results of Field Inspection

The fieldwork component of this archaeological assessment was accomplished between November 19 and December 10, 2009 by CSH archaeologist, Matt McDermott, M.A. (principal investigator). The fieldwork required approximately four person-days to complete.

No historic properties were identified within the 47-acre survey area. The majority of the survey area consisted of the landscaped and maintained grounds and facilities of the Hawaiʻi Pacific University Hawaiʻi Loa Campus (Figure 1.7). The campus grounds largely consisted of open mowed lawns, asphalt roadways and parking lots, campus buildings and facilities, and landscaped areas consisting of introduced trees and shrubbery. The majority of the campus grounds appeared to have been previously graded.

Pedestrian inspection focused on the currently undeveloped, heavily vegetated areas along the fringe of the campus grounds. These undeveloped areas are located along the southeastern edge (adjacent to and south of the academic center) and northwestern edge (between the maintained campus grounds and Kamehameha Highway) of the survey area. The undeveloped portions of the survey area along Kamehameha Highway had stands of dense cat's claw

(*Caesalpinia decapetala*). The remainder of survey area had stands of *hau* (*Hibiscus tiliatus*) interspersed between non-native trees and shrubs such as octopus tree (*Brassaia actinophylla*), java plum (*Syzygium cumini*), and guava (*Psidium guajava*).

During the pedestrian survey, several bulldozed asphalt berms and a rusted steel half-tank were identified within the undeveloped areas fronting Kamehameha Highway and determined to be related to previous construction or demolition occurring less than 50 years ago (Figure 22 and Figure 23). Additionally, several concrete culverts were identified along Kamehameha Highway within or adjacent to the current survey area (Figure 24). These culverts were determined to be modern drainage improvements associated with the development of the highway.

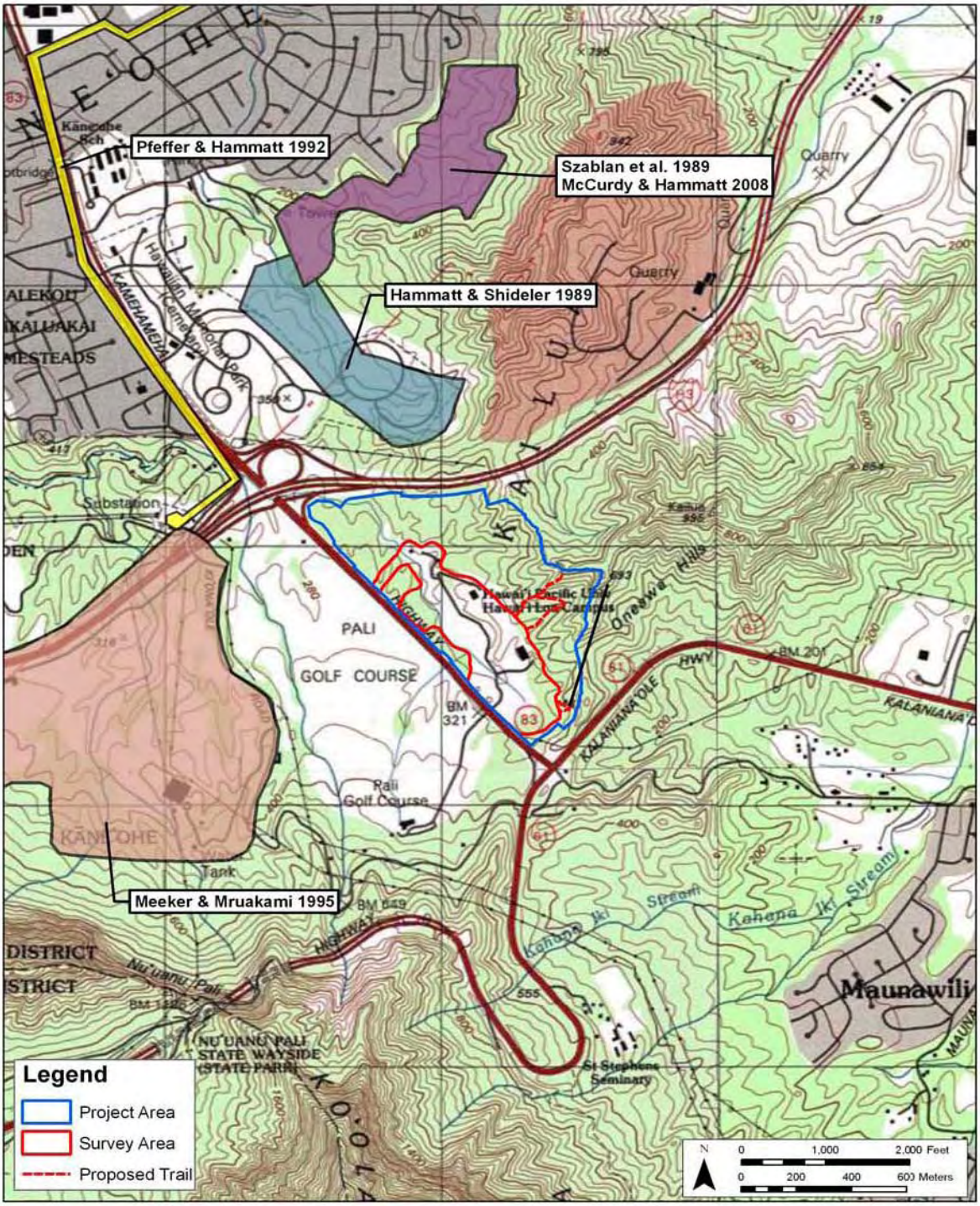


**Figure 3-5 1998 U.S. Geological Survey 7.5-minute series topographic map,** Kāne'ohe **Quadrangle showing the location of previous archaeological studies in the vicinity of the current project area.**

**Table 3-2**
**Archaeological Research near HPU Hawaiʻi Loa Campus**

| Reference | Type of Investigation | Location | Findings |
|---|---|---|---|
| McAllister 1933 | Island-wide survey | Island wide | Identified 11 historic properties in the vicinity of the current project area, 2 of which were heiau |
| Sterling and Summers 1978 | Island-wide survey | Island wide | Section concerning Kāneʻohe includes legendary references to the naming of Kāneʻohe and other historic properties and the descriptions of McAllister's (1933) sites |
| Clark and Riford 1986 | Archaeological Salvage Excavations | Nani Pua Gardens II Subdivision (TMK 4-5-30:43) | Salvage excavations at Bishop Museum site 50-Oa-G5-101. Reports 14C date of 1070-1405; substantial discussion of lithic finds |
| Hammatt 1989 | Subsurface Reconnaissance | 44-291A Kāneʻohe Bay Drive | 4 test trenches revealed no archaeological potential |
| Hammatt and Borthwick 1989 | Archaeological Survey & Assessment | 90-acre Bay View Golf Course Expansion | Documents Waikalua-loko and Waikalua fishponds |
| Hammatt and Shideler 1989 | Archaeological Survey | Veterans Cemetery 90-acres | No significant finds |
| Szabian et al. 1989 | Reconnaissance Survey | N & W facing slope of ridge separating Kailua and Kāneʻohe | Describes 11 historic properties with 25 features, four pre-contact, seven post-contact & Kawaʻewaʻe Heiau |
| Pfeffer and Hammatt 1992 | Archaeological Assessment | Transmission Corridor mostly along Kamehameha Hwy. | No finds |
| Stride et al. 1994 | Inventory Survey & Subsurface Testing | Waikalua Road (TMK 4-5-05: 1,2, 12-14) 3.3 acres at shoreline | No significant finds in eight backhoe trenches |
| Meeker and Murakami 1995 | Archaeological Monitoring and Data Recovery Investigations | Koʻolau Pali (TMK 4-5-42:1 and 6) | Seventeen historic properties investigated; of these, four were recommended for preservation. |

| Reference | Type of Investigation | Location | Findings |
|---|---|---|---|
| McCurdy and Hammatt 2009 | Archaeological Inventory Survey | Hawaiian Memorial Park | 11 historic properties were observed within or near the petition area; 6 properties had been previously identified and included Kawa'ewa'e Heiau, 2 enclosure and terrace complexes, historic terrace, pit feature, & boundary marker. 5 new properties included quarry, stone enclosure, stone alignment, stone storage, pit feature |

***Anticipated Impacts and Mitigation Measures***

No archaeological sites are within or near the vicinity to the Hawai'i Loa Campus project site. Further, there are no surface archaeological features or sites within the property.

It is recommended that an on-call archaeological monitoring program be implemented for all construction activities. A qualified archaeological monitor will remain on-call during all ground disturbance activities. Periodic spot-checks may be performed by the archaeological monitor in order to observe and document subsurface impact, exposed sediment characteristics, and the construction process.

Based on available information, including background research and preliminary community consultation, research indicates that there are no historic properties identified within the approximately 47-acre survey area. Decades of land modification and grading related to pineapple cultivation, military infrastructure at the Pali Training Camp, and the development of the Hawai'i Loa College (currently the Hawai'i Pacific University Hawai'i Loa Campus) have likely destroyed or severely impacted any surface historic property that may have existed within the current survey area. Consequently, CSH's effect recommendation for the proposed project is "no historic properties affected." No mitigation is required.

In accordance with SHPD/DLNR recommendations (SHPD correspondence, 2 December 2009, Log: 2009.4617, Doc: 0912RS11), CSH recommends an on-call archaeological monitoring program be implemented for all construction activities related to the current project. A qualified archaeological monitor will remain on-call during all ground disturbance activities. Periodic spot-checks may be performed by the archaeological monitor in order to observe and document subsurface impact, exposed sediment characteristics, and the construction process. If, in the unlikely event that intact cultural resources are encountered during the course of development activities, all work in the immediate area should stop and the on-call archaeological monitoring firm promptly notified.

The findings of the ongoing community consultation effort as well as an assessment of potential cultural impacts and recommended mitigation measures will be presented in the final Cultural Impact Assessment and the Final EA.

## 3.18 CULTURAL PRACTICES AND RESOURCES

***Existing Conditions***

Hawaiian organizations, agencies, and community members were contacted in order to identify potentially knowledgeable individuals with cultural expertise and/or knowledge of the Project area and the vicinity. The organizations consulted included the State Historic Preservation Division (SHPD), the Office of Hawaiian Affairs (OHA), the Oʻahu Island Burial Council (OIBC), Hui Mālama I Na Kūpuna ʻO Hawaiʻi Nei, the Koʻolaupoko Hawaiian Club, and community members of Kāneʻohe Ahupuaʻa.

As pertinent to the HPU Campus Expansion project area and its planned programmatic objectives and outreach outcomes, the noteworthy findings and applicable recommendations from an interim study *"Cultural Impact Assessment for the Hawaiʻi Pacific University Master Plan Project, Kāneʻohe Ahupuaʻa, Koʻolaupoko District, Island of Oʻahu,"* (February 2010), conducted by Cultural Surveys Hawaiʻi, Inc. (CSH), include the following:

(1) Numerous *wahi pana* (storied places) of the *moku* (district) of Koʻolaupoko and the *ahupuaʻa* (land division extending from the uplands to the sea) of Kāneʻohe place the specific Project area within a cultural context. In particular, the mountainous section of Kāneʻohe Ahupuaʻa near the Project area contains several *wahi pana* connected to the stunning landscape of the *pali* (cliffs), with towering *puʻu* (peaks) over the sheer cliff rock faces overlooking the *mauka* (upland, mountain) forests.

(2) Kāneʻohe Ahupuaʻa is rich in *ʻōlelo noʻeau* (proverbs) and *moʻolelo* (stories and oral histories) about the naming of the *ahupuaʻa* and its *wahi pana*. In particular, the *moʻolelo* of Keahiakahoe illuminates the entire landscape of the *ahupuaʻa*, literally from the peak of the mountains to the coastal waters. By chronicling a rivalry among the taro farmer Kahoe and his siblings, the *moʻolelo* connects the fishermen on the coast of Kāneʻohe Bay and offshore at Moku o Loe (part of the neighboring Heʻeia Ahupuaʻa) to the upland taro farming community. Through the imagery of smoke drifting upwards from Kanoe's fire, the *moʻolelo* further connects the *mauka* region to the peak of the mountain Keahiakahoe (Hawaiian Ethnological Notes ms., cited in Sterling and Summers 1978:206; Landgraf 1994:94).

(3) Several *wahi pana* surround the Project area: Kamaikola, from where a man would either ambush travelers descending the Pali Trail or kill an unsuspecting traveler with a *pohaku puka* (trap door rock) suspended above the door to his house (McAllister 1933:181); Kekele, a place abundant in fragrant *hala* (pandanus) (Pualewa 1866, cited in Sterlin and Summer 1978:221) (possibly *Pandanus odoratissimus*); Na Maka o Kane, a hill that resembled a human face in shape (Parker ms:25-26, cited in Sterling and Summers 1978:220); and Hoʻoleinaʻiwa, a hill with twenty large unusually weathered *pōhaku* (stones) (Landgraf 1994:106).

(4) The *ahupuaʻa* of Kāneʻohe was a center for agriculture and aquaculture, making it one of the primary population centers of Oʻahu in pre-Contact times (Devane et al. 1982:6). Hawaiians irrigated extensive *loʻi kalo* (irrigated taro terrace) with fresh water from *mauka* springs and streams, and they developed a vast network of connected *loko iʻa*

(fishponds). In addition to the irrigated cultivation of *kalo*, the ancestors of Kāneʻohe Ahupuaʻa grew *kula* (dryland) *kalo*, bananas, sweet potatoes, coconut trees, *hala, wauke* (paper mulberry; *Broussonetia papyrifera*) (Handy and Handy 1972:456) and *ʻawa* (kava; *Piper methysticum*) (Greer 1970:66-67). In particular, the upland settlement of Luluku contained the most extensive early wetland agricultural complex on Oʻahu (Allen 1987:265). In post-Contact times through the early 1800's, Hawaiians continued extensive cultivation of taro (Handy and Handy 1972:271-272).

(5) Several *heiau* were once located in the upland regions of Kāneʻohe Ahupuaʻa, including four surviving *heiau* in the vicinity of the Project area: Maunahuaia Heiau was in ruins in the early 19th century (Thrum 1916); Puuwaniania, an agricultural *heiau*, is now covered mostly with *waiwī* (strawberry guava; *Psidium guajava*) trees just below the Pali Highway (Landgraf 1994:102); Kaluaolomana is another *heiau* located nearby (Landgraf 1994:177), was later documented near the Luluku terrace system with the construction of the H-3 freeway (Neller 1989). In addition, Thrum (1916:90) listed Pule and Kuakala as two additional *heiau* at the base of the *pali* in Kāneʻohe Ahupuaʻa but their location is not specified.

(6) On Mōkapu Peninsula over 500 sand ilina (burials) have been unearthed in the dunes (Sterling and Summers 1978:217). There is no documented evidence from archaeological surveys, historical records or oral traditions of *ilina* or *iwi* kūpuna (ancestral remains) within the Project area; however, it is possible that undocumented burials exist within or near the Project area.

(7) The most impressive *ala* (trail) in the *ahupuaʻa* of Kāneʻohe was the Pali Trail, which traversed the sheer cliff rocks of the Nuʻuanu Pali to the base of the mountains near the Project area. Hawaiians used this steep path to transport taro, *poi* (pounded taro), potatoes, fowl, goats, and pigs between Honolulu to windward Oʻahu (Thrum 1901:89). Another path, the Likeke Trail runs along the base of the *pali* in Kāneʻohe Ahupuaʻa *mauka* of the Project area. Richard H. Davis of the Hawaiian Train and Mountain Club recently rediscovered this *ala*, and it was named the Likeke Trail in honor of his Hawaiian name (Ball 2000:199).

(8) The Battle of Nuʻuanu took place in 1795 on the *nuku* (mountain pass) above the Project area. The battle is called Kaleleka'anae, which means "leaping *ʻanae*" (mullet), and refers to the way many Oʻahu armies of Kalanikupule and some of their families chose to or were forced to jump to their deaths from the steep Nuʻuanu Pali rather than accept defeat from the warriors of Kamehameha (James 2004). After the Battle of Nuʻuanu, Kamehameha became the sole ruler of Oʻahu, Molokaʻi, Lānaʻi, Hawaiʻi, and Maui (Kamakau 1992:172-173). His sons Liholiho and Kauikeaouli—Kamehameha II and Kamehameha III, respectively—inherited most of the land in Kāneʻohe Ahupuaʻa (Kamakau 1992).

(9) Kamehameha III, in response to agricultural development in Kāneʻohe and other *ahupuaʻa* on windward Oʻahu, secured funds in 1845 to make the old Pali Trail accessible to horses by paving the path with stones. In 1882 construction began to widen and reduce the grade of the road. The improved Pali Road opened in 1897 after workers found an estimated 800 skulls along with other bones at the bottom of the Pali near the

Project area—the remains of the warriors defeated by Kamehameha in 1795 (The Island Call 1953). The road was maintained for 55 years until work began in 1952 to construct a new four-lane highway with two tunnels running under the site of the Battle of Nuʻuanu (Devaney et al. 1982:172).

(10) The middle 19th century brought great changes to Kāneʻohe Ahupuaʻa, including private and public land ownership laws during the *Māhele* (division of Hawaiian lands). The present Project area occupies land within the *ʻili* (small land division) of Kaeleuli, which covers 509.5 acres. Historic maps and documents indicate that half of this *ʻili* was awarded to the government and hald was given as a Māhele Award to an individual identified as Haole (Lyons 1876).

(11) Successive eras of commercial rice and sugar cultivation, ranching, pineapple farming, and dairy farming transformed the land of Kāneʻohe Ahupuaʻa. In particular, most of the pineapple lands in Kāneʻohe Ahupuaʻa during the early 1900's were located below the Nuʻuanu Pali at and near the current Project area. Many archaeological sites were likely destroyed by pineapple field clearance during this time (Kelly 1987).

(12) In 1918, a military reservation was built on Mōkapu Peninsula at Kāneʻohe Bay; Fort Hase was commissioned and was known as the Kuwaahoe Military Reservation. Now known as Marine Corps Base Hawaiʻi (MCBH), the base contributed to commercial and residential development in and around Kāneʻohe Ahupuaʻa. The Pali Training Camp was constructed during World War II, a regimental combat team training center covering 4,400 acres *mauka* of the Project area (U.S. Army Corps of Engineers 2005).

(13) The construction of the Wilson Tunnel on the Likelike Highway and the expansion of the Pali Highway in the 1950's and 1960's allowed easier access from Honolulu through the Koʻolau mountains to windward communities, which further contributed to residential development in and around Kāneʻohe Ahupuaʻa.

(14) During the late 1960's, Hawaiʻi Loa College was constructed within the current Project area. The college was opened in the fall of 1971 and continued successfully until merging with Hawaiʻi Pacific University in 1992.

***<u>Anticipated Impacts and Mitigation Measures</u>***

Based on the community consultations, there is one major concern regarding potential adverse impacts on cultural, historic and natural resources, practices and beliefs as a result of the proposed HPU Master Plan Project:

**Ahupuaʻa Boundary Marker Project.** The Ko`olaupoko Hawaiian Civic Club is collaborating with the Kailua and Waimanalo Hawaiian Civic Clubs and the State of Hawaiʻi to complete an *ahupua 'a* boundary marker project, which includes constructing stone markers and setting up signs at the boundaries of the 11 *ahupua* 'a in windward 0`ahu in the *moku* of Ko`olaupoko. According to Mrs. Cypher and Mrs. Hewett, the *ahupua 'a* boundary between Kāneʻohe and Kailua, includes the ridge behind the HPU campus in the Project area.

The Ko`olaupoko Hawaiian Civic Club is presently planning to build a stone *ahu* (altar) and an educational sign at Castle Junction—the intersection of the Pali and Kamehameha Highways—to mark this *ahupuaʻa* boundary. Mrs. Cypher and Mrs. Hewett are concerned about any future development on the ridge behind the HPU campus. They want the land to remain intact in order to preserve the landscape of the traditional *ahupua 'a* boundary.

Based on the information gathered from archival documents, archaeological research, and community consultation detailed in the CIA report, CSH recommends the following measures to mitigate potentially adverse effects of the proposed Project on cultural, historic and natural resources, practices and beliefs:

1. Land-disturbing activities may uncover burials or other cultural resources. Should cultural or burial sites be identifies during ground disturbance, all work should immediately cease and the appropriate agencies notified pursuant to applicable law.

2. Community members should be further consulted throughout the planning process, including the design and implementation of the proposed development. In particular, community members should be consulted so that the Project does not alter the natural and cultural landscape of the ridge behind the HPU campus, as this is part of the traditional *ahupua `a* boundary between Kāneʻohe and Kailua. Addressing their concerns will minimize the impact of the Project on the cultural practices and traditions of the *kama ʻaim* and *apuna* of Kāneʻohe Ahupuaʻa.

## 3.19 VISUAL RESOURCES

***Existing Conditions***

The project site is located in Kāneʻohe, Oahu, on Kamehameha Highway across from the Pali Municipal Golf Course. Hawaiʻi Pacific University Hawaiʻi Loa Campus is currently situated at the base of a hillside with open space to the northwest and east. *Figure 3-6* provides an aerial perspective of the project area. This perspective shows heavy shrubbery and green open space surrounding the site and that it is bounded by Kamehameha Highway, Kalanianaʻole Highway, and the H-3 Freeway. The accompanying view analysis provides visual perspectives of the existing conditions of the project site, and particularly from the prominent vantage points of Kamehameha Highway and the Pali Lookout, and an additional vantage point from the Pali Golf Course Club House.

HPU is accessible via Pali Highway and H-3 Freeway as they merge into Kamehameha Highway. Views from Kamehameha Highway immediately after turning left from Pali Highway, shows heavy shrubs and trees that completely shield the HPU Campus. (*Figure 3-7*). Upon approach to the entrance of the campus (*Figure 3-8*), trees give way to shrubs and bushes that allow views of the school's existing parking lot. At the entrance to the school (*Figure 3-9*), looking from the entrance of the Pali Golf Course, no structures, other than a guard shack, is readily visible due to trees and heavy landscaping.

Approaching HPU from the direction of the H-3 Freeway, the shrubbery continues until a sign in the median is visible directing drivers to HPU, and the campus, again, is shielded from view by heavy brush and trees (See *Figures 3-10 to 3-14*). As one approaches closer to the campus

entrance in the same direction, the landscaping continues until one is directly at the entrance (*Figure 3-9*).

Another prominent vantage point is from the Pali Lookout, located off of Pali Highway before it starts to make its descent from Honolulu into Kāne'ohe/Kailua. The Lookout is a tourist attraction offering visitors an expansive view of Windward Oahu. HPU is visible from this perspective (*Figure 3-15*). The site is shown to be surrounded by trees and heavy shrubs. Kamehameha Highway is not visible from the Lookout.

Another vantage point is from the Pali Golf Course Club House. Only golfers or visitors to the Club House would likely see this view. This view displays the rooftops of several structures at HPU, but most of them are hidden behind tall trees (*Figure 3-16*).

***Anticipated Impacts and Mitigation Measures***

As indicated above, the project site is largely shielded from public view by heavy shrubs and trees, and is visible from selected vicinities from the Pali Highway, and immediately upon entry onto the campus from Kamehameha Highway. The proposed expansion will be integrated into the natural contours of the site and be similar in scale to the existing structures, thus not impact existing views. No new rooftop will be higher than the existing Cooke Academic Center, which sits at the highest point of the project site. The new Academic Center II, along with the Paul and Vi Loo Performing Arts Center and Multi-Purpose Gym, all sit at a level lower than the existing Academic Center, but will provide a new frontage and image for the campus while still honoring, by integration, the Cooke Academic Center.

The proposed HPU expansion will conform to the height limit, and as depicted in Site Section B (*Figure 3-17*), its maximum height will be at lower height than of the current Academic Center. Landscaping will be used to improve the visual character of the project site from roadway perspectives along Kamehameha Highway.

**Figure 3-6 Aerial View Analysis Photo Key**

**Figure 3-7 View from Kamehameha Highway After Left Turn From Pali Highway (Key 1)**

**Figure 3-8 View from Kamehameha Highway Approaching Closer to HPU Entrance (Key 2)**

**Figure 3-9 View of Entrance to HPU from Entrance to Pali Municipal Golf Course (Key 3)**

**Figure 3-10 View Approaching HPU Campus from H-3 (Key 8)**

**Figure 3-11 View Approaching HPU Campus from H-3 (Key 7)**

**Figure 3-12 View Approaching HPU Campus from H-3 (Key 6)**

**Figure 3-13 View of Directional Sign for HPU Campus from H-3 (Key 5)**

**Figure 3-14 View Approaching Left-hand Turn Lane into HPU from H-3 (Key 4)**

**Figure 3-15 View from Pali Lookout Looking Towards HPU Campus**

**Figure 3-16 View from Pali Golf Course Club House with HPU Campus in the Background**

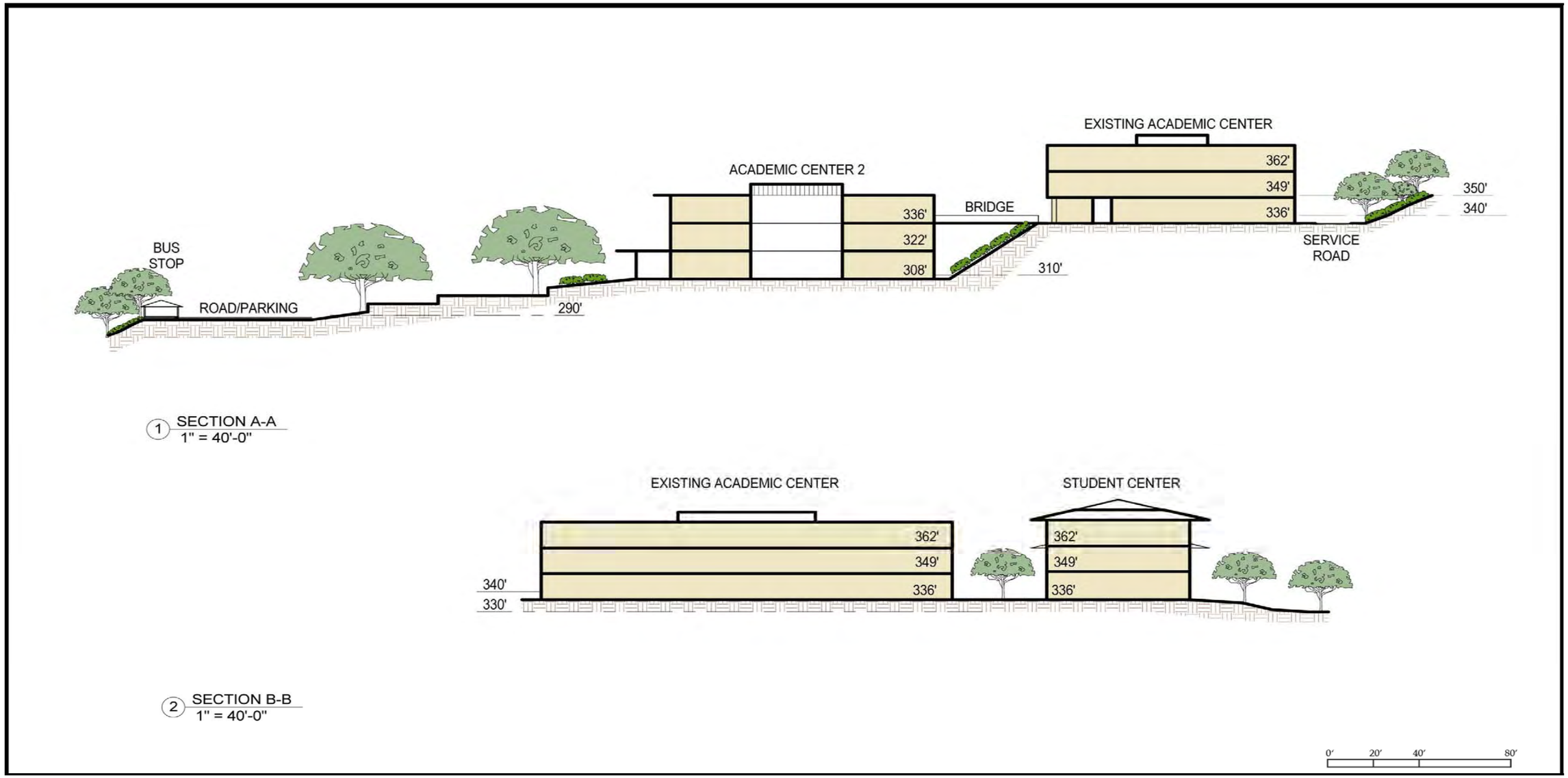


**Figure 3-17 Site Section A-A and B-B showing height comparisons of new buildings to existing Academic Center**

The HPU expansion will be similar in scale to the existing structures. Heavy landscaping, that currently shields the view from Kamehameha Highway, will be maintained and additional landscaping will be added. Specifically, impacts to the vantage point from Kamehameha Highway will be minimal and not significant.

Accordingly, significant adverse impacts on visual resources are not anticipated.

## 3.20 POTENTIAL CUMULATIVE AND SECONDARY IMPACTS

Cumulative effects are impacts, which result from the incremental effects of an activity when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertake such other actions.

The Hawai'i Pacific University Hawai'i Loa Campus Expansion project will help to improve the higher education in our State by providing increased opportunities in nursing and biological sciences education programs, on-campus residential housing, and gathering places such as the new Student Center. The project will also support the community by providing increased cultural and recreational facilities.

Construction activity during the proposed project will generate direct employment as well as indirect and induced employment in construction-related industries. For long-term operations, the expanded campus will require additional employees, including faculty and staff, as well as additional goods and services from related businesses.

# 4.0 ALTERNATIVES TO THE PROPOSED PROJECT

# 4.0 ALTERNATIVES TO THE PROPOSED PROJECT

This Draft Environmental Assessment evaluates alternatives to the proposed project described in *Section 2.0*. The following provides discussion of the alternatives to the proposed project.

## 4.1 ALTERNATIVE A – NO-ACTION ALTERNATIVE

The "no-action" is the baseline against which all other alternatives are measured. "No-action" refers to the future site and program conditions that will likely result should the proposed project not proceed.

This alternative will result in keeping the existing HPU campus on the site, in its present operation and capacity for approximately 1,200 students. Construction of the proposed expansion would not occur and the anticipated improvements to the campus and community would be foregone. While the selection of this alternative would mean that approximately $70 million would not be expended on the project, it would also mean that the plethora of substantial educational and economic benefits expected to accrue from the project would not be realized since the project would not be implemented.

Due to the many potential benefits of the proposed site redevelopment, the "no-action" alternative was not considered.

## 4.2 ALTERNATIVE B – ALTERNATIVE LOCATIONS FOR THE PROPOSED PROJECT

Hawai'i Pacific University's Hawai'i Loa Campus is one of two campuses, the other of which is located in Downtown Honolulu. The Downtown campus is not suited for expansion and a lack of on-campus housing is a big reason for the Hawai'i Loa Campus expansion.

Other reasons to execute the expansion of HPU at its HLC include:

(1) Lack of vacant land at or around the Honolulu campus;

(2) All Downtown options would include going vertical for parking and facilitation, which translates to extensive costs;

(3) The Downtown site does not have the natural resources and open-space areas the HLC is blessed with; and

(4) The Downtown campus and immediate surrounding area is already crowded and congested.

## 4.3 ALTERNATIVE C – LARGER SPACE PROGRAM

The master planning process employed to develop a program of space needs for the Hawai'i Pacific University Hawai'i Loa Campus Expansion considered a larger scaled program of improvements. In addition to what is currently being proposed, this option considered the construction of an 800-seat chapel, a maximum enrollment of 2,500 students, and an alternate entry/exit point along the northwestern section of Kamehameha Highway.

Although the larger scaled improvements alternative could provide additional benefits identified by the proposed project, current economic restraints prevent this level of expansion at this time.

# 5.0 APPLICABLE LAND USE PLANS AND POLICIES

# 5.0 PLANS AND POLICIES

In this chapter, the project's consistency with applicable land use policies set forth in the Hawai'i State Plan, State Land Use Law, the State 2050 Sustainable Plan, the City and County of Honolulu General Plan, the Ko'olaupoko Sustainable Communities Development Plan, and the Land Use Ordinance are discussed.

## 5.1 AMERICANS WITH DISABILITIES ACT OF 1991

In 1991, the Federal government enacted the Americans with Disabilities Act (ADA) to provide equal accessibility for persons with disabilities. Part of this statute requires building designs to consider the needs of persons with disabilities. Chapter 103-50 of the Hawai'i Revised Statutes covers "buildings, facilities and sites utilizing state or county funds, or federal funds administered by the state or county." Since the Hawai'i Pacific University is a private institution, it falls under the jurisdiction of Title III of the ADA, which covers private entities that "own, lease, lease to or operate a place of public accommodation." Public accommodation includes "places of education (e.g., nursery schools, elementary, secondary, undergraduate, or postgraduate private schools)."

**Discussion:**
The intent of the proposed expansion project is to continue to operate as a private university. Accordingly, the design of the new buildings will comply with ADA requirements.

## 5.2 HAWAI'I STATE PLAN

The Hawai'i State Plan establishes a statewide planning system that provides goals, objectives, and policies that detail priority directions and concerns of the State of Hawai'i; these will be discussed as they relate to the proposed project.

It is the goal of the State, under the Hawai'i State Planning Act (Chapter 226, HRS), to achieve the following:

- A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawai'i present and future generations.
- A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people.
- Physical, social, and economic well-being, for individuals and families in Hawai'i, that nourishes a sense of community responsibility, of caring, and of participation in community life (Chapter 226-4, HRS).

Specific objectives and policies of the State Plan that pertain to the project are as follows:

**Section 226-5 Objective and policies for population.**

*(a) It shall be the objective in planning for the State's population to guide population growth to be consistent with the achievement of physical, economic, and social objectives in the chapter.*
*(b) To achieve the population objective, it shall be the policy of this State to:*
*(3) Promote increase opportunities for Hawai'i's people to pursue their socio-economic aspirations throughout the islands.*
*(7) Plan the development and availability of land and water resources in a coordinated manner so as to provide for the desired levels of growth in each geographic area.*

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

*(a) Planning for the State's economy in general shall be directed towards achievement of the following objectives:*
*(1) Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawai'i's people.*
*(2) A steady growing and diversified economic base that is not overly dependant on a few industries.*
*(b) To achieve the general economic objectives, it shall be the policy of this State to:*
*(1) Expand Hawai'i's national and international marketing, communication, and organizational ties, to increase the State's capacity to adjust to and capitalize upon economic changes and opportunities occurring outside the State.*
*(2) Promote Hawai'i as an attractive market for environmentally and socially sound investment activities that benefit Hawai'i's people.*
*(3) Seek broader outlets for new or expanded Hawai'i business investments.*
*(4) Expand existing markets and penetrate new markets for Hawai'i's products and services.*
*(6) Strive to achieve a level of construction activity responsive to, and consistent with, state growth objectives.*
*(7) Encourage the formation of cooperatives and other favorable marketing arrangements at the local or regional level to assist Hawai'i's small scale producers, manufacturers and distributors.*
*(10) Stimulate the development and expansion of economic activities which will benefit areas with substantial or expected employment problems.*
*(11) Maintain acceptable working conditions and standards for Hawai'i's workers.*
*(14) Promote and protect intangible resources in Hawai'i, such as scenic beauty and the aloha spirit, which are vital to a healthy economy.*
*(15) Increase effective communication between the educational community and the private sector to develop relevant curricula and training programs to meet future employment needs in general, and requirements of new, potential growth industries in particular.*

**Section 226-10 Objectives and policies for the economy—potential growth activities.**

*(a) Planning for the State's economy with regard to potential growth activities shall be directed toward achievement of the objective of development and expansion of potential growth activities that serve to increase and diversify Hawai'i's economic base.*
*(b) To achieve the potential growth activity objective, it shall be the policy of this State to:*
*(1) Facilitate investment and employment in economic activities that have the potential for growth such as … film and television production;*

*(3) Enhance and promote Hawai'i's role as a center for international relations, trade, finance, services, technology, education, culture, and the arts.*
*(5) Promote Hawai'i's geographic, environmental, social and technical advantages to attract new economic activities into the State;*
*(8) Develop, promote, and support research and educational and training programs that will enhance Hawai'i's ability to attract and develop economic activities of benefit to Hawai'i.*

**Section 226-10.5 Objectives and policies for the economy--information industry.**

*(a) Planning for the State's economy with regard to the information industry shall be directed toward the achievement of the objective of positioning Hawai'i as the leading dealer in information businesses and services in the Pacific Rim.*
*(b) .....To achieve the information industry objective, it shall be the policy of this State to:*
*(2) Facilitate the development of new business and service ventures in the information industry which will provide employment opportunities for the people of Hawai'i;*
*(3) Encourage greater cooperation between the public and private sectors in developing and maintaining a well- designed information industry;*
*(5) Provide opportunities for Hawai'i's people to obtain job training and education that will allow for upward mobility within the information industry.*

**Discussion:**
The proposed expansion of the Hawai'i Pacific University's Hawai'i Loa Campus is consistent with the objectives and policies of the State Plan listed above. The project will offer increased and diversified opportunities to Hawai'i's people for the technical training and pursuit of creative, highly skilled employment within the State of Hawai'i.

## 5.3 HAWAI'I STATE LAND USE DISTRICT BOUNDARIES

The State of Hawai'i Land Use Law regulates the classification and uses of lands in the State to accommodate growth and development, and to retain the natural resources in the area. All State lands are classified by the State Land Use Commission, as Urban, Rural, Agricultural, or Conservation, with consideration given to the General Plan of the County.

The proposed project site lands are designated Conservation District. Chapter 205-2 (b) Hawai'i Revised Statutes, states that:

*"Conservation districts shall include areas necessary for protecting watersheds and water sources; preserving scenic and historic areas; providing park lands, wilderness, and beach reserves; conserving indigenous or endemic plants, fish, and wildlife, including those which are threatened or endangered; preventing floods and soil erosion; forestry; open space areas whose existing openness, natural condition, or present state of use, if retained, would enhance the present or potential value of abutting or surrounding communities, or would maintain or enhance the conservation of natural or scenic resources; areas of value for recreational purposes; other related activities; and other permitted uses not detrimental to a multiple use conservation concept."*

***1) The proposed land use is consistent with the purpose of the Conservation District.***

**Discussion:**
The purpose of the Conservation District is to conserve and protect the State's special and unique cultural and natural resources (Section 205-2(e) of Chapter 205, HRD). The proposed project will not impact special or unique cultural and natural resources. The project site, which currently has Hawai'i Pacific University as its current use, does not include any known rare, threatened, or endangered species, or any sensitive natural habitats.

***2) The proposed use is consistent with the objectives of the subzone of the land on which the use will occur.***

**Discussion:**
The campus site is located within the Hawai'i Loa College Special Subzone of the Conservation District. The objective of the Special Subzone "is to provide for areas possessing unique developmental qualities which complement the natural resources of the area." (Section 13-5-15, HAR). This is the most flexible of the subzones and campus uses are permitted with approval from the BLNR. The proposed use is consistent with the existing subzone as it will expand on the current educational use and will maintain the overall rural character of the area by maintaining a vast amount of open space on the site.

The existing campus was developed under a previously approved conservation district use permit (CDUP), approved by the Board of Land and Natural Resources on August 12, 1966. The proposed project will require an amendment to the existing permit or a new CDUP.

***3) The proposed project will not cause any substantial adverse impact to existing natural resources within the surrounding area, community, or region.***

**Discussion:**
The proposed project will not significantly impact existing conditions at the Hawai'i Pacific University, Hawai'i Loa Campus, nor will it generate adverse impacts to existing natural resources within the surrounding area, community, or region. Retaining walls and drainage lines will be constructed to prevent any possibility of erosion. The site is not located in a flood plain and is not adjoining any natural or manmade water features. There will be no change in the designated and approved use of the property. Improvements are planned to generally remain within the existing developed area of the overall property.

***4) The proposed land use, including buildings, structures and facilities, will be compatible with the locality and surrounding areas, and to the physical conditions and capabilities of the specific parcel or parcels.***

**Discussion:**
The proposed land use will be completely compatible to the existing use for educational purposes. The site will be landscaped to blend in with the existing landscape, which will also include a large buffer of trees to shield the site from the main public road ways.

The project site is beautiful, but challenging and the project itself will be integrated into the natural contours of the site. Furthermore, the project will incorporate key energy and water saving design strategies to limit the project's environmental footprint and will be designed with a fully integrated approach to meet the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) certification criteria.

***5) The existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon.***

**Discussion:**
The buildings of the proposed project will be situated where they will have the least impact on the existing trees and landscape. Construction and usage of these buildings would not be in conflict with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS. These facilities will not adversely impact or affect any natural resources. A sculpture garden will grace the entryway to the academic center.

***6) Subdivision of land will not be utilized to increase the intensity of land uses in the Conservation District.***

**Discussion:**
No subdivision of land is proposed as part of the proposed project.

***7) The proposed land use will not be materially detrimental to the public health, safety, and welfare.***

The proposed project will have no significant negative impact on public health, safety, or welfare. The proposal includes an increase in classroom space, performing arts space, residential dormitories, and recreational facilities, all of which will enhance the public health, safety, and welfare of students, faculty, and visitors to Hawaii Pacific University Hawaii Loa Campus. (Please refer to Chapter 3 in this EA: Description of the Environmental Setting, Potential Impacts, and Mitigation Measures.)

## 5.4 COASTAL ZONE MANAGEMENT (CZM)

The objectives of the Hawai'i Coastal Zone Management (CZM) program are set forth in Chapter 205A, HRS. The objectives of the program are intended to promote the protection and maintenance of valuable coastal resources. All lands in Hawai'i are classified as valuable coastal resources. The following discussion assesses the conformity of the proposed project to the objectives and policies of the State's CZM program.

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

**Discussion:** The project site is about 3.8 miles from Kalama Beach Park, the closest public shoreline recreational facility, and therefore will not affect coastal recreational opportunities.

***Historic Resources***

**Objective:** Protect, preserve, and where desirable, restore those natural and man-made historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.
**Discussion:** An archaeological survey and cultural impact assessment for the site were conducted. The proposed project will not impact significant historic and prehistoric resources. The proposed buildings will either be constructed in an area that has been previously cleared and graded, or in an area that does not contain any significant historic or prehistoric resources in the CZM area (*See* 3.17 of this EA). The proposed project is located on private property and there are no known cultural resources or practices that would be affected (*See* 3.18 of this EA).

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

**Discussion:** The proposed project will not impact the quality of coastal scenic and open space resources. The proposed project does not involved significant scenic view planes as identified in Figure 2-4 of the Ko'olaupoko Sustainable Communities Plan. Additionally, the project site is heavily landscaped from the main roads and will continue to conceal the existing and proposed structures.

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

**Discussion:** The proposed project is many miles from the shoreline and will not impact the quality of coastal scenic and open space resources. Retaining walls and drainage lines will be constructed to prevent any possibility of erosion. The site is not located in a flood plain and is not adjoining any natural or manmade water features. There will be no change in the designated and approved use of the property. Improvements are planned to generally remain within the existing developed area of the overall property. Best Management Practices will be employed during construction to minimize storm water runoff discharged from the site. Bioswales will be used to reduce the impact of storm water runoff and improve ground water infiltration.

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

**Discussion:** The proposed project will fulfill the educational needs of the applicant and no additional public improvements will be necessary. The programs that will expand are in growth areas of the economy and will help the State meet manpower requirements for emerging industries.

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

**Discussion:** The project site is neither located within an identified coastal flood zone, nor in a tsunami inundation zone. There are no known erosion or subsidence problems within the area of the project site.

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

**Discussion:** A Pre-Consultation letter was sent out on November 23, 2009 to government agencies and interested parties. The applicant met with the Kailua Neighborhood Board on February 16, 2010.

*Public Participation*
**Objective:** Disseminate public information on coastal issues.

**Discussion:** As previously noted a presentation was made to the Kailua Neighborhood Board. Additionally, the EA review process includes a 30-day public comment period during which the public will have an opportunity to provide their input on the project. Copies of the Draft EA will be distributed to various agencies and organizations, and notice of the Draft EA's availability will be published in the Office of Environmental Quality Control Environmental Notice. Finally, the project will be the subject of a public hearing before the BLNR.

*Beach Protection*
**Objective:** Locate structures and improvements to minimize beach erosion and minimize interference with recreational and waterline activities.

**Discussion:** The project site is not located within a recreational or waterline area and the proposed project is not expected to result in beach erosion. Again, distance from the sea minimizes impacts. Also, measures to control storm water runoff mitigate any significant impacts to marine resources.

*Marine Resources*
**Objective:** Implement the State's ocean resources management plan.

**Discussion:** The proposed project is not expected to have any adverse impacts on marine resources or interfere with public recreational and waterline activities.

## 5.5 2050 SUSTAINABLE PLAN

The Hawai'i 2050 Sustainability Plan as a long-term strategy has as its main goals and objectives respect for culture, character, beauty, and history of the state's island communities; balance among economic, community, and environmental priorities; and an effort to meet the needs of the present without compromising the ability of future generations to meet their own needs.

The 2050 Plan delineates five goals toward a sustainable Hawai'i accompanied by strategic actions for implementation and indicators to measure success or failure. The goals and strategic actions that are pertinent to the HPU Campus expansion are as follows.

**Goal One:** Living sustainably is part of our daily practice in Hawai'i.

*Strategic Actions:*

- *Develop a sustainability ethic.*
- *Conduct ongoing forums and cross-sector dialogue to promote collaboration and progress on achieving Hawai'i's sustainability goals.*

***Discussion:*** *HPU will be a sustainability model for higher education facilities and be HPU's marker in environmental stewardship. The project will incorporate design strategies to limit the project's environmental footprint and will be designed with a fully integrated approach to meet the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) certification criteria.*

**Goal Two:** Our Diversified and globally competitive economy enables us to meaningfully live, work, and play in Hawai'i.

*Strategic Actions:*

- *Develop a more diverse and resilient economy.*
- *Increase the competitiveness of Hawai'i's workforce.*

***Discussion:*** *The two main thrusts driving HPU's campus expansion are to: 1) add 400 additional on-campus housing and 2) accommodate the growth of the two academic programs based at the Hawai'i Loa Campus, Nursing and Natural Sciences. These expanded programs will help prepare students to fill the tremendous need in health and sciences.*

**Goal Three:** Our natural resources are responsibly and respectfully used, replenished, and preserved for future generations.

*Strategic Actions:*

- *Conserve water and ensure adequate water supply.*
- *Increase recycling, reuse and waste reduction strategies.*

***Discussion:*** *The Hawai'i Loa Campus will be a sustainability model for higher education facilities and will be HPU's marker in environmental stewardship. The overarching plan for energy and water resources should follow the following basic principles: 1) Reduce demand; 2) Design efficient systems; 3) On-site generation (e.g. power, water); and 4) Offset off-site resource needs and impacts.*

**Goal Four:** Our community is strong, healthy, vibrant and nurturing, providing safety nets for those in need.

*Strategic Actions:*

- *Strengthen public education.*

**Goal Five:** Our Kanaka Maoli and island cultures and values are thriving and perpetuated.

*Strategic Actions:*

- *Celebrate our cultural diversity and island way of life.*

**Discussion:**

The HPU expansion addresses sustainability and protects our natural resources through meeting sustainable building design standards and practices. Design strategies may include incorporating natural lighting, energy-efficient mechanical and electrical systems, efficient

plumbing systems, and architectural design features such as energy-efficient windows to decrease cooling loads on the building and increase interior thermal comfort levels. The project is expected to be designed to achieve LEED certification.

The Campus expansion will improve educational opportunities in Hawai'i with improved and expanded facilities for higher education. This will help to create a more skilled and resilient workforce that will help Hawai'i's economic competiveness.

Native and local cultural values are highlighted in the major themes of the Campus Master Plan. Landscaping will highlight native and Polynesian-introduced species but will also include those species that are associated with Hawai'i's multi-cultural heritage.

## 5.6 CITY AND COUNTY OF HONOLULU GENERAL PLAN

Adopted by resolution in 1977, the 1992 revised edition of the General Plan for the City and County of Honolulu sets forth the long-range objectives for the general welfare and prosperity of the people of O'ahu and broad policies to attain those objectives. The General Plan provides objectives and policies intended to guide and coordinate City land use planning and regulation, and budgeting for operations and capital improvements.

The HPU expansion will be consistent with the objectives and policies of the City and County of Honolulu General Plan.

Population

***Objective A:*** **To control the growth of Oahu's resident and visitor populations in order to avoid social, economic, and environmental disruptions.**

*Policy 4: Seek to maintain a desirable pace of physical development through City and County regulations.*

**Discussion**

The project site is large, at 133 acres, and can easily accommodate future expansion. However, the project expansion will be confined to only a total of approximately 42 acres. The Master Plan envisions development to be completed over a ten- to twenty-year period, beginning with the new residential facilities and additional parking, then the academic and student centers, and finally the performing arts center and multi-purpose gymnasium.

The proposed expansion of the HPU Campus will be compatible with the existing university community. Architecturally, the new facilities will be visually compatible and integrate with the surrounding beauty of the natural environment. The new performing arts center will provide a venue for culture and the arts for the student community, as well as the general public by invitation.

Economic Activity

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

*Policy 1: Encourage the growth and diversification of O'ahu's economic base.*
*Policy 2: Encourage the development of industries that will contribute to the economic and social well-being of O'ahu residents.*
*Policy 3: Encourage the development of local, national, and world markets for the products of Oahu-based industries.*

**Discussion:**
The expansion of the university will create additional employment opportunities for Oahu residents in areas related to teaching and academia, research, laboratory, athletics, music and performing arts, administration, office support, food service, and maintenance.

**Objective E: To prevent the occurrence of large-scale unemployment.**

*Policy 1: Encourage the training and employment of present residents for currently available and future jobs.*

**Discussion:**
College graduates lower the unemployment rate. The unemployment rate for individuals with no college experience is more than twice the rate of those with at least a bachelor's degree *(Dept. of Education).* The Campus expansion will improve educational opportunities in Hawai`i with improved and expanded facilities for higher education. This will help to create a more skilled and resilient workforce that will help Hawai'i's economic competiveness. HPU expects to increase enrollment in their nursing program, which would produce graduates fully prepared to fill a severe shortage. This level of education is particularly critical in preparing the workforce for the new economy.

**Objective G: To bring about orderly economic growth on O'ahu**

*Policy 3: Maintain sufficient land in appropriately located commercial and industrial areas to help ensure a favorable business climate on Oahu.*

**Discussion:**

The proposed HPU expansion will be an expansion of an existing university use. More graduates will ultimately be entering the Hawai`i job market and influencing the economy. An educated society is a better society. A root cause of world economic imbalance is the gaping space between the haves and have-nots. Education helps to close that gap and provides a means for citizens to gain better employment and an improved quality of life.

Investments in higher education benefit all of society through service to communities, healthier citizens who live longer lives, more productive workers, regional economic growth, and innovations in science and technology. A higher education also prepares students to be responsible citizens and produce innovations that fuel economic development. College graduates are more committed to civic engagement and community service and the value of that service is estimated at $4.45 billion annually, nationwide.

Natural Environment

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

*Policy 4:Require development projects to give due consideration to natural features such as slope, flood and erosion hazards, water- recharge areas, distinctive land forms, and existing vegetation.*
*Policy 6: Design surface drainage and flood-control systems in a manner which will help preserve their natural settings.*
*Policy 7: Protect the natural environment from damaging levels of air, water, and noise pollution.*
*Policy 9: Protect mature trees on public and private lands and encourage their integration into new developments.*

**Discussion:**
The project site is situated in open space/preservations lands with idyllic views of the *Ko`olau* Mountains. The project aims to implement sustainable design principles in its planning and design.

The design of the expansion respects the natural environment, integrating the Campus into the natural terrains of the site. To prevent stormwater run-off, bioswales, pervious surfaces, and retention/detention basins will be incorporated into the site design. Rainwater catchment systems will be used to recover rainwater for reuse in on-site irrigation and in building systems operation and maintenance.

**Objective B: To preserve and enhance the natural monuments and scenic views of Oahu for the benefit of both residents and visitors.**

*Policy 3: Locate roads, highways, and other public facilities and utilities in areas where they will least obstruct important views of the mountains and the sea.*
*Policy 4: Provide opportunities for recreational and educational use and physical contact with Oahu's natural environmental.*

**Discussion:**
The existing campus is beautiful and benefits from panoramic views of the majestic *Ko`olau* Mountains. The site is large and can accommodate future development. However, the scale of the expansion will be intimate and personal rather than institutional, encouraging interactions. It will be compact and walkable and conveniently traversed rather than spread over the entire site, surrounding and integrated into what is currently existing on the site. The new academic center, for example, will embrace, reflect, and integrate with the natural beauty of the site and classrooms and laboratories will link to the outdoor environment. Additionally, heavily landscaped recreational uses will continue to front, and provide a buffer to, Kamehameha Highway.
Energy

**Objective B: To conserve energy through the more efficient management of its use.**

*Policy 2: Provide incentives and, where appropriate, mandatory controls to achieve energy- efficient siting and design of new developments.*
*Policy 3: Carry out public, and promote private, programs to more efficiently use energy in existing buildings and outdoor facilities.*

**Discussion:**
Key energy-saving strategies that could be incorporated during the early stage of the Hawai`i Loa Campus expansion planning and design process include on-site renewable energy generation system(s), solar water heaters for on-site needs, good use of natural light, providing for natural ventilation, and incorporating proper building orientation and building envelope design to minimize heat gain such, as in the installation of green roofs, green walls, etc.

**Objective C: To fully utilize proven alternative sources of energy.**

*Policy 1: Encourage the use of commercially available solar energy systems in public facilities, institutions, residences, and business developments.*

**Discussion:**
As stated above, solar water heaters will be utilized for on-site needs.

Physical Development

**Objective E: To create and maintain attractive, meaningful, and stimulating environments throughout Oahu.**

*Policy 3: Encourage distinctive community identities for both new and existing districts and neighborhoods.*
*Policy 5: Require new developments in stable, established communities and rural areas to be compatible with the existing communities and areas.*

**Discussion:**
The proposed expansion of the HPU Campus will be compatible with the existing university community. Architecturally, the new facilities will be visually compatible and integrate with the surrounding beauty of the natural environment. The new performing arts center will provide a venue for culture and the arts for the student community, as well as the general public by invitation.

Health and Education

**Objective B: To provide a wide range of educational opportunities for the people of O'ahu.**

*Policy 1: Support education programs that encourage the development of employable skills.*
*Policy 3: Encourage the after-hours use of school buildings, grounds, and facilities.*
*Policy 4: Encourage the construction of school facilities that are designed for flexibility and high levels of use.*
*Policy 5: Facilitate the appropriate location of learning institutions from the preschool through the university levels.*

**Discussion:**
HPU is the largest private university in Hawai`i. The Hawai'i Loa Campus currently exists at the project site location. Its expansion will add top-notch facilities to accommodate projected growth in student population. An expanded Nursing and Natural Science programs will provide additional educational opportunities and well-equipped graduates. New residence halls will provide living spaces for an additional 400 on-campus students. A new academic center, a "student-centered" student center, and a multi-purpose gymnasium will provide additional classrooms and laboratories, a fitness center, retail and food service, and lounge areas to provide an enhanced living environment for the students. A performing arts center will provide a venue for culture and the arts for students as well as for the general public by invitation.

**Objective C: To make Honolulu the center of higher education in the Pacific.**

*Policy 1: Encourage continuing improvement in the quality of higher education in Hawai'i.*
*Policy 2: Encourage the development of diverse opportunities in higher education.*
*Policy 3: Encourage research institutions to establish branches on Oahu.*

**Discussion:**
The proposed project to expand HPU's HLC promotes the objectives of the General Plan in numerous ways. The project site is situated in open space/preservation lands with idyllic views of the *Ko'olau* Mountains. The project aims to implement sustainable design principles, including energy-efficient strategies, in its planning and design. Additionally, the design of the expansion respects the natural terrain of the campus. HPU will provide education and training for students interested in pursuing a satisfying career in nursing and the natural sciences. The on-campus performing arts center will provide cultural opportunities not only for faculty and students, but for the community at large. Higher education contributes to the communities' economic and social well-being. While not directly related to tourism, the State's largest industry, the project can have a beneficial impact on that sector as approximately two-thirds of HPU's student population is from the U.S. mainland and overseas.

## 5.7 CITY AND COUNTY OF HONOLULU – KO'OLAUPOKO SUSTAINABLE COMMUNITIES DEVELOPMENT PLAN

The Ko'olaupoko Sustainable Communities Development Plan (KSCDP), by the City and County of Honolulu Department of Planning and Permitting, establishes policy to manage no, or minimal, growth and development within Ko'olaupoko over the next 20 years. The vision and plan for Ko'olaupoko focuses on the long-term protection of community resources and its residential character and the adoption of public improvement programs and development regulations that reflect a stable population. The KSCDP establishes the region's role in O'ahu's development pattern by establishing policies in the following areas:

- Open space preservation
- Island-based recreation
- Community-based parks
- Historic and cultural resources

- Agricultural uses
- Residential uses
- Commercial and Industrial uses
- Institutional uses
- Military uses
- Public facilities

Relevant policies are included in *Section 3.8, Institutional Uses*

**Chapter 3.8.2—Planning Principles**

- Appropriate Architectural Scale and Style
- Environmental Compatibility

**Discussion:**

**Chapter 3.8.3—Guidelines**

- Architectural Character and Building Massing
- Pedestrian, Bicycle, and Transit Facilities
- Visual Screening, Lighting, and Signage

**Discussion:**
The new structures of the HPU will be comparable in size and scale to existing university structures, concentrated in an area where current buildings are located and designed with respect to the naturally-sloped terrain of the campus. Heavily landscaped recreational uses will continue to front, and provide a buffer to, Kamehameha Highway.

**Discussion:**
The project site is designated Open Space/Preservation on the KSCDP Land Use Map *(Figure 5-1)*. The goals of the Open Space/Preservation designation are to:

- Protect scenic beauty and scenic views and provide recreation;
- Promote access to shoreline and mountain areas;
- Define the boundaries of communities;
- Prevent urban sprawl;
- Provide buffers between agricultural uses and residential neighborhoods;
- Create a system of linear greenways along roadways and drainage channels; and
- Prevent development in areas susceptible to landslides and similar hazards

## 5.8 CITY AND COUNTY OF HONOLULU LAND USE ORDINANCE GUIDELINES

The purpose of the LUO is to regulate land use in a manner that will encourage orderly development in accordance with adopted land use policies, including the County General Plan and development plans. The LUO is also intended to provide reasonable development and design standards. These standards are applicable to the location, height, bulk and size of structures, yard areas, off-street parking facilities, and open spaces, and the use of structures

and land for agriculture, industry, business, residences or other purposes (Revised Ordinance for the City and County of Honolulu, Chapter 21).

**Discussion:**
The subject property is designated as "P-1: Preservation" by the City and County of Honolulu's Land Use Ordinance *(Figure 1-3)*. The intent of P-1 zoning is to preserve and manage major open space and recreation lands and lands of scenic and other natural resource value.

# 6.0 FINDINGS SUPPORTING ANTICIPATED DETERMINATION

# 6.0 FINDINGS SUPPORTING ANTICIPATED DETERMINATION

## 6.1 ANTICIPATED DETERMINATION

After reviewing the significance criteria outlined in Chapter 343, Hawaiʻi Revised Statutes (HRS), and Section 11-200-12, State Administrative Rules, Contents of Environmental Assessment, the proposed action has been determined to not result in significant adverse effects on the natural or human environment. A Finding of No Significant Impact (FONSI) is anticipated.

## 6.2 REASONS SUPPORTING THE ANTICIPATED DETERMINATION

The potential impacts of the facilities improvements and future operation of the proposed Hawaiʻi Pacific University Hawaiʻi Loa Campus expansion have been fully examined and discussed in this Draft Environmental Assessment. As stated earlier, there are no significant environmental impacts expected to result from the proposed action. This determination is based on the assessments as presented below for criterion (1) to (13).

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

The archaeological and cultural landscapes have been documented in studies conducted specifically for the project area. As detailed in *Section 3.15 and 3.16* of this report, the project does not involve any known loss or destruction of existing natural or cultural resources. The only specific area of concern is the unknown potential for the inadvertent discovery of subsurface historical or cultural resources, including the unknown possibility of iwi kūpuna (ancestral remains).

Given the low potential for an inadvertent find, it is not recommended at this time that specific archaeological mitigation be in place during demolition and construction. However, if any cultural, historic, or archaeological resources are unearthed or ancestral remains are inadvertently discovered, the State Department of Land and Natural Resources (DLNR), State Historic Preservation Division (SHPD), the Oʻahu Island Burial Council representative and participating interests from lineal descendents and individuals will be notified. The treatment of these resources will be conducted in strict compliance with the applicable historic preservation and burial laws.

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

The proposed activities will not curtail the range of beneficial uses of the environment. Existing uses conform to existing land use designations. The project would actually increase beneficial uses of the area by integrating facilities into a cohesive whole that supports a vibrant lifestyle. The new performing arts center and multi-purpose gym, new residence halls and Academic Center II will enhance HPU's education and scholarship and create a vibrant campus community that supports excellence in teaching and learning.

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

The proposed project does not conflict with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders related to that section.

*(4) Substantially affects the economic or social welfare and community practices of the community or State.*

Short-term economic benefits anticipated during construction will include direct, indirect, and induced employment opportunities and multiplier effects but not at a level that would generate significant economic expansion. Long-term economic benefits anticipated during future operations include increased investments into higher education and long-term employment related to the operation of a university campus.

The project will improve educational opportunities in Hawai`i by providing improved and expanded facilities for higher education. This will help to create a more skilled and resilient workforce that will help Hawaii's economic competiveness.

*(5) Substantially affects public health.*

The project is consistent with existing land uses and is not expected to affect public health, except in beneficial ways mentioned in item (4) above. However, there will be temporary short-term impacts to air quality emanating from possible dust emissions and temporary degradation of the acoustic environment in the immediate vicinity resulting from construction equipment. Since the project will add several additional structures, arrangements will be made to minimize the effects to activities in the area. Construction-related impacts of noise, dust, and emissions will be mitigated by compliance with the State Department of Health Administrative Rules.

The project will also result in an increase in the number of graduates from the expanded nursing program. The increase in skilled nurses will fill a severe shortage and translates to an overall improvement in health care to Hawaii's citizens.

Furthermore, the campus expansion is designed to encourage a healthy lifestyle for on-campus and commuter students. The scale of the expansion will be intimate and personal, encouraging interactions and walking. An expanded athletic fitness center will be located within the multi-purpose gymnasium, which will also include 6,000sf of running tracks above it. Outdoor trails into the surrounding hills may be an addition that would help promote exercise, education, and meditation.

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

The approval will not have substantial secondary impacts, such as significant population changes, or affects on public facilities. The project will provide additional facilities, including new residential halls, on the Hawai'i Loa Campus, to accommodate projected growth in student

enrollment. As a result, there will be minor and insignificant impacts to public facilities. While an increase of approximately 600 average daily students, 400 of which would live on-campus, is expected to occur and additional jobs would result, this would have only insignificant impacts on population on the site. The new facilities, such as the performing arts center, will be open to the public by invitation.

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

The proposed development will not involve a substantial degradation of environmental quality. The existing campus is beautiful and benefits from panoramic views of the majestic *Ko`olau* Mountains. Thus, the design of the expansion respects the natural environment, integrating the Campus into the natural terrains of the site. The proposed new structures, such as the new academic center, for example, will embrace, reflect, and integrate with the natural beauty of the site, and the classrooms and laboratories will link to the outdoor environment.

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

The project represents the full Master Plan envisioned for the HPU Hawai'i Loa Campus. This is not an incremental action.

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

The project area does not contain identified rare, threatened or endangered species or habitat. No impact is anticipated.

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

General temporary impacts associated with construction have been identified in this EA. Mitigation measures which are outlined in this EA will be applied during the on-going construction activity. No detrimental long-term impacts to air, water, or acoustic quality are anticipated with the proposed redevelopment. The approval is not anticipated to detrimentally affect air or water quality or ambient noise levels.

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

The entire project site lies within Zone X (500 year flood) and lies outside of the designated tsunami zone. The site has long been developed, and redevelopment will not affect environmentally sensitive areas. Proposed improvements will comply with necessary design requirements and building codes. No impact is anticipated.

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

The proposed project will be substantially set back from the main roadway. While the site includes steep slopes and terrain, the project will be clustered and integrated into the natural

contours of the site, minimizing visual impacts of the natural landscape. The project will have a minimal effect on public views of hillsides and the *Ko'olau* Mountains and will be designed and landscaped to minimize view impacts.

*(13) Require substantial energy consumption.*

The Hawai'i Pacific University Hawai'i Loa Campus expansion will increase power consumption from the island's electrical grid. However, pursuit of LEED Silver certification for the new structures will have energy-saving measures such as a selection of energy-efficient systems for air-conditioning, lighting, water heating, and motorized equipment to help to reduce consumption needs and lower overall operational costs.

## 6.3 SUMMARY

Based on the above findings, we believe the proposed expansion to Hawai'i Pacific University's Hawai'i Loa Campus does not have significant socio-economic or environmental impacts. The Environmental Assessment recommends mitigation measures to alleviate impacts when such impacts are identified.

The HPU expansion project is consistent with the Hawai'i State Land Use District Boundaries, the Hawai'i State Plan and Functional Plans, the 2050 Sustainable Plan, the City's General Plan and Development Plan, the City's Zoning Ordinance, and the American with Disabilities Act.

The proposal would improve the quality of building design, preserve and enhance the natural and cultural resources, and generally improve the overall educational system in Hawai'i. It diversifies the economy and provides education as an anticipated growth industry.

# 7.0 LIST OF REFERENCES

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Belt Collins Hawai'i, Ltd., *Civil Engineering Analysis*, March 2010.

City and County of Honolulu, Board of Water Supply, *Water System Standards*, 2002

City and County of Honolulu, Planning Department, *General Plan for City and County of Honolulu, 1992*

City and County of Honolulu, Department of Planning and Permitting, *Rules Relating to Storm Drain Standards. Honolulu, HI,* January 2000.

City and County of Honolulu, Department of Planning and Permitting, *Development Plan for Ko'olaupoko of the City and County of Honolulu*, 1999.

David, Reginald E., Rana Biological Consulting, Inc., and Guinther, Eric, AECOS Consultants, *Biological Surveys Conducted for the Proposed Hawai'i Pacific University, Hawai'i Loa Campus Expansion Project, Kāneohe, O'ahu*, January 2010.

Foote, Donald E., et al., *Soil Survey of Islands of Kaua'i, O'ahu, Maui, Moloka'i, and Lāna'i, State of Hawai'I,* Washington D.C.: U.S. Government Printing Office, 1972

Genz, Joseph, Ph.D., and Hammatt, Hallett H. Ph.D., *Cultural Impact Assessment for the Hawaii Pacific University Master Plan Project, Kine'ohe Ahupua`a, Ko`olaupoko District, Island of Oahu*, Cultural Surveys Hawai'i, Inc., February 2010.

Group 70 International, Inc., *Hawai'i Pacific University, Hawai'i Loa Campus Conceptual Master Plan*, March 2009

Hawai'i Pacific University Executive Committee, *Hawai'i Pacific University, Hawai'i Loa Campus Development: Phase One Planning Report*, 2007.

Okaneku, Randall, *Draft Traffic Impact Analysis Report for the Proposed Hawai'i Pacific University Hawai'i Loa Campus Master Plan, Kāne'ohe, O'ahu, Hawaii*, The Traffic Management Consultant, April 2010.

Pereira & Associates, William L., *Hawai'i Loa College: A Master Plan Report*, December 1964.

Yucha, Trevor, B.S., and McDermott, Matt, M.A., *Archaological Assessment for the Hawai'i Pacific University Master Plan Project, Kāne'ohe Ahupua'a, Ko'olaupoko District, Island of O'ahu,* Cultural Surveys, Inc., December 2009.

# 8.0 LIST OF AGENCIES, ORGANIZATIONS AND INDIVIDUALS RECEIVING COPIES OF THE EA

# 8.0 LIST OF AGENCIES, ORGANIZATIONS AND INDIVIDUALS RECEIVING COPIES OF THE EA

| Respondents and Distribution | Pre-Consultation | Pre-Consultation Comments Received | Receiving Draft EA | Comments Received | Receiving Final EA/ FONSI |
|---|---|---|---|---|---|
| **Federal Agencies** | | | | | |
| U.S. Fish and Wildlife | x | x | | | |
| U.S. Army Corps of Engineers | x | | | | |
| **State of Hawai'i Agencies** | | | | | |
| Department of Accounting and General Services (DAGS) | x | x | x | | |
| Department of Agriculture | x | | | | |
| Department of Business, Economic Development, and Tourism (DBEDT) | x | | | | |
| Department of Defense | x | x | x | | |
| Department of Hawaiian Home Lands (DHHL) | x | | | | |
| Department of Health | x | x | | | |
| Department of Human Services | x | x | | | |
| Department of Labor and Industrial Relations (DLIR) | x | x | | | |
| Department of Land and Natural Resources (DLNR) | x | x | x | | |
| Department of Hawaiian Affairs (OHA) | x | | | | |
| DLNR, Historic Preservation Division (SHPD) | x | x | x | | |
| Office of Environmental Quality Control (OEQC) | x | | x | | |
| Office of Planning | x | | | | |
| University of Hawai'i, Environmental Center | x | | x | | |
| **City and County of Honolulu** | | | | | |
| Board of Water Supply | x | x | x | | |
| Department of Community Services | x | | x | | |
| Department of Design and Construction | x | x | x | | |
| Department of Planning and Permitting | x | x | x | | |
| Department of Parks and Recreation | x | x | x | | |
| Department of Environmental Services | x | | x | | |

| Respondents and Distribution | Pre-Consultation | Pre-Consultation Comments Received | Receiving Draft EA | Comments Received | Receiving Final EA/ FONSI |
|---|---|---|---|---|---|
| Department of Facility Maintenance | x | x | x | | |
| Department of Transportation Services | x | x | x | | |
| Fire Department | x | x | x | | |
| Police Department | x | x | x | | |
| Office of the Mayor | x | | x | | |
| Hawaii Housing Finance & Development Corp (HHFDC) | x | | x | | |
| **Elected Officials** | | | | | |
| State Senator Jill N. Tokuda | x | | x | | |
| State House Representative Pono Chong | x | | x | | |
| Councilmember Ikaika Anderson | x | | x | | |
| **Libraries** | | | | | |
| Kailua Public Library | x | | x | | |
| Kaneohe Public Library | x | | x | | |
| Hawai'i State Library | x | | x | | |
| UH Hamilton Library | x | | x | | |
| **Citizen Groups, Individuals & Consulted Parties** | | | | | |
| The Outdoor Circle | x | | x | | |
| Friends of Hoomaluhia | x | | x | | |
| Kaneohe Bay Regional Council | x | | x | | |
| Kaneohe Business Group | x | | | | |
| Kokokahi YWCA | x | | | | |
| Neighborhood Board #30 - Kaneohe | x | | x | | |
| Neighborhood Board #31 – Kailua | x | | | | |
| Paepae o He`eia | x | | | | |
| Waikalua Loko Fishpond Restoration | x | | | | |
| Windward Ahupua`a Alliance | x | | | | |
| Windward Community College | x | | | | |

# APPENDIX A
# COMMENT LETTERS AND RESPONSES

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850

DEC 23 2009

In Reply Refer To:
2010-TA-0076

Mr. George Atta
Principal Planner
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Subject: Preparation of an Environmental Assessment for Hawaii Pacific University Hawaii Loa Campus Expansion, Kaneohe, Oahu

Dear Mr. Atta:

Thank you for your letter dated November 23, 2009, received November 24, 2009, requesting information for the preparation of a draft Environmental Assessment (DEA) for the expansion of Hawaii Pacific University Hawaii Loa Campus. The proposed project is located in Kaneohe on the island of Oahu [TMK: (1) 4-5-035:010]. The proposed project consists of construction of 400 new on-campus housing units, an academic center, student center, performing arts center, indoor recreational facilities, food service facilities, and additional parking stalls.

We have reviewed the information you provided and pertinent information in our files, including data compiled by the Hawaii Biodiversity and Mapping Program and the Hawaii Gap Analysis Program/GAP as it pertains to listed species and designated critical habitat. The federally endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*) may possibly be found in the project vicinity. Additionally, the wedge-tailed shearwater (*Puffinus pacificus*), federally protected under the Migratory Bird Treaty Act, may use the project area while traveling from the sea to their breeding sites.

We offer the following suggestions to assist you in the development of the DEA. The DEA should address all potential direct and indirect project impacts for listed species. Hawaiian hoary bats roost in both exotic and native woody vegetation and leave their young unattended in "nursery" trees and shrubs when they forage. If trees or shrubs suitable for bat roosting are cleared during the bat breeding season (April to August), there is a risk that young bats could inadvertently be harmed or killed. To minimize impacts to the endangered Hawaiian hoary bat, woody plants greater than 15-feet (4.6-meters) tall should not be removed or trimmed during the bat birthing and pup rearing season (May 15 through August 15).

TAKE PRIDE IN AMERICA



If vegetation clearing is proposed during the bat birthing and pup rearing season, we recommend that surveys be conducted by a knowledgeable biologist to determine status of the bat that may occur within the proposed project footprint. Survey information should be provided to our office with your determination of effects of the project to the bat or any other listed species observed onsite. Construction timing should be defined and should avoid disturbance to possible nesting Hawaiian hoary bats in areas where they are known to occur.

Shearwaters are known to transit this area and are prone to collisions with objects in artificially-lighted areas. Artificial lighting and structures higher than current existing vegetation for this project will need to be addressed because of the potential for seabirds to be attracted to lights, ending up circling the light source until they either collide with structures or fall to the ground due to exhaustion. Once grounded, they are vulnerable to predators or often struck by vehicles along roadways.

We hope this information assists you in developing a comprehensive and thorough DEA. If, as the project development progresses, it is determined that the proposed project will adversely impact federally listed species, then we recommend you contact our office early in the process so that we may assist you in developing avoidance and minimization measures for these species. If you have questions, please contact Aaron Nadig, Fish and Wildlife Biologist (phone: 808-792-9400; fax: 808-792-9581).

Sincerely,

for Loyal Mehrhoff
Field Supervisor

GROUP 70
INTERNATIONAL

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Katherine M. MacNeil
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Tom Young
AIA

April 14, 2010

Loyal Mehrhoff, Field Supervisor
United States Department of the Interior
Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
300 Ala Moana Blvd., Rm 3-122, Box 50088
Honolulu, HI 96850

**Subject**: Pre-Consultation for Draft Environmental Assessment
Hawai'i Pacific University (HPU) Hawai'i Loa Campus Expansion
(Kaneohe, Honolulu, Hawai'i)

Dear Loyal Mehrhoff:

Thank you for your Pre-Consultation comment letter dated December 23, 2009 concerning the Draft EA for the HPU Hawai'i Loa Campus Expansion.

We acknowledge the concerns and suggestions of the Fish and Wildlife Service of the United States Department of the Interior that federally endangered and protected species may be found in the project vicinity.

1. The DEA will address all potential direct and indirect project impacts for listed species, especially the Hawaiian hoary bat. To minimize impacts, woody plants greater than 15-feet tall will not be removed or trimmed during the bat birthing and pup rearing season (May 15 through August 15).
2. Surveys will be conducted by a knowledgeable biologist to determine status of the bat that may occur within the proposed project footprint.
3. Survey information will be provided to your office with our determination of effects of the project to the bat or any other listed species observed onsite.
4. Construction timing will be defined to avoid disturbance to possible nesting Hawaiian hoary bats in areas where they are known to occur.
5. Artificial lighting and structures higher than current existing vegetation will be addressed because of the potential for seabirds to be attracted to lights and being negatively affected.

Upon completion, we will be providing your office with a copy of the Draft EA for your review. We appreciate your input and participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

George I. Atta

George I. Atta, AICP
Principal Planner

Group 70 International • 925 Bethel Street, 5th Floor • Honolulu, HI 96813-4307 • tel. 808.523.5866 • fax. 808.523.5874 • www.group70int.com

LINDA LINGLE
GOVERNOR

RUSS K. SAITO
COMPTROLLER

SANDRA L. YAHIRO
DEPUTY COMPTROLLER

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P.O. BOX 119, HONOLULU, HAWAII 96810-0119

(P)1336.9

DEC 2 2 2009

Mr. George Atta
Group 70 International
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Mr. Atta:

Subject: Pre-Consultation for Draft Environmental Assessment
Hawaii Pacific University Hawaii Loa Campus Expansion
Kaneohe, Island of Oahu, Hawaii TMK: (1) 4-5-035:10

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 regarding the above, please have your staff call Mr. David DePonte of the Planning Branch at 586-0492.

Sincerely,

Acting for

ERNEST Y. W. LAU
Public Works Administrator

DD:vca
c: OEQC

GROUP 70
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Tom Young
AIA

April 14, 2010

Ernest Y.W. Lau, Public Works Administrator
State of Hawai'i
Department of Accounting and General Services
P.O. Box 119
Honolulu, HI 96810

**Subject**: Pre-Consultation for Draft Environmental Assessment
Hawai'i Pacific University (HPU) Hawai'i Loa Campus Expansion
(Kaneohe, Honolulu, Hawai'i)

Dear Mr. Lau:

Thank you for your Pre-Consultation comment letter dated December 22, 2009 concerning the Draft EA for the HPU Hawai'i Loa Campus Expansion.

We acknowledge your comment that the project does not impact any of the Department of Accounting and General Services' projects or existing facilities and that the Department has no comments on the proposed project.

Upon completion, we will be providing your office with a copy of the Draft EA for your review. We appreciate your input and participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

George I. Atta

George I. Atta, AICP
Principal Planner



LINDA LINGLE
GOVERNOR

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

EDWARD T. TEIXEIRA
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

December 15, 2009

DEC 16 2009

Mr. George Atta
Principal Planner
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Mr. Atta:

Pre-Consultation for Draft Environmental Assessment
Hawai'i Pacific University, Hawai'i Loa Campus Expansion, Kaneohe, Hawaii

Thank you for notification of this upcoming project. After review of your letter and the maps sent for this project, we have no suggestions to make.

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

If you have any questions, please contact Mr. Richard Stercho, Hazard Mitigation Planner, at (808) 733-4300, extension 583.

Sincerely,

EDWARD T. TEIXEIRA
Vice Director of Civil Defense

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Tom Young
AIA

April 14, 2010

Edward T. Teixeira, Vice Director of Civil Defense
State of Hawai'i
Department of Defense
3949 Diamond Head Road
Honolulu, HI 96816

**Subject**: Pre-Consultation for Draft Environmental Assessment
Hawai'i Pacific University (HPU) Hawai'i Loa Campus Expansion
(Kaneohe, Honolulu, Hawai'i)

Dear Mr. Teixeira:

Thank you for your Pre-Consultation comment letter dated December 15, 2009 concerning the Draft EA for the HPU Hawai'i Loa Campus Expansion.

We acknowledge that the Department of Defense will review the DEA when it is completed and make any recommendations that that time.

Upon completion, we will be providing your office with a copy of the Draft EA for your review. We appreciate your input and participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

George I. Atta

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Principal Planner

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LINDA LINGLE
GOVERNOR

LILLIAN B. KOLLER, ESQ.
DIRECTOR

HENRY OLIVA
DEPUTY DIRECTOR

STATE OF HAWAII
**DEPARTMENT OF HUMAN SERVICES**
Benefit, Employment & Support Services Division
820 Mililani Street, Suite 606
Honolulu, Hawaii 96813

January 7, 2009

Mr. George Atta, Principal Planner
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Mr. Atta:

Thank you for your letter of November 23, 2009 regarding the Draft Environmental Assessment for the proposed Hawai'i Loa Campus Expansion. The Director of the Department of Human Services (DHS) has forwarded your letter to me for a response.

The Hawai'i Pacific University Hawai'i Loa Campus expansion and expected enrollment of over 2,800 students by the Fall of 2012 with 948 undergraduate and graduate students in the Natural Science program and 1,900 students enrolled at the School of Nursing would not have an immediate impact on our licensed child care facilities within that geographic area. However, should there be an increase in the commuter enrollment of students on the Hawai'i Loa Campus, some of the students may require child care services for their children. Along the corridor of Kamehameha Highway between Like Like Highway and Pali Highway, there are currently only five (5) licensed Group Child Care (GCC) facilities.

These GCC facilities may not be able to accommodate the increase in enrollment at that time. HPU may want to explore the inclusion of a child care facility on the campus like the University of Hawaii at Manoa, Chaminade University of Honolulu, Kapiolani Community College and Honolulu Community College currently have.

Thank you for affording us the opportunity to provide comments on your proposed project. Should you have any questions or concerns, please contact Elaine Rabacal, Supervisor of the Child Care Licensing Unit 1, at 587-5266.

Sincerely,

Pankaj Bhanot

Pankaj Bhanot
Division Administrator

c: Lillian B. Koller, Director
OB/CCLU1

AN EQUAL OPPORTUNITY AGENCY

GROUP 70
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Tom Young
AIA

April 14, 2010

Pankaj Bhanot, Division Administrator
State of Hawaii Department of Human Services
Benefit, Employment & Support Services Division
820 Mililani Street, Suite 606
Honolulu, HI 96813

**Subject**: Pre-Consultation for Draft Environmental Assessment
Hawai'i Pacific University (HPU) Hawai'i Loa Campus Expansion
(Kaneohe, Honolulu, Hawai'i)

Dear Pankaj Bhanot:

Thank you for your Pre-Consultation comment letter dated January 7, 2010 concerning the Draft EA for the HPU Hawai'i Loa Campus Expansion.

We appreciate your comment that the HPU Hawai'i Loa Campus Expansion will not have an immediate impact on your facilities in the geographic area. Your comment on the possibility of exploring the inclusion of a child care facility on the campus is noted and will be considered during further design and planning and the preparation of the Draft Environmental Assessment.

Upon completion, we will be providing your office with a copy of the Draft EA for your review. We appreciate your input and participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

George I. Atta

George I. Atta, AICP
Principal Planner



LINDA LINGLE
GOVERNOR

DARWIN L.D. CHING
DIRECTOR

COLLEEN Y. LaCLAIR
DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS
830 PUNCHBOWL STREET, ROOM 321
HONOLULU, HAWAII 96813
www.hawaii.gov/labor
Phone: (808) 586-8842 / Fax: (808) 586-9099
Email: dlir.director@hawaii.gov

December 29, 2009

RECEIVED
DEC 30 2009
GROUP 70 INT'L

Mr. George Atta
Principal Planner
Group 70 International
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813

Dear Mr. Atta:

In accordance with your request dated November 23, 2009, the Department of Labor and Industrial Relations does not have any comments regarding the "Pre-Consultation for the Draft Environmental Assessment for the Hawai'i Pacific University (HPU) Hawaii Loa Campus Expansion".

Should you or your staff have questions, please contact me 586-8844, or Mr. Patrick Fukuki, our Business Management Officer, at 586-8888.

Sincerely,

Darwin L.D. Ching

DARWIN L.D. CHING

GROUP 70
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Tom Young
AIA

April 14, 2010

Darwin L.D. Ching
State of Hawai'i
Department of Labor and Industrial Relations
830 Punchbowl Street, Room 321
Honolulu, HI 96813

**Subject**: Pre-Consultation for Draft Environmental Assessment
Hawai'i Pacific University (HPU) Hawai'i Loa Campus Expansion
(Kaneohe, Honolulu, Hawai'i)

Dear Mr. Ching:

Thank you for your Pre-Consultation comment letter dated December 29 2009 concerning the Draft EA for the HPU Hawai'i Loa Campus Expansion.

We acknowledge that the Department of Labor and Industrial Relations has no comments on the subject matter at this time.

Upon completion, we will be providing your office with a copy of the Draft EA for your review. We appreciate your input and participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

George I. Atta

George I. Atta, AICP
Principal Planner

Group 70 International • 925 Bethel Street, 5th Floor • Honolulu, HI 96813-4307 • tel. 808.523.5866 • fax. 808.523.5874 • www.group70int.com

LINDA LINGLE
GOVERNOR OF HAWAII

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

**STATE OF HAWAII**
**DEPARTMENT OF LAND AND NATURAL RESOURCES**
**LAND DIVISION**

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 29, 2009

RECEIVED
DEC 31 2010
GROUP 70 INT'L

Group 70 International
925 Bethel Street 5th Floor
Honolulu, Hawaii 96813-4307

Attention: Mr. George Atta, Principal Planner

Ladies and Gentlemen:

Subject: Pre-Consultation for Draft Environmental Assessment for Hawaii Pacific University Hawaii Loa Campus Expansion

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

Other than the comments from Division of Forestry & Wildlife, Office of Conservation & Coastal Lands, the Department of Land and Natural Resources has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0433. Thank you.

Sincerely,

for Morris M. Atta
Administrator

OA-10-126

LINDA LINGLE
GOVERNOR OF HAWAII

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

RECEIVED
OFFICE OF CONSERVATION
AND COASTAL LANDS
2009 DEC -7 A 9:52

**STATE OF HAWAII**
**DEPARTMENT OF LAND AND NATURAL RESOURCES**
**LAND DIVISION**

DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 5, 2009

MEMORANDUM

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

RECEIVED
LAND DIVISION
2009 DEC 29 P 2:16
DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

FROM: for Morris M. Atta
SUBJECT: Pre-Consultation for Draft Environmental Assessment for Proposed Hawaii Loa Campus Expansion
LOCATION: Island of Oahu
APPLICANT: Group 70 International on behalf of Hawaii Pacific University

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by December 28, 2009.

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

Attachments

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

Signed:
Date: 12-28-2009

LINDA LINGLE
GOVERNOR OF HAWAII

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

**STATE OF HAWAII**
**DEPARTMENT OF LAND AND NATURAL RESOURCES**
**LAND DIVISION**

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

December 5, 2009

MEMORANDUM

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

FROM: for Morris M. Atta
SUBJECT: Pre-Consultation for Draft Environmental Assessment for Proposed Hawaii Loa Campus Expansion
LOCATION: Island of Oahu
APPLICANT: Group 70 International on behalf of Hawaii Pacific University

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by December 28, 2009.

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

Attachments

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

Signed:
Date: 12/8/09

RECEIVED
LAND DIVISION
2009 DEC -9 P 2:43
DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

GROUP 70
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M. Arch., AIA, LEED AP

Katherine M. MacNeil
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Tom Young
AIA

April 14, 2010

Morris M. Atta
State of Hawai'i
Department of Land and Natural Resources
P.O. Box 621
Honolulu, HI 96809

**Subject**: Pre-Consultation for Draft Environmental Assessment
Hawai'i Pacific University (HPU) Hawai'i Loa Campus Expansion
(Kaneohe, Honolulu, Hawai'i)

Dear Mr. Atta:

Thank you for your Pre-Consultation comment letter dated December 29, 2009 concerning the Draft EA for the HPU Hawai'i Loa Campus Expansion.

We acknowledge that the Department of Land and Natural Resources, Land Division, Division of Forestry & Wildlife, and the Office of Conservation & Coastal Lands has no comments on the subject matter at this time.

Upon completion, we will be providing your office with a copy of the Draft EA for your review. We appreciate your input and participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

George I. Atta, AICP
Principal Planner

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LINDA LINGLE
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KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

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

**STATE OF HAWAII**
**DEPARTMENT OF LAND AND NATURAL RESOURCES**

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

**DATE:** December 2, 2009 **LOG:** 2009.4617
**DOC:** 0912RS11

**TO:** Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, HI 96813

**SUBJECT:** **Chapter 6E-42 Historic Preservation Review / Pre-Consultation for Draft EA for Hawaii Pacific University, Hawaii Loa Campus Expansion for both Nursing and Science Programs**
**Permit #** (None)
**Building Owner:** Hawaii Pacific University
**Location:** 45-045 Kamehameha Highway, Kaneohe, HI 96744
**Tax Map Key:** (1) 4-5-035:010

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Thank you the pre-consultation letter, including Chapter 1 of your Draft Environmental Assessment, for the proposed upgrades to the Hawaii Loa Campus of Hawaii Pacific University. We received your document dated November 23, 2009 on November 24, 2009.

This office does not currently have any archaeological sites on file for the Hawaii Loa campus. Test excavations undertaken by Robert Spear, PhD, in July 1994 during work on the school waste water treatment facility located no cultural material or subsurface features.

The project envisions new residences to accommodate 400 students; new academic and student centers; a performing arts center; indoor recreational facilities (such as multi-purpose gymnasium and fitness center); increased food service facilities; and an additional 400 parking spaces. As part of the proposal, the existing soccer field would be demolished and relocated elsewhere. Major beneficiaries of these improvements would be the School of Nursing and the Natural Science program. As the project involves multiple buildings and road construction across the campus, the area of potential affect would be the entire 132 acres.

Due to the extensive work to be undertaken, we do recommend that you have a qualified archaeological monitor on call during construction activities. In the event that historic resources, including human skeletal remains, lava tubes, and lava blisters/bubbles are identified during construction activities, all work should cease in the immediate vicinity of the find, the find should be protected from additional disturbance, and the State Historic Preservation Division should be contacted immediately at (808) 692-8015.

We look forward to the submittal of the full Draft EA. Please direct any questions to Ross W. Stephenson at (808) 692-8028 or ross.w.stephenson@hawaii.gov.

Mahalo,

Nancy McMahon, Deputy Historic Preservation Officer, DLNR, State of Hawaii

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Tom Young
AIA

April 14, 2010

Nancy McMahon, Deputy Historic Preservation Officer
State of Hawai'i Department of Land and Natural Resources
State Historic Preservation Division
601 Kamokila Blvd., Rm 555
Kapolei, HI 96707

**Subject**: Pre-Consultation for Draft Environmental Assessment
Hawai'i Pacific University (HPU) Hawai'i Loa Campus Expansion
(Kaneohe, Honolulu, Hawai'i)

Dear Ms. McMahon:

Thank you for your Pre-Consultation comment letter dated January 22, 2010, concerning the Draft EA for the HPU Hawai'i Loa Campus Expansion.

We appreciate the comment from the State Historic Preservation Division (SHPD) that no historical properties will be affected by our proposed project because:

- Residential development/urbanization has altered the land; and
- Previous grubbing/grading has altered the land.

Upon completion, we will be providing your office with a copy of the Draft EA for your review. We appreciate your input and participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

George I. Atta

George I. Atta, AICP
Principal Planner



**BOARD OF WATER SUPPLY**

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

MUFI HANNEMANN, Mayor

RANDALL Y. S. CHUNG, Chairman
SAMUEL T. HATA
ALLY J. PARK
ROBERT K. CUNDIFF
WILLIAM K. MAHOE

JEOFFREY S. CUDIAMAT, Ex-Officio
BRENNON T. MORIOKA, Ex-Officio

WAYNE M. HASHIRO, P.E.
Manager and Chief Engineer

DEAN A. NAKANO
Deputy Manager and Chief Engineer

December 18, 2009

DEC 22 2009

Mr. George Atta, Principal Planner
Group 70 International, Incorporated
925 Bethel Street, 5th floor
Honolulu, Hawaii 96813-4307

Dear Mr. Atta:

Subject: Your Letter Dated November 23, 2009 on the Pre-Consultation for Draft Environmental Assessment for Hawaii Pacific University Hawaii Loa Campus Expansion, TMK: 4-5-35:10

Thank you for your letter on the proposed Hawaii Pacific University Hawaii Loa Campus Expansion.

The existing water system is presently adequate to accommodate the proposed domestic demands for the proposed University expansion. However, please be advised that this information is based upon current data and, therefore, the Board of Water Supply reserves the right to change any position or information stated herein up until the final approval of your building permit application. The final decision on the availability of water will be confirmed when the building permit application is submitted for approval.

When water is made available, the applicant will be required to pay our Water System Facilities Charges for resource development, transmission and daily storage.

The on-site fire protection requirements should be coordinated with the Fire Prevention Bureau of the Honolulu Fire Department.

The developer should investigate the availability and use of non-potable water for irrigation of the landscape areas. If non-potable water is not available or its use is not feasible, a report of the investigation should be submitted to us before we will consider the use of potable water.

The proposed project is subject to Board of Water Supply Cross-Connection Control and Backflow Prevention requirements prior to the issuance of the Building Permit Applications.

If you have any questions, please contact Robert Chun at 748-5443.

Very truly yours,

K. Shida

KEITH S. SHIDA
Program Administrator
Customer Care Division

GROUP 70
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April 14, 2010

Keith S. Shida, Program Administrator
Honolulu Board of Water Supply
Customer Care Division
630 South Street
Honolulu, HI 96813-5007

**Subject**: Pre-Consultation for Draft Environmental Assessment
Hawai'i Pacific University (HPU) Hawai'i Loa Campus Expansion
(Kaneohe, Honolulu, Hawai'i)

Dear Mr. Shida:

Thank you for your Pre-Consultation comment letter dated December 18, 2009 concerning the Draft EA (DEA) for the HPU Hawai'i Loa Campus Expansion.

We acknowledge your comments on the above referenced DEA.

1. We understand that the existing water system is presently adequate to accommodate the proposed domestic demands for the proposed University expansion. However, this information is based on current data and that the Board of Water Supply (BWS) reserved the right to change any position or information stated herein up until the final approval of our building permit application.
2. We will meet our Water System Facilities Charges obligation when water is made available.
3. We will coordinate with the Fire Prevention Bureau of the Honolulu Fire Department regarding on-site fire protection requirements.
4. The availability and use of non-potable water for irrigation of the landscape areas will be investigated.
5. We understand that the proposed project is subject to BWS Cross-Connection Control and Backflow Prevention requirements prior to the issuance of the Building Permit Applications.

Upon completion, we will be providing your office with a copy of the Draft EA for your review. We appreciate your input and participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

George I. Atta

George I. Atta, AICP
Principal Planner



DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8480 • Fax: (808) 768-4567
Web site: www.honolulu.gov

MUFI HANNEMANN
MAYOR

CRAIG I. NISHIMURA, P.E.
DIRECTOR

COLLINS D. LAM, P.E.
DEPUTY DIRECTOR

DEC 23 2009

December 21, 2009

Mr. George Atta, AICP
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813

Dear Mr. Atta:

Subject: Pre- Consultation for Draft Environmental Assessment Hawaii Pacific University (HPU) Hawaii Loa Campus Expansion (Kaneohe, Honolulu, Hawaii)

Thank you for inviting us to review the above Final Environmental Assessment (EA). The Department of Design and Construction has the following comments:

We recommend that you include in your environmental disclosure an analysis of traffic impacts on Kamehameha Highway that may result from the proposed campus expansion, and state proposed mitigative measures, if any.

As the owner of the Pali Golf Course, a public course located directly across the highway from the HPU campus, we are interested in potential traffic impacts at the highway intersection and the driveway entrances to our respective properties.

Should there be any questions, please contact Clifford Lau at 768-8483.

Very truly yours,

Collins D. Lam
FOR Craig I. Nishimura, P.E.
Director

CN:pg(342971)

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Tom Young
AIA

April 14, 2010

Craig I. Nishimura, P.E., Director
City and County of Honolulu
Department of Design and Construction
650 South King Street, 11th Floor
Honolulu, HI 96813

**Subject**: Pre-Consultation for Draft Environmental Assessment
Hawai'i Pacific University (HPU) Hawai'i Loa Campus Expansion
(Kaneohe, Honolulu, Hawai'i)

Dear Mr. Nishimura:

Thank you for your Pre-Consultation comment letter dated December 21, 2009 concerning the Draft EA for the HPU Hawai'i Loa Campus Expansion.

We acknowledge your recommendation to include a traffic analysis in the Draft Environmental Assessment. A Traffic Impact Analysis Report (TIAR) will be included in the DEA. Impacts to the entrance intersection will be a part of the TIAR.

Upon completion, we will be providing your office with a copy of the Draft EA for your review. We appreciate your input and participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

George I. Atta

George I. Atta, AICP
Principal Planner

Group 70 International • 925 Bethel Street, 5th Floor • Honolulu, HI 96813-4307 • tel. 808.523.5866 • fax. 808.523.5874 • www.group70int.com

DEPARTMENT OF FACILITY MAINTENANCE
**CITY AND COUNTY OF HONOLULU**
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MUFI HANNEMANN
MAYOR

JEOFFREY S. CUDIAMAT, P.E.
DIRECTOR AND CHIEF ENGINEER

GEORGE "KEOKI" MIYAMOTO
DEPUTY DIRECTOR

IN REPLY REFER TO:
DRM 09-1145

December 23, 2009

DEC 24 2009

Mr. George Atta
Group 70 International
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Mr. Atta:

Subject: Pre-Consultation for Draft Environmental Assessment
Hawaii Pacific University (HPU) Hawaii Loa Campus
Expansion, Kaneohe, Oahu, Hawaii

Thank you for the opportunity to provide comments on the pre-consultation for the proposed HPU Hawaii Loa Campus expansion project.

We have no comments to offer as the proposed improvements will be within privately owned property and will have negligible impact on our facilities and operations.

For your information, the public roadways abutting the campus property are under the maintenance jurisdiction of the State of Hawaii, Department of Transportation.

Since the proposed improvements will not affect our facilities or operations, we request the Department of Facility Maintenance be removed from the environmental assessment process for this project.

Should you have any questions, please call Charles Pignataro of the Division of Road Maintenance, at 768-3697.

Sincerely,

Jeoffrey Cudiamat

Jeoffrey S. Cudiamat, P.E.
Director and Chief Engineer

GROUP 70
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April 14, 2010

Jeoffrey S. Cudiamat, P.E., Director and Chief Engineer
City and County of Honolulu
Department of Facility Maintenance
1000 Uluohia Street, Suite 215
Kapolei, HI 96707

**Subject**: Pre-Consultation for Draft Environmental Assessment
Hawai'i Pacific University (HPU) Hawai'i Loa Campus Expansion
(Kaneohe, Honolulu, Hawai'i)

Dear Mr. Cudiamat:

Thank you for your Pre-Consultation comment letter dated December 23, 2009 concerning the Draft EA for the HPU Hawai'i Loa Campus Expansion.

We acknowledge that the Department of Facility Maintenance has no comments on the proposed project. In addition, we recognize that the public roadways abutting the campus property are under the maintenance jurisdiction of the State of Hawaii, Department of Transportation.

Per your request, we will remove the Department of Facility Maintenance from the list of consulted parties for the remainder of the environmental review process. We appreciate your participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

George I. Atta

George I. Atta, AICP
Principal Planner

Group 70 International • 925 Bethel Street, 5th Floor • Honolulu, HI 96813-4307 • tel. 808.523.5866 • fax. 808.523.5874 • www.group70int.com

DEPARTMENT OF PARKS AND RECREATION
**CITY AND COUNTY OF HONOLULU**
1000 ULUOHIA STREET, SUITE 309 • KAPOLEI, HAWAII 96707
TELEPHONE: (808) 768-3003 • FAX: (808) 768-3053 • CITY WEB SITE: www.honolulu.gov

MUFI HANNEMANN
MAYOR

LESTER K. C. CHANG
DIRECTOR

RICHARD HARU
DEPUTY DIRECTOR

December 4, 2009

RECEIVED
DEC - 8 2009
GROUP 70 INT'L

Mr. George Atta, Principal Planner
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Mr. Atta:

Subject: Pre-Consultation-Draft Environmental Assessment
Hawaii Pacific University (HPU) Hawaii Loa Campus Expansion

Thank you for the opportunity to review and comment at the pre-consultation stage of the Draft Environmental Assessment for Hawaii Pacific University's Hawaii Loa Campus Expansion.

The Department of Parks and Recreation has no comment and the proposed project will not impact any program or facility of the department. You may remove us as a consulted party to the balance of the EIS process.

Should you have any questions, please contact Mr. John Reid, Planner, at 768-3017.

Sincerely,

LESTER K. C. CHANG
Director

LKCC:jr
(342966)

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April 14, 2010

Lester Chang, Director
City and County of Honolulu Department of Parks and Recreation
1000 Uluohia Street, Suite 309
Kapolei, HI 96707

**Subject**: Pre-Consultation for Draft Environmental Assessment
Hawai'i Pacific University (HPU) Hawai'i Loa Campus Expansion
(Kaneohe, Honolulu, Hawai'i)

Dear Mr. Chang:

Thank you for your Pre-Consultation comment letter dated December 4, 2009 concerning the Draft EA for the HPU Hawai'i Loa Campus Expansion.

We acknowledge that the Department of Parks and Recreation has no comments on the subject matter at this time.

Per your request, we will remove the Department of Parks and Recreation from the list of consulted parties for the remainder of the environmental review process. We appreciate your participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

George I. Atta

George I. Atta, AICP
Principal Planner



DEPARTMENT OF PLANNING AND PERMITTING
**CITY AND COUNTY OF HONOLULU**
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MUFI HANNEMANN
MAYOR

DAVID K. TANOUE
DIRECTOR

ROBERT M. SUMITOMO
DEPUTY DIRECTOR

RECEIVED
JAN 12 2010
INT'L

2009/ELOG-2858(MH)

January 8, 2010

Mr. George Atta
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawai'i 96813-4307

Dear Mr. Atta:

Subject: Pre-Consultation for Draft Environmental Assessment
Hawai'i Pacific University (HPU) Hawai'i Loa Campus Expansion

In response to your request for comments of November 23, 2009 regarding the preparation of the Draft Environmental Assessment (DEA) for the subject project, we have the following comments:

1. The DEA should include a section regarding the project's relationship to State and County land use plans and policies including the Oahu General Plan and the Koolaupoko Sustainable Communities Plan (KP SCP). More specifically, this section should include:

   a. A discussion of how the proposed project is consistent with Objective B, Policy 5 of Section IX Health and Education in the City and County of Honolulu's General Plan.

   b. Section 3.8 Institutional Uses in the KP SCP outlines policies for expansion of existing campuses in the region. For existing campus expansion, the Plan calls for the campuses to retain an open space character, and for buildings and facilities on the campus to be sited and designed to respect the scenic context.

   c. KP SCP Section 3.8.2 Planning Principles calls for the architectural style and scale to be consistent with the building mass of the institution and its campus setting. The planning principles also encourage environmental compatibility. Energy efficient features, such as the use of solar panels for heating water, and passive solar design should be implemented in campus expansion plans.

   d. The proposed campus expansion should also implement the guidelines listed in KP SCP Section 3.8.3 Guidelines, which include elements on architectural character and building massing, pedestrian, bicycle, and transit facilities, and visual screening, lighting, and signage.

   e. The KP SCP Land Use Map shows the project site as located in an Industrial Use area surrounded by an Open Space/Preservation area.

2. The subject property is located within the State Conservation District and is not within the Special Management Area. Therefore, the project is not subject to the Land Use Ordinance or Chapter 25, Revised Ordinances of Honolulu. Land uses and development standards are under the jurisdiction of the State Department of Land and Natural Resources (Office of Conservation and Coastal Lands).

3. The DEA should discuss whether potential rockfall hazards exist, and if so, describe mitigation measures.

4. The DEA should discuss what can be done to minimize traffic impacts and the need for campus parking.

Should you have any questions, please contact Matt Higashida of our staff at 768-8045.

Very truly yours,

David K. Tanoue, Director
Department of Planning and Permitting

DKT:js

cc: Office of Environmental Quality Control
Hawai'i Pacific University

HPUpre.doc

GROUP 70
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April 14, 2010

David K. Tanoue
City and County of Honolulu
Department of Permitting and Planning
650 South King Street, 7th Floor
Honolulu, HI 96813

**Subject**: Pre-Consultation for Draft Environmental Assessment
Hawai'i Pacific University (HPU) Hawai'i Loa Campus Expansion
(Kaneohe, Honolulu, Hawai'i)

Dear Mr. Tanoue:

Thank you for your Pre-Consultation comment letter dated January 8, 2010, concerning the Draft EA for the HPU Hawai'i Loa Campus Expansion.

We acknowledge your comments and provide you with a response for each item:

1. a. A discussion of how the proposed project is consistent with Objective B, Policy 5 of Section IX Health and Education in the City and County of Honolulu's General Plan will be included in the Draft EA.
   b. The Draft EA will address Section 3.8 Institutional Uses in the Koolaupoki Sustainable Communities Plan (KP SCP).
   c. The Draft EA will address Section 3.8.2 Planning Principles in the KP SCP.
   d. The proposed campus expansion will implement the guidelines listed in KP SCP Section 3.8.3 Guidelines.
   e. The Draft EA will identify the project site as within the Industrial Use area surrounded by an Open Space/Preservation area.
2. We acknowledge that the project site is located within the State Conservation District and is not within the Special Management Area and is thus not subject to the Land Use Ordinance or Chapter 25, Revised Ordinances of Honolulu.
3. The DEA will discuss whether potential rockfall hazards exist and describe any mitigation measures.
4. The DEA will discuss how to minimize any traffic impacts and the need for campus parking.

Upon completion, we will be providing your office with a copy of the Draft EA for your review. We appreciate your input and participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

George I. Atta, AICP
Principal Planner

DEPARTMENT OF TRANSPORTATION SERVICES
**CITY AND COUNTY OF HONOLULU**
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MUFI HANNEMANN
MAYOR

WAYNE Y. YOSHIOKA
DIRECTOR

SHARON ANN THOM
DEPUTY DIRECTOR

TP11/09-343448R

December 30, 2009

RECEIVED
JAN - 4 2010
GROUP 70 INT'L

Mr. George Atta
Group 70 International
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813

Dear Mr. Atta:

Subject: Hawaii Pacific University (HPU) Hawaii Loa Campus Expansion
Kaneohe, Hawaii

This responds to your letter dated November 23, 2009, requesting a pre-consultation and comments in preparing the Draft Environmental Assessment (DEA) for the subject project.

The DEA should include a description of Public Transit serving the general area of your project, the impact of your project on Public Transit during construction, and the impact of your project on Public Transit as a result of the completed project. Basic information is available on our websites: www.thebus.org and www.honolulu.gov/dts. For more details, you may contact our staff at 768-8370.

The DEA should include the preparation of a Traffic Impact study. The department reserves comment on the project pending the preparation of the associated traffic impact study, which should include an assessment of impacts on area roads such as the State owned Kamehameha Highway. Upon completion of the traffic study, we request that a copy be forwarded to our department for review and comment.

Should you have any questions on the matter, you may contact Ms. Virginia Bisho of my staff at 768-5461.

Very truly yours,

Wayne Y. Yoshioka
Director

GROUP 70 INTERNATIONAL

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Katherine M. MacNeil
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Tom Young
AIA

April 14, 2010

Wayne Y. Yoshioka, Director
City and County of Honolulu
Department of Transportation Services
650 South King Street, 3rd Floor
Honolulu, HI 96813

**Subject**: Pre-Consultation for Draft Environmental Assessment
Hawai'i Pacific University (HPU) Hawai'i Loa Campus Expansion
(Kaneohe, Honolulu, Hawai'i)

Dear Mr. Yoshioka:

Thank you for your Pre-Consultation comment letter dated December 30, 2009 concerning the Draft EA for the HPU Hawai'i Loa Campus Expansion.

We acknowledge your comment that a description of Public Transit serving the general area of the project site should be included in the DEA. We further acknowledge that a description of the project's impact on Public Transit during and after construction should also be incorporated. We will take these comments under consideration as we progress with the environmental assessment.

Furthermore, a Traffic Impact Assessment Study is currently being prepared and a copy will be forwarded to your office for review and comment.

We appreciate your participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

George I. Atta

George I. Atta, AICP
Principal Planner

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

MUFI HANNEMANN
MAYOR

KENNETH G. SILVA
FIRE CHIEF

ALVIN K. TOMITA
DEPUTY FIRE CHIEF

December 15, 2009

GROUP 70 INT'L
DEC 21 2009
RECEIVED

Mr. George Atta
Principal Planner
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Mr. Atta:

Subject: Preconsultation for Draft Environmental Assessment
Hawaii Pacific University Hawaii Loa Campus Extension
Kaneohe, Oahu, Hawaii

In response to your letter of November 23, 2009, regarding the above-mentioned subject, the Honolulu Fire Department (HFD) reviewed the material provided and requires that the following be complied with:

1. Provide a fire apparatus access road for every facility, building, or portion of a building hereafter constructed or moved into or within the jurisdiction when any portion of the facility or any portion of an exterior wall of the first story of the building is located more than 150 feet (45 720 mm) from a fire apparatus access road as measured by an approved route around the exterior of the building or facility. (1997 Uniform Fire Code, Section 902.2.1.)

2. Provide a water supply, approved by the county, capable of supplying the required fire flow for fire protection to all premises upon which facilities or buildings, or portions thereof, are hereafter constructed or moved into or within the county.

   On-site fire hydrants and mains capable of supplying the required fire flow shall be provided 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. (1997 Uniform Fire Code, Section 903.2, as amended)

3. Submit civil drawings to the HFD for review and approval.

Should you have any questions, please call Battalion Chief Socrates Bratakos of our Fire Prevention Bureau at 723-7151.

Sincerely,

KENNETH G. SILVA
Fire Chief

KGS/KT:bh

GROUP 70
INTERNATIONAL

PRINCIPALS

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Katherine M. MacNeil
AIA, LEED AP

Tom Young
AIA

April 14, 2010

Chief Kenneth G. Silva
City and County of Honolulu Fire Department
636 South Street
Honolulu, HI 96813

**Subject**: Pre-Consultation for Draft Environmental Assessment
Hawai'i Pacific University (HPU) Hawai'i Loa Campus Expansion
(Kaneohe, Honolulu, Hawai'i)

Dear Chief Silva:

Thank you for your Pre-Consultation comment letter dated December 15, 2009, concerning the Draft EA for the HPU Hawai'i Loa Campus Expansion.

We acknowledge your comments and provide you with a response for each item:

1. All fire apparatus access roads will meet requisite sections of the 1997 Uniform Fire Code.
2. The water supply provided will be capable of supplying the required fire flow for fire protection per County standards. On-site fire hydrants will also comply with County standards.
3. Civil drawing will be submitted to the HFD for review and approval.

Upon completion, we will be providing your office with a copy of the Draft EA for your review. We appreciate your input and participation in the pre-consultation process.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

George I. Atta

George I. Atta, AICP
Principal Planner



POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU
801 SOUTH BERETANIA STREET · HONOLULU, HAWAII 96813
TELEPHONE: (808) 529-3111 · INTERNET: www.honolulupd.org

MUFI HANNEMANN
MAYOR

LOUIS M. KEALOHA
CHIEF

PAUL D. PUTZULU
KARL A. GODSEY
DEPUTY CHIEFS

OUR REFERENCE BS-DK

November 27, 2009

RECEIVED
DEC - 2 2009
GROUP 70 INT'L

Mr. George I. Atta, AICP
Principal Planner
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Mr. Atta:

This is in response to your letter of November 23, 2009, requesting comments on a Pre-Consultation, Draft Environmental Assessment, for the Hawaii Pacific University Hawaii Loa Campus Expansion project.

The Honolulu Police Department has no comments to offer at this time.

If there are any questions, please call Mr. Brandon Stone of the Executive Bureau at 529-3644.

Sincerely,

LOUIS M. KEALOHA
Chief of Police

By
DEBORA A. TANDAL
Assistant Chief of Police
Support Services Bureau

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Katherine M. MacNeil
AIA, LEED AP

Tom Young
AIA

April 14, 2010

Chief Louis M. Kealoha
City and County of Honolulu Police Department
801 South Beretania Street
Honolulu, HI 96813

**Subject**: Pre-Consultation for Draft Environmental Assessment
Hawai'i Pacific University (HPU) Hawai'i Loa Campus Expansion
(Kaneohe, Honolulu, Hawai'i)

Dear Chief Kealoha:

Thank you for your Pre-Consultation comment letter dated November 27 2009 concerning the Draft EA for the HPU Hawai'i Loa Campus Expansion.

We acknowledge that the Police Department has no comments on the subject matter at this time.

Upon completion, we will be providing your office with a copy of the Draft EA for your review. We appreciate your input and participation in the pre-consultation process.

Sincerely,

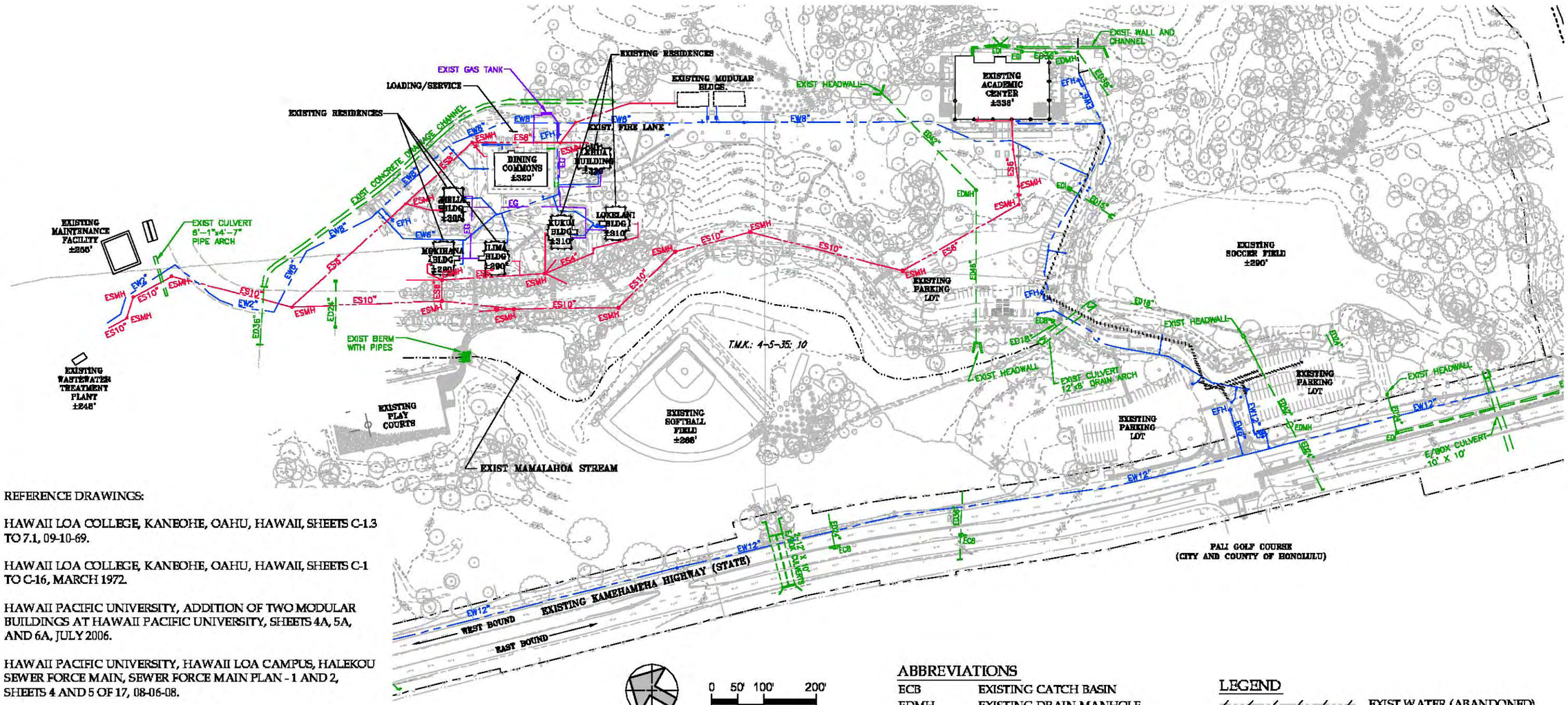
GROUP 70 INTERNATIONAL, INC.

George I. Atta

George I. Atta, AICP
Principal Planner

Group 70 International • 925 Bethel Street, 5th Floor • Honolulu, HI 96813-4307 • tel. 808.523.5866 • fax. 808.523.5874 • www.group70int.com

# APPENDIX B
# PRELIMINARY ENGINEERING REPORT AND DRAINAGE CALCULATIONS




REFERENCE DRAWINGS:

HAWAII LOA COLLEGE, KANEOHE, OAHU, HAWAII, SHEETS C-1.3 TO 7.1, 09-10-69.

HAWAII LOA COLLEGE, KANEOHE, OAHU, HAWAII, SHEETS C-1 TO C-16, MARCH 1972.

HAWAII PACIFIC UNIVERSITY, ADDITION OF TWO MODULAR BUILDINGS AT HAWAII PACIFIC UNIVERSITY, SHEETS 4A, 5A, AND 6A, JULY 2006.

HAWAII PACIFIC UNIVERSITY, HAWAII LOA CAMPUS, HALEKOU SEWER FORCE MAIN, SEWER FORCE MAIN PLAN - 1 AND 2, SHEETS 4 AND 5 OF 17, 08-06-08.

HAWAII PACIFIC UNIVERSITY, WATER SYSTEM IMPROVEMENTS, NEW 12-INCH WATER MAIN, WATERLINE 'B' - PLAN AND PROFILE, SHEETS 4 AND 5 OF 6, NOVEMBER 2006.

TOPOGRAPHIC SURVEY, HAWAII PACIFIC UNIVERSITY PROPOSED MAINTENANCE BUILDING, KAILUA- KANEOHE, KOOLAUPOKO, OAHU, HAWAII, SHEET T-2, 02-23-00.

Drawing Prepared by:
Belt Collins Hawai`i Ltd.

ABBREVIATIONS

| | |
|---|---|
| ECB | EXISTING CATCH BASIN |
| EDMH | EXISTING DRAIN MANHOLE |
| EFH | EXISTING FIRE HYDRANT |
| ESMH | EXISTING SEWER MANHOLE |
| EXIST | EXISTING |

LEGEND

| | |
|---|---|
| | EXIST WATER (ABANDONED) |
| EW12" | EXIST WATER LINE |
| ES10" | EXIST SEWER LINE |
| ED24" | EXIST DRAIN LINE |
| EG | EXIST GAS LINE |

# OVERALL UTILITY PLAN EXISTING CONDITIONS
DRAFT 03-17-10

Wed, 17 Mar 2010 - 9:48am
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Wed, 17 Mar 2010 – 9:50am
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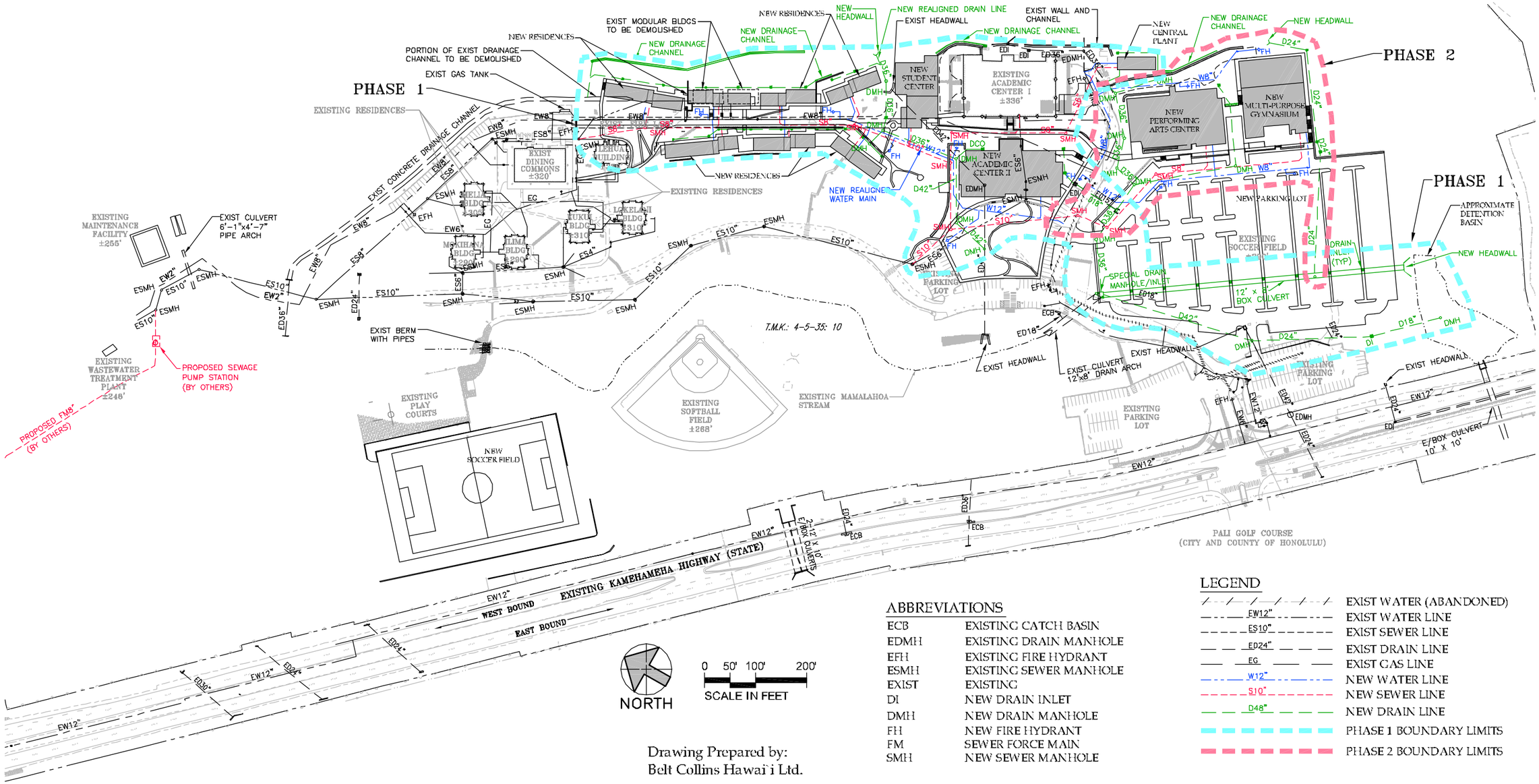



Drawing Prepared by:
Belt Collins Hawai`i Ltd.

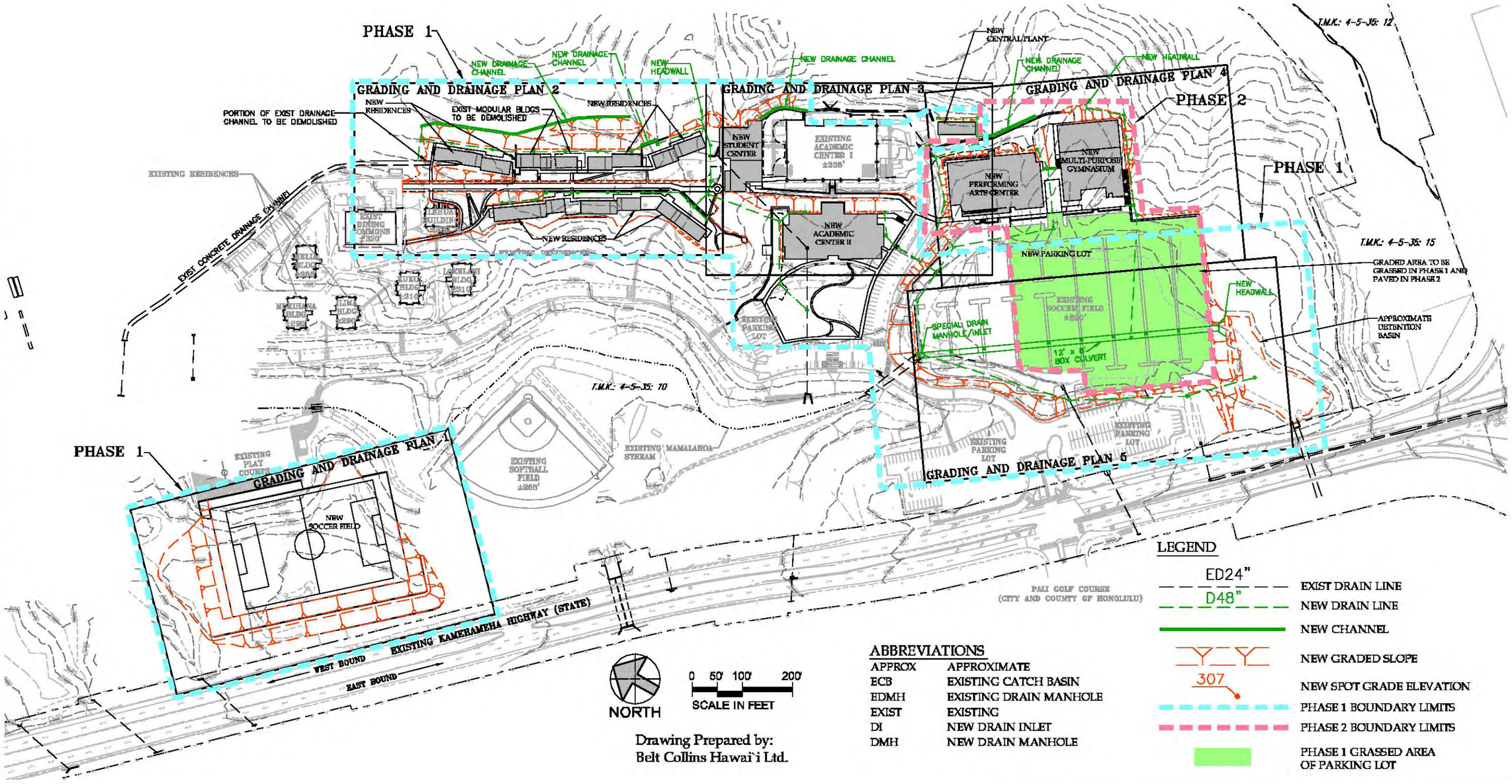
## ABBREVIATIONS

| | |
|---|---|
| ECB | EXISTING CATCH BASIN |
| EDMH | EXISTING DRAIN MANHOLE |
| EFH | EXISTING FIRE HYDRANT |
| ESMH | EXISTING SEWER MANHOLE |
| EXIST | EXISTING |
| DI | NEW DRAIN INLET |
| DMH | NEW DRAIN MANHOLE |
| FH | NEW FIRE HYDRANT |
| FM | SEWER FORCE MAIN |
| SMH | NEW SEWER MANHOLE |

## LEGEND

| | |
|---|---|
| | EXIST WATER (ABANDONED) |
| EW12" | EXIST WATER LINE |
| ES10" | EXIST SEWER LINE |
| ED24" | EXIST DRAIN LINE |
| EG | EXIST GAS LINE |
| W12" | NEW WATER LINE |
| S10" | NEW SEWER LINE |
| D48" | NEW DRAIN LINE |
| | PHASE 1 BOUNDARY LIMITS |
| | PHASE 2 BOUNDARY LIMITS |

# OVERALL UTILITY PLAN CONCEPTUAL DESIGN AND PHASING PLAN
DRAFT 03-17-10




Drawing Prepared by:
Belt Collins Hawai`i Ltd.

## ABBREVIATIONS

| | |
|---|---|
| APPROX | APPROXIMATE |
| ECB | EXISTING CATCH BASIN |
| EDMH | EXISTING DRAIN MANHOLE |
| EXIST | EXISTING |
| DI | NEW DRAIN INLET |
| DMH | NEW DRAIN MANHOLE |

## LEGEND

| | |
|---|---|
| ED24" | EXIST DRAIN LINE |
| D48" | NEW DRAIN LINE |
| | NEW CHANNEL |
| | NEW GRADED SLOPE |
| 307 | NEW SPOT GRADE ELEVATION |
| | PHASE 1 BOUNDARY LIMITS |
| | PHASE 2 BOUNDARY LIMITS |
| | PHASE 1 GRASSED AREA OF PARKING LOT |

# OVERALL GRADING AND DRAINAGE PLAN AND PHASING PLAN
DRAFT 03-17-10

Wed, 17 Mar 2010 – 10:37am
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## A. CIVIL ENGINEERING ANALYSIS

## 1. ASSESSMENT OF EXISTING CONDITIONS

Prepared by: Belt Collins Hawai'i Ltd.
2153 North King Street, Suite 200
Honolulu, HI 96819-4554
Tel: 808 521-5361* Fax: 808 538-7819
Web: http://www.beltcollins.com

### General Site Observations

From the available information, it appears that the Hawai'i Loa campus of Hawai'i Pacific University (HPU) was developed in two increments. Construction drawings dated 1969 address the southern side of campus, including the Academic Center (library) and associated driveways, utilities, and drainage. Drawings for the northern side of campus are dated 1972, and include the Dining Commons (cafeteria), Residences, sewage treatment plant, and associated driveways, utilities, and drainage.

An existing conditions plan is included at the end of the civil engineering analysis. The plan was prepared from a topographic survey dated September 3, 2009, and available record drawings obtained from HPU, the City and County of Honolulu (City) Board of Water Supply (BWS), and The Gas Company.

### Roadways

The campus is accessed from Kamehameha Highway. The highway in the area is under jurisdiction of the State Department of Transportation (DOT). The campus driveway is located at the eastern side of the campus, directly opposite the driveway to the City's Pali Golf Course. The intersection is channelized with left turns for access into the campus and golf course. There is also a right turn lane from the west-bound lanes into the campus and a right turn acceleration (west bound) lane exiting the campus.

The on-site campus driveways provide access to the parking lots and buildings for loading/service areas. Emergency vehicle access is also provided by the existing driveways. A paved fire lane provides emergency vehicle access to the existing modular buildings from the Dining Commons.

The driveway pavements were observed to be in good condition. Tree roots appeared to be well controlled with no associated pavement damage observed. Speed bumps and crosswalks are in place for traffic safety. From the

observations made drainage of the driveways appears to be adequate, with only minor areas of ponding observed.

**Water Supply**

The HPU campus is connected to the BWS system for domestic and fire protection water service. The service is from the BWS Luluku and Maunawili Reservoirs with the service elevation at 500 feet above mean sea level. Based on the reservoir elevation, the service pressure in the upper portions of the campus would be about 65 pounds per square inch, which is within the BWS Standards and plumbing code requirements.

According to BWS record plans dated November 2006, an 8x2 FM meter connected into the BWS 12-inch diameter main on Kamehameha Highway supplies the campus. A BWS reduced pressure backflow preventer is also in place after the meter.

After the backflow preventer, a 12-inch diameter line, generally following the driveway to the Academic Center, serves as the primary campus distribution line. This line was installed at the same time as the connection to the BWS system with plans dated November 2006. The 12-inch diameter line replaced an 8-inch diameter line installed in 1969.

An 8-inch diameter branch just below the Academic Center extends through the open campus area to the upper campus driveway near the Residences. From the driveway intersection below the Residences, a 2-inch diameter line extends to the maintenance facility and wastewater treatment plant. Above the junction of the 12- and 8-inch diameter lines, a 6-inch diameter branch extends upslope to the Academic Center.

***Domestic Water Service***

Domestic water service for the campus buildings is provided through laterals off the water distribution lines. The Residences, Dining Commons, and modular buildings are serviced by laterals off the 8-inch diameter line in the upper campus driveway. Based on information from HPU officials, the pressure reducer valves for the Residences are not functional. The Academic Center is serviced by a lateral off the 6-inch diameter branch in the driveway to the Academic Center.

***Fire Protection System***

The existing fire protection water system is comprised of four on-site fire hydrants within the campus, and one off-site hydrant near the campus driveway

at Kamehameha Highway. Honolulu Fire Department (HFD) criteria require a hydrant within 150 feet of a building.

**Wastewater**

Campus flows are conveyed to the City's system by a new sewage pump station and associated force main that was completed in November 2009. The point of connection for the pumping station force main to the City's system is the Halekou sewage pumping station on Kamehameha Highway at Kahiko Street.

Previous to the installation of the pump station, the campus was served by an on-site wastewater treatment plant. It is intended for the plant to be abandoned in the coming months.

A 10-inch diameter sewer line connects at a manhole to the new pump station. The 10-inch diameter line extends along the lower campus driveway to the parking lot below the Academic Center. The four down slope Residences discharge to this line, with no additional connections between this junction and the parking lot. At the parking lot, a 6-inch diameter line extends service to the Academic Center. The 10-inch diameter line along the lower driveway was apparently sized in anticipation of campus expansion.

At the Residences driveway intersection, an 8-inch diameter line branches from the 10-inch diameter sewer line and extends along the upper driveway to the Dining Commons. The upper two Residences discharge to this line. A 4-inch diameter sewer line extends service to the modular buildings beyond the Dining Commons.

**Drainage and Grading**

Runoff through the HPU campus generally contributes to Mamalahoa Stream, which flows near the western edge of campus and exits at the north end, downhill of the existing treatment plant. Runoff from the southern end of campus collects in the existing soccer field. From the soccer field, runoff crosses the existing driveway through a 12'x8' arch culvert to what is considered as the upstream end of Mamalahoa Stream. Runoff from the upper portions of the campus is captured by drainage structures and conveyed to either directly outlet into or surface flow toward the stream. In addition, runoff from the Pali Golf Course across Kamehameha Highway discharges into the campus at various locations.

Record drawings show that all of the pipe culverts crossing Kamehameha Highway existed at the time of initial site development in 1969. It is noted that the record DOT drawings do not show any easements for culvert improvements extending into the campus beyond the Kamehameha Highway right-of-way. However, an easement for one of the culverts, a 12'x10' double box culvert that outlets near the existing softball field, was noted in the topographic survey.

Drainage and grading at specific locations of the site are discussed in more detail below.

***Softball Field Area***

Runoff from the Pali Golf Course across Kamehameha Highway is conveyed into the campus through a 12'x10' double box culvert, along with runoff collected in catch basins along the highway by 24-inch and 36-inch diameter pipes. The runoff outlets along the western edge of the campus near the existing softball field and flows around both the north and south sides of the softball field to join Mamalahoa Stream.

***Dining Commons/ Residences***

Runoff from the north portion of the campus crosses the lower campus driveway to the area above the play courts and discharges to Mamalahoa Stream. Runoff from Oneawa Hills above the existing Residences and Dining Commons is captured by a concrete-lined drainage channel (Photo 1). The collected runoff crosses the lower campus driveway through a 36-inch diameter pipe culvert. Record drawings show another 24-inch diameter culvert on the east side of the intersection with the upper campus driveway, with a third crossing by an approximate 6-ft x 4-ft pipe arch by the maintenance facility. Also, a set of drainage pipes was observed on site which appears to convey runoff through a berm near the play courts (Photo 2).

Photo 1

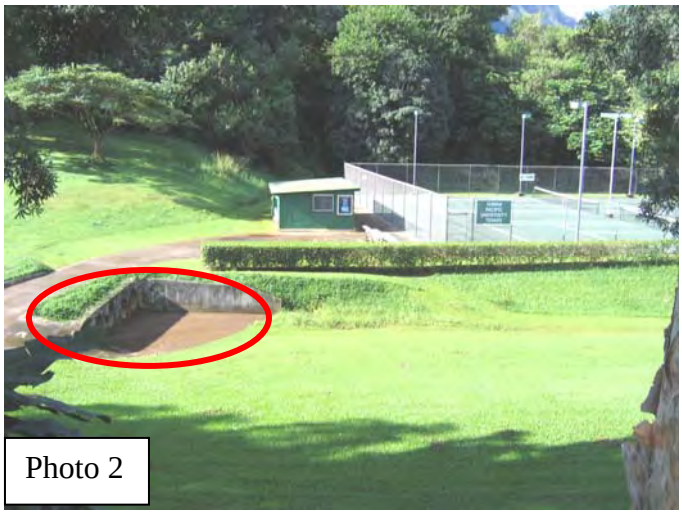


Photo 2

*Between Residences and Academic Center*
To the north of the Academic Center, runoff collects in a valley and is conveyed by 42-inch and 48-inch diameter pipes to outlet below the lower campus driveway just north of the main driveway.

*Existing Soccer Field*
The existing soccer field serves as a collection basin for most of the runoff south of the Academic Center. Hillside runoff from above the existing Academic Center is captured by a concrete-lined wall and channel (Photo 3). From this drainage structure, runoff is discharged to the south of the Academic Center across the driveway, and surface flows into the soccer field. Runoff from the area below the Academic Center south of the main staircase, as well as from the existing parking lot west of the field, are also conveyed to the soccer field.

Photo 3

In addition to the flows originating from and above the campus, three culverts cross Kamehameha Highway and convey runoff into the soccer field. A 42-inch diameter pipe headwall discharges water from the Pali Golf Course onto the soccer field. This headwall is located about midway along the west side of the field. Runoff conveyed in a 24-inch diameter pipe and 10'x10' box culvert both outlet just inside the campus, but continue to surface flow into the soccer field.

In general, the soccer field gently slopes towards the northwestern corner. An 18-inch diameter pipe and channel along the west edge also diverts runoff towards the northwest corner (Photo 4). From this corner, runoff enters the 12' x 8' arch culvert from the soccer field (Photo 5).

**Flood Designation**

The campus is in a Federal Emergency Management Agency flood hazard Zone D, which is an area where flood hazards are undetermined. Under the City Land Use Ordinance, Zone D is not considered a special flood hazard district.

Photo 4

Photo 5

## 2. CIVIL PRELIMINARY DESIGN CONCEPTS

### Introduction

The proposed infrastructure improvements in support of the master planned facilities are shown on the overall utility and grading and drainage plans. Approximate pipe sizes are shown on the plans, which need to be confirmed once the demands for the proposed master plan are identified.

The utility assessment findings based on the available information were:

- The existing utility sewer lines should be adequate to support the proposed campus expansion.
- The existing water lines may need to be upsized to maintain the required fire flow pressure.
- The drain lines will be subject to further evaluation based on the final facility layout and demands, respectively.

The proposed locations of the new Student Center and Academic Center II conflict with existing water, sewer, and drain lines. Where conflicts occur, utilities will be rerouted or reconnected and utility structures, such as headwalls or manholes, demolished as needed to accommodate the new buildings. A description of these changes and of the other proposed infrastructure to support the master plan are described in the following sections. Phasing of improvements are discussed where applicable.

**Traffic**

A traffic impact analysis report is being done by Austin Tsutsumi & Associates, Inc. The existing intersection will be evaluated to determine if any improvements are needed to support the proposed master plan.

**Emergency Vehicle Access Requirements**

The current design criteria for emergency vehicle access are as follows:

| Item | Criteria | Basis |
|---|---|---|
| Width | 20 feet minimum | Uniform Fire Code |
| Turning Radius | 42 feet minimum | Honolulu Fire Department |
| Back-up Distance | 150 feet maximum | Uniform Fire Code |
| Vertical Clearance | 13′-6″ minimum | Honolulu Fire Department |
| Surfacing | concrete/asphalt/ grass cell | Honolulu Fire Department |
| Fire Lane/Hydrant Location | 150 feet from building | Honolulu Fire Department |
| Fire Lane Slope | 19% maximum | Honolulu Fire Department |
| Fire Department Conn. | 20 feet from the fire lane and 25 to 40 feet from fire hydrant | Honolulu Fire Department |

In support of the new buildings in each phase, proposed improvements include internal driveways as needed for emergency vehicle access. In addition to vehicular access, pedestrian access around the exterior of buildings for emergency personnel will be provided. Existing fire lanes and accesses will be utilized in their existing conditions. Fire lanes will be stabilized with grass cell pavers wherever practical. The use of grass cell pavers creates a pervious surface which can support traffic loading and allow for infiltration of stormwater runoff. Signs will be added to identify fire lanes and to prohibit obstructions to their access.

Emergency access proposed for the various campus improvements are discussed in more detail in the following sections.

*Residences*
A 20-foot wide fire lane will be added along the walkway between the new Residences. This walkway will extend the existing fire lane south of the Dining Commons with vehicular use designated for emergency vehicles only. While the walkway in the middle of the fire lane will be concrete, the rest of it will be stabilized by grass cell pavers. A turnaround area will be provided for emergency vehicles near the Student Center. Pedestrian pathways will also be provided between the Residences to allow fire department personnel access to the back of the buildings within 150′ from the fire lane.

*Student Center/ Academic Center I*
The lane behind the existing Academic Center (referred to in the proposed improvements as Academic Center I) will be extended to the south side of the Student Center to serve as both a fire and service lane and will be asphalt concrete paved. The lane will require demolition and reconstruction of the wall and ditch at the northeastern side of Academic Center I. A turnaround for emergency vehicles will be provided between Academic Center I and the Student Center.

*Academic Center II*
A fire lane will be added on the north side of the new Academic Center II and will be accessed from the existing parking lot northwest of the building. The lane will be stabilized with grass cell pavers. Approximately four parking stalls located on the northeastern corner of the parking lot will be removed to accommodate the fire lane. In addition to emergency vehicle access, the lane will also be used to access storage for laboratory materials used in the new Academic Center. A turnaround will be provided at the northwest corner of the building.

*Performing Arts Center/ Multi-Purpose Gymnasium*
Emergency vehicle access to the front of the Performing Arts Center and Multi-Purpose Gymnasium will be provided by the new parking lot. For the back of the buildings, a fire lane will be added that will be accessed from the existing Academic Center driveway. The fire lane will be intended for emergency vehicles only, with a turnaround provided above the Performing Arts Center. Grass cell pavers will be used for the fire lane. Also, a pedestrian pathway with stairs along the south side of the Gymnasium will provide emergency personnel access around the exterior of the building.

**Water Supply**

Water supply improvements will provide domestic service and fire protection to the new buildings. A new 12-inch water line will be constructed to reroute the

existing 8-inch water line from the upper campus driveway around the new Student Center and Academic Center II. The new water line will be reconnected to the 12-inch water line in the Academic Center driveway on the downhill side of Academic Center II. Two new water lines will be constructed to provide service for the new Performing Arts Center and Multi-Purpose Gymnasium. The new water lines will both branch off the existing water line in the Academic Center driveway, and will extend along the uphill and downhill sides of the buildings.

According to the BWS letter response regarding pre-consultation for the Draft Environmental Assessment for Hawaii Pacific University Hawaii Loa Campus Expansion to Mr. George Atta, dated December 18, 2009, "the existing water system is presently adequate to accommodate the proposed domestic demands for the proposed University expansion." However, it should be noted that the BWS will not commit to water service for any facility until the building permit application is submitted. As stated in the same BWS letter response, " the Board of Water Supply reserves the right to change any position or information… until the final approval of [the] building permit application."

An assessment of the existing and master planned water demands will need to be completed to verify that the existing water meter can continue to serve the ultimate campus development. Payment of water system facilities charges will also need to be made as the new buildings are occupied. In order to receive facilities charge credit for plumbing fixtures removed, such as hose bibbs at the wastewater treatment plant to be abandoned, drawings or plans indicating the location, number and type of plumbing fixture will need to be submitted to BWS when the demolition or building permit is routed.

***Domestic Water Service***

Domestic water service for the new Residences, Student Center, and Academic Center II will be provided by laterals from the existing and rerouted 8-inch and 12-inch diameter water lines extending from the upper campus driveway to the Academic Center driveway.

The proposed Performing Arts Center and Multi-Purpose Gymnasium will be serviced by laterals from the new water line in the parking lot downhill of the buildings.

The Central Plant will be serviced by a lateral off of the existing water line in the Academic Center driveway.

*Fire Protection System*
Fire hydrants will be added in accordance with HFD requirements to provide fire protection coverage for the new buildings. Separate water line taps for fire department connections and sprinkler systems are not shown in the conceptual utility plan, but can be added as needed to support the new buildings. Also, due to the lengths of the water lines and associated pressure losses, verification of water line sizes to meet fire flows and pressure, needs to be done during preliminary design.

For the new Residences and Student Center, fire hydrants will be added along the new walkway between the Residences, serviced from the existing 8-inch diameter water line.

Three additional hydrants will also be added for coverage of the new Academic Center II. These hydrants will be serviced from the rerouted 12-inch diameter water line, and from the existing 12-inch diameter water line along the Academic Center driveway.

Hydrants will be added in the new parking lot for coverage of the new Performing Arts Center and Multi-Purpose Gymnasium. The new water line installed on the uphill side of the new buildings will service fire hydrants along the fire lane.

**Wastewater Service**

New sewer lines will be installed as needed to service the proposed buildings. The alignment of the new sewer lines will be set with consideration of the finish grades around the new buildings to minimize the cover over the pipes. In addition, grade differences between buildings in close proximity, such as the elevation difference up to 9 feet between the two levels of the new Residences, will be accommodated and taken into account in the preliminary design.

Based on discussions with the new sewage pump station's designer, the proposed master plan development was considered in sizing of the wet well and force main. Replacement of the pumps with larger units may be needed at some point as flows to the station increase.

A wastewater facility charge would only be required for the new buildings constructed on campus if the water meter is upsized, which is not anticipated at this time.

New sewer lines will be constructed to service the new Residences, Student Center, Academic Center II, and Center Plant, as well as to reconnect the service for existing Academic Center I. A new 8-inch diameter sewer line will be constructed to service three of the seven new Residences, connecting to the existing sewer line in the upper campus driveway. The rest of the Residences and Student Center will be serviced by new 8-inch and 10-inch diameter sewer lines that connect to the main at the lower campus driveway. An 8-inch diameter branch from these lines will be constructed between Academic Center I and II, and continue uphill to service the new Central Plant. The branch will also provide service for Academic Center I, replacing its existing lateral located in the footprint of Academic Center II. Another 10-inch sewer line, connecting to the main at the lower campus driveway, will provide service to Academic Center II.

The 10-inch sewer line below Academic Center II will be extended along the uphill side of the parking lot to service the new Performing Arts Center and Multi-Purpose Gymnasium.

**Grading and Drainage**

Final design of the grading and drainage for the proposed buildings will be based on several objectives. The goal for grading will be to balance earthwork quantities. In addition, the natural look of the slopes will be maintained as much as practical. The goals for drainage will be to protect buildings from flooding, complying with City requirements, and using the existing drainage facilities to minimize construction costs.

Balancing the earthwork will be done to minimize the amount of earthwork materials needed for import and export. Clayey silts were noted in some of the available boring logs for the original design of the campus. A geotechnical investigation for the new facilities should be completed prior to the start of construction documents to address specific site soil conditions and ensure the onsite soils are suitable intended uses. The investigative report will also provide recommendations for grading and building site preparation such as surcharging to provide proper soil stability in construction.

In order to maintain the existing look for the campus, the use of retaining walls will be minimized. Slopes will be graded at a maximum of 2:1 (horizontal to vertical), with benches for slopes over 15 feet in height in accordance with City ordinances. Actual grading will be based on the geotechnical report findings and recommendations.

For drainage, the City requires that runoff under proposed conditions be less than or equal to the amount generated under existing conditions and that the runoff is discharged in the same location. Because the new buildings are anticipated to generate more runoff than under existing conditions, a detention basin approximately 190′ x 80′ x 6′ deep near the new parking lot will be constructed to detain the additional runoff quantity during storm events.

Since there are several large existing drainage structures which convey runoff towards Mamalahoa Stream, the existing drainage structures will continue to be utilized to the extent practicable. The new drainage systems will convey runoff to the existing drainage structures within the same drainage basins as under existing conditions. In addition, runoff coming from and across Kamehameha Highway will be accommodated in the drainage improvements.

Grading and drainage concepts proposed at each area are discussed in more detail below.

***Mamalahoa Stream***

By maintaining the existing drainage structures and flows contributing to Mamalahoa Stream, it is anticipated that the drainage design will not impact the stream. Avoiding work within the stream area would allow HPU to avoid associated permitting issues.

Although not anticipated, if work within Mamalahoa Stream should become required as the master plan continues to develop, a U.S. Army Corps of Engineer (USACE) determination would be needed to see if they have jurisdiction over work within the stream. The USACE requires a permit for any filling of the waters of the United States of America (Section 404, Clean Water Act). If a Section 404 Permit is required, then Section 401, Water Quality Certification, is also required. The DOH is the regulatory authority for Section 401. A field evaluation to document evidence of a stream and/or wetlands in the project area would be needed for the USACE jurisdictional determination. If the USACE determines they do not have jurisdiction, then no USACE permit or Section 401 Certification would be required.

Regardless of whether work within the stream is needed, a Stream Channel Alteration Permit (SCAP) from the State Department of Land and Natural Resources will not be required. Based on the information provided by Belt Collins to the Commission on Water Resource Management (Commission), a SCAP will not be required to be submitted for the proposed conceptual planning for HPU because the Commission has determined that Mamalahoa Stream is an intermittent stream where aquatic resources have not been identified.

*Soccer Field*
The new soccer field will be located to the northwest of the existing softball field and directly west of the existing play courts (see Grading and Drainage Plan 1). The elevation of the new soccer field will be set to keep storm water from entering the field and play courts. As mentioned in the discussion for the existing softball field, runoff from culverts crossing Kamehameha Highway flows between the softball field and play courts. To prevent runoff from overflowing onto the new soccer field, the elevation of the field will be built above the existing softball field. Based on this elevation, excavation will be needed on the west side of the field, and an embankment will be added on the east side. On the excavated side, the field will include a lawn seating area sloping up towards Kamehameha Highway at a 4:1 slope. A retaining wall will be needed to support the rest of the elevation difference from the field to the existing ground at the highway. In the embankment area on the southeast side, retaining walls will be required to provide the grade difference needed to raise the field above the existing flow channel. Access to the field will include a ramp adjacent to the play courts up to the field for pedestrians and maintenance vehicles.

*Residences*
The new Residences will be located on the hillside between the existing Dining Commons and Academic Center I (see Grading and Drainage Plan 2). The existing fire lane from the Dining Commons to existing modular buildings will be extended and used as the main walkway and fire lane between two levels of new Residences. A portion of the existing concrete-lined channel in the area, as well as the modular buildings, conflict with the location of the new Residences, and will be demolished and removed prior to the construction. The runoff flowing into the portion of the channel to be demolished will be captured by a new concrete cut-off ditch above the new Residences.

The Residences will have finish floor elevations ranging from 340′ at the lower level buildings, up to 350′ at the upper level. The elevation differences between adjacent buildings and the walkway vary from 0 to 9 feet. These differences will be accommodated with graded slopes or with retaining walls where space is limited.

Above the upper level of Residences, a 2:1 slope will be constructed to meet existing grade. Hillside runoff will be captured by a concrete cut-off ditch located along the top of the graded slope. This ditch will convey runoff into the existing channel further downstream of the demolished portion. Between the upper level Residences and the graded slope, surface runoff will be captured by drain inlets and will be conveyed with roof drainage to the existing channel.

The main walkway and fire lane will be graded with a high point near the middle of the new Residences. Swales next to the walkway will convey runoff from the high point directed either to the north or to the south.

Between the walkway and the lower level Residences, graded slopes and retaining walls will be used to accommodate the grade differences. Surface runoff and roof drainage will be conveyed through underground pipes to the drain line at the south end of the Residences. On the downhill side of the lower level Residences, retaining walls up to 6′ tall will be used as needed, and grading will be done to create a uniform slope on the downhill side. Surface runoff will continue to flow downhill as under existing conditions.

***Student Center/ Academic Centers I and II***

The new Student Center and Academic Center II will be located directly to the north and west of the existing Academic Center I, respectively (see Grading and Drainage Plan 3). The existing 42-inch and 48-inch diameter pipes that convey runoff from the north of the existing Academic Center I will be rerouted around the new Student Center and Academic Center II. This drainage system will continue to serve the same drainage basin and will be reconnected above the existing outlet to Mamalahoa Stream.

The existing valley north of Academic Center I, above the southern Residence in the upper level and Student Center, will be regraded to accommodate the new building grades. The inlet to the existing 42-inch diameter pipe will be relocated farther uphill, so that the exterior grades at the Residence and Student Center have sufficient area to slope towards the inlet.

The slope behind the new Student Center will be regraded to minimize the retaining wall height. The soil will be retained directly by the wall of the new Student Center up to approximately 12.5 feet. Hillside runoff above the Student Center will be conveyed towards the relocated inlet to the north.

As mentioned above for emergency vehicle access, the fire and service lane behind Academic Center I will be extended between the Student Center and Academic Center I. The north end of the existing retaining wall and cut-off channel behind Academic Center I will be removed and rebuilt to incorporate the new fire lane with a retaining wall up to 12 feet high. The retaining wall will also extend the existing channel above Academic Center I.

***Existing Academic Center I***

As noted above, runoff from the existing channel crosses the Academic Center driveway through underground pipes to an outlet just uphill of the new Performing Arts Center, and eventually flows into the existing soccer field (see

Grading and Drainage Plans 3 and 4). The drain line will be intercepted by a new drainage structure, which will continue to convey runoff downhill and be incorporated into the drainage system in the new parking lot.

***Central Plant***

The Central Plant will be accessed from the existing driveway just south of Academic Center I. The uphill and side building walls of the Central Plant will act as retaining walls. Hillside runoff will be captured by inlets and will be connected to the new drainage structure for Academic Center I.

***Performing Arts Center/ Multi-Purpose Gymnasium***

The Performing Arts Center and Multi-Purpose Gymnasium will be built into the hillside south of existing Academic Center I (see Grading and Drainage Plan 4). To minimize the height of retaining walls on the uphill sides of the buildings, the walls of both buildings will act as retaining walls.

Both buildings will have access doorways on the uphill side of the buildings. The access for the Performing Arts Center will include a stairwell from the finish floor elevation to a higher elevation just outside the building. A retaining wall will be needed between the pathway from the access stairway and the fire lane uphill of the Performing Arts Center. At the Multi-Purpose Gymnasium, the downhill side of the building will be 2 stories tall. On the uphill side, only the second floor will continue to extend into the hillside. The access to the Multi-Purpose Gymnasium will be at the northeast corner of the second floor. The fire lane will also connect to the second floor elevation at this access location.

The elevation of the fire lane and access behind the Performing Arts Center and Multi-Purpose Gymnasium will be set with consideration to the grades above and below the fire lane. From the connection to the existing driveway, the fire lane will go up in elevation to minimize the height of the retaining wall on the uphill side. As the lane continues to the Multi-Purpose Gymnasium, the elevation will go down to match the second floor elevation at the northeast corner. After the fire lane ends, a pathway will be graded to allow access for emergency personnel. The pathway elevation will rise at the southeastern corner to meet existing grade in order to minimize grading.

A cut-off channel above the Performing Arts Center will serve to capture runoff from the hillside above. The runoff in the channel will connect to the new drainage structure constructed for Academic Center I.

The area behind the Multi-Purpose Gymnasium will be graded to slope away from the building, and will create a low spot in the existing valley. Runoff accumulating in the low spot will enter an inlet and will be conveyed towards

the location of the existing soccer field where it will be incorporated into the drainage system in the new parking lot.

Around the south side of the Multi-Purpose Gymnasium and along the east edge of the new parking lot, swales will intercept the hillside runoff. Runoff from the swales will be captured by inlets and connected to pipe to the south of the Gymnasium.

***Parking Lot***

The new parking lot will be constructed by filling the existing soccer field (See Grading and Drainage Plan 5). Ultimately, all of the surface drainage flowing in the existing soccer field will need to be conveyed in a new underground system with drain manholes and inlets. The system will continue to outlet through the existing 12′ x 8′ arch culvert for ultimate discharge to Mamalahoa Stream.

The new detention basin will be designed to detain the net increase in runoff. The detention basin will be located at the southwestern corner of the new parking lot in an existing valley, into which off-site runoff flows from an existing 10′x10′ box culvert. Because of the natural shape of the valley, excavation for the detention basin will be kept to a minimum, and grading will primarily be done on the new parking lot side of the basin. In addition to detaining the amount of additional runoff, the basin serves to improve storm water quality by allowing debris carried from across Kamehameha Highway to settle before flowing across the campus. A maintenance road will be graded to the bottom of the basin to allow vehicle access for cleaning debris that accumulates in the basin. Also, since the detention basin will not be intended to permanently hold runoff, a small diameter pipe will be installed from the detention basin to allow the basin to slowly drain after storm events.

A new 12′x8′ box culvert will be constructed to convey the runoff not detained in the detention basin to the existing 12′x8′ arch culvert. The box culvert will be designed with minimal cover across the parking lot. The box culvert will also accommodate the drainage for the new parking lot. Grassed biofiltration swales (bioswales) will be utilized in the parking lot aisles, with inlets located directly over the box culvert. The bioswales will improve stormwater quality, by removing silt and other pollutants from the parking lot runoff. Allowing runoff to drop directly into the box culvert will eliminate the need for inlet structures and additional pipes.

To accommodate underground connections to the arch culvert, a new drainage structure will be built at its inlet. In addition to the box culvert, drain lines that convey runoff directly into the existing soccer field will be intercepted and piped to the new structure. The drain line that conveys runoff from below Academic

Center I to the existing soccer field will be rebuilt at a higher elevation to minimize the cover at the new parking lot. A manhole will be constructed at the end of the new drain line to redirect runoff into the new arch culvert drainage structure. Runoff from the 42-inch diameter pipe and 24-inch diameter pipe crossing Kamehameha Highway will also be intercepted on the west side of the new parking lot and conveyed to the new drainage structure.

Drain lines capturing runoff from above the Performing Arts Center and Multi-Purpose Gymnasium will also be connected to the new parking lot drainage system. Runoff from above the Performing Arts Center will be connected to the new manhole serving the area below Academic Center I. The drain line from the Multi-Purpose Gymnasium will connect into the 12′x8′ box culvert.

**Other Issues**

The new fire lane behind the Performing Arts Center conflicts with electrical poles. These items will need to be removed or relocated.

**Phasing**

Proposed improvements are anticipated to be constructed in two phases. Phase 1 includes: constructing new buildings including the new Residences, Student Center, Academic Center II, and Central Plant; renovation of the existing Academic Center and the Dining Commons; a sculpture garden; relocation of the soccer field; mass grading for the new parking lot; and paving of a portion of a new parking lot. Phase 2 includes a new Performing Arts Center and Multi-Purpose Gymnasium, and paving the rest of the new parking lot. Approximate phasing limits are shown on the conceptual site utility plans and grading and drainage plans, which are included at the end of the civil engineering analysis.

Site work and infrastructure will be constructed in support of the new buildings. Emergency vehicle accesses and utilities will be phased to ensure service for improvements within each phase. Similarly, the portion of the parking lot paved in Phase 1 will include the number of stalls needed to support the facilities constructed in that phase.

Site work in Phase 1 will also be designed with consideration for Phase 2 construction. The Phase 1 utilities will be constructed in their permanent locations with no temporary connections required. The utilities will incorporate future Phase 2 finish grades and anticipated demands. As construction of Phase 2 will most likely utilize the parking lot area directly in front of the new

Performing Arts Center for staging and construction work, this area will be identified to be grassed in Phase 1.

The proposed concept grading is to balance the cut and fill earthwork quantities within each phase. Earthwork quantities estimated for construction of the new Performing Arts Center and Multi-Purpose Gymnasium in Phase 2 were found to be relatively close to balancing cut and fill with 7,500 cubic yards for embankment and 9,300 cubic yards for excavation. In order to maintain this earthwork balance in Phase 2, all other major earthwork will be done in Phase 1. The largest earthwork quantities will be needed for filling the new parking lot, and for excavating the soccer field. Therefore, in addition to the earthwork needed for the infrastructure of Phase 1, the entire parking lot will be mass graded to future subgrade level in Phase 1. Based on the current grading plans, estimated earthwork quantities for Phase 1 are 142,600 cubic yards for embankment and 118,800 cubic yards for excavation. Adjustments will be made during the design phase to balance the earthwork quantities, such as lowering the soccer field to provide more material for embankment.

Since the parking lot will be mass graded in Phase 1, redirection of runoff flowing into the existing soccer field will also be addressed. Runoff from below Academic Center I, as well as the off-site runoff from across Kamehameha Highway will be intercepted and directed to Mamalahoa Stream. Surface runoff discharging to the existing soccer field from above the new parking lot elevation, such as the outlet from existing Academic Center I, will not be impacted by the mass grading. Improvements for these drainage areas will be constructed in Phase 2.

**Construction Costs**

The major cost components of the identified civil/site improvements under the campus master plan will be grading, paving, and the storm drainage system. An order of magnitude opinion of probable construction costs are summarized in Table 1 below.

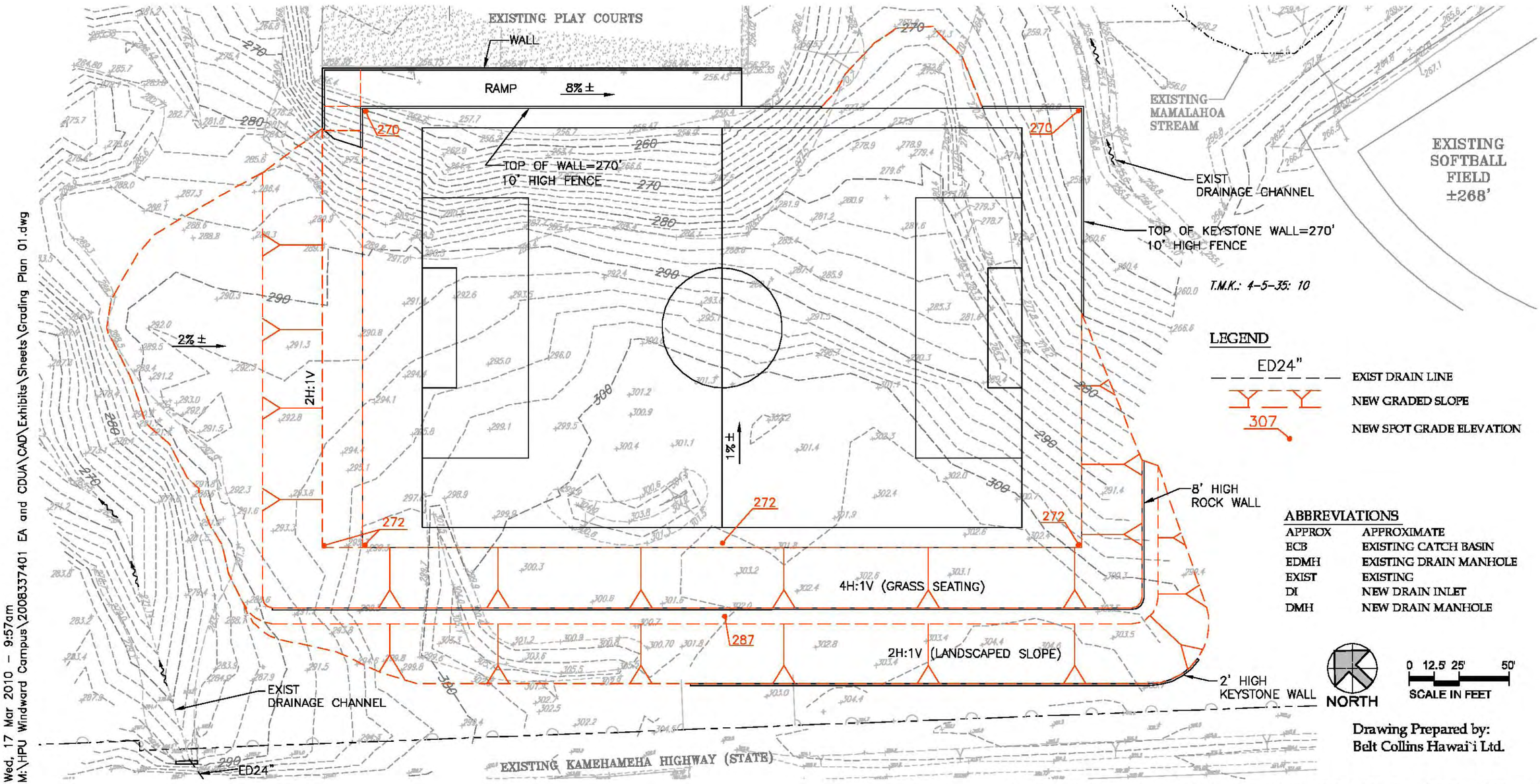
Earthwork quantities were estimated for the site improvements to building and pavement subgrades. In landscaped areas, the earthwork was done to 6" below finish grade to accommodate top soil.

The cost of improvements to redirect existing off-site storm water conveyed to Mamalahoa Stream within the campus from across Kamehameha Highway will be borne as part of the master plan. The off-site discharges are existing and need to be accommodated in the planned improvements. Establishing of easements

for the structures and flowage should be considered to identify rights and maintenance responsibilities.

| Table 1 - Summary of Probable Cost | | | |
|---|---|---|---|
| | Phase 1 | Phase 2 | Total |
| 1. Site Preparation | $ | $ | $ |
| 2. Grading | $ | $ | $ |
| 3. Paving and Sidewalks | $ | $ | $ |
| 4. Gravity Sewer | $ | $ | $ |
| 5. Water Line | $ | $ | $ |
| 6. Drainage | $ | $ | $ |
| 7. Walls | $ | $ | $ |
| **Total** | $ | $ | $ |

As part of the cost consideration, use of an open channel system as an alternative to the box culvert at the new parking lot location was evaluated. The open channel system was aligned along the west edge of the new parking lot. Although the costs initially seemed comparable for both schemes, the open channel system had disadvantages which made the option less desirable. The location of the open channel system west of the parking lot would require an additional culvert crossing the existing main driveway rather than utilizing the existing arch culvert, as well as an additional culvert under the access from the existing parking lot to the new one. Because of the new culvert required at the driveway, construction for this option would likely require that the existing main driveway be closed during construction and a temporary road be constructed. Therefore, the box culvert was considered as the more feasible option.




## LEGEND

| | |
|---|---|
| ED24" | EXIST DRAIN LINE |
| | NEW GRADED SLOPE |
| 307 | NEW SPOT GRADE ELEVATION |

## ABBREVIATIONS

| | |
|---|---|
| APPROX | APPROXIMATE |
| ECB | EXISTING CATCH BASIN |
| EDMH | EXISTING DRAIN MANHOLE |
| EXIST | EXISTING |
| DI | NEW DRAIN INLET |
| DMH | NEW DRAIN MANHOLE |

Drawing Prepared by:
Belt Collins Hawai`i Ltd.

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# GRADING AND DRAINAGE PLAN 1 (PHASE 1)
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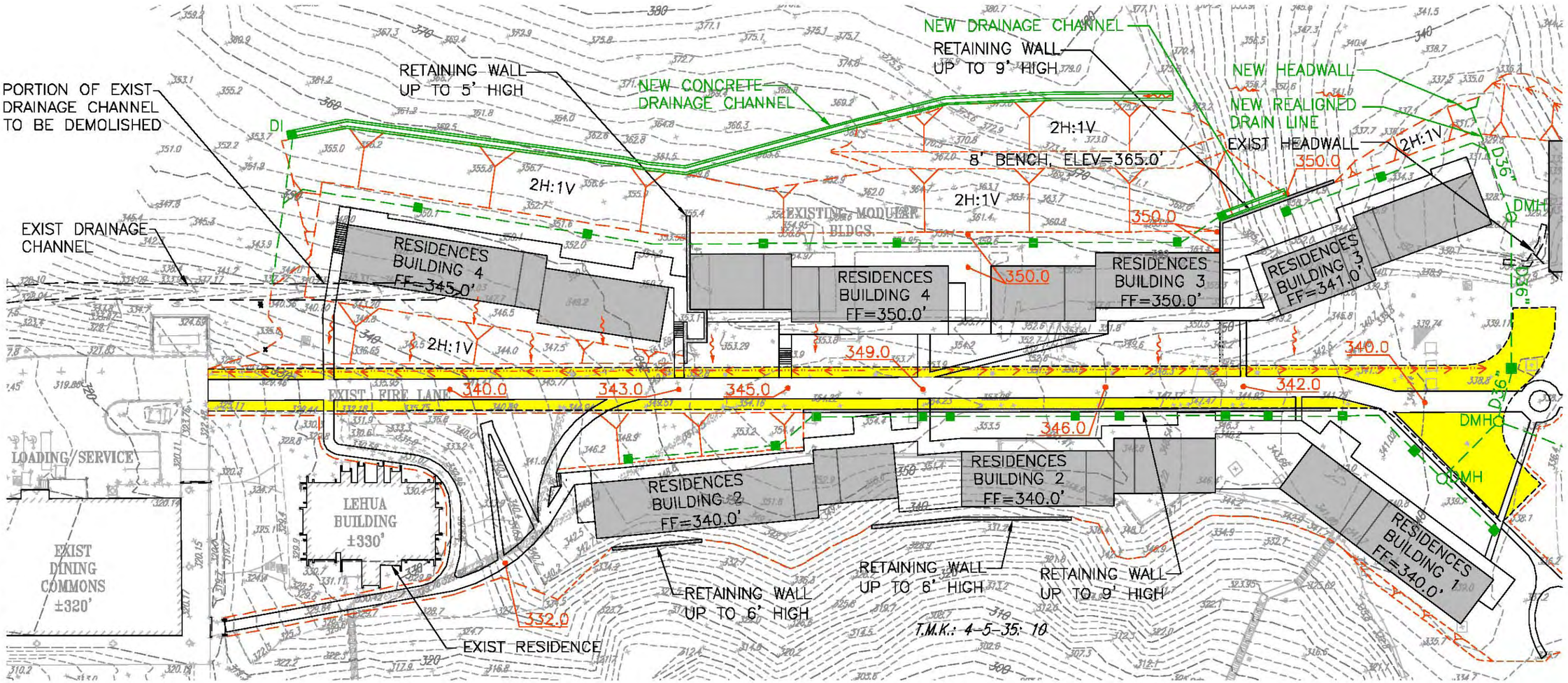


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**ABBREVIATIONS**

| | |
|---|---|
| APPROX | APPROXIMATE |
| ECB | EXISTING CATCH BASIN |
| EDMH | EXISTING DRAIN MANHOLE |
| EXIST | EXISTING |
| FF | FINISH FLOOR ELEVATION |

NORTH

0 12.5' 25' 50'
SCALE IN FEET

Drawing Prepared by:
Belt Collins Hawai`i Ltd.

**LEGEND**

| | |
|---|---|
| ED24" | EXIST DRAIN LINE |
| D48" | NEW DRAIN LINE |
| | NEW CHANNEL |
| | DIRECTION OF RUN-OFF |
| | NEW SWALE |
| | NEW GRADED SLOPE |
| 307 | NEW SPOT GRADE ELEVATION |
| DI | NEW DRAIN INLET |
| DMH | NEW DRAIN MANHOLE |
| | NEW GRASS CELL PAVERS |

# GRADING AND DRAINAGE PLAN 2 (PHASE 1)
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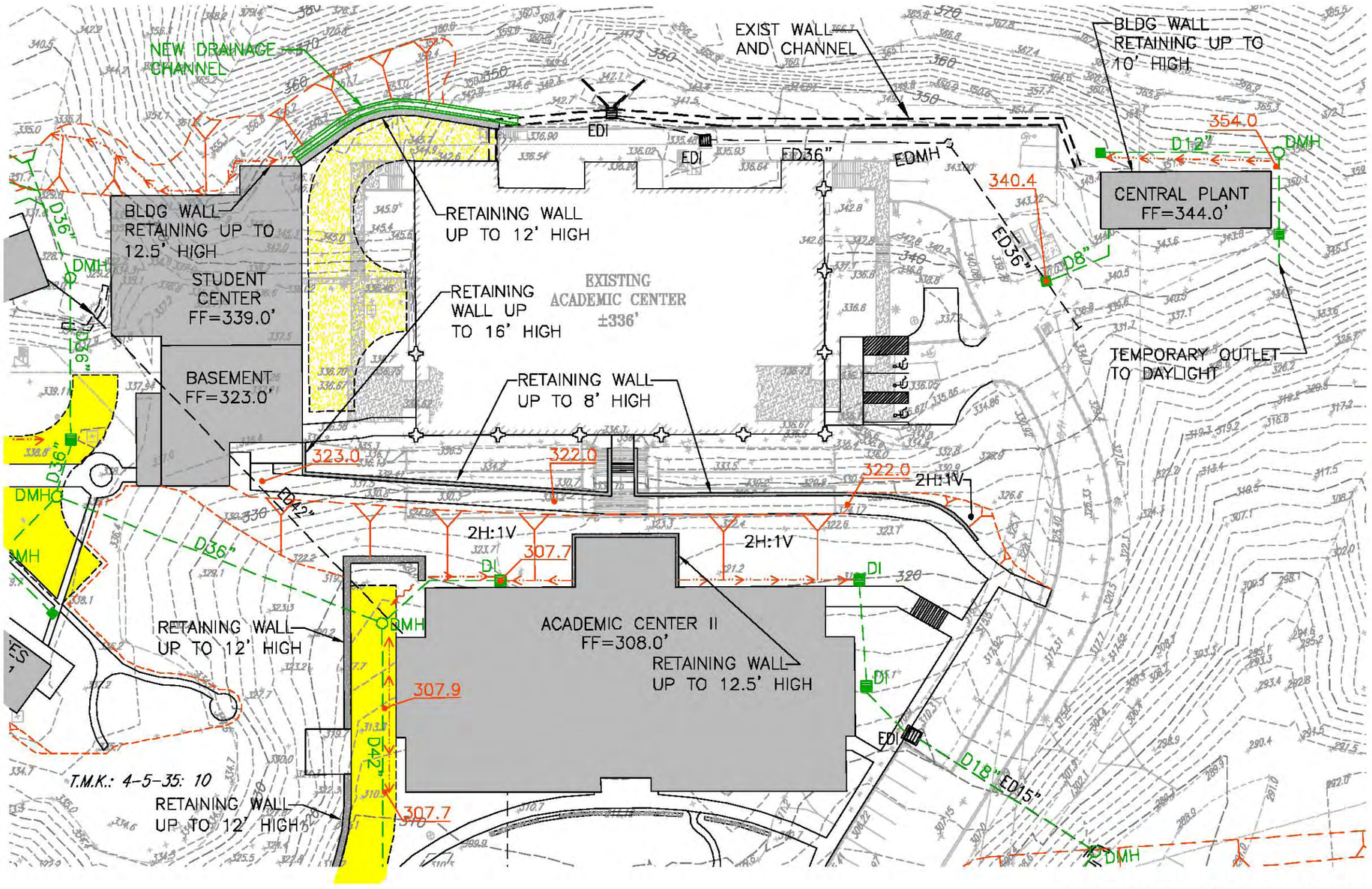


## LEGEND

| | |
|---|---|
| ED24" | EXIST DRAIN LINE |
| D48" | NEW DRAIN LINE |
| | NEW CHANNEL |
| | DIRECTION OF RUN-OFF |
| | NEW SWALE |
| | NEW GRADED SLOPE |
| 307 | NEW SPOT GRADE ELEVATION |
| DI | NEW DRAIN INLET |
| DMH | NEW DRAIN MANHOLE |
| | NEW GRASS CELL PAVERS |
| | NEW AC PAVEMENT |

## ABBREVIATIONS

| | |
|---|---|
| APPROX | APPROXIMATE |
| ECB | EXISTING CATCH BASIN |
| EDMH | EXISTING DRAIN MANHOLE |
| EXIST | EXISTING |
| FF | FINISH FLOOR ELEVATION |

NORTH

0 12.5' 25' 50'
SCALE IN FEET

Drawing Prepared by:
Belt Collins Hawai`i Ltd.

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# GRADING AND DRAINAGE PLAN 3 (PHASE 1)
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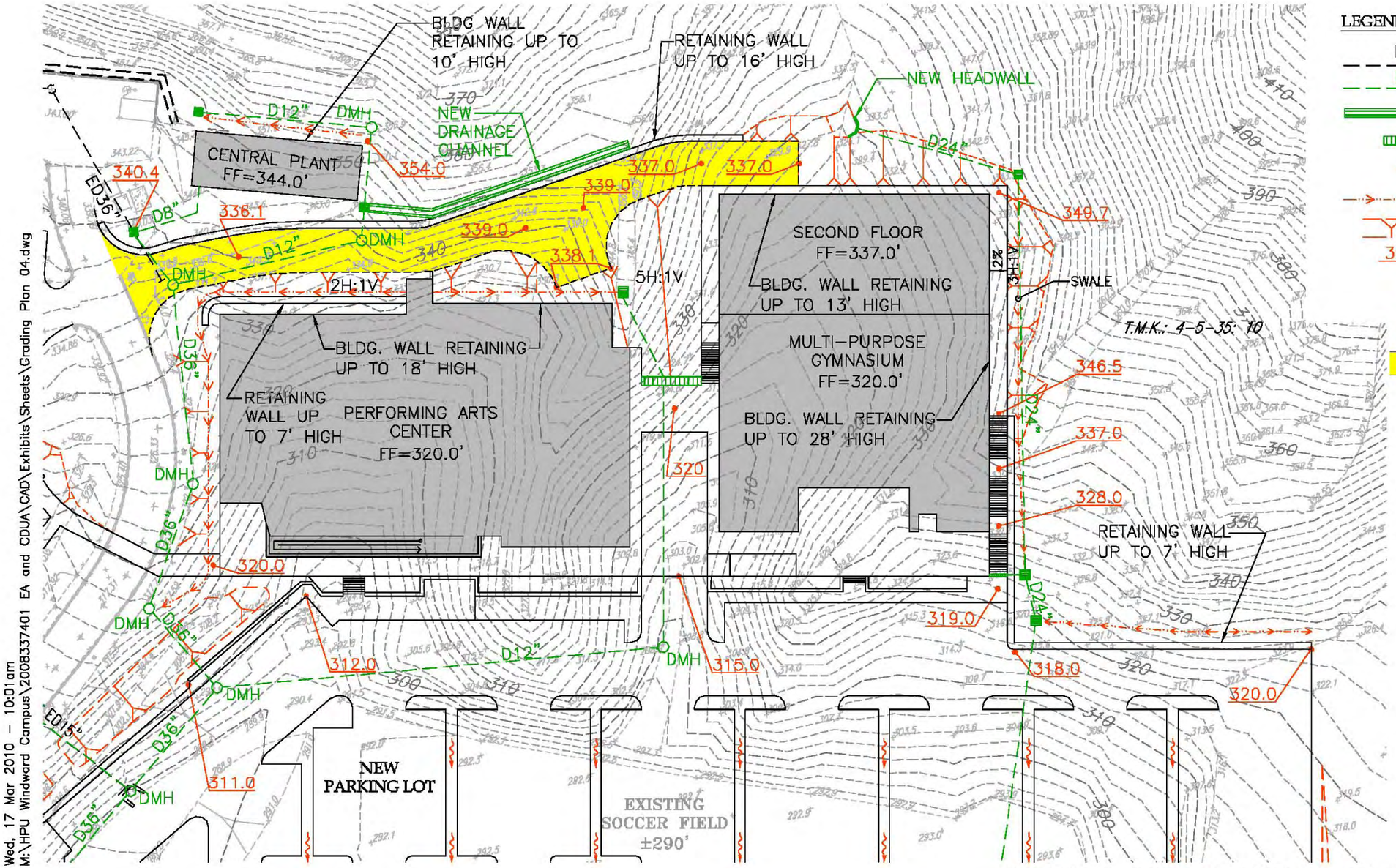


## LEGEND

| | |
|---|---|
| ED24" | EXIST DRAIN LINE |
| D48" | NEW DRAIN LINE |
| | NEW CHANNEL |
| | NEW TRENCH DRAIN |
| | DIRECTION OF RUN-OFF |
| | NEW SWALE |
| | NEW GRADED SLOPE |
| 307 | NEW SPOT GRADE ELEVATION |
| DI | NEW DRAIN INLET |
| DMH | NEW DRAIN MANHOLE |
| | NEW GRASS CELL PAVERS |

## ABBREVIATIONS

| | |
|---|---|
| APPROX | APPROXIMATE |
| ECB | EXISTING CATCH BASIN |
| EDMH | EXISTING DRAIN MANHOLE |
| EXIST | EXISTING |
| FF | FINISH FLOOR ELEVATION |

Drawing Prepared by:
Belt Collins Hawai`i Ltd.

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# GRADING AND DRAINAGE PLAN 4 (PHASE 1 AND 2)
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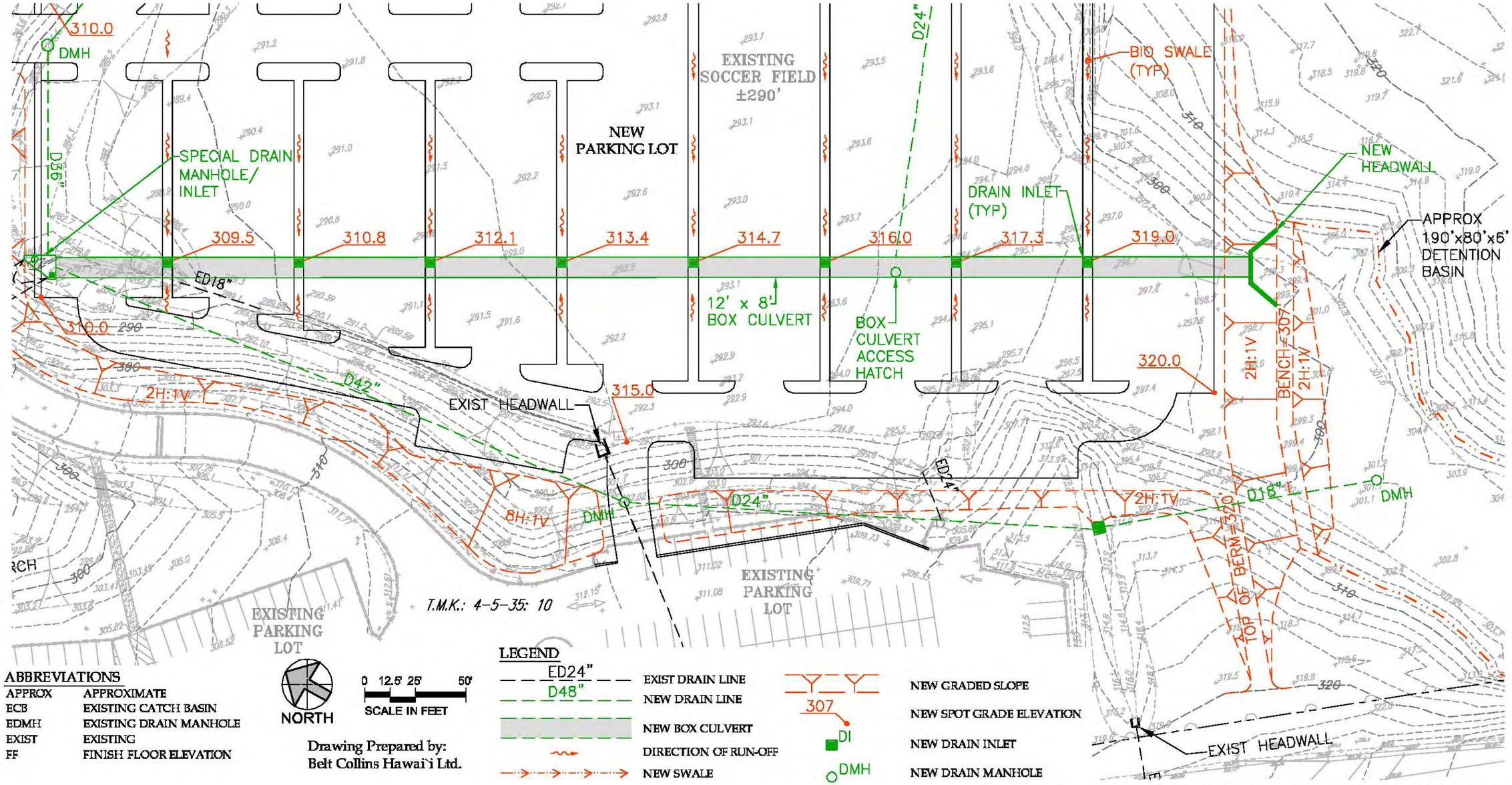


## ABBREVIATIONS

| | |
|---|---|
| APPROX | APPROXIMATE |
| ECB | EXISTING CATCH BASIN |
| EDMH | EXISTING DRAIN MANHOLE |
| EXIST | EXISTING |
| FF | FINISH FLOOR ELEVATION |

Drawing Prepared by:
Belt Collins Hawai`i Ltd.

# GRADING AND DRAINAGE PLAN 5 (PHASE 1)
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**Civil Engineering Executive Summary**

The existing HPU Windward campus infrastructure is in apparently good condition based on field observations and information from HPU officials. The pavements are in good condition and no areas of erosion were observed.

Improvements to the campus water service connection were done within the last four years, with a new 12″ water line, water meter and backflow preventer installed. No reports of on-campus water line breaks or pressure problems were received during information gathering sessions.

Construction of a new wastewater pumping station connecting the campus to the City's sewer system was completed in November 2009. The on-site wastewater treatment plant previously serving the campus will be abandoned.

Mamalahoa Stream traverses the campus between the lower campus driveway and Kamehameha Highway. Culverts conveying storm water from the highway and Pali Golf Course, opposite the highway, discharge into the campus. There is no regulated flood zone within the campus associated with the stream. Drainage within the campus generally flows to the stream in a combination of open channels and piped systems leaving the campus along the western boundary.

Under the master plan, a main parking lot is proposed to be constructed on the site of the existing soccer field, with the field relocated to the area between the existing play courts and Kamehameha Highway. The existing driveway access is also being evaluated under a traffic study to determine whether any upgrades are needed to support the proposed improvements.

Proposed master plan improvements are anticipated to be constructed in two phases. Phase 1 includes construction of new buildings (Residences, a Student Center, Academic Center II, and Central Plant); relocation of the soccer field; mass grading of the new parking lot; and paving of a portion of the parking lot. Phase 2 includes construction of a new Performing Arts Center and Multi-Purpose Gymnasium; and paving the rest of the parking lot.

Expansion of the campus water system will be required to serve the master planned buildings with domestic service and fire protection. While the City Board of Water Supply will not commit water to a facility until the time the building permit application is submitted, there are currently no restrictions on development in the campus area. It is likely that the City's water supply and on-site campus system will be adequate to support the master planned improvements. The adequacy of the existing water meter and on-site lines to support the planned campus development will need to be confirmed after final

facility demands are known. Relocation of some existing water lines would be required to accommodate the current proposed building layout.

Most of the existing sewer lines would remain in service under the proposed master plan, with phased extension of sewer lines to serve new buildings undertaken. Based on discussions with the pumping station's designer, campus expansion was considered in sizing of the wet well and force main. Replacement of the pumps with larger units may be needed at some point as flows to the station increase.

Considerable grading will be required to implement the proposed master plan. Graded slopes or retaining walls along the back of the campus will be required to accommodate the new buildings. The general concept is to excavate and bench the slopes following local grading ordinances, with cutoff drainage channels installed as required to intercept upslope flow. The decision between retaining walls and graded slopes will need to be made during building design with consideration for access, waterproofing, structural and cost requirements. Grading activities not associated with buildings along the upper portion of the campus will be separated into phases, taking account balancing earthwork quantities within each phase.

The proposed drainage system will maintain the existing flow paterns and utilize existing drainage structure conveying runoff to Mamalahoa Stream as much as possible, in order to avoid impacting the stream. A detention basin is proposed to detain additional runoff created by the proposed improvements.

Major drainage system improvements will also be required to accommodate runoff from upslope areas that discharge onto the campus. The earthwork requirements, along with the storm drainage system are anticipated to be the biggest civil improvement costs for master plan implementation.

# APPENDIX C
# DRAFT TRAFFIC IMPACT ANALYSIS REPORT

# DRAFT TRAFFIC IMPACT ANALYSIS REPORT

## FOR THE PROPOSED

# HAWAII PACIFIC UNIVERSITY

## HAWAII LOA CAMPUS MASTER PLAN

### KANEOHE, OAHU, HAWAII

### TAX MAP KEY: 4-5-035:010

## I. Introduction

### A. Project Description

Hawaii Pacific University (HPU) proposes to expand its existing Hawaii Loa Campus in Kaneohe, Oahu, Hawaii. HPU Hawaii Loa Campus is located on the north side of Kamehameha Highway, between Pali Highway/Kalanianaole Highway and Interstate Route H-3. Access to the HPU Hawaii Loa Campus is provided at an unsignalized intersection on Kamehameha Highway opposite the Pali Municipal Golf Course driveway. The 132.455-acre project site is identified as Tax Map Key: 4-5-035:10. Figure 1 depicts the vicinity map.

The proposed Master Plan includes a three-story Academic Center with 49,020 square feet of gross floor area (SFGFA), a 600-seat performing arts center (24,856 SFGFA), a multi-purpose gym (35,290 SFGFA), and a student center (16,875 SFGFA). The proposed Master Plan would add on-campus housing facilities, which would accommodate 400 students. Together with the existing 210-student residence facilities, a total of 610 students will reside on campus. The Master Plan also will add about 400 parking stalls to the existing 500± parking stalls, located on site, for a total of about 900 stalls. The HPU Hawaii Loa Campus Master Plan is depicted on Figure 2.

The proposed Master Plan is expected to accommodate student enrollment, which is expected to increase from the current 1,200 students to 1,800 students. The current 110-employee staff (excluding student employees) is expected to increase to 330 employees. The HPU Hawaii Loa Campus Master Plan is expected to be built out by the Year 2020.

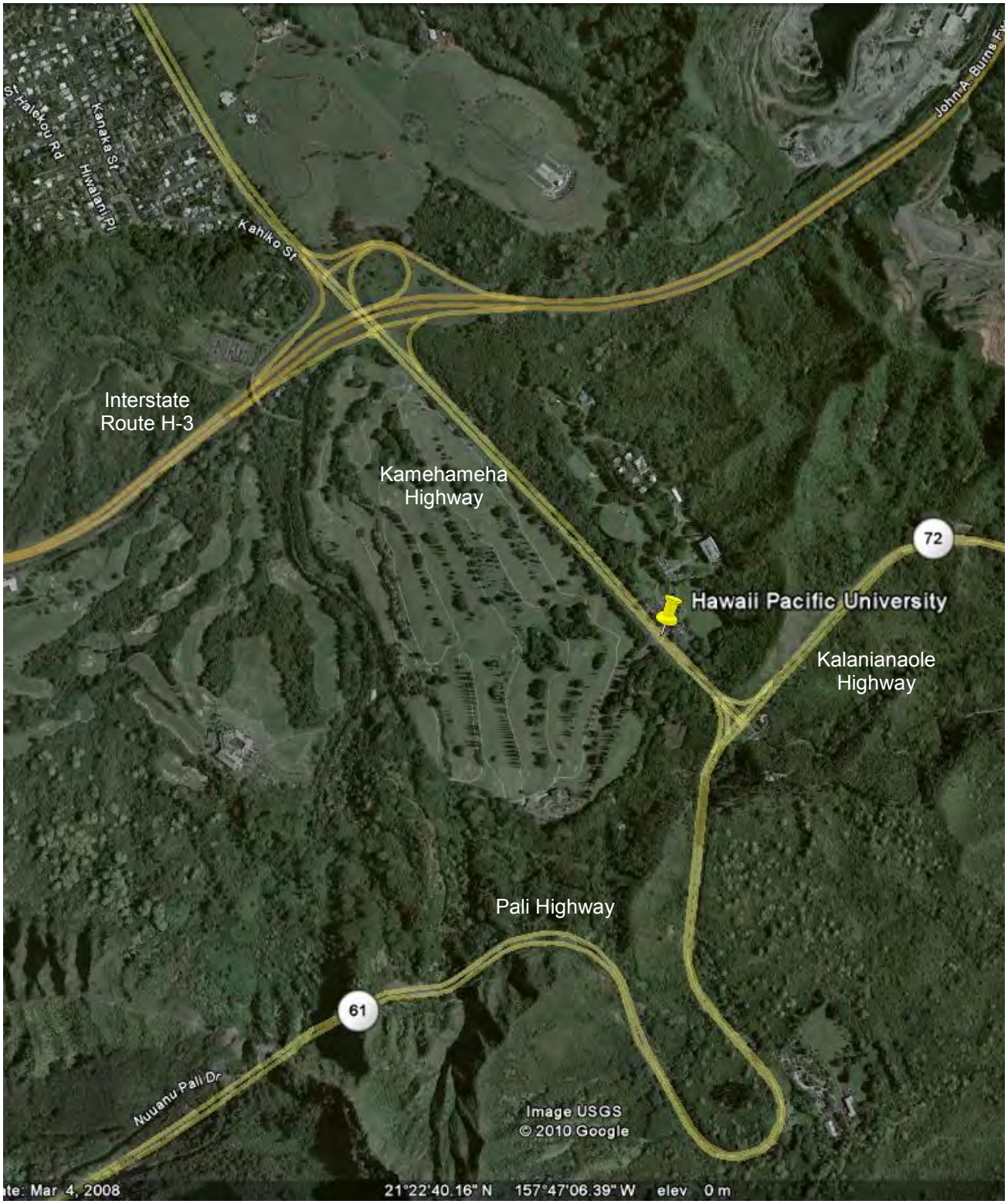


**Figure 1. Location Map**

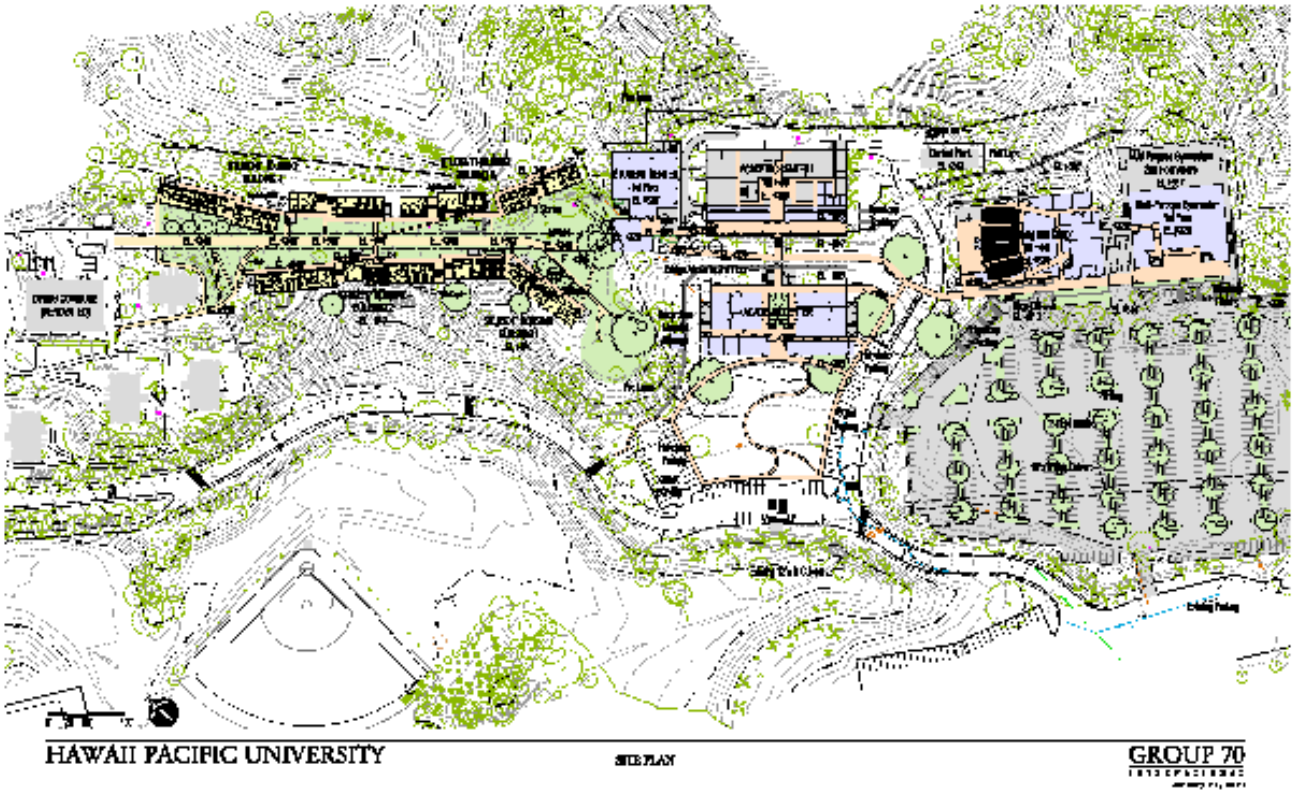


**Figure 2. HPU Hawaii Loa Campus Conceptual Plan**

## B. Purpose and Scope of the Study

The purpose of this study is to analyze the traffic impacts resulting from the development of the proposed HPU Hawaii Loa Campus Master Plan. This report presents the findings and recommendations of the study. The scope of this study includes:

1. Description of the proposed project.
2. Evaluation of existing roadways and traffic conditions.
3. Analysis of future traffic conditions without the proposed project.
4. Identification and analysis of traffic impacts resulting from the development of the full build out of the proposed project.
5. Recommendations of improvements, as necessary, that would mitigate the traffic impacts identified in this study.

## C. Methodologies

### 1. Capacity Analysis Methodology

The highway capacity analysis, performed for this study, is based upon procedures presented in the Highway Capacity Manual (HCM), published by the Transportation Research Board. HCM defines Level of Service (LOS) as "a quality measure describing operational conditions within a traffic stream". Several factors may be included in determining LOS, such as: speed, travel time, freedom to maneuver, traffic interruptions, driver comfort, and convenience. LOS's "A", "B", and "C" are considered satisfactory Levels of Service. LOS "D" is generally considered a "desirable minimum" operating level of service. LOS "E" is an undesirable condition, and LOS "F" is an unacceptable condition. Intersection LOS is primarily based upon delay. The LOS delays at signalized intersections are longer than at unsignalized intersections, because motorists will tolerate more delays at signalized intersections, which accommodate higher traffic volumes. Table 1 summarizes the LOS criteria.

**Table 1. Intersection Level of Service Criteria (HCM)**

| LOS | Signalized Intersections | | Unsignalized Intersections | |
|---|---|---|---|---|
| | **Delay (*d*)** | **Description** | **Delay (*d*)** | **Description** |
| A | $d \leq 10$ sec/veh | Few stops, little or no delay | $d \leq 10$ sec/veh | Little or no delays |
| B | $10 < d \leq 20$ sec/veh | Good progression, short cycle lengths | $10 < d \leq 15$ sec/veh | Short delays |

| Table 1. Intersection Level of Service Criteria (Cont'd.) | | | | |
|---|---|---|---|---|
| LOS | Signalized Intersections | | Unsignalized Intersections | |
| | Delay (*d*) | Description | Delay (*d*) | Description |
| C | 20<*d*≤35 sec/veh | Cycle failures begin to occur, i.e., vehicles stop at more than one red phase | 15<*d*≤25 sec/veh | Average delays |
| D | 35<*d*≤55 sec/veh | Noticeable number of cycle failures, unfavorable progression | 25<*d*≤35 sec/veh | Long delays |
| E | 55<*d*≤80 sec/veh | Frequent cycle failures, poor progression, long delays | 35<*d*≤50 sec/veh | Very long delays |
| F | *d*>80 sec/veh | Over saturation, many cycle failures, high delays | *d*>50 sec/veh | Extreme delays |

Worksheets for the capacity analysis performed throughout this report are compiled in the Appendix.

### 2. Trip Generation Methodology

The trip generation methodology is based upon generally accepted techniques that were developed by the Institute of Transportation Engineers (ITE) and published in Trip Generation, 8th Edition. ITE university/college trip rates were developed by correlating the total vehicle trip generation data with various activity/land use characteristics, such as the vehicle trips per hour (vph) per student and vph per employee. The observed trip generation characteristics of the existing Hawaii Loa Campus also were analyzed for comparison purposes.

## II. Existing Conditions

### A. Roadways

Kamehameha Highway is a four-lane, divided arterial highway between Pali Highway/Kalanianaole Highway and Interstate Route H-3. The posted speed on Kamehameha Highway is 45 miles per hour (mph) in the vicinity of the proposed project. Kamehameha Highway carries about 41,000 vehicles per day, total for both directions.

Kamehameha Highway is unsignalized at its intersection with the HPU/Pali Golf Course Driveways. The HPU Driveway provides a shared through/left-turn lane and an exclusive right-turn lane with an acceleration lane on northbound Kamehameha Highway. Kamehameha Highway intersects Pali Highway/ Kalanianaole Highway, opposite Auloa Road, at a fully-channelized signalized intersection.

Pali Highway is four-lane divided arterial highway. Pali Highway intersects Kamehameha Highway at a signalized intersection and continues as Kalanianaole Highway east of Kamehameha Highway.

## B. Existing Peak Hour Traffic Volumes and Operating Conditions

### 1. Field Investigation and Data Collection

Manual traffic count surveys were conducted on Kamehameha Highway at the Hawaii Pacific University/Pali Golf Course Driveways and at Pali Highway/ Kalanianaole Highway on December 10, 2009, during the peak periods of weekday traffic – from 6:30 AM to 8:30 AM and from 3:00 PM to 6:00 PM. The peak period traffic data are presented in the Appendix.

### 2. Existing AM Peak Hour Traffic

The AM peak hour of traffic occurred between 7:15 AM and 8:15 AM. Kamehameha Highway carried about 3,000 vph, total for both directions. The existing project site generated 165 vph, entering and exiting the HPU Driveway, during the existing AM peak hour of traffic. Six (6) pedestrians were observed crossing the south leg of Kamehameha Highway during the existing AM peak hour of traffic.

The left-turn/through movement from the HPU Driveway onto Kamehameha Highway operated at LOS "F", during the existing AM peak hour of traffic. The Pali Golf Course Driveway also operated at LOS "F". Southbound Kamehameha Highway traffic occasionally queued back from Pali Highway/Kalanianaole Highway intersection to the HPU Driveway intersection.

The intersection of Kamehameha Highway and Pali Highway/Kalanianaole Highway operated at LOS "F". The left-turn movements on Pali Highway and on Kalanianaole Highway operated at LOS "F". Both Kamehameha Highway and Auloa Road also operated at LOS "F". Figure 3 depicts the existing AM peak hour traffic volumes.

### 3. Existing PM Peak Hour Traffic

The PM peak hour of traffic occurred between 4:30 PM and 5:30 PM. Kamehameha Highway carried over 3,600 vph, total for both directions, during the existing PM peak hour of traffic. The existing project site generated 232 vph, entering and exiting the HPU Driveway, during the existing PM peak hour of traffic. Fifteen (15) pedestrians were observed crossing the south leg of Kamehameha Highway during the existing PM peak hour of traffic.

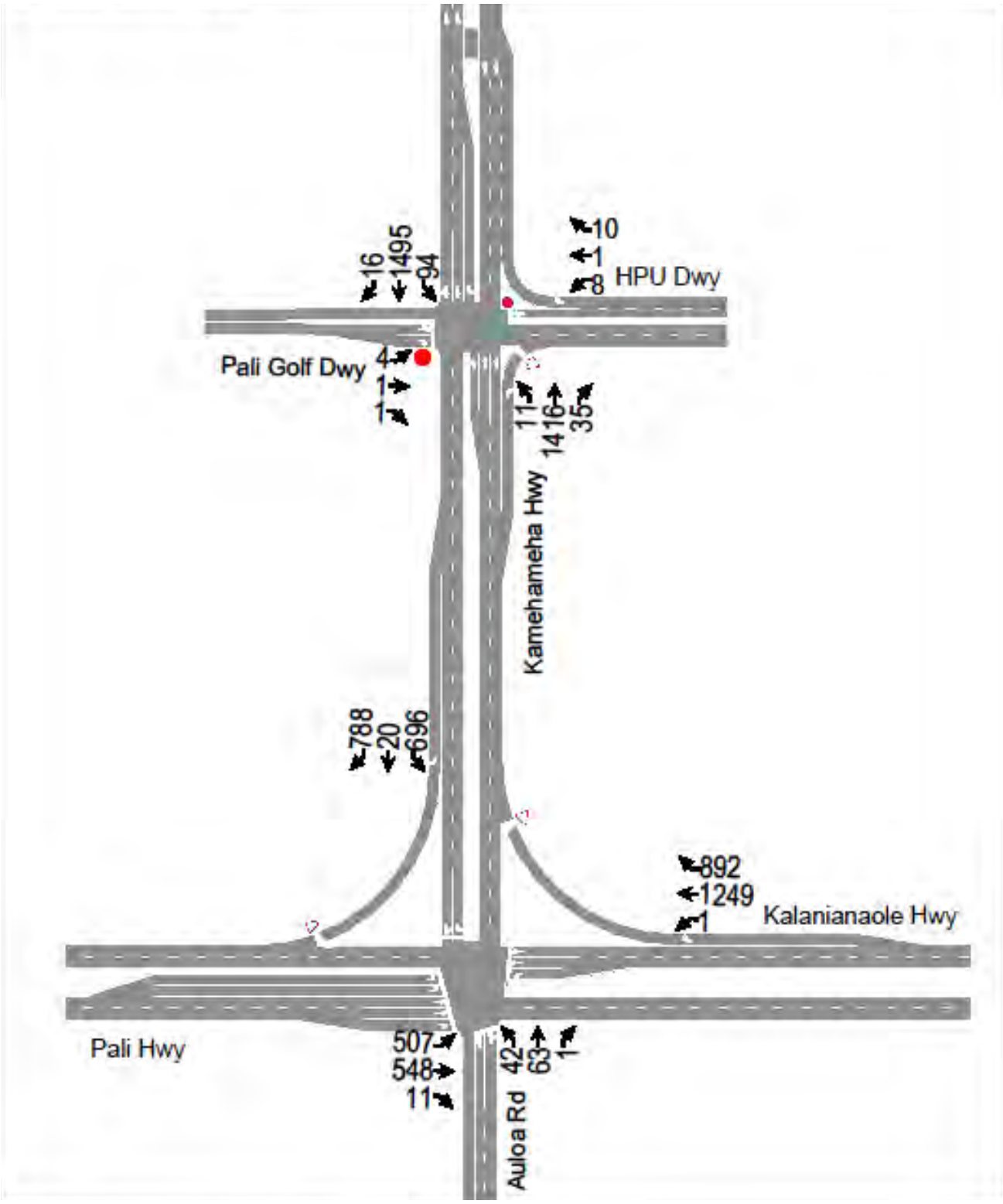


**Figure 3. Existing AM Peak Hour Traffic**

During the existing PM peak hour of traffic, the shared left-turn/through movement and the right-turn movement from the HPU Driveway operated at LOS "F" and LOS "D" respectively, at Kamehameha Highway. The Pali Golf Course Driveway also operated at LOS "F". Southbound Kamehameha Highway traffic again queued back from the Pali Highway/Kalanianaole Highway intersection to the HPU Driveway intersection.

The median on Kamehameha Highway was wide enough to shelter one vehicle, turning left from the HPU Driveway, and enabled it to execute the movement in two stages: (1) cross the northbound lanes on Kamehameha Highway and stop in the median; and (2) merge into the southbound lanes of Kamehameha Highway. The traffic signals at the intersection of Kamehameha Highway and Pali/Kalanianaole Highway facilitated the two-stage left-turn movement by creating gaps in northbound traffic to cross the northbound lanes, and slow-moving "stop-and-go" queues in the southbound direction to merge into southbound traffic.

The intersection of Kamehameha Highway and Pali Highway/Kalanianaole Highway operated at LOS "F", during the existing PM peak hour of traffic. The Kalanianaole Highway, Kamehameha Highway, and Auloa Road approaches operated at LOS "F", while the Pali Highway approach operated at LOS "E". The existing PM peak hour traffic volumes are depicted on Figure 4.

## III. Future Traffic Conditions

### A. Background Growth in Traffic

Historical traffic count data on Kamehameha Highway were obtained from at the State Department of Transportation (DOT) from 1998 through 2007. DOT data indicated a slight decline (-0.25 percent) in traffic on Kamehameha Highway. For the purpose of this traffic impact analysis, an annual growth factor of +1.0 percent was applied to the existing traffic demands to estimate the Year 2020 traffic demands.

### B. Year 2020 AM Peak Hour Traffic Analysis Without Project

During the Year 2020 AM peak hour of traffic without the proposed project, The HPU Driveway and Pali Golf Course Driveway are expected to continue to operate at LOS "F" under unsignalized conditions. The left-turn movements from Kamehameha Highway are expected to operate at LOS "C".

The intersection of Kamehameha Highway and Pali Highway/Kalanianaole Highway also is expected to continue to operate at LOS "F", during the Year 2020 AM peak hour of traffic without the proposed project. The Pali Highway and Kalanianaole Highway approaches are expected to operate at LOS "E". Both the Kamehameha Highway and Auloa Road approaches are expected to operate at LOS "F". Figure 5 depicts the Year 2020 AM peak hour traffic volumes without the proposed project.

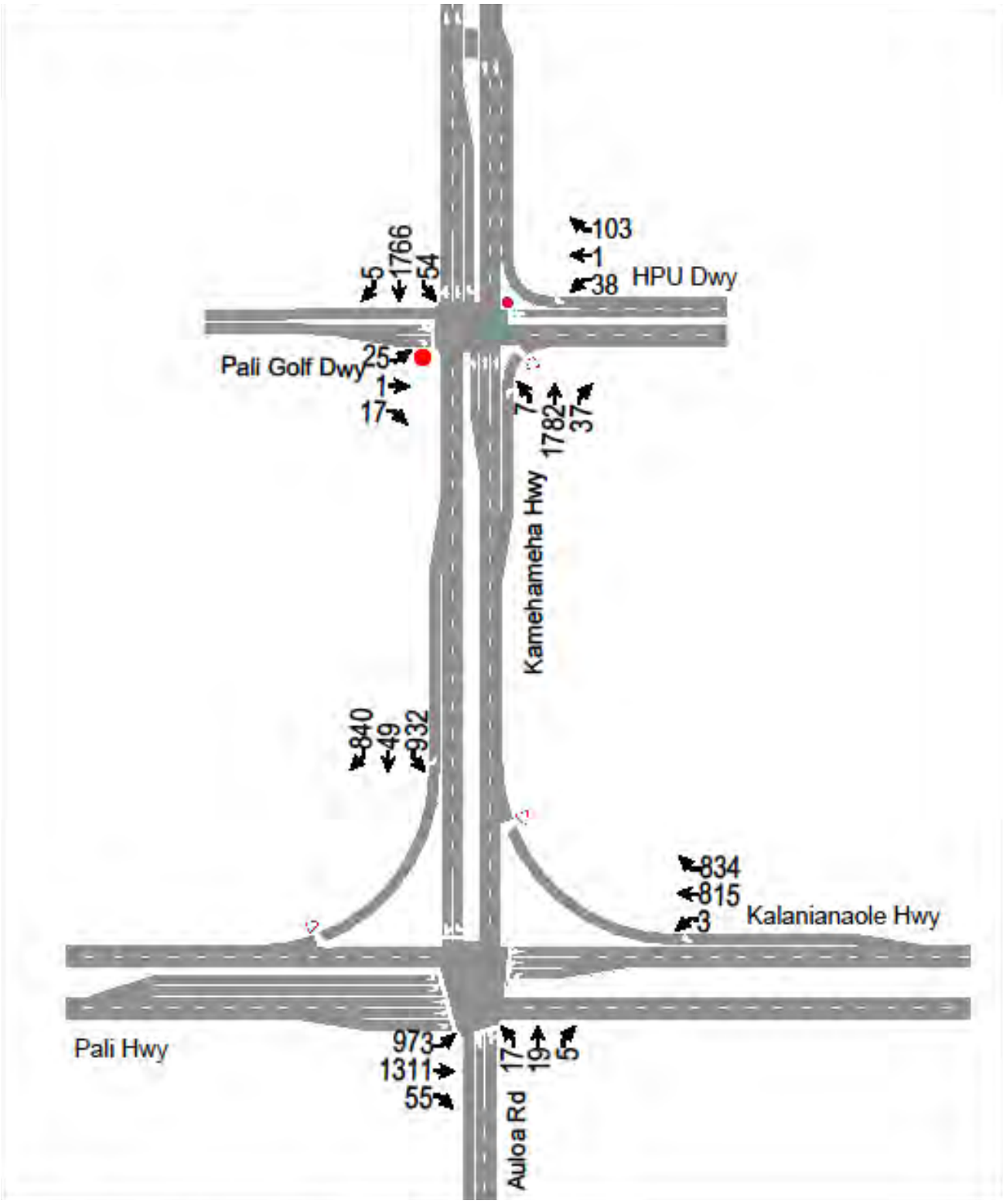


**Figure 4. Existing PM Peak Hour Traffic**

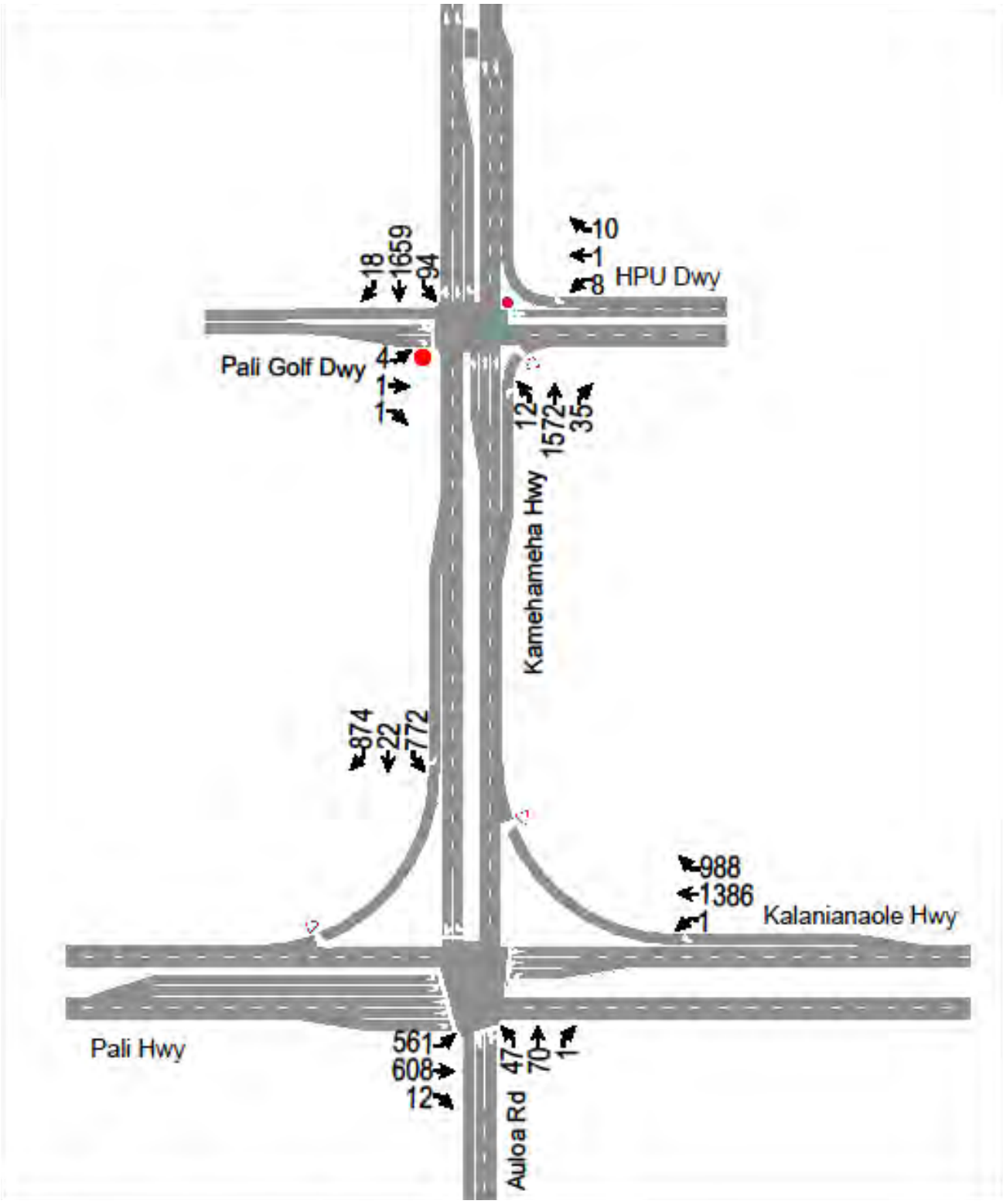


**Figure 5. Year 2020 AM Peak Hour Traffic Without Project**

### C. Year 2020 PM Peak Hour Traffic Analysis Without Project

During the Year 2020 PM peak hour of traffic without the proposed project, the left-turn/through movement and the right-turn movements from the HPU Driveway are expected to operate at LOS "F" and LOS "E" respectively, at Kamehameha Highway. The Pali Golf Course Driveway also is also expected to operate at LOS "F". The left-turn movement on southbound Kamehameha Highway is expected to operate at LOS "D".

The intersection of Kamehameha Highway and Pali Highway/Kalanianaole Highway is expected to operate at LOS "F", during the Year 2020 PM peak hour of traffic without the proposed project. The Kalanianaole Highway, Kamehameha Highway, and Auloa Road approaches are expected to continue to operate at LOS "F", while the Pali Highway approach is expected to continue to operate at LOS "E". The Year 2020 PM peak hour traffic volumes without the proposed project and the results of the capacity analysis are depicted on Figure 6.

## IV. Traffic Impact Analysis

### A. Project Generated Traffic

#### 1. Trip Generation Characteristics

The observed trip rates correlated closely with the ITE vph/employee total trip rates for a university or college. Therefore, the projected trip generation characteristics were based upon the following equations, which were developed by ITE using the number of employees (X) as the independent variable:

$$Ln(A) = 0.64 \times Ln(X) + 2.08$$

$$Ln(P) = 0.52 \times Ln(X) + 3.12$$

where, Ln = natural log function

A = Total AM peak hour trips

P = Total PM peak hour trips

X = Number of employees

The ITE trip generation equations are based upon non-linear functions. The three-fold increase in employees is expected to result it only a two-fold increase in peak hour traffic. The trip generation characteristics for the proposed project are summarized in Table 2.

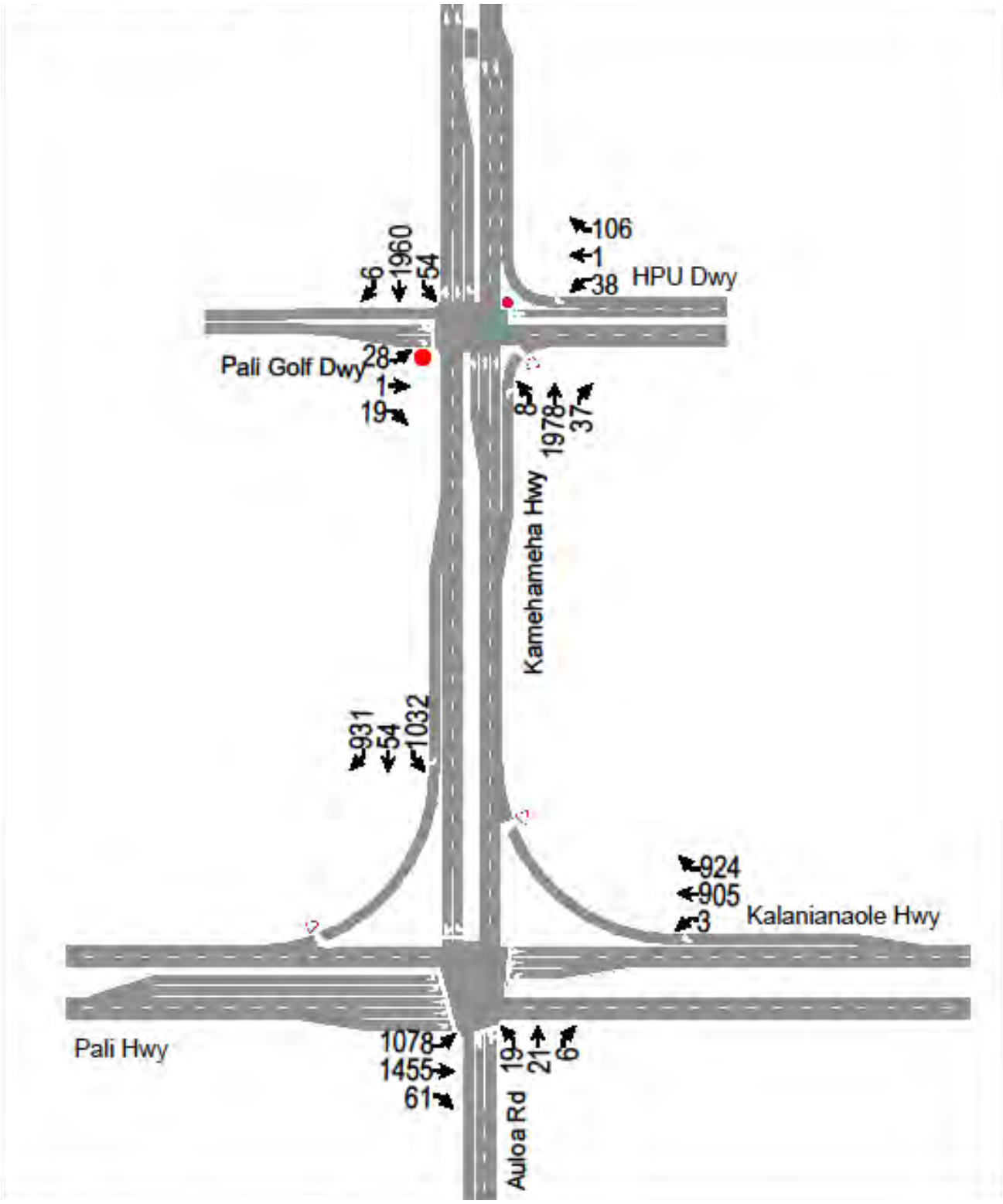


**Figure 6. PM Peak Hour Traffic Without Project**

| Table 2. Trip Generation Characteristics | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Land Use (Independent Variable)** | **(Units)** | **AM Peak Hour** | | | **PM Peak Hour** | | |
| | | **Enter** | **Exit** | **Total** | **Enter** | **Exit** | **Total** |
| **University (Current: 1,200 Students, 110 Employees)** | Observed Volume (vph) | 149 | 16 | 165 | 91 | 141 | 232 |
| | Observed Rate (vph/student) | 0.124 | 0.013 | 0.138 | 0.076 | 0.118 | 0.193 |
| | ITE Land Use Code 550 (vph/student) | 0.122 | 0.030 | 0.152 | 0.087 | 0.202 | 0.289 |
| | Observed Rate (vph/employee) | 1.355 | 0.145 | 1.500 | 0.827 | 1.282 | 2.109 |
| | ITE Land Use Code 550 (vph/employee) | 1.208 | 0.265 | 1.474 | 0.688 | 1.684 | 2.372 |
| **University (330 Employees)** | ITE Land Use Code 550 (vph/employee) | 269 | 59 | 328 | 134 | 328 | 462 |
| | **Net Increase** | **120** | **43** | **163** | **43** | **187** | **230** |

During the AM peak hour of traffic, the proposed HPU Hawaii Loa Campus Master Plan is expected to generate a net increase in traffic of 163 vph – 120 vph entering the site and 43 vph exiting the site. The proposed project is expected to generate a net increase in traffic of 230 vph – 43 vph entering the site and 187 vph exiting the site, during the PM peak hour of traffic.

## 2. Trip Distribution

The trip distribution is based upon existing site traffic patterns. Figures 7 and 8 depict the AM and PM peak hours site-generated traffic assignments for the proposed project, respectively.

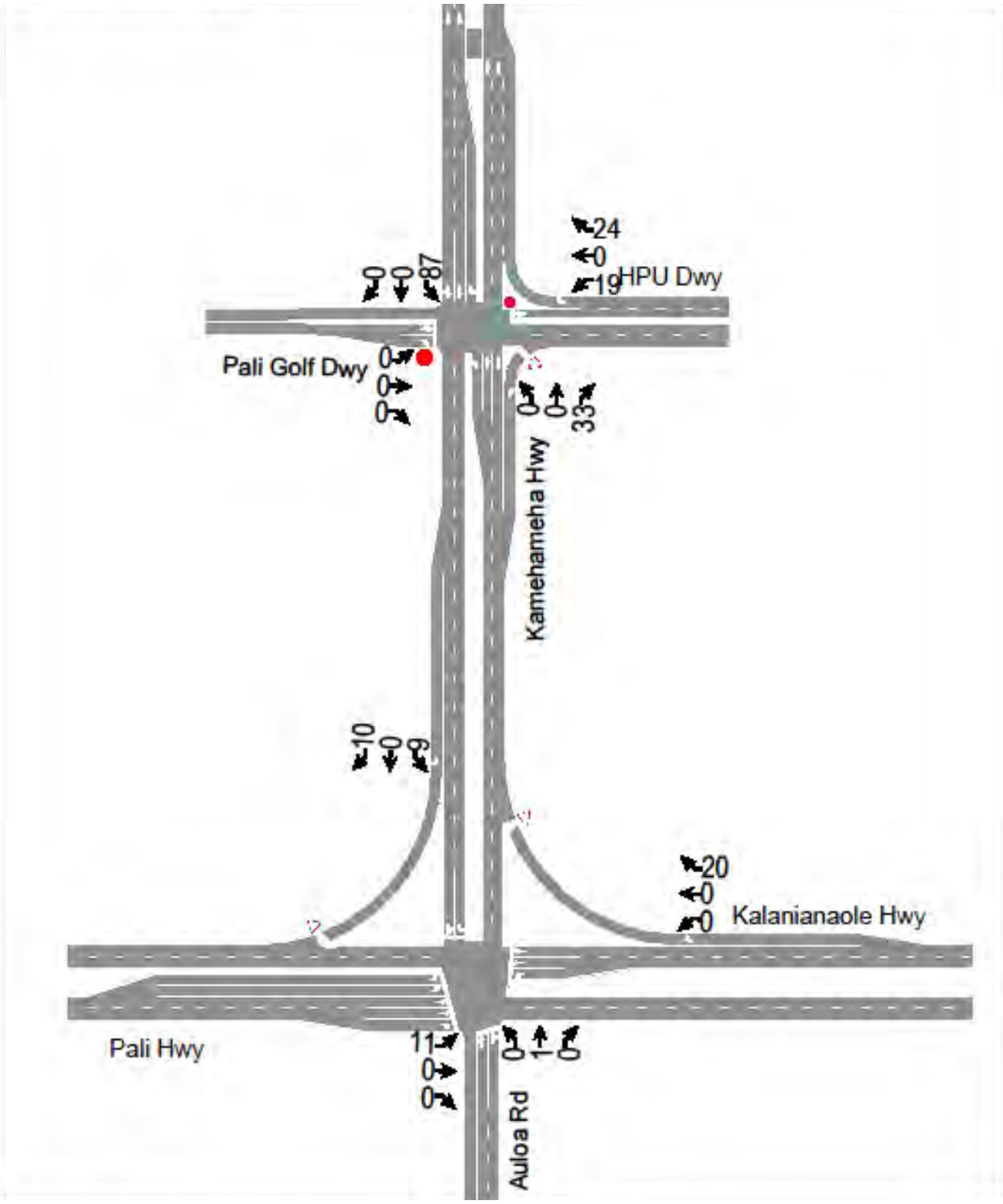


**Figure 7. AM Peak Hour Traffic Assignment**

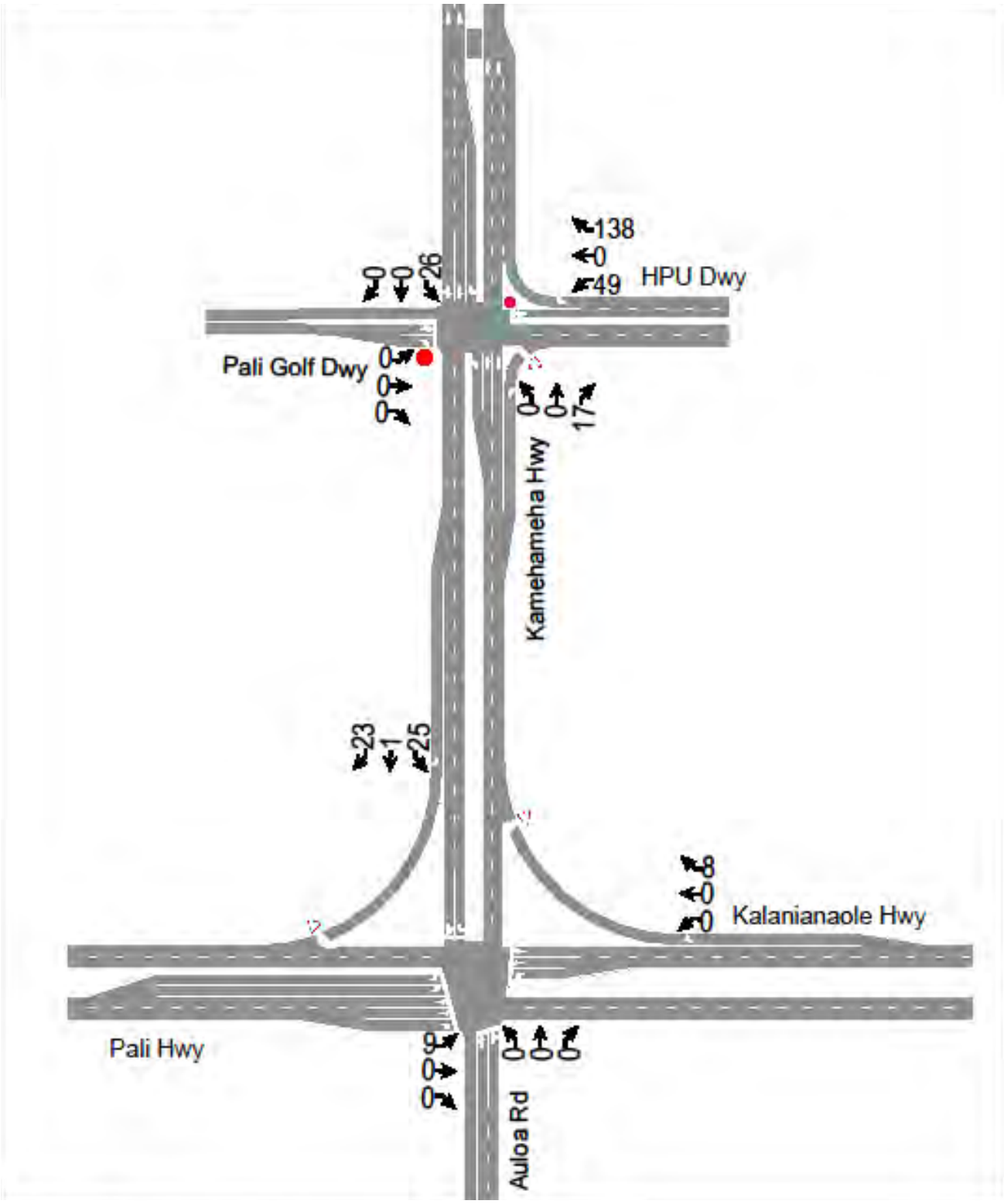


**Figure 8. PM Peak Hour Traffic Assignment**

### B. AM Peak Hour Traffic Impact Analysis With Project

The intersections in the study area are expected to operate at the same Levels of Service with or without the proposed project. The increases in the AM peak hour traffic, attributed to HPU, will comprise 4.6 percent and 0.9 percent of the total traffic at the Kamehameha Highway intersection at HPU Driveway, and at Pali Highway/Kalanianaole Highway, respectively. Figure 9 depicts the AM peak hour traffic with the proposed project, and the results of the capacity analysis.

### C. PM Peak Hour Traffic Impact Analysis With Project

The right-turn movement from the HPU Driveway onto Kamehameha Highway is expected to operate at LOS "F", while the left-turn movement from southbound Kamehameha Highway into the HPU Driveway is expected to operate at LOS "D". The other traffic movements at the intersection are expected to operate at the same Levels of Service without the proposed project.

During the PM peak hour of traffic with the proposed project, the intersection of Kamehameha Highway and Pali Highway/Kalanianaole Highway is expected to operate at the same Levels of Service without the proposed project. The increases in the PM peak hour traffic, attributed to HPU, will comprise 6.8 percent and 1.0 percent of the total traffic at the Kamehameha Highway intersections at HPU Driveway, and at Pali Highway/Kalanianaole Highway, respectively. The PM peak hour traffic with the proposed project and the results of the capacity analysis are depicted on Figure 10.

## V. Recommendations and Conclusions

### A. Recommendations

The existing left-turn lane on southbound Kamehameha Highway at the HPU Driveway is sufficient in length to accommodate the existing and projected left-turn traffic demands with and without the proposed project. An extension of the left-turn lane on southbound Kamehameha Highway at the HPU Driveway is <u>not</u> recommended at this time.

While the delays on the left-turn movement from HPU Driveway may be excessive, operating at LOS "F", the left-turn volume may <u>not</u> meet the traffic signal warrants, established in <u>Manual on Uniform Traffic Control Devices for Streets and Highways</u> (MUTCD) for a one lane approach on the minor street. The MUTCD states that "right-turn traffic should not be included if the movement enters the major street with minimal conflict", which is case under existing conditions. However, under the future traffic conditions with the proposed project, the right-turn movement from the HPU Driveway is expected to experience longer delays, operating at LOS "F". Therefore, the combined left-turn and right-turn volumes may satisfy one or more warrants for the installation of traffic signals. A traffic signal warrant analysis should be conducted in the future, as necessary.

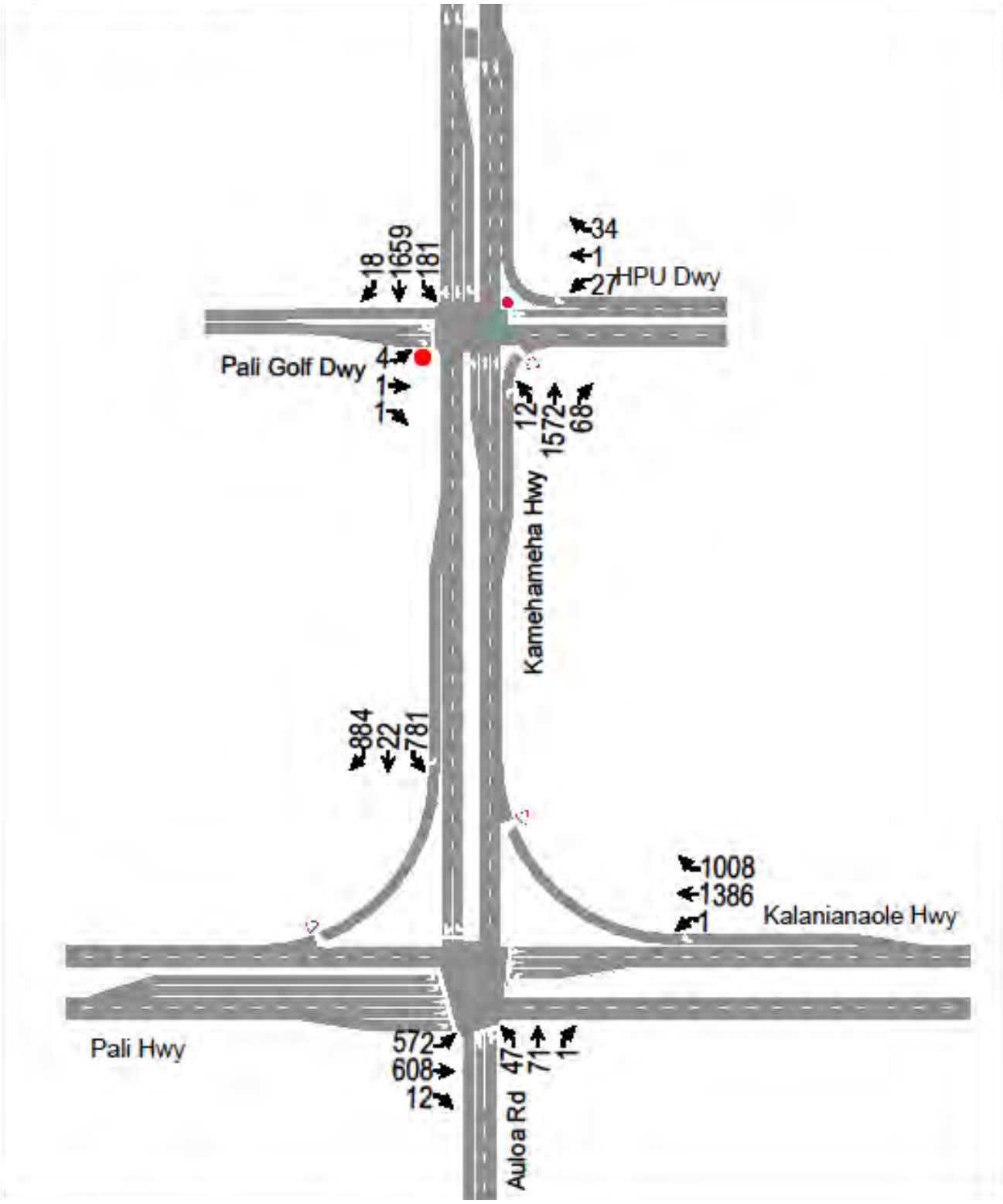


**Figure 9. AM Peak Hour Traffic With Project**

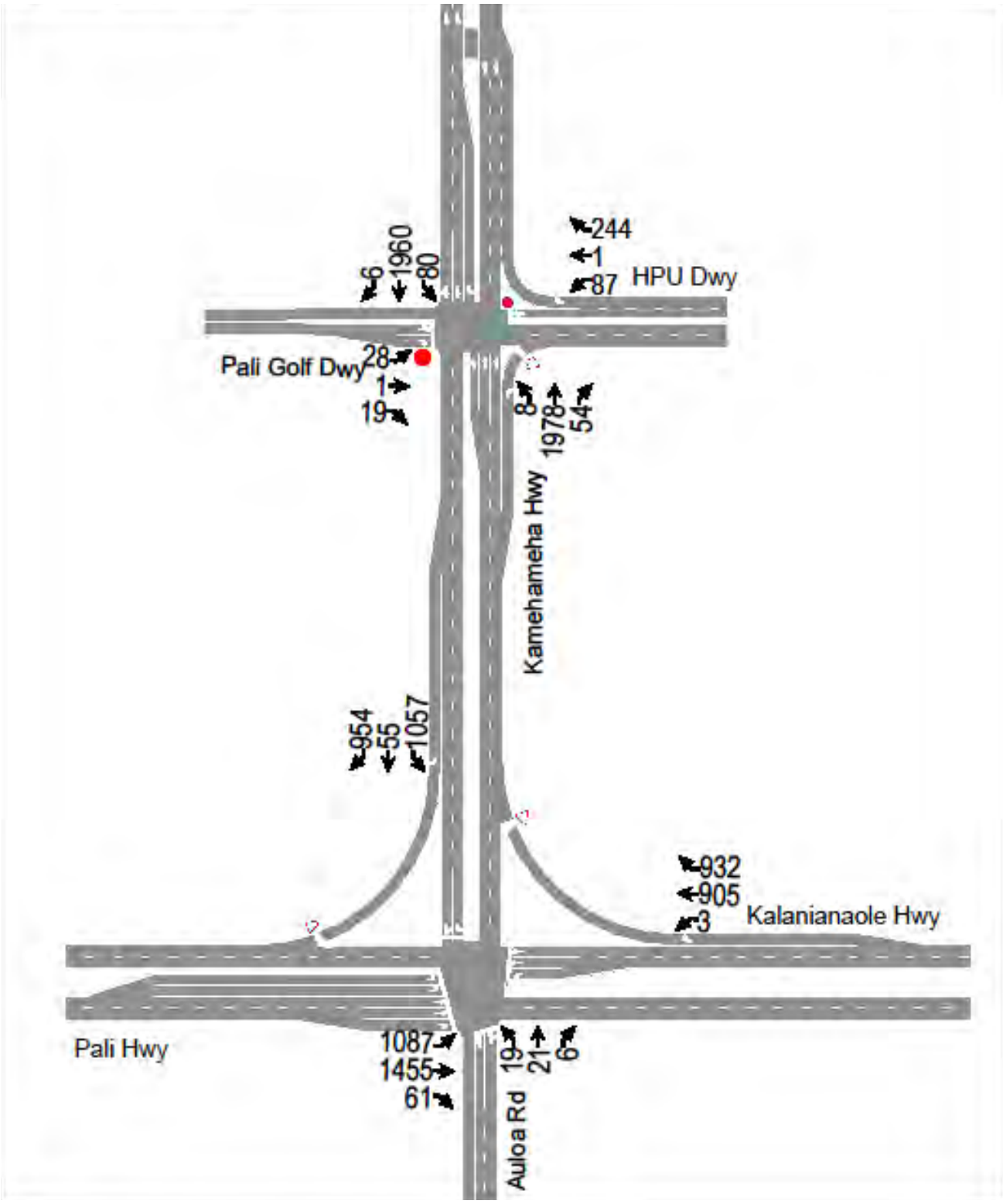


**Figure 10. PM Peak Hour Traffic With Project**

The traffic impact analysis of special events held at the performance arts center or at the multi-purpose gymnasium is beyond the scope of this study. Consideration should be given to scheduling special events at the Hawaii Loa Campus during the off-peak periods of traffic. During special events, special duty police officers should be stationed at the HPU Driveway and within the campus to monitor and control pedestrian and vehicular traffic, as necessary.

## B. Conclusions

The intersection of Pali Highway/Kalanianaole Highway and Kamehameha Highway operated at capacity conditions, during the existing AM and PM peak hours of traffic, which is expected to continue with or without the proposed project. The peak hour traffic volumes, generated by the proposed Hawaii Pacific University expansion at the Hawaii Loa Campus, are expected to comprise only 0.9 percent and 1.0 percent of the AM and PM peak hour traffic at the intersection, respectively.

The HPU Driveway operates at LOS "F", during the existing AM and PM peak hours of traffic. which is expected to continue with or without the proposed project, under unsignalized conditions. The traffic, generated by the proposed Hawaii Pacific University expansion at the Hawaii Loa Campus, is expected to comprise 4.6 percent and 6.8 percent of intersection traffic during the AM and PM peak hour traffic, respectively. The traffic operations at the intersection of Kamehameha Highway and the HPU Driveway/Pali Golf Course Driveway can be improved with the installation of traffic signals. One or more of the MUTCD warrants will need to be satisfied to justify the traffic signal installation.

# APPENDIX D
# ELECTRICAL AND MECHANICAL SYSTEMS ASSESSMENT

## ELECTRICAL SYSTEMS

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## EXECUTIVE SUMMARY

Hawai'i Pacific University is planning an expansion of its Hawai'i Loa Campus located in Kāne'ohe. The expansion includes the addition of Residences, Academic Center, Student Center, Performing Arts Auditorium and Multi-Purpose Gymnasium. The electrical and telecommunication system infrastructure has been reviewed with a new overhead system proposed to address the site restrictions and additional building electrical and telecommunication requirements.

The existing primary electrical system serving the existing Academic Center and Dining Commons are at the end of its service life and is in need of replacement in the short term.

The primary electrical system will consist of an overhead line system and pad mount transformers that will service each of the buildings or a cluster of buildings.

The buildings will utilize sustainable strategies to maximize daylighting, use of energy ultra high efficient lighting and power, and renewable energy through photovoltaic panels and wind turbines.

## ELECTRICAL SERVICE DISTRIBUTION

### Existing System

Hawai'i Pacific University – Hawai'i Loa campus receives power from Hawaiian Electric Company (HECo). The campus generally is served by an incoming overhead 12.47kV high voltage power that is distributed underground throughout the campus. The primary distribution system consists of two high voltage feeders that service the campus structures. The upper campus feeder serves the Academic Center and the lower campus feeder serves the modular buildings, Dining Commons, and Residences.

There are three customer-owned pad-mounted transformers located at the Academic Center, modular buildings, and Dining Commons. The original campus was constructed in the early 1970s that consisted of the Academic Center, Dining Commons, and Residences. The electrical equipment installed at these buildings is past its service life and will

*Academic Center transformer and new primary switch*

need to be replaced in the short term. Equipment replacement has recently been required for the Academic Center primary switch with future replacements being considered for the Academic Center transformer and Dining Commons primary switch and transformer that show signs of major enclosure corrosion.

The portable building transformer was recently installed roughly in 2004 and visually appears to be in good condition.

The existing guard shack and tennis court area are served by HECo pole-mounted transformers.

### Proposed System

The majority of the existing underground ductline will be affected by the site footprints of the new dormitory buildings and student center that will require relocation. The proposed redistribution route will be along the existing campus roadway. The proposed distribution will begin underground along the new Academic Center and Sculpture Garden. The distribution will convert back into an overhead system and continue along the existing campus roadway. A partial overhead system is being proposed initially for cost feasibility. However the overhead lines can be converted to underground that follows the same route along the roadway in the future.

The overhead primary service lines will provide service to pad-mounted transformers. Transformers are proposed as follows:

| TRANSFORMER NO. | SERVICE | PROPOSED CAPACITY (KVA) |
|---|---|---|
| 1 | (3) Residence Halls | 1,500 |
| 2 | (3) Residence Halls | 1,500 |
| 3 | (3) Residence Halls | 1,500 |
| 4 | Student Center | 2,000 |
| 5 | Academic Center | 2,500 |
| 6 | Central Utility Plant | 1,000 |
| 7 | Auditorium/Performing Arts Center | 2,500 |
| 8 | Gymnasium | 2,500 |
| 9 | Dining Facility Expansion | 750 |

**Utility Metering System**

HPU is presently primary metered which requires the facilities to install and maintain the primary electrical equipment and duct line system. Although the electrical billing rate for primary metering is less than secondary metering, HPU may want to consider secondary metering to reduce the initial installation and operating costs for the primary electrical equipment.

*HECo Primary Meter*

**TELECOMMUNICATION SERVICE DISTRIBUTION**

Telecommunication services are served from the same service points as the electrical system described above. The new distribution system would also be served form the same overhead route as the electrical service.

The campus local area network will also need an infrastructure system. The proposed underground infrastructure system would initially link the new Academic Center where the new data center is located, to both the existing Academic Center and the new Student Center. Stub out provisions for expansion to link the other buildings will also be included.

*Telephone service cabinet*

## ELECTRICAL SUSTAINABLE STRATEGIES

### Building Lighting

The use of natural daylight will be promoted and be utilized in as many spaces to the best extent possible. Maximizing windows on the north and south building walls will provide ideal daylighting opportunities. Where minimizing windows on the east and west building walls cannot be avoided, the use of exterior shades will help eliminate unwanted daylight glare.

New lighting fixtures will primarily utilize fluorescent T8 or T5 lamps.

Fluorescent light fixtures will have manual controls but also will incorporate dimmable ballasts and integral daylight sensors to dim the lamps in response to natural light available in the space. Non normally occupied spaces will utilize occupancy sensors to atomically turn off the lights when the rooms are not in use.

LED light fixtures will also be considered where appropriate such as at light coves and accent lighting.

Exterior fixtures will be fully shielded and have full cutoff lighting distribution to prevent glare into nearby buildings and prevent light spilling into the night sky. Parking lots, landscape, roadways, and sporting fields used at night, will be illuminated per Illumination Engineering Society of North America (IES) recommended levels. The lighting layout will simultaneously highlight key pedestrian areas in order to promote use of the outdoor spaces by the student body while also providing sufficient ambient illumination to ensure students and the buildings have a sense of safety and security.

**Building Power**

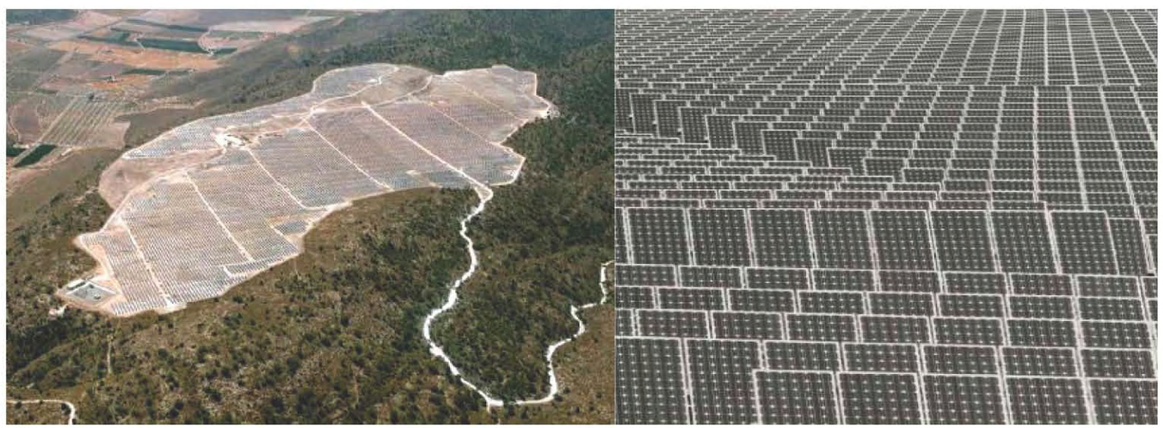
Power correcting capacitors will be provided for large inductive loads primarily at the Central Utility Plant.
The use of Energy Star-rated equipment is recommend to help in reducing energy consumption.

**Renewable Power**

The new buildings can be fitted for photovoltaic (PV) panels on the roof and over the on-site parking. The panels would be connected to the main switchboard at each building with an average production of 10 watts per square foot per panel, these panels will annually produce clean renewable electricity for consumption by the buildings.

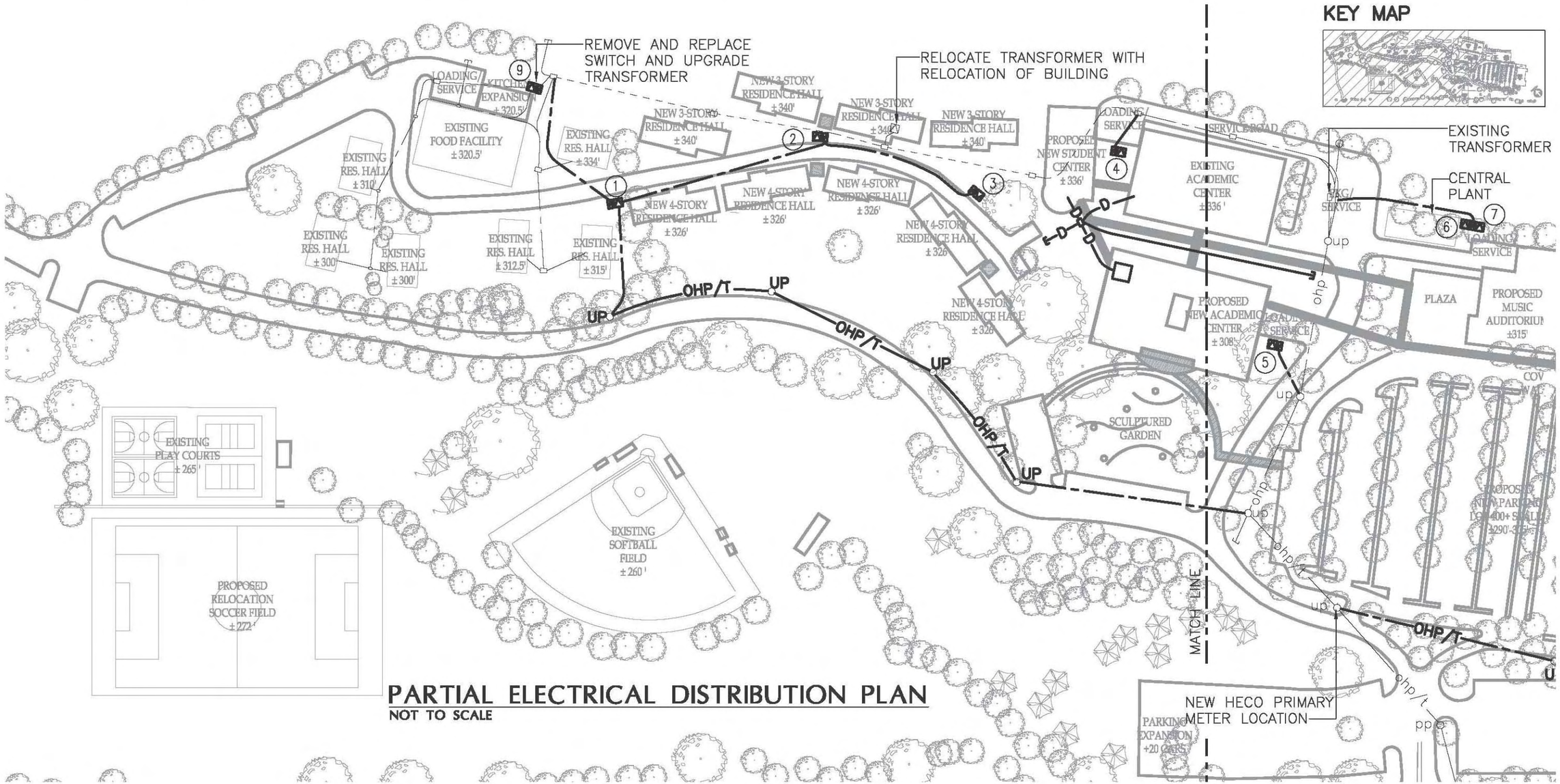
An alternate location would be the area above campus for a PV farm that would directly tie into the campus electrical grid.

In addition to demonstrate the potential of wind energy, the University may want to consider vertical axis wind turbines located with the PV panels. The advantage of wind power is the unlimited window of energy production as compared to an average product window of 6 hours for PV panels.



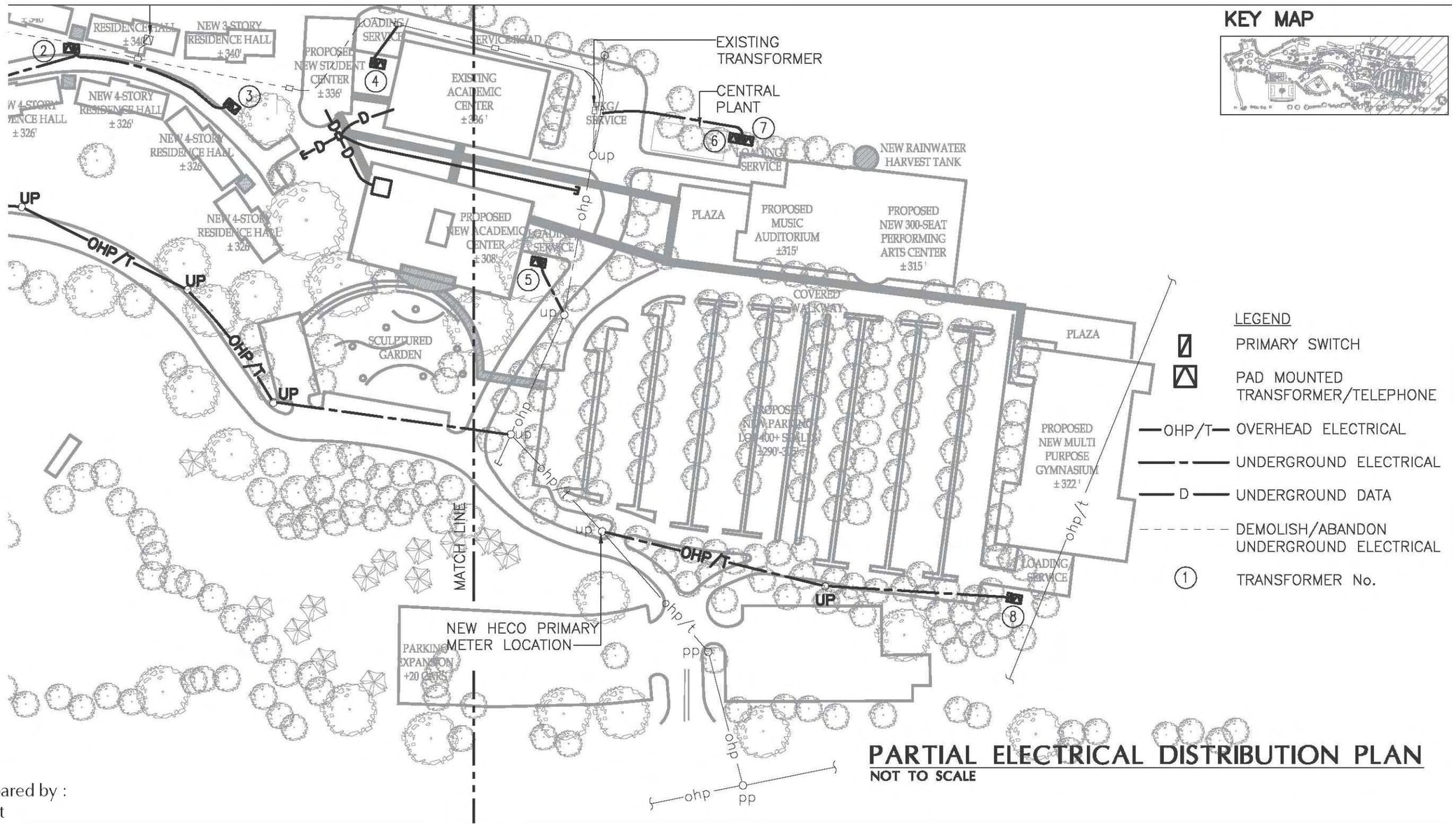
*20 Megawatt PV Farm in Spain (247 Acres)*

*(4) 500 Watt staked Vertical Access Wind Turbines*




PARTIAL ELECTRICAL DISTRIBUTION PLAN
NOT TO SCALE

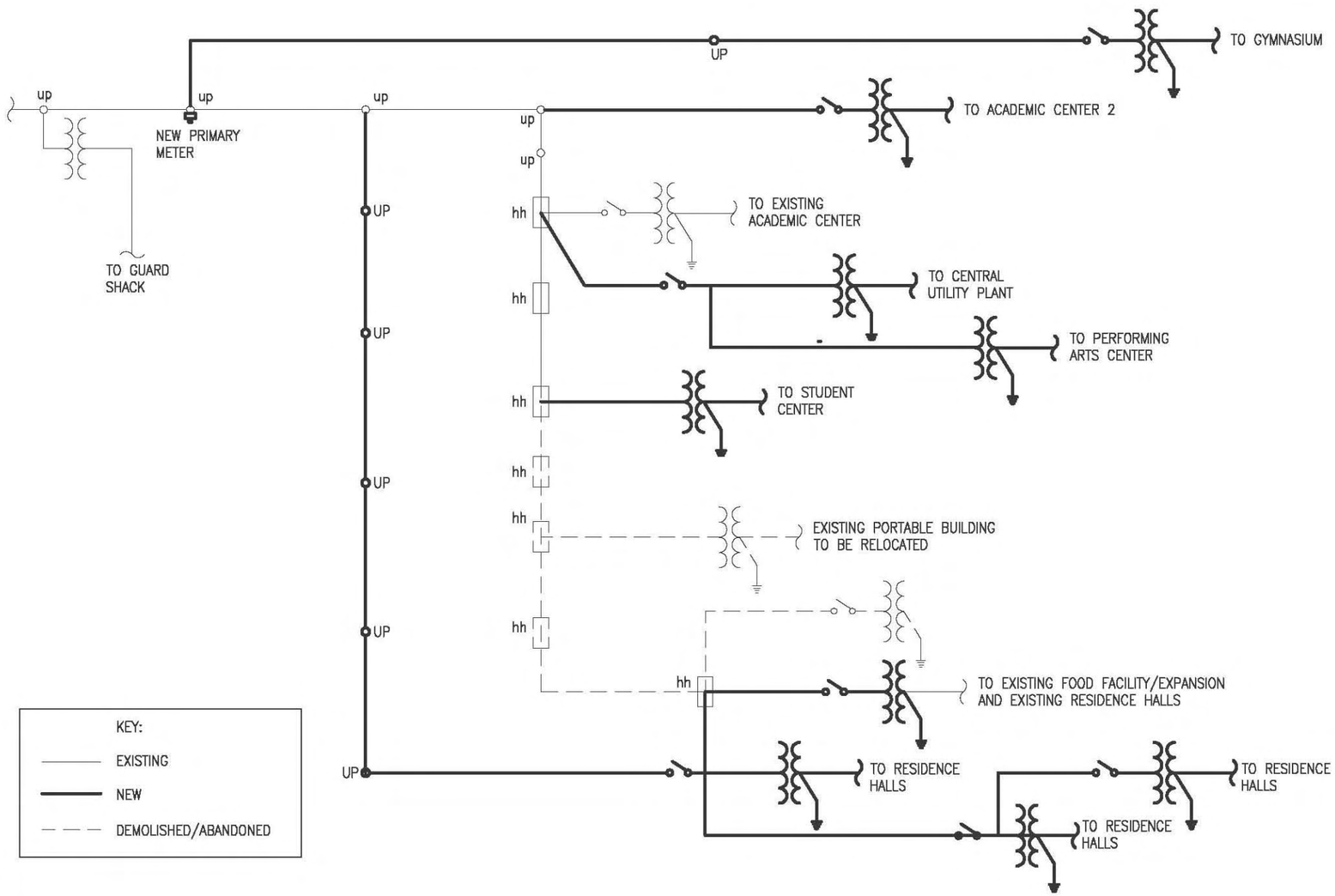
Drawing Prepared by :
Lincolne Scott




## PARTIAL ELECTRICAL DISTRIBUTION PLAN

NOT TO SCALE

Drawing Prepared by :
Lincolne Scott

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## MECHANICAL SYSTEMS

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## EXECUTIVE SUMMARY

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The existing air conditioning system serving the Academic Center is at the end of its service life and is in need of replacement within the next few years. The existing air conditioning system serving the Dining Commons is in better shape and could operate another 3-5 years.

The air conditioning load for the Academic Centers, Student Center, and Performing Arts Center is approximated at 500 tons. No air conditioning is planned for the Residences and the Multi-Purpose Gymnasium. With a concentrated load at the Academic Centers, the use of chilled beams for cooling and outside air pretreatment using dessicants for superior energy efficiency is recommended. Further, a displacement ventilation system is recommended for the Performing Arts Center for higher energy efficiency and improved indoor air quality.

For the buildings without air conditioning, maximizing thermal comfort by optimizing the building envelope to reduce heat gain is recommended, as well as incorporating techniques to maximize air movement through cross-ventilation and ceiling fans.

Plan will also include minimizing water consumption and wastewater discharge by use of ultra-high efficiency plumbing fixtures, and minimizing energy use with thermal solar water heating systems.

## EXISTING MECHANICAL SYSTEMS

### Air Conditioning

The existing Academic Center is served by rooftop, air-cooled packaged units. The units were manufactured in 1993 and are showing signs of significant deterioration. The condenser coils are corroding, causing some units to trip due to high head pressure, as noted by the service contractor. Continued operation in this manner will lead to premature failure of the compressors. Also, the support frames are deteriorating, requiring additional supports to be added. Based on the assessment performed on January 28, 2009, these air conditioning units have 1-3 years of service life remaining. Further, the numerous support framing and ductwork penetrations may be contributing to leaks through the roof membrane.

The existing Dining Commons is served by ducted split systems with the condensing units mounted on the roof. These units were also manufactured in 1993, and showing some signs of corrosion, although not as significant as the rooftop packaged units serving the Academic Center. The remaining service life is anticipated to be 3-5 years.

The existing Residences do not have any air conditioning systems.

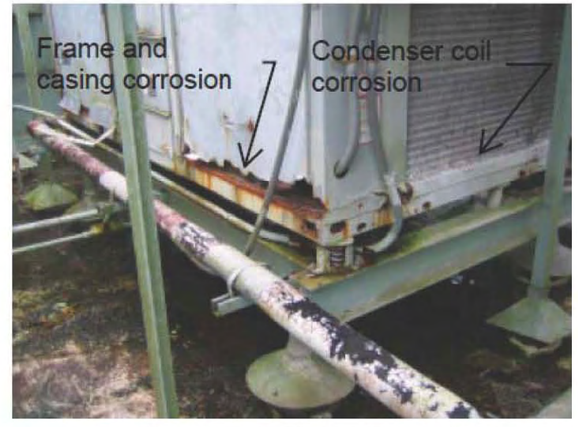



*Figure 1 – Academic Center A/C*

*Figure 2 – Dining Hall A/C*

**Plumbing**
The sanitary drainage system currently discharges by gravity into an existing wastewater treatment center on campus. The campus will be connected to the City & County of Honolulu sewer by summer 2009.

There were no current problems reported with the potable water distribution.

**Fire Protection**
The buildings are currently not provided with fire sprinklers.

**PROPOSED MECHANICAL SYSTEMS**

**Air Conditioning**
The existing air conditioning system serving the Academic Center is currently not performing adequately. The service contractor indicated conditions of trips due to high head caused by the corroding condensers in the summer, and trips on load head due to cold return air temperatures. The cause may likely be short-circuiting from the supply distribution to the return air plenum. Further, air-cooled packaged units are not energy-efficient and normally perform worse when near the end of their service life.

The campus expansion seeks to provide cutting-edge, sustainable concepts in its design. The design will seek to exceed ASHRAE 90.1-2004 requirements for energy efficiency and to this end, the following strategies should be considered:

1. Air conditioning load reduction strategies in order to minimize heat gain into conditioned spaces. Generally, the site plan has oriented the buildings with north toward 45° west from plan north.
   a. Consider a combination of horizontal overhangs and vertical sidefins that would be oriented along a north-south axis wherever possible for all exterior glazing. This would be effective at reducing direct solar gain during morning and afternoon hours, while still allowing daylighting.
   b. Exceed maximum Solar Heat Gain Coefficient (SHGCs) requirements on exterior glazing and fenestration.
   c. Exceed minimum R-values for opaque walls.
2. Incorporate effective daylighting strategies to minimize artificial lighting use without introducing direct solar penetration which increases solar heat gain and uncomfortable glare.
3. Incorporate a high-efficiency air conditioning system with a decoupled dehumidification strategy.

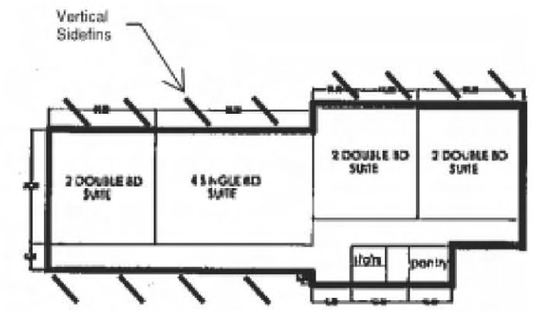



*Figure 3 – Vertical Sidefins*

A chilled-beam system (see Figure 4) with water-cooled chillers for comfort cooling and desiccant-based equipment for dehumidification is proposed for this project as the most energy efficient central system. The comfort cooling strategy will be to utilize high-efficiency, water-cooled chillers with magnetic bearing centrifugal compressors (Turbocor). This type of chiller has higher energy efficiencies due to reduced friction losses in the compressor. Unlike a conventional system, the chilled beams do not require 42-45°F chilled water supply temperatures. Supply temperatures may be higher than 55°F because they provide only temperature reduction without any dehumidification. This type of system is recommended for the Academic Center and the Student Center. The Student Center may also utilize a combination of conventional and chilled-beam technology.

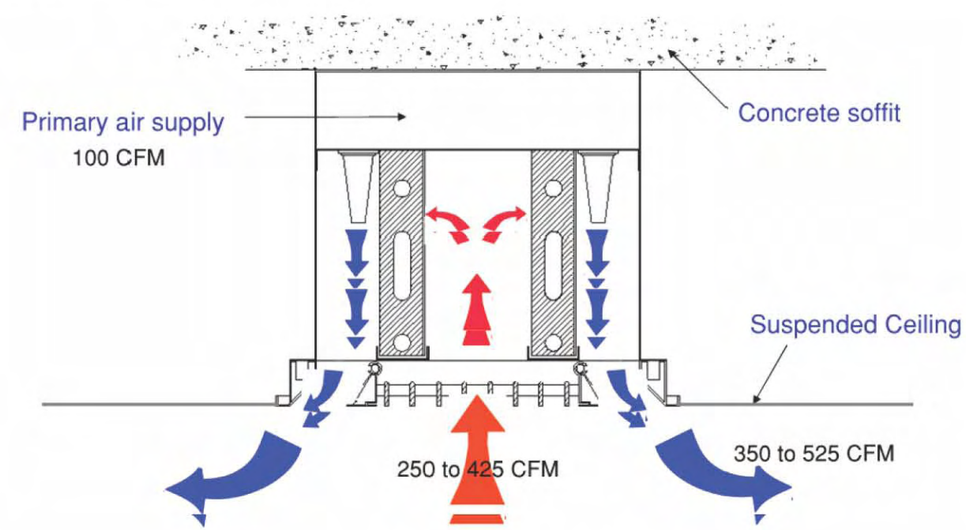



*Figure 4 - Active Chilled-Beam Operation*

The use of a displacement air conditioning system is recommended for the Performing Arts Center. This type of system delivers air at low velocity and low level, filling the occupied space similar to water filling a bathtub (see figure 5). This type of air distribution uses thermal gradients caused by heat sources within the room, such as the occupants. Because only the occupied area will be air conditioned, there is no need to condition the entire room volume. Therefore energy is conserved, and this system can also improve indoor air quality at the same time.

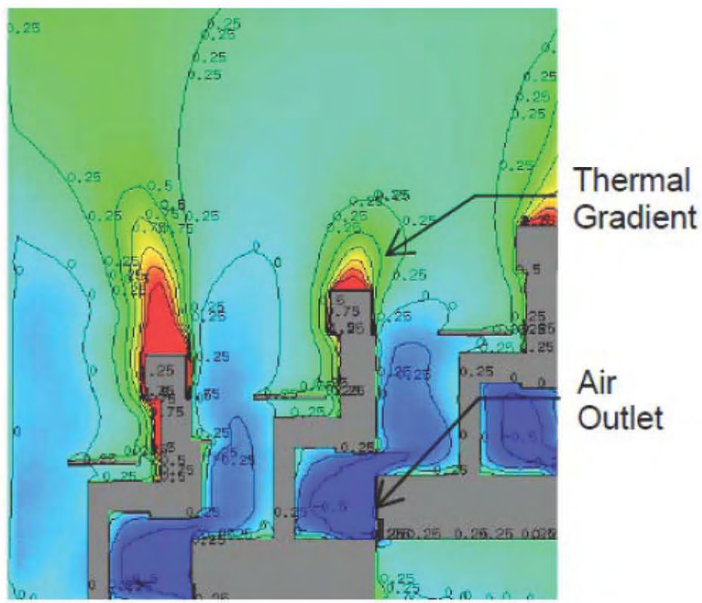



*Figure 5 – Displacement Ventilation*

Dehumidification is handled by a chemical process in lieu of a refrigeration process to absorb moisture from the outside air. This is an important strategy, because moisture is removed at the source, which is the outside air required for proper ventilation within the conditioned space. Previously, desiccant equipment required a high-temperature heat source in order to regenerate the desiccant wheel, however technology exists that now utilizes the waste heat from a self-contained refrigeration system to regenerate the desiccant wheel. This combination of technologies allows the dehumidification to consume nearly 30% less energy.

In order to achieve a higher level of indoor environmental quality, the following strategies should also be incorporated:

1. Increase the outside air quantity by an additional 30% compared to ASHRAE 62.1 – 2004.
2. Incorporate carbon dioxide monitoring in intermittent occupancy spaces and outside airflow monitoring within the building automation system.

Preliminary loads for air conditioning are as follows:

| Building | Area (sf) | Load (tons refr) |
|---|---|---|
| Academic Center 1 | 36,000 | 105 |
| Academic Center 2 | 49,000 | 242 |
| Student Center | 16,875 | 55 |
| Performing Arts Center | 31,616 | 102 |
| Residences Halls | 103,838 | - |
| Multi-Purpose Gym | 42,790 | - |
| | | |
| | Total | 504 |

The central plant is anticipated to be located adjacent to the service road between the Performing Arts and Academic Center (see drawing on page 56).

The wet environment in Kāne'ohe may contribute to humidity-related concerns, which may include premature corrosion or mold. While there are many causes of excessive mold growth, opportunities can be minimized by incorporating the following strategies:

1. Remove the largest contributor of moisture to an occupied space, which is ventilation air and infiltration. This is accomplished by our current strategy of a dedicated outside air dehumidification system, which would also positively pressurize the building to minimize infiltration, or unintended outside air entering the building.
2. Ultraviolet lights may be incorporated within the air-handling equipment to kill mold spores entrained in the air stream.
3. Consider a duct cleaning maintenance plan to remove dust and debris on a periodic basis.
4. Consider the use of tea-tree oil within the air-handling equipment which acts as a mild antiseptic and assists with the elimination of mold.

**Thermal Comfort**

For spaces without air conditioning, such as the Residences, the building design should incorporate the following strategies:

1. Minimize solar heat gain by:
   a. Increasing insulation levels in roofs (min. R-30) and walls (min. R-13).
   b. Incorporate overhangs and vertical sidefins to eliminate direct solar penetration while allowing daylight. This helps to minimize the use of artificial lights on the interior. (see Figure 6).

*Figure 6 – Air Movement*

2. Maximize natural ventilation by:
   a. Utilizing single-loaded Residences to allow maximum ventilation cross-flow.
   b. Maximize openable windows with jalousie or awning type.

3. Utilizing ceiling fans to circulate air and increase air velocity. This can significantly increase comfort during warmer months.

**Water**

The overall objective is to minimize potable water consumption and wastewater discharge. Preliminary considerations include:

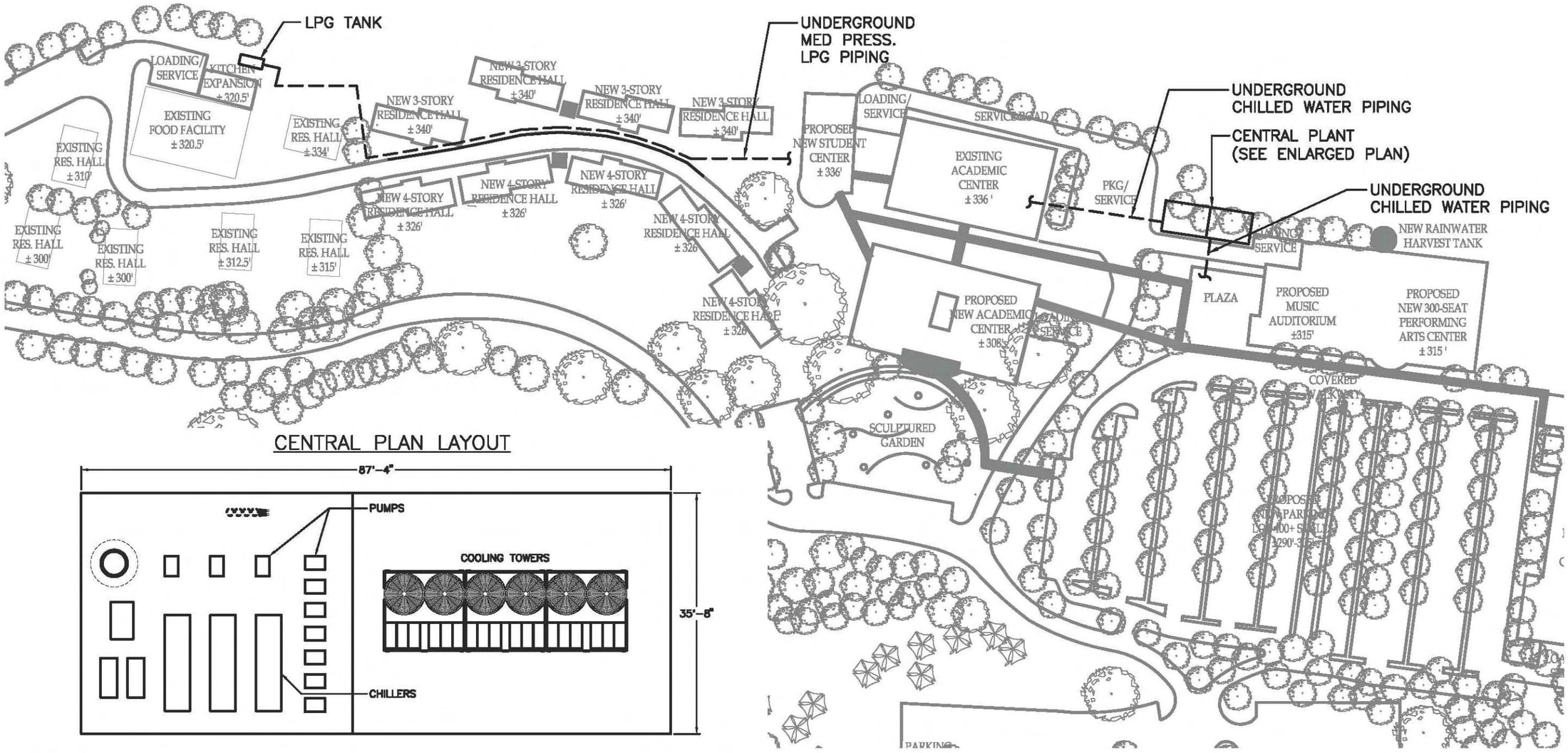
- Plumbing Fixtures
  - Consider the use of waterless urinals for the men's bathroom.
  - Utilize dual-flush valves for toilets.
  - Utilize low-flow sensor faucets (0.5 gpm) for the lavatories.
  - Should a changing room and shower be provided for faculty or students bicycling, a low-flow shower should be considered.
- Rainwater Harvesting – The site receives regular rainfall and if a use can be determined, such as for flushing fixtures or hydro-electric generation, rainwater harvesting may be a viable option.

**Domestic Water Heating**

Thermal solar collectors utilize solar energy directly to heat hot water and are highly efficient. Gas-fired hot water heaters will be utilized as backup.

**Automatic Fire Sprinklers**

Based on a preliminary code analysis with the 2006 International Building Code, it appears that fire sprinklers would be required for all buildings.




CENTRAL PLAN LAYOUT




Drawing Prepared by :
Lincolne Scott

# APPENDIX E
# ARCHAEOLOGICAL
# LITERATURE REVIEW AND FIELD INSPECTION

*Draft*

# Archaeological Assessment for the Hawai‘i Pacific University Master Plan Project, Kāne‘ohe Ahupua‘a, Ko‘olaupoko District, Island of O‘ahu

# TMK: [1] 4-05-035:010

**Prepared for**

**Group 70 International, Inc.**


**Prepared by**

**Trevor Yucha, B.S.**

**and**

**Matt McDermott, M.A.,**

**Cultural Surveys Hawai‘i, Inc.**

**Kailua, Hawai‘i**


**(Job Code: KANEOHE 12)**

**December 2009**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# Management Summary

| | |
|---|---|
| **Reference** | *Draft* Archaeological Assessment for the Hawai‘i Pacific University Master Plan Project, Kāne‘ohe Ahupua‘a, Ko‘olaupoko District, Island of O‘ahu, TMK: [1] 4-05-035:010 (Yucha and McDermott 2009) |
| **Date** | December 2009 |
| **Project Number (s)** | Cultural Surveys Hawai‘i (CSH) Job Code: KANEOHE 12 |
| **Investigation Permit Number** | CSH completed the fieldwork component of the archaeological assessment under Hawai‘i State Historic Preservation Division/Department of Land and Natural Recourses (SHPD/DLNR) permit No. 09-20, per Hawai‘i Administrative Rules (HAR) Chapter 13-13-282. |
| **Project Location** | The project area is defined as the entire 132-acre parcel (TMK: [1] 4-05-035:010) where the Hawai‘i Pacific University, Hawai‘i Loa Campus is located. This project area is located adjacent to the northeastern side of Kamehameha Highway between the H3 Highway and Kalaniana‘ole Highway within Kāne‘ohe Ahupua‘a. The project area is depicted on the 1998 U.S. Geological Survey 7.5-minute series topographic map, Kāne‘ohe Quadrangle. |
| **Land Jurisdiction** | Private: Hawai‘i Pacific University |
| **Agencies** | SHPD/DLNR |
| **Project Description** | In accordance with the Hawai‘i Pacific University Master Plan, the proposed project involves the expansion and development of new campus facilities in order to accommodate for the projected growth of the average daily number of students from 1,200 to 1,800. New facilities may include new residence halls to accommodate 400 additional on-campus students, a new academic center, a student center, the Paul and Vi Loo Performing Arts Center, indoor recreational facilities, increased food service facilities, 400 additional parking spaces, nature trails, and an alternative entry/exit from Kamehameha Highway. Ground disturbing activity will likely consist of vegetation clearance and grading and excavation for building footings, roadway installation, and utilities. In consultation with the project proponents, actual land disturbance related to the project will be confined to an approximately 47-acre portion of the overall 132-acre campus parcel. For the purposes of this investigation, this 47-acre area is termed the survey area and is the focus of study. |
| **Project Acreage** | 132 Acres (TMK: [1] 4-05-035:010) |
| **Area of Potential Effect (APE) and Survey Acreage** | The survey area and APE for the current archaeological assessment included an approximately 47-acre portion of the overall 132-acre project area. |

| | |
|---|---|
| **Historic Preservation Regulatory Context** | This document was prepared to support the proposed project’s historic preservation review under Hawai‘i Revised Statutes (HRS) Chapter 6E-42 and Hawai‘i Administrative Rules (HAR) Chapter 13-13-284. In consultation with SHPD/DLNR, the archaeological inventory survey investigation was designed to fulfill the State requirements for an archaeological inventory survey per HAR Chapter 13-13-276. Because no historic properties were identified within the project area, this investigation is termed an archaeological assessment. |
| **Fieldwork Effort** | The fieldwork component of this archaeological assessment was accomplished between November 19 and December 10, 2009 by one CSH archaeologist, Matt McDermott, M.A (principal investigator). The fieldwork required approximately four person-days to complete. |
| **Number of Historic Properties Identified** | None |
| **Effect Recommendation** | No historic properties were identified within the approximately 47-acre survey area. Decades of land modification and grading related to pineapple cultivation, military infrastructure at the Pali Training Camp, and the development of the Hawai‘i Loa College (currently the Hawai‘i Pacific University Hawai‘i Loa Campus) have likely destroyed or severely impacted any surface historic property that may have existed within the current survey area. Consequently, CSH's effect recommendation for the proposed project is "no historic properties affected." |
| **Mitigation Recommendation** | In accordance with SHPD/DLNR recommendations (SHPD correspondence, 2 December 2009, Log: 2009.4617, Doc: 0912RS11), CSH recommends an on-call archaeological monitoring program be implemented for all construction activities related to the current project. A qualified archaeological monitor will remain on-call during all ground disturbance activities. Periodic spot-checks may be performed by the archaeological monitor in order to observe and document subsurface impact, exposed sediment characteristics, and the construction process. If, in the unlikely event, that intact cultural resources are encountered during the course of development activities, all work in the immediate area should stop and the on-call archaeological monitoring firm promptly notified. |

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# Section 1 Introduction

## 1.1 Project Background

At the request of Group 70 International, Inc., Cultural Surveys Hawai‘i, Inc. (CSH) conducted an archaeological assessment for the Hawaii Pacific University Master Plan Project, Kāne‘ohe Ahupua‘a, Ko‘olaupoko District, Island of O‘ahu, (TMK: [1] 4-05-035:010. The project area is defined as the entire 132-acre parcel (TMK: [1] 4-05-035:010) where the Hawai‘i Pacific University, Hawai‘i Loa Campus is located. The project area is located adjacent to the northeastern side of Kamehameha Highway between the H3 Highway and Kalaniana‘ole Highway within Kāne‘ohe Ahupua‘a. The project area is depicted on the 1998 U.S. Geological Survey 7.5-minute series topographic map, Kāne‘ohe Quadrangle (Figure 1), tax map (Figure 2), aerial photograph (Figure 3), and conceptual campus master plan (Figure 4).

The project area is privately owned by Hawai‘i Pacific University. In accordance with the Hawai‘i Pacific University Master Plan, the proposed project involves the expansion and development of new campus facilities in order to accommodate for the projected growth of the average daily number of students from 1,200 to 1,800. New facilities may include new residence halls to accommodate 400 additional on-campus students, a new academic center, a student center, the Paul and Vi Loo Performing Arts Center, indoor recreational facilities, increased food service facilities, 400 additional parking spaces, nature trails, and an alternative entry/exit from Kamehameha Highway. Ground disturbing activity will likely consist of vegetation clearance and grading and excavation for building footings, roadway installation, and utilities. In consultation with the project proponents, actual land disturbance related to the project will be confined to an approximately 47-acre portion of the overall 132-acre campus parcel. For the purposes of this investigation, this 47-acre area is termed the survey area and is the focus of study.

This document was prepared to support the proposed project’s historic preservation review under Hawai‘i Revised Statutes (HRS) Chapter 6E-42 and Hawai‘i Administrative Rules (HAR) Chapter 13-13-284. In consultation with SHPD/DLNR, the archaeological inventory survey investigation was designed to fulfill the State requirements for an archaeological inventory survey per HAR Chapter 13-13-276. Because no historic properties were identified within the project area, this investigation is termed an archaeological assessment.

## 1.2 Scope of Work

The following archaeological inventory survey scope of work is designed to satisfy the Hawai‘i State requirements for archaeological inventory surveys HAR Chapter 13-276 and Chapter 13-275/284):

1. Historic and archaeological background research, including a search of historic maps, written records, Land Commission Award documents, and the reports from prior archaeological investigations. This research focused on the specific project area’s past land use, with general background on the pre-contact and historic settlement patterns of the *ahupua‘a* and district. This background information was used to compile a predictive

Figure 1. 1998 U.S. Geological Survey 7.5-minute series topographic map, Kāne‘ohe Quadrangle showing the location of the current project area and survey area

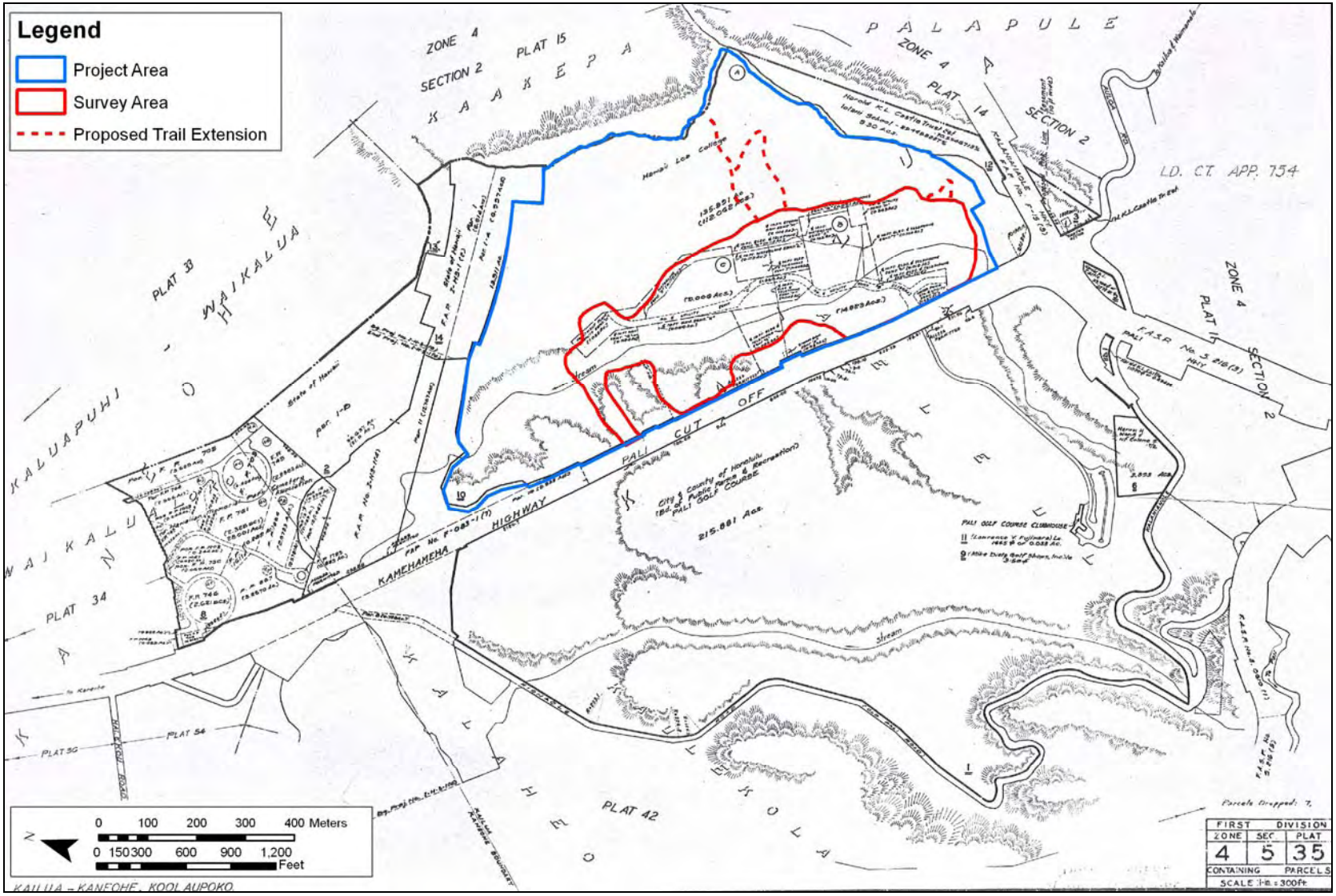


Figure 2. Tax Map Key (1) 4-5-035, showing the location of the current project area and survey area

Figure 3. Aerial photograph (source: USGS Orthoimagery 2005), showing the location of the current project area and survey area

Figure 4. Conceptual campus master plan

model for the types and locations of historic properties that could be expected within the project area.

2. A complete (100% coverage) systematic pedestrian inspection of the project area to identify any potential surface historic properties. Surface historic properties were recorded with an evaluation of age, function, interrelationships, and significance. Documentation included photographs, scale drawings, location of historic properties with GPS survey equipment, and limited controlled excavation of select sites and/or features.
3. As appropriate, consultation with knowledgeable individuals regarding the project area's history, past land use, and the function and age of the historic properties documented within the project area.
4. As appropriate, laboratory work to process and gather relevant environmental and/or archaeological information from collected samples.
5. Preparation of this archaeological inventory survey report, including the following:
   a) A project description;
   b) A section of a USGS topographic map showing the project area boundaries and the location of all recorded historic properties;
   c) Historical and archaeological background sections summarizing pre-contact and historic land use of the project area and its vicinity;
   d) Descriptions of all historic properties, including selected photographs, scale drawings, and discussions of age, function, laboratory results, and significance, per the requirements of HAR 13-276. Each historic property will be assigned a Hawai‘i State Inventory of Historic Properties number;
   e) If appropriate, a section concerning cultural consultations [per the requirements of HAR 13-276-5(g) and HAR 13-275/284-8(a)(2)].
   f) A summary of historic property categories, integrity, and significance based upon the Hawai‘i Register of Historic Places criteria;
   g) A project effect recommendation;
   h) Treatment recommendations to mitigate the project's adverse effect on any historic properties identified in the project area that are recommended eligible to the Hawai‘i Register of Historic Places.

This scope of work included coordination with the State Historic Preservation Division (SHPD) and Hawai‘i County relating to archaeological matters.

## 1.3 Environmental Setting

### 1.3.1 Natural Environment

The project area is located within the windward O‘ahu district of Ko‘olaupoko, and is situated within the *ahupua‘a* (traditional land division) of Kāne‘ohe. Kāne‘ohe is a large *ahupua‘a* of approximately 11,000 acres, extending from the windward crest of the Ko‘olau Range to include

most of the Mōkapu Peninsula. Kāne‘ohe Ahupua'a is bordered by the *ahupua‘a* of He‘eia to the west and Kailua to the east.

Elevations within the project area range from 80 to 117 m (262 to 384 ft) above mean sea level (AMSL). Soils within the project area are reported as Kanē‘ohe Silty Clay 3-8% slopes (KgB), Kanē‘ohe Silty Clay 30-65% slopes (KHOF), Hanalei Silty Clay 0-2% slopes (HnA), Alaeloa Silty Clay 40-70% slopes (ALF), and Helemano Silty Clay 30-90% slopes (HLMG) (Figure 5). Soils of the Kanē‘ohe Series are described as, "well-drained soils on terraces and alluvial fans on the windward side of O‘ahu…developed in alluvium and colluvium derived from basic igneous rock" (Foote et al. 1972:59). Soils of the Hanalei Series are described as, "somewhat poorly drained to poorly drained soils on bottom lands…developed in alluvium derived from basic igneous rock" (Foote et al. 1972:38). Soils of the Alaeloa Series are described as, "well-drained soils on uplands…developed in material weathered from basic igneous rock" (Foote et al. 1972:26). Soils of the Helemano Series are described as, "well-drained soils on alluvial fans and colluvial slopes on the sides fo gulches…developed in alluvium and colluviums derived from basic igneous rock" (Foote et al 1972:40).

The project area receives an average of approximately 1500 to 2000 mm (60 to 80 in) of annual rainfall (Giambelluca et al. 1986). Vegetation observed within the project area primarily consists of the maintained and landscaped grounds of the campus surrounded by areas of dense growth consisting of Bamboo (*Schizostachyum glaucifolium*), Mango (*Mangifera indica*), Norfolk pine (*Araucaria excels*), Cat's claw (*Caesalpinia decapetala*), Guava (*Psidium guajava*), Java plum (*Syzygium cumini*), *Hau* (*Hibiscus tiliatus*), and Octopus tree (*Brassaia actinophylla*).

### 1.3.2 Built Environment

The current project area is largely developed with facilities associated with the Hawai‘i Loa Campus of the Hawai‘i Pacific University. Existing facilities within the project area include the Amos Starr and Juliette Montague Cooke Memorial Academic Center (built in 1969), the Dining Commons (built in 1970), six residence halls (built in 1970), two modular office buildings, a maintenance building, and parking areas for approximately 500 vehicles. Several large concrete culverts are located along the southwestern edge of the project area along Kamehameha Highway. These culverts were determined to be modern drainage improvement less than 50 years old.

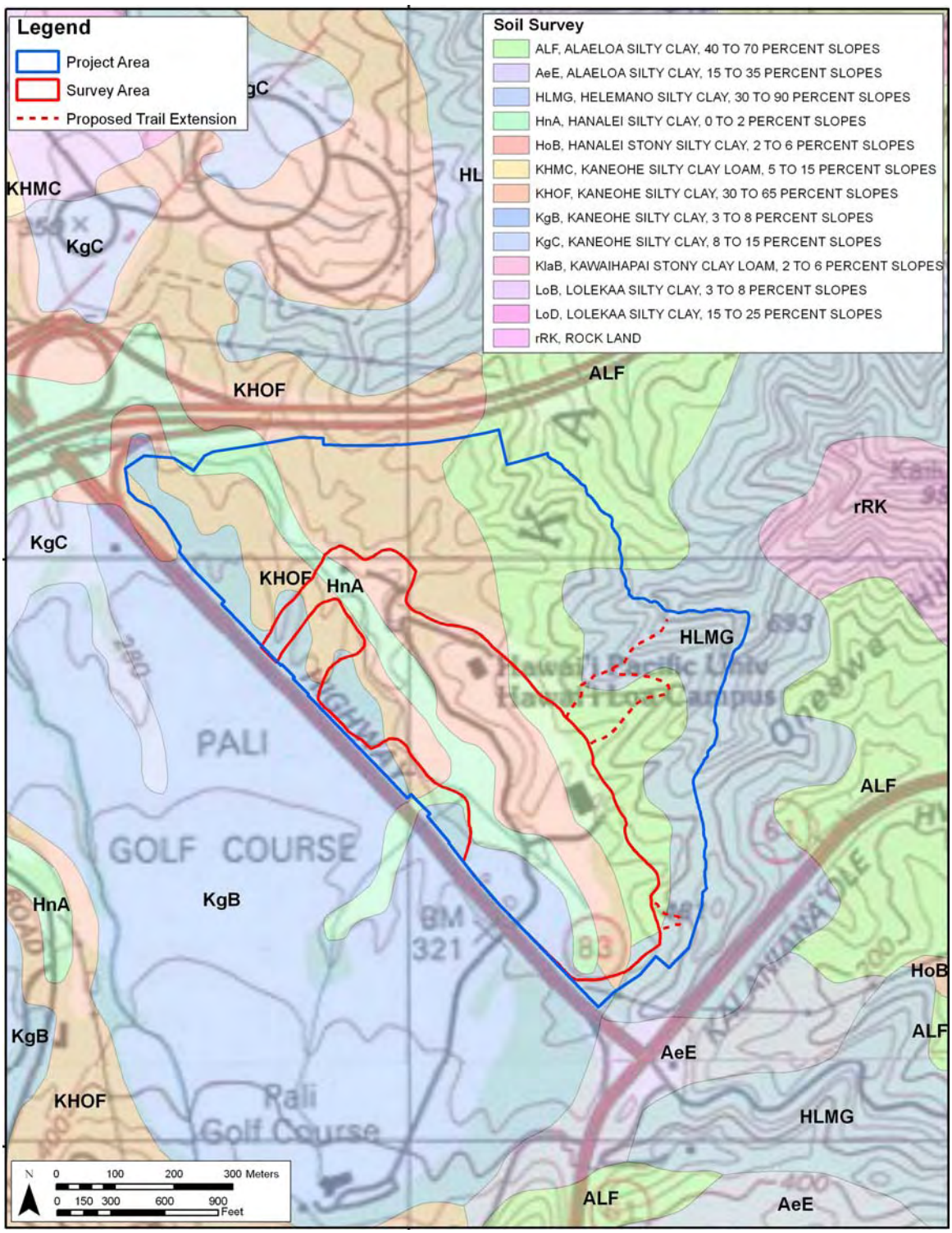


Figure 5. Overlay of Soil Survey of the State of Hawai‘i (Foote et al. 1972), indicating sediment types within the project area and survey area (source: Soils Survey Geographic Database [SSUGRO] 2001, U.S. Department of Agriculture).

# Section 2 Methods

## 2.1 Field Methods

The fieldwork component of this archaeological assessment was accomplished between November 19 and December 10, 2009 by one CSH archaeologist, Matt McDermott, M.A. (principal investigator). The fieldwork required approximately four person-days to complete.

The archaeological assessment fieldwork consisted of complete pedestrian inspection of the entire approximately 47-acre survey area and proposed trail extensions. Pedestrian inspection was accomplished through systematic sweeps assisted by the use of a GARMIN GPSMAP60Cx hand-held GPS unit (accuracy +/- 2-5 m) uploaded with the survey area boundary. The interval between sweeps was generally 5 to 10 m. A GPS track log was recorded during pedestrian sweeps in order to verify 100% pedestrian coverage. Any potential historic properties encountered during pedestrian inspection were located using the handheld GPS unit. In general, visibility was somewhat hampered by dense vegetation that sometimes obscured the ground surface within the undeveloped portions of the survey area.

## 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 ‘Āina Corporation’s Māhele Data Base (www.waihona.com).

# Section 3 Background Research

## 3.1 Traditional and Historical Background

### 3.1.1 Mythological and Traditional Accounts

There are several myths and legends associated with Kāne‘ohe. A few stories provide the origin of the name of the *ahupua‘a* of Kāne‘ohe. The word “Kāne” in Kāne‘ohe has been interpreted variously as “husband”, “man”, or as a reference to the god Kāne, the god of creation, while *‘ohe* means “bamboo”. One account attributes the name to a story about a woman who compared her husband’s cruelty to the cutting edge of a bamboo knife (Pukui and Elbert 1986, Clark 2002). Kāne‘ohe may also be derived from *‘ohe*, which is said to be one of the *kinolau* (body forms) of the god Kāne (Abbott 1992:15). Another account is as follows:

> In Kaneohe proper, the people learned a new use for the Ohe…In olden times anyone who did not conform to the way of life lived so industriously by the shore people, was called E-epa, or non-conformist. The E‘epa were not actually “touched in the head”, or lo-lo [crazy], but just different. They liked to wander off by themselves and dwell among the mysteries of the upland forests where they listened to the music of Nature, and often became poets or musicians.
>
> Those upland reaches, all unexplored territory and sacred to the Spirits or Akua of Nature, where referred to as the Wao (upland forest), or places of mystery. In order to keep children from wandering to the uplands, their elders told the little ones, “Do not go up there or the Bamboo Man may keep you. We would mourn your absence in loneliness. Remain at home and learn your useful duties.”
>
> Hano-ihu…longed to explore. Pu‘ili…longed to accompany her playmate, Hano-ihu, when he wandered far. But, being more timid, she contended herself during the boy’s absences and kept his secret of those upland trips he enjoyed.
>
> One sad day, Hano-ihu did not return. The people searched and could find no trace of the disobedient boy. Finally, the villagers decided the boy had died, and they told the other children that the Bamboo Man had taken the boy-wanderer.
>
> Pu‘ili…decided that he was not dead and she must search for him. Acting upon the thought, the little girl followed the direction often taken by the boy and was soon alone in the dark recesses of the forest lands of Wao, the Mysterious.
>
> She saw nothing to fear. Rather, she delighted in the beauty of the forests, the fragrance of the ferns and blossoms growing besides singing rills of sweet waters, and danced along happily to the whistling of the Wind Gods in the tree tops touching the blue sky far above.
>
> Soon she realized the whistling was not actual the Wind, for it had a bird-like note that repeated itself in a gentle rhythm. Also, she saw the bamboo moving in the

> breeze and heard how it rattled its branches. She found two lengths of a bamboo branch and, one in each hand, beat time on the two sticks while she followed the plaintive note calls.
>
> Before her…she saw her beloved playmate sitting on the bank. Beside him was a tall, thin man whose eyes watched the boy, while the child blew upon a bamboo length. The man’s lean hands waved to the rhythm of the notes, and the girl went dancing toward the pair, keeping time with her pair of bamboo sticks.
>
> Hano-ihu and the tall man finished their melody, then praised the little Pu‘ili for joining them….She sat with them and learned that the man was Kane‘ohe, the Bamboo Man who, as a child, had followed the lure of Wao and had invented a bamboo flute. Kindly, the old man explained to the children how the art of creativity often is lost unless those inspired do follow the call. He told them, “Now we shall return to the village, for I have answered the call and you two little ones will be musicians like me. In honor of this occasion, I shall name the flute after you, my boy...we shall name the time-keeping sticks for her.”
>
> Gaily, the three went down the forest trail of Wao the Inspiring. They were welcomed with feasting and joy. That is how we have the...Bamboo, instruments today. The Hano-ihu or Nose flute; and the Pu‘ili, or notched Bamboo sticks; and the hula named for these gifts of Kane‘ohe, the Bamboo Man. (Paki 1972:29-30)

Windward O‘ahu is famous for legends of Kamapua‘a; the half man, half pig demigod renown for making mischief and for his masterful escapes from retribution for his chicken and taro thievery as well as romantic escapades. One story centers on Kamapua‘a and the Kawa‘ewa‘e Heiau. Thrum (1906) reports that Kawa‘ewa‘e Heiau was erected in the beginning of the 12th century by the high chief ‘Olopana (Thrum 1906:48) and constructed by *menehune* (legendary race of small people who built structures by night) (Fornander 1878:23). In the version of the story presented by King David Kalakaua (1990), Kamapua‘a, embittered by his father/uncle (depending on which story is being told) the ‘Olopana’s rejection of this hog-child, retreats to the mountains where he attracts a band of like-minded thieves and commences to “harass the estates of Olopana”, stealing ‘Olopana’s pigs, fowls and fruits as well as taking pleasure in breaking his nets, cutting adrift his canoes and robbing his fish-ponds (Kalakaua 1990:143). Enraged by Kamapua‘a’s pillage and acts of rebellion, ‘Olopana orders his capture. After several battles and failed attempts to catch Kamapua‘a, ‘Olopana’s army succeeds in delivering Kamapua‘a to the high chief to the “great joy and relief of the people of Koolau” (p.145). Kalakaua relates the following:

> Olopana had erected a *heiau* at Kaneohe, Lonoaohi officiated as high priest, and thither he resolved to take his rebellious son or nephew, and offer him as a sacrifice to the gods. Hina [Kamapua‘a’s mother] pleaded for the life of Kamapuaa, but Olopana could not be moved. Satisfied that he would listen to no appeals for mercy, she determined to save her son, even at the sacrifice of her husband, and to that end secured the assistance of the high priest, through whose treachery to Olopana the life of Kamapuaa was saved.

On the day fixed for the sacrifice Kamapuaa…was taken to the *heiau*, followed by Olopana, who was anxious to witness the ghastly ceremonies, and with his own eyes see that his troublesome enemy was duly slain and his body laid upon the altar. In offering human sacrifices the victim was taken without the walls of the *heiau* and slain with clubs by the assistants of the high-priest. The body was then brought in and placed upon the altar in front of the entrance to the inner court, or sanctuary, when the left eye was removed by the officiating priest, and handed…to the chief who had ordered the sacrifice….

Standing with three or four attendants, at the door of his tabooed retreated…Olopana saw his victim preliminarily led to the place of sacrifice, and a few minutes after motion for the ceremonies to begin. Kamapuaa was taken without the walls of the temple to be slain….Passing beyond the outer wall the party entered a small walled enclosure adjoining, and the executioner raised his club and brought it down upon the head of his victim. Kamapuaa smiled, but did not move. Twice, thrice with mighty sweep the club descended upon the head of Kamaupua‘a, but scarcely bent the bristly hairs upon his crown.

With a semblance of wonder the executioner, whose tender blows would have scarcely maimed a mouse, dropped his club and said:

“Three times have I tried and failed to slay him! The gods refuse the sacrifice!”

“It is so, it is so, it is so!” chimed his companions….

Therefore, instead of slaying Kamapuaa, the assistants, as they had been secretly instructed to do by the high-priest, removed the cords from his limbs, smeared his hair, face and body with the fresh blood of a fowl, and on their shoulders bore him back and placed him upon the altar as if dead.

The high-priest approached the apparently lifeless body, and bent for a moment over the face, as if to remove the left eye; then placing on a wooden tray the eye of a large hog, which had been procured for that purpose, he sent an assistant with it to Olopana, at the same time retiring within the inner court, and leaving by the side of Kamapuaa, and near his right hand, as if by accident, the sharp ivory pahoa, or dagger, with which he had, to all appearance, been operating.

Giving but a single glance at the eye presented to him by the assistant of the high-priest, Olopana passed it to an attendant without the customary semblance of eating it, and approached the altar alone. Kamapuaa did not breathe. His face was streaked with blood, his eyelids were closed, and not a single muscle moved to indicate life.

Olopana looked at the hated face for a moment, and then turned to leave the *heiau*….As he did so Kamapuaa clutched the dagger besides his hand, and, springing from the altar, drove the blade into the back of Olopana. Again and

> again he applied the weapon until the chief, with a groan of anguish, fell dead at the feet of his slayer. (Kalakaua 1990:145-146)

Kalakaua goes on to describe how Kamapua‘a is released from custody by the high-priest, and how as the people of the district had, “suffered through his plundering visitations, and hundreds of lives had been sacrificed in his pursuit and final capture, the people rose almost in a body to hunt him down and destroy him” (p.147). Kamapua‘a and his cohorts eventually sail off O‘ahu for the Windward islands in search of refuge.

### 3.1.2 Pre-Contact Period

In pre-contact times, the *ahupua‘a* of Kāne‘ohe offered fresh water from *mauka* (upland) springs watering extensive agricultural fields and a well developed fishpond system, making it both an agricultural and aquacultural center on O‘ahu (Devaney 1976). Handy and Handy (1972) described Kāne‘ohe as:

> …an area of little hills with many small streams between them. In 1935 it was still one of the most active communities in planting commercial taro. A goodly proportion of its lowland lo‘i, tucked away in pockets flanked and often hidden by low hills or near the town itself, was then still planted in taro by Hawaiians who owned the land and by Orientals who leased land or were hired to cultivate it (Handy and Handy 1972:455).

Pre-contact land use would have consisted mainly of *kalo* (wetland taro) and *kula* (dryland) cultivation of *hala* - pandanus (used for making household furnishings such as mats), *wauke* – paper mulberry (used for making *tapa/kapa* cloth), bananas and sweet potatoes (Handy and Handy 1972:456). Kāne‘ohe Bay, with about two-dozen walled fishponds, was a bountiful source of fish (Devaney et al. 1976:6).

### 3.1.3 Early Historic Period, 1778-1840

Kāne‘ohe has long been viewed as a “valuable” *ahupua‘a* both in terms of agricultural and fishery productivity. In 1830 the chiefs of Hawai‘i, Maui, and O‘ahu, in a council meeting concerning the “late doings on Oahu”, referred to Kāne‘ohe as the “most valuable part” of the district of Ko‘olaupoko (Kamakau 1992:303). Kāne‘ohe held a unique position in the history of *‘awa* (*Piper methysticum*) cultivation. The relaxant drink prepared from rootstock of the *P. methysticum* plant was regarded as immoral by missionaries who sought to restrict consumption of the “intoxicant” brew. In 1846 obliging lawmakers created licensing laws and set up a system of appointing “‘*awa* agents” to plant and sell *‘awa* on the various islands. The argument for this system was that, although *‘awa* was considered morally hazardous, it had medicinal value. There were 2 *‘awa* agents assigned to O‘ahu; one was William Harbottle who was authorized to grow *‘awa* on 2 acres of land in Kāne‘ohe (Greer 1970:66-67).

Describing the early historical times of Hawaiian *ali‘i* (monarchy) in Kāne‘ohe, Devaney et al. (1976) state:

> …when Kahanahana ruled O‘ahu [circa 1773-1783], he sometimes lived in Kaneohe. After defeating Kahanahana circa 1783, Maui Chief Kahekili and most

> of his famous warriors lived in Koolaupoko at Kailua, Kaneohe, and Heeia (Fornander 1969:225; Kamakau 1961:138). When Kamahameha I apportioned the conquered O‘ahu lands in 1795 to his warrior chiefs and counselors (Ii 1959:69-70), he retained as his personal property the ahupua‘a of Kaneohe… Much of Kaneohe and all of Kahaluu and Kualoa were inherited as personal lands by Kamehameha’s sons Liholiho and Kauikeaouli, Kamehameha II and III (Indices…1920:27-28). (Devaney et al. 1976:5)

### 3.1.4 The Māhele

The Organic Acts of 1845 and 1846 initiated the process of the Māhele - the division of Hawaiian lands - that introduced private property into Hawaiian society. In 1848, the crown and the *ali‘i* (royalty) received their land titles. *Kuleana* awards to commoners for individual parcels within the *ahupua‘a* were subsequently granted in 1850. Kamehameha III had inherited Kāne‘ohe and retained the bulk of the *ahupua‘a* during the Māhele. After his death, his wife, Queen Kalama (Hakaleleponi), retained their portion of Kāne‘ohe (Barrère 1994, Kame‘eleihiwa 1992).

The crown lands were considered the private lands of the monarch, and many lands were sold or mortgaged during the reigns of Kamehameha III and IV to settle debts to foreigners. To end this practice, in 1865 the Crown lands were made inalienable, and their dispensation was regulated by a Board of Commissioners of Crown Lands, which effectively put them under the administrative control of foreign-born residents (Kame‘eleihiwa 1992:310).

Before the passage of the Act of January 3, 1865, which made Crown Lands inalienable, Kamehameha III and his successors did as they pleased with the Crown Lands, selling, leasing, and mortgaging them at will (Chinen 1958:27).

In 1850, the Privy Council passed resolutions that would affirm the rights of the commoners or native tenants. To apply for fee-simple title to their lands, native tenants were required to file their claim with the Land Commission within the specified time period of February 1846 and February 14, 1848. The *Kuleana* Act of 1850 confirmed and protected the rights of native tenants. Under this act, the claimant was required to have two witnesses who could testify they knew the claimant and the boundaries of the land, knew that the claimant had lived on the land for a minimum of two years, and knew that no one had challenged the claim. The land also had to be surveyed.

Not everyone who was eligible to apply for *kuleana* lands did so and, likewise, not all claims were awarded. Some claimants failed to follow through and come before the Land Commission, some did not produce two witnesses, and some did not get their land surveyed. For whatever reason, out of the potential 2,500,000 acres of Crown and Government lands “less than 30,000 acres of land were awarded to the native tenants” (Chinen 1958:31).

Coulter’s (1931) population density estimates for 1853 (Figure 6) show that approximately 700 people lived in Kāne‘ohe Ahupua‘a which was, at the time, one of the more densely populated areas in O‘ahu. As a result of the *Kuleana* Act of 1850, a total of 242 land claims were made for Kāne‘ohe Ahupua‘a, but only a bit more than half of those were awarded (Waihona ‘Aina 2000). The average *kuleana* award was 2.38 acres (Kelly 1976:8). However, these claims

were not only for commoners, as chiefs and/or *konohiki* (headmen) were also awarded lots. The bulk of Kāne‘ohe Ahupua‘a eventually went to Queen Hakaleleponi Kalama (1817-1870), eleven *konohiki*, and 3 non-*konohiki* (privileged awardees who received large parcels of land) (Kelly 1976:7). The primary type of land claimed in Kāne‘ohe was taro land, identified in the claims, testimony, and awards as *lo‘i*, but there were also fishponds and *kula* (dryland crops).

The present project area occupies land within the *‘ili* of Kaeleuli, which covers 509.5 acres (Figure 7). Historic maps and documents indicate that half of this *‘ili* was awarded to the government and half was given as a Māhele Award to Haole (#51MA) (Lyons 1876).

### 3.1.5 Historic Period

#### *3.1.5.1 Rice and Sugar Plantations*

In the 1860s, both commercial sugar cane and rice cultivation began in Kāne‘ohe. One of the earliest sugar plantations on O‘ahu was owned by Charles Coffin Harris, who came to Hawai‘i in 1850 with a plan to practice law. He established the Kaneohe Sugar Plantation Company (ca. 1865) on 7,000 acres of Queen Kalama’s land (Dorrance and Morgan 2000:41). In 1871, Harris bought Queen Kalama’s Ko‘olaupoko properties from her heir, Charles Kanaina, as well as some land in Honolulu for $22,448. The sale included “…livestock, tool, fishponds, and fishing rights” (*Bureau of Conveyance* Book 34:53, cited in Devaney et al. 1982:29); the fishponds of Waikalua-loko and Keana were part of this sale.

C.C. Harris’s plantation shut down in 1891 because the sugar yield was not enough to support the operation (Dorrance and Morgan 2000:41). Harris’s daughter and heir, Mrs. David Rice, incorporated the lands as Kaneohe Ranch and converted them to stock farming. James B. Castle purchased a large block of their land holdings in 1907 (Montgomery 1971, cited in Dorrance and Morgan 2000:42).

Rice cultivation was to eventually supersede taro and dominate the lowlands of Kāne‘ohe. The ancient taro *lo‘i* and *‘auwai* (ditch, channel) irrigation systems were used and new ditches were built to support rice cultivation. During the height of rice cultivation (ca. 1880-1920), Chinese dominated the business. “To a great extent the rice business, growing and milling was controlled by Chinese *hui* (firms), which recruited laborers from China, handled investment capital from rich absentee landlords, and tallied profits” (Montgomery 1971, cited in Devaney et al. 1982:49). By the late 1880s, virtually the entire floodplain areas of Kāne‘ohe were under rice cultivation. In 1892-1893, the Kaneohe Rice Mill was erected and put into production on property adjoining Waikalua Stream. There was a flume that brought water from the river to the rice mill. About twice a week a steamer came into Kāne‘ohe Bay to pick up and transport rice to market in Honolulu (Ching, personal communication, in Allen 1987:295).

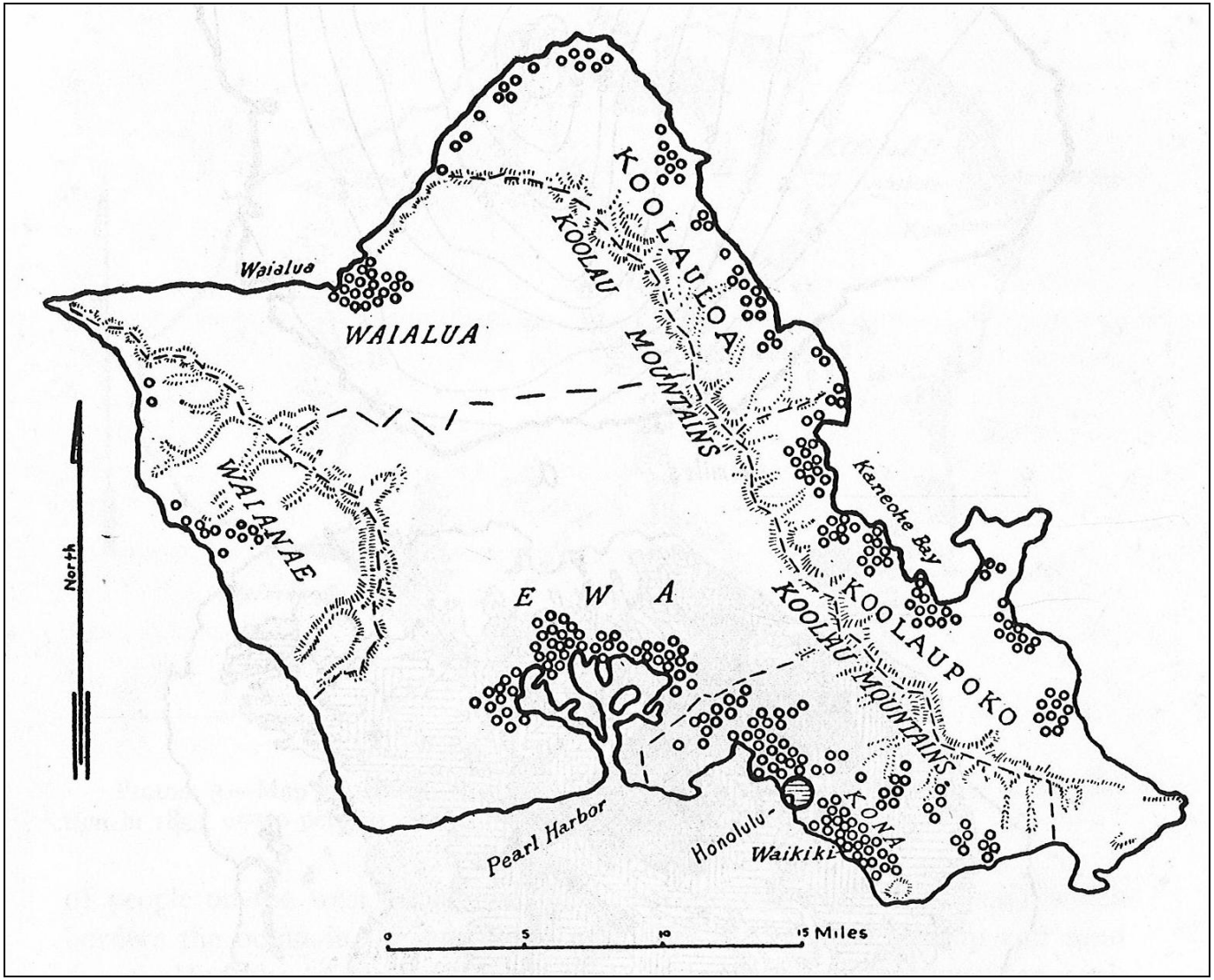


Figure 6. 1853 (Coulter 1931) population density estimates; each symbol represents 50 people

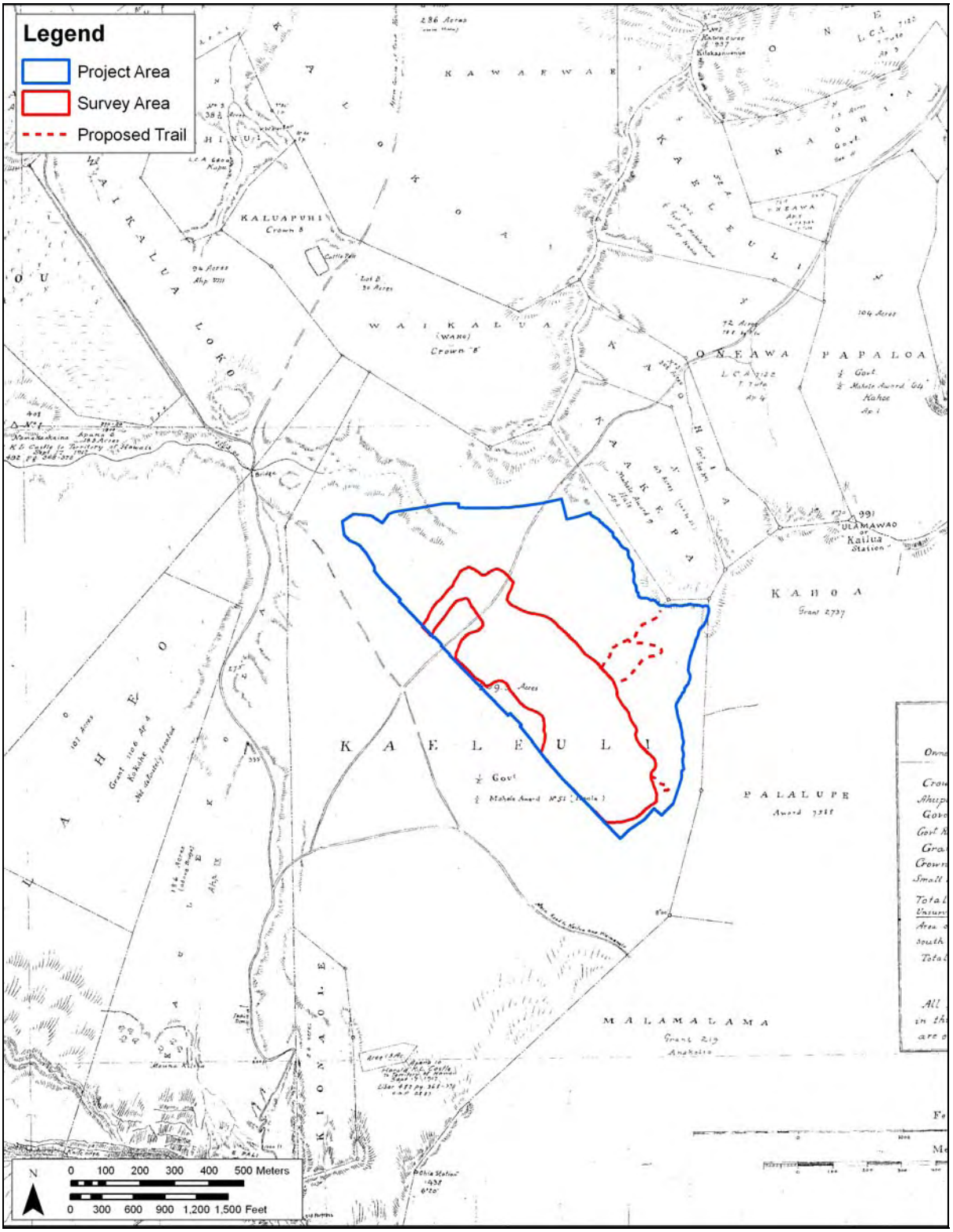


Figure 7. Portion of 1874 Lyons Map showing the locations of Crown and Government lands and LCAs in the vicinity of the project area

By the 1920s, rice had gradually declined in importance due to a number of factors. Two of the primary reasons for this decline were the beginning of rice production in California and the "annexation of Hawaii by the United States in 1898 [which] resulted in restrictions on the number of Chinese laborers arriving from the Far East" (Devaney et al. 1982:53). However, rice cultivation, as well as taro cultivation, continued up to ca. 1960.

*3.1.5.2 Ranching and Dairy*

Harold K.L. Castle, the only child of James B. Castle owned most of the *ahupua‘a* of Kāne‘ohe in the early 1900s (Kaneohe Ranch Management 2008), and in 1917 he purchased 9,500 acres of land from Harris's daughter (Henke 1929:62).

In the mid 19th century, ranching became a major enterprise. English Captain George Vancouver introduced cattle and sheep to O‘ahu in 1793 (Henke 1929:8), and by the 1840s cattle had multiplied into a large herd (Devaney et al. 1982:70). At its peak, Kaneohe Ranch extended from the ocean in Kailua to the Pali and included 12,000 acres and 2,000 head of cattle (Henke 1929:62). By the mid 1860s, the cattle were so numerous as to cause environmental degradation. Alien grasses and other species, such as pigeon peas, were introduced to the area as cattle fodder (Henke 1929:62). Much of the land modification in the upland and hilly portions of Kāne‘ohe may be the result of heavy cattle grazing over a long period of time:

> A view from the Pali looking toward Kaneohe in 1854 revealed that there were "hundreds of cattle…feeding on the rich pasture with which these plains were covered (Bates 1854:104). By the mid-1860s, we have an indication that livestock was altering the landscape. The undulating plains at the foot of Nuuanau Pali (Kekele lands) were described as "a rich land a while ago but now there are not many plants because animal are permitted there" Sterling and Summers Ms.:207, cited in Devaney et al. 1982:70].

Cattle and horse grazing in Kāne‘ohe Ahupua‘a, including Mōkapu Peninsula, continued into the 1900s (Fiddler 1956:1). By the end of World War II, ranching was no longer economically viable for the Kaneohe Ranch, and the ranch became primarily a landlord to other farmers (Kaneohe Ranch Management 2008).

The dairy industry rose to prominence over beef cattle ranching in the post-war years. The shortage of available land due to urban expansion, the shortage of fee simple land, and the high price of land leases forced farmers in the dairy districts near Honolulu (e.g., Koko Head) to relocate to more remote areas of O‘ahu (Durand Jr. 1959:241). In the 1950s Kailua-Kāne‘ohe was an important dairy district of Windward O‘ahu. Dairy farming was dominated by Caucasians of Portuguese and Spanish ancestry, and secondarily by the Japanese: "Among the names of island dairymen, illustrating the Portuguese-Spanish-Mainland importance…are…Brazil, Carlos, Campos, Costa, Ferreria, Foster, Freitas, Knowles, Medeiros, Moniz, Ornellas, Rapoza, Santos, Toledo, Vause and White" (Durand Jr. 1959:235). However, this period was relatively short-lived as the expansion of the Pali route, exorbitant land prices in Honolulu, and more automobiles on O‘ahu contributed to rapid urbanization in Kailua-Kāne‘ohe (Durand Jr. 1959:244-245).

### *3.1.5.3 Pineapple Cultivation*

The commercial cultivation of pineapple began in the 1890s and the first decade of the 1900s in Kāne‘ohe Ahupua‘a. From approximately 1910 to 1925, pineapple cultivation was a major industry in this area. In 1911, the company of Libby, McNeill and Libby built a pineapple cannery in the nearby *ahupua‘a* of He‘eia. At its peak, 2,500 acres were under pineapple cultivation on Windward O‘ahu stretching from Kāne‘ohe to Kahalu‘u (Harper 1972). Most of the pineapple lands in Kāne‘ohe were located below the Pali where the current project at the Hawai‘i Pacific University Hawai‘i Loa campus, the Pali Golf Course, and the Hawaiian Memorial Park are located today (Kelly in Allen 1987:295-296) (Figure 8). A *heiau*, Kaualauki Heiau in He‘eia Ahupua‘a, was mostly destroyed by pineapple field clearance during this time—a likely fate of many archaeological sites (Kelly in Allen 1987). In 1919, the Kaneohe Ranch Company and Heeia Agricultural Co., Ltd. leased 1,000 acres of land throughout the *ahupua‘a* of He‘eia, Kāne‘ohe, and Kailua, formerly planted in sugar, to the Libby company for a term of 17 years. In 1917, Libby leased an additional 600 acres in He‘eia Ahupua‘a (Libby, McNeill & Libby Ms:2, cited in Kawachi 1990). While the rice fields that covered old taro lands were mainly located near streams and near the coast, the pineapple fields were located on the slopes of higher lands, usually on land subleased to individual Japanese farmers:

> Pineapples were planted by individual Chinese and Japanese farmers on moderately sloped hill land where rice and taro could not be grown . . . these areas included the dissected alluvial terraces and the lower slopes and spurs of the Ko‘olau range [Miyagi 1963:115].

The change to the windward landscape in the first decades of the twentieth century as a result of pineapple cultivation is illustrated by the following passage:

> At last we reached the foot of the Pali. . . . Joe and I looked over the surrounding hills, but looked in vain for the great areas of guava through which but a few months ago we had fought and cut our way. As far as the eye could reach pineapple had taken the place of the forest of wild guava. The newest industry in Hawaii was beginning even to press upon the cane fields of this side of the island [Alexander 1914:318, cited in Devaney et al. 1982:62].

The pineapple fields were abandoned when Moloka‘i and Lāna‘i pineapple cultivation began to boom, and Libby pulled out of the Ko‘olaupoko enterprise (Kelly 1976:47). The cannery closed in 1923 (Dorrance 1998:95). Most of the former pineapple land went to grass, and some of it was used to graze cattle. Several of the small farmers returned to rice cultivation (Kelly 1975:47).

### *3.1.5.4 Military Infrastructure*

In 1918 a military reservation was built on the Mōkapu Peninsula at Kāne‘ohe Bay; Fort Hase was commissioned and was known as the Kuwaahoe Military Reservation. Now known as the Marine Corps Base Hawaii (MCBH), the base helped lead to a boom in commercial and residential development in and around Kāne‘ohe.

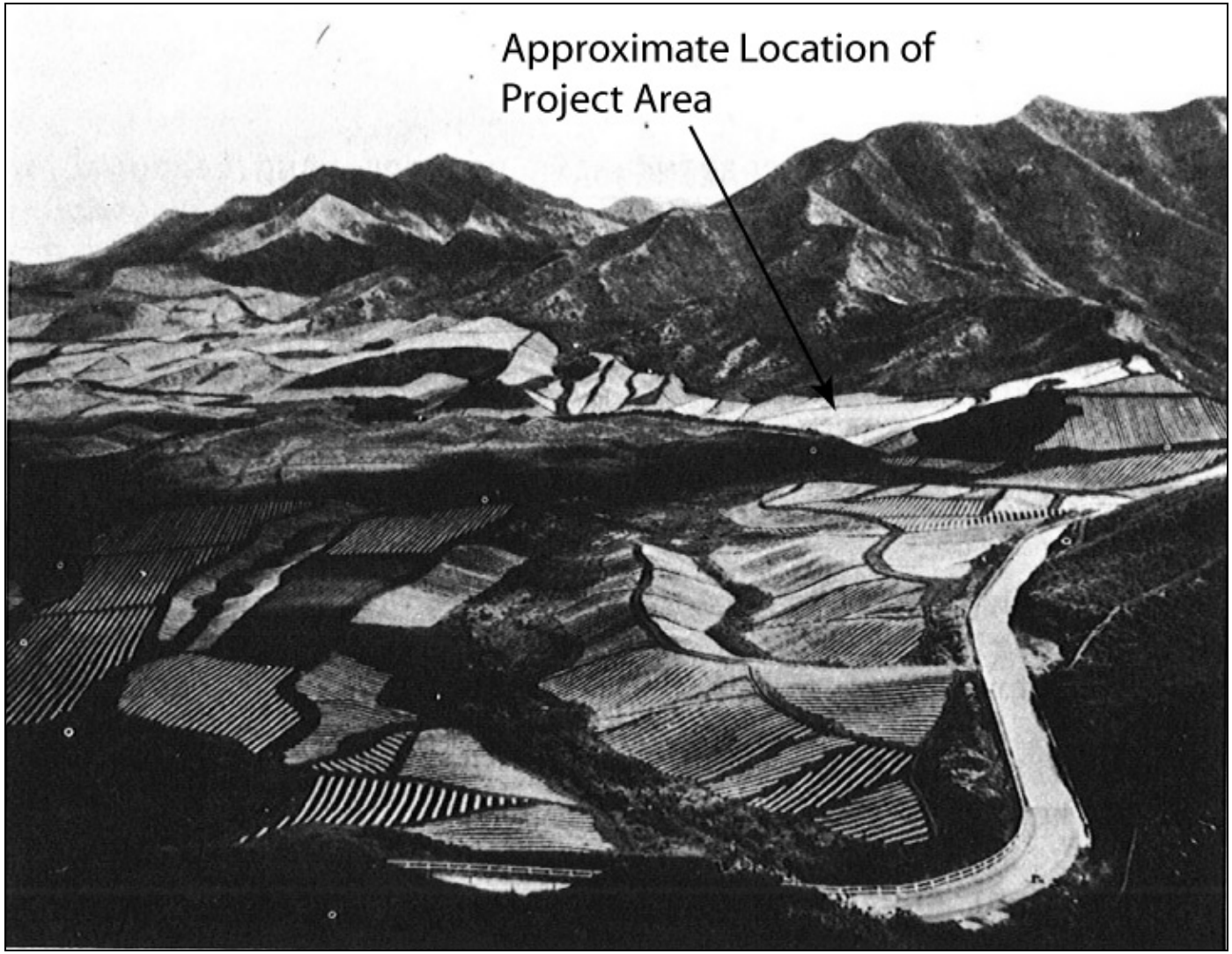


Figure 8. Photograph showing the extent of pineapple cultivation within the current project area (*Paradise of the Pacific*, Dec. 1923 in Davaney et al. 1982)

During World War II, the Pali Training Camp was constructed in the vicinity of the current project area. The camp "is comprised of approximately 4,400 acres that were used, by the military, as a regimental combat team training center for jungle and ranger training" (US Army Corps of Engineers 2005). The Pali Training Camp was centered in the area of the present-day Pali Golf Course located west of, and adjacent to, Kamehameha Highway (Figure 9 and Figure 10). The current project area is depicted as a cleared peripheral area with a temporary roadway extending from the Pali Training Camp to the north along the current project area's northern boundary.

### 3.1.6 Modern Land Use

After World War II, residential developments changed the face of Kāne‘ohe Ahupua‘a. The newly constructed Wilson Tunnel on the Likelike Highway and the expansion of the Pali Highway in the 1950s and 60s allowed easier access from Honolulu through the Ko‘olau mountains to windward communities. This led the way to a development boom on the windward side of O‘ahu. High tax rates on real estate sales forced many old-time landowners to lease their land to residential developers rather than sell on a fee-simple basis. Kaneohe Ranch at one time leased their land to over 5,000 single family residential lots in Kailua and Kāne‘ohe. The vast majority of the leaseholds were sold to the lessees (Kaneohe Ranch Management 2008).

During the late 1960's Hawai‘i Loa College was constructed within the current project area (Figure 11). Infrastructure included the Amos Starr and Juliette Montague Cooke Memorial Academic Center (built in 1969), the Dining Commons (built in 1970), and six residence halls (built in 1970). The college was opened in the fall of 1971 and continued successfully until merging with Hawai‘i Pacific University in 1992. The existing Hawai‘i Pacific University, Hawai‘i Loa campus currently serves an average daily number of 1,200 students.

## 3.2 Previous Archaeological Research

Previous archaeological studies conducted in the vicinity of the current project area are shown in Figure 12 and presented in Table 1. The following is a summary of these archaeological studies.

The first systematic archaeological study of the Kāne‘ohe area was conducted by J. Gilbert McAllister of the Bernice P. Bishop Museum in the 1930s. McAllister (1933) consulted with knowledgeable consultants about both physical and legendary sites of each district during his island-wide survey of O‘ahu in the 1930s. McAllilster describes two historic properties near the current project area.

At the base of the *pali* was a section of land known as Kamaikola (Site 357), from where a man named Pakuanui would either ambush travelers descending the pali trail or kill an unsuspecting traveler with a *pohaku puka* (trap door rock) suspended above the door to his house (McAllister 1933:181). McAllister (1933:182) also mentions a *heiau* (Site 358) with three large paved terraces with a stone-lined depression facing the *pali*, most likely an *imu* (earth oven). This is most likely Maunahuia Heiau that Thrum (1915) observed in ruins at the foot of the *pali*

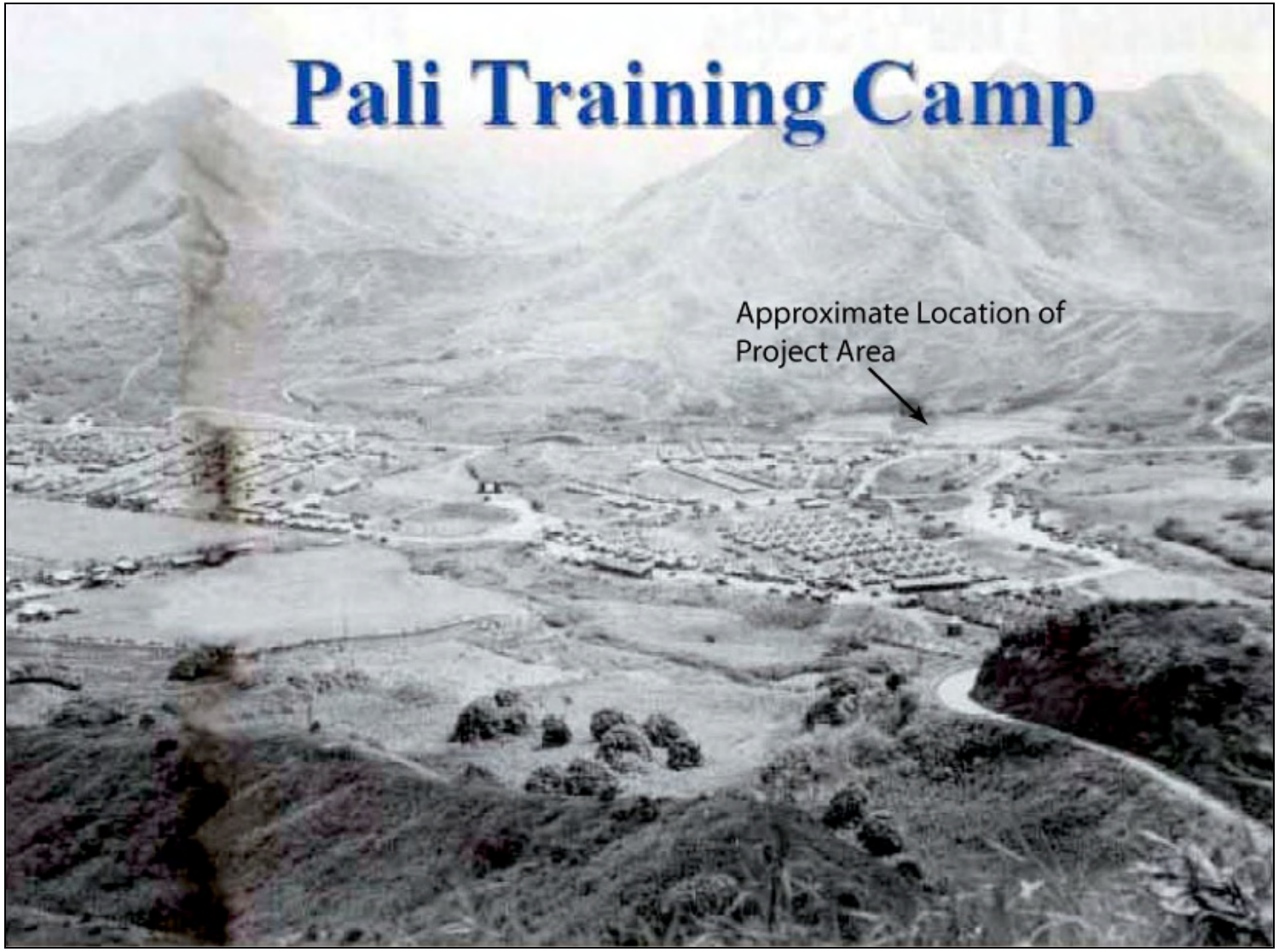


Figure 9. Photograph showing the Pali Training Camp adjacent to the current project area (US Army Corps of Engineers 2005)

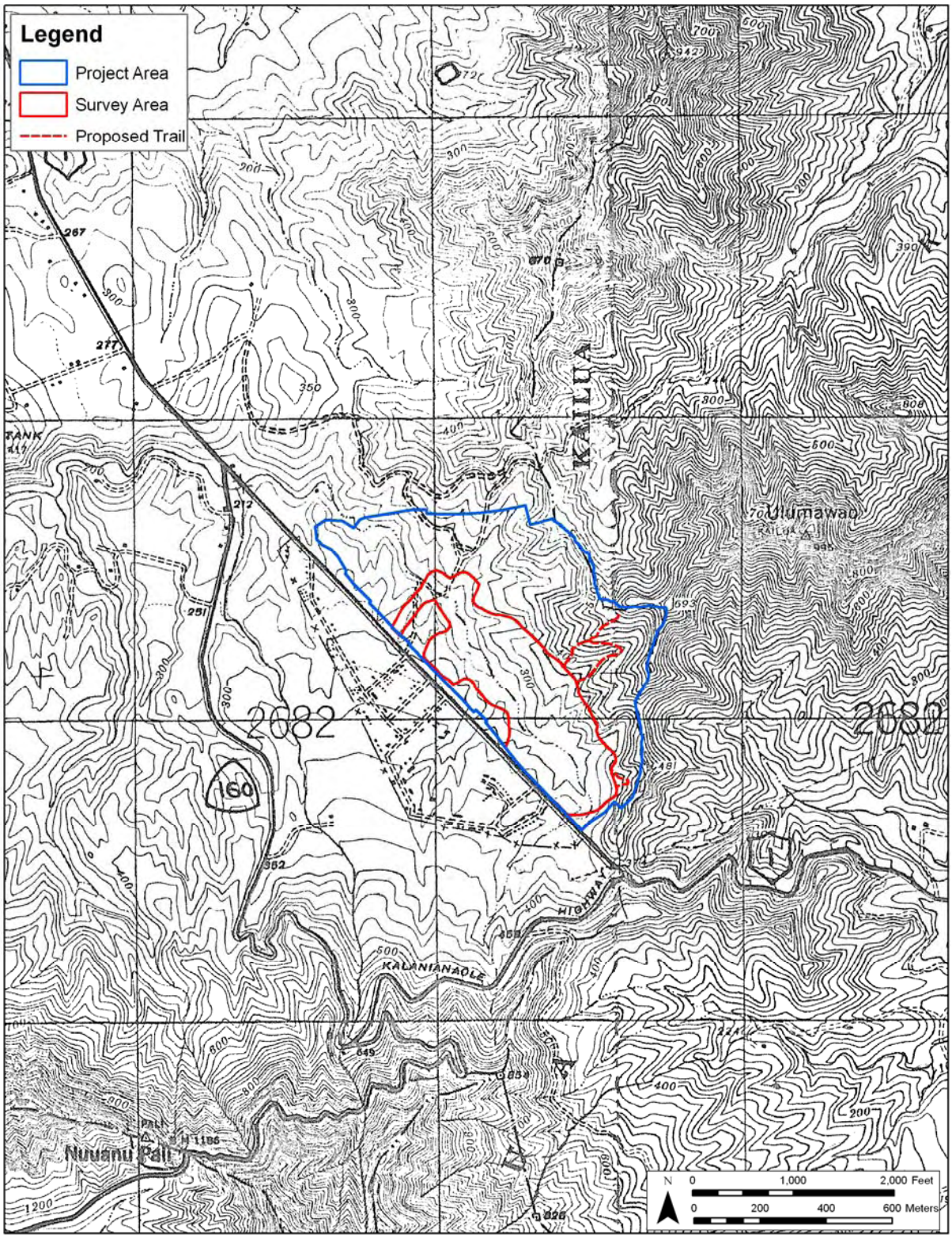


Figure 10. Portion of the 1943 U.S. War Department map showing the current project area and survey area

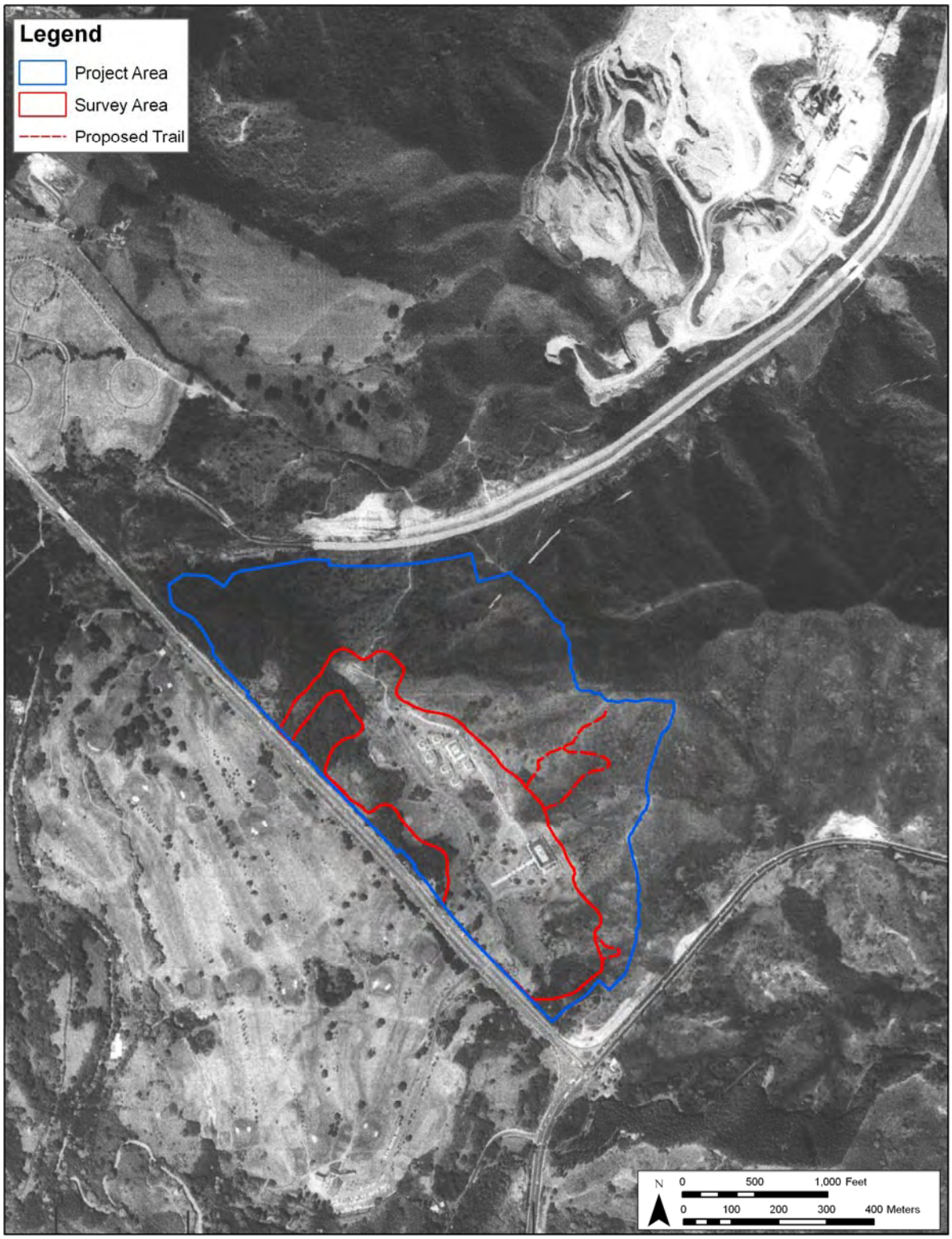


Figure 11. Portion of the 1977-1978 U.S. Geological Survey Orthophotoquad, Kāne‘ohe Quadrangle, showing the location of the current project area and survey area

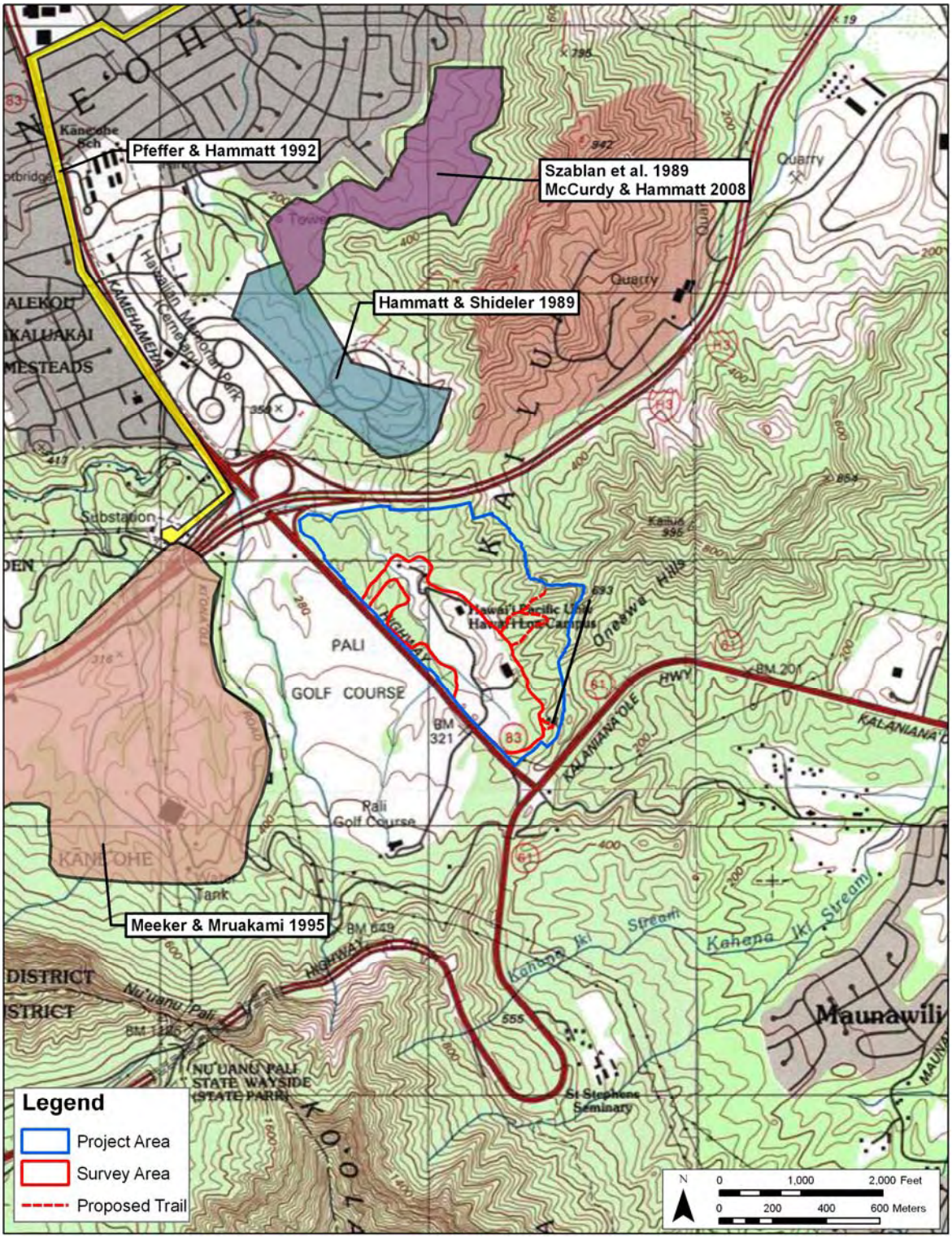


Figure 12. 1998 U.S. Geological Survey 7.5-minute series topographic map, Kāne‘ohe Quadrangle showing the location of previous archaeological studies in the vicinity of the current project area

Table 1. Previous archaeological studies in the vicinity of the current project area

| Reference | Type of Investigation | Location | Findings |
|---|---|---|---|
| McAllister 1933 | Island-wide survey | Island wide | Identified 11 historic properties in the vicinity of the current project area, 2 of which were heiau |
| Sterling and Summers 1978 | Island-wide survey | Island wide | Section concerning Kāne‘ohe includes legendary references to the naming of Kāne‘ohe and other historic properties and the descriptions of McAllister’s (1933) sites |
| Clark and Riford 1986 | Archaeological Salvage Excavations | Nani Pua Gardens II Subdivision (TMK 4-5-30:43) | Salvage excavations at Bishop Museum site 50-Oa-G5-101. Reports $^{14}$C date of 1070-1405; substantial discussion of lithic finds |
| Hammatt 1989 | Subsurface Reconnaissance | 44-291A Kāne‘ohe Bay Drive | 4 test trenches revealed no archaeological potential |
| Hammatt and Borthwick 1989 | Archaeological Survey & Assessment | 90-acre Bay View Golf Course Expansion | Documents Waikalua-loko and Waikalua fishponds |
| Hammatt and Shideler 1989 | Archaeological Survey | Veterans Cemetery 90-acres | No significant finds |
| Szabian et al. 1989 | Reconnaissance Survey | N & W facing slope of ridge separating Kailua and Kāne‘ohe | Describes 11 historic properties with 25 features, four pre-contact, seven post-contact & Kawa‘ewa‘e Heiau |
| Pfeffer and Hammatt 1992 | Archaeological Assessment | Transmission Corridor mostly along Kamehameha Hwy. | No finds |

| Reference | Type of Investigation | Location | Findings |
|---|---|---|---|
| Stride et al. 1994 | Inventory Survey & Subsurface Testing | Waikalua Road (TMK 4-5-05: 1,2, 12-14) 3.3 acres at shoreline | No significant finds in eight backhoe trenches |
| Meeker and Murakami 1995 | Archaeological Monitoring and Data Recovery Investigations | Ko‘olau Pali (TMK 4-5-42:1 and 6) | Seventeen historic properties investigated; of these, four were recommended for preservation. |
| McCurdy and Hammatt 2009 | Archaeological Inventory Survey | Hawaiian Memorial Park | 11 historic properties were observed within or near the petition area; 6 properties had been previously identified and included Kawa‘ewa‘e Heiau, 2 enclosure and terrace complexes, historic terrace, pit feature, & boundary marker. 5 new properties included quarry, stone enclosure, stone alignment, stone storage, pit feature |

Another temple on the windward slopes of the *pali* on the ridge Puuwaniania above the depression Kaluaolomana is a *heiau* variously named Puuwaniania Heieau or Kaluaolomana Heiau (Thrum 1916). In addition, a hill at the base of the *pali* called Na Maka o Kane (The Eyes of Kane) resembled a human face in shape; below the smooth brow of a hill a tapering projection appeard as a nose, two slight depressions appeared as the hollow eye-pits on a human skull, and farther down other features highlighted the facial muscles (Parker ms:25-26, cited in Sterling and Summers 1978:220).

In 1986, the Bishop Museum conducted archaeological salvage excavations of site G5-101 (SIHP # -2937) within TMK 4-5-030:043 (Clark and Riford 1986), approximately 160 meters northwest of the current project area’s western boundary. This pre-Contact Hawaiian habitation site is within the Nani Pua Gardens II Subdivision and was identified during archaeological investigations. The 1.7-acre parcel is bordered on the north and east by Kāne‘ohe Stream.

Preliminary investigations revealed a surface layer with lithic artifacts and a buried cultural layer. Additional historic properties recorded in the area included two lithic scatters (Site 50-Oa-G5-100), a former rice field and taro terrace (Site 50-Oa-G5-104), an Italian prisoner-of-war camp, and the Kaneohe Rice Mill. Subsurface testing at Waikalua Loko recovered a relatively early radiocarbon date of A.D. 1070-1405. A vast assemblage of lithic artifacts suggested the site was primarily used by “craftsman specializing in the manufacture of stone tools, primarily adzes” (Clark and Riford 1986:110). Two human burials were encountered that were in a fully extended position, and lacked cultural material (Clark and Riford 1986:104).

Szabian et al. (1989) conducted an archaeological reconnaissance survey for the proposed Pikoiloa Cemetery. In addition to Kawa‘ewa‘e Heiau (SIHP # -0354), already listed on the National and State Registers of Historic Places, eleven historic properties were recorded with at least 25 associated features. Of these, four were interpreted as pre-Contact and seven as historic in nature.

In 1992, CSH conducted an archaeological assessment for the proposed 46kV sub-transmission line (Pfeffer and Hammatt 1992). No historic properties were encountered during pedestrian survey and no further archaeological was recommended.

In 1993, CSH conducted an archaeological inventory survey within 3.2 acres along the shoreline of Kāne‘ohe Bay at Waikalua Road, approximately 160 meters north of the current project area (Stride et al. 1994). Research indicated a high probability that the project area had been a traditional Hawaiian settlement. The property was also the Coral Gardens, a 1915 to 1940 resort hotel. Eight backhoe trenches were excavated to determine the presence or absence of cultural deposits. No cultural material or human remains were observed during the survey or backhoe testing other than modern trash. No further archaeological work was recommended for the project.

In 1995, International Archaeological Research Institute, Inc. (IARII) conducted archaeological monitoring and data recovery for the Minami Golf Course located approximately 670 meters west of the current project area (Meeker and Murakami 1995). A total of seventeen historic properties were investigated, four of which were recommended for preservation. Historic properties included one set of dry land agricultural terraces, several prehistoric and historic firepits and kilns, stone mounds, and a lithic activity area.

Between October 2006 and October 2007, CSH conducted an archaeological inventory survey for the proposed Hawaiian Memorial Park expansion (McCurdy and Hammatt 2009), located less than 740 meters from the current project area. The 56.6-acre petition area overlapped with a portion of the Szabian et al. (1989) project area discussed above. (Petition area rather than project area is used for the proposed expansion since the project is subject to a state land use boundary amendment petition for the reclassification of land use.) A total of 11 historic properties were observed within or near the petition area.

Six properties were previously recorded (SIHP #s 50-80-10-354, pre-Contact Kawa‘ewa‘e Heiau; -4680, historic terrace; -4681, pre-Contact complex of enclosures and terracing; -4683, historic pit feature; -4684, pre-Contact complex of enclosures and terracing; and -4686, historic boundary marker).

The remaining five properties were new discoveries (SIHP #s -6929, pre-Contact quarry;-6930, pre-Contact stone enclosure; -6931, pre-Contact stone alignment; -6932, historic stone storage feature; and -6933, historic pit feature).

Seven of the historic properties are within the Hawaiian Memorial Park petition area; these include SIHP #s -4680, -4683, -4684, -4686, -6930, -6932, and -6933. Of these, two are considered pre-Contact and five are considered historic.

No further work was recommended for SIHP #s -4680, -4683, -4686, -6932, and -6933. Preservation in the form of avoidance was recommended for SIHP # s -4681, -4684, -6929, -6930, and 6931. Recommendations included an archaeological monitoring program, and preparation of a cultural resource preservation plan to address buffer zones and protective measures for all historic properties recommended for preservation within and near the petition area.

## 3.3 Background Summary and Predictive Model

Kāne‘ohe has long been viewed as a valuable *ahupua‘a* both in terms of agricultural and fishery productivity. In 1830 the chiefs of Hawai‘i, Maui, and O‘ahu, in a council meeting concerning the “late doings on Oahu”, referred to Kāne‘ohe as the “most valuable part” of the district of Ko‘olaupoko (Kamakau 1972:303).

During the historic period, traditional dry and wetland cultigens were replaced with rice, sugar cane, and pineapple within the productive agricultural fields of Kanē‘ohe. It seems likely that the majority of surficial archaeological sites were destroyed during these historic agricultural pursuits when fields were cleared and plowed and pre-contact structures were dismantled or modified. An early twentieth-century photograph (See Figure 8) shows the majority of the current project area under pineapple cultivation suggesting that any pre-contact surficial structures that may have existed were likely destroyed.

After the onset of World War II, the Pali Training Camp was constructed adjacent to, and partially within, the current project area. Background research suggests that military infrastructure within the current project area was minimal likely consisting of a portion of temporary roadway along the project area's northern boundary (See Figure 9 and Figure 10).

During the late 1960's and early 1970's Hawai‘i Loa College was constructed within the current project area. This construction likely involved fairly extensive grading and ground disturbance within the project area, further impacting any previously existing historic properties.

A review of background research has indicated that land modification and development associated with pineapple cultivation, military infrastructure, and the early construction of the Hawai‘i Loa College have likely destroyed or severely impacted any previously existing historic properties within the current project area. Therefore, no historic properties are expected to be located within the current project area.

# Section 4 Results of Fieldwork

The fieldwork component of this archaeological assessment was accomplished between November 19 and December 10, 2009 by one CSH archaeologist, Matt McDermott, M.A. (principal investigator). The fieldwork required approximately four person-days to complete.

No historic properties were identified within the 47-acre survey area. The majority of the survey area consisted of the landscaped and maintained grounds and facilities of the Hawai‘i Pacific University Hawai‘i Loa Campus (Figure 13 to Figure 15). The campus grounds largely consisted of open mowed lawns, asphalt roadways and parking lots, campus buildings and facilities, and landscaped areas consisting of introduced trees and shrubbery. The majority of the campus grounds appeared to have been previously graded.

Pedestrian inspection focused on the currently undeveloped, heavily vegetated areas along the fringe of the campus grounds and within the proposed trail extensions (Figure 16 and Figure 17). These undeveloped areas are located along the southeastern edge (adjacent to and south of the academic center) and northwestern edge (between the maintained campus grounds and Kamehameha Highway) of the survey area. The two proposed trail extensions are located along the eastern boundary of the survey area generally extending eastward and upslope. The large central trail extension consists of a straight section that extends up a ridgeline and an adjoining loop that extends down a nearby valley along an intermittent drainage channel (Figure 18 to Figure 20). The small southern trail extension loops from within the southeastern undeveloped area upslope along a narrow cut trail to the current location of a pig trap (Figure 21). The undeveloped portions of the survey area along Kamehameha Highway had stands of dense cat's claw (*Caesalpinia decapetala*). The remainder of survey area had stands of *hau* (*Hibiscus tiliatus*) interspersed between non-native trees and shrubs such as octopus tree (*Brassaia actinophylla*), java plum (*Syzygium cumini*), and guava (*Psidium guajava*).

During the pedestrian survey, several bulldozed asphalt berms and a rusted steel half-tank were identified within the undeveloped areas fronting Kamehameha Highway and determined to be related to previous construction or demolition occurring less than 50 years ago (Figure 22 and Figure 23). Additionally, several concrete culverts were identified along Kamehameha Highway within or adjacent to the current survey area (Figure 24). These culverts were determined to be modern drainage improvements associated with the development of the highway.

Figure 13. General view of campus grounds showing modular buildings, view to north

Figure 14. General view of campus grounds showing the Academic Center, view to northeast

Figure 15. General view of campus grounds showing the soccer field, view to northwest

Figure 16. Thick cat’s claw vegetation is the southeastern portion of the survey area, view to southeast

Figure 17. Thick vegetation near the southern end of the survey area, view to west

Figure 18. General view of the central trail extension looking upslope, view to northeast

Figure 19. General view of the central trail extension from the top of the ridgeline showing the campus grounds and facilities at center, view to southwest

Figure 20. General view of the central trail extension showing the intermittent drainage, view to southwest

Figure 21. Pig trap located at the uppermost portion of the southern trail extension loop, view to southeast

Figure 22. Disturbed area with asphalt berm in the northwestern portion of the survey area, view to west

Figure 23. Rusted steel half-tank in the northwestern portion of the survey area, view to north

Figure 24. Concrete culvert opening near the southern end of the survey area along Kamehameha Highway, view to southeast

# Section 5 Project Effect and Mitigation Recommendations

## 5.1 Project Effect

No historic properties were identified within the approximately 47-acre survey area. Decades of land modification and grading related to pineapple cultivation, military infrastructure at the Pali Training Camp, and the development of the Hawai‘i Loa College (currently the Hawai‘i Pacific University Hawai‘i Loa Campus) have likely destroyed or severely impacted any surface historic property that may have existed within the current survey area. Consequently, CSH's effect recommendation for the proposed project is "no historic properties affected."

## 5.2 Mitigation Recommendations

In accordance with SHPD/DLNR recommendations (SHPD correspondence, 2 December 2009, Log: 2009.4617, Doc: 0912RS11—Appendix A), CSH recommends an on-call archaeological monitoring program be implemented for all construction activities related to the current project. A qualified archaeological monitor will remain on-call during all ground disturbance activities. Periodic spot-checks may be performed by the archaeological monitor in order to observe and document subsurface impact, exposed sediment characteristics, and the construction process. If, in the unlikely event, that intact cultural resources are encountered during the course of development activities, all work in the immediate area should stop and the on-call archaeological monitoring firm promptly notified.

# Section 6 References Cited

**Abbott, Isabella A.**
1992 *La‘au Lapa‘au Hawai‘i: Traditional Hawaiian Uses of Plants*. Bishop Museum Press, Honolulu.

**Allen, Jane (editor) Mary Riford, Thecia M. Bennett, Gail Murakami, and Marion Kelly**
1987 *Five Upland ‘Ili: Archaeological and Historical Investigations in the Kāne‘ohe Interchange, Interstate Highway H-3, Island of O‘ahu*. Departmental Report Series B7-1. Department. of Anthropology, Bernice P. Bishop Museum, Honolulu.

**Barrère, Dorothy B.**
1994 *The King’s Mahele: The Awardees and Their Lands.* Compiled by Dorothy B. Barrère, Volcano, HI.

**Chinen, Jon J.**
1958 The Great Māhele, Hawai‘i's Land Division of 1848, University of Hawai‘i Press, Honolulu.

**Clark, John R.K.**
2002 *Hawaii Place Names*. University of Hawai‘i Press, Honolulu.

**Clark, Stephan Dane, and Mary Riford**
1986 Archaeological Salvage Excavations at Site 50-Pa-G5-101, Waikalua-Loko, Kāne‘ohe, Ko‘olaupoko, O‘ahu Island, Hawai‘i. Department of Anthropology, Bernice Pauahi Bishop Museum, Honolulu.

**Coulter, John W.**
1931 Population and Utilization of Land and Sea in Hawai‘i, 1853. Bernice Pauahi Bishop Museum Bulletin 88, Honolulu.

**Devaney, Dennis, Marion Kelly, Polly Jae Lee, and Lee S. Motteler**
1976 *Kāne‘ohe: A History of Change (1778-1950).* Bernice. P. Bishop Museum. The Bess Press, Honolulu.

**Devaney, Dennis M., Marion Kelly, Polly Jae Lee, and Lee S. Motteler**
1982 *Kāne‘ohe: A History of Change.* The Bess Press, Honolulu.

**Dorrance, William H. and Francis S. Morgan**
2000 *Sugar Islands: The 165-Year Story of Sugar in Hawai‘i.* Mutual Publishing, Honolulu.

**Durand, Loyal Jr.**
1959 The Dairy Industry of the Hawaiian Islands. *Economic Geography*, Vol. 35, No. 3:228-246.

**Fiddler, Frank.**
1956 *Mokapu, a Study of the Land*. U.S. Marine Corps Air Station, Honolulu.

**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. Department of Agriculture, U.S. Government Printing Office, Washington, D.C.

**Fornander, Abraham**
1878 An Account of the Polynesian Race: Its Origins and Migrations and the Ancient History of the Hawaiian People to the Times of Kamehameha I. Volume I, Trubner & Co., Ludgate Hill, London, UK.

**Giambelluca, Thomas W., Michael A. Nullet, and Thomas A. Schroeder**
1986 *Rainfall Atlas of Hawai‘i,* Department of Land and Natural Resources, Honolulu.

**Greer, Richard A.**
1970 Honolulu in 1847. *Hawaiian Journal of History,* Vol. 4:59-95.

**Hammatt, Hallett H.**
1989 Archaeological Subsurface Reconnaissance of a Residential Property on Kane‘ohe Bay, O‘ahu (44-291A Kāne‘ohe Bay Drive, TMK 4-4-7:8, 10). Cultural Surveys Hawai‘i, Kailua, HI.

**Hammatt, Hallett H., and Douglas F. Borthwick**
1989 Archaeological Survey and Assessment of a 90-Acre Parcel for the Proposed Expansion of the Bay View Golf Course Kāne‘ohe, O‘ahu. Cultural Surveys Hawai‘i, Kailua, HI.

**Hammatt, Hallett H. and David W. Shideler**
1989 Archaeological Survey of a 90-acre Parcel for Proposed Hawai‘i State Veterans Cemetery Kāne‘ohe, O‘ahu. Cultural Surveys Hawaii, Kailua, HI.

**Handy, E. Craighill., and Elizabeth G. Handy**
1972 Native Planters of Hawaii: Their Life, Lore, and Environment. Bishop Museum Press, Bulletin 233, Honolulu.

**Harper, Joseph**
1972 Pineapple, A Major Industry in the Area 50 Years Ago. *Ka Lama* 3 (2):3, 8. (Newspaper sponsored by Kahaluu Ecumenical Youth Project (KEY) and Hui Ko‘olau), Kahaluu Printing Co., Kahaluu, HI.

**Henke, Louis A.**
1929 *A Survey of Livestock in Hawaii.* University of Hawai‘i Research Publication No. 5, Honolulu.

**‘Ī‘ī, John Papa**
1959 *Fragments of Hawaiian History* (Pukui translation), Bishop Museum Press, Honolulu.

**Kalākaua, David**
1990 The Legends and Myths of Hawaii: The Fables and Folk-Lore of a Strange People. Mutual Publishing, Honolulu.

**Kamakau, Samuel M.**
1992 *Ruling Chiefs of Hawaii (Revised Edition).* Kamehameha Schools Press, Honolulu.

**Kame‘eleihiwa, Lilikalā**
1992 Native Land and Foreign Desires: Pehea Lā E Pono Ai? Bishop Museum Press, Honolulu.

**Kaneohe Ranch Management Limited**
2008 *Kaneohe Ranch History*. Electronic document, http://www.kaneoheranch.com/index.cfm?page=history&subnav=subnav_history&section=history, accessed November 20, 2008.

**Kawachi, Carol T.**
1990 An Archaeological Reconnaissance of He‘eia Fastlands, He‘eia, Koolaupoko, O‘ahu , SHPD/DLNR, State of Hawai‘i, Honolulu.

**Kelly, Marion**
1975 *Lolo I‘a O He‘eia: Heeia Fishpond*. Department of Anthropology, Bishop Museum, Honolulu.

1976 Report 2 Historical Research: The History of the Land of Kaneohe. Department of Anthropology, Bishop Museum, Honolulu.

**Lyons, C. J.**
1876 Kāne‘ohe, O‘ahu, with West Kailua *[map] Scale = 1:6000 Registered Map 285. On file at the State of Hawaii Department of Accounting and General Services Land Survey Division, Honolulu.*

**McAllister, J. Gilbert**
1933 *Archaeology of O‘ahu*. Bernice P. Bishop Museum, Bulletin 104, Honolulu.

**McCurdy, Todd D. and Hallett H. Hammatt**
2009 Archaeological Inventory Survey for the Hawaiian Memorial Park Expansion, Kāne‘ohe Ahupua‘a, Ko‘olaupoko District, Island of O‘ahu TMK: [1] 4-05-033:001. Cultural Surveys Hawai‘i, Kailua, HI

**Meeker, Virgil and Gail M. Murakami**
1995 From Fire Pits to Charcoal Kilns: Resource Procurement and Land Use in the Upland Kāne‘ohe Catchment. International Archaeological Research Institute, Honolulu.

**Miyagi, Michichiro**
1963 *Land Use in Waiahole Valley, Oahu.* M.A. thesis, University of Hawai‘i, Honolulu.

**Montgomery, Carol S.**
1971 Progress Report on the Ecological Succession in Kahalulu, Oahu. Ethnic Studies Program Resource Center, University of Hawai‘I, Honolulu.

**Paki, Pilahi**
1972 *Legends of Hawaii: Oahu's Yesterday.* Victoria Publications, Honolulu.

**Parker, Henry Hodges**
ms *Reminiscences.* Hawaiian Mission Children’s Society, Honolulu

**Pfeffer, Michael and Hallett H. Hammatt**
1992 Archaeological Assessment for the Proposed 46 kV Sub-Transmission Line for Ko‘olau-Kāne‘ohe, Kāne‘ohe, O‘ahu, Cultural Surveys Hawai‘i, Kailua, HI.

**Pukui, Mary K. and Samuel H. Elbert**
1986 *Hawaiian Dictionary*. University of Hawai‘i Press, Honolulu.

**Sterling, Elspeth P., and C. C. Summers**
1978 *Sites of O‘ahu*. Department of Anthropology, Bernice P. Bishop Museum, Honolulu.

**Stride, Mark, Douglas Borthwick, Victoria S. Creed and Hallett H. Hammatt**
1994 Inventory Survey and Subsurface Testing at Waikalua Road, Kāne‘ohe Bay, O‘ahu 3.2 Acres (TMK 4-5-05:1, 2, 12, 13 & 14) Cultural Surveys Hawai‘i, Kailua, HI.

**Szabian, John, James Landrum III and Paul L. Cleghorn**
1989 A Reconnaissance Survey of the Proposed Pikoiloa Cemetery, Kāne‘ohe, O‘ahu Island, TMK 4-5-33:1-2. Applied Research Group, Bishop Museum. Honolulu.

**Thrum, Thos. G.**
1906 Heiaus and Heiau sites throughout the Hawaiian Islands. *Thrum’s Hawaiian Annual* for 1907:36-48. Thomas G. Thrum, Honolulu.

1915 Completing Oahu’s Heiau Search. *Thrum’s Hawaiian Annual for 1916*. Thomas G. Thrum, Honolulu.

**U.S. Army Corps of Engineers**
2005 *Environmental Projects.* Electronic document, http://www.poh.usace.army.mil/env/env-projects.htm#Pali, accessed December 7, 2009.

**Waihona ‘Aina**
2000 *The Māhele Database*. Electronic document, http://waihona.com, accessed November 5, 2009.

# Appendix A SHPD/DLNR Pre-Consultation Letter

LINDA LINGLE
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ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

**STATE OF HAWAII**
**DEPARTMENT OF LAND AND NATURAL RESOURCES**

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

**DATE:** December 2, 2009 **LOG:** 2009.4617
**DOC:** 0912RS11

**TO:** Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, HI 96813

**SUBJECT:** **Chapter 6E-42 Historic Preservation Review / Pre-Consultation for Draft EA for Hawaii Pacific University, Hawaii Loa Campus Expansion for both Nursing and Science Programs**
**Permit #** (None)
**Building Owner:** Hawaii Pacific University
**Location:** 45-045 Kamehameha Highway, Kaneohe, HI 96744
**Tax Map Key:** (1) 4-5-035:010

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Thank you the pre-consultation letter, including Chapter 1 of your Draft Environmental Assessment, for the proposed upgrades to the Hawaii Loa Campus of Hawaii Pacific University. We received your document dated November 23, 2009 on November 24, 2009.

This office does not currently have any archaeological sites on file for the Hawaii Loa campus. Test excavations undertaken by Robert Spear, PhD, in July 1994 during work on the school waste water treatment facility located no cultural material or subsurface features.

The project envisions new residences to accommodate 400 students; new academic and student centers; a performing arts center; indoor recreational facilities (such as multi-purpose gymnasium and fitness center); increased food service facilities; and an additional 400 parking spaces. As part of the proposal, the existing soccer field would be demolished and relocated elsewhere. Major beneficiaries of these improvements would be the School of Nursing and the Natural Science program. As the project involves multiple buildings and road construction across the campus, the area of potential affect would be the entire 132 acres.

Due to the extensive work to be undertaken, we do recommend that you have a qualified archaeological monitor on call during construction activities. In the event that historic resources, including human skeletal remains, lava tubes, and lava blisters/bubbles are identified during construction activities, all work should cease in the immediate vicinity of the find, the find should be protected from additional disturbance, and the State Historic Preservation Division should be contacted immediately at (808) 692-8015.

We look forward to the submittal of the full Draft EA. Please direct any questions to Ross W. Stephenson at (808) 692-8028 or ross.w.stephenson@hawaii.gov.

Mahalo,

Nancy McMahon, Deputy Historic Preservation Officer, DLNR, State of Hawaii

LINDA LINGLE
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# STATE OF HAWAII
## DEPARTMENT OF LAND AND NATURAL RESOURCES

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

January 21, 2010

David Shideler
Cultural Surveys Hawai`i, Inc.
P.O. Box 1114
Kailua Hawai`i 96734

LOG NO: 2010.0249
DOC NO: 1001NM41
Archaeology

Dear Mr. Shideler:

**SUBJECT: Chapter 6E-8 Historic Preservation Review –**
**Archaeological Assessment for the Hawaii Pacific University Master Plan**
**Kaneohe Ahupua'a, Koolaupoko District, Island of O'ahu**
**TMK: (1) 4-5-035: 010**

Thank you for the opportunity to review the aforementioned AA report for Hawaii Pacific University Master Plan (Yucha and McDermott, 2010), which we received on December 22, 2009. This was in survey of 47 acres. No historic properties were found.

Archaeological monitoring was recommended and we concur.

This report is accepted and it meets the minimum requirements for compliance with the Hawaii Administrative Rules (HAR) §13-13-276 *Rules Governing Standards for Archaeological Inventory Studies and Reports.*

A text- searchable PDF version on CD of this report should also been submitted for our library with a copy of this letter.

Please contact me at (808) 692-8015 if you have any questions or concerns regarding this letter.

Aloha,

Nancy A. McMahon

Nancy McMahon, Archaeology and Historic Preservation Manager
State Historic Preservation Division

# APPENDIX F
# INTERIM REPORT
# CULTURAL IMPACT ASSESSMENT

# Cultural Impact Assessment for the Hawai'i Pacific University Master Plan Project, Kāne'ohe Ahupua'a, Ko'olaupoko District, Island of O'ahu

## TMK: [1] 4-5-035:010

**Prepared for**

**Group 70 International, Inc.**


**Prepared by**

**Joseph Genz, Ph.D.**

**and**

**Hallett H. Hammatt, Ph.D.**

**Cultural Surveys Hawai'i, Inc.**

**Kailua, Hawai'i**


**(Job Code: KANEOHE 13)**

**February 2010**


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# Management Summary

| | |
|---|---|
| Reference | Cultural Impact Assessment for the Hawai'i Pacific University Master Plan Project, Kāne'ohe Ahupua'a, Ko'olaupoko District, Island of O'ahu, TMK: [1] 4-5-035:010 (Genz and Hammatt 2010) |
| Date | February 2010 |
| Project Number (s) | Cultural Surveys Hawai'i Inc. (CSH) Job Code: KANEOHE 13 |
| Agencies | State of Hawai'i Department of Health/Office of Environmental Quality Control (DOH/OEQC) |
| Project Location | The Project area encompasses the Hawai'i Pacific University Hawai'i Loa Campus. |
| Land Jurisdiction | Private |
| Project Description | Strategic planning for the HPU Hawai'i Loa Campus expansion aims to accommodate current and anticipated enrollment growth. The conceptual five-year Master Plan proposes the following new facilities and improvements that will make the campus more cohesive: A signalized intersection at the existing entry/exit from Kamehameha Highway; the current soccer field relocated so that the space can be converted to a landscaped parking area with 400 parking spaces; the Paul and Vi Loo Performing Arts Center; indoor recreational facilities; a covered walkway flanking the parking lot for pedestrian access; the Academic Center II building; a pathway and bridge connecting the Academic Center II to the Cooke Academic Center; a new student center with a bookstore and café; new residential facilities to accommodate 400 on-campus student residents; and renovated food service facilities. |
| Project Acreage | 132.46 acres |
| Area of Potential Effect (APE) and Survey Acreage | For the purposes of this Cultural Impact Assessment, the APE is defined as the approximately 132.46-acre Project area. While this investigation focused on the Project APE, the study area included the entire *ahupua'a* of Kāne'ohe. |
| Document Purpose | The Project requires compliance with the State of Hawai'i environmental review process (Hawai'i Revised Statutes [HRS] Chapter 343), which requires consideration of a proposed Project's effect on cultural practices and resources. At the request of Group 70 International, Inc., CSH is conducting this Cultural Impact Assessment (CIA). Through document research and ongoing cultural consultation efforts, this report provides information pertinent to the assessment of the proposed Projects' impacts to cultural practices and resources (per the *Office of Environmental Quality Control's* |

| | |
|---|---|
| | *Guidelines for Assessing Cultural Impacts*) which may include Traditional Cultural Properties (TCP) of ongoing cultural significance that may be eligible for inclusion on the State Register of Historic Places, in accordance with Hawai'i State Historic Preservation Statute (Chapter 6E) guidelines for significance criteria (HAR §13–284 under Criterion E. The document is intended to support the Project's environmental review and may also serve to support the Project's historic preservation review under HRS Chapter 6E and Hawai'i Administrative Rules (HAR) Chapter 13–284. |
| Consultation Effort | Hawaiian organizations, agencies and community members were contacted in order to identify potentially knowledgeable individuals with cultural expertise and/or knowledge of the Project area and the vicinity. The organizations consulted included the State Historic Preservation Division (SHPD), the Office of Hawaiian Affairs (OHA), the O'ahu Island Burial Council (OIBC), Hui Mālama I Nā Kūpuna 'O Hawai'i Nei, the Ko'olaupoko Hawaiian Civic Club, and community members of 'Kāne'ohe Ahupua'a. |
| Results of Background research | Background research for this Project yielded the following results:<br>1. Numerous *wahi pana* (storied places) of the *moku* (district) of Ko'olaupoko and the *ahupua'a* (land division extending from the uplands to the sea) of Kāne'ohe place the specific Project area within a cultural context. The mountainous section of Kāne'ohe Ahupua'a near the Project area contains several *wahi pana* connected to the stunning landscape of the *pali* (cliffs), with towering *pu'u* (peaks) over the sheer cliff rock faces overlooking the *mauka* (upland, mountain) forests. These *wahi pana* include: Kamaikola, from where a man would either ambush travelers descending the Pali Trail or kill an unsuspecting traveler with a *pōhaku puka* (trap door rock) suspended above the door to his house (McAllister 1933:181); Kekele, a place abundant in fragrant *hala* (pandanus) (Pualewa 1886, cited in Sterling and Summer 1978:221); Na Maka o Kane, a hill that resembled a human face in shape (Parker ms:25-26, cited in Sterling and Summers 1978:220); and Ho'oleina'iwa, a hill with twenty large unusually weathered *pōhaku* (stones) (Landgraf 1994:106).<br>2. Kāne'ohe Ahupua'a is rich in *'ōlelo no'eau* (proverbs) and *mo'olelo* (stories and oral histories) about the naming of the *ahupua'a* and its *wahi pana*. In particular, the *mo'olelo* of Keahiakahoe illuminates the entire landscape of the *ahupua'a*, literally from the peak of the mountains to the coastal waters. By chronicling a rivalry among the taro farmer |

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| | Kahoe and his siblings, the *mo'olelo* connects the fishermen on the coast of Kāne'ohe Bay and offshore at Moku o Lo'e (part of the neighboring He'eia Ahupua'a) to the upland taro farming community. Through the imagery of smoke drifting upwards from Kahoe's fire, the *mo'olelo* further connects the *mauka* regions to the peak of Pu'u Keahiakahoe (Hawaiian Ethnological Notes ms., cited in Sterling and Summers 1978:206; Landgraf 1994:94).<br><br>3. The *ahupua'a* of Kāne'ohe was a center for agriculture and aquaculture, making it one of the primary population centers on O'ahu in pre-Contact times (Devaney et al. 1982:6). Hawaiians irrigated extensive *lo'i kalo* (irrigated taro terrace) with fresh water from *mauka* springs and streams, and they developed a vast network of connected *loko i'a* (fishponds). In addition to the irrigated cultivation of *kalo* (taro), the ancestors of Kāne'ohe Ahupua'a grew *kula* (dryland) *kalo*, *mai'a* (bananas), *'uala* (sweet potatoes), *niu* (coconut trees), *hala*, *wauke* (paper mulberry) (Handy and Handy 1972:456) and *'awa* (kava) (Greer 1970:66-67). In particular, the upland settlement of Luluku contained the most extensive early wetland agricultural complex on O'ahu (Allen 1987:265). In post-Contact times through the early 1800s, Hawaiians continued extensive cultivation of taro (Handy and Handy 1972:271-272).<br><br>4. Several *heiau* were once located in the upland regions of Kāne'ohe Ahupua'a, including four surviving *heiau* in the vicinity of the Project area: Maunahuia Heiau was in ruins in the early 19th century (Thrum 1916); Puuwaniania, an agricultural *heiau*, is now covered mostly with *waiwī* (strawberry guava) trees just below the Pali Highway (Landgraf 1994:102); Kaluaolomana is another *heiau* located nearby (Landgraf 1994:104); and Kukuiokāne Heiau, which was thought to be destroyed during the pineapple plantation era (McAllister 1933:177), was later documented near the Luluku terrace system with the construction of the H-3 freeway (Neller 1989). In addition, Thrum (1916:90) listed Pule and Kuakala as two additional *heiau* at the base of the *pali* in Kāne'ohe Ahupua'a but their location is not specified.<br><br>5. On Mōkapu Peninsula over 500 sand *ilina* (burials) have been unearthed in the dunes (Sterling and Summers 1978:217). There is no documented evidence from archaeological surveys, historical records or oral traditions of *ilina* or *iwi kūpuna* (ancestral remains) within the Project area; however, |

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| | it is possible that undocumented burials exist within or near the Project area.<br>6. The most impressive *ala* (trail) in the *ahupua'a* of Kāne'ohe was the Pali Trail, which traversed the sheer cliff rocks of the Nu'uanu Pali to the base of the mountains near the Project area. Hawaiians used this steep path to transport taro, *poi* (pounded taro), potatoes, chickens, goats, and pigs between Honolulu to windward O'ahu (Thrum 1901:89). Another path, the Likeke Trail, runs along the base of the *pali* in Kāne'ohe Ahupua'a *mauka* of the Project area. Richard H. Davis of the Hawaiian Trail and Mountain Club recently rediscovered this *ala*, and it was named the Likeke Trail in honor of his Hawaiian name (Ball 2000:199).<br>7. The Battle of Nu'uanu took place in 1795 on the *nuku* (mountain pass) above the Project area. The battle is called Kaleleka'anae, which means "leaping *'anae*" (mullet), and refers to the way many O'ahu armies of Kalanikupule and some of their families chose to or were forced to jump to their deaths from the steep Nu'uanu Pali rather than accept defeat from the warriors of Kamehameha (James 2004). After the Battle of Nu'uanu, Kamehameha became the sole ruler of O'ahu, Moloka'i, Lāna'i, Hawai'i, and Maui (Kamakau 1992:172-173). His sons Liholiho and Kauikeaouli—Kamehameha II and Kamehameha III, respectively—inherited most of the land in Kāne'ohe Ahupua'a (Kamakau 1992).<br>8. Kamehameha III, in response to agricultural development in Kāne'ohe and other *ahupua'a* on windward O'ahu, secured funds in 1845 to make the old Pali Trail accessible to horses by paving the path with stones. In 1882, construction began to widen and reduce the grade of the road. The improved Pali Road opened in 1897 after workers found an estimated 800 skulls along with other bones at the bottom of the Pali near the Project area—the remains of the warriors defeated by Kamehameha in 1795 (The Island Call 1953). The road was maintained for 55 years until work began in 1952 to construct a new four-lane highway with two tunnels running under the site of the Battle of Nu'uanu (Devaney et al. 1982:172).<br>9. The middle 19th century brought great changes to Kāne'ohe Ahupua'a, including private and public land ownership laws during the Māhele (division of Hawaiian lands). The present Project area occupies land within the *'ili* (small land division) of Kaeleuli, which covers 509.5 acres. Historic maps and |

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| | documents indicate that half of this *'ili* was awarded to the government and half was given as a Māhele Award to an individual identified as "Haole" (foreigner) (Lyons 1876).<br>10. Successive eras of commercial rice and sugar cultivation, ranching, pineapple farming, and dairy farming transformed the land of Kāne'ohe Ahupua'a. In particular, ranching in the mid-19th century, which extended from the ocean to the *pali*, quickly caused environmental degradation and severely modified the landscape in the *mauka* regions (Devaney et al. 1982). Further, most of the pineapple lands in Kāne'ohe Ahupua'a during the early 1900s were located below the Nu'uanu Pali at and near the current Project area. Many archaeological sites were likely destroyed by pineapple field clearance during this time (Kelly 1987).<br>11. In 1918, a military reservation was built on Mōkapu Peninsula at Kāne'ohe Bay; Fort Hase was commissioned and was known as the Kuwaahoe Military Reservation. Now known as the Marine Corps Base Hawaii (MCBH), the base contributed to commercial and residential development in and around Kāne'ohe Ahupua'a. The Pali Training Camp was constructed during World War II, a regimental combat team training center covering 4,400 acres *mauka* of the Project area (U.S. Army Corps of Engineers 2005).<br>12. The construction of the Wilson Tunnel on the Likelike Highway and the expansion of the Pali Highway in the 1950s and 1960s allowed easier access from Honolulu through the Ko'olau mountains to windward communities, which further contributed to residential development in and around Kāne'ohe Ahupua'a.<br>13. During the late 1960s Hawai'i Loa College was constructed within the current Project area. The college was opened in the fall of 1971 and continued successfully until merging with Hawai'i Pacific University in 1992. |
| Results of Community Consultation | CSH attempted to contact 47 community members, government agency and community organization representatives, and individuals, including residents, cultural and lineal descendants, and cultural practitioners. Of the eighteen people that responded, four *kūpuna* (elders) and/or *kama'āina* (native born) participated in formal interviews for more in-depth contributions to the CIA. This community consultation indicates:<br>1. Community members associate the Project area and vicinity with several *wahi pana* and cultural properties in Kāne'ohe |

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| | Ahupua'a, including an area called Kekele renowned for the fragrance of its *hala* (probably *Pandanus tectorius*) blossoms, Maunahuia Heiau, Hi'ilaniwai waterfall, and several *pōhaku* along the Likeke Trail.<br><br>2. *Wahi pana* and *mo'olelo* of the area near the Project site reveal a strong connection to past traditions and a renewed salience of those traditions today. Mrs. Cypher shares a *mo'olelo* that captures the destruction of Chief Maunahuia's *heiau* following the collapse of the *kapu* (prohibition, special privilege) system just prior to the arrival of the missionaries in the 1820s. She maintains that *kāhuna* (priests) marked their consecrated grounds by planting mango trees around Maunahuia Heiau and other sacred sites throughout the Hawaiian Islands.<br><br>3. A sense of place in Kāne'ohe Ahupua'a is rooted in a network of trails, both contemporary and historic. In particular, Mrs. Cypher discusses the cultural significance of the Likeke Trail. Hiking to the start of the Likeke Trail from the Ko'olau Golf Course invokes a strong sense of history, as travelers first walk on a section of the old Pali Road that was constructed in 1919, then along a section of the traditional Pali Trail, and finally along a portion of the cobbled Pali Road that was assembled in 1845. Yet, walking on the Likeke Trail itself brings to mind an even deeper sense of history. At a clearing on the Likeke Trail, Mrs. Cypher points to the Nu'uanu Pali and describes the historic Battle of Nu'uanu that enabled Kamehameha to conquer O'ahu in 1795. From there she traces down the Nu'uanu Pali to the area where the remains of the defeated warriors were discovered, as well as the fragrant land of Kekele. Mrs. Cypher continues to point out several *wahi pana* and cultural properties along the trail, including Hi'ilaniwai waterfall, Maunahuia Heiau, and several *pōhaku*, including Pōhaku o Kāne.<br><br>4. A strong connection to ancestral land is based on lived experiences of the vast *lo'i kalo*. Mrs. Hewett describes the intense productivity of the taro fields in the nearby Haiku lands of He'eia Ahupua'a in the 1930s. Her family prepared taro in a variety of ways as their staple food, including steamed taro and taro hotcakes, and they sold *poi*. She recollects how the freshwater springs and rivers created a natural wetland region for taro production. Now, Mrs. Hewett and the Ko'olaupoko Hawaiian Civic Club are spearheading |

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| | an initiative to rebuild the vast *lo'i kalo*.<br>5. The Haiku lands of He'eia Ahupua'a and other *mauka* regions in Kāne'ohe Ahupua'a supported an abundance of papaya, banana, and bamboo, according to Mrs. Hewett. She also recounts that her family gathered plants for Hawaiian medicines and *māmaki* (probably *Pipturus albidus*) leaves for tea in the area.<br>6. The *kama'āina* of Kāne'ohe Ahupua'a also had access to the marine and freshwater resources of Kāne'ohe Bay. Mrs. Hewett reminisces about how her family fished and hunted for crabs in the waters of Kāne'ohe Bay, and, with access to He'eia Fishpond, caught and consumed *'ō'io* (ladyfish, bonefish; possibly *Albula vulpes*). She also recollects that the taro fields once maintained populations of *'ōpae* (freshwater shrimp, probably *Halocaridina* spp.), which she used to collect with the spine of a coconut palm.<br>7. The identity of the *kama'āina* of Kāne'ohe Ahupua'a is also influenced by the successive historic eras of pineapple cultivation, rice cultivation, and the dairy industry. Mr. Yim recalls that in the 1920s and 1930s about 100 families comprised the town of Kāne'ohe, which centered on pineapple farming. Several participants reflect on the influx of Portuguese, Chinese and Japanese dairy and vegetable farmers near the Project area following the collapse of the pineapple industry.<br>8. The respondents are not aware of any cultural or historic properties, including *ilina* or *iwi kūpuna*, within or adjacent to the current Project area. |
| Summary of Community Recommendations | Based on the community consultations, there is one major concern regarding potential adverse impacts on cultural, historic and natural resources, practices and beliefs as a result of the proposed HPU Master Plan Project:<br>1. **Ahupua'a Boundary Marker Project**. The Ko'olaupoko Hawaiian Civic Club is collaborating with the Kailua and Waimanalo Hawaiian Civic Clubs and the State of Hawai'i to complete an *ahupua'a* boundary marker project, which includes constructing stone markers and setting up signs at the boundaries of the 11 *ahupua'a* in windward O'ahu in the *moku* of Ko'olaupoko. According to Mrs. Cypher and Mrs. Hewett, the *ahupua'a* boundary between Kāne'ohe and Kailua includes the ridge behind the HPU campus in the Project area. |

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| | The Ko'olaupoko Hawaiian Civic Club is presently planning to build a stone *ahu* (altar) and an educational sign at Castle Junction—the intersection of the Pali and Kamehameha Highways—to mark this *ahupua'a* boundary. Mrs. Cypher and Mrs. Hewett are concerned about any future development on the ridge behind the HPU campus. They want the land to remain intact in order to preserve the landscape of the traditional *ahupua'a* boundary. |
| Overall Recommendations | Based on the information gathered from archival documents, archaeological research and community consultation detailed in the CIA report, CSH recommends the following measures to mitigate potentially adverse effects of the proposed Project on cultural, historic and natural resources, practices and beliefs:<br><br>1. Land-disturbing activities may uncover burials or other cultural resources. Should cultural or burial sites be identified during ground disturbance, all work should immediately cease and the appropriate agencies notified pursuant to applicable law.<br><br>2. Community members should be further consulted throughout the planning process, including the design and implementation of the proposed development. In particular, community members should be consulted so that the Project does not alter the natural and cultural landscape of the ridge behind the HPU campus, as this is part of the traditional *ahupua'a* boundary between Kāne'ohe and Kailua. Addressing their concerns will minimize the impact of the Project on the cultural practices and traditions of the *kama'āina* and *kūpuna* of Kāne'ohe Ahupua'a. |

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# Section 1 Introduction

## 1.1 Project Background

At the request of Group 70 International, Inc., Cultural Surveys Hawai'i, Inc. (CSH) conducted a Cultural Impact Assessment (CIA) of approximately 139.46 acres for the Hawai'i Pacific University Master Plan Project, Kāne'ohe Ahupua'a, Ko'olaupoko District, Island of O'ahu, TMK: [1] 4-5-035:010 (Figures 1-3). Strategic planning for the HPU Hawai'i Loa Campus expansion aims to accommodate current and anticipated enrollment growth. The conceptual five-year Master Plan proposes the following new facilities and improvements (Figure 4) that will make the campus more cohesive: A signalized intersection at the existing entry/exit from Kamehameha Highway (1A); the current soccer field relocated (2A) so that the space can be converted to a landscaped parking area with 400 parking spaces (2); the Paul and Vi Loo Performing Arts Center (3) and indoor recreational facilities (3B); a covered walkway flanking the parking lot for pedestrian access (4); the Academic Center II building (5); a pathway and bridge connecting the Academic Center II to the Cooke Academic Center (6); a new student center with a bookstore and café (7); new residential facilities to accommodate 400 on-campus student residents (8); and renovated food service facilities (9).

CSH conducted a literature review and field inspection for the Project area. The results of this archaeological study are presented in a companion report titled, *Archaeological Assessment for the Hawai'i Pacific University Master Plan Project, Kāne'ohe Ahupua'a, Ko'olaupoko District, Island of O'ahu, TMK: [1] 4-5-035:010* (Yucha and McDermott 2010) (see Section 5.4), which was accepted by the State Historic Preservation Division (SHPD) on January 21, 2010.

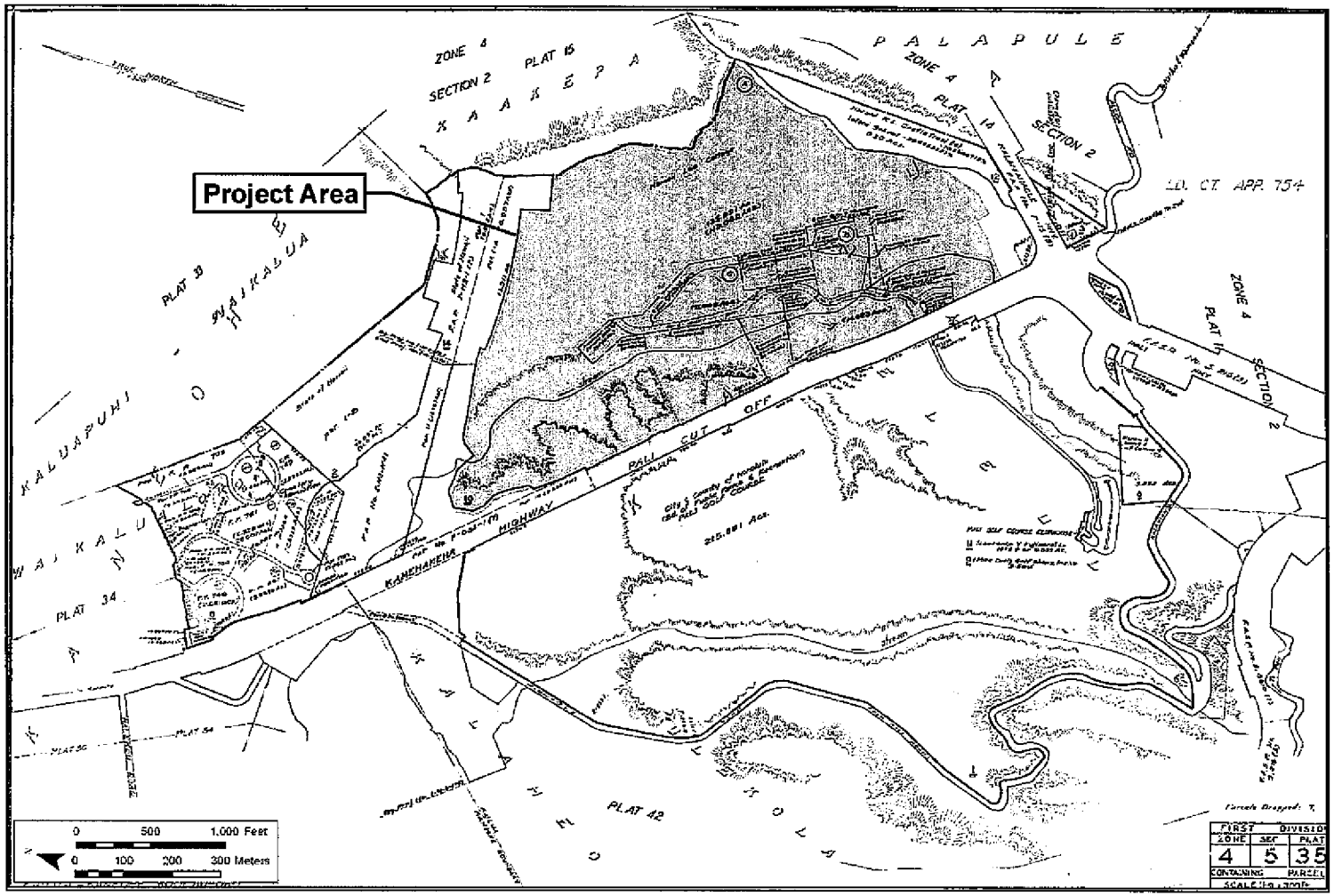



Figure 1. TMK: [1] 4-5-035:010 showing Project area (Hawai'i Tax Map Key Service 2009)

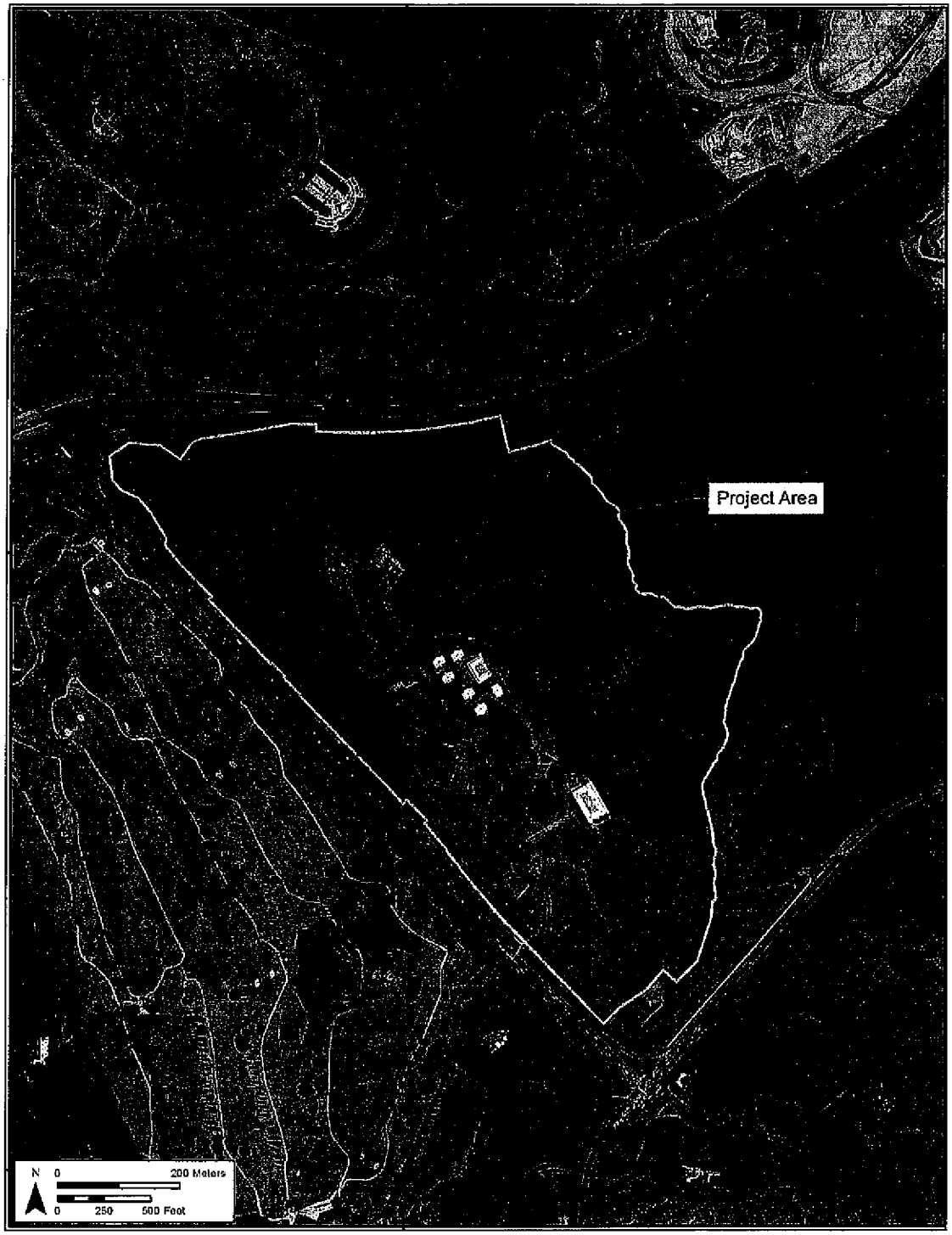



Figure 2. Portion of the orthoimagery of the 2005 Kāne'ohe U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle showing the Project area

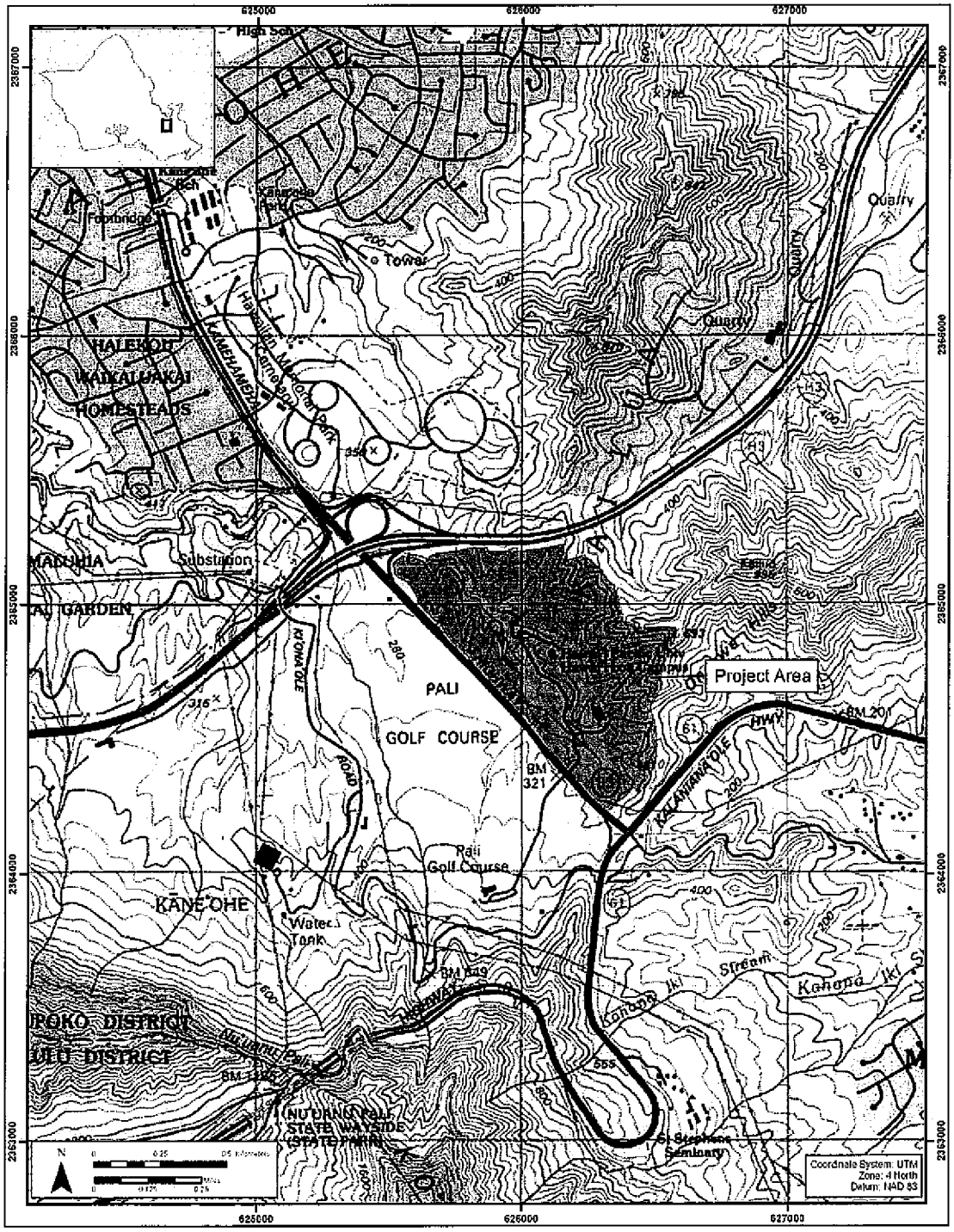



Figure 3. Portion of the 1998 Kāne'ohe USGS 7.5-minute topographic quadrangle showing the Project area

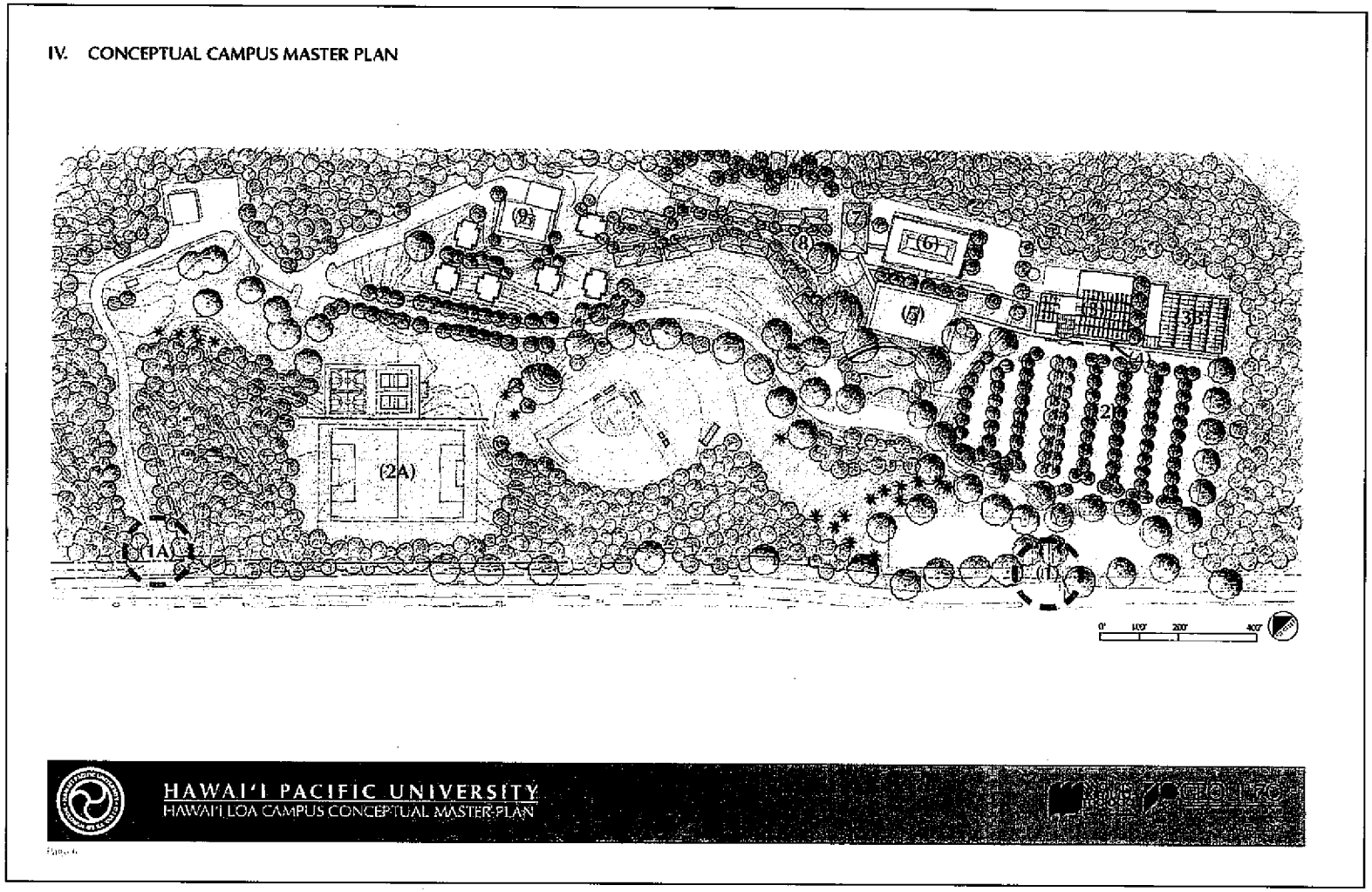



Figure 4. Conceptual Campus Master Plan (Group 70 International, Inc. 2009)

## 1.2 Document Purpose

The Project requires compliance with the State of Hawai'i environmental review process (Hawai'i Revised Statutes [HRS] Chapter 343), which requires consideration of a proposed Project's effect on cultural practices. CSH is conducting this CIA at the request of Group 70 International, Inc. Through document research and ongoing cultural consultation efforts, this report provides information pertinent to the assessment of the proposed Project's impacts to cultural practices and resources (per the *Office of Environmental Quality Control's Guidelines for Assessing Cultural Impacts*), which may include Traditional Cultural Properties (TCP) of ongoing cultural significance that may be eligible for inclusion on the State Register of Historic Places, in accordance with Hawai'i State Historic Preservation Statute (Chapter 6E) guidelines for significance criteria (HAR §13–284 under Criterion E) which states to be significant an historic property shall:

> Have an important value to the Native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group's history and cultural identity.

The document is intended to support the Project's environmental review and may also serve to support the Project's historic preservation review under HRS Chapter 6E and Hawai'i Administrative Rules Chapter 13–284.

## 1.3 Scope of Work

The scope of work for this CIA includes:

1. Examination of cultural and historical resources, including Land Commission documents, historic maps, and previous research reports, with the specific purpose of identifying traditional Hawaiian activities including gathering of plant, animal, and other resources or agricultural pursuits as may be indicated in the historic record.
2. Review of previous archaeological work at and near the subject parcel that may be relevant to reconstructions of traditional land use activities; and to the identification and description of cultural resources, practices, and beliefs associated with the parcel.
3. Consultation and interviews with knowledgeable parties regarding cultural and natural resources and practices at or near the parcel; present and past uses of the parcel; and/or other practices, uses, or traditions associated with the parcel and environs.
4. Preparation of a report that summarizes the results of these research activities and provides recommendations based on findings.

## 1.4 Environmental Setting

### 1.4.1 Natural Environment

The Project area is located within the windward O'ahu *moku* (district) of Ko'olaupoko, and is situated within the *ahupua'a* (land division extending from the uplands to the sea) of Kāne'ohe. Kāne'ohe is a large *ahupua'a* of approximately 11,000 acres, extending from the windward crest of the Ko'olau Mountains to include most of Mōkapu Peninsula and is bordered by the *ahupua'a* of He'eia to the west and Kailua to the east.

Soils within the Project area are primarily Kanē'ohe Silty Clay (KgB), 3-8% slopes; Kanē'ohe Silty Clay (KHOF), 30-65% slopes; Hanalei Silty Clay (HnA), 0-2% slopes; Alaeloa Silty Clay (ALF), 40-70% slopes; and Helemano Silty Clay (HLMG), 30-90% slopes (Foote et al. 1972) (Figure 5). Soils of the Kanē'ohe Series are described as "well-drained soils on terraces and alluvial fans on the windward side of O'ahu...developed in alluvium and colluvium derived from basic igneous rock" (Foote et al. 1972:59). Soils of the Hanalei Series are described as "somewhat poorly drained to poorly drained soils on bottom lands...developed in alluvium derived from basic igneous rock" (Foote et al. 1972:38). Soils of the Alaeloa Series are described as "well-drained soils on uplands...developed in material weathered from basic igneous rock" (Foote et al. 1972:26). Soils of the Helemano Series are described as, "well-drained soils on alluvial fans and colluvial slopes on the sides of gulches...developed in alluvium and colluviums derived from basic igneous rock" (Foote et al. 1972:40).

The Project area receives an average of approximately 1500 to 2000 mm (60 to 80 in) of annual rainfall (Giambelluca et al. 1986). Vegetation observed within the Project area primarily consists of the maintained and landscaped grounds of the campus surrounded by areas of dense growth consisting of bamboo, mango, Norfolk pine, cat's claw, guava, Java plum, *hau* (hibiscus), and octopus tree (Yucha and McDermott 2010).

### 1.4.2 Built Environment

The current Project area is largely developed with facilities associated with the Hawai'i Loa Campus of the Hawai'i Pacific University. Existing facilities within the Project area include the Amos Starr and Juliette Montague Cooke Memorial Academic Center (built in 1969), the Dining Commons (built in 1970), six residence halls (built in 1970), two modular office buildings, a maintenance building, and parking areas for approximately 500 vehicles (Group 70 International, Inc. 2009). Several large concrete culverts are located along the southwestern edge of the Project area along Kamehameha Highway, which were determined to be modern drainage improvement less than 50 years old (Yucha and McDermott 2010).

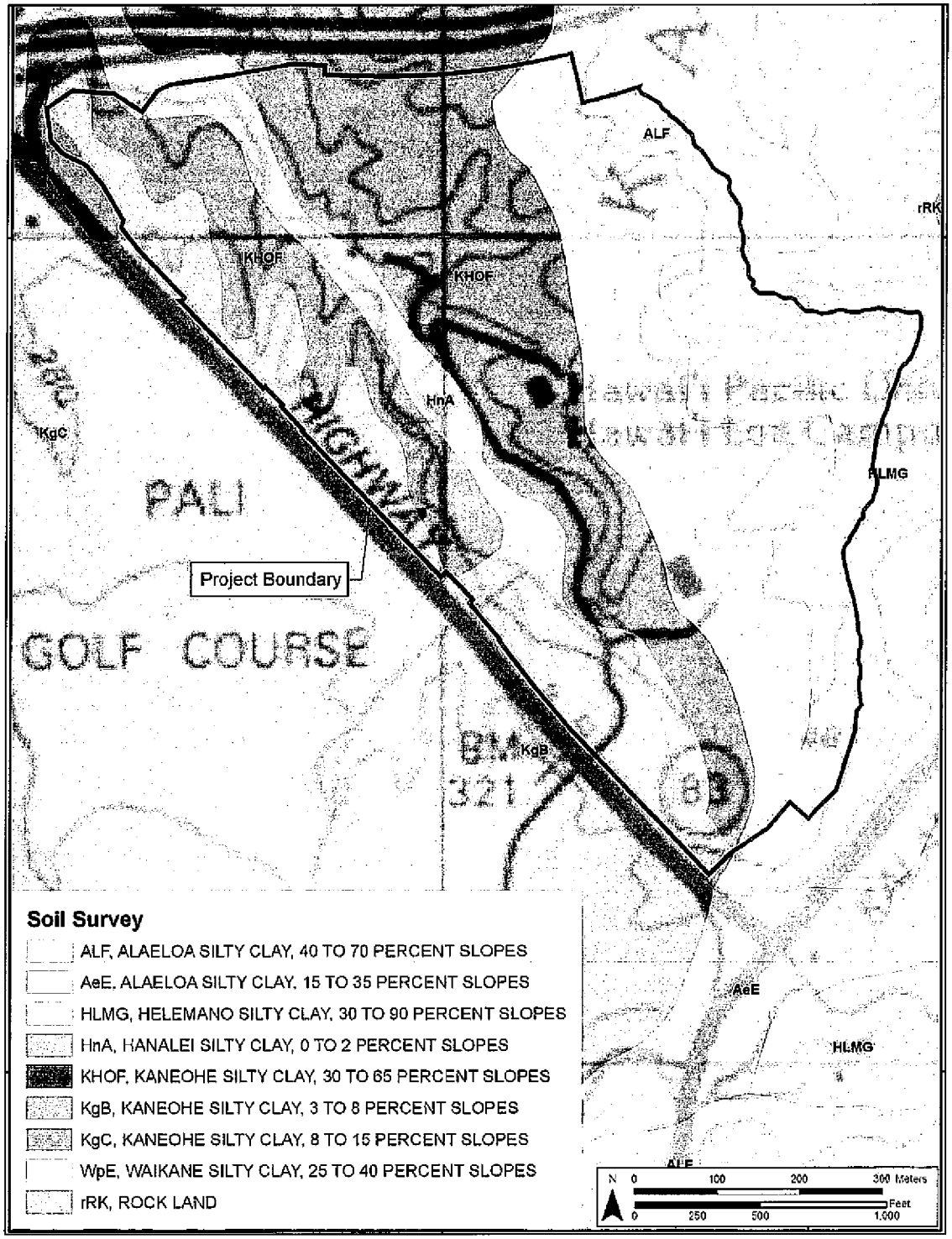



Figure 5. Portion of 1998 Kāne'ohe USGS 7.5-minute series topographic quadrangle showing the Project area with soil overlay (Foote el al. 1972)

# Section 2 Methods

## 2.1 Archival Research

Historical documents, maps and existing archaeological information pertaining to Kāne'ohe Ahupua'a were researched at the CSH library and other archives including the University of Hawai'i at Mānoa's 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 photographs and primary and secondary historical sources. Information on Land Commission Awards was accessed through Waihona 'Aina Corporation's Māhele Data Base (2000) as well as a selection of CSH library references.

For cultural studies, research for the Traditional Background section centered on Hawaiian activities including: religious and ceremonial knowledge and practices; traditional subsistence land use and settlement patterns; gathering practices and agricultural pursuits; as well as Hawaiian place names and *mo'olelo* (stories and oral histories), *mele* (songs), *oli* (chants), *'ōlelo no'eau* (proverbs) and more. For the Historic Background section research focuses on land transformation, development and population changes beginning in the early post–European Contact era to the present day (see Scope of Work above).

## 2.2 Community Consultation

### 2.2.1 Sampling and Recruitment

A combination of qualitative methods, including purposive, snowball, and expert (or judgment) sampling, were used to identify and invite potential participants to the study. These methods are used for intensive case studies, such as CIAs, to recruit people that are hard to identify, or are members of elite groups (Bernard 2006:190). Our purpose is not to establish a representative or random sample. It is to "identify specific groups of people who either possess characteristics or live in circumstances relevant to the social phenomenon being studied....This approach to sampling allows the researcher deliberately to include a wide range of types of informants and also to select key informants with access to important sources of knowledge" (Mays and Pope 1995:110).

We began with purposive sampling informed by referrals from known specialists and relevant agencies. For example, we contacted the State Historic Preservation Division (SHPD), Office of Hawaiian Affairs (OHA), O'ahu Island Burial Council (OIBC), and community and cultural organizations in Kāne'ohe for their brief response/review of the Project and to identify potentially knowledgeable individuals with cultural expertise and/or knowledge of the Project area and vicinity, cultural and lineal descendants of Kāne'ohe, and other appropriate community representatives and members. Based on their in–depth knowledge and experiences, these key respondents then referred CSH to additional potential participants who were added to the pool of invited participants. This is snowball sampling, a chain referral method that entails asking a few key individuals (including agency and organization representatives) to provide their comments and referrals to other locally recognized experts or stakeholders who would be likely candidates

for the study (Bernard 2006:192). CSH also employs expert or judgment sampling which involves assembling a group of people with recognized experience and expertise in a specific area (Bernard 2006:189–191). CSH maintains a database that draws on over two decades of established relationships with community consultants: cultural practitioners and specialists, community representatives and cultural and lineal descendants. The names of new potential contacts were also provided by colleagues at CSH and from the researchers' familiarity with people who live in or around the study area. Researchers often attend public forums (e.g., Neighborhood Board, Burial Council and Civic Club meetings) in (or near) the study area to scope for participants. Please refer to Table 2, Section 6, for a complete list of individuals and organizations contacted for this CIA.

CSH focuses on obtaining in–depth information with a high level of validity from a targeted group of relevant stakeholders and local experts. Our qualitative methods do not aim to survey an entire population or subgroup. A depth of understanding about complex issues cannot be gained through comprehensive surveying. Our qualitative methodologies do not include quantitative (statistical) analyses, yet they are recognized as rigorous and thorough. Bernard (2006:25) describes the qualitative methods as "a kind of measurement, an integral part of the complex whole that comprises scientific research." Depending on the size and complexity of the Project, CSH reports include in–depth contributions from about one–third of all participating respondents. Typically this means three to twelve interviews.

### 2.2.2 Informed Consent Protocol

An informed consent process was conducted as follows: (1) before beginning the interview the CSH researcher explained to the participant how the consent process works, the Project purpose, the intent of the study and how his/her information will be used; (2) the researcher gave him/her a copy of the Authorization and Release Form to read and sign (Appendix A); (3) if the person agreed to participate by way of signing the consent form *or* providing oral consent, the researcher started the interview; (4) the interviewee received a copy of the Authorization and Release Form for his/her records, while the original is stored at CSH; (5) after the interview was summarized at CSH (and possibly transcribed in full), the study participant was afforded an opportunity to review the interview notes (or transcription) and summary and to make any corrections, deletions or additions to the substance of their testimony/oral history interview; this was accomplished either via phone, post or email or through a follow–up visit with the participant; (6) the participant received the final approved interview and any photographs taken for the study for record. If the participant was interested in receiving a copy of the full transcript of the interview (if there is one as not all interviews are audio-recorded and transcribed), a copy was provided. Participants were also given information on how to view the report on the OEQC website and offered a hardcopy of the report once the report is a public document.

If an interviewee agreed to participate on the condition that his/her name is withheld, procedures are taken to maintain his/her confidentiality (see Protection of Sensitive Information below).

### 2.2.3 Interview Techniques

To assist in discussion of natural and cultural resources and cultural practices specific to the study area, CSH initiated semi–structured interviews (as described by Bernard 2006) asking questions from the following broad categories: gathering practices and *mauka* (upland, mountain) and *makai* (lowland, ocean) resources, burials, trails, historic properties and *wahi pana* (storied place/s). The interview protocol is tailored to the specific natural and cultural features of the landscape in the study area identified through archival research and community consultation. For example, for this study, fishing, gathering and agriculture were emphasized over other categories less salient to Project participants. These interviews and oral histories supplement and provide depth to consultations from government agencies and community organizations that may provide brief responses, reviews and/or referrals gathered via phone, email and occasionally face–to–face commentary.

#### 2.2.3.1 In–depth Interviews and Oral Histories

Interviews were conducted initially at a place of the study participant's choosing (usually at the participant's home or at a public meeting place) and/or—whenever feasible—during site visits to the Project area. Generally, CSH's preference is to interview a participant individually or in small groups (two–four); occasionally participants are interviewed in focus groups (six–eight). Following the consent protocol outlined above, interviews may be recorded on tape and in handwritten notes, and the participant photographed. The interview typically lasts one to four hours, and records the—who, what, when and where of the interview. In addition to questions outlined above, the interviewee is asked to provide biographical information (e.g., connection to the study area, genealogy, professional and volunteer affiliations, etc.).

#### 2.2.3.2 Field Interviews

Field interviews are conducted with individuals or in focus groups comprised of with *kūpuna* (elders) and *kama'āina* (native-born) who have a similar experience or background (e.g., the members of an area club, elders, fishermen, *hula* dancers) who are physically able and interested in visiting the Project area. In some cases, field visits are preceded with an off–site interview to gather basic biographical, affiliation and other information about the participant. Initially, CSH researchers usually visit the Project area to become familiar with the land and recognized (or potential) cultural places and historic properties in preparation for field interviews. All field activities are performed in a manner so as to minimize impact to the natural and cultural environment in the Project area. Where appropriate, Hawaiian protocol may be used before going on to the study area and may include the offering of *ho'okupu* (offering, gift), *pule* (prayer) and *oli* (chant). All participants on field visits are asked to respect the integrity of natural and cultural features of the landscape and not remove any cultural artifacts or other resources from the area.

### 2.2.4 Protection of Sensitive Information

It is sometimes the case that participants in cultural studies agree to contribute their comments or be interviewed for a study on the condition that their names are withheld from the report. Their reasons for doing so vary from concern about protecting the identity of resource collectors

and/or revealing the precise location of certain natural and cultural resources to opposition to the proposed project. For the interviewee who agrees to participate on the condition that his/her name is withheld from public disclosure, CSH takes all precautions to make sure his/her contribution remains confidential. The confidentiality of subjects is maintained via protected files. For this reason, CIA reports sometimes include a subsection of Summaries of Kama'āina Interviews entitled, Additional Statements.

## 2.3 Compensation and Contributions to Community

Many individuals and communities have generously worked with CSH over the years to identify and document the rich natural and cultural resources of these islands for cultural impact, ethno–historical and, more recently, Traditional Cultural Properties (TCP) studies. CSH makes every effort to provide some form of compensation to individuals and communities who contribute to cultural studies. This is done in a variety of ways: individual interview participants are compensated for their time in the form of a small honorarium and/or other *makana* (gift); community organization representatives (who may not be allowed to receive a gift) are asked if they would like a donation to a Hawaiian charter school or nonprofit of their choice to be made anonymously or in the name of the individual or organization participating in the study; contributors are provided their transcripts, interview summaries, photographs and—when possible—a copy of the CIA report; CSH is working to identify a public repository for all cultural studies that will allow easy access to current and past reports; CSH staff do volunteer work for community initiatives that serve to preserve and protect historic and cultural resources (for example in, Lāna'i and Kaho'olawe). Generally our goal is to provide educational opportunities to students through internships, share our knowledge of historic preservation and cultural resources and the State and Federal laws that guide the historic preservation process, and through involvement in an ongoing working group of public and private stakeholders collaborating to improve and strengthen the Chapter 343 environmental review process.

# Section 3 Traditional Background

## 3.1 Overview

Hawaiians recognize several land divisions in varying scales, including the *moku*, the *kalana* (smaller land division than a *moku*), the *ahupua'a*, and the *'ili* (smaller land divisions within an *ahupua'a*) (Malo 1951:16). S. K. Kuhano wrote in 1873 (cited in Kame'eleihiwa 1992:330) that O'ahu was divided into six *kalana* (although later scholars refer to these same divisions as *moku*)—Kona, 'Ewa, Wai'anae, Waialua, Ko'olau Loa and Ko'olau Poko—that were further divided into 86 *ahupua'a* (Figure 6). Within Ko'olaupoko, there were 11 *ahupua'a*, including Waimānalo, Kailua, Kāne'ohe, He'eia, Kahala'u, Waihe'e, Ka'alaea, Waiāhole, Waikāne, Hakipu'u, and Kualoa. Modern maps and land boundaries still generally follow this ancient system of land division.

The Project area lies at the base of the *pali* (cliffs) of the Ko'olau Mountains in Kāne'ohe Ahupua'a in southern Ko'olau Poko Moku (Figure 7). Numerous cultural properties are located within the *ahupua'a* of Kāne'ohe (Figure 8), including *wahi pana*, *ala* (trails), *heiau* (temples), *loko i'a* (fishponds), and *ilina* (burials). For clarity, the cultural properties within the *ahupua'a* of Kāne'ohe are bolded in the text of Section 3 and the locations of these cultural properties, if known, are shown in Figure 9.

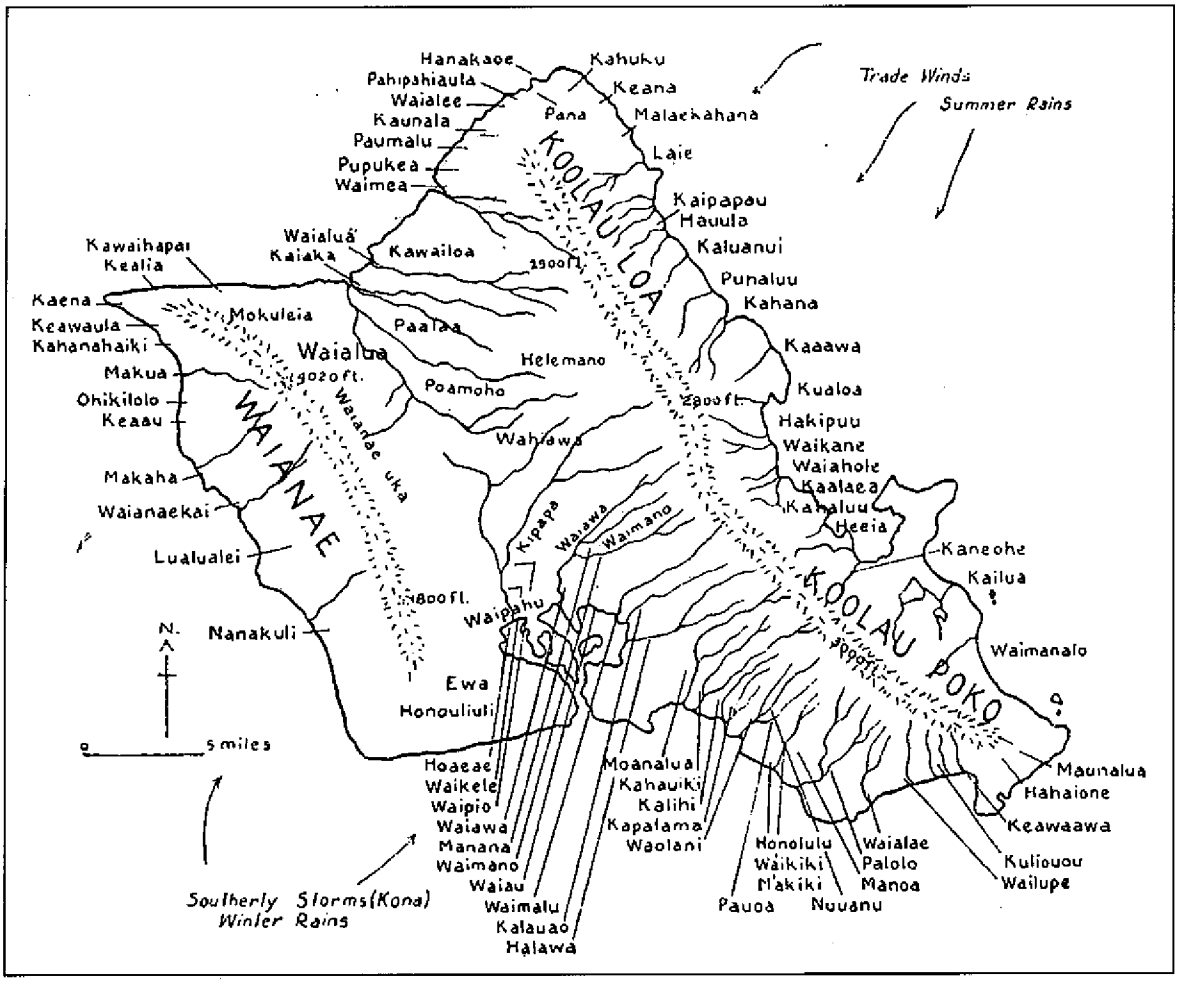



Figure 6. *Moku* and *ahupua'a* of O'ahu (Handy 1940:75)

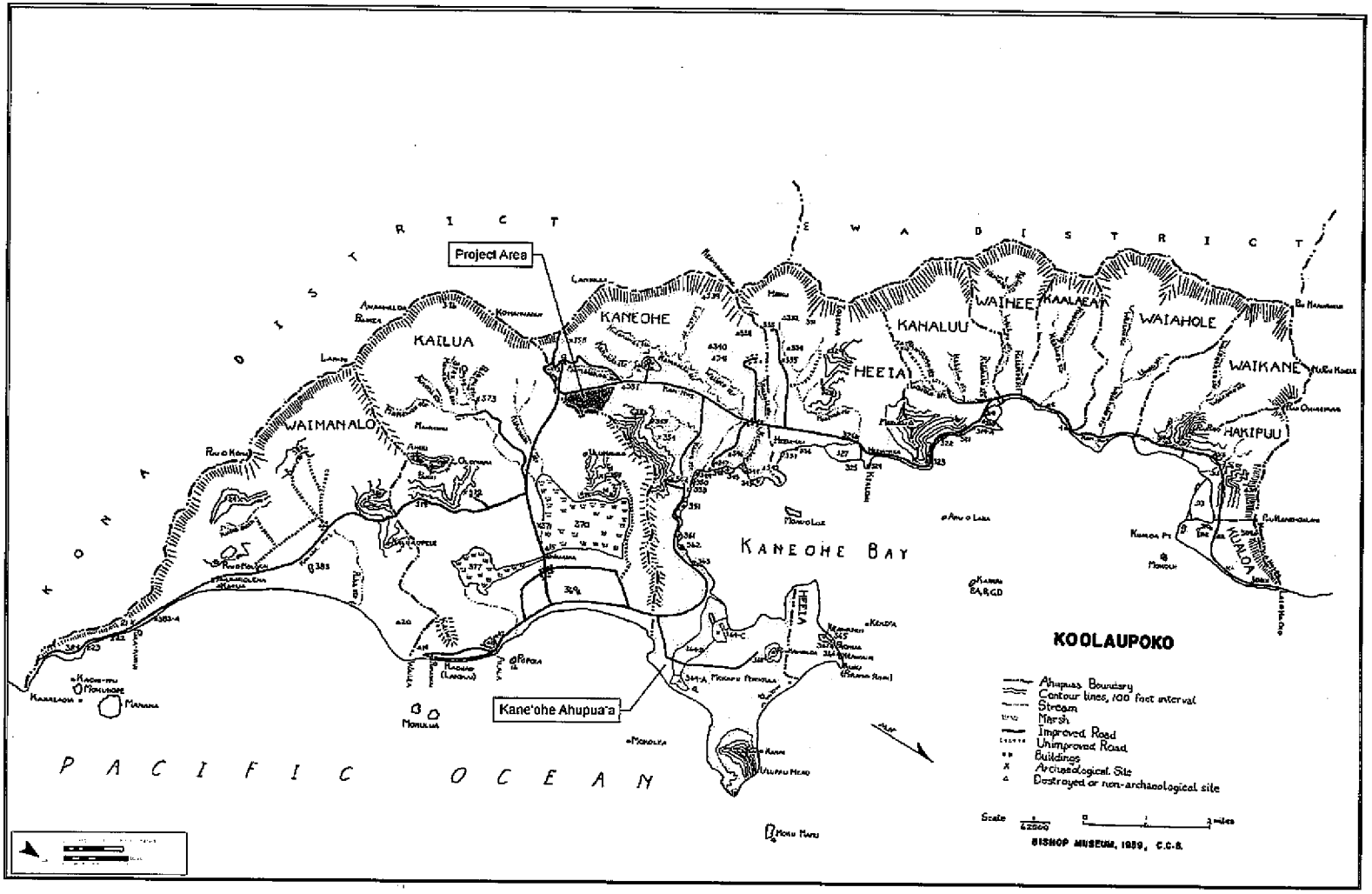



Figure 7. The *moku* of Ko'olau Poko, showing the *ahupua'a* of Kāne'ohe and Project area (Sterling and Summers 1978)

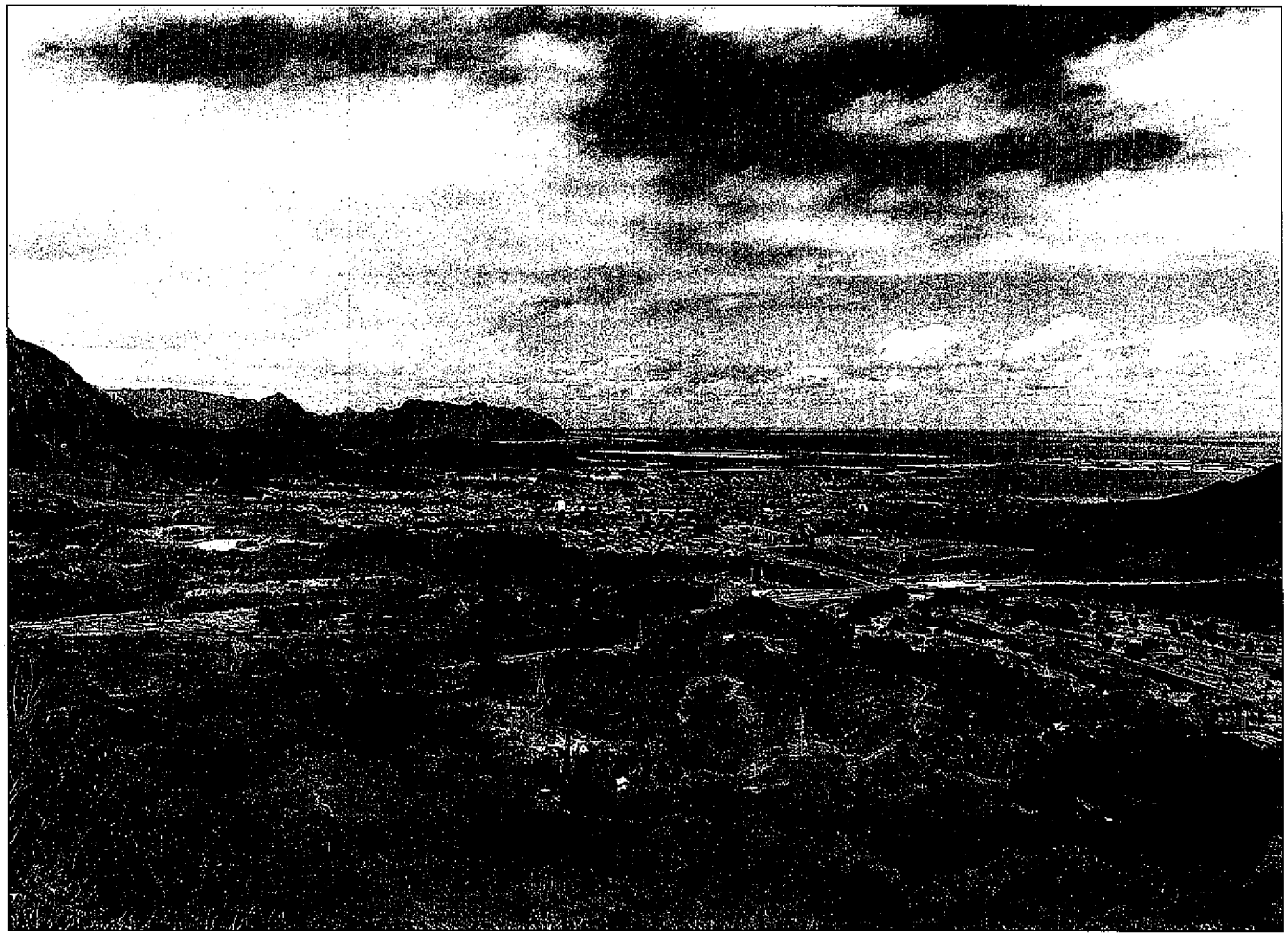
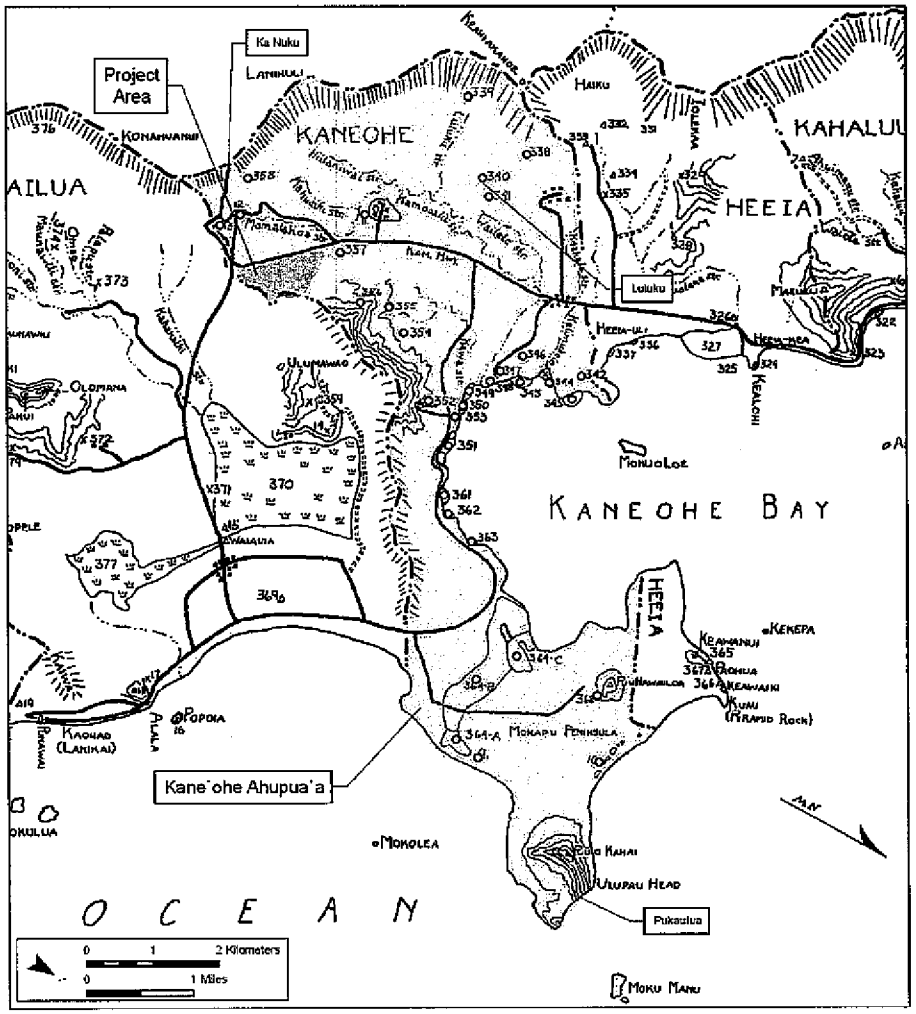


Figure 8. The *ahupua'a* of Kāne'ohe, view from Nu'uanu Pali toward Kāne'ohe Bay and the western section of Mōkapu Peninsula (Landgraf 1994:93)




- 9, Kapoho Salt Pans
- 10, Mokapu Sand Burials
- 11, Na Maka o Kane
- 12, Kekele
- 13, Puuwaniania Heiau or Kaluaolomana Heiau
- 338, Papuaa a Kane
- 339, Three Pana
- 340, Kukuiokane Heiau
- 341, Kumukumu Spring
- 342, Puupahu Heiau
- 343, Kalokohanahou Fishpond
- 344, Kanohuluiwi Fishpond
- 345, Punalu'u Fishpond
- 346, Ditch
- 347, Kalaoa Heiau
- 348, Naonealaa Heiau
- 349, Waikalua Loko Fishpond
- 350, Keana Fishpond
- 351, Mahinui, Kaluoa and Mikiola Fishponds
- 352, Anukini Heiau
- 353, Kinikailua-Manokaneohe Spring
- 354, Kawaewae Heiau
- 355, Holua Slide
- 356, Puumakani Heiau
- 357, Kamailiola
- 358, Maunahuia Heiau
- 361, Keaalau Fishpond
- 362, Hanalua Fishpond
- 363, Papaa Fishpond
- 364-A, Kaluapuhi Fishpond
- 364-B, Nuupia Fishpond
- 364-C, Halekou Fishpond
- 368, Spring

Figure 9. Cultural properties in the *ahupua'a* of Kāne'ohe (adapted from Sterling and Summers 1978); sites listed are from McAllister (1933)

## 3.2 Wahi Pana

A Hawaiian *wahi pana*, also referred to as a place name, "physically and poetically describes an area while revealing its historical or legendary significance" (Landgraf 1994:v). *Wahi pana* can refer to natural geographic locations, such as streams, peaks, rock formations, ridges, and offshore islands and reefs, or they can refer to Hawaiian divisions, such as the *ahupua'a* and *'ili*, and man-made structures, such as fishponds. In this way, the *wahi pana* of the *moku* of Ko'olaupoko, the entire *ahupua'a* of Kāne'ohe, and the specific Project area at the base of the towering *pali* (cliffs) tangibly link the *kama'āina* of Kāne'ohe to their past. All *wahi pana* meanings are cited from *Place Names of Hawaii* by Mary Kawena Pukui, Samuel Ebert, and Esther Mo'okini (Pukui et al. 1974) unless otherwise noted.

Ko'olau Poko, the traditional name for the *moku* of Kāne'ohe, translates literally as "the short windward" in contrast with the northern half of this coastline known as Ko'olau Loa, "the long windward." In view of the fact that the coastline of Ko'olau Poko, which contains the great valleys of Kāne'ohe Bay and Kailua, is longer than (or at least as long as) Ko'olau Loa, the reference to "the short windward" may reflect the distance from the sea to the great *pali* of the Ko'olau Mountains, which seem to loom directly over much of the district. In comparison, the "long windward" is generally a longer walk in most parts of Ko'olau Loa from the sea to the mountains.

The meaning of the *ahupua'a* of Kāne'ohe may come from *kāne* (man), which may be a reference to Kāne, the god of creation, and *'ohe* (bamboo). The word *kāne* has also been interpreted as "husband." The name has been attributed to a story about a woman who compared her husband's cruelty to the cutting edge of a bamboo knife (Clark 2002). Kāne'ohe may also be derived from *'ohe*, which is said to be one of the *kinolau* (body forms) of the god Kāne (Abbott 1992:15).

The mountainous section of the *ahupua'a* of Kāne'ohe contains many *wahi pana* connected to the stunning landscape of the *pali*, with towering *pu'u* (peaks) over the sheer cliff rock faces overlooking the upland forests. The beauty of the *pali* is captured in the following *'ōlelo no'eau*: "*Na pali hāuliuli o ke Ko'olau*," which means "The hills and cliffs of the windward side of O'ahu are always dark and beautiful with trees and shrubs" (Pukui 1983:249). This area at the base of the *pali*, which includes the Project area, is particularly rich in *wahi pana*.

**Pu'u Keahia Kahoe**, which literally means "the fire of Ka-hoe Hill," is the tallest *pu'u* on the mountain range above Kea'ahala overlooking the *ahupua'a* of Kāne'ohe (Figure 10). The name of the peak stems from the tension between two brothers, Kahoe and Pahu (see 3.3.2 for the *mo'olelo* of Keahiakahoe). The tears of their sister, Lo'e, formed a spring in front of the *pali* of Keahiakahoe called **Lo'e wai** (Bernice Pauahi Bishop Museum Library nd:2181, cited in Sterling and Summers 1978:206).

Beneath Pu'u Keahiakahoe are three *pana* (distinguished places)—**Hiilaniwai** ("cherished waters"), **Kahuaikia** ("the small fruit"), and **Mamalahoa** ("splintered paddle"). These three streams are considered the wives of Kāne with whom he would meet secretly at the waters' junction, called *Hookui a na keia o na wai a Kane* (McAllister 1933:177). McAllister located the streams near Pu'u Keahiakahoe while Handy and Handy (1972) situated them near Pu'u

Lanihuli. Hiilaniwai, which also means "carrying heavenly waters," emerges from a rocky precipice in the mountains of Kāne'ohe (Saturday Press 1883, cited in Sterling and Summers 1978:207). In a secluded dell near the base of the *pali* stood a stone altar of the same name as the stream Hiilaniwai, where a priest performed a ritual called Hui-Wai (Union of Water) for the dedication or offering of a child to a deity for a specific purpose (Parker ms:7, cited in Sterling and Summers 1978:207).

A battle between the gods of light and the gods of darkness for possession of springs with supernatural powers took place farther downstream of Hiilaniwai, and the scene was fenced off to become **Ka-Pa-Puaa** ("the pigpen") (Parker ms:7-8, cited in Sterling and Summers 1978:209). Just beneath Keahiakahoe was a pigpen of Kāne called **Papuaa a Kane** (McAllister 1933:177). A spring called **Kumukumu** was connected to the *heiau* Kukuiokāne at the base of the *pali* (McAllister 1933:177).

Several *wahi pana* are located close to the current Project area at the base of the Nu'uanu Pali. Immediately north of the Project area was a section of land known as **Kamaikola**, from where a man named Pakuanui would either ambush travelers descending the Pali Trail or kill an unsuspecting traveler with a *pōhaku puka* (trap door rock) suspended above the door to his house (McAllister 1933:181). *Mauka* of the Project area is a place abundant in *hala* called **Kekele** ("damp") that was fragrant with *hala* blossoms and bountiful in *hala* fruit for lei-making (Pualewa 1866, cited in Sterling and Summer 1978:221) (Figure 11). One *'ōlelo no'eau* captures the importance of this particular fragrance: "*Na hala o Kekele*," which translates as "The *hala* grove of Kekele" (Pukui 1983:242), while another *'ōlelo no'eau* attaches a different meaning to Kekele: "*Hopu hewa i ka 'āhui o Kekele*," which translates as "[One] grasps the pandanus cluster of Kekele by mistake," refers to a person who meets with disappointment (Pukui 1983:119).

Two other *wahi pana* are located *mauka* of the Project area. A hill at the base of the *pali* called **Na Maka o Kane** ("the Eyes of Kāne") resembled a human face in shape; below the smooth brow of a hill, a tapering Projection appeared as a nose, two slight depressions appeared as the hollow eye-pits on a human skull, and farther down other features highlighted the facial muscles (Parker ms:25-26, cited in Sterling and Summers 1978:220). **Ho'oleina'iwa**, or the "place where frigate birds leap," consists of over twenty large unusually weathered boulders resting on a hill in the *'ili* of Ho'oleina'iwa at the base of the mountains near the Project area (Landgraf 1994:106) (Figure 12). There is no written documentation on this culturally significant site, but the tee-off area for the Ko'olau Golf Course was moved to preserve these *pōhaku* that appear similar to the birthing stones of Kūkaniloko (Landgraf 1994:106).

The path of the old Pali Trail started at **Ka-hoo-waha-pōhaku**, where people would ascend the cliff to reach a spring called **Ka-wai-kilo-kanaka** ("the water for spying on people"), named after the clearness of the reflection of the person in that water (Kaaia 1874, cited in Sterling and Summers 1978:224). Another name for the spring is **Wai-aka** ("shadowy water"), or **Waikolokohe**, which stems from the reflection in the water of wind-blown *lehua 'āhihi* blossoms (Pooloa 1919, cited in Sterling and Summers 1978:224). From there one would climb to a rock called **Ka-ipu-o-Lono**, where a misplaced step would lead to one's fall and likely death (Kaaia 1874, cited in Sterling and Summers 1978:224). From there to the *nuku* (mountain pass) of Nu'uanu was a land section called **Ka-pili**, and past the *nuku* was a division of land called **Ka-holo-a-ke-ahole** (Kaaia 1874, cited in Sterling and Summers 1978:224). Along the way

toward the summit was a pool named **Ka-wai-kilo-kohe** (Na Anoai o Oahu nei 1930, cited in Sterling and Summers 1978:224), which literally means "the water for spying on vagina." **Ka Nuku** ("the mountain pass") at the Pali lookout (Landgraf 1994:98) (Figure 13) was also called Ka-pili, as *pili* (to join) refers to the adjoiing cliffs (Kaaia 1874, cited in Sterling and Summers 1978:224). Two famous stones, **Hapuu** and **Kalanaihauola**, sat at the top of the Nu'uanu Pali (Makaikeoe 1908, cited in Sterling and Summers 1978:224), to which travelers left offerings of flowers and fruit to ensure a safe journey over the *pali*. On the top of the northern peak of the Nu'uanu Pali is a **cave** to which the spirit of Pumaia flew (Fornander 1916-17:474). **Lanihuli** is the *pu'u* above the Nu'uanu Pali. The *'ōlelo no'eau "Kāwelu holu o Lanihuli,"* or "the swaying grass of Lanihulu," refers to the rippling in the strong breezes blowing over the *pali* (Pukui 1983:180) (Figure 14).

Farther *makai* toward Kāne'ohe Bay, a **ditch** once separated Punalu'u and Waikalua to contain the pigs of royalty (McAllister 1933:178). In addition, a small round hill with a long, narrow depression near Kāwa'ewa'e Heiau was the site of a ***hōlua*** (sled) course, which was destroyed for pineapple cultivation (McAllister 1933:181).

At the coast of Kāne'ohe Bay people from Kailua and Kāne'ohe once died in great numbers at a spring called **Kinikailua-Manokaneohe** (*kini* literally means 40,000 and *mano* literally means 4,000) (McAllister 1933:179). The *'ōlelo no'eau "Kini Kailua, mano Kāne'ohe,"* which translates as "forty thousand in Kailua, four thousand in Kāne'ohe," refers to either the number of people that would die by sorcery from a woman named Kawaiho'olana keen to avenge the murder of her son, or sorcery to destroy Kamehameha's enemies on O'ahu (Pukui 1983:193).

The west side of the peninsula of Mōkapu, or the "sacred island," belonged to the *ahupua'a* of He'eia, while the rest of the peninsula was part of the *ahupua'a* of Kāne'ohe. A spring named **Hawaiiloa** ("distant Hawai'i") once brought fresh water to the top of **Pu'u Hawaiiloa** (McAllister 1933:185), or the "distant Hawai'i hill." This crater is part of the *'ili* of Heleloa ("far travels") and a structure of terraces and walls appears to mark the *ahupua'a* boundary of Kāne'ohe and He'eia (Tuggle and Hommon 1986:57-58) (Figure 15).

The tallest peak on Mōkapu Peninsula is **Pu'u o Kaha'i** ("hill of Kaha'i"), named after the final resting place of a hero named Kaha'i from Maui (Oahu Place Names ms; cited in Sterling and Summers 1978:215). Pele's first landing place on O'ahu was nearby at the crater **Ulupau**, which literally means "increasing soot" due to a volcanic eruption and the fumes that followed (Fiddler 1956) (Figure 16). **Pukaulua**, which means "*ulua* (crevallem, jack and pompano fish) opening" is a ridge forming on one side of Ulupa'u crater with a cliff face known as Kahekili's Leap that was named after an *ali'i* who was an expert at *lele kawa* (diving into the sea from high cliffs) (Landgraf 1994:80) (Figure 17). **Waikulu**, which means "dripping water," was the old name for Ulupa'u and may refer to the water that rains down as the surf breaks against the coast (Landgraf 1994:84).

**Mokumanu**, or "bird island," is located off the peninsula of Mōkapu near Ulupa'u and is part of the *ahupua'a* of Kāne'ohe (Figure 18). Kūhaimoana, a shark god, once lived on the leeward side of Mokumanu (Landgraf 1994:82).

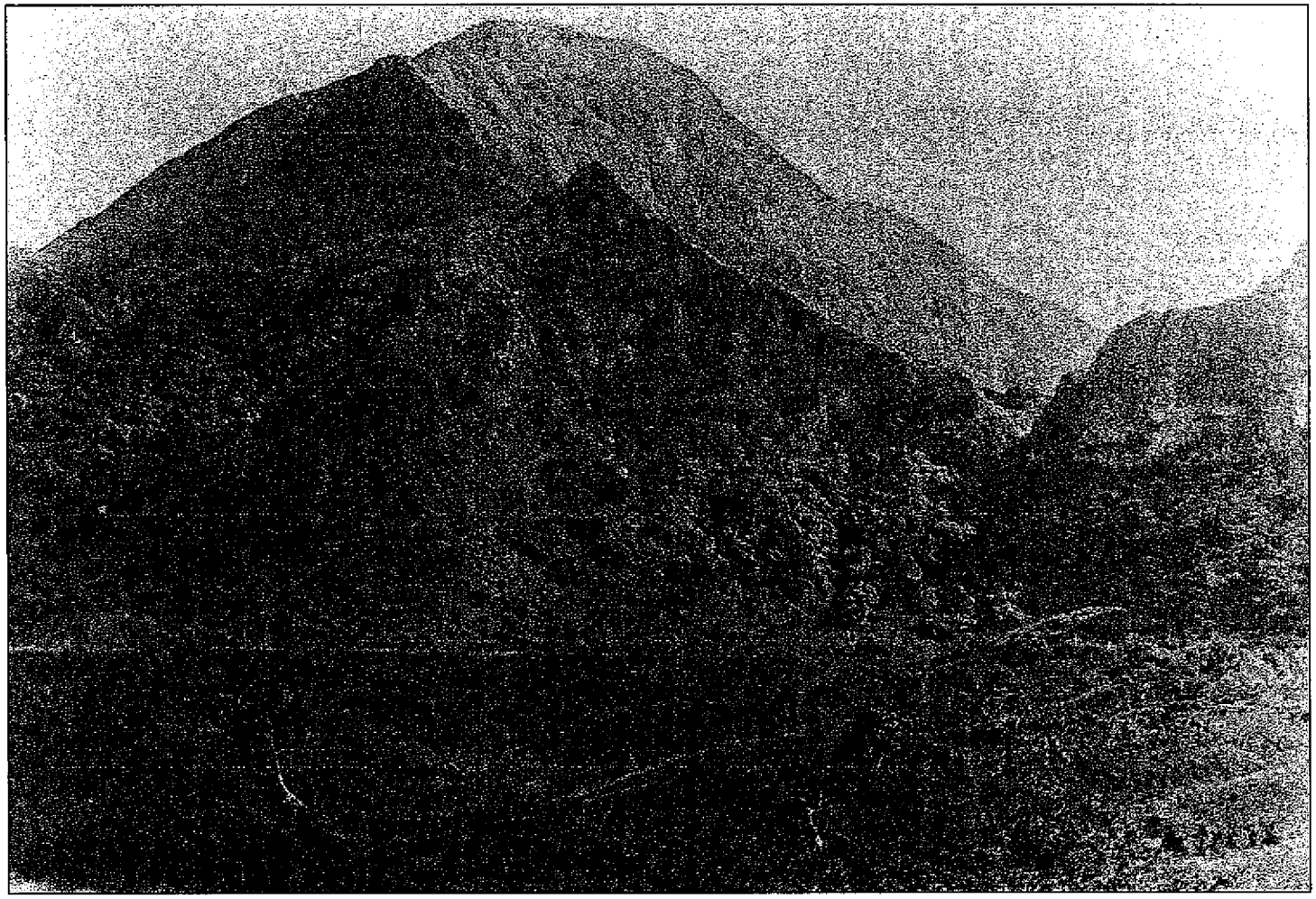


Figure 11. Kekele in the late 1880s with only a few *hala* trees left (Hawaii State Archives, in Devaney et al. 1982:234); the Project area is located approximately in the left foreground

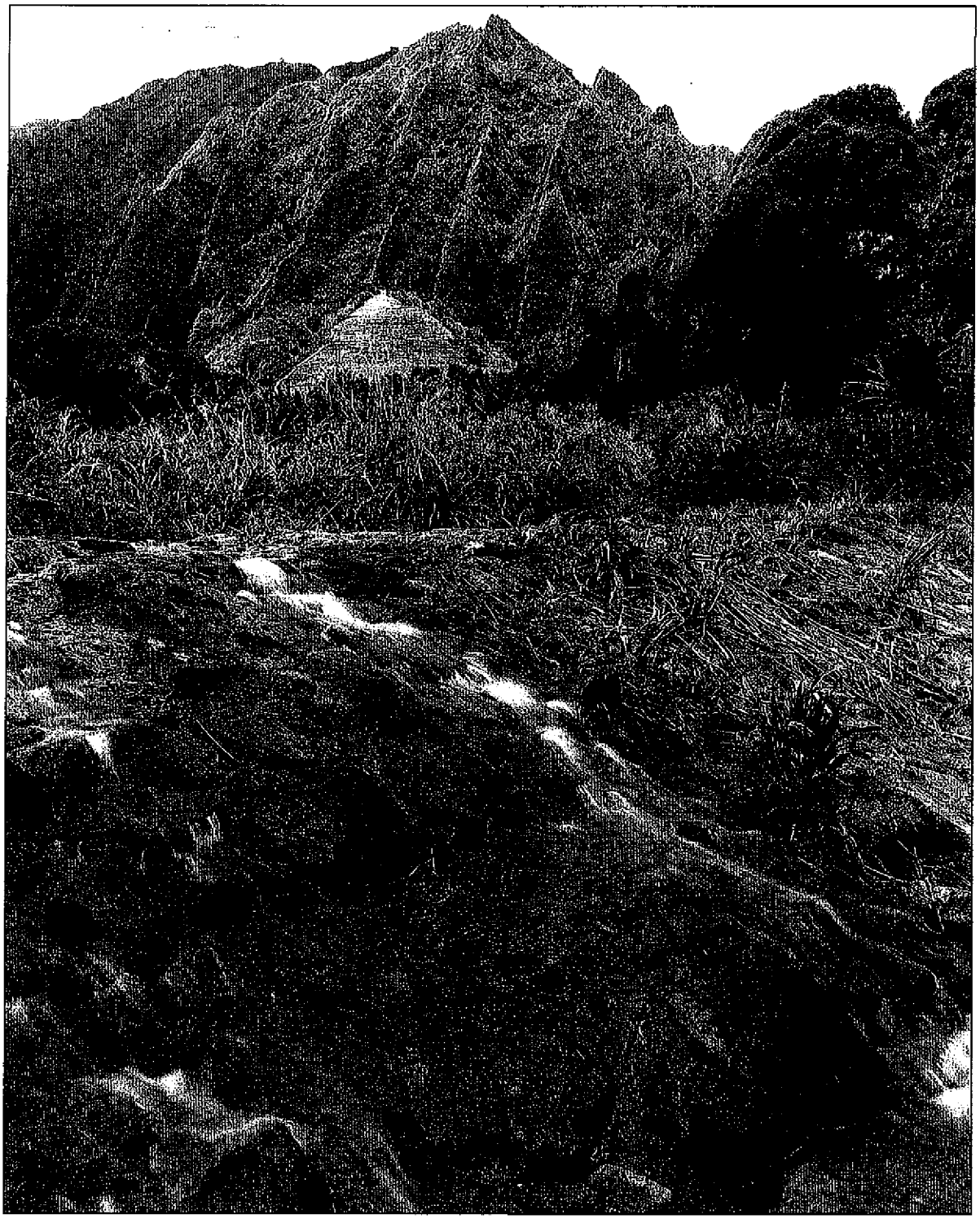


Figure 10. Keahiakahoe (Landgraf 1994:95)

Figure 12. Ho'oleina'iwa (Landgraf 1994:107)

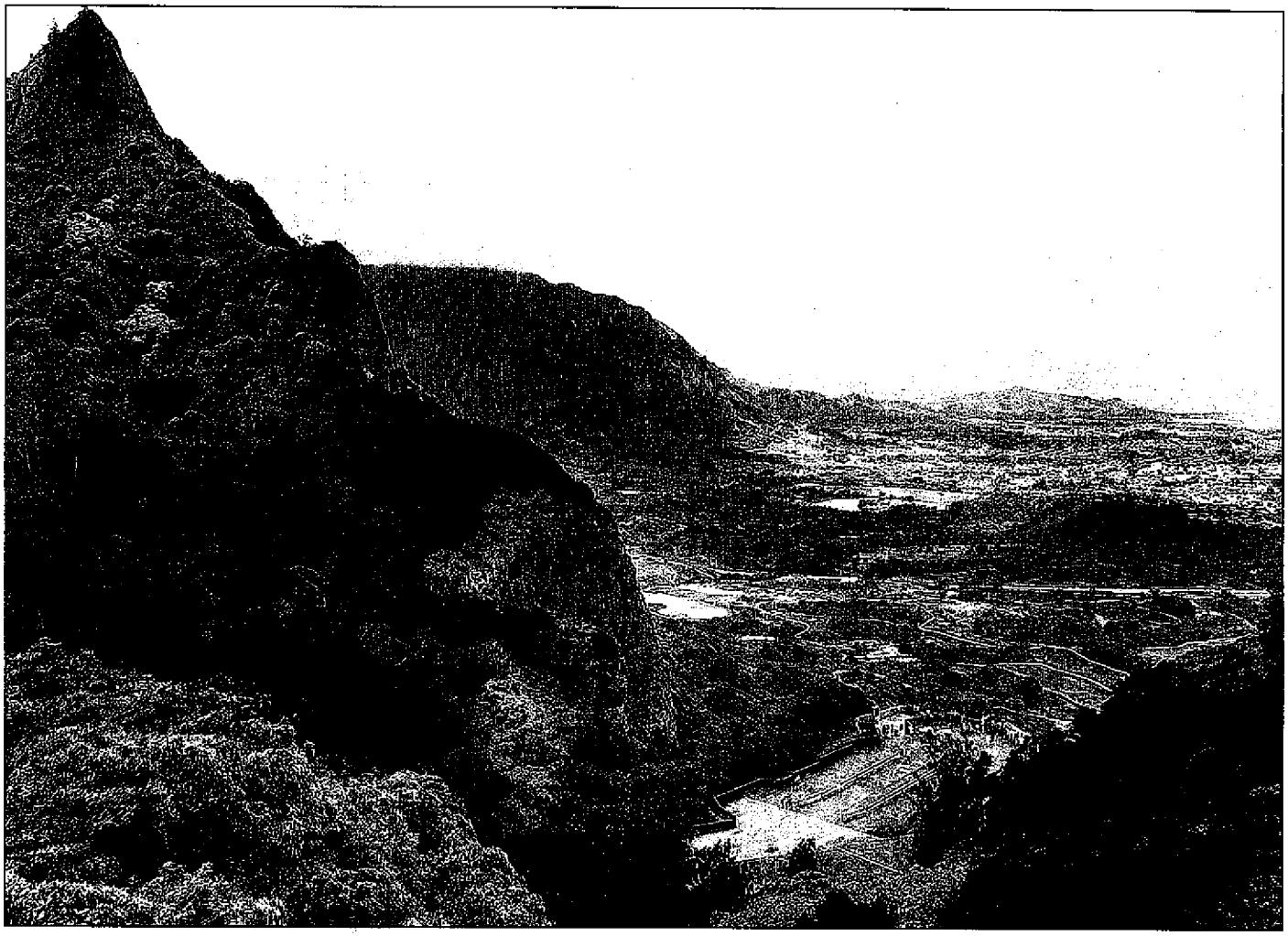


Figure 13. Ka Nuku (Landgraf 1994:99)

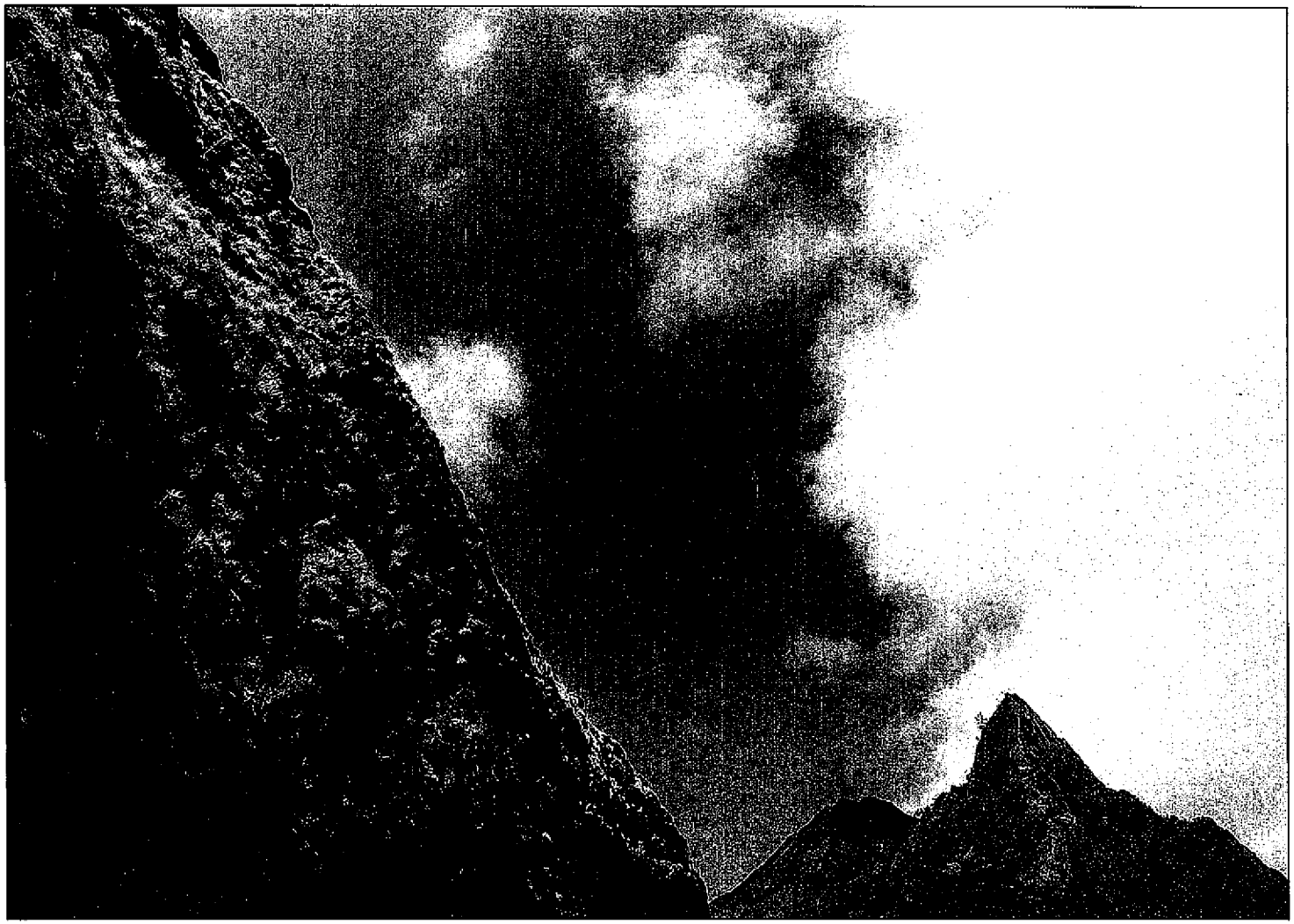


Figure 14. Lanihuli (Landgraf 1994:97)

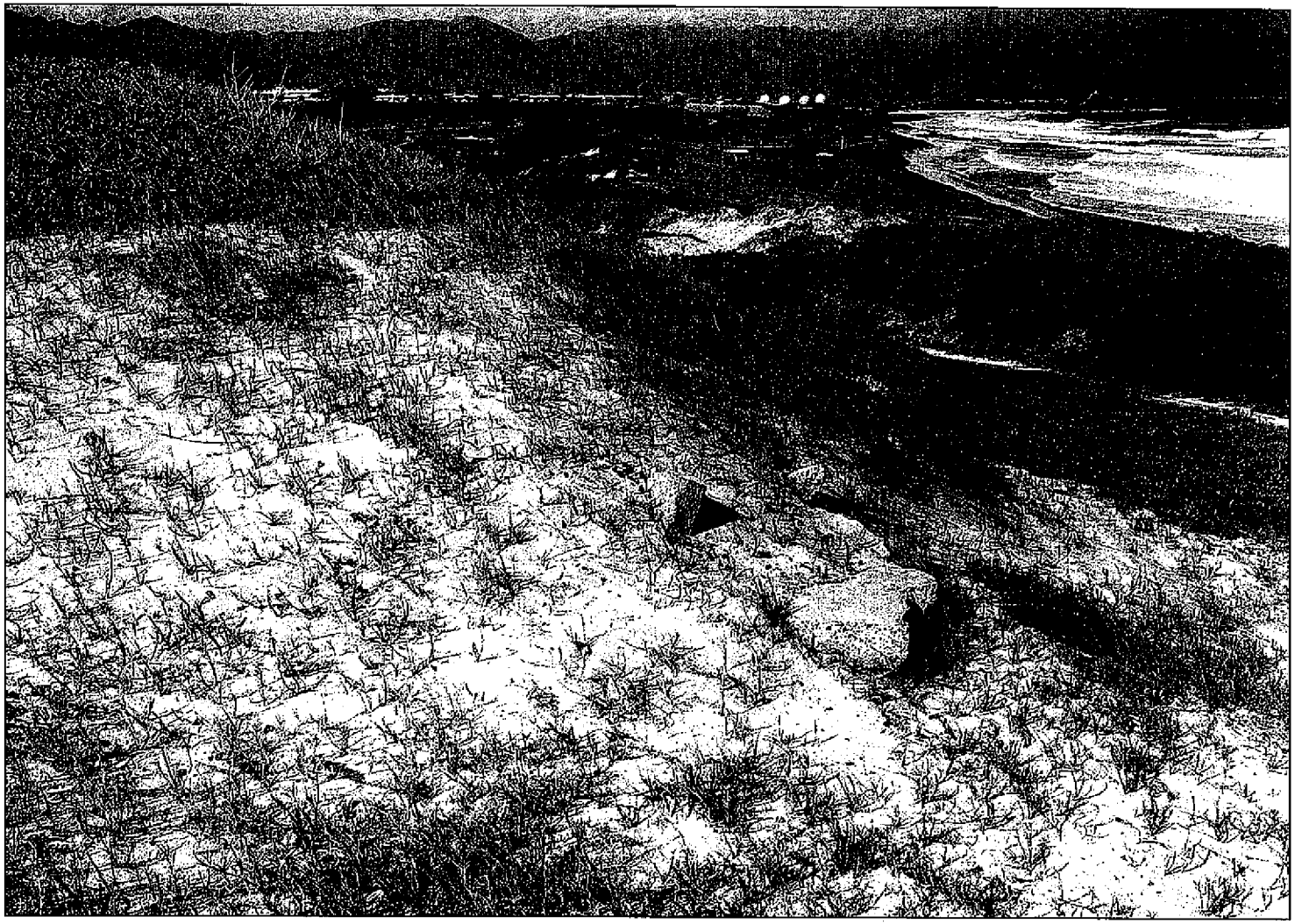


Figure 15. Heleloa (Landgraf 1994:77)

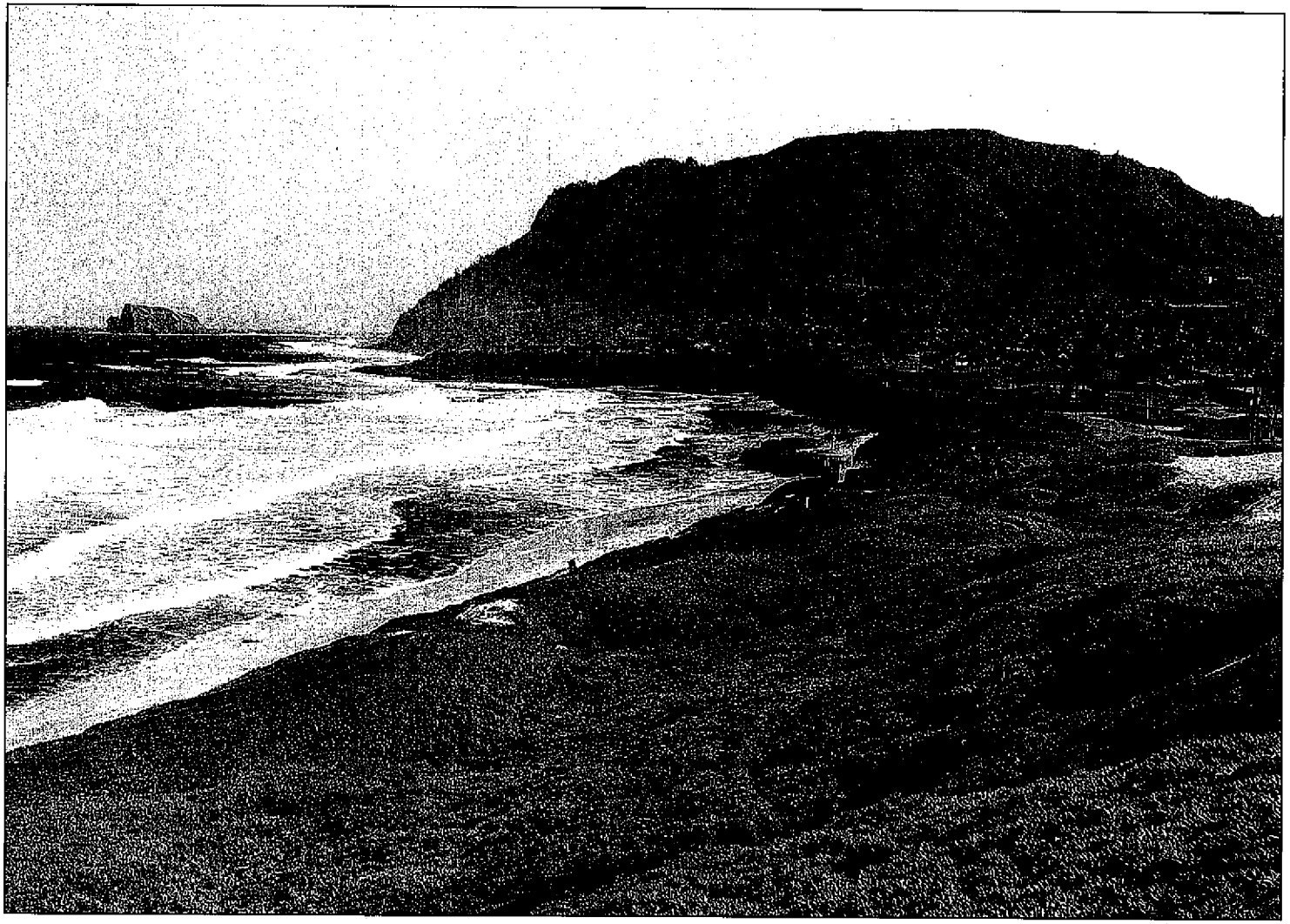


Figure 16. Ulupa'u (Landgraf 1994:79)

Figure 17. Pukaulua (Landgraf 1994:81)

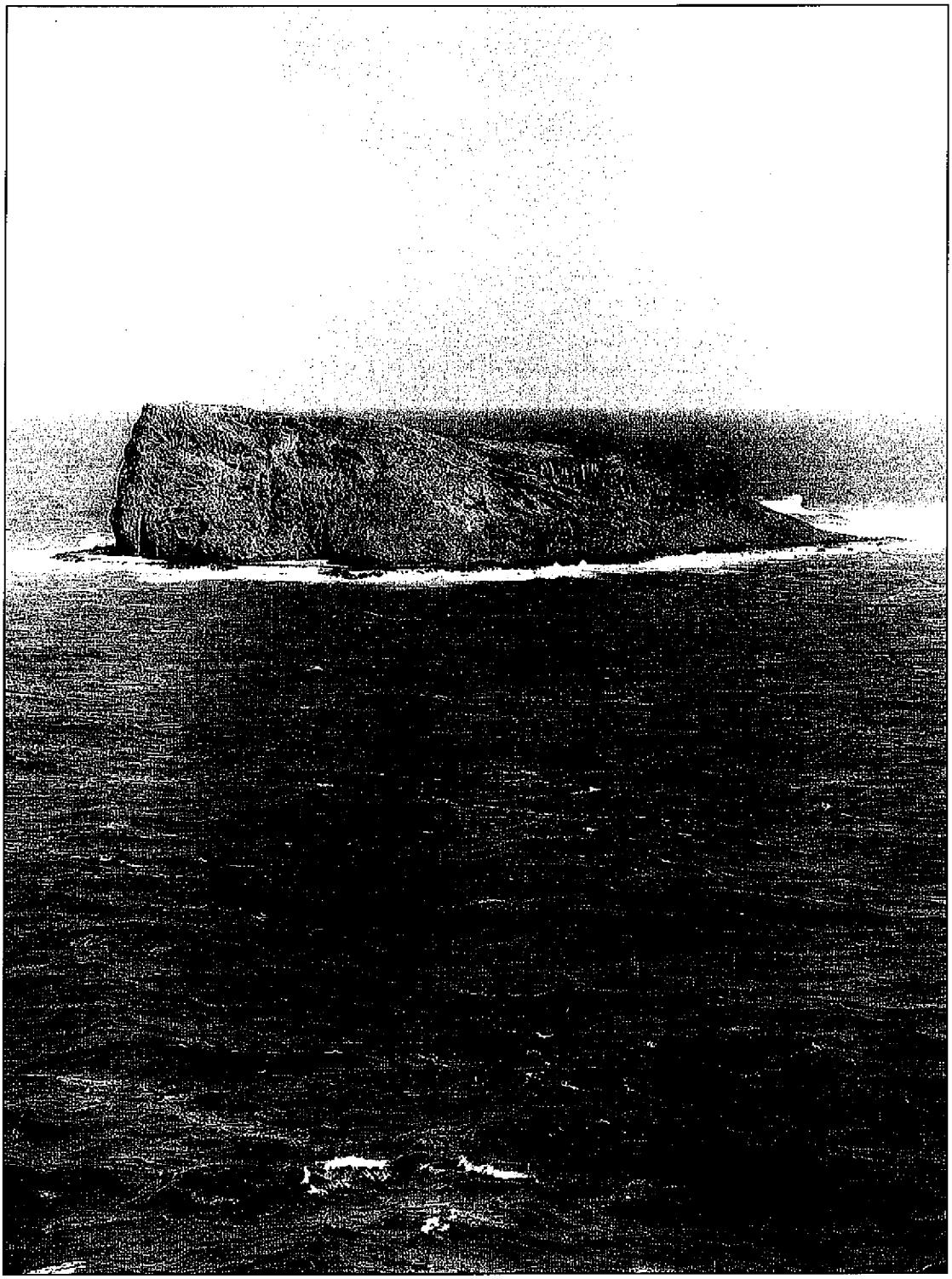


Figure 18. Mokumanu (Landgraf 1994:83)

## 3.3 Mo'olelo

### 3.3.1 Kāne'ohe

There are several *mo 'olelo* associated with Kāne'ohe Ahupua'a, including the following story of the origin of the name Kāne'ohe:

> In Kaneohe proper, the people learned a new use for the Ohe…In olden times anyone who did not conform to the way of life lived so industriously by the shore people, was called E-epa, or non-conformist. The E'epa were not actually "touched in the head", or lo-lo [crazy], but just different. They liked to wander off by themselves and dwell among the mysteries of the upland forests where they listened to the music of Nature, and often became poets or musicians.
>
> Those upland reaches, all unexplored territory and sacred to the Spirits or Akua of Nature, were referred to as the Wao [inland forest], or places of mystery. In order to keep children from wandering to the uplands, their elders told the little ones, "Do not go up there or the Bamboo Man may keep you. We would mourn your absence in loneliness. Remain at home and learn your useful duties."
>
> Hano-ihu…longed to explore. Pu'ili…longed to accompany her playmate, Hano-ihu, when he wandered far. But, being more timid, she contented herself during the boy's absences and kept his secret of those upland trips he enjoyed.
>
> One sad day, Hano-ihu did not return. The people searched and could find no trace of the disobedient boy. Finally, the villagers decided the boy had died, and they told the other children that the Bamboo Man had taken the boy-wanderer.
>
> Pu'ili…decided that he was not dead and she must search for him. Acting upon the thought, the little girl followed the direction often taken by the boy and was soon alone in the dark recesses of the forest lands of Wao, the Mysterious.
>
> She saw nothing to fear. Rather, she delighted in the beauty of the forests, the fragrance of the ferns and blossoms growing besides singing rills of sweet waters, and danced along happily to the whistling of the Wind Gods in the tree tops touching the blue sky far above.
>
> Soon she realized the whistling was not actually the Wind, for it had a bird-like note that repeated itself in a gentle rhythm. Also, she saw the bamboo moving in the breeze and heard how it rattled its branches. She found two lengths of a bamboo branch and, one in each hand, beat time on the two sticks while she followed the plaintive note calls.
>
> Before her…she saw her beloved playmate sitting on the bank. Beside him was a tall, thin man whose eyes watched the boy, while the child blew upon a bamboo

> length. The man's lean hands waved to the rhythm of the notes, and the girl went dancing toward the pair, keeping time with her pair of bamboo sticks.
>
> Hano-ihu and the tall man finished their melody, then praised the little Pu'ili for joining them....She sat with them and learned that the man was Kane'ohe, the Bamboo Man who, as a child, had followed the lure of Wao and had invented a bamboo flute. Kindly, the old man explained to the children how the art of creativity often is lost unless those inspired do follow the call. He told them, "Now we shall return to the village, for I have answered the call and you two little ones will be musicians like me. In honor of this occasion, I shall name the flute after you, my boy...we shall name the time-keeping sticks for her."
>
> Gaily, the three went down the forest trail of Wao the Inspiring. They were welcomed with feasting and joy. That is how we have the...Bamboo, instruments today. The Hano-ihu or Nose flute; and the Pu'ili, or notched Bamboo sticks; and the hula named for these gifts of Kane'ohe, the Bamboo Man. (Paki 1972:29-30)

### 3.3.2 Keahiakahoe

The *mo'olelo* of Keahiakahoe illuminates the entire landscape of Kāne'ohe Ahupua'a. Kahoe, a farmer in the mountains at Kea'ahala, always gave *poi* (pounded, cooked taro) to his coastal-dwelling brother, Pahu. Pahu, a fisherman living near the coast on Pu'u Pahu (Pahu Hill), however, regularly gave Kahoe merely his leftover bait fish. When Lo'e, their sister who lived on Moku o Lo'e, told Kahoe that his brother was a good fishermen, Kahoe realized Pahu's deceit. A few months later a shortage of fish forced the farmers in the mountains to cook at night for fear of drawing hungry fishermen from the shore during the daytime. However, the smoke from Kahoe's fire drifted far up a cliff before it could be seen, so he did not have to cook at night (Hawaiian Ethnological Notes ms., cited in Sterling and Summers 1978:206). One day Lo'e saw Pahu looking up toward the summit of the *pali* and stated "So, now all you can do is stand and look at Kahoe's fire [*Ke ahi a Kahoe*]" (Landgraf 1994:94).

### 3.3.3 Nāoneala'a

The legend of La'amaikahiki, "so named for his coming from Kahiki" (Kamakau 1867, cited in Sterling and Summers 1978:209-210), relates La'a's arrival on the north side of the mouth of Kāne'ohe Stream. La'a, a famous navigator, had traveled to Hawai'i and specifically to O'ahu because, "He heard Hawai'i was a fertile land ... with ... O'ahu the richest of all" (Kamakau 1867, cited in Sterling and Summers 1978:209).

> There was a man at Hanuma named Ha'ikamalama. When he heard sounds from the sea, he wondered what it was. It was the sound of the big and little drum, therefore he thumped the rhythm on his chest with the tips of his fingers. The sound seemed to come from the sea on the Koolau side, so he sailed to Makapu'u. He saw them going by on the ocean so he went by land until he saw the canoe heading toward Ka-waha-o-ka-Mano. He guessed that they were going to

> Kaneohe in Koolau-poko. When the canoe reached Wai hau palua, he ran to the shore, with his fingers beating the rhythm and he chanting the chant to Kupa.
>
> When La'a and the men on the canoe noticed this, they were astonished. He knew their names through their playing of the kaeke [drum]. La'a threw out some sand as a resting place for the canoes. This place is now called Na-one-a La'a (La'a's sands). It is in Kaneohe. (Kamakau 1867, cited in Sterling and Summers 1978:209-210)

La'a was accompanied on his voyage by forty paddlers: Kaikaikūpolō, his *kahuna* (priest); Luhaukapawa, his *kuhikuhi pu'uone* (diviner); Kūkeaomihamiha, his *kilo* (astronomer); Kupa, his *ho'oheihei pahu* (drummer); and Mā'ulamaihea, his *kāula* (prophet). La'a brought *hula* and temple drums that had been previously unknown to the islands, and it is said that he introduced hula. The drums and *hula* were components of a new religion with new gods and a priesthood that he brought from Kahiki. For a time, he settled at Nāoneala'a and Kualoa where he founded a chiefly class of rulers (Landgraf 1994:116, Silva 2005). Na-one-a-La'a, was "*tapu* to the commoner when *ali'i* lived there" (McAllister 1933:178). Thrum (1916:90) reports that the Naoneala'a Heiau once stood at Waikalua near the beach.

Kamakau referred to the general area as Wai-hau-palua; the place name was apparently shortened to Waikalua, or "water of the pit" (Landgraf 1994:116) over time. Kamakau also specifically refers to this area, with a slightly different spelling (Waihaupawa/Naonealaa) in his discussion of the invasion of O'ahu (ca. 1737) by the Hawai'i Island chief Alapai and his warriors. Alapai and his warriors maintained encampments at Kailua and Kāne'ohe, to ensure abundant food supplies. Kaua'i chief Peleioholani, who was encamped at Wai-hau-palua, met with Alapai at Nāoneala'a to settle the war.

> It was January 1737, that the two hosts met, splendidly dressed in cloaks of bird feathers and in helmet shaped head coverings beautifully decorated with feathers of birds ... both chiefs were attired in a way to inspire admiration and awe, and the day was one of rejoicing as that of the ending of a dreadful conflict. So it was that Peleioholani and Alapai met at Naonealaa Kāne'ohe. (Kamakau 1992:72)

### 3.3.4 Kamapua'a and the Kāwa'ewa'e Heiau

Windward O'ahu is famous for legends of Kamapua'a—the half man, half pig demigod renowned for making mischief and for his masterful escapes from retribution for his chicken and taro thievery. One *mo'olelo* centers on Kamapua'a and the Kāwa'ewa'e Heiau. Thrum (1907:48) reports that Kāwa'ewa'e Heiau was erected in the beginning of the 12th century by the high chief 'Olopana. Kāwa'ewa'e Heiau was said to have been constructed by *menehune* (legendary race of small people who built structures by night) (Fornander 1878:23). 'Olopana, depending on which story is being told, is said to have been the father or uncle of the notorious Kamapua'a. In the version of the story presented by King David Kalākaua (1990), Kamapua'a, embittered by 'Olopana's rejection of this hog-child, retreats to the mountains where he attracts a band of like-minded thieves and commences to "harass the estates of Olopana," stealing 'Olopana's pigs, fowls and fruits as well as taking pleasure in breaking his nets, cutting adrift his canoes and robbing his fish-ponds (Kalākaua 1990:143). Enraged by Kamapua'a's pillage and acts of

rebellion, 'Olopana orders his capture. After several battles and failed attempts to catch Kamapua'a, 'Olopana's army succeeds in delivering Kamapua'a to the high chief to the "great joy and relief of the people of Koolau" (Kalākaua 1990:145). Kalākaua relates the following:

> Olopana had erected a *heiau* at Kaneohe, Lonoaohi officiated as high priest, and thither he resolved to take his rebellious son or nephew, and offer him as a sacrifice to the gods. Hina [Kamapua'a's mother] pleaded for the life of Kamapuaa, but Olopana could not be moved. Satisfied that he would listen to no appeals for mercy, she determined to save her son, even at the sacrifice of her husband, and to that end secured the assistance of the high priest, through whose treachery to Olopana the life of Kamapuaa was saved.
>
> On the day fixed for the sacrifice Kamapuaa...was taken to the *heiau*, followed by Olopana, who was anxious to witness the ghastly ceremonies, and with his own eyes see that his troublesome enemy was duly slain and his body laid upon the altar. In offering human sacrifices the victim was taken without the walls of the *heiau* and slain with clubs by the assistants of the high-priest. The body was then brought in and placed upon the altar in front of the entrance to the inner court, or sanctuary, when the left eye was removed by the officiating priest, and handed...to the chief who had ordered the sacrifice....
>
> Standing with three or four attendants...Olopana saw his victim preliminarily led to the place of sacrifice, and a few minutes after motioned for the ceremonies to begin. Kamapuaa was taken without the walls of the temple to be slain....Passing beyond the outer wall the party entered a small walled enclosure adjoining, and the executioner raised his club and brought it down upon the head of his victim. Kamapuaa smiled, but did not move. Twice, thrice with mighty sweep the club descended upon the head of Kamaupuaa, but scarcely bent the bristly hairs upon his crown.
>
> With a semblance of wonder the executioner, whose tender blows would have scarcely maimed a mouse, dropped his club and said:
>
> "Three times have I tried and failed to slay him! The gods refuse the sacrifice!"
>
> "It is so, it is so, it is so!" chimed his companions....
>
> Therefore, instead of slaying Kamapuaa, the assistants, as they had been secretly instructed to do by the high-priest, removed the cords from his limbs, smeared his hair, face and body with the fresh blood of a fowl, and on their shoulders bore him back and placed him upon the altar as if dead.
>
> The high-priest approached the apparently lifeless body, and bent for a moment over the face, as if to remove the left eye; then placing on a wooden tray the eye of a large hog, which had been procured for that purpose, he sent an assistant with it to Olopana, at the same time retiring within the inner court, and leaving by the

> side of Kamapuaa, and near his right hand, as if by accident, the sharp ivory *pahoa*, or dagger, with which he had, to all appearance, been operating.
>
> Giving but a single glance at the eye presented to him by the assistant of the high-priest, Olopana passed it to an attendant without the customary semblance of eating it, and approached the altar alone. Kamapuaa did not breathe. His face was streaked with blood, his eyelids were closed, and not a single muscle moved to indicate life.
>
> Olopana looked at the hated face for a moment, and then turned to leave the *heiau*....As he did so Kamapuaa clutched the dagger besides his hand, and, springing from the altar, drove the blade into the back of Olopana. Again and again he applied the weapon until the chief, with a groan of anguish, fell dead at the feet of his slayer. (Kalākaua 1990:145-146)

Kalākaua goes on to describe how Kamapua'a is released from custody by the high-priest, and how as the people of the district had "suffered through his plundering visitations, and hundreds of lives had been sacrificed in his pursuit and final capture, the people rose almost in a body to hunt him down and destroy him" (Kalākaua 1990:147). Kamapua'a and his cohorts eventually sailed away from O'ahu for the Windward Islands in search of refuge.

## 3.4 Subsistence and Settlement

Archaeological investigations and historic documents suggest that the *ahupua'a* of Kāne'ohe was prosperous, productive and heavily populated in pre-Contact times. With fresh water from *mauka* springs and streams and a well-developed fishpond system, Kāne'ohe was a center for agriculture and aquaculture, making it one of the primary population centers on O'ahu (Devaney et al. 1982:6).

Pre-Contact land use in the *ahupua'a* of Kāne'ohe consisted primarily of plantations of taro, bananas, sweet potatoes and coconut trees, as well as groves of *hala* (pandanus) and *wauke* (paper mulberry) (Handy and Handy 1972:456; Portlock 1789:4). Handy and Handy (1972:456) note that "the lowland *lo'i* areas were so extensive that evidently the more laborious terracing of the interior slopes was not regarded by the early Hawaiians as necessary." This complicated taro terrace system included taro patches that ranged in size from forty square feet, which could feed one person for an entire year, to two or three acres (Handy and Handy 1972:455-456).

A prehistoric inland settlement within the upland *'ili* of **Luluku** in Kāne'ohe, which literally means "destruction," contained the most extensive early wetland agricultural complex on O'ahu (Allen 1987:265) (Figure 19). This archaeological site contains irrigated terraces radiocarbon dated to A.D. 500, and the stratigraphic sequence reflects a long period of continued use (Allen 1987:265). The lower agricultural terraces of the terraced complex were destroyed in 1991 for the construction of the H-3 freeway, while a main portion of the site is encircled by the freeway's on and off ramps (Landgraf 1994:108). Luluku is located fifty yards below Kukuiokāne Heiau (Allen 1987:265).

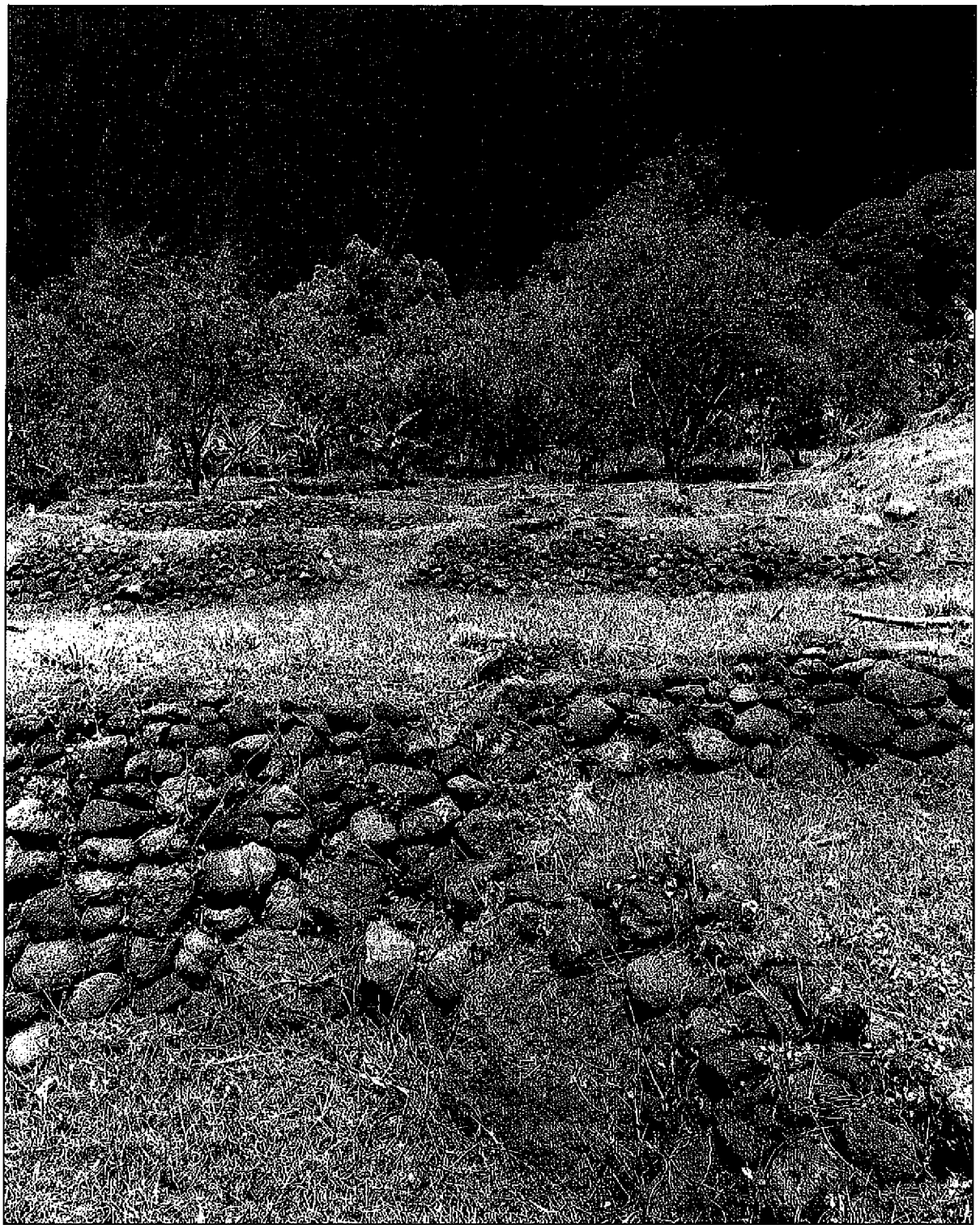


Figure 19. Luluku (Landgraf 1994:108)

## 3.5 Heiau

Several *heiau* were documented in Kāne'ohe Ahupua'a in the early 20th century. Several of these are located in the mountainous regions of Kāne'ohe near the Project area. **Maunahuia Heiau** within Wakaluawaho was in ruins at the foot of the *pali* (Thrum 1916). This could be an unnamed *heiau* listed by McAllister (1933:182). According to William Kalani, this site at the base of the *pali* appears to have been a *heiau* with three large paved terraces with a stone-lined depression facing the pali, most likely an *imu* (earth oven) (McAllister 1933:182).

Near the base of the *pali* a large platform, **Kukuiokāne Heiau**, was supposedly destroyed during the pineapple plantation era (McAllister 1933:177), but it was rediscovered with the construction of the H-3 freeway (Neller 1989). Kukuiokāne, or the "light of Kāne, was the largest agricultural *heiau* in Kāne'ohe, spanning a distance of one hundred and ninety meters and containing several terraces (Landgraf 1994:110) (Figure 20). This *heiau* is located fifty yards above the Luluku dryland agricultural terrace system (Landgraf 1994:110).

Another temple on the windward slopes of the *pali* on the ridge Pu'uwāni'ani'a, or the "hill of maligning talk," (Landgraf 1994:102) above the depression Kaluaolomana is a *heiau* named **Pu'uwāni'ani'a** (Thrum 1916). This agricultural *heiau*, now covered mostly with *waiwī* (strawberry guava) trees just below the Pali Highway, consists of two large eroded stones surrounded by a low wall (Landgraf 1994:102) (Figure 21). **Kaluaolomana** is another *heiau* on the ridge of Pu'uwāni'ani'a (Landgraf 1994:104) (Figure 22), although Thrum (1916) listed Kaluaolomana as another name for Puuwaniania Heiau. In addition, Thrum (1916:90) listed **Pule** and **Kuakala** as two additional *heiau* near the *pali*.

Between the mountains and Kāne'ohe Bay along the ridge dividing the *ahupua'a* of Kāne'ohe and Kailua is **Kāwa'ewa'e Heiau** (Figure 23). Kāwa'ewa'e is one of five *heiau* erected by 'Olopana in the 12th century (McAllister 1933:179). 'Olopana plotted to sacrifice the pig demigod Kamapua'a at Kāwa'ewa'e, which means "coral or stone used to rub off pig bristles," (Landgraf 1994:112) but instead Kamapua'a killed 'Olopana (Thrum 1916:90) (see Section 3.3.4 for the *mo'olelo* of Kamapua'a and Kāwa'ewa'e Heiau). The massive walls of the *heiau* measure five feet wide and from four to seven feet high, and a terrace was positioned on the north side of the walled enclosure (McAllister 1933:179). Another *heiau* built by 'Olopana located on a ridge facing the *pali* was **Puumakani Heiau** ("windy hill"); however, the stones were removed for the building of a cattle corral (McAllister 1933:181)

Chief La'amaikahiki arrived from Tahiti in the 1200s and built several *heiau* farther *makai* along the coast of Kāne'ohe Bay (Thrum 1916:90). He threw out sand as a resting place for the canoes, and this is where the *heiau* **Nāonealaa** was built (Kamakau 1867), which literally means "the sands of La'a" (see Section 3.3.3 for *mo'olelo* on Nāonealaa). Other *heiau* that once existed near the coast of Kāne'ohe Bay were **Puupahu Heiau** (McAllister 1933:177) and **Kalaoa Heiau** (McAllister 1933:178). A hill, also named named **Puu Pahu**, marks the grave of Manu-ka ("Frightener-of-birds") (Rice 1923). **Ahukini Heiau** (altar for many blessings) was constructed about 1200 feet from the sea with low walls built of very small stones (McAllister 1933:179).

Figure 20. Kukuiokāne Heiau (Landgraf 1994:111)

Figure 21. Pu'uwāni'ani'a Heiau, covered with *waiwī* trees (Landgraf 1994:103)

Figure 22. Kaluaolomana Heiau (Landgraf 1994:105)

Figure 23. Kāwa'ewa'e Heiau (Landgraf 1994:113)

## 3.6 Loko I'a

Kāne'ohe Bay is one of several large estuary systems in the Hawaiian Islands. All of these areas contained lagoons and productive fisheries protected by broad fringing reefs, and met all the natural requirements as suitable sites for walled *loko i'a*, which Hawaiians built in large numbers. On O'ahu all such areas have suffered losses in fishery resources and most of their Hawaiian-built walled fishponds have been destroyed (Devaney et al. 1982:139). In the 19th century some 30 walled *loko i'a* were present around Kāne'ohe Bay. Several of these were *loko kuapā,* a type of fishpond characterized by a *kuapā* (seawall). The most common fish cultivated in fishponds were *'ama'ama* (mullet) and *awa* (milkfish) (Summers 1964:2).

The northern coastal strip of Kāne'ohe Ahupua'a contained three fishponds. The fishpond **Kalokohanahou** ("the repaired pond"), which incorporated a small island into its wall, was just below Pu'u Pahu (McAllister 1933:177). The fishpond **Kanohuluiwi**, which means *'i'iwi* (scarlet Hawaiian honey creeper) feathers (Landgraf 1994:114), covered an area of 2.5 acres with its narrow rock walls (McAllister 1933:178) (Figure 24). Adjacent to Kanohulu'iwi was the seven-acre fishpond **Waikapoki**, which was destroyed in the 1950s to build a marina (Devaney et al. 1982:146-152). Another fishpond, **Punaluu** (spring dived for), covered an area of 12.5 acres with its basalt walls reaching 1600 feet (McAllister 1933:178).

Farther south along the coast are three fishponds that were connected together. **Waikalua Loko** is located along the southern shore of Kāne'ohe Bay with the wall extending 1,420 feet that encloses 11 acres of water (McAllister 1933:178) (Figure 25,Figure 26). The *kuapā* (fishpond wall) extends approximately 1,400 linear feet and has three sluice gates called *mākākā*, which are the primary sources of seawater to the pond from tidal movements in Kāne'ohe Bay. Waikalua literally means "water of the *lua* (type of dangerous hand-to-hand fighting) fighter" or "of the pit." Lua fighters were bodyguards to the chiefs and were trained in hand-to-hand fighting to cause severe pain and broken bones. The naming of Waikalua Loko Fishpond may refer to the two streams that originally provided fresh water to the fishpond—Kāne'ohe Stream and Kawa Stream. Thus, Wai-ka-lua may literally translate as "the two freshwaters." Kāne'ohe Stream was one of the largest watersheds in Windward O'ahu so the name could reflect the freshwaters' importance. Kawa Stream provided fresh water to the Waikalua Loko Fishpond until it was channeled due to residential development in the Kāne'ohe area. Waikalua Loko still exists today and is cared for by the Waikalua Loko Fishpond Preservation Society. The fishponds **Waikalua** and **Loko Keana** shared a common *kuapā*. Remnants of Waikalua Fishpond still exist; however, it is covered with mangrove. Loko Keana, which means "cave," has been filled.

Directly east of Waikalua Loko, Waikalua and Keana Fishponds was another trio of fishponds called, from west to east, **Mikiola** ("active and alive"), **Kapu'u** and **Mahinui** (McAllister 1933:179), which is named for a "great champion" who was defeated by Olo-mana. All three of these fishponds were filled to make way for residential development in 1937 according to the previous testimony of CSH community consultant Fred Takebayashi, whose father was the caretaker of the Mikiola Fishpond (Cruz et al. 2009). Farther east along Kāne'ohe Bay are three small fishponds called **Keaakay**, **Hanakua** and **Papaa** ("secure enclosure"), each named after the land to which they are adjacent (McAllister 1933:182).

Three adjoining fishponds separated Mōkapu from the main land. The *loko kuapā* (fishponds made by building a wall on a reef) **Halekou** ("*kou*-wood house") covered 92 acres with a 1600 foot long wall (McAllister 1933:184) (Figure 27). It shared a common wall with the *loko kuapā* **Nuupia** ("arrowroot heap") that enclosed 215 acres with a 1500 foot long wall (McAllister 1933:184) (Figure 28). Nu'upia was the father and Halekou the mother of a boy named Puniakai'a, who tamed Uhumāka'ika'i, the parent of all fishes, to gain control of all the fishes in the sea (Landgraf 1994:88). The pond **Kaluapuhi**, which means "eel pit" because an eel-shaped rock was in a cave (Pukui et al. 1974:79), was the original pond that encompassed both Nu'upia and Halekou, which once covered 2,097 acres (Tuggle and Hommon 1986:64) but now only covers 24 acres (McAllister 1933:184). Kaluapuhi was connected with Kailua Bay by one *mākākā* (McAllister 1933:184). Rectangular salt pans called **Kapoho** ("the depression") or **Pa'akai** ("salt," Landgraf 1994:90) were constructed adjacent to Kaluapuhi Pond on the low banks of the land to collect evaporated salt from seawater (MacCaughey 1917, cited in Sterling and Summers 1978:214) (Figure 29).

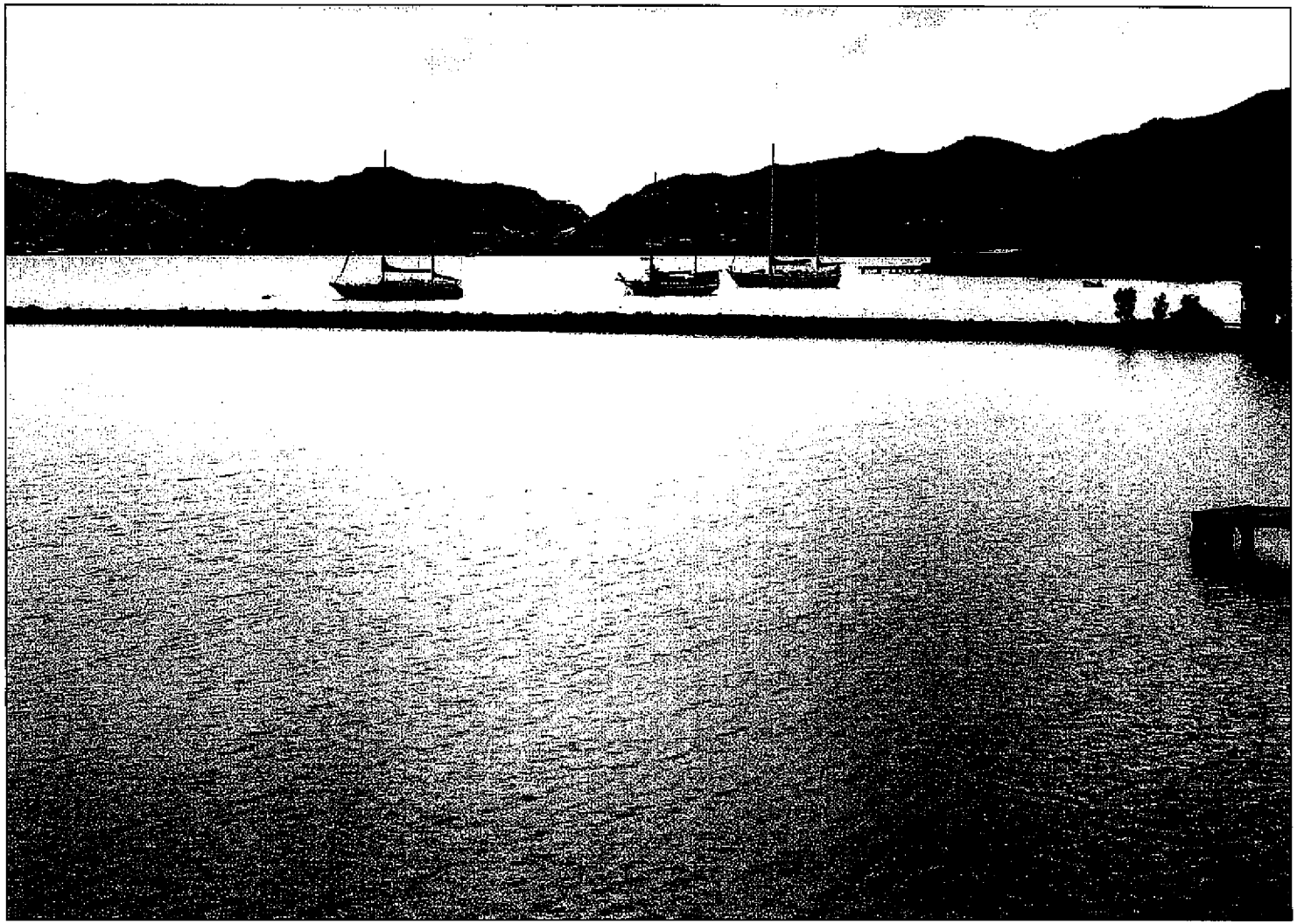


Figure 24. Kanohulu'iwi (Landgraf 1994:115)

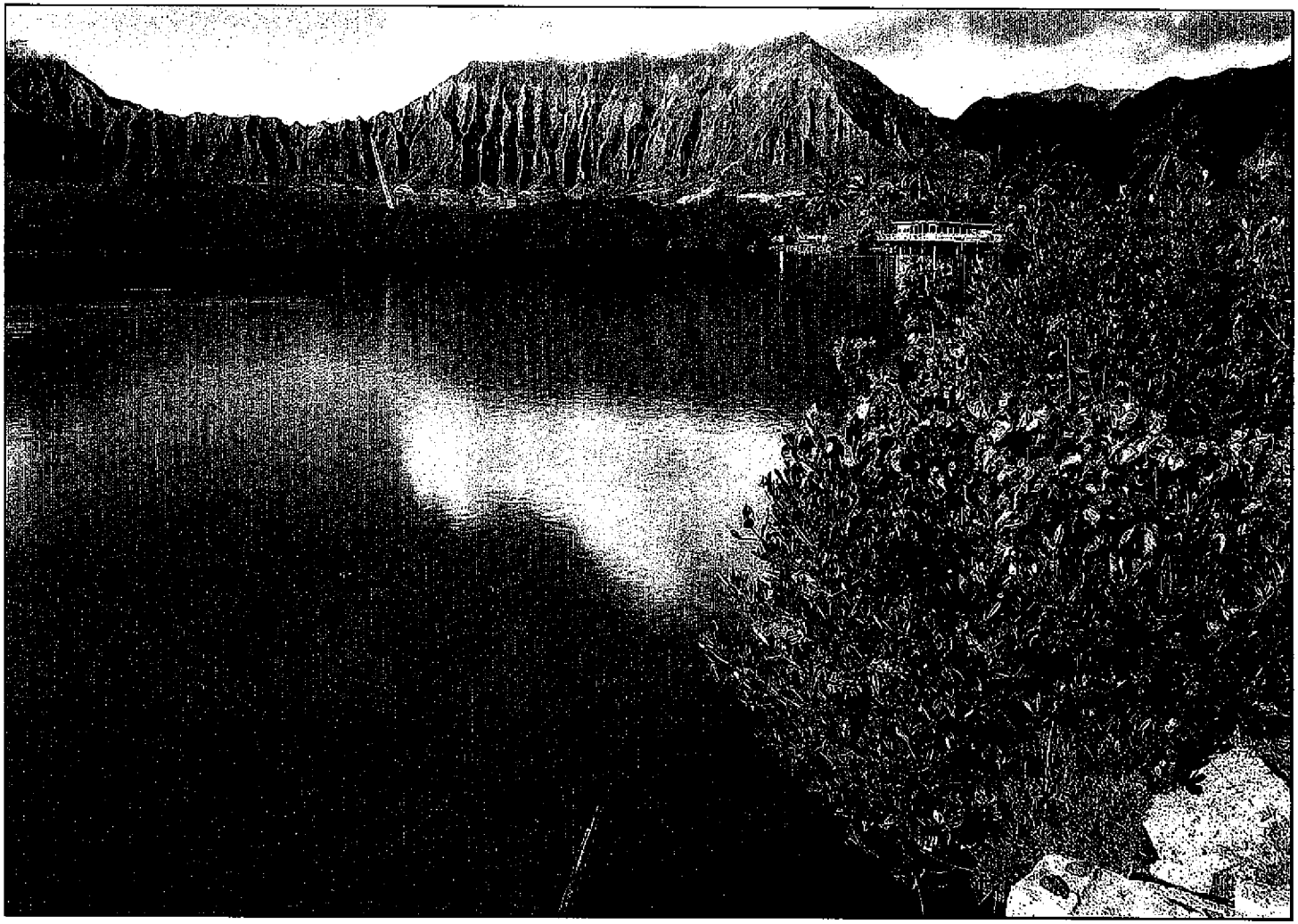


Figure 25. Waikalua (Landgraf 1994:117)

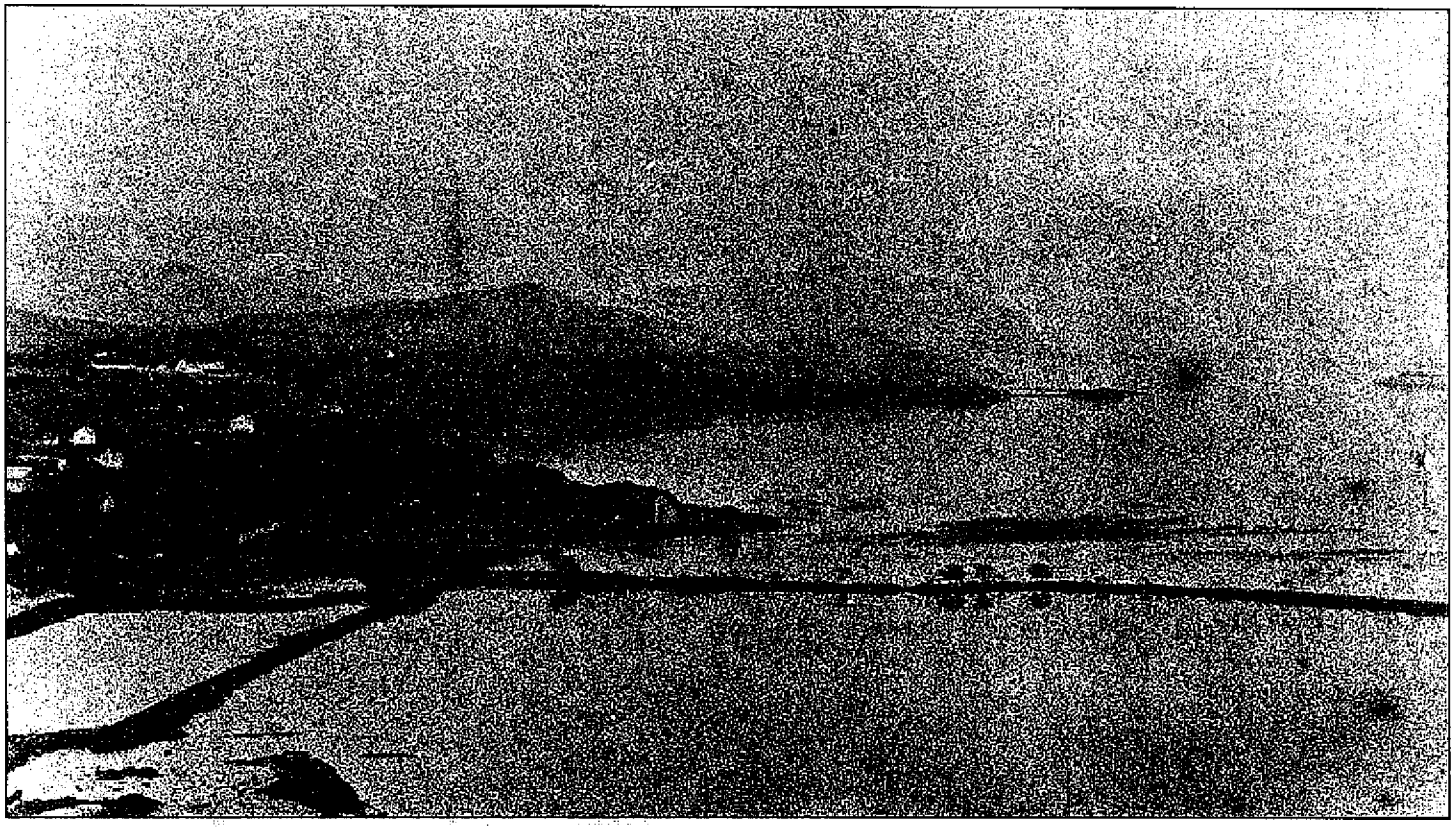


Figure 26. Waikalua Loko Fishpond in foreground with small pond for "fry" on left in 1887 (Hawai'i State Archives, in Devaney et al. 1982:148)

Figure 27. Halekou (Landgraf 1994:87)

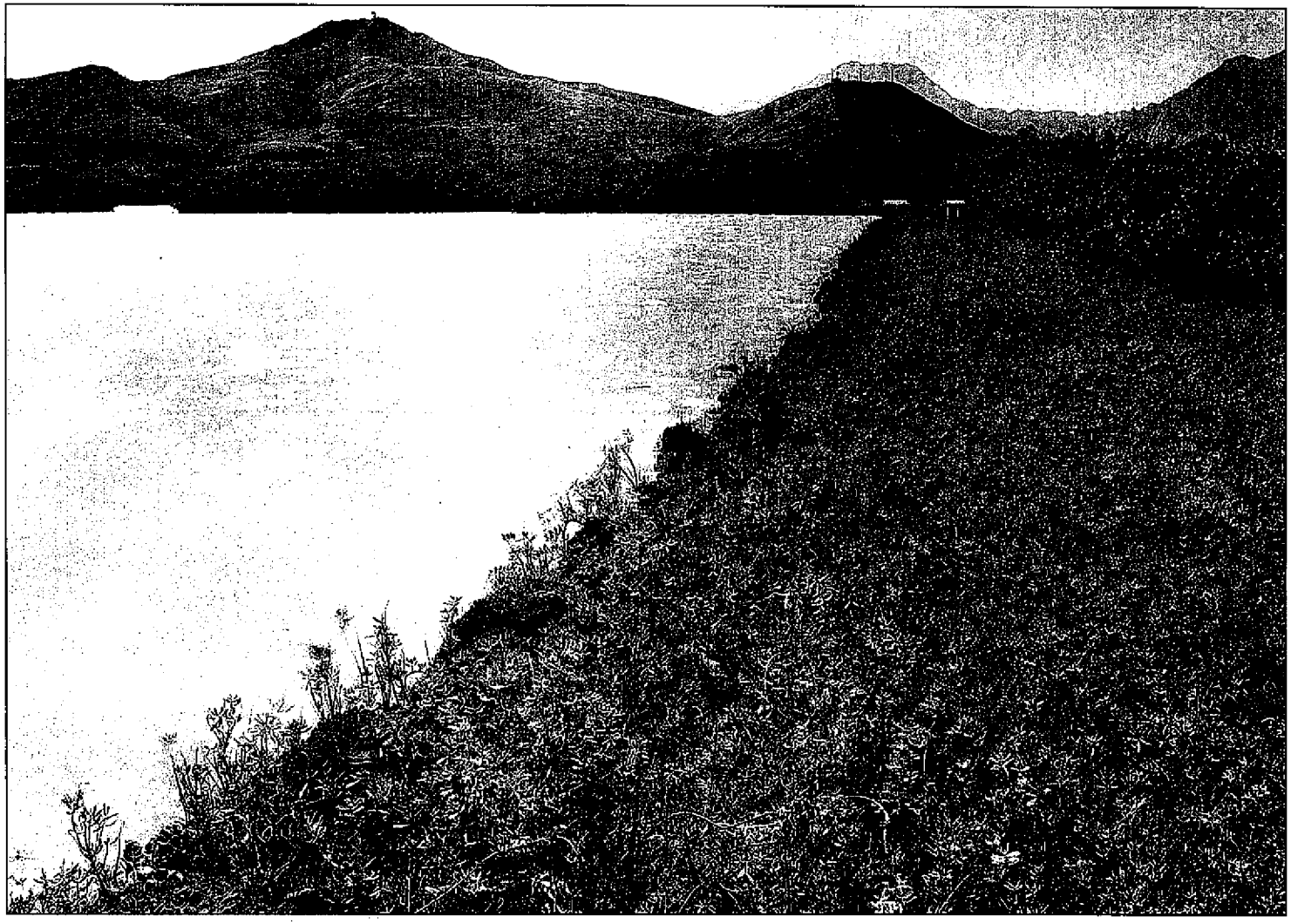


Figure 28. Nu'upia (Landgraf 1994:89)

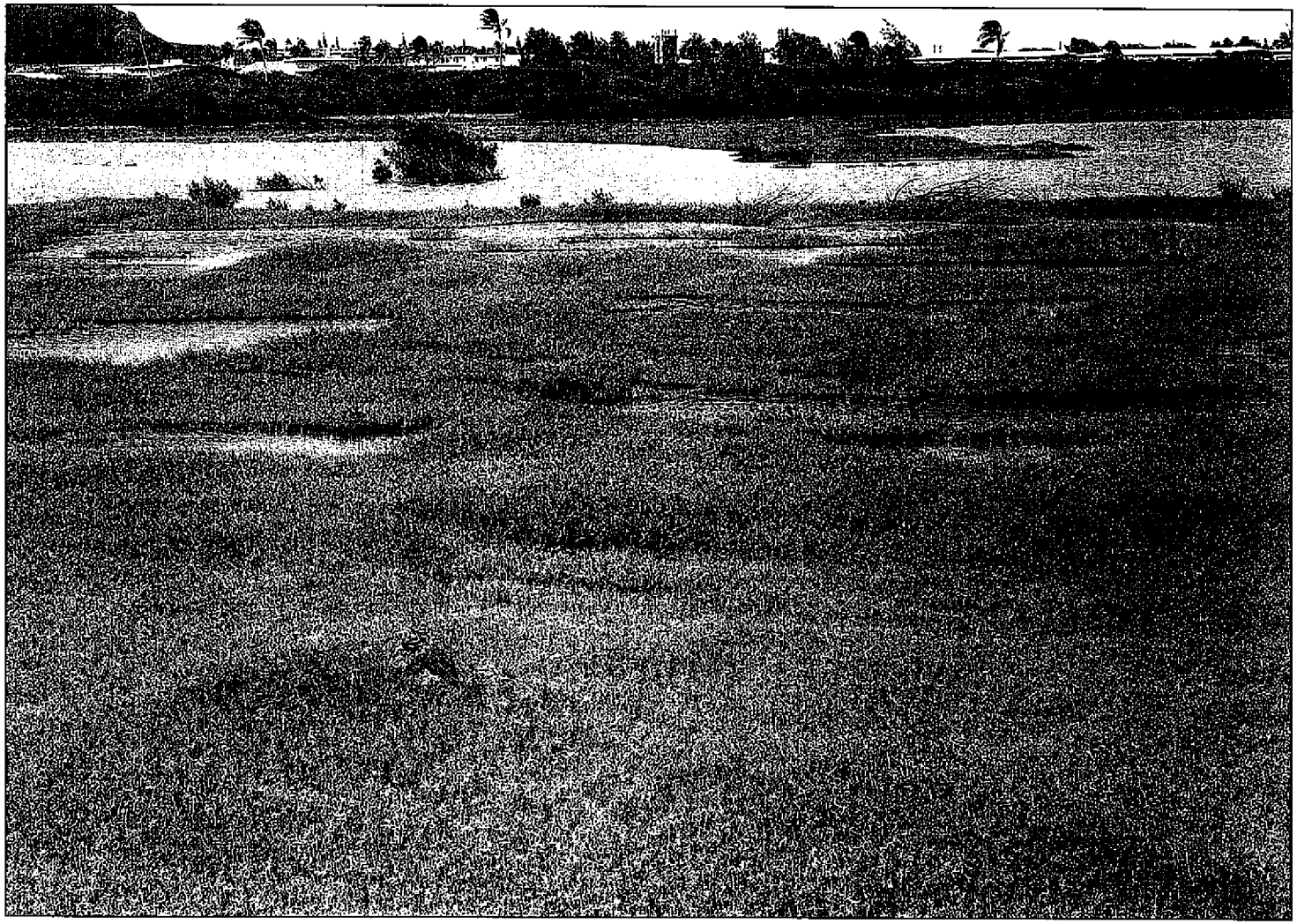


Figure 29. Kaluapuhi and Pa'akai (Landgraf 1994:91)

## 3.7 Ala

*Ala* once served to connect the various settlements throughout O'ahu. The most popular trail was the coastal route which circled O'ahu and there were many trails traversing the mountain ranges ('Ī'ī 1959). John Papa 'Ī'ī (1959) documented early post-Contact trails on the leeward side of O'ahu, but there is little information on the network of *alanui* (pathways) that once undoubtedly connected Kāne'ohe to outlying communities. For example, a trail once ran along the base of the *pali* in Kāne'ohe. Richard H. Davis of the Hawaiian Trail and Mountain Club recently rediscovered the trail, and it was named the **Likeke Trail** in honor of his Hawaiian name (Ball 2000:199) (Figure 30). See Section 7.4 for a detailed description of the cultural and historic properties found along the Likeke Trail.

The most impressive *ala* in the *ahupua'a* of Kāne'ohe was the **Pali Trail**, which traversed the sheer cliff rocks of the Nu'uanu Pali to the base of the mountains near the Project area (Figure 31). This path connected Honolulu to windward O'ahu. According to the diary entry of Reverend R. Tinker in 1831, Hawaiians used the trail to transport taro, potatoes, *poi* (pounded taro), fowl, goats, and pigs (Thrum 1901:89). Parts of this steep path later became incorporated into the stone-paved horse trail in 1845, the newly constructed Pali Road in 1897, and recent improvements starting in 1952 that led to the existing Pali Highway (Devaney et al. 1982) (Figure 32) (see Section 4.5). Lord Byron, Commander of the H.M.S. Blonde, captured the descent of the Pali Trail with the following entry in the ship's log in 1825:

> Several parties from the Blonde have been formed to visit different parts of the Islands; the most singular spot in which is, undoubtedly, the Parre, or precipice, on the weather side.
>
> The path which leads to it from Honoruru winds along the beautiful and fertile valley of Anu Anu [Nu'uanu], and thence ascends gradually, for eight miles, through a cultivated and populous district, separated by a pretty stream from a thick wood, which we crossed, completely sheltered from the mid-day sun, and found ourselves suddenly on the brink of a precipice some thousands of feet above the grassy plain below.
>
> The descent to this plain, which, like that of Honoruru, extends to the sea, is the most fearful imaginable. In many places the path consists of little more than holes cut in the rock for the hands and feet; and, where most commodious, it lies along narrow ledges, where a false step would be inevitable destruction.
>
> ...At the bottom of the Parre there are two large stones, on which, even now, offerings of flowers and fruits are laid to propitiate the akua Wahini, or goddesses, who are supposed to have the power to granting a safe passage. (Byron 1826, cited in Sterling and Summers 225)

In the same year botanist Andrew Bloxam captured a sense of the steepness of the trail in a diary entry:

> In one spot an almost perpendicular descent of thirty feet down small projecting ledges of the rock, worn smooth by the bare feet of the natives, obliged us for our own safety to pull off our shoes and stockings to prevent our slipping, as one false step might have been fatal. (Bloxam 1825:39, cited in Sterling and Summers 1978:225)

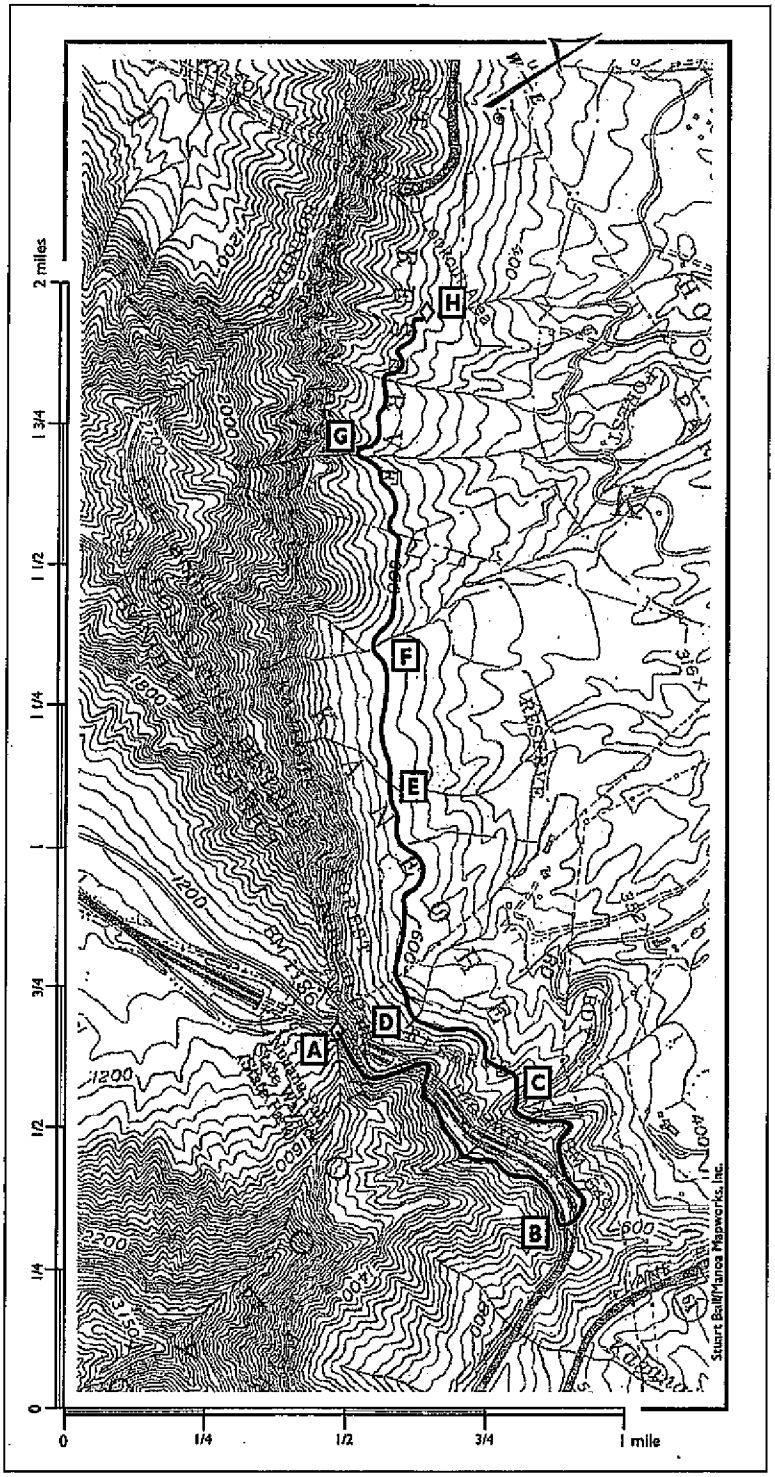



Figure 30. Likeke Trail; A to C is the Old Pali Road, and C to H is the Likeke Trail; the Project area lies to the right of the image (Ball 2000:196)

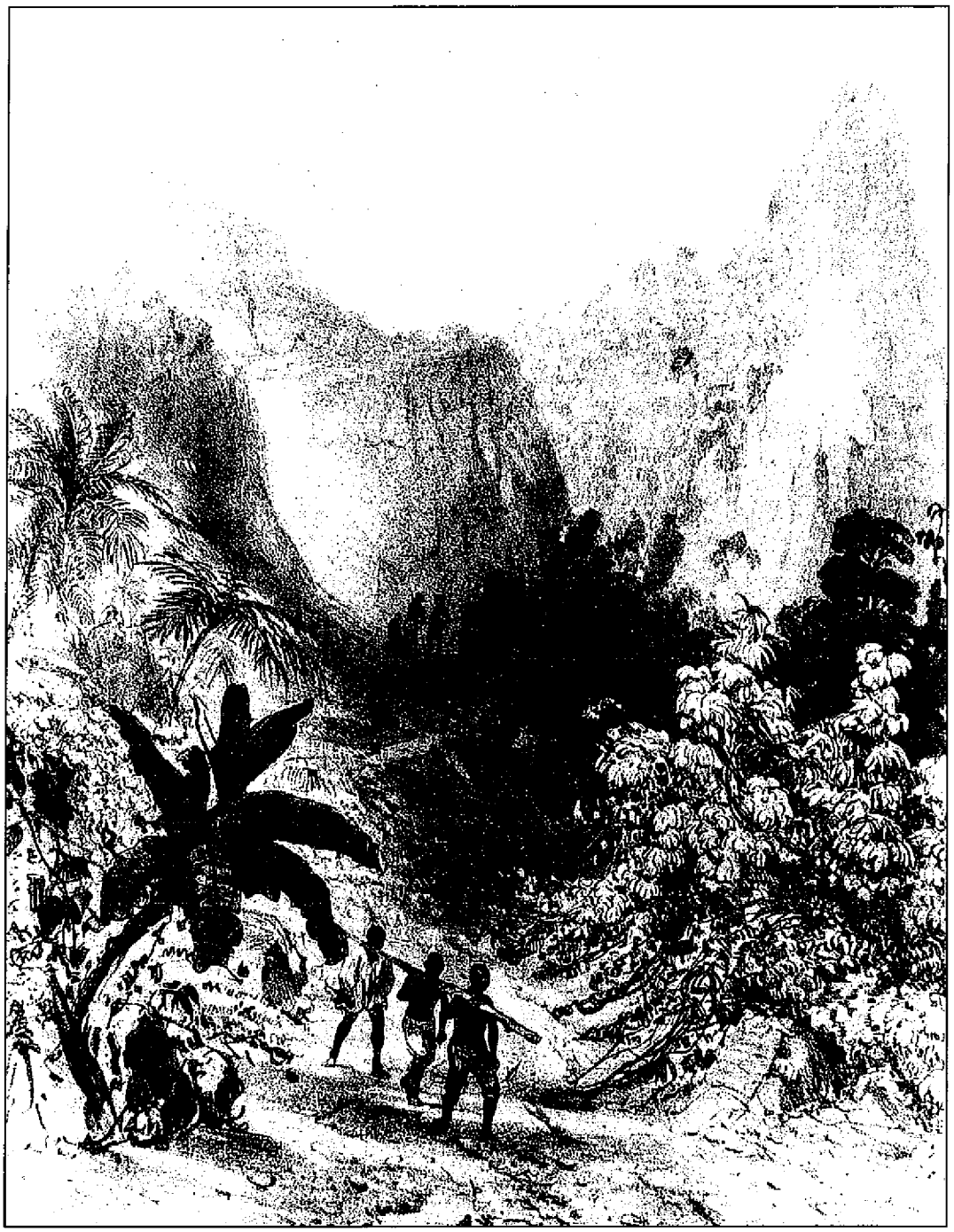


Figure 31. The old Pali Trail, 1836; lithograph of painting by Capt. V. B. Fisquet (R. J. Baker Collection and BPBM Collection, in Devaney 1982:174)

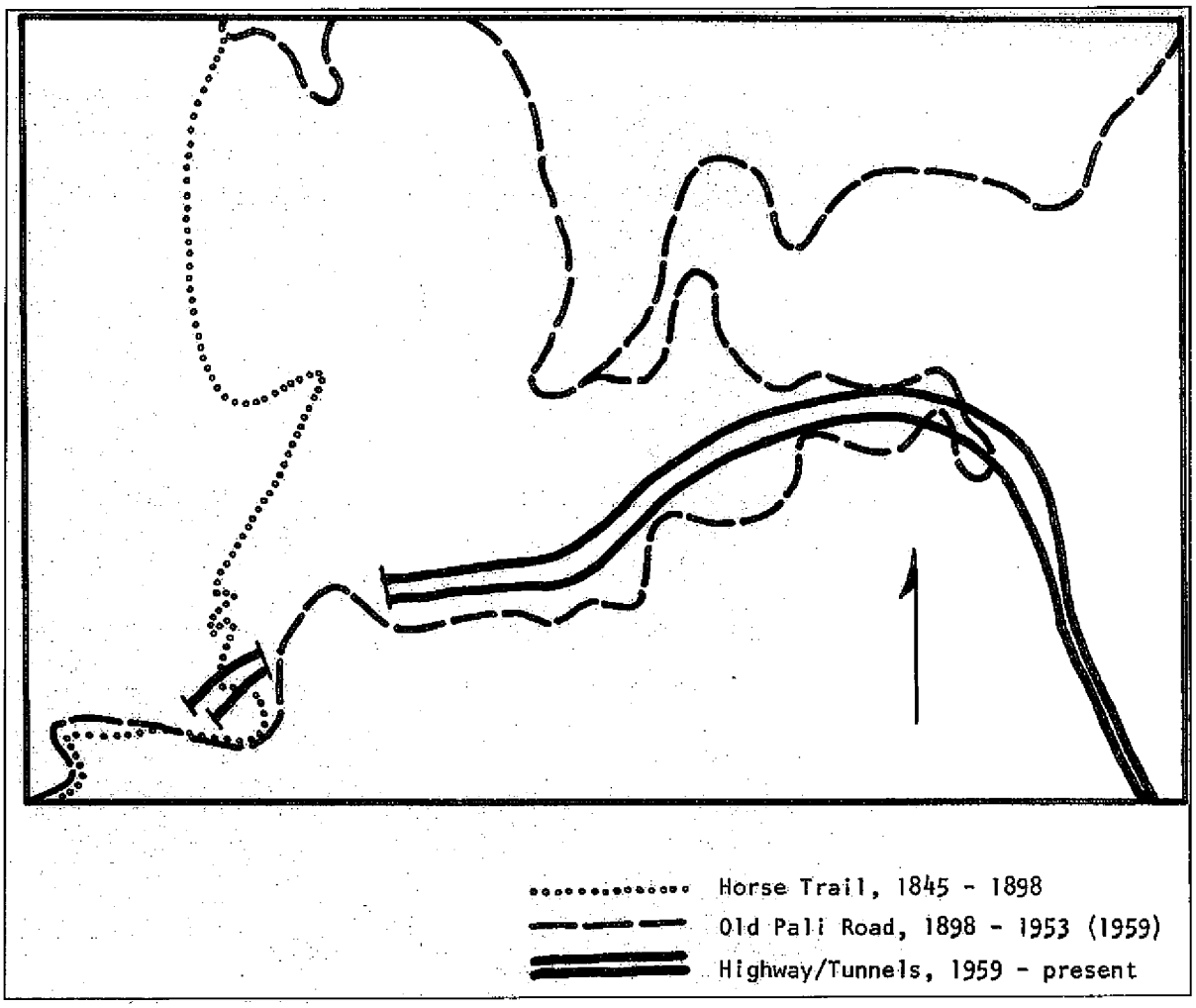



Figure 32. Diagram of the Pali Trail, old Pali Road and new Pali Highway; the current Project area is close to the upper right corner of the image (Devaney et al. 1982:175)

## 3.8 Ilina

On the Mōkapu Peninsula within the *'ili* of Heleloa are sand *ilina* in the dunes. Over 500 **sand burials** have been unearthed. The Mōkapu dunes were most likely established burial grounds for the residents of several villages located on the windward half of the peninsula (Sterling and Summers 1978:217). There is no documented evidence from archaeological surveys, historical records or oral traditions of *ilina* or *iwi kūpuna* (ancestral remains) within the Project area.

# Section 4 Historic Background

## 4.1 Overview

Kāne'ohe has long been viewed as a valuable *ahupua'a* both in terms of agricultural and fishery productivity. In 1830, the chiefs of Hawai'i, Maui, and O'ahu, in a council meeting concerning the "late doings on Oahu," referred to the *ahupua'a* of Kāne'ohe as the "most valuable part" of the district of Ko'olau Poko (Kamakau 1992:303). Kāne'ohe Ahupua'a had plantations of taro, bananas, sweet potatoes and coconut trees, as well as groves of *hala* and *wauke* (Handy and Handy 1972:456; Portlock 1789:4). In addition, *'awa* (kava) was extensively cultivated in the mid-1800s (Greer 1970:66-67).

The land has witnessed many changes since the Māhele that introduced private property into Hawaiian society in 1846. Chronologically, Kāne'ohe has shifted from the traditional agricultural use of the land to rice and sugar plantations, ranching and dairy industries, pineapple plantations, the construction of military infrastructure, and, more recently, residential development. Finally, close to the Project area, the precipice of the Nu'uanu Pali along the ridge boundary of Kāne'ohe Ahupua'a was the site of a monumental battle that resulted in Kamehameha becoming sole ruler of most of the Hawaiian Islands, and was also the focus of a series of trails and roads that has connected Honolulu to windward O'ahu over the course of several historic eras.

## 4.2 Taro Cultivation

The Hawaiians continued in post-Contact times extensive cultivation of taro through the early 1800s. One of the main preparations of taro is *poi,* made by pounding the taro root (Figure 33). Handy and Handy described this expanse of taro cultivation in the *moku* of Ko'olaupoko:

> Southeastward along the windward coast, beginning with Waikane and continuing through Waiahole, Ka'alaea, Kahalu'u, He'eia, and Kane'ohe, were broad valley bottoms and flatlands between the mountains and the sea which, taken all together, represent the most extensive wet-taro area on Oahu. (Handy and Handy 1972:271-272)

The *mauka* regions of Kāne'ohe Ahupua'a contained complex terrace systems that diverted stream water for taro irrigation (Handy 1940:97). Despite the substantial impact of rice and sugar plantations, ranching and dairy industries, and pineapple plantations on the land from the mid 1800s to the early 1900s, taro cultivation persisted. Handy and Handy describe this later scene of Kāne'ohe Ahupua'a:

> ...an area of little hills with many small streams between them. In 1935 it was still one of the most active communities in planting commercial taro. A goodly proportion of its lowland *lo'i*, tucked away in pockets flanked and often hidden by low hills or near the town itself, was then still planted in taro by Hawaiians who owned the land and by Orientals who leased land or were hired to cultivate it. (Handy and Handy 1972:455)

Figure 33. 1893 Photograph by J.J. Williams of *poi* pounding, taken near Kawa Stream in Kāne'ohe Ahupua'a (Scott 1968: 727)

## 4.3 'Awa Cultivation

Kāne'ohe Ahupua'a held a unique position in the history of *'awa* cultivation. The relaxant drink prepared from the roots of the *'awa* plant was regarded as immoral by missionaries who sought to restrict its consumption. In 1846 obliging lawmakers created licensing laws and set up a system of *'awa* agents to plant and sell *'awa* on the various islands. The argument for this system was that, although *'awa* was considered morally hazardous, it had medicinal value. There were two *'awa* agents assigned to O'ahu, including William Harbottle who was authorized to grow *'awa* on two acres of land in Kāne'ohe (Greer 1970:66-67).

## 4.4 Battle of Nu'uanu

When Kamehameha's fleet landed on the beaches of Waikīkī in 1795 to start the invasion of O'ahu, Kalanikupule and his chiefs were positioned strategically in the valley of Nu'uanu. They could have fought at Kalanikupule's home in Waikīkī but Kalanikupule took his men to Nu'uanu Valley (Kamakau 1992:172-173). Kalanikupule had positioned cannon fortifications above the Nu'uanu Pali on the ridge of the towering Kōnāhuanui peak (James 2004). Two of these cannon fortifications remain as visible evidence of the historic clash that ensued (James 2004). The battle is called Kaleleka'anae, which means "leaping *'anae*" (mullet), and refers to the way many O'ahu armies of Kalanikupule and some of their families chose to or were forced to jump to their deaths from the *nuku* (mountain pass) of the steep Nu'uanu Pali rather than accept defeat from the warriors of Kamehameha (James 2004). At least 300 warriors from both sides died (Kamakau 1992:172-173). The following account vividly describes the final battle on the precipice overlooking the *ahupua'a* of Kāne'ohe:

> The forces of Kamehameha charged; in the onslaught many of the Oahuans were slain, and the rest pursued with great slaughter until they were driven to the end of the valley, which terminates in a precipice of six hundred feet, nearly perpendicular height, forming a bold and narrow gorge between the two foreclad-mountains. A few made their escape; some were driven headlong over its brink, and tumbled, mangled and lifeless corpses, on the rocks and trees beneath; others fought with desperation and met a warrior's death, among whom was Kalanikupule, who gallantly contested his inheritance to the last. (Jarves 1847:92)

Some of the weaponry from the Battle of Nu'uanu has been discovered. A Japanese farming family living at the base of the Nu'uanu Pali at the beginning of the 20th century found several sling shot stones just below the *nuku* that were most likely used during the battle (Fanning 2008:96).

Fornander's (1878) narrative of this moment offers an alternate fate for Kalanikupule, as he apparently escaped to the mountains with some of his men for several months, but was discovered and sacrificed to the Kamehameha's war god Kuhailimoko. After the battle of Nu'uanu, Kamehameha became the sole ruler of O'ahu, Moloka'i, Lāna'i, Hawai'i and Maui (Kamakau 1992:172-173). He retained the *ahupua'a* of Kāne'ohe as his own personal property when he divided the conquered lands of O'ahu to his warrior chiefs and counselors ('Ī'ī 1959:69-

70). His sons Liholiho and Kauikeaouli—Kamehameha II and Kamehameha III, respectively—inherited most of Kāne'ohe Ahupua'a (Kamakau 1992).

## 4.5 Pali Trail and Pali Road

The Pali Trail, which connected the *ahupua'a* of Honolulu to Kāne'ohe and other *ahupua'a* in the *moku* of Ko'olaupoko by traversing the sheer cliff rocks of the Nu'uanu Pali to the base of the mountains near the Project area (see Section 3.7), has gone through several dramatic changes since the mid-19th century (see Figure 32). According to a letter written by Reverend R. Tinker in 1840, an American merchant named Hinckley first proposed making the Pali Trail more passable, but a blacksmith named Beers supervised cutting steps into the steepest sections and building an iron railing (Thrum 1901:89). In response to agricultural development in Kāne'ohe and other *ahupua'a* in windward O'ahu, King Kamehameha III secured funds in 1845 to make the old Pali Trail accessible to horses. Sections of the path were paved with stones and the road was officially opened on June 28, 1845 when King Kamehameha III, John Young and Dr. Gerritt P. Judd traversed the Pali. In 1861 Dr. Judd and Reverend E. Corwin made the first descent in a horse-drawn carriage (The Island Call 1953). The Pali Trail was widened to six feet, paved with stones, and the grade was lessened in most areas to 15% (Bishop 1898, cited in Devaney et al. 1982:165 (Figure 34).

In 1882, construction began to further widen the road to twenty feet and reduced the grade to 8%, which forced the road to wind back and forth on the side of the Pali rather than straight down, but delays due to rain damage and high costs prevented the new Pali Road from opening until 1897 (Thurston 1890:265) (Figure 35). Johnny Wilson, a young engineer with the Public Works Department, spent months surveying the steep terrain and forest of the Pali, but there were difficulties, such as "workers getting dynamited to oblivion and tumbling over the precipice..." (Chiddix and Simpson 2004:78). Construction workers found an estimated 800 skulls, along with other bones at the bottom of the Pali near the Project area—the remains of the warriors defeated by Kamehameha (The Island Call 1953). The road was declared open in 1897 and was maintained for 55 years with occasional improvements (Figure 36) until work began in 1952 to construct a new four-lane highway with two tunnels running under the *nuku* where Kalanikupule fought Kamehameha's forces (Devaney et al. 1982:172).

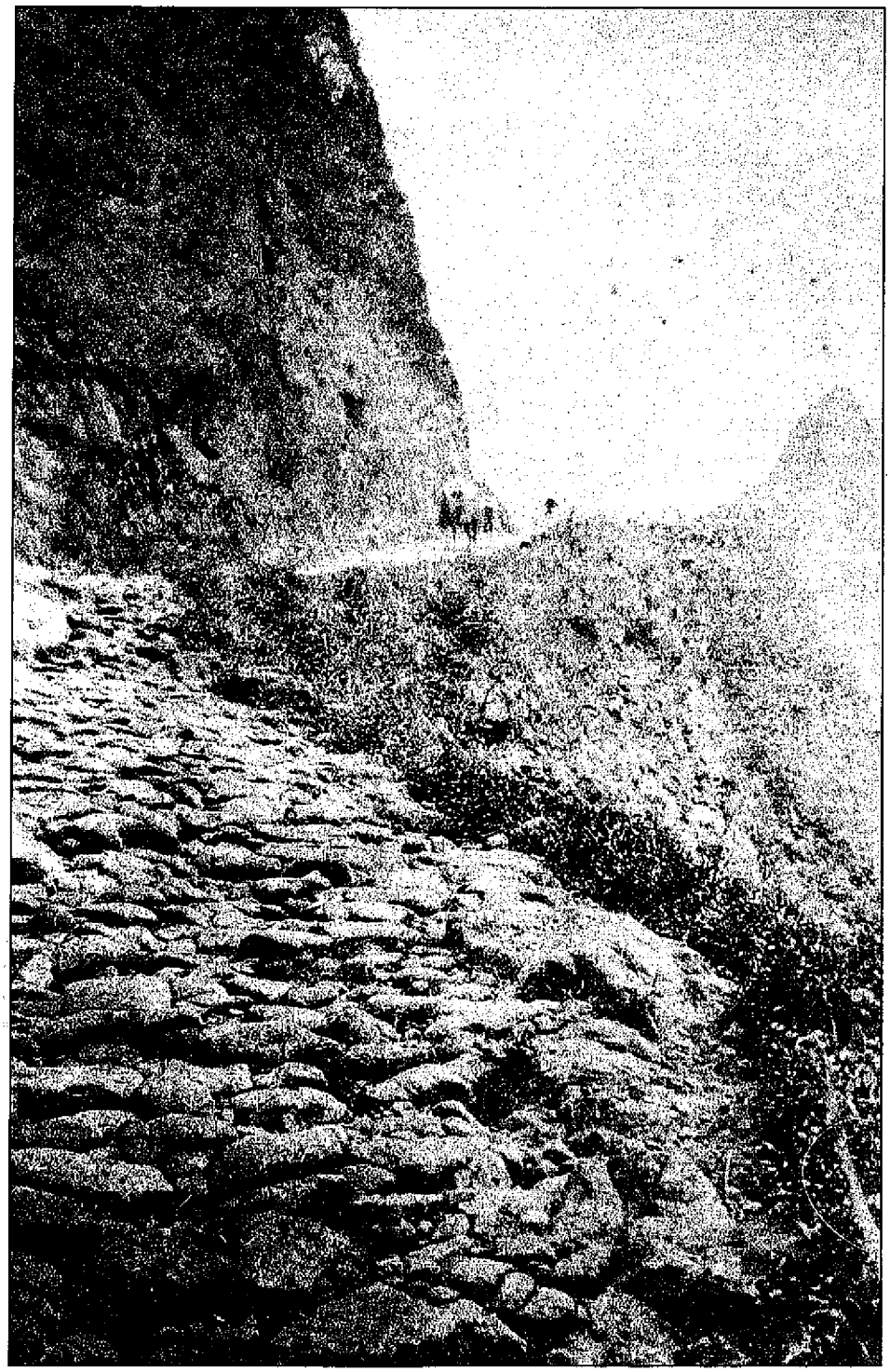


Figure 34. The stone-paved Pali Trail with horses in the background, 1887 (Hawai'i State Archives, in Devaney et al. 1982:177)

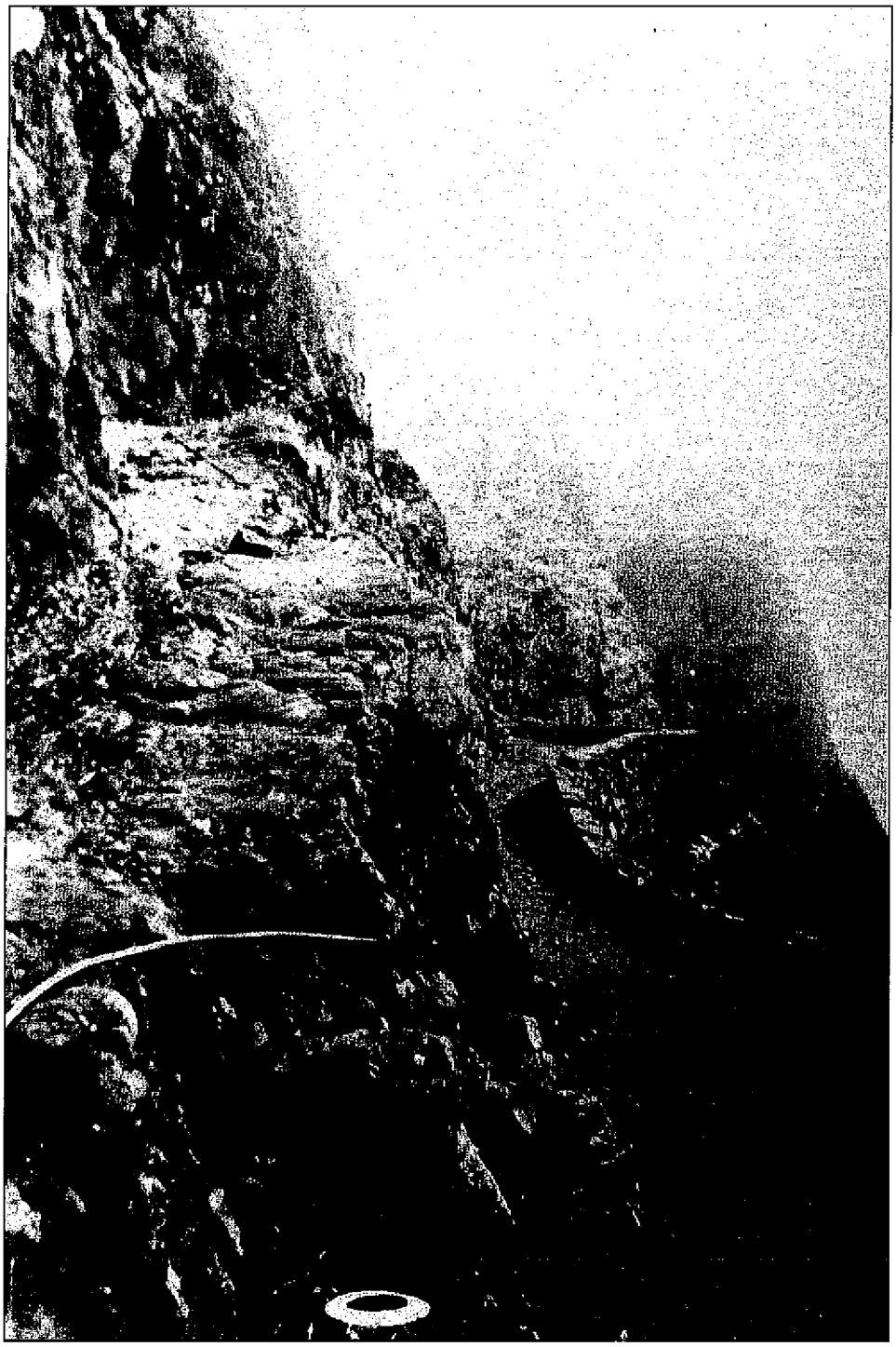


Figure 35. Old Pali Trail (left) and the newly constructed Pali Road with stone wall (right), 1880s (Bernice Pauai Bishop Museum Collection, in Devaney et al. 1982:175)

Figure 36. Old Pali Road, 1946 (Hawaiian Aviation Preservation Society 2009)

## 4.6 The Māhele

The Organic Acts of 1845 and 1846 initiated the process of the Māhele—the division of Hawaiian lands—that introduced private property into Hawaiian society. In 1848, the Crown and the *ali'i* (royalty) received their land titles. *Kuleana* (claim) awards to commoners for individual parcels within the *ahupua'a* were subsequently granted in 1850. Kamehameha III had inherited Kāne'ohe and retained the bulk of the *ahupua'a* during the Māhele. After his death, his wife, Queen Kalama (Hakaleleponi), retained their portion of Kāne'ohe (Barrère 1994, Kame'eleihiwa 1992).

The crown lands were considered the private lands of the monarch, and many lands were sold or mortgaged during the reigns of Kamehameha III and IV to settle debts to foreigners. To end this practice, the Crown lands were made inalienable in 1865, and their dispensation was regulated by a Board of Commissioners of Crown Lands, which effectively put them under the administrative control of foreign-born residents (Kame'eleihiwa 1992:310). Before the passage of the Act of January 3, 1865, which made Crown Lands inalienable, Kamehameha III and his successors did as they pleased with the Crown Lands, selling, leasing, and mortgaging them at will (Chinen 1958:27).

In 1850, the Privy Council passed resolutions that would affirm the rights of the commoners or native tenants. To apply for fee-simple title to their lands, native tenants were required to file their claim with the Land Commission within the specified time period of February 1846 and February 14, 1848. The *Kuleana* Act of 1850 confirmed and protected the rights of native tenants. Under this act, the claimant was required to have two witnesses who could testify they knew the claimant and the boundaries of the land, knew that the claimant had lived on the land for a minimum of two years, and knew that no one had challenged the claim. The land also had to be surveyed.

Not everyone who was eligible to apply for *kuleana* lands did so and, likewise, not all claims were awarded. Some claimants failed to follow through and come before the Land Commission, some did not produce two witnesses, and some did not get their land surveyed. For whatever reason, out of the potential 2,500,000 acres of Crown and Government lands "less than 30,000 acres of land were awarded to the native tenants" (Chinen 1958:31).

As a result of the *Kuleana* Act of 1850, a total of 242 land claims were made for Kāne'ohe Ahupua'a, but only a bit more than half of those were awarded (Waihona 'Aina 2000). The average *kuleana* award was 2.38 acres (Kelly 1976:8). However, these claims were not only for commoners, as chiefs and/or *konohiki* (headmen) were also awarded lots. The bulk of Kāne'ohe Ahupua'a eventually went to Queen Hakaleleponi Kalama (1817-1870), eleven *konohiki,* and three non-*konohiki* (privileged awardees who received large parcels of land) (Kelly 1976:7). The primary type of land claimed in Kāne'ohe was taro land, identified in the claims, testimony, and awards as *lo'i*, but there were also fishponds and *kula* (dryland crops).

The present Project area occupies land within the *'ili* of Kaeleuli, which covers 509.5 acres (Figure 37). Historic maps and documents indicate that half of this *'ili* was awarded to the government and half was given as a Māhele Award to an individual identified as "Haole" (foreigner) (#51MA) (Lyons 1876).

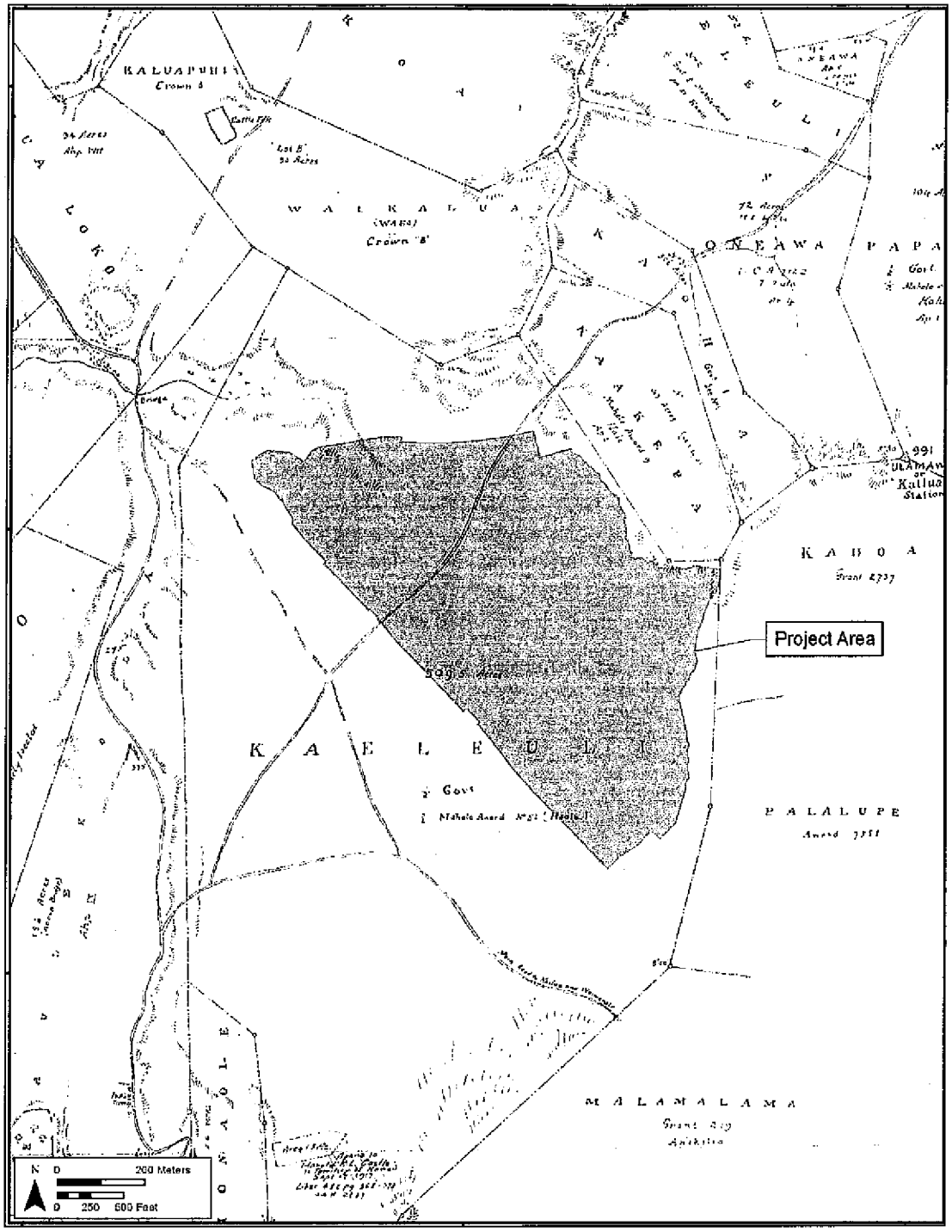



Figure 37. Portion of 1874 C.L. Lyons Map of Kāne'ohe O'ahu showing locations of Crown and Government lands and LCAs in the vicinity of the Project area

## 4.7 Rice and Sugar Plantations

The mid-19th century brought great changes to Kāne'ohe Ahupua'a, including private and public land ownership laws during the Māhele, commercial rice and sugar cultivation, and ranching. Agricultural cultivation and ranching established the region as a source of market resources for Honolulu and beyond. Coulter's (1931) population density estimates for 1853 (Figure 38) show that approximately 700 people lived near the coast of Kāne'ohe Ahupua'a, which was one of the more densely populated areas on O'ahu.

In the 1860s, both commercial sugar cane and rice cultivation began in Kāne'ohe Ahupua'a. One of the earliest sugar plantations on O'ahu was owned by Charles Coffin Harris, who came to Hawai'i in 1850 with a plan to practice law. He established the Kaneohe Sugar Plantation Company (ca. 1865) on 7,000 acres of Queen Kalama's land (Dorrance and Morgan 2000:41). In 1871, Harris bought Queen Kalama's Ko'olaupoko properties from her heir, Charles Kanaina, as well as some land in Honolulu for $22,448. The sale included "...livestock, tool, fishponds, and fishing rights" (*Bureau of Conveyances Records* Book 34:52, cited in Devaney et al. 1982:29); the fishponds of Waikalua-loko and Keana were part of this sale. C. C. Harris's plantation shut down in 1891 because the sugar yield was not enough to support the operation (Dorrance and Morgan 2000:41). Harris's daughter and heir, Mrs. David Rice, incorporated the lands as Kaneohe Ranch and converted them to stock farming. James B. Castle purchased a large block of their land holdings in 1907 (Montgomery 1971, cited in Dorrance and Morgan 2000:42).

Rice cultivation replaced taro and dominated the lowlands of Kāne'ohe. The ancient taro *lo'i* and *'auwai* (ditch, channel) irrigation systems were used and new ditches were built to support rice cultivation. During the height of rice cultivation (ca. 1880-1920), Chinese dominated the business. "To a great extent the rice business, growing and milling was controlled by Chinese *hui* (firms), which recruited laborers from China, handled investment capital from rich absentee landlords, and tallied profits" (Montgomery 1971, cited in Devaney et al. 1982:49). By the late 1880s, virtually the entire floodplain areas of Kāne'ohe were under rice cultivation. In 1892-1893, the Kāne'ohe Rice Mill was erected and put into production on property adjoining Waikalua Stream. There was a flume that brought water from the river to the rice mill. About twice a week a steamer came into Kāne'ohe Bay to pick up and transport rice to market in Honolulu (Allen 1987:295).

By the 1920s, rice had gradually declined in importance due to a number of factors. Two of the primary reasons for this decline were the beginning of rice production in California and the "annexation of Hawaii by the United States in 1898 [which] resulted in restrictions on the number of Chinese laborers arriving from the Far East" (Devaney et al. 1982:53). However, rice cultivation, as well as taro cultivation, continued up to ca. 1960.

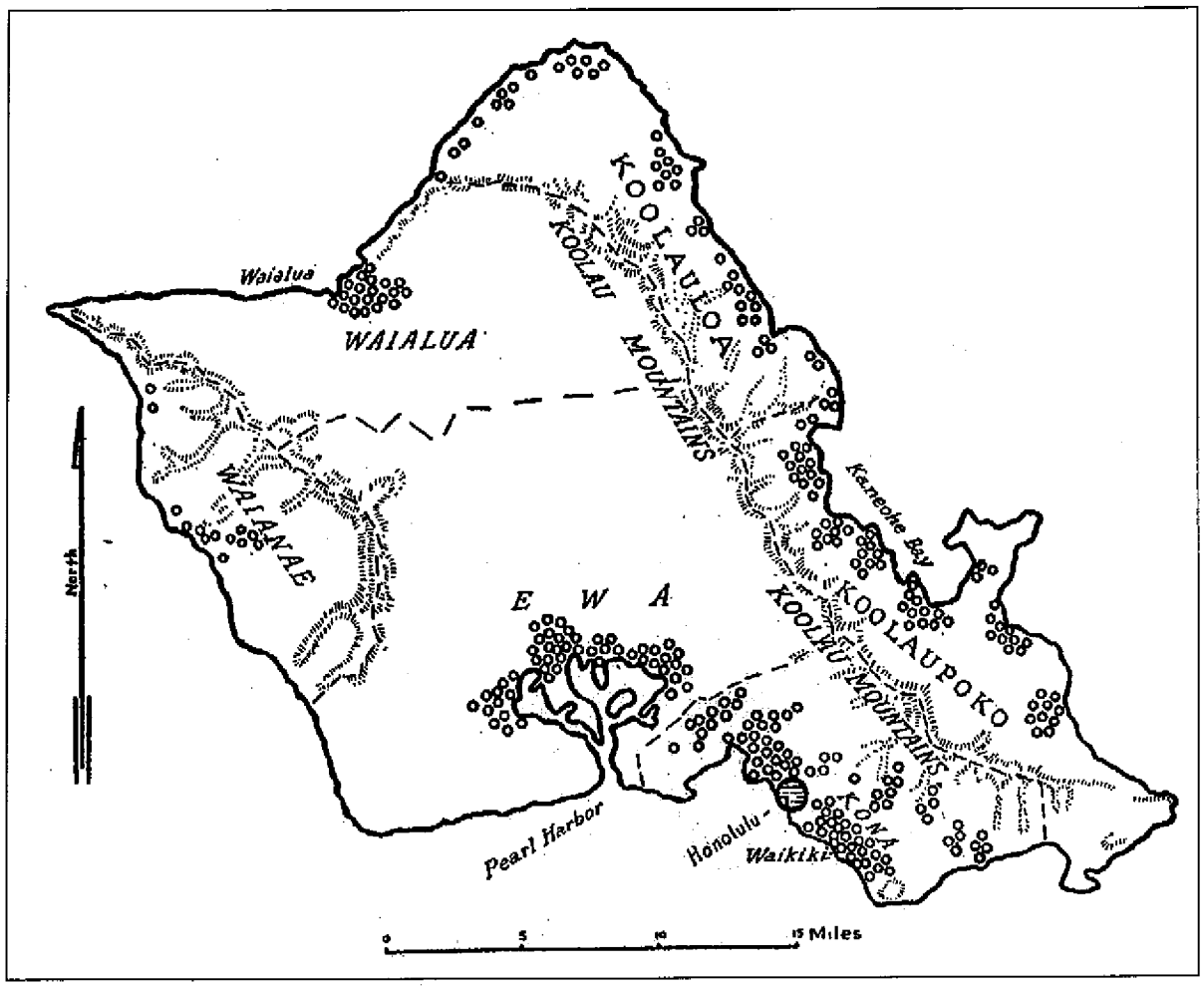



Figure 38. 1853 population density estimates; each symbol represents 50 people (Coulter 1931)

## 4.8 Ranching and Dairy Industries

In the mid-19th century, ranching became a major enterprise. English Captain George Vancouver introduced cattle and sheep to O'ahu in 1793 (Henke 1929:8), and by the 1840s, cattle had multiplied into a large herd (Devaney et al. 1982:70). At its peak, Kaneohe Ranch extended from the ocean in Kailua to the Pali and included 12,000 acres and 2,000 head of cattle (Henke 1929:62). By the mid-1860s, the cattle were so numerous as to cause environmental degradation. Alien grasses and other species, such as pigeon peas, were introduced to the area as cattle fodder (Henke 1929:62). Much of the land modification in the upland and hilly portions of Kāne'ohe may be the result of heavy cattle grazing over a long period of time. A view from the Pali looking toward Kāne'ohe in 1854 revealed that there were "hundreds of cattle...feeding on the rich pasture with which these plains were covered" (Bates 1854:104, cited in Devaney et al. 1982:70). The undulating plains at the foot of Nu'uanu Pali (Kekele lands) were described as "a rich land a while ago but now [mid-1860s] there are not many plants because animal are permitted there" (Sterling and Summers Ms.:207, cited in Devaney et al. 1982:70)

Cattle and horse grazing in Kāne'ohe Ahupua'a, including Mōkapu Peninsula, continued into the 1900s (Fiddler 1956:1). Harold K. L. Castle, the only child of James B. Castle, owned most of the *ahupua'a* of Kāne'ohe in the early 1900s (Kaneohe Ranch Management Limited 2008), and in 1917, he purchased 9,500 acres of land from Harris's daughter (Henke 1929:62). By the end of World War II, ranching was no longer economically viable for the Kaneohe Ranch, and the ranch became primarily a landlord to other farmers (Kaneohe Ranch Management Limited 2008).

The dairy industry rose to prominence over beef cattle ranching in the post-war years. The shortage of available land due to urban expansion, the shortage of fee-simple land, and the high price of land leases forced farmers in the dairy districts near Honolulu (e.g., Koko Head) to relocate to more remote areas of O'ahu (Durand 1959:241). In the 1950s, Kailua-Kāne'ohe was an important dairy district of Windward O'ahu. Dairy farming was dominated by Caucasians of Portuguese and Spanish ancestry, and secondarily by the Japanese: "Among the names of island dairymen, illustrating the Portuguese-Spanish-Mainland importance...are...Brazil, Carlos, Campos, Costa, Ferreria, Foster, Freitas, Knowles, Medeiros, Moniz, Ornellas, Rapoza, Santos, Toledo, Vause and White" (Durand 1959:235). The dairy industry was relatively short-lived as the expansion of the Pali route, exorbitant land prices in Honolulu, and more automobiles on O'ahu contributed to rapid urbanization in the *ahupua'a* of Kāne'ohe and Kailua (Durand 1959:244-245). Many landowners decided to develop their land for suburban housing and terminated leases with farm leaseholders.

## 4.9 Pineapple Plantations

The commercial cultivation of pineapple began in the 1890s and the first decade of the 1900s in Kāne'ohe Ahupua'a. From approximately 1910 to 1925, pineapple cultivation was a major industry in this area. In 1911, the company of Libby, McNeill and Libby built a pineapple cannery in the nearby *ahupua'a* of He'eia. At its peak, 2,500 acres were under pineapple cultivation on Windward O'ahu stretching from Kāne'ohe to Kahalu'u (Harper 1972). Most of the pineapple lands in Kāne'ohe were located below the Nu'uanu Pali near the current Project at

the HPU Hawai'i Loa campus, the Pali Golf Course, and the Hawaiian Memorial Park (Kelly 1987:295-296) (Figure 39) Kaualauki Heiau in He'eia Ahupua'a, was mostly destroyed by pineapple field clearance during this time—a likely fate of many archaeological sites (Kelly 1987). In 1919, the Kaneohe Ranch Company and Heeia Agricultural Co., Ltd. leased 1,000 acres of land throughout the *ahupua'a* of He'eia, Kāne'ohe, and Kailua, formerly planted in sugar, to the Libby company for a term of 17 years. In 1917, Libby leased an additional 600 acres in He'eia Ahupua'a (Libby, McNeill and Libby Ms:2, cited in Kawachi 1990). While the rice fields that covered old taro lands were mainly located near streams and near the coast, the pineapple fields were located on the slopes of higher lands, usually on land subleased to individual Japanese farmers:

> Pineapples were planted by individual Chinese and Japanese farmers on moderately sloped hill land where rice and taro could not be grown . . . these areas included the dissected alluvial terraces and the lower slopes and spurs of the Ko'olau range. (Miyagi 1963:115)

The change to the windward landscape in the first decades of the twentieth century as a result of pineapple cultivation is illustrated by the following passage:

> At last we reached the foot of the Pali. . . . Joe and I looked over the surrounding hills, but looked in vain for the great areas of guava through which but a few months ago we had fought and cut our way. As far as the eye could reach pineapple had taken the place of the forest of wild guava. The newest industry in Hawaii was beginning even to press upon the cane fields of this side of the island. (Alexander 1914:318, cited in Devaney et al. 1982:62)

The pineapple fields were abandoned when Moloka'i and Lāna'i pineapple cultivation began to boom. Libby pulled out of the Ko'olaupoko enterprise (Kelly 1975:47) and the cannery closed in 1923 (Dorrance 1998:95). Most of the former pineapple land went to grass, and some of it was used to graze cattle. Several of the small farmers returned to rice cultivation (Kelly 1975:47).

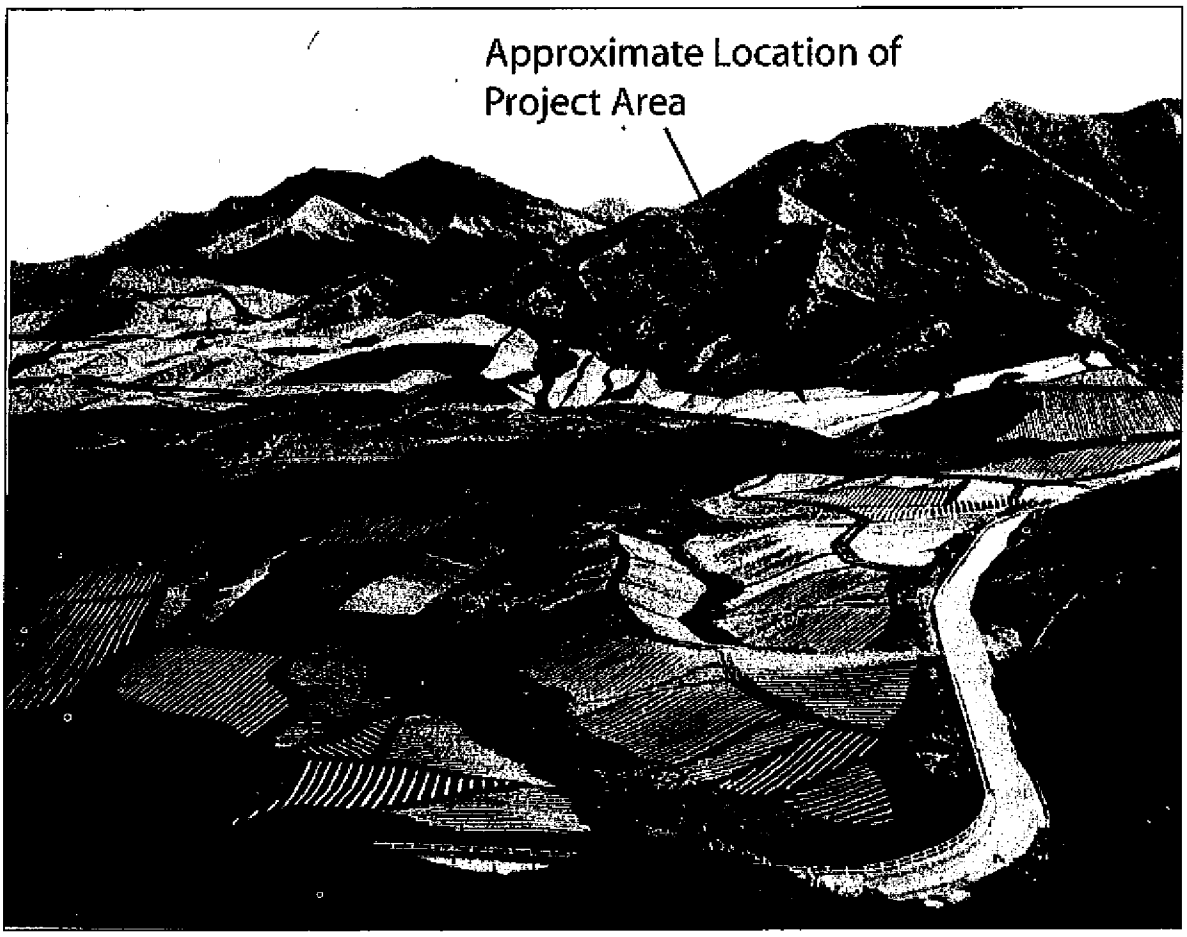



Figure 39. 1923 Photograph showing the extent of pineapple cultivation within the current Project area (Paradise of the Pacific, in Devaney et al. 1982:69)

## 4.10 Military Infrastructure

In 1918, a military reservation was built on the Mōkapu Peninsula at Kāne'ohe Bay; Fort Hase was commissioned and was known as the Kuwaahoe Military Reservation. Now known as the Marine Corps Base Hawaii (MCBH), the base helped lead to a boom in commercial and residential development in and around Kāne'ohe. Historic maps of the base of the Nu'uanu Pali and the Project area show minimal development between 1919-1943 (Figure 40-Figure 42).

During World War II, the Pali Training Camp was constructed in the vicinity of the current Project area. The camp "is comprised of approximately 4,400 acres that were used, by the military, as a regimental combat team training center for jungle and ranger training" (US Army Corps of Engineers 2005). The Pali Training Camp was centered in the area of the present-day Pali Golf Course located west of, and adjacent to, Kamehameha Highway (Figure 43). The current Project area is depicted as a cleared peripheral area with a temporary roadway extending from the Pali Training Camp to the north along the current Project area's northern boundary.

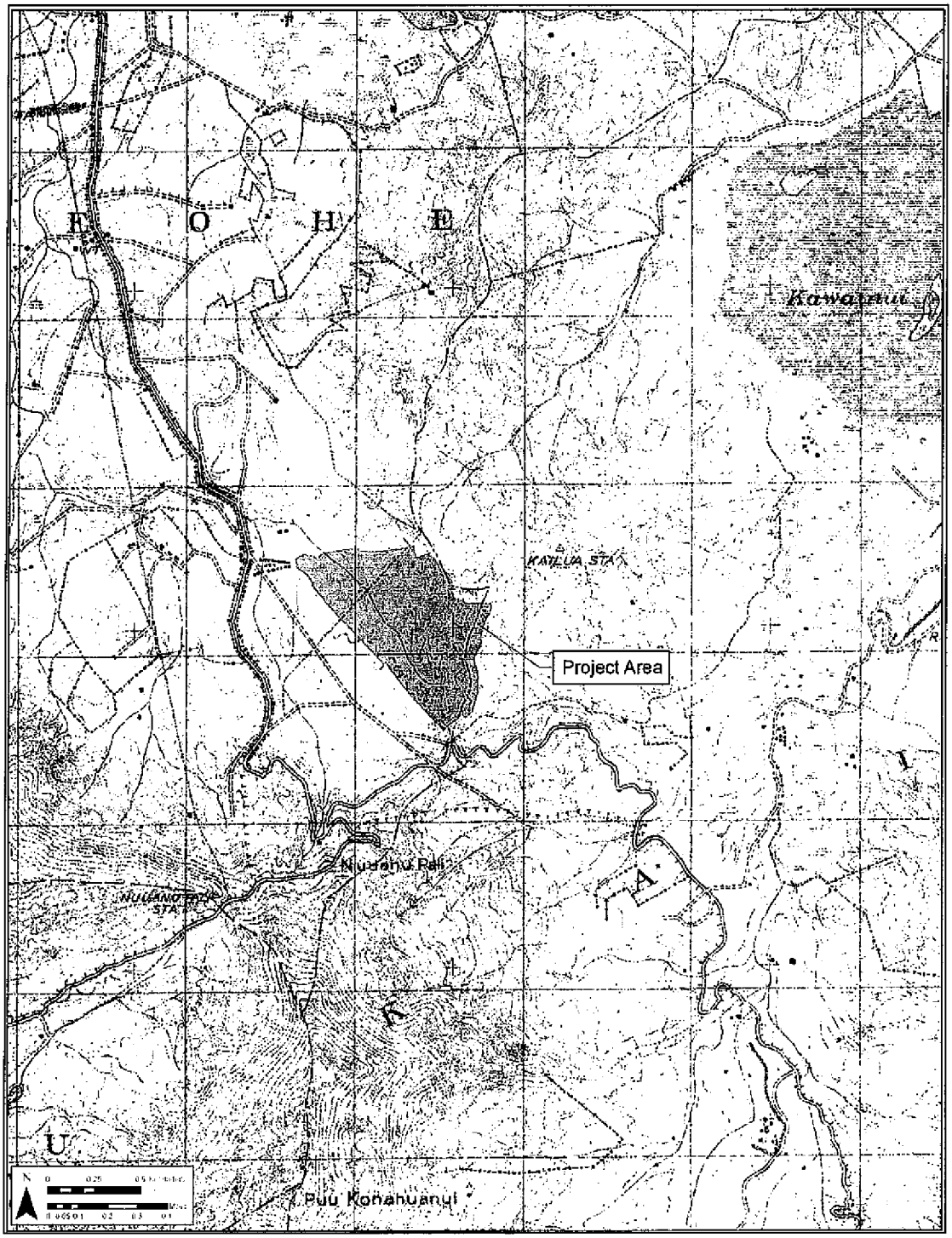



Figure 40. Portion of 1919 U.S. War Department map showing the Project area

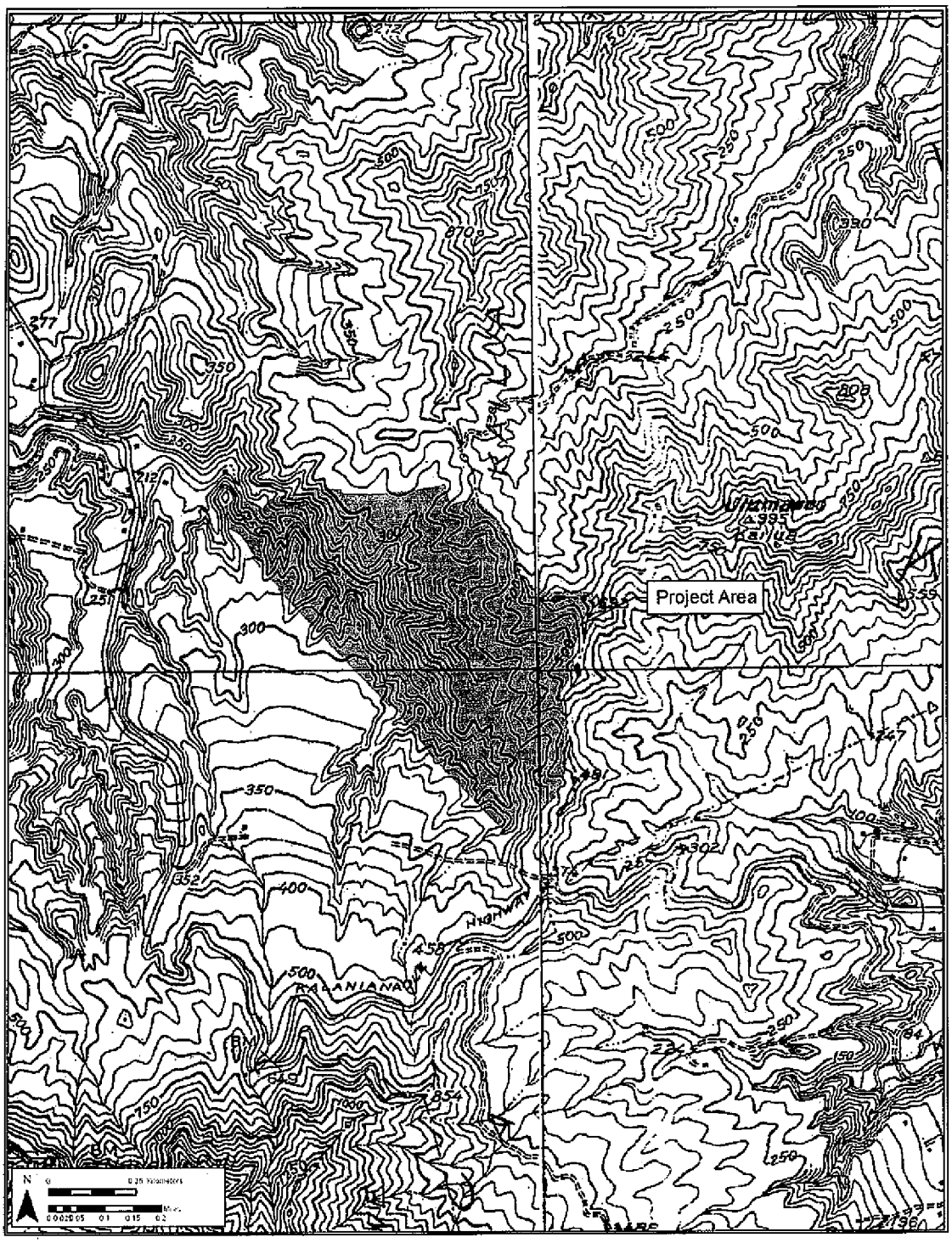



Figure 41. Portion of 1928 Mōkapu and Kāne'ohe USGS 7.5-minute topographic quadrangle showing the Project area

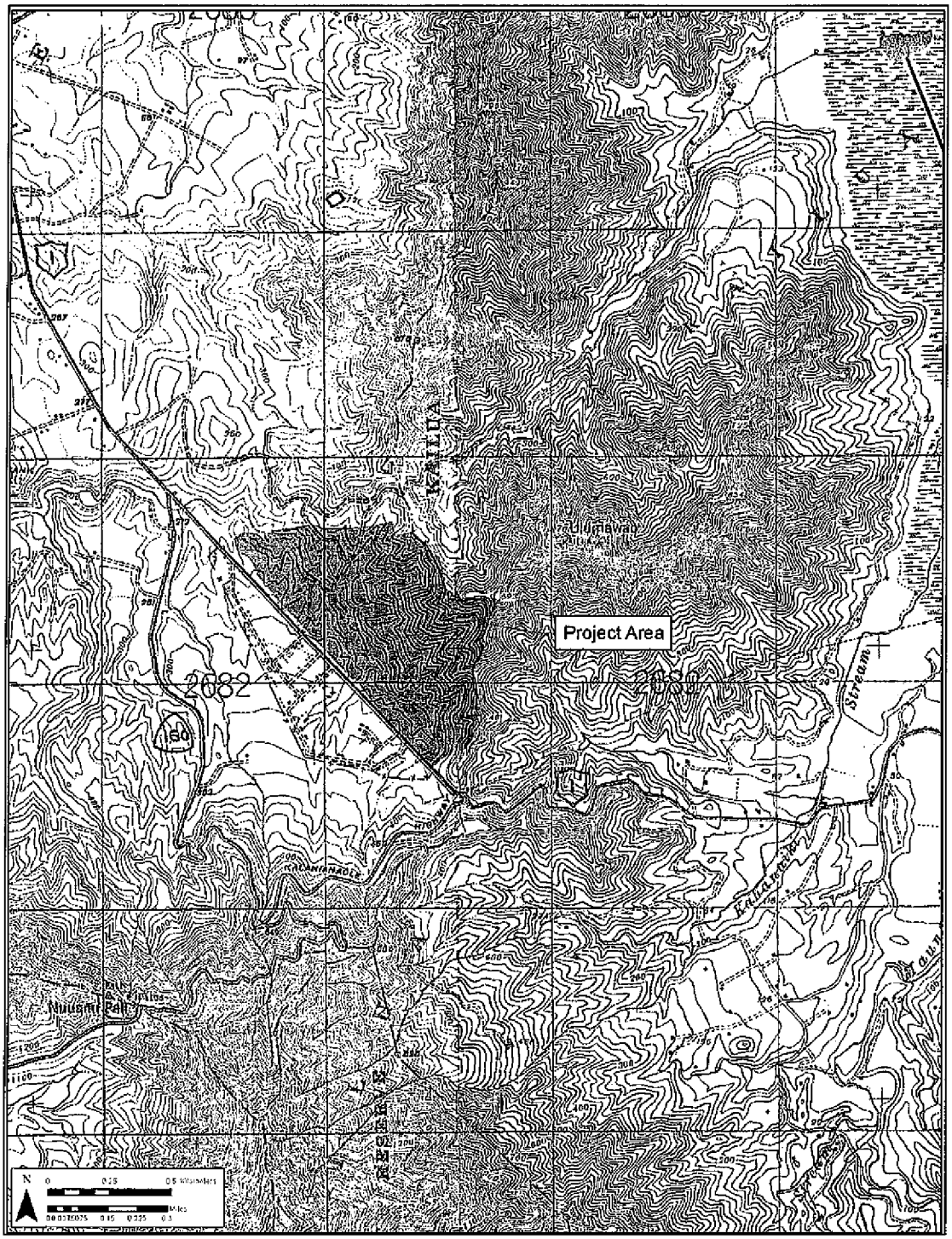



Figure 42. Portion of 1943 U.S. War Department map showing the Project area

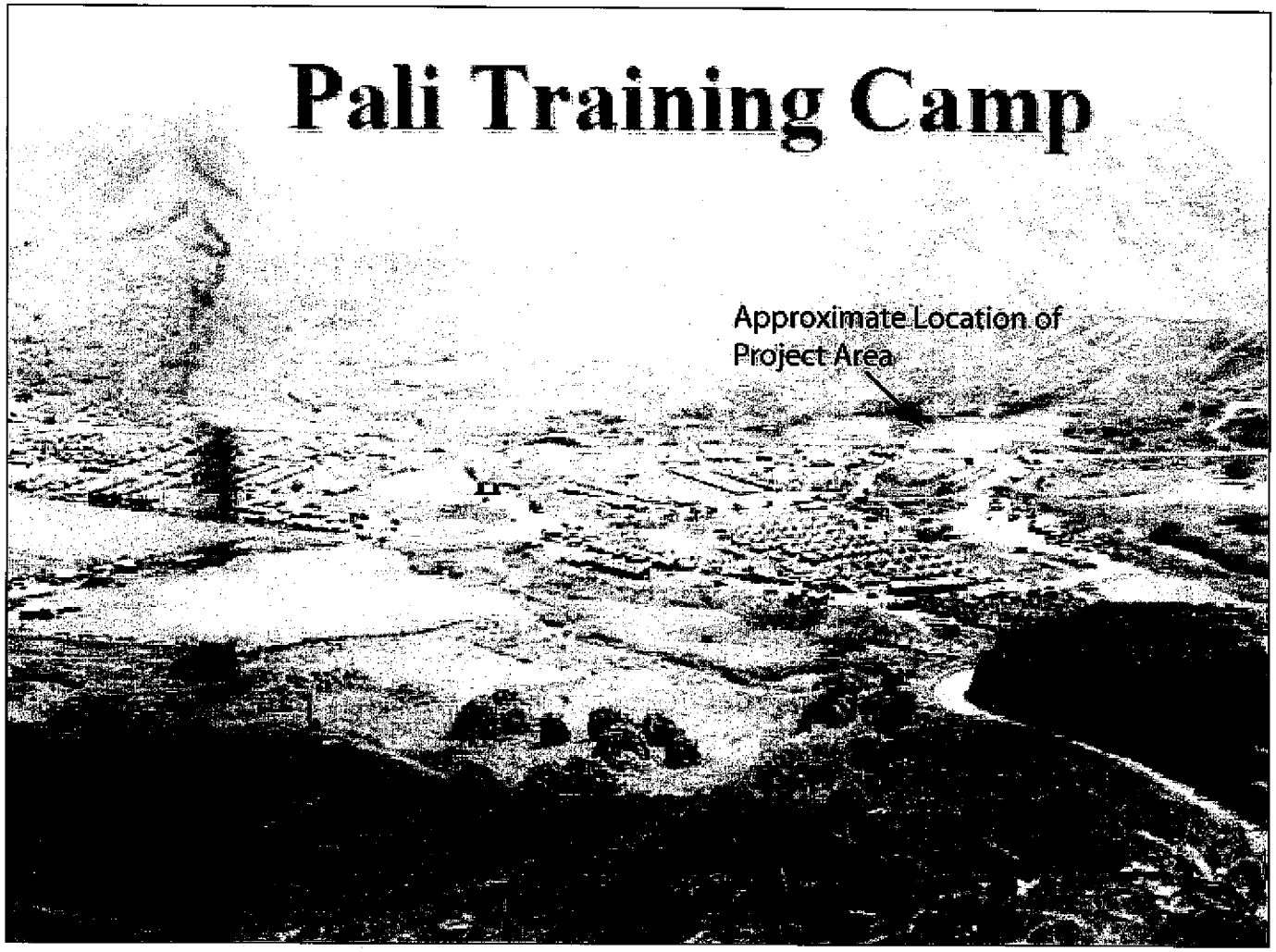



Figure 43. Photograph showing the Pali Training Camp adjacent to the current Project area (US Army Corps of Engineers 2005)

## 4.11 Modern Land Use

After World War II, residential developments changed the face of Kāne'ohe Ahupua'a. The newly constructed Wilson Tunnel on the Likelike Highway and the expansion of the Pali Highway in the 1950s and 1960s allowed easier access from Honolulu through the Ko'olau mountains to windward communities. This led the way to a development boom on the windward side of O'ahu. High tax rates on real estate sales forced many old-time landowners to lease their land to residential developers rather than sell on a fee-simple basis. Kaneohe Ranch at one time leased their land to over 5,000 single family residential lots in the *ahupua'a* of Kailua and Kāne'ohe. The vast majority of the leaseholds were sold to the lessees (Kaneohe Ranch Management 2008).

During the late 1960s, Hawai'i Loa College was constructed within the current Project area (Figure 44). Infrastructure included the Amos Starr and Juliette Montague Cooke Memorial Academic Center (built in 1969), the Dining Commons (built in 1970), and six residence halls (built in 1970). The college was opened in the fall of 1971 and continued successfully until merging with Hawai'i Pacific University in 1992. The existing Hawai'i Pacific University Hawai'i Loa campus currently serves an average daily number of 1,200 students (Group 70 International, Inc. 2009).

Figure 44. Portion of the orthoimagery of the 1977-78 Kāne'ohe USGS 7.5-minute topographic quadrangle showing the Project area

# Section 5 Archaeological Research

## 5.1 Overview

The main purpose of this section is to provide a detailed discussion of the archaeological sites within and immediately adjacent to the Project area (Figure 45, Table 1). Overall, the landscape surrounding the Project area contains several *wahi pana*, *heiau*, terraces, and other archaeological features, but no cultural properties exist within the Project area. In addition, no *ilina* have been discovered within or near the Project area.

## 5.2 Early Archaeological Surveys

Island-wide archaeological surveys of O'ahu, which included Kāne'ohe Ahupua'a, were conducted by Thrum (1916), McAllister (1933), and Sterling and Summers (1978). In the description that follows, the site numbers refer to those listed by McAllister (1933) (see Figure 9).

McAllister (1933:182) describes a *heiau* (Site 358) *mauka* of the Project area with three large paved terraces and a stone-lined depression facing the *pali*, most likely an *imu*. This may be Maunahuia Heiau (Site 358) that Thrum (1916) observed in ruins at the foot of the *pali*. Another *heiau* on the windward slopes of the *pali* on the ridge Puuwaniania above the depression Kaluaolomana is a *heiau* named Puuwaniania Heiau (Site 13). Kaluaolomana Heiau is located nearby (Landgraf 1994:104), although Thrum (1916) listed Kaluaolomana as another name for Puuwaniania Heiau. In addition, Thrum (1916:90) listed Pule and Kuakala as two additional *heiau* near the *pali*.

A hill at the base of the Nu'uanu Pali, Na Maka o Kane, resembled a human face in shape (Site 11). Below the smooth brow of a hill a tapering projection appeared as a nose, two slight depressions appeared as the hollow eye-pits on a human skull, and farther down other features highlighted the facial muscles (Parker ms:25-26, cited in Sterling and Summers 1978:220).

Ho'oleina'iwa consists of over twenty large unusually weathered boulders resting on a hill in the *'ili* of Ho'oleina'iwa at the base of the mountains *mauka* of the Project area (Landgraf 1994:106). There is no written documentation on this culturally significant site, but the tee-off area for the Ko'olau Golf Course was moved to preserve these *pōhaku* that appear similar to the birthing stones of Kūkaniloko (Landgraf 1994:106).

At the base of the Nu'uanu Pali immediately north of the Project area was a section of land known as Kamaikola (Site 357), from where a man named Pakuanui would either ambush travelers descending the Pali Trail or kill an unsuspecting traveler with a *pōhaku puka* suspended above the door to his house (McAllister 1933:181). At the base of the Nu'uanu Pali *mauka* of the Project area is Kekele (Site 12), a place that was fragrant with *hala* blossoms and bountiful in *hala* fruit for lei-making (Pualewa 1866, cited in Sterling and Summer 1978:221).

## 5.3 Recent Archaeological Studies in the Vicinity of the Project Area

CSH conducted an archaeological inventory survey for the proposed Hawaiian Memorial Park expansion (McCurdy and Hammatt 2008), located less than 740 meters from the current Project area. This study overlapped with a portion of a previous archaeological reconnaissance survey for the Pikoiloa Cemetery (Szabian et al. 1989). CSH observed 11 cultural properties. Several of these cultural properties had been previously recorded, including Kāwa'ewa'e Heiau, two complexes of enclosures and terracing, a historic terrace, and a historic boundary marker. CSH discovered several previously undocumented cultural properties, including a quarry, a stone enclosure, a stone alignment, a historic stone storage feature, and a historic pit feature. In addition, CSH conducted archaeological surveys for the Veterans Cemetery (Hammatt and Shideler 1989) and a sub-transmission line (Pfeffer and Hammatt 1992) without finding any cultural properties.

International Archaeological Research Institute, Inc. (IARII) conducted archaeological monitoring and data recovery for the Ko'olau Golf Course located approximately 670 meters west of the current Project area (Meeker and Murakami 1995). A total of 17 cultural properties were investigated, four of which were recommended for preservation. Cultural properties included one set of dry land agricultural terraces, several prehistoric and historic fire pits and kilns, stone mounds, and a lithic activity area.

Table 1. Previous Archaeological Studies in and within the Vicinity of Current Project Area

| Reference | Type of Investigation | Location | Findings |
|---|---|---|---|
| Thrum 1916 | Island-wide survey | Island wide | Identified two *heiau* in the vicinity of the Project area. |
| McAllister 1933 | Island-wide survey | Island wide | Identified 11 historic properties in the vicinity of the current Project area, two of which were *heiau*. |
| Sterling and Summers 1978 | Island-wide survey | Island wide | Section concerning Kāne'ohe includes legendary references to the naming of Kāne'ohe and other historic properties and the descriptions of McAllister's (1933) sites. |
| Hammatt and Shideler 1989 | Archaeological Survey | Veterans Cemetery 90-acres | No significant finds. |
| Szabian et al. 1989 | Reconnaissance Survey | North and West facing slope of ridge separating Kailua and Kāne'ohe | Describes 11 historic properties with 25 features, including Kāwa'ewa'e Heiau. |
| Pfeffer and Hammatt 1992 | Archaeological Assessment | Transmission Corridor mostly along Kamehameha Hwy. | No finds. |
| Meeker and Murakami 1995 | Archaeological Monitoring and Data Recovery Investigations | Ko'olau Pali | Seventeen historic properties investigated; of these, four were recommended for preservation. They include one set of dryland agricultural terraces, two open properties with lithic activity, and a single cluster of three stone mounds. |

| Reference | Type of Investigation | Location | Findings |
|---|---|---|---|
| McCurdy and Hammatt 2008 | Archaeological Inventory Survey | Hawaiian Memorial Park | Eleven historic properties were observed within or near the petition area; six properties had been previously identified and included Kāwa'ewa'e Heiau, two enclosure and terrace complexes, historic terrace, pit feature, and a boundary marker. Five new properties included a quarry, stone enclosure, stone alignment, stone storage, and a pit feature. |

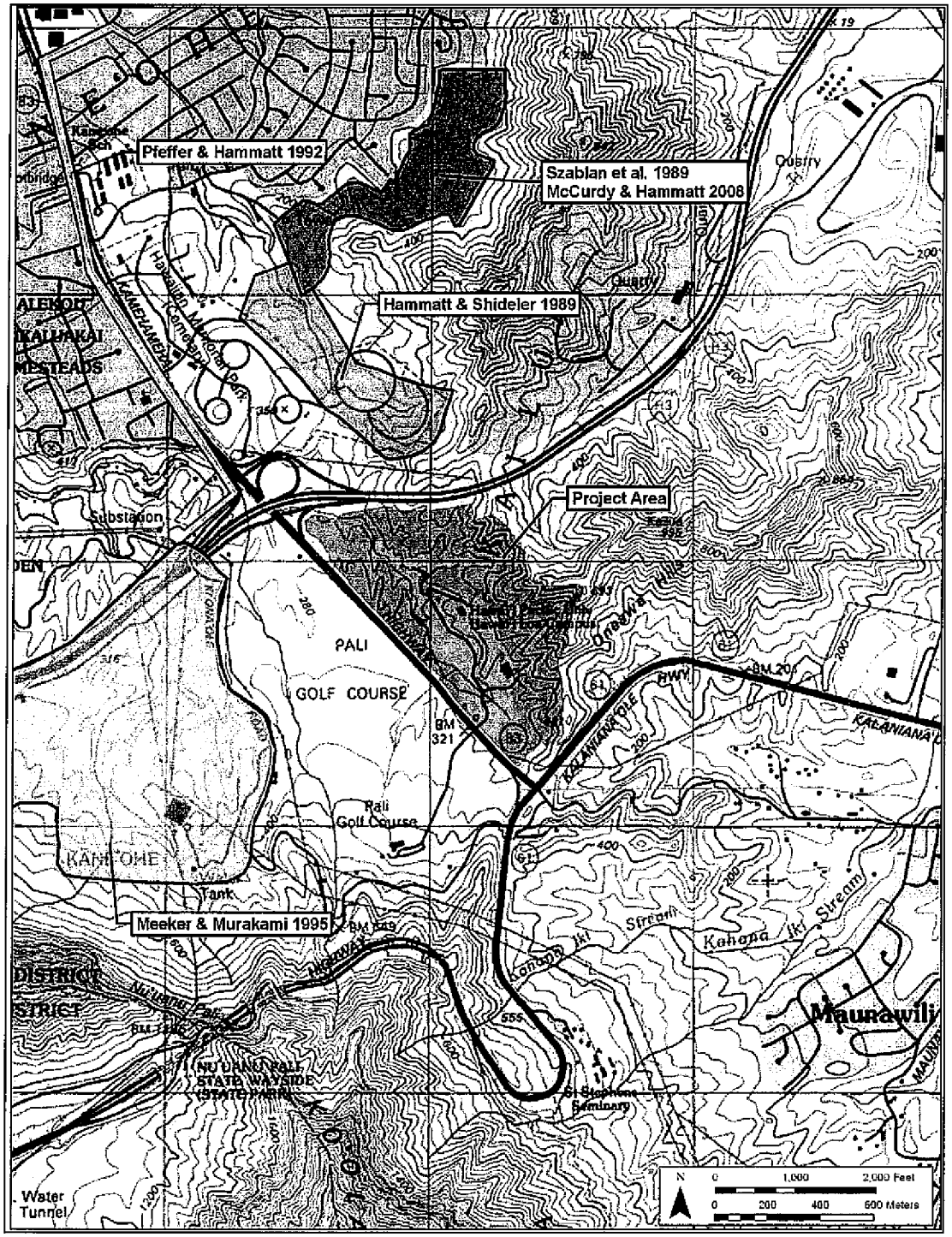



Figure 45. Portion of 1998 Kāne'ohe USGS 7.5-minute series topographic quadrangle showing locations of previous archaeological studies in the vicinity of the current Project area

## 5.4 CSH Archaeological Assessment

A CSH archaeologist conducted a field inspection of the Project area on November 19 and December 10, 2009 (Yucha and McDermott 2010). No cultural properties were identified within the Project area. The majority of the Project area consisted of the landscaped and maintained grounds and facilities of the Hawai'i Pacific University Hawai'i Loa Campus. The campus grounds largely consisted of open-mowed lawns, asphalt roadways and parking lots, campus buildings and facilities, and landscaped areas consisting of introduced trees and shrubbery. The majority of the campus grounds appeared to have been previously graded.

The survey focused on the currently undeveloped, heavily vegetated areas along the fringe of the campus grounds. These undeveloped areas are located along the southeastern edge (adjacent to and south of the academic center) and northwestern edge (between the maintained campus grounds and Kamehameha Highway) of the Project area. The undeveloped areas were dominated by dense, nearly impassable cat's claw and *hau* interspersed between non-native trees and shrubs, such as octopus tree, Java plum, and guava.

# Section 6 Community Consultation

Throughout the course of this assessment, an effort was made to contact and consult with Hawaiian cultural organizations, government agencies, and individuals who might have knowledge of and/or concerns about traditional cultural practices specifically related to the Project area. This effort was made by letter, e-mail, telephone and in person contact. The initial outreach effort was started in November 2009. Community consultation was completed in February 2010. In the majority of cases, a letter, map and an aerial photograph of the Project area, and a conceptual image of the proposed changes to the HPU Hawai'i Loa campus were mailed with the following text:

> At the request of Group 70 International, Inc., Cultural Surveys Hawai'i (CSH) is conducting a Cultural Impact Assessment (CIA) for the Hawai'i Pacific University Master Plan Project, Kāne'ohe Ahupua'a, Ko'olaupoko District, Island of O'ahu (TMK [1] 4-5-035:010). The 132.46 acre Project area encompasses the HPU Hawai'i Loa Campus.
>
> Strategic planning for the HPU Hawai'i Loa Campus expansion aims to accommodate current and anticipated enrollment growth. The conceptual five-year Master Plan proposes the following new facilities and improvements (see image) that will make the campus more cohesive: A signalized intersection at the existing entry/exit from Kamehameha Highway (1A); the current soccer field relocated (2A) so that the space can be converted to a landscaped parking area with 400 parking spaces (2); the nearby Paul and Vi Loo Performing Arts Center (3) and indoor recreational facilities (3B); a covered walkway flanking the parking lot for pedestrian access (4); the Academic Center II building (5); a pathway and bridge connecting the Academic Center II to the existing Cooke Academic Center (6); a new student center with a bookstore and café (7); new residential facilities to accommodate 400 on-campus student residents (8); and renovated food service facilities (9).
>
> The purpose of this cultural study is to assess potential impacts to cultural practices as a result of proposed development in the Kāne'ohe Ahupua'a. We are seeking your *kōkua* and guidance regarding the following aspects of our study:
>
> - **General history and present and past land use of the Project area.**
> - **Knowledge of cultural sites which may be impacted by future development of the Project area - for example, historic sites, archaeological sites, and burials.**
> - **Knowledge of traditional gathering practices in the Project area, both past and ongoing.**
> - **Cultural associations of the Project area, such as legends and traditional uses.**

- **Referrals of *kūpuna* or elders and *kama'āina* who might be willing to share their cultural knowledge of the Project area and the surrounding *ahupua'a* lands.**
- **Any other cultural concerns the community might have related to Hawaiian cultural practices within or in the vicinity of the Project area.**

In most cases, several (2-3) attempts were made to contact individuals, organizations, and agencies apposite to the CIA for Kāne'ohe Ahupua'a. The results of the community consultation process are presented in Table 2. Excerpts from more extensive interviews specifically related to Kāne'ohe Ahupua'a and the Project area are presented in Section 6 below.

Table 2. Results of Community Consultation

| [illegible] | [illegible] | [illegible] |
|---|---|---|
| Ailā, William | Hui Mālama I Nā Kūpuna 'O Hawai'i Nei | November 17, 2009 CSH sent letter.<br>January 4, 2010 CSH sent second letter by email. |
| Akioka, Kalae | Pū'ōhala Elementary School *kupuna* | November 17, 2009 CSH sent letter.<br>November 30, 2009 Mr. Akioka replied and does not know of any cultural information in the Project area. |
| Anonymous | Hawai'i Pacific University Hawai'i Loa Campus | January 19, 2010 CSH conducted an interview with a person who requested to remain anonymous (see Section 7.6). |
| Ayau, Halealoha | Hui Mālama I Nā Kūpuna 'O Hawai'i Nei | November 17, 2009 CSH sent letter.<br>January 4, 2010 CSH sent second letter by email.<br>January 4, 2010 Mr. Ayau replied and will forward community outreach information to other members. |
| Brennan, Paul | Kailua Historical Society | November 17, 2009 CSH sent letter by email.<br>November 20, 2009 Mr. Brennan replied and does not want to comment on Kāne'ohe. |
| Bridges, Cy | O'ahu Island Burial Council | December 29, 2009 CSH sent letter. |
| Burrows, Chuck | 'Ahahui Mālama I ka Lōkahi, President | November 17, 2009 CSH sent letter.<br>January 4, 2010 CSH sent second letter by email. |
| Camvel, Donna and Wali | Ko'olaupoko Hawaiian Civic Club, 2nd Vice President | November 17, 2009 CSH sent letter.<br>January 4, 2010 CSH sent second letter by email. |

| [illegible] | [illegible] | [illegible] |
|---|---|---|
| | | January 25, 2010 CSH phoned and left message.<br>January 27, 2010 CSH phoned and Mrs. Camvel said she will call back. |
| Cayan, Phyllis "Coochie" | SHPD, History & Culture Branch Chief | November 17, 2009 CSH sent letter.<br>December 21, 2009 Mrs. Cayan replied (see Section 6.1). Mrs. Cayam referred Denise Mahealani Cypher, Tiona Wailehua Val Ching, Kawai Ueoka, Aaron Mahi, Cy Bridges, and Muriel Seto. CSH could not find contact information for Val Ching and Kawai Ueoka, and Muriel Seto was not contacted due to time limitations. |
| Chang, Lianne | Hula practitioner, *kupuna* and *kama'āina* of Kāne'ohe | November 17, 2009 CSH sent letter.<br>January 4, 2010 CSH sent second letter by email.<br>January 4, 2010 Mrs. Chang replied and referred Kihei and Mapuana DeSilva and Dr. David Burrows, but he was not contacted due to time limitations. |
| Chang, Linda | Hula practitioner, *kupuna* and *kama'āina* of Kāne'ohe | November 17, 2009 CSH sent letter.<br>January 4, 2010 CSH sent second letter by email. |
| Cypher, Mahealani | Ko'olaupoko Hawaiian Civic Club, Past President and current Cultural Interpreter | November 17, 2009 CSH sent letter.<br>December 11, 2009 CSH phoned and Mrs. Cypher said she is concerned about the *ahupua'a* boundary marker project on the ridge behind the HPU campus.<br>January 10, 2010 Mrs. Cypher led a cultural tour of the Likeke Trail (see Section 7.4), and CSH conducted an interview during the tour. Mrs. Cypher referred Noenoelani Zuttermeister, Barbara Wong, Hank Iida and Glen Nezota.<br>February 2, 2010 CSH phoned and Mrs. Cypher approved interview summary. |

| [illegible] | [illegible] | [illegible] |
|---|---|---|
| De Silva, Kihei and Mapuana | Hula halau 'Ilima | November 17, 2009 CSH sent letter.<br>January 4, 2010 CSH sent second letter by email.<br>January 25 CSH phoned and left message. |
| Dunn, Elizabeth | Hawai'i Chapter of the Sierra Club, O'ahu Volunteer Coordinator and Membership Chair | November 17, 2009 CSH sent letter.<br>January 4, 2010 CSH sent second letter by email. |
| Fanning, Florence | *Kama'āina* of Kāne'ohe and author of *A Partial History of Japanese in Kanoehe* | January 11, 2010 CSH phoned and Mrs. Fanning referred Alice Hewett. |
| Gon, Sam | Nature Conservancy | November 17, 2009 CSH sent letter.<br>January 4, 2010 CSH sent second letter by email.<br>January 10, 2010 Mr. Gon replied and is not familiar with the Project area. |
| Grote, Edith | *Kama'āina* of Kāne'ohe | January 10, 2010 CSH phoned Mrs. Grote.<br>January 12, 2010 Interview.<br>January 18, 2010 Mrs. Grote phoned and withdrew her interview from the study. |
| Hewett, Alice | Ko'olaupoko Hawaiian Civic Club | November 17, 2009 CSH sent letter.<br>January 19, 2010 CSH phoned.<br>January 21, 2010 CSH conducted interview (see Section 7.3) and Mrs. Hewett referred Donna Camvel.<br>January 29, 2010 CSH phoned and Mrs. Hewett approved interview summary. |
| Himatsu, Gary | Windward Lions Club | November 17, 2009 CSH sent letter. |
| Iida, Hank | *Kama'āina* of Kāne'ohe | January 11, 2010 CSH phoned and Mr. Iida referred Florence Fanning. |
| Kaluhiwa, Rocky and Jerry | *Kama'āina* of Kāne'ohe | January 11, 2010 CSH phoned and left message. |

| [illegible] | [illegible] | [illegible] |
|---|---|---|
| Kāne, Shad | O'ahu Island Burial Council, Nā Koa 'O Pālehua | November 17, 2009 CSH sent letter.<br>January 4, 2010 CSH sent second letter by email. |
| Ka'uhane, Keola | *Kama 'āina* of Kāne'ohe | November 17, 2009 CSH sent letter.<br>January 4, 2010 CSH sent second letter by email. |
| Kawelo, Hi'ilei | *Kama 'āina* of Kāne'ohe | November 17, 2009 CSH sent letter.<br>January 4, 2010 CSH sent second letter by email. |
| Kim, Aldin | *Kama 'āina* of Kāne'ohe | November 17, 2009 CSH sent letter. |
| Lau, Elizabeth C. Pelekikena | Ko'olaupoko Hawaiian Civic Club | November 17, 2009 CSH sent letter.<br>January 29, 2010 CSH phoned Mrs. Hewett, who said she spoke with Mrs. Lau who explained to her that she is not aware of any cultural properties near the Project area. |
| Leong, Marian | Partners in Education Program Caretakers of Kāwa'ewa'e Heiau | November 17, 2009 CSH sent letter.<br>January 4, 2010 CSH sent second letter by email. |
| Loo, Clifford | Kamehameha Schools *kupuna* | November 17, 2009 CSH sent letter.<br>January 25, 2010 CSH phoned and left message. |
| Mahi, Aaron D. | OIBC | November 17, 2009 CSH sent letter.<br>December 29, 2009 CSH sent second letter by email. |
| Mahoe, Chinky | *Kumu hula* | November 17, 2009 CSH sent letter.<br>January 4, 2010 CSH sent second letter by email. |
| Mahealani, Merryman | Partners in Education Program Caretakers of Kāwa'ewa'e Heiau | November 17, 2009 CSH sent letter. |
| Motohiro, Daniel | Windward Lions Club | November 17, 2009 CSH sent letter. |
| Nāmu'o, Clyde | OHA, Administrator | November 17, 2009 CSH sent letter.<br>December 18, 2009 Mr. Nāmu'o replied (see |

| [illegible] | [illegible] | [illegible] |
|---|---|---|
| | | Section 6.2). |
| Nezota, Glen | Kāne'ohe Bakery | January 26, 2010 CSH phoned and left message. |
| Ogata, Charlie | Queen Emma Hawaiian Civic Club, member and former *kia'i* (caretaker) of the Kāwa'ewa'e Heiau | November 17, 2009 CSH sent letter.<br>January 4, 2010 CSH sent second letter by email. |
| Pedrina, Rich | *Kumu hula*, Halau Hula 'O Napunaheleonapua | November 17, 2009 CSH sent letter.<br>January 4, 2010 CSH sent second letter by email.<br>January 15, 2010 Mr. Pedrina replied and referred Clifford Loo. |
| Wada, Susan | Queen Lili'uokalani Children's Center | November 17, 2009 CSH sent letter. |
| Waddington, Jim | Hawai'i Chapter of the Sierra Club, O'ahu Sierra Club, O'ahu Group Hike Leader | November 17, 2009 CSH sent letter.<br>January 4, 2010 CSH sent second letter by email. |
| Wailehua, Tiona | *Kupuna* of Kāne'ohe | December 29, 2010 CSH sent letter.<br>January 26, 2010 CSH called. |
| Waterman, Casina K. Pelekikena | Caretakers of Kāwa'ewa'e Heiau | November 17, 2009 CSH sent letter.<br>January 4, 2010 CSH sent second letter by email. |
| Wolfgramm, Emil | *Kama'āina* of Kāne'ohe | November 17, 2009 CSH sent letter. |
| Wong, Barbara | *Kama'āina* of Kāne'ohe | January 20, 2010 CSH phoned and left message. |
| Yanagihara, Roy | Kāne'ohe Neighborhood Board Chair | November 17, 2009 CSH sent letter.<br>January 4, 2010 CSH sent second letter by email. |
| Yim, Evans | *Kama'āina* of Kāne'ohe | January 26 CSH phoned Mr. Evans and conducted a phone interview (see Section 7.5).<br>February 2, 2010 CSH phoned and Mr. |

| [illegible] | [illegible] | [illegible] |
|---|---|---|
| | | Evans approved interview summary. |
| Yong, Lilinoe | *Kama'āina* of Kāne'ohe | November 17, 2009 CSH sent letter.<br>January 4, 2010 CSH sent second letter by email. |
| Yoshimori, Grant | Hui O Piko'iloa | November 17, 2009 CSH sent letter.<br>January 4, 2010 CSH sent second letter by email.<br>January 6, 2010 Mr. Yoshimori replied and referred Ricky Bermudez but no address or phone number is available. |
| Zuttermeister, Noenoelani | *Kama'āina* of Kāne'ohe | January 12, 2010 CSH phoned and Mrs. Zuttermeister referred Alice Hewett, Rocky and Jerry Kaluhiwa, Evans Yim, and Edith Grote. |

## 6.1 State Historic Preservation Division (SHPD)

CSH contacted Phyllis "Coochie" Cayan, History and Culture Branch Chief of SHPD, on November 17, 2009. In a written response sent to CSH on December 1, 2009 (see Appendix B), Ms. Cayan states that there are many significant sites within the *ahupua'a* of Kāne'ohe, including *heiau* complexes, burials and burial sites, fishing shrines and other cultural treasures. SHPD recommends identifying the core families of Kāne'ohe Ahupua'a and other resources, including the Ko'olaupoko Hawaiian Civic Club, the Neighborhood Boards for both Kāne'ohe and Kailua, the Hawaiian educators at Windward Community College, the Queens Liliuokalani Childrens Center (QLCC), senior citizen programs in both areas, as well as the following individuals: Denise Mahealani Cypher (Native Hawaiian), Aunty Tiona Wailehua (*kupuna*; a core family), Val Ching (Hawaiian practitioner), Kawai Ueoka (Hawaiian practitioner), Aaron Mahi (Native Hawaiian/OIBC member), Cy Bridges (Native Hawaiian/OIBC member), and Muriel Seto (Kailua Historical Society).

## 6.2 Office of Hawaii Affairs (OHA)

CHS contacted Clyde Nāmu'o, Administrator of OHA, on November 17, 2009. In a written response sent to CSH on December 18, 2009 (see Appendix C), Mr. Nāmu'o states that OHA recognizes that the proposed Project aims to accommodate current and future student enrollment with new facilities and planned improvements designed to make the HPU Hawai'i Loa Campus more cohesive, but OHA does not have any specific comments concerning the impact of the Project on historical, cultural or natural resources.

# Section 7 Summaries of *Kama'āina* Interviews

## 7.1 Overview

*Kama'āina* and *kūpuna* with knowledge of the proposed Project and study area participated in semi-structured interviews for this CIA. Interviews for this study were conducted from November 2009 to February 2010. CSH attempted to contact 47 individuals for this draft CIA report; of those, 18 responded; and four participated in formal interviews. Efforts are still ongoing to solicit additional responses, which will be incorporated into subsequent drafts of this report. CSH initiated the interviews with questions from the following six broad categories: *Wahi Pana* and *Mo'olelo*, Agriculture, Gathering and Hunting, Freshwater and Marine Resources, Trails, Cultural and Historic Properties, and Burials. Participants' biographical backgrounds (in brief), comments and concerns about the proposed development and Project area and environs are presented below.

## 7.2 Acknowledgements

The authors and researchers of this report extend our deep appreciation to everyone who took time to speak and share their *mana'o* (thoughts) with CSH whether in interviews or brief consultations. We request that if these interviews are used in future documents, the words of contributors are reproduced accurately and not in any way altered, and that if large excerpts from interviews are used, report preparers obtain the express written consent of the interviewee/s.

## 7.3 Alice Hewett

CSH met with Alice Hewett on January 21, 2010 at her home in Kāne'ohe. Mrs. Hewett, now 78 years old, was born in Honolulu on Aug 8, 1931 and has lived in Kāne'ohe all her life. Her father, Frank Kanae, was a fireman in Kāne'ohe and her mother raised their children at home. Mrs. Hewett grew up near the present-day King's Intermediate School near Kāne'ohe Bay, but her family also owned lands in the Haiku wetlands, also referred to as the Haiku plantation, at the base of the Ko'olau *pali* in He'eia Ahupua'a, which borders Kāne'ohe Ahupua'a to the north.

Mrs. Hewett's family used the river water of Haiku to irrigate several acres of *lo'i*. She remembers a constant supply of water for the irrigated taro terraces in Haiku. As a child, Mrs. Hewett worked with her siblings to clean and pound the taro with machines into *poi*. She was too young to spend much time in the taro fields, but she reminisces fondly about the central importance of taro to her family. She and her family consumed taro as their staple food. They ate it in a variety of ways for most meals, including *poi*, steamed taro, and taro hotcakes. Her family also sold *poi* to U.S. servicemen in Kāne'ohe during World War II and to the public through vegetable markets in town. In fact, she and her family regularly filled 50 bags of taro each morning. As a young girl in elementary school, Mrs. Hewett sewed one- and two-pound bags of *poi* for a penny each.

The Haiku land was incredibly productive. In addition to the intense cultivation of taro from the naturally irrigated wetlands, the taro patches contained *'ōpae*, or freshwater shrimp. Mrs. Hewett recollects using the spine of a coconut palm to collect the shrimp. In addition, the land

supported an abundance of papaya, banana, and bamboo. Mrs. Hewett's family was also knowledgeable of several plants used for Hawaiian medicines, and they also gathered *māmaki*, the leaves of which were used to make tea. Her family also hunted wild pigs and raised chickens in Haiku.

Mrs. Hewett's family fished and hunted for crabs in the waters of Kāne'ohe Bay behind their home near the King Intermediate School. In addition, they had access to the He'eia Fishpond. Mrs. Hewett remembers with fondness catching and eating *'ō'io* (ladyfish, bonefish) and white crabs.

Mrs. Hewett has witnessed many changes to the land of Kāne'ohe and He'eia during her lifetime. She recalls that pineapples covered the *mauka* regions of these *ahupua'a*, but this enterprise was not very productive. As a result, rice was also cultivated, but the land was transformed once again with the dairy industry. Dairy farmers of mainly Portugese ancestry allowed their cattle to graze on much of the land in Kāne'ohe. However, the wet, bottom lands were still used to grow taro. Today, taro in this area is seldom grown, so Mrs. Hewett and the Ko'olaupoko Hawaiian Civic Club are actively trying to rebuild the *lo'i* of Haiku.

Reflecting on the specific area of land under consideration for the current Project, Mrs. Hewett remembers that several Japanese families lived there. They were dairy farmers who sold vegetable produce and flowers at stands on the old Pali Road *makai* of the present-day Castle Junction near the current Project area. Mrs. Hewett remembered the vegetable stands of Nishimoto and Kanaka. She also referred to Fanning's (2008:98) *Partial History of the Japanese in Kaneohe: 1898 to 1959* to recall other specific family names—Kawamoto, Kimura, Koreyasu, Kashiwabara, Yamada, Kodama, Murabayashi, Takagawa, Tanaka, Sakamoto, and Wakabayashi.

In addition, a military training area called the Pali Camp, or 18 Camp, was located directly north of the current Project area during World War II. Mrs. Hewett recalls leaving St. Anthony's Church in Kailua when Japanese planes flying overhead signaled the start of the Pacific theater of World War II. Several of her relatives were killed when they were returning to Pearl Harbor.

Mrs. Hewett is knowledgeable of a *heiau* in Haiku Valley, but she is not aware of any historical, cultural or archaeological sites at or near the Project area. However, the State of Hawai'i is presently planning to build a stone *ahupua'a* boundary marker on the ridge behind the HPU Hawaii Loa Campus as part of an island-wide initiative. She is concerned that the Project may impact this *ahupua'a* boundary marker project.

## 7.4 Mahealani Cypher

CSH accompanied Mahealani Cypher, Cultural Interpreter for the Ko'olaupoko Hawaiian Civic Club, on the Likeke Trail on January 10, 2010. The Likeke Trail winds along the base of the Ko'olau *pali* in the *ahupua'a* of Kāne'ohe close to the Project area. Mrs. Cypher pointed out and described the *wahi pana* along the Likeke Trail and supplied CSH with a brochure (Ko'olaupoko Hawaiian Civic Club 2008).

Hawaiians once traveled on many trails through the *mauka* regions of Kāne'ohe Ahupua'a. In particular, Hawaiians used a trail along the based of the *pali* to visit an *ali'i* named Maunahuia.

Richard Davis re-discovered this trail in the 1970s. Since the Hawaiian translation of Richard is Likeke, the trail is now referred to as the Likeke Trail. To enter the Likeke Trail requires first hiking along a section of the old Pali Road that was constructed in 1919, then along a section of the traditional Pali Trail, and finally along a portion of the cobbled Pali Road that was assembled in the mid 1800s (Figure 46).

The area surrounding the Likeke Trail at the base of the Nu'uanu Pali is known as Kekele, a place where fragrant *hala* blossoms once bloomed in a large grove. It was referred to in songs and traditions as "the sweet land of fragrance and perfume" because the fragrance from the blossoms of these trees scented the whole region. Towering above Kekele is Pu'u Konahuanui within the neighboring *ahupua'a* border of Kailua. There are several large *pōhaku* along the trail that serve as silent sentinels of the land, including Pōhaku o Kāne (Figure 47). The Ko'olaupoko Hawaiian Civic Club re-discovered this large *pōhaku*, which was until recently hidden in the brush next to the trail.

Farther along the trail is a spring-fed waterfall that Mrs. Cypher believes is Hi'ilaniwai, meaning "carrying heavenly waters" (Figure 48). Mrs. Cypher notes that previous archaeologists located Hi'ilaniwai farther to the north, but she maintains that it the waterfall along the Likeke Trail near the Nu'uanu Pali is the correct location. After exploring the *mauka* regions of Kāne'ohe Ahupua'a, Mrs. Cypher has come across two waterfalls that could potentially be Hi'ilaniwai and only the waterfall near the Nu'uanu Pali fits previous descriptions of water flowing from a rocky precipice in a secluded dell near the base of the hills.

Beyond Hi'ilaniwai along the trail in a grove of large mango trees reside the remnant stone foundations of Maunahuia Heiau (Figure 49). This *heiau* and surrounding agricultural terraces once belonged to Chief Maunahuia. This *heiau* and other visual images of the traditional belief system are thought to have been destroyed by priests just prior to the arrival of the missionaries in the mid-1820s and following the breakdown of the *kapu* system. The *kāhuna* continued to secretly practice their traditional religious beliefs. Based on her observations that many sacred areas throughout the Hawaiian Islands have had mango trees planted around the sites, Mrs. Cypher suggests that *kāhuna* planted mango trees, which were introduced to Hawai'i in the 1820s, to mark their consecrated grounds after learning that such trees grew to be very large and lasted many generations. Scholars focusing on the agriculture of ancient Hawai'i such as Handy and Handy (1972) reference mango trees for their fruit, but Mrs. Cypher contends that Hawaiians planted them in a circle around the center of *heiau* and other sacred sites, including Maunahuia Heiau, to mark the land for future generations.

Mrs. Cypher is concerned that the Project may interfere with a State of Hawai'i project to construct an *ahupua'a* boundary marker on the ridge, which traditionally separates the *ahupua'a* of Kāne'ohe from Kailua.

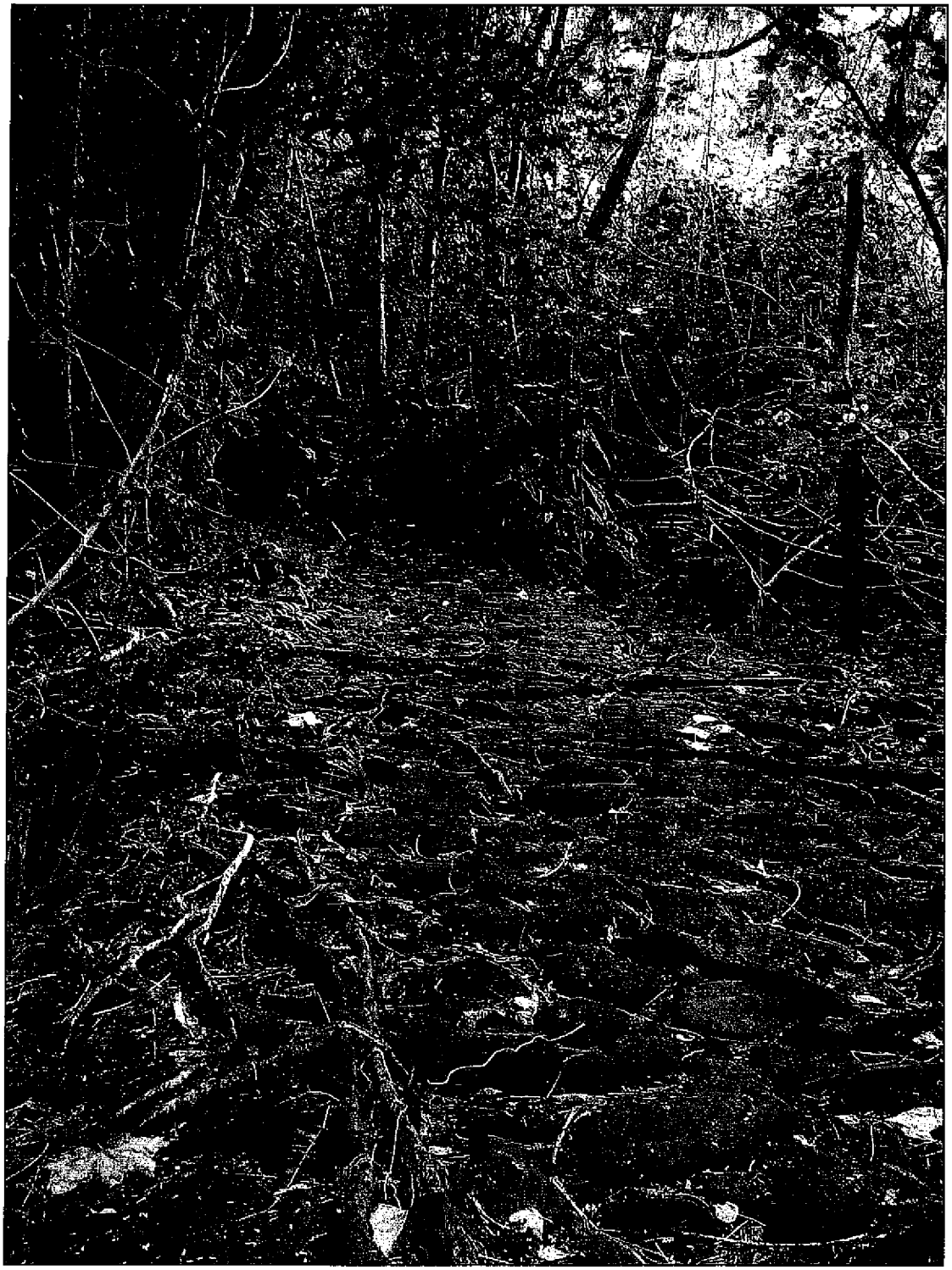


Figure 46. Stone-paved Pali Road (CSH January 10, 2010)

Figure 47. Pōhaku o Kāne (CSH January 10, 2010)

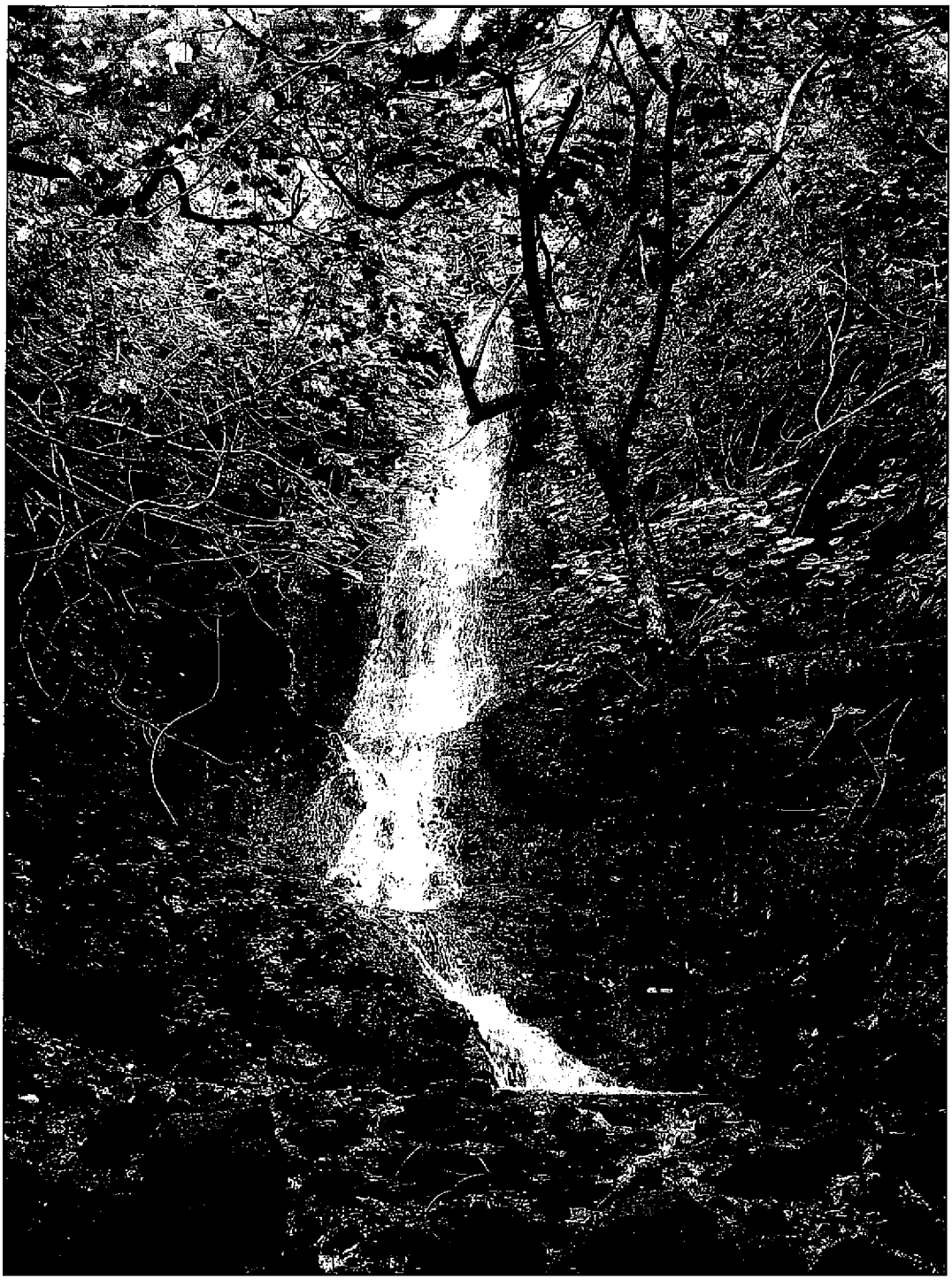


Figure 48. Hi'ilaniwai (CSH January 10, 2010)

Figure 49. Maunahuia Heiau (CSH January 10, 2010)

## 7.5 Evans Yim

CSH conducted a telephone interview with Evans Yim on January 25, 2010. Mr. Yim, now 89 years old, was born in Kāne'ohe in 1920 and has lived in Kāne'ohe all his life. Mr. Yim's father, Yim Lun Chee, and his mother, Lin Chun Lee, emigrated from China to Hawai'i and made Kāne'ohe their home.

Mr. Yim's father's occupation as ship's cook on the voyage to Hawai'i set the stage for an entrepreneurial life for his family. Prior to the start of World War II, Mr. Yim's parents were bakers in the center of town near the current Reverend Benjamin Parker Elementary School. Mr. Yim recalls fondly the many pies, molasses breads, and *kihekihe* (coconut malasadas) his mother baked. The income from the bakery enabled Mr. Yim and his siblings—three brothers and one sister—to attend school.

Due to a rationing of food items during the war, Mr. Yim and his siblings obtained licenses to sell much desired cattle feed, rice, and liquor. Without knowing anything about meat, they worked as butchers in their new meat and poultry market, and distributed these much needed rationed items throughout Kāne'ohe. Mr. Yim also worked at a service station to sell rationed gas. The Rotary Club of Kāne'ohe recently honored Mr. Yim for his commitment to the people of Kāne'ohe during the war.

In 1947, Mr. Yim's family opened the first supermarket in Kāne'ohe. Inadequate space for parking forced them to ask Bishop Estates for a lease, but their request was denied. Over several years, Mr. Yim's family bought small sections of *kuleana* land with the hope of exchanging these lands with that of Bishop Estates. They eventually succeeded in acquiring this land for additional parking space. Mr. Yim has been instrumental in developing small businesses in Kāne'ohe. In particular, he established the Kāne'ohe Business Group in the early 1950s. One of the lasting ideas that this group of small businesses started 40 years ago was a Christmas Parade that continues to excite the community of Kāne'ohe each year. The Kāne'ohe Business Group donated $2000 worth of candy each year during the parade to the children of Kāne'ohe.

Mr. Yim has witnessed tremendous land use changes in Kāne'ohe during his lifetime that spans nine decades. Yim's childhood memories of Kāne'ohe from the 1920s and 1930s center on a very small community—about 100 families—that worked primarily for the pineapple cannery. He recalls that most of the land of Kāne'ohe during this era was covered in pineapples. The pineapple fields were later converted to rice cultivation, which extended *mauka* to the present-day Kamehameha Highway. The land at the base of the mountains was then cleared for cattle grazing. According to Mr. Yim, dairy farms operated by residents of Chinese and Portugese ancestry surrounded the current Project area. In particular, the Freita family used the land from the Hawaiian Memorial Park *mauka* to the Project area for cattle grazing .The land immediately *mauka* of the Project area was converted to the Pali Golf Course in 1957. Mr. Yim recalls that the City and County of Honolulu wanted to relocate the center of town in Kāne'ohe toward the mountains near the Project area, but the small businessmen, who were already established, opposed the proposition. Through the progression from pineapple cultivation, rice cultivation, and cattle grazing, growth and development within Kāne'ohe was very slow. The barrier to such growth [until the construction of the tunnels at the Nu'uanu Pali in 1952] was the Ko'olau Mountains.

The Ko'olau Mountains, according to Mr. Yim, contained the most treasured natural resource—water. He describes the mountains of Kāne'ohe holding freshwater like a honeycomb. The water supply was so great, in fact, that a tunnel was constructed through the Ko'olau Mountains to supply Wahiawa with water for irrigation.

Mr. Yim is very familiar with the Project area—he used to regularly walk the 18 holes of the Pali Golf Course immediately *mauka* of the Project area before starting work each morning at the bakery. Mr. Yim is not aware of any cultural or historic properties in or near the HPU Hawai'i Loa campus. He notes the idyllic location of this center for learning, and does not have any concerns for the Project.

## 7.6 Additional Statements

CSH met with a *kama'āina* of 'Aiea on January 19, 2010 who has over 30 years of experience and knowledge of the HPU Hawai'i Loa Campus. The respondent asked to be a confidential participant in this Cultural Impact Assessment. The study participant shared the following information about the Project area.

Born in 1951, he/she visited Kāne'ohe as a child and remembers the area as primarily grazing land for cattle. He/she became familiar with the Project area in 1979 when the campus was Hawai'i Loa College. He/she recalls that when Hawai'i Loa College merged with HPU in 1992, there were several improvements to the landscape, including enhanced roads, lighting systems, and parking structures. Later, around 2000, a maintenance building was added to the campus facilities. He/she notes that heavy rain usually results in runoff from the hillside behind the southern section of the campus and that the existing drainage system cannot accommodate so much water. As a result, the lower, northern portion of the campus is often flooded during heavy rain.

He/she remembers an additional entrance to the campus from Kamehameha Highway near the intersection of the Pali Highway. A trail used to cut through the southern section of the campus grounds, but it was later closed off. He/she recalls stories of a *heiau* near the Kapa'a Quarry *makai* of the Project area, but is not aware of any cultural or historic properties on the campus grounds or on the hillside behind the campus. He/she does not have any concerns about the Project.

# Section 8 Cultural Landscape of the Project Area

Discussions of specific aspects of traditional Hawaiian culture as they may relate to the Project area are presented below. This section examines cultural resources and practices identified within or in proximity to the subject Project area in the broader context of the encompassing Kāne'ohe landscape. Here, information from Sections 3-7 is integrated and summarized, anticipating the final analysis and overall recommendations to follow in Section 9.

## 8.1 Wahi Pana and Mo'olelo

Kāne'ohe Ahupua'a is rich in *mo'olelo* that describe the naming of the *ahupua'a*, its *wahi pana* and other cultural and historic properties (Clark 2002, Paki 1972; Pukui and Elbert 1974; Sterling and Summers 1978), and it is through such traditions that the *kama'āina* and *kupuna* of Kāne'ohe connect to their past. The *wahi pana* and *mo'olelo* reveal that the cultural context of the Project area extends from the towering *pali* of the Ko'olau toward Kāne'ohe Bay within the *ahupua'a* of Kāne'ohe and connects to the bordering *ahupua'a* of Kailua and He'eia.

In particular, the *mo'olelo* of Keahiakahoe (Hawaiian Ethnological Notes ms., cited in Sterling and Summers 1978:206; Landgraf 1994:94) illuminates the entire landscape of Kāne'ohe Ahupua'a. By chronicling a sibling rivalry, the *mo'olelo* connects the fishermen on the coast of Kāne'ohe Bay (the brother Pahu) and offshore at Moku o Loe (the sister Loe), which is part of He'eia Ahupua'a, to the upland taro farming community (the brother Kahoe). Through the imagery of smoke drifting upwards from Kahoe's fire, the *mo'olelo* further connects the cultivated land to the peak of the mountain. In this way, the *mo'olelo* of Keahiakahoe captures landscape features throughout the entire *ahupua'a* of Kāne'ohe.

Several *wahi pana* located close to the current Project area at the base of the Nu'uanu Pali continue to have special significance to *kama'āina* and *kūpuna* of Kāne'ohe Ahupua'a. *Mauka* of the Project area is a place abundant in *hala* called Kekele (Site 12) that was once fragrant with *hala* blossoms and bountiful in *hala* fruit for lei-making (Pualewa 1866, cited in Sterling and Summer 1978:221). Mrs. Cypher elaborates that Kekele was referred to in songs and traditions as "the sweet land of fragrance and perfume" because the fragrance from the blossoms of these trees once scented the whole region. Mrs. Cypher also notes that Konahuanui, the tallest peak in the Ko'olau Mountains, towers above Kekele from the neighboring *ahupua'a* border of Kailua.

Near Kekele along the Likeke Trail *mauka* of the Project area is a spring-fed waterfall that Mrs. Cypher believes is Hi'ilaniwai, which means "carrying heavenly waters." McAllister located Hi'ilaniwai (Site 339) near Pu'u Keahiakahoe while Handy and Handy (1972) situated it near Pu'u Lanihuli. Mrs. Cypher has been to both streams, and only the stream along the Likeke Trail at the base of Pu'u Lanihuli fits previous descriptions of water flowing from a rocky precipice in a secluded dell near the base of the hills (Saturday Press 1883, cited in Sterling and Summers 1978:207). The pure waters of Hi'ilaniwai stream provide Mrs. Cypher and participants of the cultural tour of the Likeke Trail with a sense of renewal and cleansing.

Other *wahi pana* close to the Project area are Kamaikola (Site 357), from where a man named Pakuanui would either ambush travelers descending the Pali Trail or kill an unsuspecting traveler with a *pōhaku puka* suspended above the door to his house (McAllister 1933:181), and Na Maka o Kane, or the Eyes of Kāne (Site 11), a hill that resembled a human face in shape (Parker ms:25-26, cited in Sterling and Summers 1978:220).

## 8.2 Agriculture and Gathering

Archaeological investigations and historic documents suggest that the *ahupua'a* of Kāne'ohe was a center for agriculture and aquaculture, making it one of the primary population centers on O'ahu in pre-Contact times (Devaney et al. 1982:6). Hawaiians irrigated extensive *lo'i kalo* with fresh water from *mauka* springs and streams, and they developed a vast network of connected *loko i'a*. In addition to the irrigated cultivation of *kalo*, the ancestors of the *kama'āina* in Kāne'ohe Ahupua'a grew dryland *kalo*, bananas, sweet potatoes, coconut trees, *hala*, *wauke* (Handy and Handy 1972:456) and *'awa* (Greer 1970:66-67). Hawaiians continued in post-Contact times extensive cultivation of taro through the early 1800s (Handy and Handy 1972:271-272).

The latter part of the 19th century introduced profound changes to the way that Hawaiians used the land of Kāne'ohe Ahupua'a, including private and public land ownership laws during the Māhele, commercial rice and sugar cultivation, ranching, and pineapple farming. First, Chinese immigrants used the existing *lo'i kalo* and *'auwai* irrigation systems to support rice cultivation (Montgomery 1971, cited in Devaney et al. 1982:49). Ranching of cattle, sheep and horses at the same time greatly impacted the landscape (Devaney et al. 1982:70). Clearance of the land for commercial pineapple cultivation at the end of the 19th century took place primarily in the land surrounding the current Project area, and this most likely destroyed any remaining archaeological sites (Kelly 1987:295-296). After the pineapple industry diminished in the early 20th century, the farmers returned to rice and taro cultivation (Kelly 1975:47). The dairy industry rose to prominence over beef cattle ranching following World War II, but this was relatively short-lived as the expansion of the Pali route, exorbitant land prices in Honolulu, and more automobiles on O'ahu contributed to rapid urbanization in the *ahupua'a* of Kāne'ohe (Durand 1959:241).

Despite the substantial and successive impacts of rice and sugar plantations, ranching and dairy industries, and pineapple fields on the land of Kāne'ohe Ahupua'a between the mid 19th and early 20th centuries, taro cultivation persisted (Handy and Handy 1972:455) and *kama'āina* are now starting to rebuild their former *lo'i*. Mrs. Hewett describes the intense productivity of the taro fields in the nearby Haiku lands of He'eia Ahupua'a in the 1930s. Now, Mrs. Hewett and the Ko'olaupoko Hawaiian Civic Club are spearheading an initiative to rebuild the vast *lo'i* from her childhood memory. Haiku and other *mauka* regions in Kāne'ohe were also productive in other agricultural crops, according to Mrs. Hewett, such as papaya, banana, and bamboo trees. In addition, Mrs. Hewett recalls that her family gathered Hawaiian plant medicines and *māmaki* leaves for tea in the Haiku region of He'eia Ahupua'a in the 1930s.

## 8.3 Marine and Freshwater Resources

Hawaiians built about two-dozen walled *loko i'a* on Kāne'ohe Bay, a large estuary system with a fringing reef that protects a large lagoon and fishery resources (Devaney et al. 1982:139). Mrs. Hewett reminisces about how her family fished and hunted for crabs in the waters of Kāne'ohe Bay, and, with access to He'eia Fishpond, caught and consumed *'ō'io*. The mountainous regions of Kāne'ohe and He'eia Ahupua'a are filled with fresh-water springs and streams. Mrs. Hewett recollects how the constant supply of water created a natural wetland region for taro production and that the taro fields once maintained populations of *'ōpae*. Mr. Yim views the abundant water supply of the Koolau Mountains as its most treasured natural resource.

## 8.4 Trails

*Ala* once served to connect the various settlements throughout O'ahu but there is little information on the network of *alanui* that once connected Kāne'ohe Ahupua'a to outlying communities. The most impressive *ala* in the *ahupua'a* of Kāne'ohe was the Pali Trail, which traversed the sheer cliff rocks of the Nu'uanu Pali to the base of the mountains near the Project area. Hawaiians regularly used this path to transport taro, potatoes, *poi*, fowl, goats, and pigs between windward O'ahu and Honolulu (Thrum 1901:89). Parts of this steep path later became incorporated into the stone-paved horse trail in 1845, the newly constructed Pali Road in 1897, and recent improvements starting in 1952 that led to the existing Pali Highway (Devaney et al. 1982).

In 1795, the *nuku* of the steep Nu'uanu Pali was the site of Kaleleka'anae, or "leaping *'anae*," which refers to the way many O'ahu armies of Kalanikupule and some of their families chose to or were forced to jump to their deaths rather than accept defeat from the warriors of Kamehameha (James 2004). After the Battle of Nu'uanu, Kamehameha became the sole ruler of O'ahu, Moloka'i, Lāna'i, Hawai'i and Maui (Kamakau 1992:172-173). He retained the *ahupua'a* of Kāne'ohe as his own personal property when he divided the conquered lands of O'ahu to his warrior chiefs and counselors ('Ī'ī 1959:69-70). His sons Liholiho and Kauikeaouli—Kamehameha II and Kamehameha III, respectively—inherited most of Kāne'ohe Ahupua'a (Kamakau 1992).

Another path, the Likeke Trail, runs along the base of the *pali* in Kāne'ohe *mauka* of the Project area. Richard H. Davis of the Hawaiian Trail and Mountain Club recently rediscovered this trail, and it was named the Likeke Trail in honor of his Hawaiian name (Ball 2000:199). Hiking to the start of the Likeke Trail from the Ko'olau Golf Course envokes a strong sense of local history, as one first walks on a section of the old Pali Road that was constructed in 1919, then along a section of the traditional Pali Trail, and finally along a portion of the cobbled Pali Road that was assembled in 1845.

Walking on the Likeke Trail itself with Mrs. Cypher, the cultural interpreter for the Ko'olaupoko Hawaiian Civic Club, instills an even deeper sense of history of the area. At a clearing on the Likeke Trail, she points to the Nu'uanu Pali and describes the historic Battle of Nu'uanu that enabled Kamehameha to conquer O'ahu in 1795. From there she traces down the Nu'uanu Pali to the area where the remains of the defeated warriors were discovered, as well as the fragrant land of Kekele. As the cultural tour and trail progress, Mrs. Cypher identifies several

*wahi pana* and cultural properties, including Hi'ilaniwai stream, Manuhuia Heiau, and several *pōhaku*, including Pōhaku o Kāne.

## 8.5 Historic and Cultural Properties

Kāne'ohe Ahupua'a contains numerous historic and cultural properties, including *heiau*, *loko i'a*, *pōhaku*, *ilina*, and *iwi kūpuna*. Several cultural properties with continuing salience to *kama'āina* and *kūpuna* of Kāne'ohe are located near the Project area, but participants in this CIA study are not aware of any cultural or historic properties directly within the Project area.

Maunahuia Heiau (Site 358) is located along the Likeke Trail *mauka* of the Project area. Thrum (1916) observed this *heiau* in ruins, and McAllister (1933:182) describes an unnamed terraced *heiau* near the same area. Mrs. Cypher explains that Maunahuia Heiau and its surrounding agricultural terraces once belonged to Chief Manuhuia. According to Mrs. Cypher, this *heiau* and other visual images of the traditional belief system were destroyed just prior to the arrival of the missionaries in the mid 1820s and following the breakdown of the *kapu* (prohibition, special privilege) system. Yet, the *kāhuna* continued to secretly practice their traditional religious beliefs. Mrs. Cypher has observed that mango trees often grow around sacred areas throughout the Hawaiian Islands. She suggests that *kāhuna* planted mango trees, which were introduced to Hawai'i in the 1820s, to mark their consecrated grounds after learning that such trees grew to be very large and lasted many generations. In this way, they planted mango trees in a circle around the center of *heiau* and other sacred sites, including Maunahuia Heiau.

Landgraf (1994) recently observed two other *heiau* near the Project area. Pu'uwāni'ani'a Heiau (Site 13), now covered mostly with *waiwī* trees just below the Pali Highway, consists of two large eroded stones surrounded by a low wall (Landgraf 1994:102). Kaluaolomana Heiau is located nearby (Landgraf 1994:104), although Thrum (1916:90) listed Kaluaolomana as another name for Puuwaniania Heiau. Further, Kukuiokāne Heiau, supposedly destroyed during the pineapple plantation era (McAllister 1933:177), was rediscovered near the Luluku terrace system with the construction of the H-3 freeway (Neller 1989). In addition, Thrum (1916:90) listed Pule and Kuakala as two additional *heiau* near the *pali* but he does not reference their locations.

In addition to the *heiau*, a cluster of *pōhaku* is located mauka of the Project area. Landgraf (1994:106) recently observed twenty large unusually weathered boulders, referred to as Ho'oleina'iwa, *mauka* of the Project area. There is no previous documentation on this culturally significant site, but the tee-off area for the Ko'olau Golf Course was moved to preserve these *pōhaku* that appear similar to the birthing stones of Kūkaniloko (Landgraf (1994:106). Mrs. Cypher points to several *pōhaku* along the Likeke Trail that serve as silent sentinels of the land, including Pōhaku o Kāne.

## 8.6 Burials

Participants in this CIA study do not discuss the possible presence of *ilina* or *iwi kūpuna*; however, it is possible that undocumented burials are located within or near the Project area.

# Section 9 Summary and Recommendations

CSH undertook this CIA at the request of Group 70 International, Inc. The cultural survey broadly included the entire Kāne'ohe Ahupua'a, and more specifically the approximately 139 acres of private land owned by Hawai'i Pacific University located in Kāne'ohe Ahupua'a, Ko'olaupoko District, Island of O'ahu, TMK: [1] 4-5-035:010. Strategic planning for the HPU Hawai'i Loa Campus expansion aims to accommodate current and anticipated enrollment growth. The conceptual five-year Master Plan proposes several new facilities and improvements (see Figure 4) that will make the campus more cohesive.

## 9.1 Results of Background Research

Background research on the Project area and surrounding *ahupua'a* of Kāne'ohe indicates:

1. Numerous *wahi pana* (storied places) of the *moku* (district) of Ko'olaupoko and the *ahupua'a* (land division extending from the uplands to the sea) of Kāne'ohe place the specific Project area within a cultural context. The mountainous section of Kāne'ohe Ahupua'a near the Project area contains several *wahi pana* connected to the stunning landscape of the *pali* (cliffs), with towering *pu'u* (peaks) over the sheer cliff rock faces overlooking the *mauka* (upland, mountain) forests. These *wahi pana* include: Kamaikola, from where a man would either ambush travelers descending the Pali Trail or kill an unsuspecting traveler with a *pōhaku puka* (trap door rock) suspended above the door to his house (McAllister 1933:181); Kekele, a place abundant in fragrant *hala* (pandanus) (Pualewa 1886, cited in Sterling and Summer 1978:221); Na Maka o Kane, a hill that resembled a human face in shape (Parker ms:25-26, cited in Sterling and Summers 1978:220); and Ho'oleina'iwa, a hill with twenty large unusually weathered *pōhaku* (stones) (Landgraf 1994:106).

2. Kāne'ohe Ahupua'a is rich in *'ōlelo no'eau* (proverbs) and *mo'olelo* (stories and oral histories) about the naming of the *ahupua'a* and its *wahi pana*. In particular, the *mo'olelo* of Keahiakahoe illuminates the entire landscape of the *ahupua'a*, literally from the peak of the mountains to the coastal waters. By chronicling a rivalry among the taro farmer Kahoe and his siblings, the *mo'olelo* connects the fishermen on the coast of Kāne'ohe Bay and offshore at Moku o Lo'e (part of the neighboring He'eia Ahupua'a) to the upland taro farming community. Through the imagery of smoke drifting upwards from Kahoe's fire, the *mo'olelo* further connects the *mauka* regions to the peak of Pu'u Keahiakahoe (Hawaiian Ethnological Notes ms., cited in Sterling and Summers 1978:206; Landgraf 1994:94).

3. The *ahupua'a* of Kāne'ohe was a center for agriculture and aquaculture, making it one of the primary population centers on O'ahu in pre-Contact times (Devaney et al. 1982:6). Hawaiians irrigated extensive *lo'i kalo* (irrigated taro terrace) with fresh water from *mauka* springs and streams, and they developed a vast network of connected *loko i'a* (fishponds). In addition to the irrigated cultivation of *kalo* (taro), the ancestors of Kāne'ohe Ahupua'a grew *kula* (dryland) *kalo*, *mai'a* (bananas), *'uala* (sweet potatoes), *niu* (coconut trees), *hala*, *wauke* (paper mulberry) (Handy and Handy 1972:456) and

*'awa* (kava) (Greer 1970:66-67). In particular, the upland settlement of Luluku contained the most extensive early wetland agricultural complex on O'ahu (Allen 1987:265). In post-Contact times through the early 1800s, Hawaiians continued extensive cultivation of taro (Handy and Handy 1972:271-272).

4. Several *heiau* were once located in the upland regions of Kāne'ohe Ahupua'a, including four surviving *heiau* in the vicinity of the Project area: Maunahuia Heiau was in ruins in the early 19th century (Thrum 1916); Puuwaniania, an agricultural *heiau*, is now covered mostly with *waiwī* (strawberry guava) trees just below the Pali Highway (Landgraf 1994:102); Kaluaolomana is another *heiau* located nearby (Landgraf 1994:104); and Kukuiokāne Heiau, which was thought to be destroyed during the pineapple plantation era (McAllister 1933:177), was later documented near the Luluku terrace system with the construction of the H-3 freeway (Neller 1989). In addition, Thrum (1916:90) listed Pule and Kuakala as two additional *heiau* at the base of the *pali* in Kāne'ohe Ahupua'a but their location is not specified.

5. On Mōkapu Peninsula over 500 sand *ilina* (burials) have been unearthed in the dunes (Sterling and Summers 1978:217). There is no documented evidence from archaeological surveys, historical records or oral traditions of *ilina* or *iwi kūpuna* (ancestral remains) within the Project area; however, it is possible that undocumented burials exist within or near the Project area.

6. The most impressive *ala* (trail) in the *ahupua'a* of Kāne'ohe was the Pali Trail, which traversed the sheer cliff rocks of the Nu'uanu Pali to the base of the mountains near the Project area. Hawaiians used this steep path to transport taro, *poi* (pounded taro), potatoes, chickens, goats, and pigs between Honolulu to windward O'ahu (Thrum 1901:89). Another path, the Likeke Trail, runs along the base of the *pali* in Kāne'ohe Ahupua'a *mauka* of the Project area. Richard H. Davis of the Hawaiian Trail and Mountain Club recently rediscovered this *ala*, and it was named the Likeke Trail in honor of his Hawaiian name (Ball 2000:199).

7. The Battle of Nu'uanu took place in 1795 on the *nuku* (mountain pass) above the Project area. The battle is called Kaleleka'anae, which means "leaping *'anae*" (mullet), and refers to the way many O'ahu armies of Kalanikupule and some of their families chose to or were forced to jump to their deaths from the steep Nu'uanu Pali rather than accept defeat from the warriors of Kamehameha (James 2004). After the Battle of Nu'uanu, Kamehameha became the sole ruler of O'ahu, Moloka'i, Lāna'i, Hawai'i, and Maui (Kamakau 1992:172-173). His sons Liholiho and Kauikeaouli—Kamehameha II and Kamehameha III, respectively—inherited most of the land in Kāne'ohe Ahupua'a (Kamakau 1992).

8. Kamehameha III, in response to agricultural development in Kāne'ohe and other *ahupua'a* on windward O'ahu, secured funds in 1845 to make the old Pali Trail accessible to horses by paving the path with stones. In 1882, construction began to widen and reduce the grade of the road. The improved Pali Road opened in 1897 after workers found an estimated 800 skulls along with other bones at the bottom of the Pali near the Project area—the remains of the warriors defeated by Kamehameha in 1795 (The Island Call 1953). The road was maintained for 55 years until work began in 1952 to construct a

new four-lane highway with two tunnels running under the site of the Battle of Nu'uanu (Devaney et al. 1982:172).

9. The middle 19th century brought great changes to Kāne'ohe Ahupua'a, including private and public land ownership laws during the Māhele (division of Hawaiian lands). The present Project area occupies land within the *'ili* (small land division) of Kaeleuli, which covers 509.5 acres. Historic maps and documents indicate that half of this *'ili* was awarded to the government and half was given as a Māhele Award to an individual identified as "Haole" (foreigner) (Lyons 1876).
10. Successive eras of commercial rice and sugar cultivation, ranching, pineapple farming, and dairy farming transformed the land of Kāne'ohe Ahupua'a. In particular, ranching in the mid-19th century, which extended from the ocean to the *pali*, quickly caused environmental degradation and severely modified the landscape in the *mauka* regions (Devaney et al. 1982). Further, most of the pineapple lands in Kāne'ohe Ahupua'a during the early 1900s were located below the Nu'uanu Pali at and near the current Project area. Many archaeological sites were likely destroyed by pineapple field clearance during this time (Kelly 1987).
11. In 1918, a military reservation was built on Mōkapu Peninsula at Kāne'ohe Bay; Fort Hase was commissioned and was known as the Kuwaahoe Military Reservation. Now known as the Marine Corps Base Hawaii (MCBH), the base contributed to commercial and residential development in and around Kāne'ohe Ahupua'a. The Pali Training Camp was constructed during World War II, a regimental combat team training center covering 4,400 acres *mauka* of the Project area (U.S. Army Corps of Engineers 2005).
12. The construction of the Wilson Tunnel on the Likelike Highway and the expansion of the Pali Highway in the 1950s and 1960s allowed easier access from Honolulu through the Ko'olau mountains to windward communities, which further contributed to residential development in and around Kāne'ohe Ahupua'a.
13. During the late 1960s Hawai'i Loa College was constructed within the current Project area. The college was opened in the fall of 1971 and continued successfully until merging with Hawai'i Pacific University in 1992.

## 9.2 Results of Community Consultation

### 9.2.1 Consultation Efforts

CSH attempted to contact 47 community members, government agency and community organization representatives, and individuals, including residents, cultural and lineal descendants, and cultural practitioners. Of the eighteen people that responded, four *kūpuna* and/or *kama'āina* participated in formal interviews for more in-depth contributions to the CIA. This community consultation indicates:

1. Community members associate the Project area and vicinity with several *wahi pana* and cultural properties in Kāne'ohe Ahupua'a, including an area called Kekele renowned for the fragrance of its *hala* (probably *Pandanus tectorius*) blossoms, Maunahuia Heiau, Hi'ilaniwai waterfall, and several *pōhaku* along the Likeke Trail.

2. *Wahi pana* and *mo'olelo* of the area near the Project site reveal a strong connection to past traditions and a renewed salience of those traditions today. Mrs. Cypher shares a *mo'olelo* that captures the destruction of Chief Maunahuia's *heiau* following the collapse of the *kapu* system just prior to the arrival of the missionaries in the 1820s. She maintains that *kāhuna* marked their consecrated grounds by planting mango trees around Maunahuia Heiau and other sacred sites throughout the Hawaiian Islands.
3. A sense of place in Kāne'ohe Ahupua'a is rooted in a network of trails, both contemporary and historic. In particular, Mrs. Cypher discusses the cultural significance of the Likeke Trail. Hiking to the start of the Likeke Trail from the Ko'olau Golf Course invokes a strong sense of history, as travelers first walk on a section of the old Pali Road that was constructed in 1919, then along a section of the traditional Pali Trail, and finally along a portion of the cobbled Pali Road that was assembled in 1845. Yet, walking on the Likeke Trail itself brings to mind an even deeper sense of history. At a clearing on the Likeke Trail, Mrs. Cypher points to the Nu'uanu Pali and describes the historic Battle of Nu'uanu that enabled Kamehameha to conquer O'ahu in 1795. From there she traces down the Nu'uanu Pali to the area where the remains of the defeated warriors were discovered, as well as the fragrant land of Kekele. Mrs. Cypher continues to point out several *wahi pana* and cultural properties along the trail, including Hi'ilaniwai waterfall, Maunahuia Heiau, and several *pōhaku*, including Pōhaku o Kāne.
4. A strong connection to ancestral land is based on lived experiences of the vast *lo'i kalo*. Mrs. Hewett describes the intense productivity of the taro fields in the nearby Haiku lands of He'eia Ahupua'a in the 1930s. Her family prepared taro in a variety of ways as their staple food, including steamed taro and taro hotcakes, and they sold *poi*. She recollects how the freshwater springs and rivers created a natural wetland region for taro production. Now, Mrs. Hewett and the Ko'olaupoko Hawaiian Civic Club are spearheading an initiative to rebuild the vast *lo'i kalo*.
5. The Haiku lands of He'eia Ahupua'a and other *mauka* regions in Kāne'ohe Ahupua'a supported an abundance of papaya, banana, and bamboo, according to Mrs. Hewett. She also recounts that her family gathered plants for Hawaiian medicines and *māmaki* (probably *Pipturus albidus*) leaves for tea in the area.
6. The *kama'āina* of Kāne'ohe Ahupua'a also had access to the marine and freshwater resources of Kāne'ohe Bay. Mrs. Hewett reminisces about how her family fished and hunted for crabs in the waters of Kāne'ohe Bay, and, with access to He'eia Fishpond, caught and consumed *'ō'io* (possibly *Albula vulpes*). She also recollects that the taro fields once maintained populations of *'ōpae* (probably *Halocaridina* spp.), which she used to collect with the spine of a coconut palm.
7. The identity of the *kama'āina* of Kāne'ohe Ahupua'a is also influenced by the successive historic eras of pineapple cultivation, rice cultivation, and the dairy industry. Mr. Yim recalls that in the 1920s and 1930s about 100 families comprised the town of Kāne'ohe, which centered on pineapple farming. Several participants reflect on the influx of Portuguese, Chinese and Japanese dairy and vegetable farmers near the Project area following the collapse of the pineapple industry.

8. The respondents are not aware of any cultural or historic properties, including *ilina* or *iwi kūpuna*, within or adjacent to the current Project area.

### 9.2.2 Community Recommendations

Based on these consultations, there is one major concern regarding potential adverse impacts on cultural, historic and natural resources, practices and beliefs as a result of the proposed Project:

1. **Ahupua'a Boundary Marker Project**. The Ko'olaupoko Hawaiian Civic Club is collaborating with the Kailua and Waimanalo Hawaiian Civic Clubs and the State of Hawai'i to complete an *ahupua'a* boundary marker project, which includes constructing stone markers and setting up signs at the boundaries of the 11 *ahupua'a* in windward O'ahu in the *moku* of Ko'olaupoko. According to Mrs. Cypher and Mrs. Hewett, the *ahupua'a* boundary between Kāne'ohe and Kailua includes the ridge behind the HPU campus in the Project area. The Ko'olaupoko Hawaiian Civic Club is presently planning to build a stone *ahu* and an educational sign at Castle Junction—the intersection of the Pali and Kamehameha Highways—to mark this *ahupua'a* boundary. Mrs. Cypher and Mrs. Hewett are concerned about any future development on the ridge behind the HPU campus. They want the land to remain intact in order to preserve the landscape of the traditional *ahupua'a* boundary.

## 9.3 Recommendations

Based on background research and community consultation detailed in the CIA report, CSH recommends the following measures to mitigate potentially adverse effects of the proposed Project on cultural, historic and natural resources, practices and beliefs:

1. Land-disturbing activities may uncover burials or other cultural resources. Should cultural or burial sites be identified during ground disturbance, all work should immediately cease and the appropriate agencies notified pursuant to applicable law.
2. Community members should be further consulted throughout the planning process, including the design and implementation of the proposed development. In particular, community members should be consulted so that the Project does not alter the natural and cultural landscape of the ridge behind the HPU campus, as this is part of the traditional *ahupua'a* boundary between Kāne'ohe and Kailua. Addressing their concerns will minimize the impact of the Project on the cultural practices and traditions of the *kama'āina* and *kūpuna* of Kāne'ohe Ahupua'a.

# Section 10 References Cited

**Abbott, Isabella A.**

1992 *La'au Lapa'au Hawai'i: Traditional Hawaiian Uses of Plants.* Bishop Museum Press, Honolulu, Hawai'i.

**Alexander, H. F.**

1914 Cycling Around Oahu. *Mid-Pacific Magazine* 8(4):317-23. Quoted in Devaney et al., *Kāne'ohe: A History of Change* (The Bess Press, Honolulu, Hawai'i, 1982).

**Allen, Jane**

1987 Site Eligibility, Significance, and Recommendations. In *Five Upland 'Ili: Archaeological and Historical Investigations in the Kanē'ohe Interchange, Interstate Highway H-2., Island of O'ahu,* edited by Jane Allen, pp. 285-294. Bernice P. Bishop Museum Honolulu, Hawai'i.

**Barrère, Dorothy B.**

1994 *The King's Mahele: The Awardees and Their Lands.* Compiled by Dorothy B. Barrère, Volcano, Hawai'i.

**Ball, Stuart M.**

2000 *The Hiker's Guide to O'ahu.* University of Hawai'i Press, Honolulu, Hawai'i.

**Bates, George Washington**

1854 *Sandwich Island Notes (by a Haole).* Harper and Brothers: New York. Quoted in Devaney et al., *Kāne'ohe: A History of Change* (The Bess Press, Honolulu, Hawai'i, 1982).

**Bernard, Russell H.**

2006 *Research Methods in Anthropology: Qualitative and Quantitative Approaches, Fourth Edition.* Rowman Altamira, Lanham, Maryland.

**Bernice Pauahi Bishop Museum Library**

nd Index to Hawaiian Ethnological Notes. Bishop Museum Library, Honolulu, Hawai'i. Quoted in Sterling and Summers, *Sites of O'ahu* (Department of Anthropology, Bernice P. Bishop Museum, Honolulu, Hawai'i, 1978).

**Bishop, S. E. (ed.)**

1898 Nuuanu Pali Road Opened. *The Friend* 56(2):16). Quoted in Devaney et al., *Kāne'ohe: A History of Change* (The Bess Press, Honolulu, Hawai'i, 1982).

**Bloxam, Andrew**

1825 *Diary of Andrew Bloxam, Naturalist on the "Blonde."* B.P. Bishop Museum Special Publication 10. Bishop Museum Press, Honolulu, Hawai'i. Quoted in Sterling and Summers, *Sites of O'ahu* (Department of Anthropology, Bernice P. Bishop Museum, Honolulu, Hawai'i, 1978).

**Byron, George A.**
1826 *Voyage of the H.M.S. Blonde to the Sandwich Islands, in the Years 1824-1825. Captain the Right Honorable Lord Byron, Commander.* J. Murray, London. Quoted in Sterling and Summers, *Sites of O'ahu* (Department of Anthropology, Bernice P. Bishop Museum, Honolulu, Hawai'i, 1978).

**Chiddix, Jim and MacKinnon Simpson**
2004 *Next Stop Honolulu! Oahu Railway & Land Company 1889-1971.* Sugar Cane Press, Honolulu, Hawai'i.

**Chinen, Jon J.**
1958 *The Great Māhele, Hawai'i's Land Division of 1848.* University of Hawai'i Press, Honolulu, Hawai'i.

**Clark, John R. K.**
2002 *Hawaii Place Names.* University of Hawai'i Press, Honolulu, Hawai'i.

**Coulter, John W.**
1931 *Population and Utilization of Land and Sea in Hawai'i, 1853.* Bernice Pauahi Bishop Museum Bulletin 88, Honolulu, Hawai'i.

**Cruz, Brian, Randy Groza, and Hallett H. Hammatt**
2009 *Cultural Impact Assessment for the Bay View 201H Project, Kāne'ohe Ahupua'a, Ko'olaupoko District, Island of O'ahu, TMK: [1] 4-5-030:001, 006, 036, 037.* Cultural Surveys Hawai'i, Kailua, Hawai'i.

**Devaney, Dennis M., Marion Kelly, Polly Jae Lee, and Lee S. Motteler**
1982 *Kāne'ohe: A History of Change.* The Bess Press, Honolulu, Hawai'i.

**Dorrance, William H.**
1998 *Oahu's Hidden History.* Tours into the Past. Mutual Publishing, Honolulu, Hawai'i.

**Dorrance, William H. and Francis S. Morgan**
2000 *Sugar Islands: The 165-Year Story of Sugar in Hawai'i.* Mutual Publishing, Honolulu, Hawai'i.

**Durand, Loyal Jr.**
1959 The Dairy Industry of the Hawaiian Islands. *Economic Geography*, Vol. 35, No. 3:228-246.

**Fanning, Chizuko**
2008 *Partial History of the Japanese in Kaneohe: 1898-1959.* Henry T. Iida, Honolulu, Hawai'i.

**Fiddler, Frank.**
1956 *Mokapu, a Study of the Land.* U.S. Marine Corps Air Station, Honolulu, Hawai'i.

**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. Department of Agriculture, U.S. Government Printing Office, Washington, D.C.

**Fornander, Abraham**

1878 *An Account of the Polynesian Race: Its Origins and Migrations and the Ancient History of the Hawaiian People to the Times of Kamehameha I. Volume I.* Trubner & Co., Ludgate Hill, London.

1916-17 *Fornander Collection of Hawaiian Antiquities and Folk-lore.* Volume IV. Memoirs of the Bernice Pauahi Bishop Museum. Bishop Museum Press, Honolulu, Hawai'i.

**Giambelluca, Thomas W., Michael A. Nullet, and Thomas A. Schroeder**

1986 *Rainfall Atlas of Hawai'i*, Department of Land and Natural Resources, Honolulu, Hawai'i.

**Greer, Richard A.**

1970 Honolulu in 1847. *Hawaiian Journal of History,* Vol. 4:59-95.

**Group 70 International. Inc.**

2009 Hawai'i Pacific University Hawai'i Loa Campus Conceptual Master Plan, Honolulu, Hawai'i.

**Hammatt, Hallett H. and D. Shideler**

1989 Archaeological Survey of a 90-acre Parcel for Proposed Hawai'i State Veterans Cemetery Kāne'ohe, O'ahu, Cultural Surveys Hawai'i, Kailua, Hawai'i.

**Handy, E. S. Craighill**

1940 *The Hawaiian Planter, Volume 1. His Plants, Methods and Areas of Cultivation.* Bernice P. Bishop Museum Bulletin 161, Bishop Museum Press, Honolulu, Hawai'i.

**Handy, E. Craighill., and Elizabeth G. Handy**

1972 *Native Planters of Hawaii: Their Life, Lore, and Environment.* Bishop Museum Press, Bulletin 233, Honolulu, Hawai'i.

**Harper, Joseph**

1972 Pineapple, A Major Industry in the Area 50 Years Ago. *Ka Lama* 3 (2):3, 8. (Newspaper sponsored by Kahaluu Ecumenical Youth Project (KEY) and Hui Ko'olau), Kahaluu Printing Co., Kahaluu, Hawai'i.

**Hawaiian Aviation Preservation Society**

2009 Old Pali Road Aerial 1946. Electronic document, http://hiavps.com, accessed December 21, 2009.

**Hawai'i State Archives**

1887 C. B. Wood photographs. In Devaney et al., *Kāne'ohe: A History of Change* (The Bess Press, Honolulu, Hawai'i, 1982), 148, 177.

**Hawai'i TMK Service**

2009 Tax Map Key [1] 4-5-035. On file at Hawai'i TMK Service, 222 Vineyard Street, Suite 401, Honolulu, Hawai'i.

**Henke, Louis A.**

1929 *A Survey of Livestock in Hawaii.* University of Hawai'i Research Publication No. 5, Honolulu, Hawai'i.

**'Ī'ī, John Papa**
1959 *Fragments of Hawaiian History* (Pukui translation), Bishop Museum Press, Honolulu, Hawai'i.

**(The) Island Call**
1953 [An article for October]. Hawaiian Telephone Co., Honolulu, Hawai'i.

**James, Rob**
2004 *The Battle of Nu'uanu, May 1795*. Kamehameha Schools Press, Honolulu, Hawai'i.

**Jarves, James Jackson**
1847 *History of the Hawaiian Islands*. Charles Edwin Hitchcock, Honolulu, Hawai'i.

**Kaaia, J. K.**
1874 No Ke Alapali O Nuuanu. *Kuokoa* for Feb 14. Quoted in Sterling and Summers, *Sites of O'ahu* (Department of Anthropology, Bernice P. Bishop Museum, Honolulu, Hawai'i, 1978)

**Kalākaua, David**
1990 *The Legends and Myths of Hawaii: The Fables and Folk-Lore of a Strange People*. Mutual Publishing, Honolulu, Hawai'i.

**Kamakau, Samuel M.**
1867 Moolelo O Kamehameha. *Kuokoa*, January 12, 1867. Quoted in Sterling and Summers, *Sites of O'ahu* (Department of Anthropology, Bernice P. Bishop Museum, Honolulu, Hawai'i, 1978).

1992 *Ruling Chiefs of Hawaii (Revised Edition)*. Kamehameha Schools Press, Honolulu, Hawai'i.

**Kame'eleihiwa, Lilikalā**
1992 *Native Land and Foreign Desires: Pehea Lā E Pono Ai?* Bishop Museum Press, Honolulu, Hawai'i.

**Kaneohe Ranch Management Limited**
2008 *Kaneohe Ranch History*. Electronic document, http://www.kaneoheranch.com/index.cfm?page=history&subnav=subnav_history&section=history, accessed November 20, 2008.

**Kawachi, Carol T.**
1990 *An Archaeological Reconnaissance of He'eia Fastlands, He'eia, Koolaupoko, O'ahu*. SHPD/DLNR, State of Hawai'i, Honolulu, Hawai'i.

**Kelly, Marion**
1975 *Loko I'a O He'eia: Heeia Fishpond*. Department of Anthropology, Bishop Museum, Honolulu, Hawai'i.

1976 *Report 2 Historical Research: The History of the Land of Kaneohe*. Department of Anthropology, Bishop Museum, Honolulu, Hawai'i.

1987 Land Use in the 'Ili of Luluku, Kaneohe, Kolaupoko, Oahu, In *Five Upland 'Ili: Archaeological and Historical Investigations in the Kanē'ohe Interchange,*

*Interstate Highway H-2., Island of O'ahu*, edited by Jane Allen, pp. 285-294. Bernice P. Bishop Museum Honolulu, Hawai'i.

**Ko'olaupoko Hawaiian Civic Club**

2008 *In the Footsteps of our Kupuna...A Journey on the Ancient Likeke Trail.* Ko'olau Foundation and the Ko'olaupoko Hawaiian Civic Club, Kāne'ohe, Hawai'i.

**Landgraf, Anne Kapulani**

1994 *Nā Wahi Pana 'o Ko'olau Poko.* University of Hawai'i Press, Honolulu, Hawai'i.

**Lyons, C. L.**

1876 Kāne'ohe, O'ahu, with West Kailua *[map] Scale = 1:6000 Registered Map 285. On file at the State of Hawaii Department of Accounting and General Services Land Survey Division, Honolulu, Hawai'i.*

**MacCaughey, Vaughn**

1917 A Footpath Journey. *Mid Pacific Magazine* 14:281-196. Quoted in Sterling and Summers, *Sites of O'ahu* (Department of Anthropology, Bernice P. Bishop Museum, Honolulu, Hawai'i, 1978).

**Malanikeoe, J. K. W.**

1908 Haina Nane, *Kuokoa*, Oct 2. Quoted in Sterling and Summers, *Sites of O'ahu* (Department of Anthropology, Bernice P. Bishop Museum, Honolulu, Hawai'i, 1978).

**Malo, David**

1951 *Hawaiian Antiquities.* Bernice P. Museum Special Publication 2 Second Edition. Translated from the Hawaiian by Dr. Nathaniel B. Emerson 1898. Bishop Museum, Honolulu, Hawai'i.

**Mays, Nicholas and Catherine Pope**

1995 Rigour and qualitative research. *British Medical Journal* 311:109–112.

**McAllister, J. Gilbert**

1933 *Archaeology of O'ahu.* Bernice P. Bishop Museum, Bulletin 104, Honolulu, Hawai'i.

**McCurdy, Todd D. and Hallett H. Hammatt**

2008 *Archaeological Inventory Survey for the Hawaiian Memorial Park Expansion, Kāne'ohe Ahupua'a, Ko'olaupoko District, Island of O'ahu TMK: [1] 4-05-033:001.* Cultural Surveys Hawai'i, Kailua, Hawai'i.

**Meeker, Virgil and Gail M. Murakami**

1995 *From Fire Pits to Charcoal Kilns: Resource Procurement and Land Use in the Upland Kāne'ohe Catchment.* International Archaeological Research Institute, Honolulu, Hawai'i.

**Miyagi, Michichiro**

1963 *Land Use in Waiahole Valley, Oahu.* M.A. thesis, University of Hawai'i, Honolulu, Hawai'i.

**Montgomery, Carol S.**

1971 *Progress Report on the Ecological Succession in Kahalulu, Oahu.* Ethnic Studies Program Resource Center, University of Hawai'i, Honolulu, Hawai'i. Quoted in Dorrance and Morgan, *Sugar Islands: The 165-Year Story of Sugar in Hawai'i* (Mutual Publishing, Honolulu, Hawai'I, 2000).

**Na Anoai O Oahu Nei**

1930 Hoku o Hawaii, March 11, Honolulu, Hawai'i. Quoted in Sterling and Summers, *Sites of O'ahu* (Department of Anthropology, Bernice P. Bishop Museum, Honolulu, Hawai'i, 1978).

**Neller, Earl Buddy**

1989 H-3 Ramp May Be Next to Heiau. *Honolulu Advertiser*, July 28, Honolulu, Hawai'i.

**Paki, Pilahi**

1972 *Legends of Hawaii: Oahu's Yesterday.* Victoria Publications, Honolulu.

**Parker, Henry Hodges**

ms *Reminiscences.* Hawaiian Mission Children's Society, Honolulu, Hawai'i. Quoted in Sterling and Summers, *Sites of O'ahu* (Department of Anthropology, Bernice P. Bishop Museum, Honolulu, Hawai'i, 1978).

**Pfeffer, Michael and Hallett H. Hammatt**

1992 *Archaeological Assessment for the Proposed 46 kV Sub-Transmission Line for Ko'olau-Kāne'ohe, Kāne'ohe, O'ahu*, Cultural Surveys Hawai'i, Kailua, Hawai'i.

**Pooloa, George**

1919 Na Pana Kaulana O Na Inoa O Ka Mokupuni. *Ke Aloha Aina* for Feb 1. Quoted in Sterling and Summers, *Sites of O'ahu* (Department of Anthropology, Bernice P. Bishop Museum, Honolulu, Hawai'i, 1978).

**Portlock, Nathaniel**

1789 *A Voyage Round the World: But More Particularly to the Northwest Coast of America, Performed in 1785, 1786, 1787, and 1788, in the King George and Quelotte.* John Stockdale, London.

**Pualewa, W.N.**

1886 No Ka Aoao Hikina O Koolaupolo, *Ke Au Okoa* for Nov. 12. Quoted in Sterling and Summers, *Sites of O'ahu* (Department of Anthropology, Bernice P. Bishop Museum, Honolulu, Hawai'i, 1978).

**Pukui, Mary K.**

1983 *'Ōlelo No'eau: Hawaiian Proverbs and Poetical Sayings.* Bernice P. Bishop Museum Special Publication No. 71. Bishop Museum Press, Honolulu, Hawai'i.

**Pukui, Mary K., Samuel H. Elbert and Esther Mookini**

1974 *Place Names of Hawaii.* University of Hawai'i Press, Honolulu, Hawai'i.

**Rice, W.H.**

1923 *Hawaiian Legends.* B.P. Bishop Museum, Bull. 3, Honolulu, Hawai'i.

**Saturday Press**

1884 *Dictionary of Hawaiian Localities* for Jan 12. T.G. Thrum, Honolulu, Hawai'i. Quoted in Sterling and Summers, *Sites of O'ahu* (Department of Anthropology, Bernice P. Bishop Museum, Honolulu, Hawai'i, 1978).

**Scott, Edward B.**

1968 *The Saga of the Sandwich Islands. Vol. 1.* Sierra-Tahoe Publishing Co., Lake Tahoe, Nevada.

**Silva, Carol**

2005 Royal Routes on the Windward Coast, *Island Chronicles* May/June 2005. http://www.spiritofaloha.com/place/0505/place.html.

**Sterling, Elspeth P., and C. C. Summers**

1978 *Sites of O'ahu.* Department of Anthropology, Bernice P. Bishop Museum, Honolulu, Hawai'i.

**Summers, Catherine C.**

1964 *Hawaiian Fishponds.* Bernice P. Bishop Museum Special Publication 52, Bishop Museum Press, Honolulu.

**Szabian, John, James Landrum III and Paul L. Cleghorn**

1989 *A Reconnaissance Survey of the Proposed Pikoiloa Cemetery, Kāne'ohe, O'ahu Island, TMK 4-5-33:1-2.* Applied Research Group, Bishop Museum, Honolulu, Hawai'i.

**Thrum, Thos. G.**

1901 Nuuanu Pali in Olden Time. *Thrum's Hawaiian Annual* for 1901:87-89. Thomas G. Thrum, Honolulu, Hawai'i.

1907 Heiaus and Heiau sites throughout the Hawaiian Islands. *Thrum's Hawaiian Annual* for 1907:36-48. Thomas G. Thrum, Honolulu, Hawai'i.

1916 Completing Oahu's Heiau Search. *Thrum's Hawaiian Annual* for 1916. Thomas G. Thrum, Honolulu, Hawai'i.

**Thurston, L. A.**

1890 Biennial Report of the Minister of the Interior to the Legistlative Assembly of 1890. Department of Interior, Hawai'i State Archives, Honolulu, Hawai'i.

**Tuggle, David and Robert Hommon**

1986 *Historic Property Inventory Marine Corps Air Station.* Naval Facilities Engineering Command, Honolulu, Hawai'i.

**Waihona 'Aina**

2000 *The Māhele Database.* Electronic document, http://waihona.com, accessed November 5, 2009.

**U.S. Army Corps of Engineers**

2005 *Environmental Projects.* Electronic document, http://www.poh.usace.army.mil/env/env-projects.htm#Pali, accessed December 7, 2009.

**U.S. Geological Survey**

1928 U.S. Geological Survey 7.5 Minute Series Topographic Map, Kāne'ohe Quadrangle, showing Project area location. Available at U.S. Geological Survey Maps/ U.S. Department of War Maps. Available at USGS Information Services, Box 25286, Denver, Colorado.

1977-78 U.S. Geological Survey 7.5 Minute Series Topographic Map, Kāne'ohe Quadrangle , showing Project area location. Available at U.S. Geological Survey Maps/ U.S. Department of War Maps. Available at USGS Information Services, Box 25286, Denver, Colorado.

1998 U.S. Geological Survey 7.5 Minute Series Topographic Map, Kāne'ohe Quadrangle , showing Project area location. Available at U.S. Geological Survey Maps/ U.S. Department of War Maps. Available at USGS Information Services, Box 25286, Denver, Colorado.

2005 U.S. Geological Service Orthoimagery. Aerial photograph. Available at NOAA Biogeography Program.

**U.S. War Department**

1919 U.S. War Department Map, Kāne'ohe Quadrangle, showing Project area location. On file at USGS Information Services, Box 25286, Denver, Colorado.

1943 U.S. War Department Map, Kāne'ohe Quadrangle, showing Project area location. On file at USGS Information Services, Box 25286, Denver, Colorado.

**Yucha, Trevor, and Matt McDermott**

2010 *Archaeological Assessment for the Hawai'i Pacific University Master Plan Project, Kāne'ohe Ahupua'a, Ko'olaupoko District, Island of O'ahu, TMK: [1] 4-5-035:010.* Cultural Surveys Hawai'i, Kailua, Hawai'i.

# Appendix A Authorization and Release Form

**Cultural Surveys Hawai'i, Inc.**
Archaeological and Cultural Impact Studies
Hallett H. Hammatt, Ph.D., President

P.O. Box 1114 Kailua, Hawai'i 96734 Ph: (808) 262-9972 Fax: (808) 262-4950

Job code: Kaneohe13 jgenz@culturalsurveys.com www.culturalsurveys.com

## AUTHORIZATION AND RELEASE FORM

**Cultural Surveys Hawai'i (CSH) appreciates the generosity of the *kūpuna* and *kama'āina* who are sharing their knowledge of cultural and historic properties, and experiences of past and present cultural practices in the Kāne'ohe Ahupua'a for the Cultural Impact Assessment CSH is preparing for the HPU Master Plan Project.**

**We understand our responsibility in respecting the wishes and concerns of the interviewees participating in our study. Here are the procedures we promise to follow:**

1. **You will have the opportunity to review the written notes of our interview with you. At that time you may make any additions, deletions or corrections you wish.**
2. **You will be given a copy of the interview notes for your records.**
3. **You will be given a copy of this release form for your records.**
4. **You will be given any photographs taken of you during the interview.**

**For your protection, we need your written confirmation that:**

1. **You consent to the use of the complete transcript and/or interview quotes for reports on cultural sites and practices, historic documentation, and/or academic purposes.**
2. **You agree that the interview shall be made available to the public.**
3. **If a photograph is taken during the interview, you consent to the photograph being included in any report/s or publication/s generated by this cultural study.**

**I, _____, agree to the procedures outlined above and, by my**
(Please print your name here)
**signature, give my consent and release for this interview to be used as specified.**

_____
(Signature)

_____
(Date)

# Appendix B SHPD Response Letter

LINDA LINGLE
GOVERNOR OF HAWAII

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

RUSSELL Y. TSUJI
FIRST DEPUTY

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

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

**STATE OF HAWAII**
**DEPARTMENT OF LAND AND NATURAL RESOURCES**

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

December 17, 2009

LOG NO: 2009.4742
DOC. NO: 0912PC006

**MEMORANDUM**

TO: Joe Genz, Cultural Researcher
Cultural Surveys Hawai'i, P.O. Box 1114, Kailua,Hawai'i 96734

FROM: Phyllis Coochie Cayan, History and Culture Branch Chief

**Subject: KANEOHE 13: A Cultural Impact Assessment (CIA) for the Hawaii Pacific University Master Plan Project, Kaneohe Ahupuaa, Koolaupoko District, Island of O'ahu.**
**TMK: [1] 4-5-035:00, 010.**

This memo is in response to your request to help assess potential impacts to cultural practices as a result of the proposed Hawaii Pacific University Master Plan Project at its 132.46 acre campus in Kaneohe. As you may know, the ahupuaa of Kaneohe has many significant sites which include but are not limited to heiau complexes, burials and burial sites, fishing shrines and other cultural treasures too numerous to list. SHPD recommends you all identify the core families of Kaneohe as well as other resource folks who can contribute to your study.

Some groups to contact include the Koolaupoko Hawaiian Civic Club, the Neighborhood Boards for both Kaneohe and Kailua, the Hawaiian Studies educators at Windward Community College, the Queen Liliuokalani Childrens Center (QLCC) and the senior citizens programs in both areas. From these resources you may be better able to identify the core families of the area.

Other resource folks you may find helpful as you begin this planning process are:

1. Denise Mahealani Cypher, Native Hawaiian Phone: 226-0195
   Mahealani and her group work to protect all the sacred sites on the Koolau side.

2. Aunty Tiona Wailehua, Kupuna (a core family) Phone: 247-6889
3. Val Ching, Hawaiian practitioner – Check with Punaluu QLCC to contact him.
4. Kawai Ueoka, Hawaiian practitioner- Check with Punaluu QLCC to contact her.
5. Aaron Mahi, Native Hawaiian/OIBC member Email:aaronmahi@aol.com Phone: 247-5307

6. Cy Bridges, Native Hawaiian/OIBC member Email: bridgesc@polynesia.com Phone: 228-6105
7. Muriel Sefo, Kailua Historical Society

Any questions, please call me at 808-692-8015 or via email Phyllis.L.Cayan@hawaii.gov

# Appendix C OHA Response Letter

PHONE (808) 594-1698 FAX (808) 594-1865

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

HRD09/4743

December 7, 2009

Joe Genz
Cultural Surveys Hawai'i
P.O. Box 1114
Kailua, Hawai'i 96734

**RE: Cultural Impact Assessment Consultation**
**Hawai'i Pacific University Master Plan Project**
**Kāne'ohe Ahupua'a, Ko'olaupoko District, O'ahu**
**Tax Map Key: (1) 4-5-035:010**

Aloha e Joe Genz,

The Office of Hawaiian Affairs (OHA) is in receipt of your November 17, 2009 letter initiating consultation ahead of a cultural impact assessment (assessment) for the Hawai'i Pacific University Master Plan Project (project). It is our understanding the entire 132.46 acre project area encompasses the Hawai'i Pacific University (HPU) Hawai'i Loa Campus. Based on the information contained within your letter, this proposed project aims to accommodate current and future student enrollment with new facilities and planned improvements designed to make the HPU Hawai'i Loa Campus more cohesive.

OHA has no specific comments on the assessment at this time. Thank you for initiating consultation at this early stage and we look forward to the opportunity to review the completed assessment. Should you have any questions, please contact Keola Lindsey, Lead Advocate-Culture at 594-1904 or keolal@oha.org.

'O wau iho nō me ka 'oia'i'o,

Clyde W. Nāmu'o
Administrator

# APPENDIX G
# BIOLOGICAL SURVEYS

# Biological Surveys Conducted for the Proposed Hawai‘i Pacific University, Hawai‘i Loa Campus Expansion Project, Kāne‘ohe, O‘ahu

Prepared by:

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&

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Prepared for:

Group 70 International, Inc.
925 Bethel Street, 5th Floor
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January 15, 2010

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### *Introduction*

Hawai‘i Pacific University is proposing to expand its campus facilities on its approximately 132.455-acre Hawai‘i Loa Campus that is located in the traditional *moku* of Ko‘olaupoko and the *ahupuaha‘a* of Kāne‘ohe on the island of O‘ahu. The lands surveyed are legally described as TMK- 4-5-035:10. The campus is located on the western face of the Oneawa hills and it fronts Kāmehameha Highway directly across the highway from the City and County of Honolulu's Pali Golf Course (Figure 1).

The primary purpose of these surveys was to determine if there were any botanical, avian or mammalian species currently listed, or proposed for listing as endangered or threatened under either the federal or the State of Hawai‘i's endangered species programs on, or within the immediate vicinity of the project depicted on Figure 1. Federal and State of Hawai‘i listed species status follows species identified in the following referenced documents (Division of Land and Natural Resources (DLNR) 1998, Federal Register 2005, U. S. Fish & Wildlife Service (USFWS) 2005, 2009). Fieldwork was conducted on November 23, 24, and December 1, 2009.

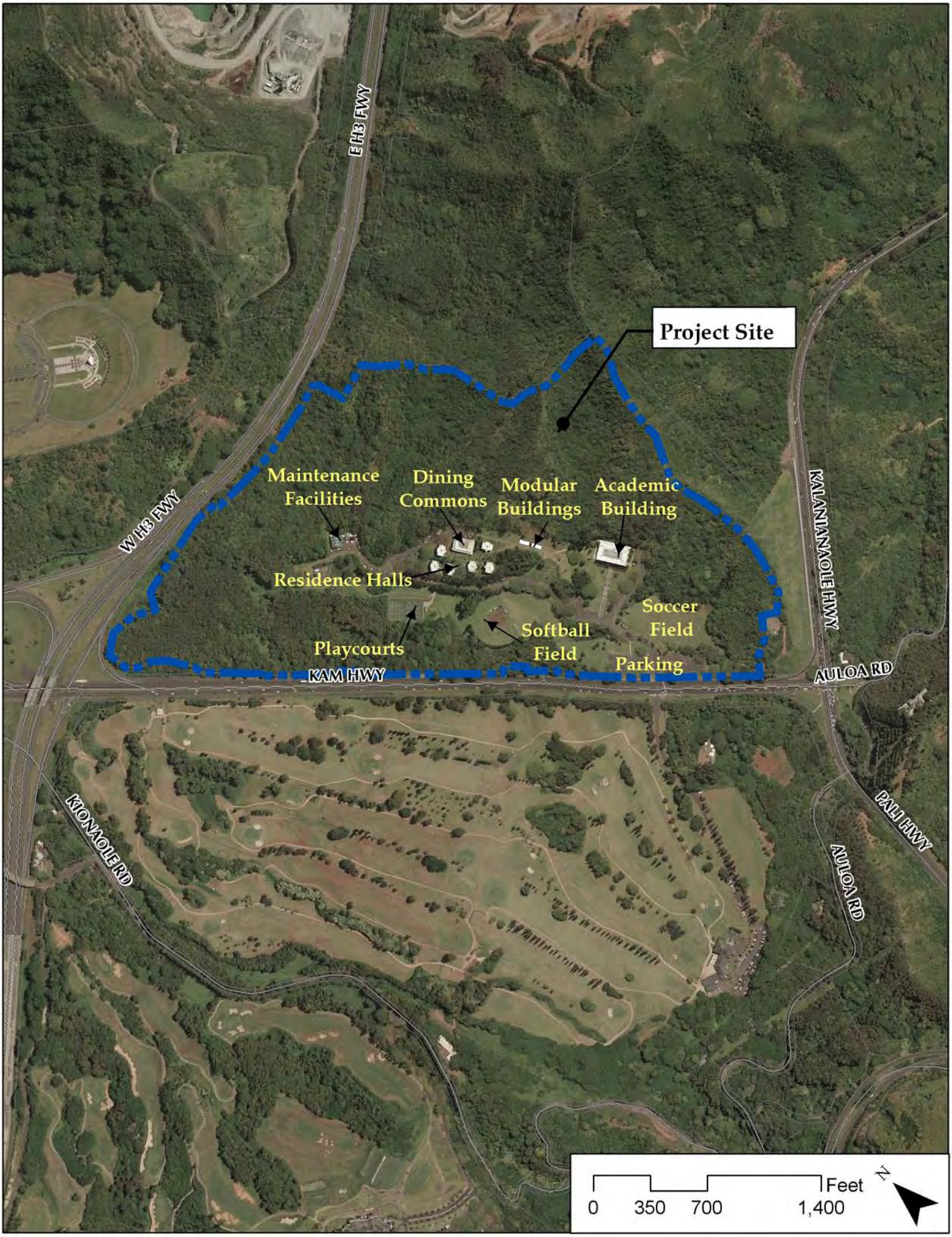
Avian phylogenetic order and nomenclature follows *The American Ornithologists' Union Check-list of North American Birds 7th Edition* (American Ornithologists' Union 1998), and the 42nd through the 50th supplements to *Check-list of North American Birds* (American Ornithologists' Union 2000; Banks et al. 2002, 2003, 2004, 2005, 2006, 2007, 2008, Chesser et al., 2009). Mammal scientific names follow *Mammals in Hawaii* (Tomich 1986). Plant names follow *Manual of the Flowering Plants of Hawai‘i* (Wagner et al., 1990, 1999) for native and naturalized flowering plants, and *A Tropical Garden Flora* (Staples and Herbst, 2005) for crop and ornamental plants. Place names follow *Place Names of Hawaii* (Pukui et al., 1974).

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

### *General Site and Project Description*

The property is bound to the west by the H3 Freeway, to the south by Kamehameha Highway, to the east by Kalaniana‘ole Highway and to the north by undeveloped portions of the Oneawa hills (Figure 1). As can readily be seen in Figure 1 there is quite a bit of room left to expand the university on their existing site, though the step nature of much of the site does place limitations on what can be readily accomplished on the site.

The University has embarked on a multi-year plan to enhance and expand their facilities, as part of a long-range plan is to enhance the quality of the university experience for students and teachers alike. To that end, the main focus of the expansion project is to add 400 additional on-campus housing units and to expand the academic and support facilities to accommodate the growth of the two academic programs based at the Hawai‘i Loa Campus, namely nursing and natural sciences. A new performing arts center, multi-purpose gym, and new academic center (Academic Center II) are also among the additional facilities currently being planned.


E H3 FWY
W H3 FWY
Project Site
Maintenance Facilities
Dining Commons
Modular Buildings
Academic Building
Residence Halls
Playcourts
Softball Field
Soccer Field
Parking
KAM HWY
KALANIANAOLE HWY
AULOA RD
KIONAOLE RD
PALI HWY
AULOA RD
0 350 700 1,400
Feet
N

The bulk of the proposed expansion will take place within the relatively flat areas of the campus surrounding the existing buildings and facilities. Large portions of the campus are very steep with grades approaching a 1:1 ratio between the existing main campus center and the summit of the property. The summit of the property is approximately 693 feet (211.6 meters) above mean sea level (MSL), sloping down to a minimum elevation of approximately 235 feet (71.6 meters) MSL where Māmalahoa Stream goes under the H3 Freeway at the northwest corner of the property. Māmalahoa stream originates on campus, and is an intermittent stream, which is also fed by runoff originating from the Pali Golf Course that enters the campus through a series of pipe culverts, built under Kamehmeha Highway.

The vegetation on this campus site is an eclectic combination of heavily manicured ornamental plantings (lawns and numerous mature shade trees) within the areas that are currently developed, while other areas have been planted, but allowed to assume a more natural condition. Areas of natural forest surround the developed campus on nearly all sides.

Figure 2 – HPU campus showing manicured lawn and mature shade trees. View looking at location of proposed Academic Center building

Figure 3 – HPU campus looking towards the Koʻolaus from the main campus building area Proposed detention basin site is between the trees along roadway and baseball field beyond.

***Botanical Survey Methods***

The botanical survey was undertaken on November 23-24, 2009 (with a brief return visit on December 1) utilizing wandering transects that traversed all parts of the campus proposed for changes as shown on the Hawaiʻi Loa Campus Conceptual Master Plan prepared by Group 70, International (March 2009). In effect, this was the entire campus including slope and swale areas to the north of the existing facilities where additional planned structures will require grading of the steeper slopes. Not surveyed at all were the grounds surrounding the existing dormitory complex and along the existing roads to and including the existing campus maintenance yard. The route of the botanical survey was recorded by GPS as the survey progressed, so that coverage could be assessed. The survey was conducted in the wet season and therefore plants typical of this site, especially annuals, were likely to be observed and recognized. For any plants not recognized in the field, photographs were taken and/or material collected for later identification in the laboratory.

***Botanical Survey Results***

A plant checklist (Table 1) was compiled from field observations, with entries arranged alphabetically under plant family names (standard practice). Included in the list are scientific

name, common name, and status (whether native or non-native) for each species observed on the property. Species status given in **bold** indicates a plant of some interest to the Hawaiian Islands flora. It is worth noting for this survey location that "status" is the assigned relationship of a species to natural Hawaiian Islands environments. Thus, "naturalized" (Nat) is assigned to a species that is non-native but successfully established in the wild. The extensive landscaping across the campus includes some weeds (naturalized species), but also many native and non-native species that have been planted and are being cared for. These plants are in effect "ornamentals" at this location, but their status is unchanged as reflected in the third column and indicated by note <1> in the last column of the table.

In addition to identifying the plants present within the study site, qualitative estimates of plant abundance were made. These are coded in the table as explained in the Legend to Table 1 and apply to observations made during the present survey. For some species, a two-level system of abundance is used: the letter-number codes indicating species that have a limited distribution (e.g., found in only one small area of the property), but present there in numbers exceeding just a few individuals. For example, an abundance rating of "R" indicates a plant encountered only once or twice during the entire survey. An "R2" indicates a plant encountered in just one or two places, but with several to many individuals present where encountered. An "R3" would be a plant seldom encountered (i.e., rare), but locally abundant in one or more of the locations where it was observed.

The site vegetation is complex, and although abundance ratings are given for only the surveyed area as a whole, these must be treated with some caution. For example, Java plum (*Syzigium cumini*) is listed as "AA" or abundant/dominant. This abundance rating is true for the forested areas to the south and west of the campus, but not for the developed campus (where few Java plums occur) or the scrub forest to the north. A second note (Note <2>) calls out herbaceous plants associated with the lawns and some decorative planting areas. Thus, abundance values for these species tend to reflect only the species abundance in the lawn areas and certainly not the entire survey area. Thus, *Kylinga* spp. and dayflower (*Commelina diffusa*) are common to abundant in the lawn areas, but much less so elsewhere. On the other hand, Glenwood grass (*Sacciolepis indica*) is fairly common in mowed locations, but also a significant component of the scrub forest slopes to the north.

## Table 1 - Checklist of Plants Found in Selected Areas of the HPU Hawai‘i Loa Campus

| ***Species listed by family*** | ***Common name*** | Status | Abundance | Notes |
|---|---|---|---|---|
| | *FERNS & FERN ALLIES* PTERIDOPHYTES | | | |
| ATHYRIACEAE | | | | |
| *Diplazium esculentum* (Retz.) Sw. | paca, *hō‘i‘o* | Nat | U3 | <3> |
| LINDSAEACEAE | | | | |
| *Sphenomeris chinensis* (L.) Maxon | *pala‘ā* | **Ind** | AA | |
| LYCOPODIACEAE | | | | |
| *Lycopodiella cernua* (L.) Pic. Serm. | *wāwae‘iole* | **Ind** | R2 | |
| NEPHROLEPIDACEAE | | | | |
| *Nephrolepis multiflora* (Roxb.) F.M. Jarrett ex C.V. Morton | sword fern | Nat | AA | |
| POLYPODIACEAE | | | | |
| *Phymatosorus grossus* (Langsd. & Fisch.) Brownlie | *laua‘e* | Nat | AA | <1> |
| PSILOTACEAE | | | | |
| *Psilotum nudum* (L.) P. Beauv. | *moa* | **Ind** | R | |
| PTERIDACEAE | | | | |
| *Pityrogramma austroamericana* Domin | gold fern | Nat | R2 | |
| THELYPTERIDACEAE | | | | |
| *Christella dentata* (Forssk.) Brownsey & Jermy | wood fern | Nat | C | |
| *Christella parasitica* (L.) H. Lév. | wood fern | Nat | C3 | |
| | *GYMNOSPERMS* | | | |
| ARAUCARIACEAE | | | | |
| *Araucaria columnaris* (G. Forster) J.D. Hoiok.. | Cook-pine | Nat | O2 | <1> |
| | *FLOWERING PLANTS* DICOTYLEDONS | | | |
| ACANTHACEAE | | | | |
| *Dicliptera chinensis* (L.) Juss. | --- | Nat | U3 | |
| *Hemigraphis reptans (*G. Forster) T. Anderson | --- | Nat | R2 | |
| *Thunbergia fragrans* Roxb. | sweet clock vine | Nat | U | |
| ANACARDIACEAE | | | | |
| *Mangifera indica* L. | mango | Nat | U | |

*Table 1 continued*

| ***Species listed by family*** | ***Common name*** | Status | Abundance | Notes |
|---|---|---|---|---|
| *Schinus terebinthifolius Raddi* | Christmas berry | Nat | U | |
| APIACEAE | | | | |
| *Centella asiatica* (L.) Urb. | Asiatic pennywort | Nat | U3 | <2> |
| *Hydrocotyle sibthorpioides* Lam. | pennywort | Nat | R2 | <2> |
| APOCYNACEAE | | | | |
| *Allamanda cathartica* L. | allamanda | Orn | R | |
| *Plumeria rubra* L. | frangipani | Orn | R | |
| *Thevetia peruviana* (Pers.) K. Schum. | be-still tree | Nat | U3 | <1> |
| ARALIACEAE | | | | |
| *Schefflera actinophyla* (Endl.) Harms | octopus tree | Nat | AA | |
| ASTERACEAE (COMPOSITAE) | | | | |
| *Ageratum conyzoides* L. | *maile hohono* | Nat | R | |
| *Calyptocarpus vialis* Less. | --- | Nat | U3 | <2> |
| *Conyza bonariensis* (L.) Cronq. | hairy horseweed | Nat | U | |
| *Cyanthillium cinereum* (L.) H. Rob. | little ironweed | Nat | U | |
| *Elephantopus mollis* Kunth | elephant's foot | Nat | R | |
| *Emilia fosbergii* Nicolson | Flora's paintbrush | Nat | U3 | |
| *Erechtites valerianifolia* (Wolf) DC | --- | Nat | R | <3> |
| *Spagneticola trilobata* (L.) | wedelia | Nat | AA | <1> |
| *Synedrella nodiflora* (L.) Gaertn. | nodeweed | Nat | U | |
| *Taraxacum officinale* W.W. Weber ex Wigg. | common dandelion | Nat | U | <2> |
| *Tridax procumbans* L. | coat buttons | Nat | R | |
| *Youngia japonica* (L.) DC | Oriental hawksbeard | Nat | U2 | <2> |
| BALSAMINACEAE | | | | |
| *Impatiens walleriana* J. D. Hook. | busy lizzy | Nat | R3 | <1> |
| BIGNONIACEAE | | | | |
| *Spathodea campanulata* P. Beauv. | African tulip tree | Nat | C | <1> |
| *Tabebuia aurea* (Silva Manso) S. Moore | silver trumpet | Orn | R | |
| *Tabebuia chrysotricha* (A.P. de Candolle) Standley | golden trumpet | Orn | R | |
| *Tabebuia heterophylla* (A.P. de Candolle) Britton | pink tecoma | Orn | U | |
| CARICACEAE | | | | |
| *Carica papaya* L. | papaya | Nat | R | |
| CARYOPHYLLACEAE | | | | |
| *Drymaria cordata* (L.) Willd. ex Roem. | *pipili* | Nat | U | <2> |
| CECROPIACEAE | | | | |
| *Cecropia obtusifolia* Bertol. | guarumo | Nat | R | <1> |
| CLUSIACEAE | | | | |
| *Clusia rosea* Jacq. | autograph tree | Nat | O | <1> |

*Table 1 continued*

| ***Species listed by family*** | ***Common name*** | Status | Abundance | Notes |
|---|---|---|---|---|
| EUPHORBIACEAE | | | | |
| *Aleurites moluccana* (L.) Wild. | *kukui* | **Pol** | C | <1> |
| *Chamaesyce albomarginata* (Torr. & A. Grey) Small | rattlesnake weed | Nat | R2 | <2> |
| *Chamaesyce hirta* (L.) Millsp. | garden spurge | Nat | R | |
| *Codiaeum variegatum* (L.) Blume | croton | Orn | R | <1> |
| *Macaranga tanarius* (L.) Müll. Arg. | --- | Nat | R | |
| *Phyllanthus debilis* Klein ex Willd. | niuri | Nat | O | |
| *Ricinus communis* L. | castor bean | Nat | R2 | |
| FABACEAE | | | | |
| *Acacia confusa* Merr. | Formosan *koa* | Nat | O | <1> |
| *Alysicarpus vaginalis* (L.) DC | alyce clover | Nat | U | <2> |
| *Calliandra haematocephala* Hassk. | red powderpuff | Orn | R | |
| *Canavalia* cf. *cathartica* Thouars | *maunaloa* | Nat | O3 | <3> |
| *Caesalpinia decapetala* (Roth) Alston | wait-a-bit | Nat | C | |
| *Cassia fistula* L. | golden shower | Orn | R | |
| *Chamaecrista nictitans* (L.) Moench | partridge pea | Nat | R | |
| *Desmodium incanum* DC | Spanish clover | Nat | U2 | <2> |
| *Falcataria moluccana* (Miq.) Barneby & Grimes | albizia | Nat | U | <1> |
| *Leucaena leucocephala* (Lam.) deWit | *koa haole* | Nat | U | |
| *Macroptilium atropurpureum* (DC) Urb. | --- | Nat | R | |
| *Mimosa pudica* L. | sensitive plant | Nat | U3 | <2> |
| *Neonotonia wightii* (Wight & Arnott) Lackey | glycine vine | Nat | U2 | <3> |
| *Samanea saman* (N. Jacq.) Merr. | monkeypod | Nat | C | <1> |
| *Trifolium arvense* L. | rabbit-foot clover | Nat | U2 | |
| LAMIACEAE | | | | |
| *Hyptis pectinata* (L.) Poit. | comb hyptis | Nat | R | |
| LAURACEAE | | | | |
| *Cinnamomun burmanni* (Nees) Blume | Padang cassia | Nat | O3 | <3> |
| *Persea americana* Mill. | avacado | Nat | R | |
| LOGANIACEAE | | | | |
| *Fagraea berteroana* Benth. | *pua kenikeni* | Orn | R | |
| LYTHRACEAE | | | | |
| *Cuphea hyssopifolia* Kunth | false heather | Nat | R3 | <1> |
| MALVACEAE | | | | |
| *Hibiscus rosa-sinensis* L. | Chinese hibiscus | Orn | O3 | |
| *Hibiscus tiliaceus* L. | *hau* | **Ind** | O3 | |
| MELASTOMATACEAE | | | | |
| *Clidemia hirta* (L.) D. Don var. hirta | Koster's curse | Nat | O | |
| MORACEAE | | | | |

*Table 1 continued*

| ***Species listed by family*** | ***Common name*** | Status | Abundance | Notes |
|---|---|---|---|---|
| *Artocarpus altilis* (Z) Fosb. | breadfruit | Pol | R | <1> |
| *Ficus benjamini* L. | weeping fig | Orn | R | |
| *Ficus microcarpa* L. | Chinese banyan | Nat | U | <1> |
| MYRSINACEAE | | | | |
| *Ardisia crenata* Sims | Hilo-holly | Nat | AA | |
| *Ardisia elliptica* Thunb. | shoe-button ardisia | Nat | C | |
| MYRTACEAE | | | | |
| *Callistemon viminalis* (J. Gaertn.) Loudon | weeping bottlebrush | Orn | U | |
| *Eucalyptus botryoides* Sm. | bangalay | Nat | R | |
| *Eucalyptus* sp. | gum tree | Nat | U2 | <3> |
| *Melaleuca quinquenervia (*Cav.) S.T. Blake | paperbark | Nat | O2 | <1> |
| *Metrosideros polymorpha* Gaud. | *‘ōhi‘a* | **End** | U | |
| *Psidium cattleianum* Sabine | strawberry guava | Nat | O3 | |
| *Psidium guajava* L. | common guava | Nat | R | |
| *Syzigium cumini* (L.) Skeels | Java plum | Nat | AA | <1> |
| NYCTAGINACEAE | | | | |
| *Bougainvillea spectabilis* Wild. | bougainvillea | Orn | O | |
| OXALIDACEAE | | | | |
| *Oxalis corniculata* L. | yellow wood sorrel | **Ind** | U3 | <2> |
| *Oxalis debilis* var. *corymbosa* (A.P. de Candolle) Lour. | pink wood sorrel | Orn | R | |
| PASSIFLORACEAE | | | | |
| *Pasiflora edulis* Sims | *liliko‘i* | Nat | O3 | <3> |
| *Passiflora suberosa* L. | wild passionfruit | Nat | R | |
| PLANTAGINACEAE | | | | |
| *Plantago lanceolata* L. | nrw-lvd plantain | Nat | U2 | <2> |
| *Plantago major* L. | common plantain | Nat | U2 | <2> |
| ROSACEAE | | | | |
| *Rubus rosifolius* Sm. | thimbleberry | Nat | R2 | |
| RUBIACEAE | | | | |
| *Ixora* sp. | ixora | Orn | R3 | |
| *Padaeria foetida* L. | *maile pilau* | Nat | O3 | |
| *Spermacoce assurgens* Ruiz & Pav. | buttonweed | Nat | R2 | |
| RUTACEAE | | | | |
| *Citrus* sp. | | Orn | R | <3> |
| SOLANACEAE | | | | |
| *Solandra maxima* (Sessé & Moçiño) P.S. Green | chalice vine | Orn | R | |
| THYMELAEACEAE | | | | |
| *Wikstroemia oahuensis* (A. Gray) Rock | *‘ākia* | **End** | U | |

*Table 1 continued*

| ***Species listed by family*** | ***Common name*** | Status | Abundance | Notes |
|---|---|---|---|---|
| ULMACEAE | | | | |
| *Trema orientalis* (L.) Blume | gunpowder tree | Nat | R | |
| URTICACEAE | | | | |
| *Pilea microphylla* (L.) Liebm. | artillery plant | Nat | U3 | <2> |
| VERBENACEAE | | | | |
| *Citharexylum caudatum* L. | fiddlewood | Nat | AA | |
| *Citharexylum spinosum* L. | fiddlewood | Nat | U | <1> |
| *Duranta erecta* L. | golden dewdrop | Orn | R3 | |
| *Lantana camara* L. | lantana | Nat | U | |
| *Stachytarpheta cayennensis* (Rich.) Vahl | nettle-lvd vervain | Nat | U | |
| | MONOCOTYLEDONES | | | |
| AGAVACEAE | | | | |
| *Cordyline fruticosa* (L.) A. Chev. | ti, *ki* | **Pol** | U | |
| *Dracaena fragrans* (L.) Ker Gawl. | fragrant dracaena | Orn | R | |
| *Dracaena marginata* Lam. | money tree | Orn | R | |
| *Nolina recurvata* (Lemaire) W. Helms. | beaucarnia | Orn | R | |
| ARACEAE | | | | |
| *Epipremnum pinnatum 'Aureum'* G.S. Bunting | pothos | Nat | U3 | <1> |
| *Monstera delicosa* Liebmann | monstera | Orn | R | <1> |
| *Philodendron scandens* K. Koch & Sello | heart-leaf philodendron | Nat | O3 | <1> |
| *Syngonium* cf. *podophyllum* Schott | nephthytis | Nat | O3 | <1> |
| *Xanthosoma robustum* Schott | 'ape | Nat | R | |
| ARECACEAE | | | | |
| *Caryota* cf. *urens* L. | wine palm | Orn | R | |
| *Cocos nucifera* L. | coconut, *niu* | **Pol** | O | <1> |
| *Dypsis lutescens* (H. Wendl.) Beentje & Dransfield | golden-fruited palm | Orn | U | |
| *Pritchardia* sp. | *loulu* | Orn | R | <1> |
| *Veitchia merrilli* (Beccari) H.E. Moore | Manila palm | Orn | U2 | <1> |
| BROMELIACEAE | | | | |
| *Ananas comosus* L. | pineapple | Orn | R2 | |
| COMMELINACEAE | | | | |
| *Commelina diffusa* N.L. Burm. | day flower | Nat | C | <2> |
| CYPERACEAE | | | | |
| *Cyperus gracilis* R. Br. | McCoy grass | Nat | U3 | <2> |
| *Cyperus involucratus* Rottb. | umbrella sedge | Nat | R | |
| *Cyperus polystachyos* Rottb. | --- | **Ind** | R | |
| *Kyllinga brevifolia* Rottb. | *kili'o'opu* | Nat | A | <2> |

*Table 1 continued*

| ***Species listed by family*** | ***Common name*** | Status | Abundance | Notes |
|---|---|---|---|---|
| *Kyllinga nemoralis* (J.R. Forster & G. Forster) Dandy ex Hutchinson & Dalziel | *kili‘o‘opu* | Nat | C | <2> |
| HELICONIACEAE | | | | |
| *Heliconia latispatha* Benth. | latispatha heliconia | Orn | O3 | <1> |
| MUSACEAE | | | | |
| *Musa* cultivar | banana | Orn | R | <1> |
| ORCHIDACEAE | | | | |
| *Arundina graminifolia* (D. Don) Hochr. | bamboo orchid | Nat | O | |
| *Spathoglottis plicata* Blume | Malayan ground orchid | Nat | U | |
| PANDANACEAE | | | | |
| *Pandanus tectorius* Z | | **Ind** | O | <1> |
| POACEAE (GRAMINEAE) | | | | |
| *Andropogon virginicus* L. | broomsedge | Nat | O3 | |
| *Axonopus compressus* (Swartz) P. Beau. | brd-lvd carpetgrass | Nat | AA | <2> |
| *Bambusa vulgaris* J.C. Wendl. | golden bamboo | Nat | R | |
| *Bothriochloa pertusa* (L.) Camus | pitted beardgrass | Nat | R | <2> |
| *Cynodon dactylon* (L.) Pers. | Bermuda grass | Nat | U3 | <2> |
| *Dichanthium aristatum* (Poir.) Hubb. | Wilder grass | Nat | A | |
| *Digitaria insularis* (L.) Mez ex Ekman | sourgrass | Nat | U | |
| *Digitaria violascens* Link | smooth crabgrass | Nat | R | |
| *Eleusine indica* (L.) Gaertn. | wiregrass | Nat | U | <2> |
| *Eragrostis pectinacea* (Michx.) Nees | Carolina lovegrass | Nat | R3 | |
| *Eremochloa ophiuroides* (Munro) Hackel | centipede grass | Orn | U | <2,3> |
| *Melinus minutiflora* P. Beauv. | molasses grass | Nat | O3 | |
| *Oplismenus hirtellus* (L.) P. Beauv. | basketgrass | Nat | C | |
| *Paspalum conjugatum* Bergius | Hilo grass | Nat | O | <2> |
| *Pennisetum purpureum* Schumach. | elephant grass | Nat | R3 | |
| *Paspalum dilatatum* Poir. | Dallis grass | Nat | R | |
| *Paspalum scrobiculatum* L. | ricegrass | **Ind** | O3 | |
| *Phyllostachys nigra* (Lindley) Munro | black bamboo | Nat | U | <1> |
| *Sacciolepis indica* (L.) Chase | Glenwood grass | Nat | AA | <2> |
| *Setaria palmifolia* (J. König) Stapf | palm grass | Nat | U3 | |
| *Sporobolus* cf. *indicus* (L.) R. Br. | dropseed | Nat | R | <2> |
| *Urochloa maxima* (Jacq.) Webster | Guinea grass | Nat | O3 | |
| *Urochloa mutica* (Forssk.) Nguyen | California grass | Nat | U3 | |
| STRELITZIACEAE | | | | |
| *Strelitzia reginae* Dryander | bird-of-paradise | Orn | R | |
| ZINGERBERACEAE | | | | |
| *Alpinia purpurata* (Viell.) K. Schum. | red ginger | Orn | U2 | |

*Table 1 continued*

| ***Species listed by family*** | ***Common name*** | Status | Abundance | Notes |
|---|---|---|---|---|
| *Alpinia zerumbet* (Pers.) B.L. Burtt & R.M. Smith | shell ginger | Orn | O3 | |
| *Etlingera elatior* (Jack) R.M. Smith | torch ginger | Orn | R3 | |

## Legend to Table 1

Status = distributional status

**end.** = endemic; native to Hawaii and found naturally nowhere else.

**ind.** = indigenous; native to Hawaii, but not unique to the Hawaiian Islands.

nat. = naturalized, exotic, plant introduced to the Hawaiian Islands since the arrival of Cook Expedition in 1778, and well-established outside of cultivation.

orn. = exotic, ornamental or cultivated; plant not naturalized (not well-established outside of cultivation).

**pol.** = Polynesian introduction before 1778.

Abundance = occurrence ratings for plants in survey area.

R – Rare - only one, two, or three plants seen.

U - Uncommon - several to a dozen plants observed.

O - Occasional - found regularly around the site.

C - Common - considered an important part of the vegetation and observed numerous times.

A - Abundant - found in large numbers; may be locally dominant.

AA - Abundant - abundant and dominant in some areas surveyed, defining vegetation in those areas.

Notes:

<1> a naturalized species utilized as on site as an ornamental, or an ornamental extensively planted in forest areas surrounding developed areas on this site.

<2> plant associated with the extensive mowed (lawn) areas.

<3> plant lacking seasonal flowers or fruit; identification uncertain.

A total of 159 species of plants were recorded during the course of this survey; this count includes nine ferns and one gymnosperm; the remaining are flowering plants (angiosperms). Considering the full count, two are endemic, eight are indigenous, and four are early aboriginal introduction to the Hawaiian Islands (so-called "canoe plants"). The percent of truly native plants species is thus 6.3%. Including all pre-1778 species, this number increases to 8.8%. As is typical for lowland O‘ahu sites, these low values are actually an exaggeration of the percentage of the plants (or vegetation biomass) represented by native species in the landscape, since none of the species were recorded as more than occasional sightings, with the one exception of *pala‘a* (*Sphenomeris chinensis*), a fern which was very abundant in parts of the scrub forest located to the north of the campus.

The listing in Table 1 includes 34 ornamental species (21.4%). However, many species planted around the well-maintained grounds of this campus are ornamentals that have gained the status of "naturalized" because they have become successfully established somewhere in the Islands outside of human cultivation. Not much meaning can be attached to this fact, other than the high number of ornamentals (species planted and not known to naturalize) is an indication of the landscaped nature of a large portion of the area that was surveyed. Broad-leaved carpet grass (*Axonopus compressus*) and wedelia (*Sphagneticola trilobata*) are two examples of species that are used extensively as landscape elements (carpet-grass is the main lawn grass here), but are also widely distributed in Hawai‘i outside of cultivation (i.e., naturalized).

As a side note, a small open meadow area located near the proposed soccer field should be designated botanist hell if not destroyed by construction (recommended). In this approximately one-quarter acre plot, surrounded by wait-a-bit and lantana, is a dense stand of thimbleberry (*Rubis rosifolius*) and sensitive plant (*Mimosa pudica*) supported on long arms of the wait-a-bit, the whole growing between 0.5 and 1.5 m (2-4 ft) in height. These four species are the kings (and queens) of thorny, introduced plants in Hawai‘i.

***Avian Survey Methods***

Ten avian count stations were sited along two transects running roughly parallel with Kamehameha Highway. Each station was located approximately 984 feet (300 meters) apart from each other. Eight-minute point counts were made at each of the 10 count stations. Each station was counted once. Field observations were made with the aid of Leica 10 X 42 binoculars and by listening for vocalizations. Counts were concentrated during early morning hours, the peak of daily bird activity. Additionally, the zoologist walked the site in a similar fashion as the botanist, to ensure that no additional species or habitats not encountered during the time dependant avian counts were present on the site.

***Avian Survey Results***

A total of 371 individual birds of 17 different species, representing 13 separate families, were recorded during station counts (Table 2). One of the species recorded, Pacific Golden-Plover (*Pluvialis fulva*) is an indigenous migratory shorebird species that nests in the high Arctic during the late spring and summer months, returning to Hawai‘i and the Tropical Pacific to spend the fall and winter months each year. Plover usually leave Hawai‘i for their trip back to the Arctic in late April or the very early part of May each year. The remaining 16 avian species detected are all considered to be alien to the Hawaiian Islands. No avian species currently listed, or proposed for listing under either the federal or State of Hawaii endangered species statutes was detected during the course of this survey.

Avian diversity and densities were in keeping with the habitat present within the project site, and its location on the windward side of the island of O‘ahu. Two species, Common Waxbill (*Estrilda astrild* ), and Red-vented Bulbul (*Pycnonotus cafer*) accounted for slightly less than 54 percent of the total number of birds detected. Common Waxbills were the most frequently recorded species accounting for 31 percent of the total number of birds recorded during station counts. An average of 37 individual birds was recorded per station count.

| Table 2 – Avian Species Detected on the HPU, Hawai‘i Loa Campus | | | |
|---|---|---|---|
| ***Common Name*** | ***Scientific Name*** | ***ST*** | ***RA*** |
| | CICONIIFORMES | | |
| | ARDEIDAE - Herons, Bitterns & Allies | | |
| Cattle Egret | *Bubulcus ibis* | A | 0.20 |
| | CHARADRIIFORMES | | |
| | CHARADRIIDAE - Lapwings & Plovers | | |
| | Charadriinae - Plovers | | |
| Pacific Golden-Plover | *Pluvialis fulva* | IM | 2.10 |
| | COLUMBIFORMES | | |
| | COLUMBIDAE - Pigeons & Doves | | |
| Spotted Dove | *Streptopelia chinensis* | A | 0.90 |
| Zebra Dove | *Geopelia striata* | A | 5.50 |
| | PASSERIFORMES | | |
| | PYCNONOTIDAE - Bulbuls | | |
| Red-vented Bulbul | *Pycnonotus cafer* | A | 8.50 |
| Red-whiskered Bulbul | *Pycnonotus jocosus* | A | 2.40 |
| | TURDIDAE - Thrushes | | |
| White-rumped Shama | *Copsychus malabaricus* | A | 0.80 |
| | TIMALIIDAE - Babblers | | |
| Hwamei | *Garrulax canorus* | A | 0.40 |
| Red-billed Leiothrix | *Leiothrix lutea* | A | 3.00 |
| | ZOSTEROPIDAE - White-eyes | | |
| Japanese White-eye | *Zosterops japonicus* | A | 6.40 |
| | STURNIDAE - Starlings | | |
| Common Myna | *Acridotheres tristis* | A | 3.90 |
| | EMBERIZIDAE - Emberizids | | |
| Red-crested Cardinal | *Paroaria coronata* | A | 0.60 |
| | CARDINALIDAE - Cardinals Saltators & Allies | | |
| Northern Cardinal | *Cardinalis cardinalis* | A | 0.70 |
| | FRINGILLIDAE - Fringilline and Carduleline Finches & Allies | | |
| | Carduelinae - Carduline Finches | | |
| House Finch | *Carpodacus mexicanus* | A | 1.70 |
| | PASSERIDAE - Old World Sparrows | | |
| House Sparrow | *Passer domesticus* | A | 0.70 |
| | ESTRILDIDAE - Estrildid Finches | | |
| | Estrildinae - Estrildine Finches | | |
| Common Waxbill | *Estrilda astrild* | A | 0.40 |
| Chestnut Munia | *Lonchura atricapilla* | A | 0.40 |

***Key To Table 2***

***ST*** Status

A Alien – Introduced to the Hawaiian Islands by humans

IM Indigenous Migrant – Native migratory species, winters in Hawai‘i nests elsewhere

***RA*** Relative Abundance - Number of birds detected divided by the number of count stations (10)

### *Mammalian Survey Methods*

With the exception of the endangered Hawaiian hoary bat (*Lazarus cinereus semotus*), or *‘ōpe‘ape‘a* as it is known locally, all terrestrial mammals currently found on the Island of O‘ahu are alien species. Most are ubiquitous. The survey of mammals was limited to visual and auditory detection, coupled with visual observation of scat, tracks, and other animal sign. A running tally was kept of all vertebrate species observed and heard within the project area.

### *Mammalian Survey Results*

Two mammalian species were detected during the course of this survey. Large numbers of humans (*Homo sapiens*) were seen within the developed portions of the campus. Additionally we saw three small Indian mongooses (*Herpestes a. auropunctatus*) within the study area. No mammalian species currently listed, or proposed for listing under either the federal or State of Hawai‘i endangered species statutes was detected during the course of this survey.

### *Discussion*

#### *Botanical Resources*

A majority of the area proposed for various additions and improvements to the Hawai‘i Loa Campus is highly disturbed from a botanical perspective. That is, the natural vegetation has been replaced with a highly manicured and maintained, park-like landscaping, which contributes to the innate beauty of this campus. Other areas do have a very natural appearance, but many of the plant species present reveal an underlying effort at introducing ornamentals into the natural landscape. Areas of this sort are most evident along the south margin of the swale (the bottom of which is mostly an extensive lawn) that runs through the campus from southeast to northwest. Natural vegetation predominates on the slopes that border the more developed parts of the campus, particularly the area between Kamehameha Highway and the aforementioned swale and swale margins, where a secondary forest dominated by Java plum, fiddlewood (*Citharexylum caudatum*), octopus tree (*Schefflera actinophyla*), African tulip (*Spathodea campanulata*), and Padang cassia (*Cinnamomon burmanni*) is present. Understory plants common to this forested area are juvenile fiddlewood, wait-a-bit (*Cassia fistula*), wood fern (*Christella* spp.), shoe-button ardisia (*Ardisia elliptica*), basket grass (*Oplismenus hirtellus*), and several different vines (pothos, heart-leaf philodendron, nepthytis). This forest extends around the existing soccer field from the southeast to the north side of the field, and then merges into a distinctly different vegetation type behind the existing main Academic Center building.

On the north side of the campus, from behind the Academic Center building and off to the north, the steeper slopes support a short stature forest (scrub growth). Swales in this area tend to be dominated by *hau* (*Hibiscus tiliaceus*) and *laua'e* fern (*Phymatosorus grossus*). Plantings of *Eucalyptus* spp. and Cook-pine (*Araucaria columnaris*) are present close to the campus grounds. This area is most interesting botanically, because it appears to contain surviving remnants of the original native vegetation, particularly a short-stature form of *'ōhi'a* (*Metrosideros polymorpha*) and*'akia* (*Wikstroemia oahuensis*), a native shrub. An introduced shrub, Hilo holly (*Ardisia crenata*), is abundant. In general, this "forest" is fairly open (Figure 4), with a prominent herbaceous layer of sword fern (*Nephrolepis multiflora*), *pala'ā*, Glenwood grass (*Sacciolepis indica*), ricegrass (*Paspalum scrobiculatum*), bamboo orchid (*Arundina graminifolia*), and Wilder grass (*Dichanthium aristatum*).

Figure 4. Scrub forest north of campus, showing mostly introduced shrubs and small stature trees. In this view, *'ōhi'a* can be seen on the right (red flower) and lower left; the groundcover is mostly *pala'ā* fern.

To better delineate the "native" part of this scrub forest, the position of the lowest *'ōhi'a* (and in some cases, *'akia*) plants on the slopes were recorded by GPS. By "lowest, is meant the plants found closest to the campus in a line across the slope east of the campus. This line runs roughly SE-NW from just behind the Academic Center building to the *Eucalyptus* grove east of the dormitory complex and is quite close to the campus directly behind the Academic Center, but further upslope to the northwest.

### *Avian Resources*

The findings of this survey are consistent with the location and habitat currently present on the site. All but one of the 17 avian species detected on the property are commonly occurring alien species. The lone native species recorded, Pacific Golden-Plover is a migratory shorebird species that nests in the Arctic, and winters in Hawaii and the Tropical Pacific. Plover, or *kōlea* as they are known in Hawaii are encountered in almost all relatively open habitat from golf courses to shopping center roofs in Hawaiʻi between late July and the end of April. No species currently listed, or proposed for listing under either the federal or the State of Hawaiʻi endangered species programs were detected during the course of this survey.

Although not detected during this survey both the endangered Hawaiian Petrel (*Pterodroma sandwichensis*), and the threatened endemic sub-species of the Newell's Shearwater (*Puffinus auricularis newelli*), may over-fly the project area in extremely small numbers between April and the end of November each year. Both of these pelagic seabird species nest high in the mountains in burrows excavated under thick vegetation, especially *uluhe* (*Dicranopteris linearis*) fern. There is no suitable nesting habitat for either of these seabird species on the HPU Campus. It should be noted that although very small numbers of downed Newellʻs Shearwaters have been recovered on Oʻahu over the years, no confirmed nesting has yet been documented for either of these seabird species on the island.

The primary cause of mortality in both Hawaiian Petrels and Newell's Shearwaters is thought to be predation by alien mammalian species at the nesting colonies (USFWS 1983, Simons and Hodges 1998, Ainley et al. 2001). Collision with man-made structures is considered to be the second most significant cause of mortality of these seabird species in Hawaiʻi. Nocturnally flying seabirds, especially fledglings on their way to sea in the summer and fall, can become disoriented by exterior lighting. When disoriented, seabirds often collide with manmade structures, and if they are not killed outright, the dazed or injured birds are easy targets of opportunity for feral mammals (Hadley 1961, Telfer 1979, Sincock 1981, Reed et al. 1985, Telfer et al. 1987, Cooper and Day 1998, Podolsky et al. 1998, Ainley et al. 2001, Hue et al., 2001, Day et al., 2003).

### *Mammalian Resources*

The findings of the mammalian survey are in keeping with the nature of the site surveyed, namely an actively maintained busy university campus. Although no rodents were detected during the course of this survey it is probable that at least a few of the four established alien *muridae* known from the Island of Oʻahu, roof rat (*Rattus r. rattus*), Norway rat (*Rattus norvegicus*), Polynesian rat (*Rattus exulans hawaiiensis*), and European house mice (*Mus musculus domesticus*), use resources on the campus area on occasion, as all are human commensal species.

### *Potential Impacts to Protected Species*

It is not expected that the expansion and operation of the Hawaiʻi Pacific University, Hawaiʻi Loa Campus will result in deleterious impacts to any botanical, avian or mammalian species currently

listed or proposed for listing under either the federal or state of Hawai‘i endangered species statutes.

### *Botanical Resources*

No protected species of plants (USFWS, 2005, 2009) were located during the botanical survey and none is anticipated to occur in this area. Introduced plants, both ornamentals and naturalized species, dominate the campus vegetation. Preservation of larger trees as necessary and practicable will be part of the planning process for the new facilities, but there are no plants on campus (in the survey area) that deserve special protection.

The occurrence of native species on the slopes behind (north of) the campus suggests this area still supports remnants of the original vegetation. The closest occurrence of *‘ōhi‘a* and *‘akia* plants upslope of the campus maintained landscape ranges from about 30 feet on the east to 150 feet on the west. No impacts are planned for the area behind the main Academic Center where these plants are found closest to the developed campus. Grading and construction of a drainage basin are proposed for the slope area to the west, and here these plants are mostly if not entirely beyond the impact area as shown on planning maps. That is, few if any plants would be impacted. The density (number of plants per unit area) of these native shrubs is extremely low, perhaps 2 or 3 per acre, near the campus. Removal of some of these plants will not result in significant impacts to the remaining native plants in the area, and could be easily compensated for (see recommendations, below).

### *Hawaiian Petrel and Newell’s Shearwater*

The principal potential impact that expansion and operation of the proposed school poses to Hawaiian Petrels and Newell’s Shearwaters is the increased threat that birds will be downed after becoming disoriented by lights associated with the project during the nesting season. The two main areas that outdoor lighting could pose a threat to these nocturnally flying seabirds is if, 1) during construction it is deemed expedient, or necessary to conduct nighttime construction activities, 2) following build-out the potential operation of streetlights and athletic field lighting during the seabird nesting season.

### *Recommendations*

If nighttime construction activity or equipment maintenance is proposed during the construction phases of the project, all associated lights should be shielded, and when large flood/work lights are used they should be placed on poles that are high enough to allow the lights to be pointed directly at the ground.

If streetlights or facility lighting is installed in conjunction with the school, it is recommended that lights be shielded to reduce the potential for interactions of nocturnally flying Hawaiian Petrels and Newell’s Shearwaters with external lights and man-made structures (Reed et al. 1985, Telfer et al. 1987).

It is recommended that the project replant areas that are disturbed during construction with native species where practicable. The presence of a remnant native plant association could provide direction for this planting. This association appears to have survived over the centuries because it occupies an area of generally very poor soil that does not as readily support invasion by non-native trees as is the case in other parts of the grounds surrounding the developed campus (the southwest through south to east areas). Proposed cuts in and near this area will create exposures of poor soils, and plantings here should be mostly native *‘ōhi‘a* and *‘akia*, preferably using seeds collected from the local plants to best preserve the existing populations of these plants. Such an effort could provide an opportunity to utilize HPU botanical expertise, providing a real world project for students in the natural sciences department.

***Glossary:***

*Ahupuaʻa* – Traditional Hawaiian land division, usually extending from the uplands to the sea.
Alien – Introduced to Hawaiʻi by humans
Angiosperm – Plants that has flowers and produces seeds enclosed within a carpel. The angiosperms are a large group and include herbaceous plants, shrubs, grasses, and most trees.
Commensal – Animals that share human food and lodgings, such as rats and mice.
Endangered – Listed and protected under the Endangered Species Act of 1973, as amended as an endangered species.
Gymnosperm – Plants that have seeds unprotected by an ovary or fruit. Gymnosperms include the conifers, cycads, and ginkgo.
Indigenous – Native to the Hawaiian Islands, but also found elsewhere naturally
*Kōlea* – Pacific Golden-Plover
*Mauka* – Upslope, towards the mountains
*Moku* - Land division, district or section
*Muridae* – Rodents, including rats, mice and voles, one of the most diverse family of mammals
Naturalized – In this case refers to none native plants that have become established in the wild in Hawaiʻi
Nocturnal – Night-time, after dark
*ʻŌpeʻapeʻa* – Hawaiian hoary bat
Pelagic – An animal that spends its life at sea – in this case seabirds that only return to land to nest and rear their young
Phylogenetic – The evolutionary order that organisms are arranged by
Threatened – Listed and protected under the ESA as a threatened species

DLNR – Hawaiʻi State Department of Land & Natural Resources
DOFAW – Division of Forestry and Wildlife
GPS – Global Positioning System, an accurate worldwide navigational and surveying facility based on the reception of signals from an array of orbiting satellites.
MSL – Mean sea level
TMK – Tax Map Key
USFWS – United State Fish & Wildlife Service

***Literature Cited:***


Ainley, D. G, R. Podolsky, L. Deforest, G. Spencer, and N. Nur. 2001. The Status and Population Trends of the Newell's Shearwater on Kaua'i: Insights from Modeling, *In*: Scott, J. M, S. Conant, and C. Van Riper III (editors) *Evolution, Ecology, Conservation, and Management of Hawaiian Birds: A Vanishing Avifauna.* Studies in Avian Biology No. 22:. Cooper's Ornithological Society, Allen Press, Lawrence, Kansas. (Pg. 108-123)

American Ornithologist's Union. 1998. *Check-list of North American Birds*. 7th edition. AOU. Washington D.C. 829pp.

_____. 2000. Forty-second supplement to the American Ornithologist's Union *Check-list of North American Birds*. Auk 117:847-858.

Banks, R. C., C. Cicero, J. L. Dunn, A. W. Kratter, P. C. Rasmussen, J. V. Remsen, Jr., J. D. Rising, and D. F. Stotz. 2002. Forty-third supplement to the American Ornithologist's Union *Check-list of North American Birds*. Auk 119:897-906.

_____. 2003 Forty-fourth supplement to the American Ornithologist's Union *Check-list of North American Birds*. Auk 120:923-931.

_____. 2004 Forty-fifth supplement to the American Ornithologist's Union *Check-list of North American Birds*. Auk 121:985-995.

_____. 2005 Forty-sixth supplement to the American Ornithologist's Union *Check-list of North American Birds*. Auk 122:1031-1031.

_____. 2006 Forty-seventh supplement to the American Ornithologist's Union *Check-list of North American Birds*. Auk 123:926-936.

Banks, R. C., C. R. Terry Chesser, C. Cicero, J. L. Dunn, A. W. Kratter, I. J. Lovette, P. C. Rasmussen, J. V. Remsen, Jr., J. D. Rising, and D. F. Stotz. 2007 Forty-eighth supplement to the American Ornithologist Union *Check-list of North American Birds*. Auk 124:1109-1115.

Banks, R. C., C. R. Terry Chesser, C. Cicero, J. L. Dunn, A. W. Kratter, I. J. Lovette, P. C. Rasmussen, J. V. Remsen, Jr., J. D. Rising, and D. F. Stotz, and K. Winker. 2008 Forty-ninth supplement to the American Ornithologist Union *Check-list of North American Birds*. Auk 125:758-768.

Chesser, R. T., R. C. Banks, F. K. Barker, C. Cicero, J. L. Dunn, A. W. Kratter, I. J. Lovette, P. C. Rasmussen, J. V. Remsen, Jr., J. D. Rising, and D. F. Stotz, and K. Winker. 2009. Fiftieth supplement to the American Ornithologist Union *Check-list of North American Birds*. Auk 126:1-10.

Cooper, B. A and R. H. Day. 1998. Summer Behavior and Mortality of Dark-rumped Petrels and Newells' Shearwaters at Power Lines on Kauai. Colonial Waterbirds, 21 (1): 11-19.

_____. 2003. Movement of Hawaiian Petrels to inland breeding sites on Maui Island, Hawaii. Waterbirds 26:62-71.

Cooper, B. A and R. H. Day. 2004. Results of Endangered Bird and Bat Surveys at the Kaheawa Pastures Wind Energy Facility on Maui Island, Hawaii, Fall 2004. Prepared for: Kaheawa Wind Power LLC, Makawao, HI and UPC Wind Management, LLC, Newton, MA.

Day, R. H., and B. A. Cooper. 1999. Results of Endangered Bird and Bat Surveys at the Proposed Kaheawa Pastures Wind Energy Facility on Maui Island, Hawaii, Summer 1999. Prepared for: Zond Pacific, Wailuku, HI.

Day, R. H., B. Cooper, and T. C. Telfer. 2003. Decline of Townsend's (Newell's Shearwaters (*Puffinus auricularis newelli*) on Kauai, Hawaii. The Auk 120: 669-679.

Denis, N. and T.E. Hamer. 2007. Endangered Bird And Bat Surveys At The Proposed Auwahi South Wind Energy Facility On The Island Of Maui, Hawai'i. Prepared for Shell WindEnergy Inc.

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.

Federal Register. 2005. Department of the Interior, Fish and Wildlife Service, 50 CFR 17. Endangered and Threatened Wildlife and Plants. Review of Species That Are Candidates or Proposed for Listing as Endangered or Threatened; Annual Notice of Findings on Resubmitted Petition; Annual Description of Progress on Listing Actions. Federal Register, 70 No. 90 (Wednesday, May 11, 2005): 24870-24934.

Hadley, T. H. 1961. Shearwater calamity on Kauai. 'Elepaio 21:60.

Hue, D., C. Glidden, J. Lippert, L. Schnell, J. MacIvor and J. Meisler. 2001. Habitat Use and Limiting Factors in a Population of Hawaiian Dark-rumped Petrels on Mauna Loa, Hawai'i. , *in:* : Scott, J. M, S. Conant, and C. Van Riper III (editors) *Evolution, Ecology, Conservation, and Management of Hawaiian Birds: A Vanishing Avifauna*. Studies in Avian Biology No. 22. Cooper's Ornithological Society, Allen Press, Lawrence, Kansas (Pg. 234-242).

Podolsky, R., D.G. Ainley, G. Spencer, L. de Forest, and N. Nur. 1998. "Mortality of Newell's Shearwaters Caused by Collisions with Urban Structures on Kaua'i". Colonial Waterbirds 21:20-34.

Pukui , M. K., S. H. Elbert, and E. T. Mookini. 1974. *Place Names of Hawaii*. University of Hawaii Press. Honolulu, Hawai'i. 289 pp.

Reed, J. R., J. L Sincock, and J. P. Hailman 1985. Light Attraction in Endangered Procellariform Birds: Reduction by Shielding Upward Radiation. Auk 102: 377-383.

Simons, T. R., and C. N. Hodges. 1998. Dark-rumped Petrel (*Pterodroma phaeopygia*). *In* A. Poole and F. Gill (editors). The Birds of North America, No. 345. The Academy of Natural Sciences, Philadelphia, PA. and the American Ornithologists Union, Washington, D.C.

Sincock, J. L. 1981. Saving the Newell‘s Shearwater. Pages 76-78 in Proceedings of the Hawaii Forestry and Wildlife Conference, 2-4 October 1980. Department of Land and Natural Resources State of Hawaii, Honolulu.

Staples, G. W. and D. R. Herbst. 2005. *A Tropical Garden Flora. Plants Cultivated in the Hawaiian Islands and other Tropical Places.* Bishop Museum, Honolulu. 908 pp.

Telfer, T. C. 1979. Successful Newell's Shearwater Salvage on Kauai. ‘Elepaio 39:71

Telfer, T. C. , J. L. Sincock, G. V. Byrd, and J. R. Reed. 1987. Attraction of Hawaiian seabirds to lights: Conservation efforts and effects of moon phase. Wildlife Society Bulletin 15:406-413.

Tomich, P.Q. 1986. *Mammals in Hawaii*. Bishop Museum Press. Honolulu, Hawaii. 37 pp.

U.S. Fish & Wildlife Service (USFWS) 1983. Hawaiian Dark-Rumped Petrel & Newell's Manx Shearwater Recovery Plan. USFWS, Portland, Oregon. February 1983.

_____. 2005. Endangered and Threatened Wildlife and Plants. 50CFR 17:11 and 17:12 (Tuesday, November 1, 2005).

_____. 2009. USFWS Threatened and Endangered Species System (TESS), online at http://ecos.fws.gov/tess_public/StartTESS.do

Wagner, W.L., D.R Herbst, and S.H. Sohmer. 1990. *Manual of the Flowering Plants of Hawai‘i*. University of Hawaii Press, Honolulu, Hawaii 1854 pp.

Wagner, W.L. and D.R. Herbst. 1999. *Supplement to the Manual of the flowering plants of Hawai‘i*, pp. 1855-1918. *In:* Wagner, W.L., D.R. Herbst, and S.H. Sohmer, Manual of the flowering plants of Hawai‘i. Revised edition. 2 vols. University of Hawaii Press and Bishop Museum Press, Honolulu.

# APPENDIX H
# LANDSCAPE PLAN

# Appendix H- Landscape Design Strategies

## LANDSCAPE MASTER PLAN

One of the greatest assets of the Hawai'i Loa Campus is its natural setting – dramatic views of the Ko'olau Mountains, mature canopy trees, and the surrounding lush conservation land. The existing landscape functions as a unifying element where buildings are meant to harmonize with the natural setting and respect the majestic Pali.

The goal of the Hawai'i Loa – Campus for the Future, Phase One Planning Report, 2007 is to create a "memorable and uplifting campus that demonstrates Hawaiian sense of place and serves the highest purposes of learning…" The campus will "protect and enhance the natural environment and resources of the land, air and sea…"

To help achieve this goal, the landscape Master Plan seeks to respect the natural setting, while emphasizing the use of native Hawaiian and Polynesian-introduced plants to promote sustainability and create a Hawaiian place of learning.

# Appendix H - Landscape Design Strategies (continued)

## EXISTING CONDITIONS

### Irrigation System

The Hawai'i Loa Campus receives approximately 60"-70" of rain annually. The lawn areas are irrigated by a quick coupler system that was installed in the early 1970s and is operated manually. There are about 5 irrigation points of connection instead of one dedicated backflow prevention device for the entire irrigation system.

### Landscape

The surrounding conservation land is dominated by non-native trees such as African tulip, eucalyptus, banyan, rubber tree, mango and Norfolk Island pine; the wooded hillsides provide a lush backdrop to the campus.

A variety of non-native trees are also growing in the developed portion of the campus including monkeypod tree, shower tree, pink tecoma, royal poinciana, puakenikeni, paperbark, manila palm and areca palm. Many of these trees may have been planted in response to the Hawai'i Loa College – A Master Plan Report prepared by William L. Pereira & Associates which recommended the planting of such trees and palms for scale and texture, and for color, especially when seen from above.

Except for coconut and green ti, no emphasis was placed on the use of native Hawaiian or Polynesian-introduced plants in the original Master Plan. However, coconut palms, kukui and hala are quite prevalent on campus, especially near Atherton Field and along the road leading to the Academic Center.

Monkeypod trees most define the character of the campus due to their large, spreading canopies. These trees, coupled with the expansive lawns, wooded hillsides and dramatic views of the Ko'olau Mountains truly reflect the image of Hawai'i as a "paradise."

# Appendix H - Landscape Design Strategies (continued)

## VISION

The vision of the Hawai'i Loa Campus reflects three core Planning Principles:

- Principle 1: Enhance the quality of education and scholarship at Hawai'i Pacific University
- Principle 2: Create a vibrant campus community with residential life that supports excellence in teaching and learning
- Principle 3: Establish Hawaiian sense of place as the basis for sustainable campus development.

## PLANNING GOALS

The Planning Goals to fulfill the campus vision includes the use of "architectural and landscape strategies that meet sustainability standards and incorporate design principles with known success in Hawai'i, to create a campus that achieves significant:

- Reduction in long-term maintenance
- Reduced dependence on nonrenewable energy sources
- Enhanced conservation and protection of natural resources, and
- Respect for and enhancement of the inherent beauty of the campus."

## HAWAIIAN SENSE OF PLACE

One of the three Planning Principles for the Hawai'i Loa Campus is the establishment of a Hawaiian sense of place. This commitment demonstrates the University's mission statement that "Hawai'i Pacific University is an international learning community set in the rich cultural context of Hawai'i."

The character of the campus is derived in large part from the natural environment. Views of the Ko'olau Mountains should be maintained to retain the sense of place within the *ahupua'a*. The natural environment – major open spaces and mature trees - should also dominate, rather than the built environment.

Hawai'i's mild semi-tropical climate allows for an indoor-outdoor relationship where the boundaries between buildings and landscape are indistinguishable; buildings are part of a series of spaces that are linked by greenery. Tree canopies should be maintained to provide shade, protection from the rain, and define outdoor rooms or spaces for gathering and socializing.

# Appendix H - Landscape Design Strategies (continued)

The Hawai'i Loa Campus will "reflect the University's spirit of aloha, commitment to global connections, and sense of community within and beyond the borders of the campus." The landscape should therefore reflect not only the Hawaiian culture, but Hawai'i Pacific University's global reach.

Emphasizing significant places of the campus help to create a Hawaiian identity. Memorial trees provide connections to places, people, and events that were important in the school's history. Special effort should be given to protect and maintain these plantings.

Where new plantings are required and specific species are not needed for aesthetic consistency to create an extension of adjacent plantings or for educational purposes, native Hawaiian and Polynesian-introduced species should be considered first.

The use of native materials (such as *'ohi'a* wood, basalt, and moss rock), native design motifs that reflect the culture or nature, and artwork can all help to enhance the Hawaiian sense of place.

**Sustainable Campus Development**

One of the three Planning Principles for the Hawai'i Loa Campus is sustainable campus development. This commitment is a natural expression of Hawaiian sense of place; the native Hawaiians approached life with respect and stewardship of the land. The following design strategies can help to conserve our natural resources.

**Reduction in Long-term Maintenance**

The landscape design phase is the ideal time to make decisions that can greatly reduce maintenance cost. Maintenance can be reduced through the selection of appropriate landscaping material, siting, and installation. The following design concepts will help to minimize the amount of maintenance required:

- Install high-quality plant material of the appropriate size.
- Use plants that are native, micro-climatically adapted, low maintenance and pest-resistant whenever possible.
- Allow plants to conform to their natural shape. This allows the plant to mature in a healthy manner and saves on resources required for trimming.
- Select plants that physically fit within the area to be landscaped, not only at the time of planting but during the entire life of the planting.
- Do not plant trees where their branches will overhang roofs which can become damaged due to falling limbs and leaf litter.
- Provide adequate clearance between trees and utility lines.
- Limit higher maintenance shrubs and groundcovers to high impact areas.
- Install a minimum 2'-wide gravel maintenance strip around the perimeter of buildings. The maintenance strip allows convenient maintenance of both the landscaping and the building, allows for increased air circulation around the building reducing humidity, provides for visual inspections for the entry points of insects and pests into the buildings, and keeps irrigation water away from the building.
- Plant groundcovers or install mulch at slopes and shady areas where grass will not grow well.
- For lawn areas where occasional service vehicle use is required, install reinforced grass paving to enable access, yet prevent soil compaction.

# Appendix H - Landscape Design Strategies (continued)

**Reduced Dependence on Nonrenewable Energy Sources**

*Reduce the heat island effects by shading pavement and structures:*

- Protect and maintain the existing tree canopy.
- Plant trees to protect west- and south-facing building exposures.
- Select and site trees to provide cover over walkways and parking areas.
- Plant trees of adequate size to provide shade from the beginning of occupancy, where possible.

*Install green roofs to:*

- Decrease energy consumption in the building.
- Reduce the heat island effect.

*Use solar-powered irrigation controllers where feasible.*

**Enhanced Conservation and Protection of Natural Resources**

*Install green roofs to:*

- Reduce stormwater volume and peak discharge rate.
- Improve air and water quality.
- Increase carbon dioxide absorption.
- Increase native plant communities and wildlife habitat.

*Minimize irrigation water demand:*

- Create a water-efficient landscape through plant selection – with an emphasis on native species, where appropriate.
- Use water-efficient irrigation systems and devices such as drip irrigation, rain sensors and flow sensors.
- Use alternative water sources such as rainwater harvesting, gray water, storm water capture and re-use, and air conditioner condensate where feasible.

*Maximize permeable surfaces:*

- Incorporate landscaped areas into parking lots.
- Use reinforced grass paving for fire lanes and overflow parking lots.
- Use pervious concrete or pervious paver systems.

**Respect For and Enhancement of the Inherent Beauty of the Campus**

*Protection of Existing Trees:*

- At a minimum, protect the root zone and preserve the existing tree canopy.
- During construction, construct a minimum 42-inch high barrier around existing trees to remain.
- The following activities should be prohibited within the root protection zone:
  - Operating or parking vehicles and heavy equipment.
  - Storage of building materials, excavated spoils, or dumping of materials such as, but not limited to, paint, concrete, petroleum products or any other material deleterious to tree health.
  - Soil disturbance or grade change.

*Age Diversity:*

To ensure age diversity, it is important to regularly plant, remove, and replace trees to avoid trees of the same size and age declining at the same time and creating costly maintenance problems.

*Invasive Species:*

In addition to enhancing the campus landscape, the surrounding natural landscape should be protected by encouraging plant selections that minimize the use of invasive and potentially invasive plant species. The State Department of Land & Natural Resources (DLNR), Division of Forestry & Wildlife's (DOFAW) list of Hawai'i's Most Invasive Horticultural Plants should be consulted.

## LANDSCAPE DESIGN CONCEPT

The conceptual landscape design proposes to create a Hawaiian sense of place that reflects the rich cultural context of Hawai'i and the natural beauty of the campus. Native Hawaiian and Polynesian-introduced plants are proposed for "purposeful" landscaping where the plants can be used, studied and appreciated. Phase One includes the following major development components:

1. Academic Center II
2. Student Center
3. Performing Arts Center and Gymnasium/Fitness Center
4. Food Service Facilities
5. Residences

**Academic Center II**

The Academic Center II will be the focal point of the campus. The window treatment above the main entry will allow for reflections of the landscape, reinforcing the campus' sense of place and dramatic natural setting.

Curvilinear moss rock walls will visually connect the building to the landscape, and will appear as natural rock outcroppings. Sculptures will be placed on the terraced lawn to further enhance the Hawaiian sense of place.

The proposed siting of the building will allow the existing large monkeypod trees to remain and to be protected during construction. To accurately reflect the location of the existing trees, a topographic survey will need to be completed as part of the design phase. A certified arborist should also be consulted to prepare a tree protection and preservation plan.

*"An Evaluation of Five Native Plant Species for Use in Green Roofs and Storm Water Management in Hawai'i," a thesis submitted to the Graduate Division of the University of Hawai'i in partial fulfillment of the requirements for the Degree of Master of Science in Botany, August 2008, by Leyla Cabugos.*

A green roof is proposed for this building. It will not only have ecological benefits, but will also help the building harmonize with its natural setting as it can be seen from above, most notably from the Pali lookout.

The basic elements of green roofs include a vegetative layer, growing medium, filter cloth, drainage layer, water storage and aeration, root barrier, and waterproof membrane.

As green roof practices are not yet common in Hawai'i, and there are also few tropical or sub-tropical examples as well, test plots with different native plant species would likely be required to determine the best choices for long-lived material, coverage and minimal maintenance. Possible plants include Carex wahuensis, Sesuvium portulacastrum ('Akulikuli), Dianella sandwicensis ('Uki'uki), and Osteomeles anthyllidifolia ('Ulei).

Medicinal plants are proposed around the Academic Center II as the Hawai'i Loa Campus is the home of the School of Nursing.

# Appendix H - Landscape Design Strategies (continued)

**Student Center**

Students from across the United States and the world attend Hawai'i Pacific University. To reflect the journey that these students have made to come to Hawai'i, a canoe plant theme garden - incorporating plants that the original Polynesian voyagers carried with them in their canoes – is proposed. Not knowing what they would find at their new home, the Polynesians brought with them plants that would provide for their basic necessities of food, medicine, clothing and cordage.

A plaza or student gathering area is proposed adjacent to the Student Center. A large canopy tree will serve as a backdrop, as well as screen for the Residences beyond.

**Residences**

A meandering walkway will connect the Student Center to the Residences. To minimize the amount of impervious surfaces and provide a more pedestrian-oriented environment, reinforced grass paving is proposed for the required 20'-wide emergency access lane.

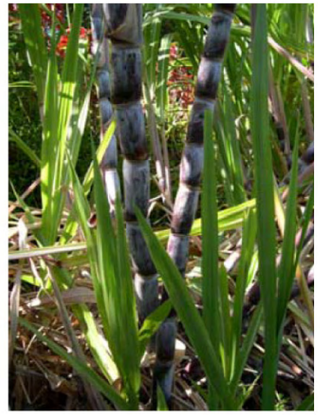
Outdoor gathering places are invaluable in student housing. They are an extension of the dorm room and provide additional places to study, meet, and socialize. Gathering spaces of varying sizes and seating options should be provided to accommodate a variety of group sizes. The outdoor areas should remain fairly open and flexible for multi-use functions.

As the existing Residences have Hawaiian names for trees and flowers – Melia, Lehua, Mokihana, 'Ilima, Lokelani and Kukui – the landscaping around the new Residences may include plants used in *lei* making to continue the theme.

Making a *lei* and giving it to someone is a gesture of *aloha*. *Lei* have come to be recognized as expressions of love, greeting, farewell, honor, and congratulations. While *lei* did have ceremonial functions in ancient Hawai'i, they are worn today more for personal adornment. They are made from one's favorite plant material – both native and introduced species. Planting native plants used for *lei* helps to preserve native plant communities as the materials do not have to be gathered from natural areas.

**Dining Commons**

Multiple dining areas are proposed to provide a variety of dining options. Native Hawaiian and Polynesian-introduced plants that are edible, used in food preparation and used for utensils are proposed around the expanded Food Service facilities.



**Performing Arts Center and Multi-Purpose Gymnasium**

As the two buildings will be quite large due to their function, green walls are proposed to soften the elevations of the buildings facing the parking lot. These walls will not only provide a connection to nature, but reduce the heat island effect and provide sound absorption.

*Example of a green wall in Tokyo, Japan*

These green walls could be green facades – wall systems where climbing plants or cascading ground covers are trained to cover supporting structures of either modular trellis systems or cable/rope wire systems – or living walls (aka, biowalls or vertical gardens) – pre-vegetated panels or integrated fabric systems that are affixed to a structural wall or frame.

As green walls are not yet common in Hawai'i, test plots with different native and introduced plant species would likely be required to determine the best choices for long-lived material, coverage and minimal maintenance, with a preference for native materials.

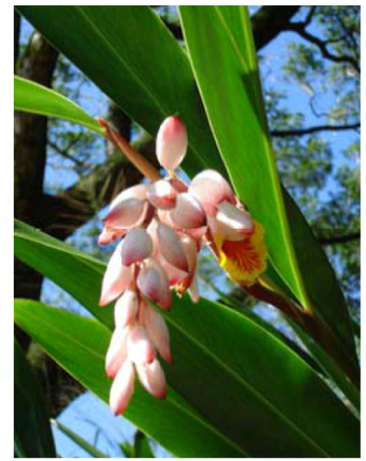
## Appendix H- Landscape Design Strategies (continued)

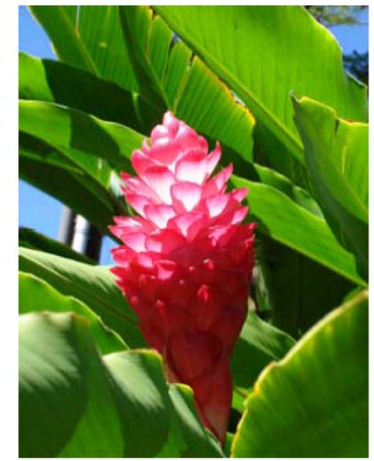
Plants that are used in *hula*, to adorn *hula* altars, are symbolic of the *hula* goddesses Hiʻiaka and Laka, and are used in the making of musical instruments are proposed for the Performing Arts Center and the Multi-Purpose Gymnasium. The landscape is not only meant to be looked at, but to be a source of native plant material, thereby helping to preserve native forests.

Additional monkeypod trees should be planted along the entry drive and perimeter of the parking lot to reinforce the landscape character of the campus that is most defined by this tree.

**Introduced Species**

In addition to native Hawaiian and Polynesian-introduced plants, many of the exotics that are associated with Hawaiʻi should be planted. These are included because our Hawaiian sense of place is perceived not only through our culture, but our senses of sight, smell, touch, taste and sound. The fragrance of *puakenikeni* and *laua'e* fern, the striking colors and forms of gingers and *heliconia*, and the bold forms of monstera, should all be incorporated within the landscape.





## IRRIGATION SYSTEM

**Rainwater Harvesting**

To conserve potable water, rainwater may be harvested from the roofs to use as irrigation water. Rainfall data will need to be reviewed as part of the design phase to determine the amount of available rainfall versus irrigation demand. Rainfall harvested during the wetter winter months may need to be stored in tanks to make up for the deficit during the drier summer months. Filtration devices, to ensure cleanliness, and pumps would also be required.

*Example of a rainwater catchment tank at Hawai'i Baptist Academy Middle School Campus*

**Drip Irrigation**

Drip irrigation is another strategy for a water-efficient irrigation system. It can be used for ground cover beds, shrubs and even trees. However, a pressurized system is preferred for lawn areas to provide more even coverage.

# Appendix H- Landscape Design Strategies (continued)

## CONCEPTUAL LANDSCAPE PLANT PALETTE : DINING COMMONS - EDIBLE PLANTS, FOOD PREPARATION AND UTENSILS

Aleurites moluccana / Kukui ***


Detail of leaves, flowers and fruit

Artocarpus altilis / 'Ulu (Breadfruit) ***

Pandanus tectorius / Hala *

Detail of fruit

Syzygium malaccense / 'Ohi'a 'ai (Mountain Apple)

Thespesia populnea / Milo ***

Detail of fruit and flower

Cocos nucifera / Niu (Coconut Palm) ***

Musa spp. / Mai'a (Banana) ***

Saccharum officinarum / Ko (Sugar Cane) ***

Detail of stalk

Alocasia macrorrhiza / 'Ape (Elephant's Ear) ***

Colocasia esculenta / Kalo (Taro) ***

Cordyline fruticosa / Ki (Ti) ***

Osteomeles anthyllidifolia / 'Ulei *

## CONCEPTUAL LANDSCAPE PLANT PALETTE : TREES AND PALMS

Aleurites moluccana / Kukui ***

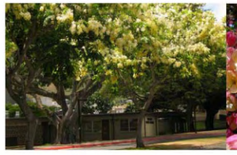

Detail of leaves, flow-

Pandanus tectorius / Hala *

Detail of flower (hinano) Thespesia populnea /

Milo ***

Detail of fruit and flower


Cassia x nealiae / "Queen's Hospital White" Shower

Detail of Rainbow Shower flower

Fagraea berteriana / Puakenikeni

Detail of flower

Samanea saman / Monkeypod

Araucaria heterophylla / Norfolk Island Pine

Cocos nucifera / Niu (Coconut Palm) ***

Pritchardia spp. / Loulu **

Ravenala madagascariensis / Traveller's Tree

## CONCEPTUAL LANDSCAPE PLANT PALETTE : SHRUBS AND GROUND COVERS

Alpinia purpurata / Red Ginger

Alpinia speciosa / Shell Ginger

Alpinia spp. / 'Kimi' Dark Pink Ginger

Heliconia caribaea / Giant Red Heliconia

Heliconia caribaea / Giant Yellow Heliconia

Nicolaia elatior / Torch Ginger

Cordyline fruticosa / Ki (Ti) ***

Cordyline spp. / Red Ti

Gardenia brighamii / Na'u (Native Gardenia) **

Hibiscus arnottianus / Koki'o Ke'oke'o **

Monstera deliciosa / Monstera

Osteomeles anthyllidifolia / 'Ulei *

Bacopa monnieri / 'Ae'ae (Bacopa) *

Carex wahuensis **

Dianella sandwicensis / 'Uki'uki *

Microlepia strigosa / Palapalai *

Microsorium polypodium / Laua'e Iki (Dwarf Laua'e)

Microsorium polypodium / Laua'e Fern

Nephrolepis cordifolia / Kupukupu *

* Indiginous Species
*** Endemic Species
*** Polynesian Introduction

# Appendix H - Landscape Design Strategies (continued)

## CONCEPTUAL LANDSCAPE PLANT PALETTE : ACADEMIC CENTER II - MEDICINAL PLANTS

Acacia koa / Koa **

Aleurites moluccana / Kukui ***

Detail of leaves, flowers and fruit

Cocos nucifera / Niu (Coconut Palm)***

Morinda citrifolia / Noni

Pandanus tectorius / Hala *

Detail of fruit

Syzygium malaccense / 'Ohi'a 'ai ***

Detail of fruit

Cibotium chamissoi / Hapu'u **

Saccharum officinarum / Ko (Sugar Cane) ***

Detail of stalks

Cordyline fruticosa / Ki (Ti) ***

Zingiber zerumbet / 'Awapuhi kuahiwi (Shampoo Ginger) ***

## CONCEPTUAL LANDSCAPE PLANT PALETTE : RESIDENCES - LEI MAKING

Aleurites moluccana / Kukui ***

Detail of leaves, flowers and fruit

Pandanus tectorius / Hala *

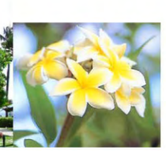
Detail of flower (hinano)

Cocos nucifera / Niu (Coconut Palm) ***

Fagraea berteriana / Puakenikeni

Detail of flower

Plumeria spp. / Plumeria


Detail of flower

Cordyline fruticosa / Ki (Ti) ***

Dodonaea viscosa / 'A'ali'i *

Dianella sandwicensis / 'Uki'uki *

Detail of fruit

Microlepia strigosa / Palapalai *

Microsorium polypodium / Laua'e Iki

## CONCEPTUAL LANDSCAPE PLANT PALETTE : STUDENT CENTER - CANOE PLANTS

Aleurites moluccana / Kukui ***

Detail of leaves, flowers and fruit

Artocarpus altilis / 'Ulu (Breadfruit) ***

Bambusa spp. / 'Ohe (Bamboo) ***

Cocos nucifera / Niu (Coconut Palm) ***

Morinda citrifolia / Noni ***

Musa spp. / Mai'a (Banana) ***

Syzygium malaccense / 'Ohi'a 'ai (Mountain Apple)

Detail of Fruit

Thespesia populnea / Milo ***

Broussonetia papyrifera / Wauke ***

Detail of Leaves

Alocasia macrorrhiza / 'Ape (Elephant's Ear) ***

Colocasia esculenta / Kalo (Taro) ***

Cordyline fruticosa / Ki (Ti) ***

## CONCEPTUAL LANDSCAPE PLANT PALETTE : PERFORMING ARTS CENTER AND MULTI-PURPOSE GYMNASIUM - HULA & MUSIC INSTRUMENTS

Bambusa spp. / 'Ohe (Bamboo) ***

Cocos nucifera / Niu (Coconut Palm)

Metrosideros polymorpha / 'Ohi'a lehua **

Musa spp. / Mai'a (Banana)

Syzygium malaccense / 'Ohi'a 'ai ***

Asplenium nidus / 'Ekaha (Bird's Nest

Broussonetia papyrifera / Wauke ***

Detail of leaves

Cordyline fruticosa / Ki (Ti) ***

Microlepia strigosa / Palapalai Fern *

Osteomeles anthyllidifolia / 'Ulei *

* Indiginous Species
*** Endemic Species
*** Polynesian Introduction