DAVID Y. IGE
GOVERNOR

DR. CHRISTINA M. KISHIMOTO
SUPERINTENDENT

STATE OF HAWAI`I
DEPARTMENT OF EDUCATION
P.O. BOX 2360
HONOLULU, HAWAI`I 96804

OFFICE OF FACILITIES AND OPERATIONS

August 5, 2019

TO: Scott Glenn
Director, Office of Environmental Quality Control
Department of Health

FROM: John C. H. Chung
for Public Works Administrator, Facilities Development Branch

SUBJECT: **Final Environmental Assessment and Finding of No Significant Impact for the Proposed Waipahu High School New Classroom Building, Waipahu, Oahu, TMK (1) 9-4-008:020 (por.) and 025 (por.)**

The Hawaii State Department of Education hereby transmits the Final Environmental Assessment and Finding of No Significant Impact (FEA-FONSI) for the proposed Waipahu High School New Classroom Building situated on TMK parcel (1) 9-4-008: 020 (por.) and 025 (por.), on the island of Oahu, for publication in the next available edition of *The Environmental Notice*.

Transmitted with this letter are four (4) copies of a searchable pdf document of the FEA-FONSI and a shapefile for the proposed action. We have entered information about the proposed action in pertinent fields of the Office of Environmental Quality Control's online Submittal Form, including the action summary.

Should you have any questions, please contact Karynn Yoneshige, Project Coordinator of the Facilities Development Branch, Project Management Section, at 784-5127, or our authorized agent of this project, Greg Nakai, of PBR HAWAII at 521-5631.

JCHC:ky
Enclosures

c: Rochelle Nagata-Wu, WRNS Studio
Greg Nakai, PBR Hawaii & Associates, Inc.
Facilities Development Branch

20-049

From: webmaster@hawaii.gov
To: HI Office of Environmental Quality Control
Subject: New online submission for The Environmental Notice
Date: Monday, August 12, 2019 9:20:37 AM

Action Name

Waipahu High School New Classroom Building

Type of Document/Determination

Final environmental assessment and finding of no significant impact (FEA-FONSI)

HRS §343-5(a) Trigger(s)

- (1) Propose the use of state or county lands or the use of state or county funds

Judicial district

'Ewa, O'ahu

Tax Map Key(s) (TMK(s))

(1) 9-4-008:020 (por.); (1) 9-4-008:025 (por.)

Proponent type

Agency

Proposing/determining agency

State of Hawaii Department of Education

Agency contact name

Karynn Yoneshige

Agency contact email

Karynn_Yoneshige/FacilDev/HIDOE@notes.k12.hi.us

Agency contact phone

(808) 784-5127

Agency address

Office of School Facilities and Support Services, Facilities Development Branch
3633 Waialae Avenue
Honolulu, HI 96816
United States
Map It

Was this submittal prepared by a consultant?

Yes

Consultant

PBR HAWAII & Associates

Consultant contact name

Greg Nakai

Consultant contact email

gnakai@pbrhawaii.com

Consultant contact phone

(808) 521-5631

Consultant address

1001 Bishop Street, Suite 650
Honolulu, HI 96813
United States
Map It

Action summary

A New Classroom Building (approx. 60,700 gross square feet) with 24 classrooms is proposed at Waipahu High School to help alleviate the existing shortage of classrooms and provide necessary facilities to support the needs of the current student body and the evolving Natural Sciences, Culinary, and Hospitality programs. The new facilities will provide specialized spaces including science classrooms, culinary kitchens, computer and design thinking rooms, and a flexible indoor/outdoor dining area, as well as general classrooms, an administrative suite, and a fully self-contained special education classroom or other special function space. A new fire access road and a small parking area to serve the new building and staff are also proposed. In addition, to address the existing lack of onsite parking for students, a New Makai Parking Area (including approximately 214 parking stalls) within the currently undeveloped makai portion of the upper campus parcel is proposed for a future phase.

Reasons supporting determination

Please refer to Sections 2.1 (Background and Need for the Project), 2.2 (Project Objectives), and 7 (Findings, Supporting Reasons, and Anticipated Determination) of the Final EA.

Attached Documents (agency letter & EA/EIS)

- Waipahu-HS-New-Classroom-Building-FEA-copy-4.pdf
- Waipahu-HS-New-Classroom-Building-FEA-copy-3.pdf
- Waipahu-HS-New-Classroom-Building-FEA-copy-2.pdf
- Waipahu-HS-New-Classroom-Building-FEA-copy-1.pdf
- Waipahu-HS-FEA-FONSI-Transmittal-Letter-from-DOE_2019-08-05.pdf

Shapefile

- The location map for this Final EA is the same as the location map for the associated Draft EA.

Shapefile upload

- WaipahuHS_Project_Site.zip

Authorized individual

Greg Nakai

Proponent

State of Hawaii Department of Education

Authorization

- The above named authorized individual hereby certifies that he/she has the authority on behalf of the identified proponent to make this submission.

WAIPAHU HIGH SCHOOL
NEW CLASSROOM BUILDING

FINAL ENVIRONMENTAL ASSESSMENT
FINDING OF NO SIGNIFICANT IMPACT (HRS 343)

PREPARED FOR

STATE OF HAWAI'I, DEPARTMENT OF EDUCATION

PREPARED BY

PBR HAWAII
& ASSOCIATES, INC.

AUGUST 2019

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Waipahu High School
New Classroom Building

Final Environmental Assessment
Finding of No Significant Impact
(Chapter 343, HRS)

Prepared for
State of Hawai‘i Department of Education

Prepared by
PBR HAWAII & Associates, Inc.

PBR HAWAII
& ASSOCIATES, INC.

August 2019

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LIST OF ACRONYMS

The following is a list of terms, abbreviations, and acronyms used in this document.

A	
AC	air conditioning
ADA	Americans with Disabilities Act
AFONSI	Anticipated Finding of No Significant Impact
AIS	Archaeological Inventory Survey
ALISH	Agricultural Lands of Importance to the State of Hawai‘i
AM	Morning
B	
BMPs	Best Management Practices
BWS	City and County of Honolulu, Board of Water Supply
C	
CFR	Code of Federal Regulations
CGG	University of Hawai‘i Coastal Geology Group
CIA	Cultural Impact Assessment
COSCP	Central O‘ahu Sustainable Communities Plan
CWRM	Commission on Water Resource Management, DLNR
CZM	Coastal Zone Management
D	
dba	Doing business as
DHHL	State of Hawai‘i, Department of Hawaiian Home Lands
DLNR	State of Hawai‘i, Department of Land and Natural Resources
DOE	State of Hawai‘i, Department of Education
DOT	State of Hawai‘i, Department of Transportation
DPP	City and County of Honolulu, Department of Planning & Permitting
DTS	City and County of Honolulu, Department of Transportation Services
E	
EA	Environmental Assessment
EIS	Environmental Impact Statement
F	
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FM	Domestic/fire service (water meter)
FONSI	Finding of No Significant Impact
G	
GPD	Gallons per day
H	
H-POWER	Honolulu Program of Waste Energy Recovery
HAR	Hawai‘i Administrative Rules
HART	Honolulu Authority for Rapid Transportation
HI-CHPS	Hawai‘i Collaborative for High Performing Schools
HECO	Hawaiian Electric Company
HFD	Honolulu Fire Department
HPD	Honolulu Police Department

HRS	Hawai‘i Revised Statutes
L	
LCC	Leeward Community College
LEED	Leadership in Energy and Environmental Design
LEED NC	LEED New Construction
LSB	Land Study Bureau
LUC	State of Hawai‘i, Land Use Commission
LUO	Land Use Ordinance
M	
MAR	Mobility Assessment Report
MPH	Miles per hour
MSL	Mean sea level
N	
NFIP	National Flood Insurance Program
NHO	Native Hawaiian Organization
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System Permit
NRCS	Natural Resources Conservation Service
P	
PM	Afternoon
R	
R-5	Residential Zoning District (City and County of Honolulu)
ROH	Revised Ordinances of Honolulu
S	
SCP	Sustainable Communities Plan
SEFP	State Education Functional Plan
SFP	State Functional Plan
SHPD	State Historic Preservation Division
SLR	Sea Level Rise
SLR-XA	Sea Level Rise Exposure Area
SMA	Special Management Area
SWQR	Storm Water Quality Report
T	
TMK	Tax Map Key
U	
USGS	U.S. Geological Survey
W	
WHS	Waipahu High School
WzA	Waipahu Silty Clay, 6 to 12 percent slopes
WzC	Waipahu Silty Clay, 6 to 12 percent slopes

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1.0 INTRODUCTION

This Environmental Assessment (EA) is prepared in accordance with Chapter 343, Hawai‘i Revised Statutes (HRS) for the construction of the proposed Waipahu High School (WHS) New Classroom Building.

1.1 PROJECT SUMMARY

Project Name:	Waipahu High School New Classroom Building
Location:	94-1211 Farrington Highway, Waipahu, O‘ahu 96797
Judicial District:	‘Ewa
Tax Map Key (TMK):	(1) 9-4-008: 020 (portion) and 025 (portion)
Proposing Agency:	State of Hawai‘i – Department of Education (DOE)
Landowner:	The City and County of Honolulu (“the City” and/or “the County”) (Parcel 20); and the State of Hawai‘i (Parcel 25)
Existing Use:	Existing classroom buildings, paved basketball courts, and undeveloped areas
Proposed Action:	To construct a new, 3-story classroom building in two phases, with classrooms, conference rooms, and offices. A new east (makai) parking lot with driveway access is also proposed for a future phase.
Project Area:	• New Classroom Building: Approx. 60,700 square feet (sf) (gross area) • New Makai Parking Lot: Approx. 81,440 sf
Land Use Designations:	• State Land Use: *Urban* • Central O‘ahu Sustainable Communities Plan: *High School* • County Zoning: Residential (R-5)
Special Management Area:	The Project is not located in the Special Management Area.
Permits/Approvals Required:	• Chapter 343, HRS Compliance • National Pollutant Discharge Elimination System (NPDES) Permit (if necessary) • Dust Control Plan • Noise Permit (if necessary) • Americans with Disabilities Act (ADA) Compliance • Section 6E, Hawai‘i Revised Statutes (HRS) Review • Highways Division Permit • Industrial Wastewater Discharge Permit • Zoning Waiver • Grading, Grubbing, and Stockpiling Permits • Building Permit (electrical, plumbing, civil)

- Occupancy Permit
- Site Development Master Application for Sewer Connection
- Storm Drain Connection License (if necessary)
- Storm Water Quality Strategic Plan
- Street Usage Permit

Determining Agency: State of Hawai‘i – Department of Education (DOE)

Determination: Finding of No Significant Impact (FONSI)

1.2 LOCATION

Waipahu High School is located between Waipahu and Pearl City, in Central O‘ahu, State of Hawai‘i (Figure 1). The proposed New Classroom Building (the “Project” or “Proposed Project”) will be located at the site (“Project Site”) of the existing basketball courts on the makai side of campus facing Pearl Harbor. The future makai parking lot will be located along the undeveloped makai portion of campus.

1.3 SURROUNDING LAND USES

Waipahu High School is surrounded by residential, recreational, and educational uses (Figure 2). As the school sits atop a bluff, makai of the school are the Pearl Harbor Bike Path, the future Middle Loch Park, and the Middle Loch of Pearl Harbor. Immediately south of the campus is the Waipahu Aloha Clubhouse. Recreational uses such as the Ted Makalena Golf Course and Waipi‘o Peninsula Sports Complex (Soccer Park) are located further south of the school, on Waipi‘o Peninsula. The campus is bounded to the west by Waipi‘o Point Access Road, and to the north by Farrington Highway, beyond both of which are residential neighborhoods. Across Farrington Highway to the northwest is The Church of Jesus Christ of Latter-day Saints (LDS Church). To the east of the campus is Cane Haul Road and the school's athletic fields, beyond which to the northeast are the Honolulu Authority for Rapid Transit (HART) Rail Operations Center, Leeward Community College, and the future Leeward Community College Rail Station.

1.4 LAND OWNERSHIP

Utilizing the Tax Map Key (TMK) system, the land under the Project Site is identified as TMKs (1) 9-4-008: 020 (portion) and 025 (portion). The City and County of Honolulu holds title to Parcel 20, and the State of Hawai‘i holds title to Parcel 25 (Figure 3).

Contact: Ms. Karynn Yoneshige
Project Coordinator
Facilities Development Branch
Office of School Facilities and Support Services
State of Hawai‘i Department of Education
3633 Wai‘alae Ave. Honolulu, HI 96816
Phone: (808) 784-5127
Fax: (808) 733-4660

1.5 IDENTIFICATION OF APPLICANT

The Department of Education (DOE) is the project applicant.

Contact: Ms. Karynn Yoneshige
Project Coordinator
Facilities Development Branch
Office of School Facilities and Support Services
State of Hawai‘i Department of Education
3633 Wai‘alae Ave. Honolulu, HI 96816
Phone: (808) 784-5127
Fax: (808) 733-4660

1.6 IDENTIFICATION OF ENVIRONMENTAL CONSULTANT

The environmental consultant is PBR HAWAII & Associates, Inc. dba PBR HAWAII.

Contact: Mr. Greg Nakai
Planner/Project Manager
PBR HAWAII
1001 Bishop Street
ASB Tower, Suite 650
Honolulu, Hawai‘i 96813
Phone: (808) 521-5631
Fax: (808) 523-1402

1.7 IDENTIFICATION OF APPROVING AGENCY

The DOE is the approving agency.

Contact: Ms. Karynn Yoneshige
Project Coordinator
Facilities Development Branch
Office of School Facilities and Support Services
State of Hawai‘i Department of Education
3633 Wai‘alae Ave. Honolulu, HI 96816
Phone: (808) 784-5127
Fax: (808) 733-4660

1.8 COMPLIANCE WITH STATE OF HAWAI‘I AND CITY AND COUNTY OF HONOLULU ENVIRONMENTAL LAWS

Preparation of this document falls in accordance with the provisions of Chapter 343, HRS (2007) and Title 11, Chapter 200, Hawai‘i Administrative Rules (HAR) pertaining to Environmental Impact Statements. Section 343-5, HRS established nine “triggers” that require either an EA or

an Environmental Impact Statement (EIS). The use of State or County lands or funds requires the preparation of an EA.

1.9 IDENTIFICATION OF AGENCIES CONSULTED

1.9.1 Early Consultation

A pre-assessment consultation was conducted from April 2017 to May 2017 prior to the preparation of the Draft EA. The purpose of the pre-assessment consultation was to consult with agencies, organizations, and individuals with technical expertise or an interest in, or will be affected by, the Proposed Project. This process is part of the scoping process for the Draft EA. Comments and input received during this period were used to identify environmental issues and concerns to be addressed in the Draft EA, which in turn underwent a 30-day public comment period.

As part of this early consultation process, the agencies, organizations, and individuals who were sent pre-assessment consultation letters are listed in Table 1 below. Those who provided written comments (either by hard copy or electronically) are indicated in Table 1. Copies of the written comments and responses are reproduced in Appendix A.

1.9.2 Public Review

The Draft EA was published in the State of Hawai‘i Office of Environmental Quality Control’s (OEQC’s) *The Environmental Notice* on June 8, 2019, initiating a 30-day public review period that ended on July 8, 2019.

As part of the Draft EA public review process, the following agencies, organizations, and individuals were sent either a hard copy of the Draft EA or a letter including a link to the online digital copy of the Draft EA. Those who provided written comments (either by hard copy or electronically) are indicated in Table 1 below. Copies of the written comments and responses are reproduced in Appendix F.

Table 1: Pre-Assessment Consultation and Draft EA Correspondence

Agencies/Organizations/Individuals	Pre-Assessment Consultation Letter Sent	Pre-Assessment Comment Received	DEA Notification Letter Sent	DEA Comment Received
STATE				
Office of Environmental Quality Control (OEQC)	X		X	
Department of Accounting and General Services	X	X	X	
Department of Agriculture	X		X	
Department of Business, Economic Development & Tourism (DBEDT)	X		X	
DBEDT – Hawai‘i State Energy Office/Strategic Industries Division	X		X	
DBEDT - Office of Planning	X	X	X	
Department of Defense	X	X	X	

Agencies/Organizations/Individuals	Pre-Assessment Consultation Letter Sent	Pre-Assessment Comment Received	DEA Notification Letter Sent	DEA Comment Received
Department of Education – Student Transportation Services			X	
Department of Hawaiian Home Lands	X	X	X	
Department of Health (DOH)	X		X	
DOH – Environmental Planning Office (EPO)	X	X		
Department of Human Services	X	X	X	X
Department of Labor and Industrial Relations	X		X	
Department of Land and Natural Resources (DLNR)	X	X	X	X
DLNR – Historic Preservation Division	X		X	
Department of Transportation	X		X	
Hawai'i Housing Finance and Development Corporation	X		X	
Office of Hawaiian Affairs	X		X	
FEDERAL				
U.S. Army Corps of Engineers, Honolulu District	X		X	
U.S. Fish and Wildlife Service	X		X	
Federal Emergency Management Agency, Region IX	X		X	X
U.S. Department of the Navy			X	
COUNTY				
Board of Water Supply	X	X	X	X
Department of Community Services	X		X	
Department of Customer Services	X		X	
Department of Design and Construction	X	X	X	X
Department of Environmental Services	X		X	
Department of Facility Maintenance	X	X	X	X
Department of Parks and Recreation	X	X		
Department of Planning and Permitting	X	X	X	X
Department of Transportation Services	X	X	X	
Honolulu Authority for Rapid Transit			X	
O'ahu Transit Services			X	
Fire Department	X	X	X	X
Police Department	X	X	X	
ELECTED OFFICIALS				
State Senator Clarence Nishihara	X		X	
State Senator Mike Gabbard			X	
State Senator Michelle Kidani			X	
State Senator Donovan Dela Cruz			X	
State Representative Roy Takumi			X	
State Representative Ty Cullen			X	
State Representative Henry Aquino	X		X	

Agencies/Organizations/Individuals	Pre-Assessment Consultation Letter Sent	Pre-Assessment Comment Received	DEA Notification Letter Sent	DEA Comment Received
City Councilmember Brandon Elefante	X		X	
City Councilmember Ron Menor			X	
Neighborhood Board No. 22 Chair Rito Saniatan	X		X	
UTILITIES				
Hawaiian Electric Company, Inc.	X		X	
Oceanic Time Warner (now Spectrum)	X	X	X	
Hawaiian Telcom	X		X	
LIBRARIES				
Waipahu Public Library			X	
Hawai‘i State Library – Hawai‘i Documents Center			X	
NEWS MEDIA				
Honolulu Star Advertiser			X	
Honolulu Civil Beat			X	
CITIZEN GROUPS/INDIVIDUALS, OTHER CONSULTED PARTIES				
Friends of Waipahu High School			X	
Kapolei Community Development Corporation			X	
Ke One O Kakuhihewa (O‘ahu Island Council)			X	
Pearl Harbor Hawaiian Civic Club			X	
‘Ewa Pu‘uloa Association			X	
‘Ahahui Siwila Hawai‘i O Kapōlei			X	
Lili‘uokalani Trust			X	
Kalaeloa Heritage and Legacy Foundation			X	
Hui o Ho‘ohonua			X	
Aha Moku o O‘ahu			X	
Waipahu Community Association			X	
Hawai‘i Plantation Village			X	
The Outdoor Circle			X	
Sierra Club of Hawai‘i			X	
Surfrider Foundation O‘ahu Chapter			X	
University of Hawai‘i Sea Grant College Program			X	

PDF: Q:\Oahu\Waipahu High School NCRB\PDF\Figures
Path: Q:\Oahu\Waipahu High School NCRB\GIS\Project\Figure 1 - Regional Location WHSNCRB.mxd

DATE: 5/21/2019

LEGEND

Project Site

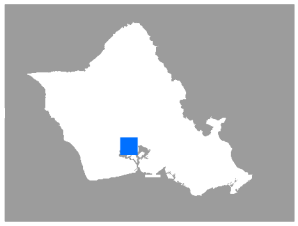


Figure 1:
Regional Location

WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING

State of Hawai'i - Department of Education — O'ahu

North

Linear Scale (feet)

0 500 1,000 2,000

PBR HAWAII & ASSOCIATES, INC.

Source: ESRI Online Basemap. United States Geological Survey, 2017. Hawai'i State Department of Education, 2017.

PDF: Q:\Oahu\Waipahu High School NCRB\PDF
Path: Q:\Oahu\Waipahu High School NCRB\GIS\Project\Figure 2 - Surrounding Land Uses WHSNCRB.mxd

DATE: 5/21/2019

LEGEND

Project Site

Figure 2:
Surrounding Land Uses

WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING

State of Hawai'i - Department of Education — O'ahu

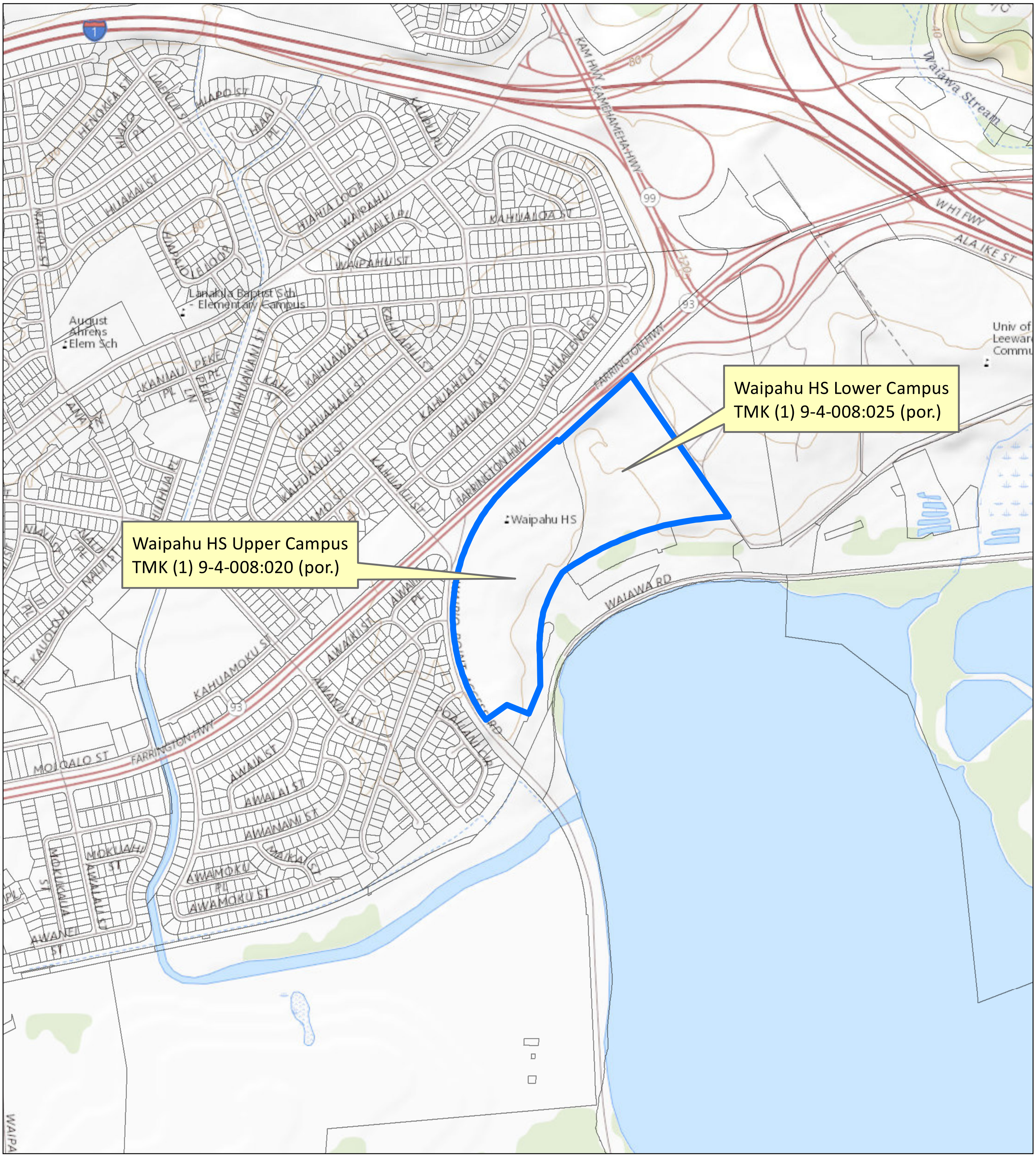
North

Linear Scale (feet)

0 250 500 1,000

PBR HAWAII & ASSOCIATES, INC.

Source: ESRI Online Basemaps, 2016. USGS Digital Line Graphs, 1983.



PDF: Q:\Oahu\Waipahu High School NCRB\PDF
Path: Q:\Oahu\Waipahu High School NCRB\GIS\Project\Figure 3 - TMK WHSNCRB.mxd

DATE: 5/21/2019

LEGEND

Project Site

Tax Map Key Parcels

Figure 3:
Tax Map Keys

WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING

State of Hawaiʻi - Department of Education O'ahu

North

Linear Scale (feet)
0 250 500 1,000

PBR HAWAII & ASSOCIATES, INC.

Source: City & County of Honolulu, 2019. State of Hawaiʻi, Department of Education. ESRI Online Basemaps.

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2.0 PROJECT DESCRIPTION

This section provides background information and a general description of the Waipahu High School New Classroom Building ("Project") site.

2.1 BACKGROUND AND NEED FOR THE PROJECT

The Waipahu High School campus is located in Waipahu, in Central O'ahu, State of Hawai'i (Figure 1). The proposed Waipahu New Classroom Building will be located on the makai side of the campus facing Pearl Harbor. Photographs of the site are included in the Archaeological Inventory Survey (AIS) in Appendix B.

History of Waipahu High School – According to the school's website, Waipahu High School (WHS) was founded in 1938 under the Sessions Laws of 1937 and Act 191 of 1938. The school was established to give students in 'Aiea, Pearl City, Waipahu, 'Ewa, Nānākuli and Wai'anae better educational opportunities. Mr. Dallas C. McClaren was the first principal of Waipahu High and Intermediate School, which was then located at the present site of Waipahu Elementary School. The first graduates of Waipahu High School were the members of the class of 1941.

In September 1969, the move to the present site was made to accommodate the growing student enrollment. In 1972, Waipahu gained its status as a four year high school. In May 1976, the administration building was dedicated to former principal Alton V. Armstrong. In 1995, this building was renovated to classrooms. A new administration building was dedicated in April 1996.

Need for a new classroom building – With the addition of new academies at WHS, the school currently faces a shortage of classroom space. In recent years, WHS has set up portable classrooms in order to accommodate the existing enrollment. Despite this, however, WHS still faces a shortage of classroom space, as the school continues to experience overcrowding of existing facilities.

Need for parking – Along with the shortage of classroom space, WHS also lacks on-campus parking for students, resulting in students parking off-campus, on neighborhood streets.

2.2 PROJECT OBJECTIVES

The objective of the New Classroom Building is to provide 21st century classroom facilities to alleviate current overcrowding of existing facilities and allow for the future removal of dilapidating portable buildings. The New Classroom Building will not increase enrollment. The objective of the future southeast (makai) parking area is to address the current lack of on-campus parking for students.

2.3 DESCRIPTION OF THE PROJECT

New Classroom Building – A 60,700-square-foot (approx. 39,575 net square feet of usable space and restrooms) New Classroom Building (Project) is proposed at Waipahu High School. The Project will provide 24 classrooms to help alleviate the existing shortage of classrooms and

provide necessary facilities to support the needs of the current student body and the evolving Natural Sciences, Culinary, and Hospitality programs. The new facilities will provide specialized spaces including science classrooms, culinary kitchens, computer and design thinking rooms, and a flexible indoor/outdoor dining area.

The Project will be constructed in two phases. Phase 1 will consist of: seven science classrooms (1 natural resources, 2 biology, 1 chemistry, 1 biotechnology, 1 fish tank, and 1 autogrow); two culinary classrooms (culinary, baking) and two dining classrooms; a design thinking classroom and a computer lab; an administrative suite; and a covered roof terrace. A new fire access road from the existing campus parking to the New Classroom Building will also be added. Phase 2 will consist of 10 general classrooms and either a fully self-contained special education classroom, a food innovation hub, or other special function space. General classrooms could be designed to provide lab or other specialty classrooms as necessitated by school needs. A small parking area north of the New Classroom Building is also proposed for Phase 2 (as funding allows) which would serve the new building and staff, and will not be for student parking. Six existing portable classrooms are proposed to be demolished in Phase 2.

New Parking Area – To address the existing lack of onsite parking for students, the DOE also proposes to construct (at an undetermined future phase) an additional parking area including approximately 214 parking stalls and landscaping within the currently undeveloped southeastern (makai) portion of the upper campus parcel, as well as vehicular/parking access roads from Waipi‘o Point Access Road or the HART access road. A schematic design study for the proposed parking areas has been completed, but no further design work is anticipated for this portion of the Project until funding becomes available.

2.4 PROJECT COST AND IMPLEMENTATION TIMEFRAME

New Classroom Building: Construction of the New Classroom Building is anticipated to start in 2020. Construction will be carried out in two (2) phases, for an estimated total construction period of 32 months. Basic bid construction costs for the New Classroom Building are indicated in Table 2 below.

New Parking Area: Construction of the future southeast (makai) parking lot and new driveway access is anticipated to commence once funding has been secured. An 8-month total construction period is estimated for the New Parking Area, and construction will be carried out in one (1) phase, which may overlap with Phase 2 of the New Classroom Building. The estimated construction cost for the future New Parking Area is indicated in Table 2 below.

Table 2: Estimated Project Cost and Phasing

	Anticipated Start Date	Estimated Duration	Estimated Cost
New Classroom Building – Phase 1	June 2020	17 months	$27 million (2020 dollars)
New Classroom Building – Phase 2	June 2023	15 months	$11 million (2023 dollars)
New Parking Area	June 2023	8 months	$11 million (2023 dollars)

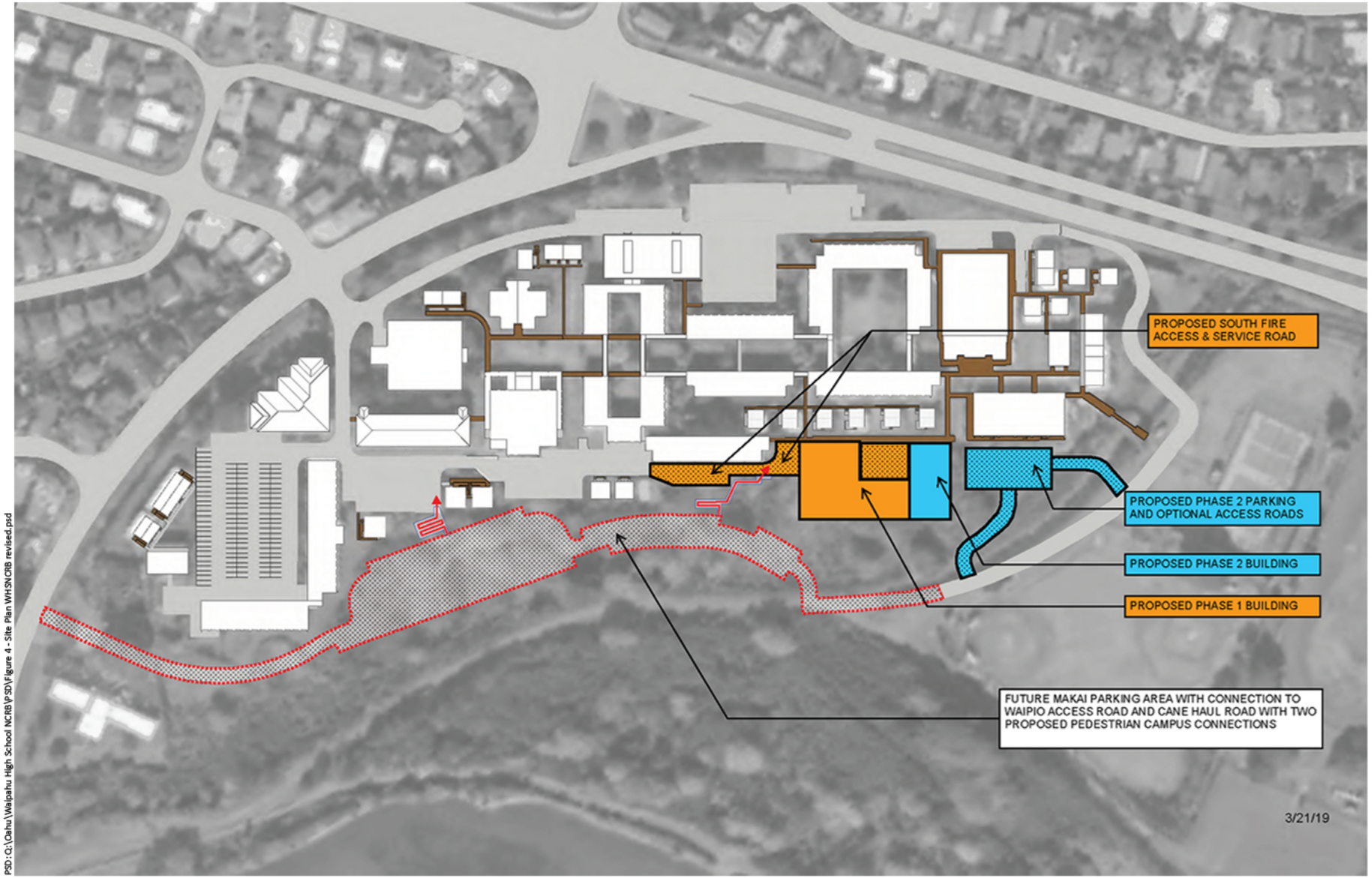

Figure 4:
Site Plan

WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING

State of Hawai'i - Department of Education — O'ahu

North

NOT TO SCALE

PBR HAWAII & ASSOCIATES, INC.

Source: WRNS Studio Hawaii, 2019.
Disclaimer: This graphic has been prepared for general planning purposes only and should not be used for boundary interpretations or other spatial analysis.

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3.0 DESCRIPTION OF THE NATURAL ENVIRONMENT, POTENTIAL IMPACTS, AND MITIGATION MEASURES

This section describes the existing conditions of the physical or natural environment, potential impacts of the New Classroom Building to the environment, and mitigation measures to minimize impacts.

3.1 CLIMATE

Average annual daily temperature in the Project Area is approximately 75 degrees Fahrenheit. The annual prevailing wind direction for this area of O‘ahu is east northeast, about 40 percent of the time, at approximately 3.9 knots (4.5 miles per hour). This portion of O‘ahu experiences very little rainfall, with a mean annual precipitation of approximately 24 inches per year, most of which occurs between the months of October and March (Giambelluca et al., 2014).

Potential Impacts and Mitigation Measures

The design process will take into account and address the effects of solar heat gain and exposure of the building envelope. Building orientation and form will be studied to optimize for trade winds and control solar heat gain while allowing for natural daylighting. The building design and the site design will work in conjunction to help reduce overall thermal heat gain. Currently being considered for use are: light colored reflective surfaces, insulation, sunshading devices, high-performance glazing, and other design strategies/technologies that could help to reduce the thermal loading on these sides of the building. Working roof or ground gardens will be incorporated to support the natural resources and culinary program where feasible.

3.2 TOPOGRAPHY

Waipahu High School is located on a bluff that overlooks the Middle Loch of Pearl Harbor and the associated military base. Elevations of campus range from approx. 60 feet above mean sea level (msl) at the northern corner of the campus to approx. 16 feet above msl at bottom of the hill at the southeastern corner of the campus. The mauka portions of the campus are generally level, situated at elevations between approximately 50 and 60 feet above msl. The elevation of the Project Site is approx. 52 feet above msl. The steepest embankments occur along the makai boundary of the campus.

Potential Impacts and Mitigation Measures

The proposed New Classroom Building will be built upon mostly-graded land at the existing basketball court area currently at the makai edge of campus. By filling in this available space, the proposed New Classroom Building will have a negligible effect on the topography of the area (Figure 5). The building heights will be close to flush with the existing buildings on campus. During construction, a National Pollutant Discharge Elimination System (NPDES) permit will be required for the Project if the demolition, construction and staging areas results in the disturbance of over one (1) acre of land area. Best Management Practices (BMPs) will be

implemented to prevent pollution and protect the environment. In addition, The Project will have an erosion and sedimentation control plan prepared to address all construction activities.

The proposed new parking areas will be built on the undeveloped makai portion of campus, which is presently overgrown with vegetation and slopes down toward Cane Haul Road. Based on the soils report and percolation testing conducted as part of the geotechnical investigation completed in December 2016, the existing brown silty clay soils at the Site have a relatively poor infiltration rate; consequently, storm water runoff likely ponds or continues to sheet-flow downstream, bringing sedimentation and pollutants into downstream water bodies. Although the proposed parking areas and access roads would alter the topography and add impervious surfaces, the implementation of Low-Impact Development (LID) features is anticipated to reduce the volume of surface water runoff and improve water quality by decreasing the amount of sedimentation and pollutants. No further mitigation measures are planned.

3.3 SOILS

Three soil suitability studies prepared for lands in Hawai‘i principally focus on the relative agricultural productivity of different land types. These studies are: 1) the U.S. Department of Agriculture Natural Resource Conservation Service (NRCS) Soil Survey; 2) the University of Hawai‘i Land Study Bureau Detailed Land Classification; and 3) the State Department of Agriculture’s Agricultural Lands of Importance to the State of Hawai‘i (ALISH).

3.3.1 Natural Resources Conservation Service (NRCS)

The *Natural Resource Conservation Service, Soil Survey for the Island of O‘ahu*, classifies the soil underlying the Project as: Waipahu silty clays (WzA, WzC) (Figure 6):

- *Waipahu silty clay, 0 to 2 percent slopes (WzA).* Permeability is moderately slow. Runoff is slow or very slow, and the erosion hazard is none to slight.
- *Waipahu silty clay, 6 to 12 percent slopes (WzC).* On this soil, runoff is medium and the erosion hazard is moderate.

3.3.2 Land Study Bureau (LSB) Detailed Land Classification

The University of Hawai‘i Land Study Bureau (LSB) document, *Detailed Land Classification, Island of O‘ahu***,** classifies soils based on a productivity rating. Letters indicate class of productivity with A representing the highest class and E the lowest. The soils of the entire Waipahu High School campus are classified as Urban.

3.3.3 Agricultural Lands of Importance to the State of Hawai‘i (ALISH)

The Agricultural Lands of Importance to the State of Hawai‘i (ALISH) system classifies important agricultural lands as Prime, Unique, or Other Agricultural Land. The Waipahu High School campus is located on “Urban” lands, which are not classified using ALISH.

PDF: Q:\Oahu\Waipahu High School NCRB\PDF
Path: Q:\Oahu\Waipahu High School NCRB\GIS\Project\Figure 5 - Topography WHSNCRB1 revised.mxd

DATE: 5/21/2019

LEGEND

Project Site

10 ft Contours 10Ft

Figure 5:
Topography

WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING

State of Hawai'i - Department of Education — O'ahu

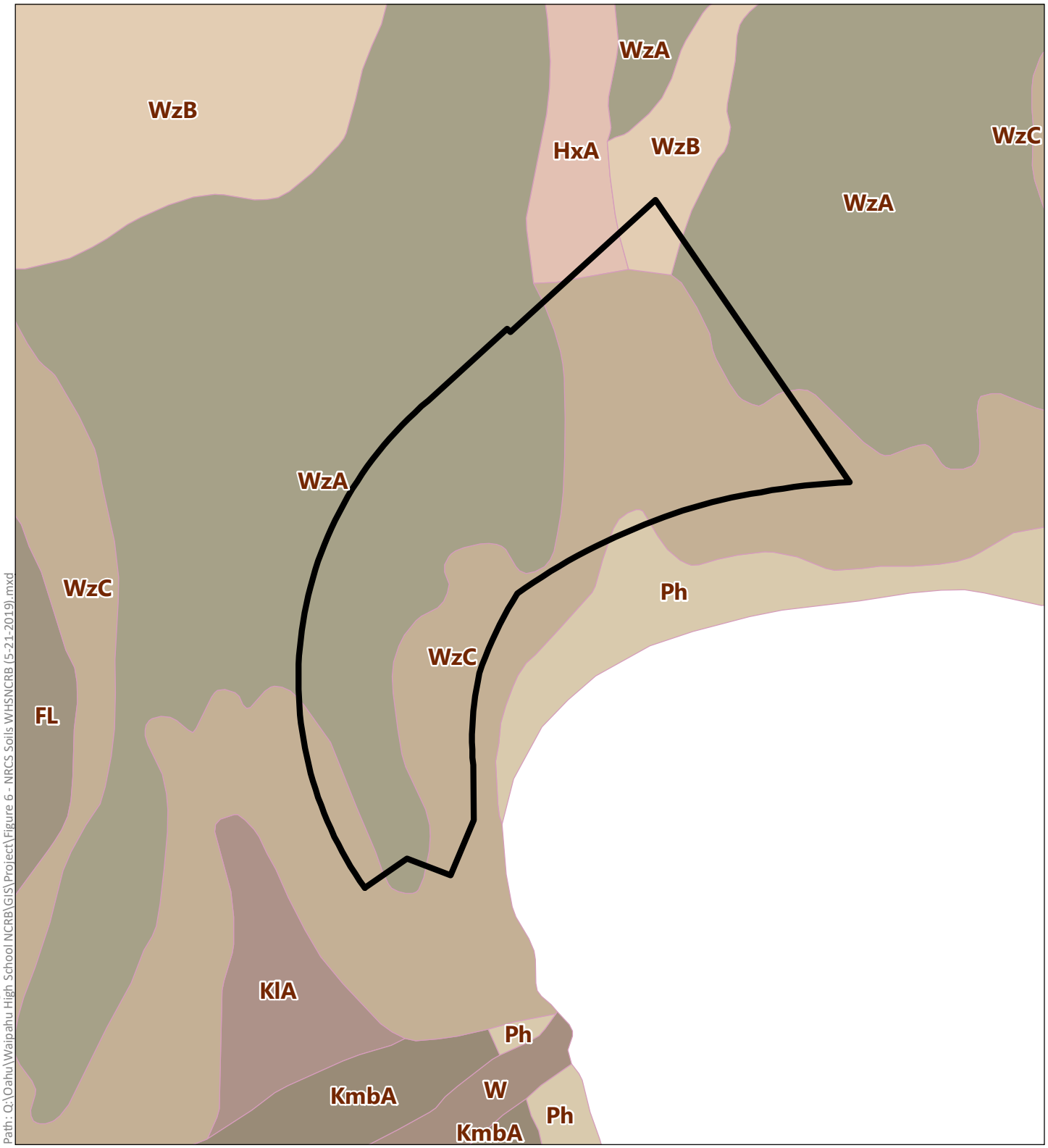
North

Linear Scale (feet)

0 87.5 175 350

PBR HAWAII & ASSOCIATES, INC.

Source: State of Hawai'i, Department of Education. NOAA ifSAR, 10-ft contours, 2007. ESRI Basemap, 2016.



PDF: Q:\Oahu\Waipahu High School NCRB\PDF
Path: Q:\Oahu\Waipahu High School NCRB\GIS\Project\Figure 6 - NRCS Soils WHSNCRB (5-21-2019).mxd

DATE: 5/21/2019

Project Site

Soil Type

- FL: Fill land, mixed
- HxA: Honouliuli clay, 0 to 2 percent slopes
- KlA: Kawaihapai clay loam, 0 to 2 percent slopes, MLRA 158
- KmbA: Keaau clay, saline, 0 to 2 percent slopes
- Ph: Pearl Harbor clay
- W: Water > 40 acres
- WzA: Waipahu silty clay, 0 to 2 percent slopes
- WzB: Waipahu silty clay, 2 to 6 percent slopes
- WzC: Waipahu silty clay, 6 to 12 percent slopes

Figure 6:
NRCS Soil Types

WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING

State of Hawai'i - Department of Education
O'ahu

North

Linear Scale (feet)
0 125 250 500

PBR HAWAII & ASSOCIATES, INC.

Source: USDA NRCS, 2017. ESRI Online Basemaps.

Potential Impacts and Mitigation Measures

Construction of the New Classroom Building will not have a deleterious effect on the soil in the Project Site. The soils at the Project Site are not well suited for crop cultivation. In addition, the site has been previously modified to accommodate the development of the existing campus. As such, the proposed development has no capacity to impact the availability of agricultural land for cultivation.

3.4 HYDROLOGY

The WHS campus is located within the Waipi‘o Watershed, which measures approximately 1,772 acres and is part of the greater Central O‘ahu Watershed Area that feeds into Pearl Harbor. Watersheds capture rainfall and atmospheric moisture from the air and allows the water to drip slowly into underground aquifers or enter stream channels and eventually to the ocean.

Surface Water

As the Project Site is located at the edge of a bluff overlooking the Middle Loch of Pearl Harbor, surface water generally sheet-flows from the existing basketball courts down the vegetated slope toward Cane Haul Road, the Pearl Harbor Bike Path, and eventually to the Middle Loch.

Ground Water

The WHS campus is situated in the Waipahu-Waiawa Aquifer System of the Pearl Harbor Aquifer Sector Area. This aquifer sector area is the Honolulu Board of Water Supply’s (BWS’s) largest source of potable water, and the Waipahu-Waiawa Aquifer System Area is the primary source of water in the Central O‘ahu Watershed (Honolulu Board of Water Supply, U.S. Army Corps of Engineers, and the City and County of Honolulu Department of Environmental Services, 2007).

Wetlands

Although no wetlands occur directly on the Project Site or on the WHS campus, the USFWS National Wetlands Inventory indicates that an Estuarine and Marine Deepwater habitat (classified as E1UBL) is located approximately 620 feet makai (south/southeast) of the proposed New Classroom Building, within the Middle Loch of Pearl Harbor (U.S. Fish and Wildlife Service, n.d.).

Potential Impacts and Mitigation Measures

The proposed New Classroom Building will be built upon mostly-graded land at the existing basketball court area currently at the makai edge of campus. By filling in this available space, the New Classroom Building will have a negligible effect on the topography and hydrology of the Site (Figure 5).

The proposed new parking areas will be built on the undeveloped makai portion of campus, which is overgrown with vegetation and littered with rubbish and slopes down toward Cane Haul Road. Based on the soils report and percolation testing conducted as part of the geotechnical investigation completed in December 2016, the existing brown silty clay soils at the Project Site

have a relatively poor infiltration rate; consequently, storm water runoff would more than likely pond or continue to sheet-flow downstream, bringing sedimentation and pollutants into downstream water bodies. Although the proposed parking areas and access roads would alter the topography and add impervious surfaces, the implementation of Low-Impact Development (LID) features is anticipated to reduce the volume of surface water runoff and improve water quality by decreasing the amount of sedimentation and pollutants.

In a letter received during the pre-assessment consultation process, the State of Hawai‘i Office of Planning (OP) provided the following comment (see Appendix A):

> "Pursuant to HAR § 11-200-10(6) - the identification and summary of impacts and alternatives considered; in order to ensure that the natural resources and coastal areas within the State of Hawaii remain protected, the Draft EA should summarize the potential impact to nearshore marine resources and actions proposed to ensure the coastal ecosystems are protected and potential hazards mitigated. The marine water quality classification, should be considered when developing mitigation measures to protect the coastal ecosystem. The Draft EA should detail proposed safeguards and best management practices (BMPs) used to protect water quality, and prevent sediment, soils, and construction debris from impacting surface water resources and the marine ecosystem."
>
> "The Draft EA should examine potential benefits and/or negative impacts resulting from this project on coastal and marine resources. Issues to consider include, but are not limited to, site characteristics of the project in relation to erosion controls, undeveloped open spaces, and the absorption characteristics of nearby soil. Furthermore, it should differentiate between the existing permeable surfaces versus hardened surfaces that have a cumulative effect on the volume and speed of storm runoff. These items, as well as the marine water quality classification, should be considered when developing mitigation measures to protect the coastal ecosystem."
>
> "Because this project may increase the amount of impervious surfaces within an urbanized area of Waipahu, please consider the use of low impact development (LID) design features. LID features that can be considered include options not solely for the new building, but may be employed campus wide. Proven LID features include runoff control techniques such as bioretention basins; grassed swales; permeable surfaces for walkways, driveways, and parking areas; and onsite infiltration techniques that treat stormwater in place, rather than allow rainfall to flow offsite."

Short-term impacts to downstream wetlands may include the potential for soil erosion and runoff, and the generation of fugitive dust during grading and construction. All construction activities will comply with all applicable federal, state, and county regulations and rules for erosion, sedimentation, and dust control. Contractors will use best management practices (BMPs) to minimize erosion during construction and planting, including watering loose soils during construction, and planting groundcover over areas where construction has been completed. Additionally, BMPs for stormwater management will be implemented to minimize impacts of the Project to the area's hydrology and existing drainage facilities, while maintaining on-site infiltration and preventing polluted runoff from storm events. These measures will address any

direct impacts from construction and avoid any secondary or cumulative impacts from erosion or fugitive dust caused by construction. Following construction, exposed soils will have been built over, paved over or landscaped to control erosion. A National Pollutant Discharge Elimination System (NPDES) permit will be required for the project if the demolition, construction and staging areas results in the disturbance of over one (1) acre of land area.

The waters of the Middle Loch of Pearl Harbor are classified as Class 1, Inland Waters. Any potential impacts to these waters caused by the construction and/or operation of the Proposed Project will meet the provisions of the: a) anti-degradation policy (Chapter 11-54-1.1, HAR); b) designated uses (Chapter 11-54-3, HAR); and c) water quality criteria (Chapter 11.54-4 through 11-54-8, HAR, as well as 11-55, HAR). However, direct discharges of storm water runoff into State waters are not expected to occur due to BMPs to reduce airborne dust and waterborne silt during construction. Although it is not anticipated, a Section 401 Water Quality Certification from the State Department of Health, Clean Water Branch (CWB) pursuant to the "Clean Water Act," will be obtained if it is determined that the project may result in any discharge into navigable waters or as otherwise triggered.

Long-term impacts will be mitigated by the installation of LID measures to manage stormwater at this site before it is returned to the natural system. Such measures will be designed to manage stormwater in a way that better replicates natural systems, thereby slowing the flow of surface water from the site and reducing pollutants in the process, resulting in improved water quality of the downstream water bodies. No impacts to ground water resources are anticipated.

During the Draft EA public review period, the State Department of Land and Natural Resources (DLNR) Commission on Water Resource Management (CWRM) wrote (refer to letter in Appendix F):

> "We recommend the use of best management practices (BMP) for stormwater management to minimize the impact of the project to the existing area's hydrology while maintaining on-site infiltration and preventing polluted runoff from storm events. Stormwater management BMPs may earn credit toward LEED certification. More information on stormwater BMPs can be found at http://planning.hawaii.gov/czm/initiatives/low-impact-development/"
>
> "Please also consider installing raingardens as another educational and aesthetic feature that will also help to retain storm water onsite and reduce runoff."

Construction and permanent post-construction BMPs and Low Impact Development (LID) measures will be designed, implemented, and maintained in compliance with the Administrative Rules, Title 20, Department of Planning and Permitting (DPP), Chapter 3 – Rules Relating to Water Quality, effective August 16, 2017. Onsite drainage system improvements will be designed in accordance to DPP's Storm Drainage Standards, dated August 2017. See also the discussion in Section 4.7.3 (Drainage System) below.

During the Draft EA public review period, the City and County of Honolulu Department of Planning and Permitting (DPP) provided the following comment (refer to letter in Appendix F):

> "The DEA should include a narrative describing the Project's post-construction storm water quality strategic plan pursuant to Section 20-3-50 of the 'Rules Relating to

> Water Quality.' The strategic plan shall include a written description of the proposed development, expected activities and pollutants that will be generated by activities at the site, and low impact development site design strategies that will be used to comply with the rules. The strategic plan should also include a development schedule."
>
> "The Project's compliance with the Rules Relating to Water Quality and Storm Drainage Standards will be verified at the time that the grading/construction plans are submitted to the Department of Planning and Permitting for review."

A Storm Water Quality Report (SWQR) has been submitted to DPP, and the Project's compliance with the Rules Relating to Water Quality and Storm Drainage Standards will be verified at the time grading/construction plans are submitted to DPP for review.

3.5 NATURAL HAZARDS

Natural hazards like flooding, tsunami inundation, hurricanes, earthquakes, and volcanic eruptions have historically impacted the Hawaiian Islands. Climate change will also impact the Islands, as will the related sea level rise.

Flooding

According to the Flood Insurance Rate Map (FIRM) prepared by the Federal Emergency Management Agency (FEMA), National Flood Insurance Program, the Project Site is located in "Zone D", meaning base flood statistics have not yet been measured (Figure 7). The Project Site sits in a dry and arid environment where the risks of flooding are low due to a combination of factors, including low rainfall, and the topography of the Site.

Tsunami

Since the early 1800s, approximately 50 tsunami have inundated Hawai'i's shores. Seven historical events have caused major damage. The most recent tsunami to impact O'ahu occurred on March 11, 2011, causing damage at several locations around the island, especially the North Shore. There are no records of inundation of lands in the vicinity of Waipahu High School during any of the recorded tsunami.

The City and County of Honolulu uses three tsunami evacuation designations. The first is the Tsunami Evacuation Zone where evacuation is required for any tsunami warning. The second is the Extreme Tsunami Evacuation Zone where additional areas must be evacuated only during an extreme tsunami event generated from earthquakes of Magnitude 9+ on the Richter scale. Remaining areas are identified as safe areas that are anticipated to be outside of the inundated areas due to tsunami events. The proposed New Classroom Building is located outside both the Tsunami Evacuation Zone and the Extreme Tsunami Evacuation Zone. (Figure 8)

Hurricanes

Since 1980, two hurricanes have had a devastating effect on Hawai'i: Hurricane 'Iwa in 1982 and Hurricane 'Iniki in 1992. Long-term prediction of future hurricanes is virtually impossible. However, one should reasonably anticipate the prospect of another hurricane impacting the islands.

Earthquake & Volcanic Hazards

In Hawai‘i, volcanic activity produces most earthquakes in contrast to other areas sitting on tectonic plate margins. Thousands of earthquakes occur in Hawai‘i each year. However, the vast majority of them are undetectable through normal human senses. A few historical earthquakes have reached moderate and even disastrous magnitudes.

The last earthquakes felt statewide were magnitudes of 6.7 and 6.0. These earthquakes occurred at Kīholo Bay along Hawai‘i Island’s Kona Coast on October 15, 2006. These earthquakes resulted in more than $100 million in damages to the northwest area of Hawai‘i Island and minimal damage on O‘ahu. From that same event, O‘ahu was also subject to an earthquake induced electrical blackout that paralyzed the city of Honolulu and shut down the Honolulu International Airport for nearly a day.

Climate Change & Sea Level Rise

As global temperatures increase, established patterns of weather and climate are shifting. These erratic changes in weather patterns have increased the severity of events like droughts, storms, floods, and even hurricanes, while at the same time causing these events to be more difficult to predict and protect against. The fragility of the ecosystems and unique island nature of O‘ahu and the Hawaiian Islands at large makes the state particularly vulnerable to the damaging effects of climate change. Global sea levels are on the rise, and have the potential to erode and even inundate coastal areas over the course of the next century. Waipahu High School’s location upon a bluff shields the Project Site from the worst potential impacts of sea level rise (SLR), as shown in Figure 9.

Potential Impacts and Mitigation Measures

The Proposed Project is not anticipated to have any impact or any deleterious effects on natural hazard conditions and no unique mitigation measures are planned, other than observing the International Building Code in the design of the facility (to address the potential impacts from hurricanes and earthquakes). During the pre-assessment consultation process, the State Department of Defense (DOD), which includes the Hawai‘i Emergency Management Agency, wrote that they have “no comments to offer relative to the project” (Appendix A).

During the Draft EA public review period, FEMA provided a summary of the minimum, basic National Flood Insurance Program (NFIP) floodplain management building requirements as described in Vol. 44 Code of Federal Regulations (44 CFR), Sections 59-65 (refer to letter in Appendix F):

- “All buildings constructed within a riverine floodplain, (i.e., Flood Zones A, AO, AH, AE, and Al through A30 as delineated on the FIRM), must be elevated so that the lowest floor is at or above the Base Flood Elevation level in accordance with the effective Flood Insurance Rate Map.”

- “If the area of construction is located within a Regulatory Floodway as delineated on the FIRM, any development must not increase base flood elevation levels. The term development means any man-made change to improved or unimproved real estate, including but not limited to buildings, other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, and storage of equipment

or materials. A hydrologic and hydraulic analysis must be performed prior to the start of development, and must demonstrate that the development would not cause any rise in base flood levels. No rise is permitted within regulatory floodways."

- "All buildings constructed within a coastal high hazard area, (any of the 'V' Flood Zones as delineated on the FIRM), must be elevated on pilings and columns, so that the lowest horizontal structural member, (excluding the pilings and columns), is elevated to or above the base flood elevation level. In addition, the posts and pilings foundation and the structure attached thereto, is anchored to resist flotation, collapse and lateral movement due to the effects of wind and water loads acting simultaneously on all building components."

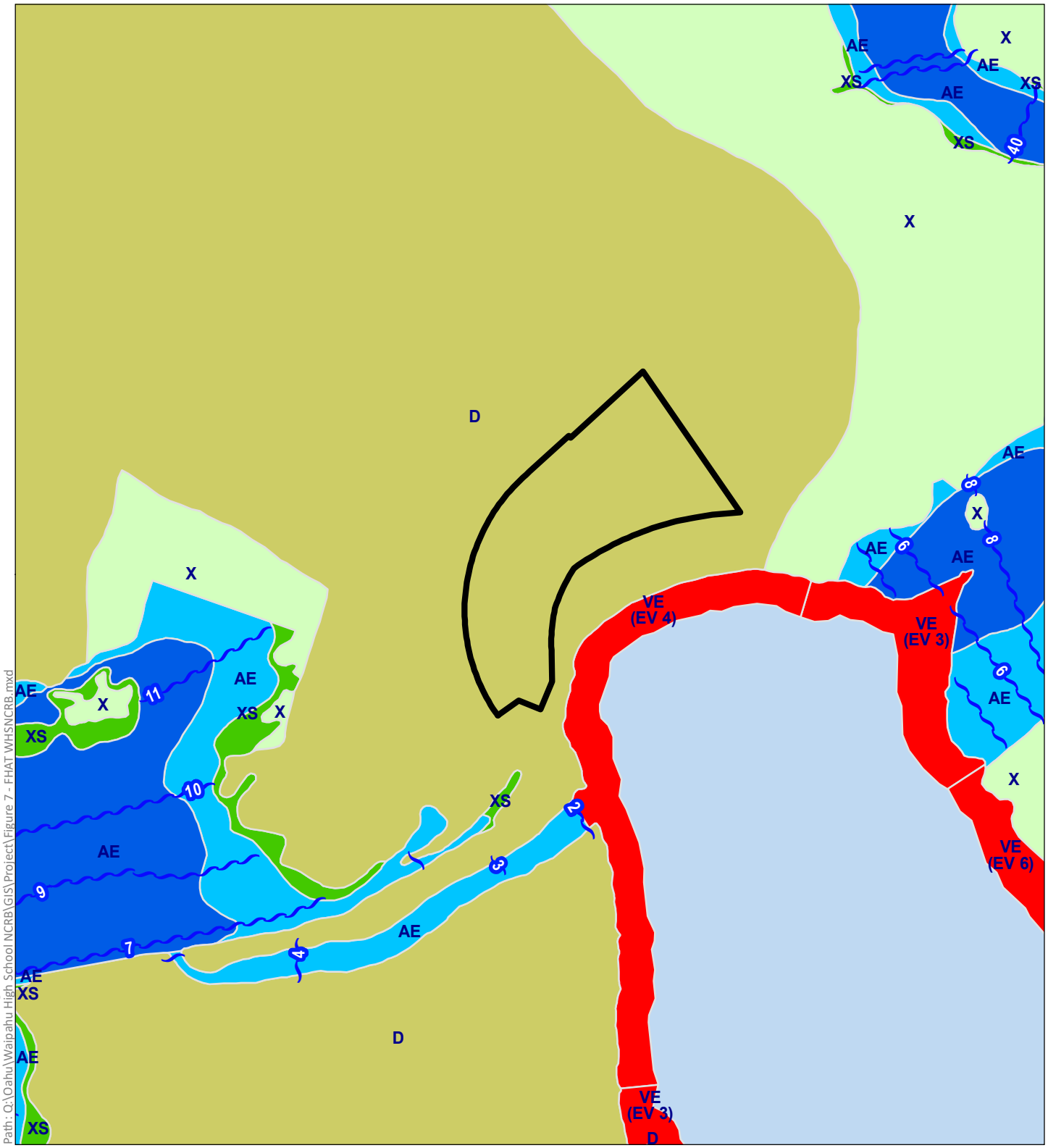
- "Upon completion of any development that changes existing Special Flood Hazard Areas, the NFIP directs all participating communities to submit the appropriate hydrologic and hydraulic data to FEMA for a FIRM revision. In accordance with 44 CFR, Section 65.3, as soon as practicable, but not later than six months after such data becomes available, a community shall notify FEMA of the changes by submitting technical data for a flood map revision. To obtain copies of FEMA's Flood Map Revision Application Packages, please refer to the FEMA website at http://www.fema.gov/business/nfip/forms.shtm."

The Project Site is not located within a riverine floodplain, a Regulatory Floodway, nor within a coastal high hazard area. In addition, the Project will not alter existing Special Flood Hazard Areas.

During the Draft EA public review period, DPP wrote (refer to letter in Appendix F):

> "The discussion on Climate Change & Sea Level Rise should state that the Project is outside of the 3.2' Sea Level Rise Exposure Area (SLR-XA), as shown in Figure 9. As a disclosure document and for planning purposes, the DEA should also include in Figure 9 the 6' SLR-XA, which is anticipated to affect properties toward the end of the century, and indicate if the Project is in or out of the 6' SLR-XA."

Figure 9 has been revised to show that the Project is located not only outside the 3.2-foot Sea Level Rise Exposure Area (SLR-XA) as modeled by the University of Hawai'i Coastal Geology Group (CGG), but also beyond the 6-foot SLR line as modeled by the National Oceanic and Atmospheric Administration (NOAA) Digital Coast Sea Level Rise Viewer.



PDF: Q:\Oahu\Waipahu High School NCRB\PDF
Path: Q:\Oahu\Waipahu High School NCRB\GIS\Project\Figure 7 - FHAT WHSNCRB.mxd

DATE: 5/21/2019

LEGEND

- Project Site
- Base Flood Elevation (BFE) Line

Flood Zone

- AE: 1% annual chance flood, with BFE
- VE: 1% annual chance coastal flood, with BFE
- Floodway areas in AE
- XS: 0.2% annual chance flood
- X: Minimal flood areas
- D: Unstudied areas

Figure 7:
Flood Insurance Rate Map

WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING

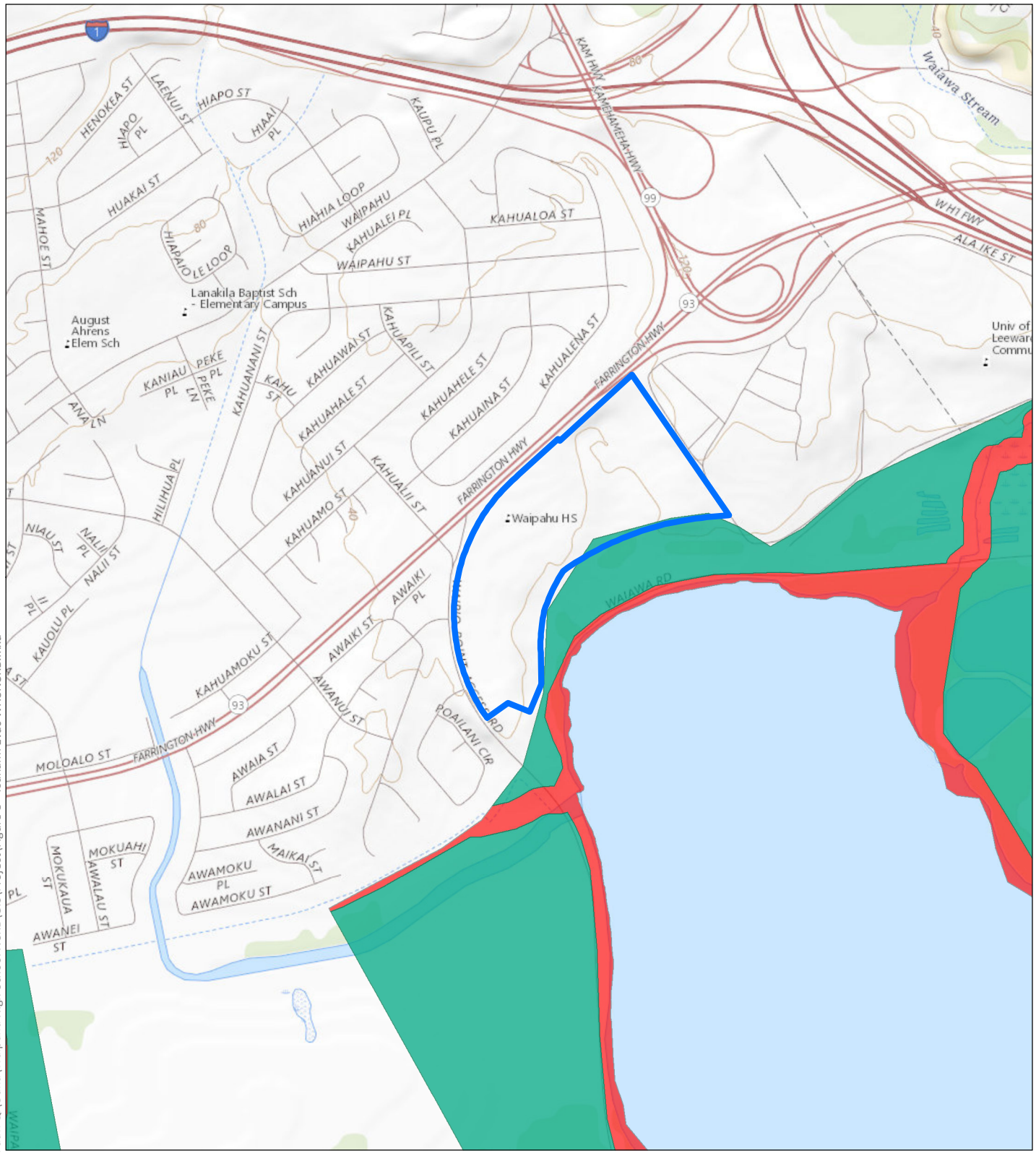
State of Hawai'i - Department of Education
O'ahu

North

Linear Scale (feet)
0 250 500 1,000

PBR HAWAII & ASSOCIATES, INC.

Source: FEMA, 2018. ESRI Online Basemaps.



PDF: Q:\Oahu\Waipahu High School NCRB\PDF
Path: Q:\Oahu\Waipahu High School NCRB\GIS\Project\Figure 8 - Tsunami Evac WHSNCRB.mxd

DATE: 5/21/2019

LEGEND

- Project Site
- Tsunami Evacuation Zone
- Tsunami Evacuation Zone (Extreme)

Figure 8:
Tsunami Evacuation Zone

WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING

State of Hawai'i - Department of Education — O'ahu

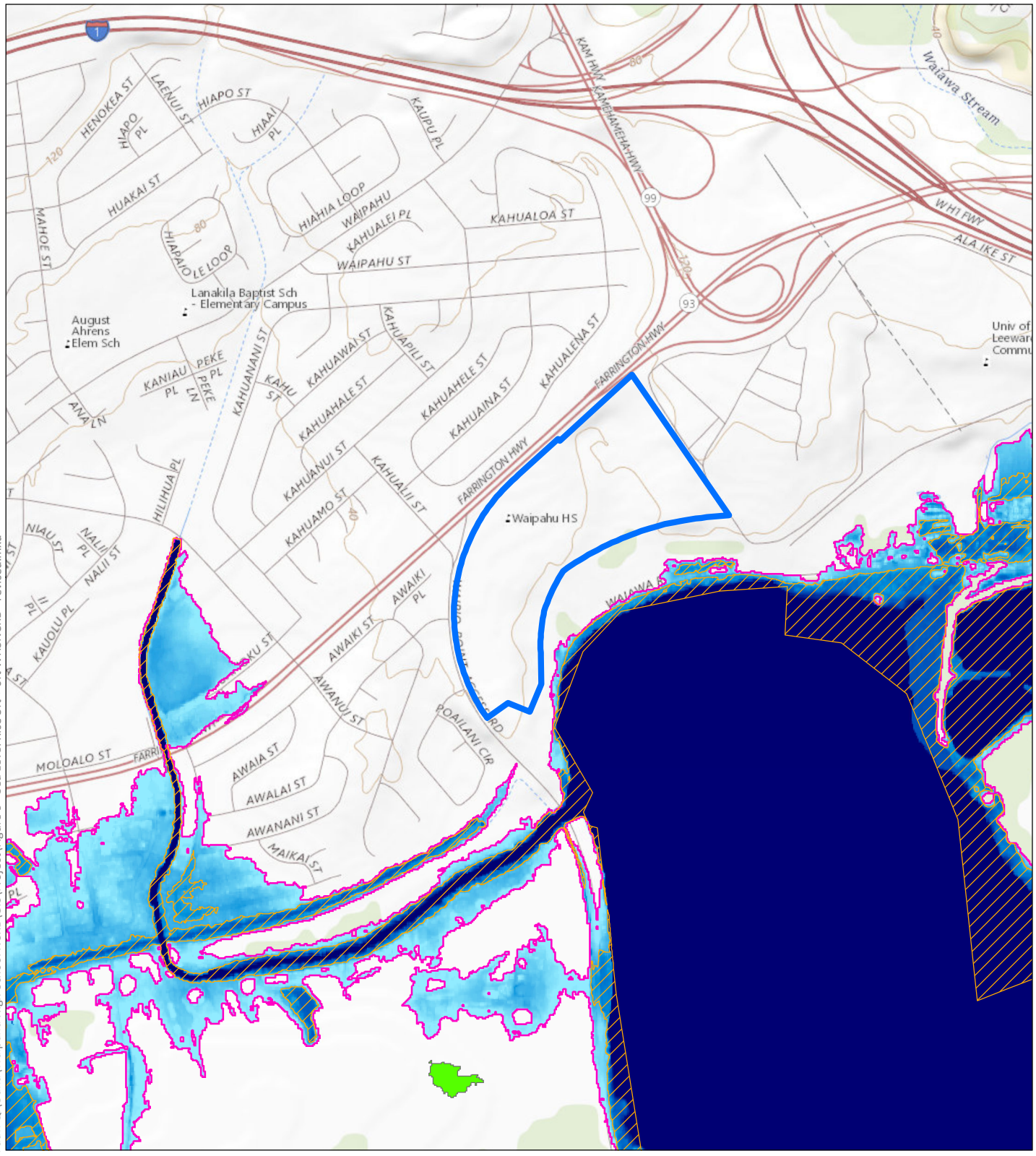
North

Linear Scale (feet)

0 250 500 1,000

PBR HAWAII & ASSOCIATES, INC.

Source: City & County of Honolulu, 2010 & 2015. ESRI Online Basemaps.



PDF: Q:\Oahu\Waipahu High School NCRB\PDF
Path: Q:\Oahu\Waipahu High School NCRB\GIS\Project\Figure 9 - Sea Level Rise 3ft + 6ft WHSNCRB - revised.mxd

DATE: 7/15/2019

LEGEND

- Project Site
- SLR Exposure Area - 3.2 Ft. Scenario
- Low-Lying Areas
- SLR - 6 Ft. Scenario

Water Depth

- Deep
- Shallow

Source: SOEST, UH CGG, PacIOOC, Tetra Tech, Inc., 2017. ESRI Online Basemaps.

Figure 9:
Sea Level Rise

WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING

State of Hawai'i - Department of Education — O'ahu

North

Linear Scale (feet)

0 250 500 1,000

PBR HAWAII & ASSOCIATES, INC.

3.6 FLORA & FAUNA

The Waipahu High School campus has been subject to intense human utilization since its move to the current location in 1969. Within the immediate proximity of the Project Site, there are no known habitats for rare, threatened, or endangered flora or faunal species (Figure 10). The main landscaping features of the New Classroom Building site include a paved area containing a basketball court and the sidewalks between existing classsroom buildings.

Potential Impacts and Mitigation Measures

The proposed New Classroom Building will involve improvements to existing paved areas and courtyards. The future new makai parking area being considered would involve removing trees and overgrowth and developing an undeveloped portion of campus. Due to intense human utilization since WHS's move to the current location in 1969, the New Classroom Building and the future new makai parking area are not anticipated to have any impact on endangered flora or faunal species. No mitigation measures are planned.

PDF: Q:\Oahu\Waipahu High School NCRB\PDF
Path: Q:\Oahu\Waipahu High School NCRB\GIS\Project\Figure 10 - Critical Habitats WHSNCRB.mxd

DATE: 5/21/2019

LEGEND

- Project Site
- Critical Plant Habitat (none shown)
- Critical Animal Habitat (none shown)

Figure 10:
Critical Habitats

WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING

State of Hawai'i - Department of Education — O'ahu

North

Linear Scale (feet)
0 500 1,000 2,000

PBR HAWAII & ASSOCIATES, INC.

Source: U.S. Fish & Wildlife Service, 2018. ESRI Online Basemaps.

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4.0 DESCRIPTION OF THE HUMAN ENVIRONMENT, POTENTIAL IMPACTS, AND MITIGATION MEASURES

This section describes the existing conditions of the human environment, potential impacts of the Waipahu High School New Classroom Building, and mitigation measures to minimize any impacts.

4.1 ARCHAEOLOGICAL AND CULTURAL RESOURCES

4.1.1 Archaeological Resources

Waipahu High School's current campus was built in 1969 and has been in continuous use for almost 50 years. The campus has been built out incrementally since, with expansions as recently as 2004. The Project Site consists of an existing basketball court and the immediately surrounding area; in addition, the DOE is exploring the possibility of constructing at a later phase two additional parking areas and accessways within the currently undeveloped southeastern/makai edge of the campus. To examine the potential for archaeological resources in the area, especially those from before the construction of Waipahu High School at its current location, an Archaeological Inventory Survey (AIS) was conducted for the Project by ASM Affiliates. The study can be found in Appendix B.

Potential Impacts and Mitigation Measures

ASM conducted background research and initial fieldwork for an earlier iteration of the current project in February of 2017. Then, beginning on August 28, 2018, a pedestrian survey of the expanded survey area was conducted. The remaining inventory fieldwork for the expanded study area was conducted over six days between September 3 and October 1, 2018.

As a result of the fieldwork for the current study a single newly identified site (Site 50-80-09-08778) comprising four features (Features A-D) was recorded within the study area. Features A-D comprise multiple subfeatures, which include the following: a series of discontinuous dry-stacked rock retaining walls (Subfeatures A1, A2, B1, B2, B3, and B4), concrete reinforced stone masonry (CRM) steps (Subfeature A3), a combination dry-stacked rock and concrete block retaining wall (Subfeature C1), a concrete block wall with associated concrete pads and steps (Subfeature C2), and a large concrete box/vault (Feature D). Site 8778, a Historic Period agricultural station, is considered significant under Criterion d for the information it has yielded relative to the early to middle twentieth century activities associated with the former HSPA Experiment Substation in Waipi‘o. The research and fieldwork conducted during the current study has been sufficient to exhaust the information potential of Site 8778. Thus, no further work is the recommended treatment for Site 8778. Because the current study has mitigated any potential future adverse effects to this site, the HRS Chapter 6E-review determination of effects for the current project is "no historic properties affected."

Per the findings of this study, the Department of Education does not anticipate any adverse impact to archeological resources as a result of construction. Should the inadvertent discovery of significant cultural materials and/or burials occur during construction, all work in the immediate

area of the find must cease and the State Historic Preservation Division (SHPD) be notified, as outlined in HAR 13 § 13-275-12. No further mitigation measures are planned.

4.1.2 Cultural Resources

In addition to the archaeological study, ASM Affiliates also prepared a Cultural Impact Assessment (CIA) for the Proposed Project in November 2018. The study can be found in Appendix C.

Potential Impacts and Mitigation Measures

As discussed in Section 4.1.1 (Archaeological Resources) above, a single Historic Period archaeological site (SIHP Site 8778) that comprises remnants of the HSPA Waipi‘o Experiment Substation was identified during the recent AIS (Gotay and Rechtman, 2018) of the project area. This site was determined significant under Criterion d with a treatment of no further work. As a result of the archival research and the oral-historical interviews conducted for the CIA, there were no traditionally valued cultural, historical, or natural resources documented to exist within the current project area; nor were any traditional and customary practices associated with the study area identified. None of the interviewees expressed any cultural concerns relative to the proposed improvements project. Thus, the CIA concludes that development activities associated with the proposed Waipahu High School campus improvements project will not result in any cultural impacts.

During the pre-assessment consultation process, the Department of Hawaiian Home Lands (DHHL) wrote: “…we do not anticipate any impacts to our lands or beneficiaries from the project. However, we highly encourage all agencies to consult with Hawaiian Homestead community associations and other (N)native Hawaiian organizations when preparing environmental assessments in order to better assess potential impacts to cultural and natural resources, access and other rights of Native Hawaiians” (Appendix A).

As part of the oral interview process of the Cultural Impact Assessment, ASM Affiliates thus consulted with Native Hawaiian Organizations (NHOs) and other community organizations and individuals with knowledge of traditional cultural practices in Waipahu and the ‘Ewa area. None of the interviewees were aware of any information regarding cultural places or practices specific to the Project Area, nor did they express any cultural concerns relative to the Proposed Project (see Appendix C). No mitigation measures are planned.

4.2 TRANSPORTATION

During the pre-assessment consultation process, the City and County of Honolulu Department of Transportation Services (DTS) commented (see letter in Appendix A):

> “The DEA should include a traffic impact study to evaluate existing traffic conditions of the surrounding City roadways, possible increase in traffic and pedestrian volumes as a result of the project, including short-term impacts during construction and long-term impacts after construction, and measures to mitigate these impacts by applying complete streets principles whenever possible.”

> "The DEA should also include a discussion regarding the existing safety and traffic operational concerns in the area, including school parking needs, student drop off and pick up in the morning and afternoon peak hours, and pedestrian and bicycle access along adjacent City roadways with corresponding measures to mitigate these concerns."

A traffic engineer, Fehr & Peers, prepared a mobility assessment report (MAR) that presents the results of a traffic and multi-modal circulation study for this Project. The MAR is included in this EA as Appendix D and is summarized in the sections below.

4.2.1 Roadways and Traffic

The key roadways providing access to or in the vicinity of the Site are described below.

Farrington Highway is operated and maintained by Hawai'i Department of Transportation (HDOT) and is a two-lane highway mauka of the Project Site. Farrington Highway is located south of, and parallel to, H-1 extending between Kapolei and Waipahu. The posted speed limit is 30 miles per hour (mph) along Farrington Highway and 25 mph along the school frontage zone. TheBus has two transit stops along Farrington Highway in front of WHS.

Waipi'o Point Access Road is a two-lane, approximately 1.6-mile long roadway between Farrington Highway and the Ted Makalena Golf Course. Waipi'o Point Access Road provides access between Farrington Highway and adjacent residential neighborhoods, the Ted Makalena Golf Course, Waipi'o Peninsula Soccer Park, as well as direct access to WHS. The posted speed limit on this street is 25 mph. The intersection at Farrington Highway is controlled by a traffic signal with channelized right-turn lanes in each direction, with the mauka-bound right-turn lane controlled by a stop sign. Marked pedestrian crosswalks are provided on the north, west, and south legs of the intersection. Pedestrian crossing is prohibited on the east side of the intersection along Farrington Highway, where a fence is posted along the median. The intersection of Waipi'o Point Access Road and Awalai Street is two-way stop controlled with marked pedestrian crosswalks on the west and south legs of the intersection.

Primary vehicular access to WHS (including the Project Site) is provided along Waipi'o Point Access Road makai of Farrington Highway, directly across Awalai Street.

Two intersections were studied for the MAR: (1) Farrington Highway & Waipi'o Point Access Road-Kahuali'i Street; and (2) Waipi'o Point Access Road & Awalai Street. The operations of the two existing study intersections were evaluated during weekday AM and PM peak periods (6:00 – 9:00 AM and 2:00 PM – 6:00 PM). Traffic counts were collected during the weekday AM and PM peak periods at the study intersections in August 2017 when local schools were in session. The morning peak hour of traffic for the study area occurred between the hours of 7:00 – 8:00 AM. The afternoon peak hour of traffic occurred between the hours of 2:15 – 3:15 PM.

The operations of roadway facilities are described with the term level of service (LOS). LOS is a qualitative description of traffic flow based on such factors as speed, travel time, delay, and freedom to maneuver. Six levels are defined from LOS A, with the least congested operating conditions, to LOS F, with the most congested operating conditions. LOS E represents "at-

capacity" operations. Operations are designated as LOS F when volumes exceed capacity, resulting in stop-and-go conditions.

The Farrington Highway/Waipi'o Point Access Road intersection currently operates at LOS D during the AM peak hour and LOS C during the PM peak hour (see Table 3 below). As noted under field observations, drivers experience delays at this intersection during morning drop-off and afternoon pick-up periods at the school particularly for the left-turn movements. Based on the operational level of service for each turning movement, the left turn movements in all directions operate at LOS E or F due to the permitted left-turn phasing and high number of pedestrians crossing the intersection. Overall operations at the intersection meet or exceed the minimum desirable operating level of LOS D due to the lesser delays in the through and channelized right-turn movements, most of which are not controlled by the signal.

The intersection of Waipi'o Point Access Road/Awalai Street is two-way stop controlled. Due to the concentrated vehicle and pedestrian volumes at the intersection during the peak hours, which occurs during drop-off and pick-up periods, vehicle delay on Awalai Street and the school driveway results in oversaturated conditions. The result is LOS F operations which was confirmed during field observations (see Table 3 below). The primary issue is the high vehicle demand on Alawai Street and Waipi'o Point Access Road and the conflict on these streets as vehicles approach the site attempting to enter the on-site drop-off/pick up zone and parking lots.

Table 3: Existing Conditions Peak Hour Intersection Level of Service

Intersection	Traffic Control	Peak Hour	Existing Conditions	
			(sec/veh)	LOS
Farrington Highway & Waipi'o Point Access Road-Kahuali'i Street	Signalized	AM	35.4	D
		PM	22.1	C
Waipi'o Point Access Road & Awalai Street	Side-street stop-controlled	AM	>100.0	F
		PM	>100.0	F

Currently, congestion and vehicle queues are an existing concern during the morning drop-off and afternoon pick-up periods. Based on observations and discussions with school staff, approximately 50 percent of the student body walk or take transit (TheBus) to school, resulting in very high pedestrian volumes at the intersections during the beginning and end of the school day.

Potential Impacts and Mitigation Measures

The proposed New Classroom Building at WHS is intended to serve the existing student population in response to overcrowded classrooms and aging infrastructure. Thus, the Project is not expected to result in an increase in student enrollment and is not expected to generate any new vehicle trips to the site. Accordingly, no significant impacts are projected at either of the two study intersections. However, a traffic operational analysis was completed for a potential (hypothetical) increase in student enrollment and associated future trips in response to concerns from City and County of Honolulu Department of Transportation Services (DTS) staff. With the addition of forecasted project-generated trips from the New Classroom Building, the Existing Plus Project analysis showed no change in operating level of service compared to existing conditions. The LOS F conditions and delay currently experienced at Waipi'o Point Access Road/Awalai Street during drop-off and pick-up is anticipated to remain the same or slightly

worsen if the project results in new trips. However, the impacts are considered temporary and occur for approximately 20 minutes during each weekday peak period.

In addition to the proposed New Classroom Building, and dependent upon future funding, the DOE is also seeking to construct a new makai parking area with approximately 214 parking spaces to address the existing shortage of onsite parking (see Section 4.2.2 below). If funding is provided in the future for the new makai parking area, the new parking will help alleviate: 1) poor circulation and long traffic queues combined with heavy pedestrian traffic during drop-off (AM) and pick-up (PM) periods; and 2) insufficient on-site parking causing students to park along the unpaved shoulder of Waipi‘o Point Access Road.

The Project will not require permanent rerouting or alteration of roadway traffic, but during construction it may be required occasionally to accommodate construction equipment. Construction activities may generate short-term traffic impacts to the motoring public, bicyclists, students, faculty, staff, and visitors to WHS mostly in the immediate vicinity of the intersection of Waipi‘o Point Access Road and Farrington Highway. Temporary construction access would potentially be through the Waipi‘o Point Access Road Navy Gate. Traffic cones and other directional devices will be placed in the roadway to guide vehicles around work areas. The contractor will implement mitigation measures to provide access past work sites and to minimize the inconvenience to the community. These measures may include the following:

- Posting flagmen for traffic control around work sites.
- Backfilling/covering all trenches at the end of the work day.
- Posting safety devices and signs for the duration of construction.
- Scheduling the transferal of construction materials and equipment to and from the Project site during non-peak traffic hours, but not during school dismissal periods.
- Scheduling construction activities requiring lane closures to occur thirty minutes after school begins, ending thirty minutes prior to the end of the school day

During the pre-assessment consultation process, DTS commented (see letter in Appendix A):

- “Any damage to the existing roadway, sidewalk and driveway areas caused by the project should be repaired to current City standards.”
- “Best Management Practice controls should be included at construction site to prevent trailing of dirt and debris on City roadways.”
- “Construction materials and equipment should be transferred to and from the project site during off-peak traffic hours (8:30 a.m. to 3:30 p.m.), but not during school dismissal periods for the safety of the students and to minimize any possible disruption to the local streets.
- “A street usage permit from the City's Department of Transportation Services should be obtained for any construction-related work that may require the temporary closure of any traffic lane on a City street.”

In addition, should the need to transport any oversized equipment/overweight loads on State highway facilities, a DOT Highways Division permit will be obtained.

4.2.2 Parking

The upper campus has six parking lots distributed throughout the campus and consisting of 302 parking stalls. The lower campus has a single parking lot with 135 parking stalls as well as a small parking area with 2 accessible stalls adjacent to the pump house and tennis courts. Combined, Waipahu High School has 439 existing parking stalls (including 24 ADA accessible stalls and 1 electric charging stall). Currently, the School uses just the 302 stalls at the upper campus for daily faculty parking. The lower campus parking lot is currently utilized only for special school events and not for daily parking due to challenges for security and monitoring these areas of campus.

Currently, there is no student parking on campus. Some students park along the unpaved grassy shoulder along the northbound side of Waipi‘o Point Access Road and then walk towards the campus. No paved sidewalks or paths are provided along the WHS frontage.

Potential Impacts and Mitigation Measures

During the pre-assessment consultation process, DTS commented: “All parking needs for the proposed facility (employees, visitors and students) should be handled on-site” (see letter in Appendix A).

The DOE is proposing to add a small north parking area to service the New Classroom Building and staff; this north parking area would not be for student parking.

In the long-term, the Project is not anticipated to have a significant impact on the demand for parking at Waipahu High School, as no change in student population is expected due to the Project. Because the enrollment is expected to be retained close to the 2,500 student capacity and the lower campus parking is currently not utilized on a typical school day, the existing parking quantity is expected to continue to meet the needs of the school and the New Classroom Building. A significant portion of the student population utilize public transportation (TheBus) and the future rail is anticipated to provide another mass transit option for users.

However, the DOE is currently exploring the feasibility of adding a new parking lot and driveway access along the undeveloped east (makai) portions of the campus at a future phase. If added, the new makai parking area would provide on-site parking for students, thereby reducing the number of students parking on Waipi‘o Point Access Road.

During the Draft EA public review period, DPP commented (refer to letter in Appendix F):

> “It is our understanding that the proposed Project is needed to support the existing enrollment and will not affect the existing traffic patterns. However, the Mobility Assessment Report (MAR) will need to be updated once the proposed new makai parking area is funded and scheduled. The new makai parking area will change the traffic patterns around the school and the MAR will need to be updated to reflect the current traffic conditions and enrollment at that time.”

4.2.3 Current Public Transportation

TheBus is the main public transportation service on the Island of Oʻahu, where it served over 69 million riders in the fiscal year of 2015-2016. A fleet of 542 buses transports over 216,000 riders a week via fixed-route, express, and paratransit service. Within the project study area, Routes 81, W1, W2, A, 40, 42, and 43 provide service along Farrington Highway with transit stops located immediately in front of the high school.

Routes 81, W1, and W2 are express routes providing service between commercial or employment centers and residential areas. Route 81 (Waipahu Express) provides local stops between central Waipahu and downtown Honolulu. Route W1 (Waipahu Via Farrington Hwy Express) provides service between ʻEwa Beach and Waikīkī. Route W2 (Waipahu Via Paiwa Express) provides service between Waipahu and Waikīkī.

Routes 40, 42, and 43 are regular service bus routes that serve the local area, including WHS. Route 40 traverses the perimeter of Oʻahu starting in Mākaha and travels southeast along Farrington Highway to Pearl City where it continues along Kamehameha Highway to Downtown Honolulu. Complementary eastbound service is also provided in the reverse direction. Route 42 originates in ʻEwa Beach providing local stops through Waipahu, Pearl Harbor, Downtown Honolulu and Waikīkī, where the route continues in the reverse direction with complementary service. Route 43 provides local stops in Waipahu, traveling along Farrington Highway and Moanalua Freeway to Downtown Honolulu. Complementary service to Waipahu is provided in the reverse direction. Route A begins in Waipahu and travels along Farrington Highway and Kamehameha Highway to Downtown Honolulu and the University of Hawaiʻi. Complementary service to Waipahu is provided in the reverse direction.

Two bus stops adjacent to the Project Site are located on Farrington Highway mauka of WHS. The westbound stop is located on the mauka side of Farrington Highway and the eastbound stop is located on the makai side of the highway. The westbound stop (bus stop #454) encroaches into the free right turn lane causing vehicles turning onto Kahualiʻi Street to stop during bus passenger loading/unloading. The eastbound stop (bus stop #678) is adjacent to a pedestrian plaza and includes a turnout lane, which allows eastbound vehicles to pass the bus while it is stopped to load or unload passengers. During field observations, some private vehicles would stop in the turnout to drop off or pick up WHS students, and temporarily delay buses trying to access the stop. Figure 11 depicts the existing transit routes and bus stops near the Project Site.

Potential Impacts and Mitigation Measures

During the pre-assessment consultation process, DTS wrote:

> "The area Neighborhood Board, as well as the area residents, businesses, emergency personnel (fire, ambulance and police), Oahu Transit Services, Inc. (TheBus and The Handi-Van), etc., should be kept apprised of the details of the proposed project and the impacts that the project may have on the adjoining local street area network" (see letter in Appendix A).

As recommended by DTS, Oʻahu Transit Services will be kept apprised of the Proposed Project to mitigate any short-term, construction-related impacts to public transportation services.

In the long-term, no change in student population is anticipated as a result of the Project; as such, DOE anticipates no increase in public transit demand. No significant impacts to public transportation services are anticipated. No further mitigation measures are planned.

4.2.4 Future Public Transportation

The County's Honolulu Authority for Rapid Transportation (HART) is constructing a high-capacity transit corridor project (the Honolulu Rail Transit Project) between East Kapolei and Ala Moana Shopping Center. The nearest rail transit station to the Project will be the Hālaulani Station #6 at Leeward Community College (LCC), which will serve as a park-and-ride facility, and will also be home to the Rail Operations Center where trains will be housed and serviced. Also near to the Project Site will be Pouhala Transit Center Station #5, near the intersection of Mokuola Street & Farrington Highway. These stations are anticipated to reduce traffic congestion in the area resulting from lower use of personal vehicles by commuters.

Along Farrington Highway, the Fixed Guideway alignment that is closest to the Waipahu High School campus sits on elevated columns approximately six feet wide by thirty feet tall. The fixed guideway is approximately 30 feet wide when elevated. Near to Waipahu High School, the column heights of the guideway lower to at-grade on approach to the HART Rail Operations Center and the Leeward Community College Station.

At the time of writing, trains are expected to be running between East Kapolei and Aloha Stadium by late 2020, and the full rail line is expected to be operable through Downtown Honolulu and Ala Moana by 2025.

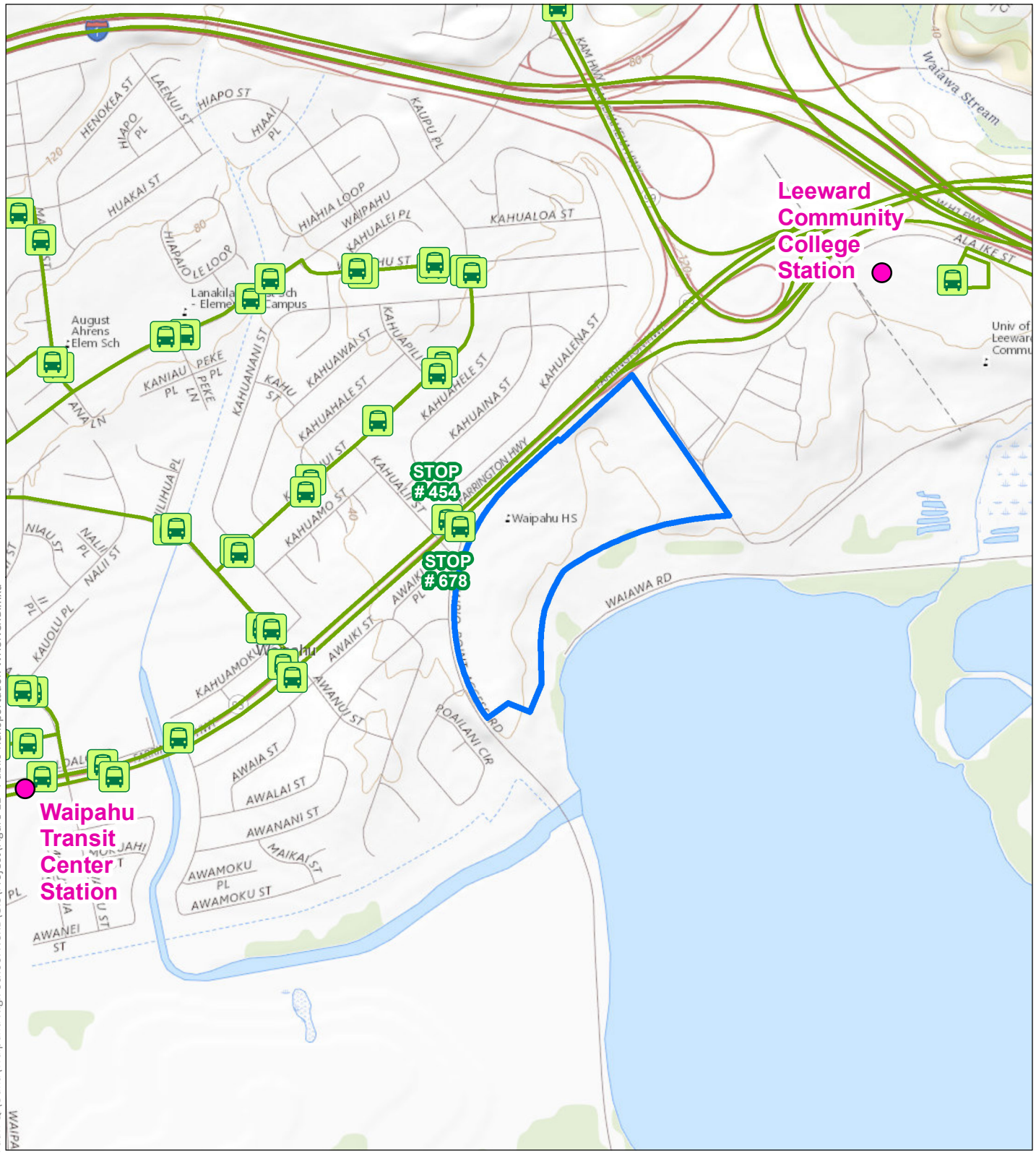
Potential Impacts and Mitigation Measures

During the pre-assessment consultation process, DTS wrote:

> "The Honolulu Authority for Rapid Transportation should be informed of this project. They have a project called the Middle Loch Connector that involves constructing a multi-use path connecting Waipahu High School to Leeward Community College. The construction schedules should be coordinated to ensure minimal impacts on City streets" (see letter in Appendix A).

As recommended by DTS, in the short-term, construction schedules will be coordinated with HART to ensure minimal impacts on city streets during construction of the Proposed Project. The Proposed Project and potential future new makai parking area will be located uphill from the HART Middle Loch Connector and not in the vicinity of the path locations.

The Project is not anticipated to have any long-term impacts on the City's future public transit infrastructure. As the rail line is built out, parking in and around Waipahu High School may see less demand, as students, faculty, and staff are able to use the new HART system to commute to and from WHS. The rail system is not anticipated to have an impact on student enrollment at WHS, as only a small portion of the rail line falls within the school district. No further mitigation measures are planned.



PDF: Q:\Oahu\Waipahu High School NCRB\PDF
Path: Q:\Oahu\Waipahu High School NCRB\GIS\Project\Figure 11 - Public Transportation WHSNCRB.mxd

DATE: 5/21/2019

LEGEND

- Project Site
- Bus Route
- Bus Stop
- HART Station

Figure 11:
Public Transportation

WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING

State of Hawai'i - Department of Education — O'ahu

North

Linear Scale (feet)
0 250 500 1,000

PBR HAWAII & ASSOCIATES, INC.

Source: City & County of Honolulu, 2017. ESRI Online Basemaps.

4.2.5 Bicycle Facilities

Bicycle facilities generally consist of four types of facilities: bike/multi-use paths; bike lanes; bike routes or signed shared roadways ("sharrows"); and separated bikeways or cycle tracks. The only existing off-street bicycle facility in the immediate vicinity of the school is the Pearl Harbor Bike Path located makai of WHS between the school and Middle Loch of Pearl Harbor. No separate bicycle lanes are provided on Waipiʻo Point Access Road or on other roadways in the immediate vicinity of the Project Site.

Based on weekday peak period counts conducted during at the same time as traffic counts, the number of bicyclists in the area is limited. At the Farrington Highway/Kahualiʻi Street-Waipiʻo Point Access Road intersection there were a total of seven (7) bicyclists during the AM (4 bicyclists) and PM (3 bicyclists) peak hours. At the Waipiʻo Point Access Road and Awalai Street intersection there were a total of eight (8) bicyclists during the AM (5 bicyclists) and PM (3 bicyclists) peak hours.

Potential Impacts and Mitigation Measures

Students on bicycles are also expected to access the Project Site from the adjacent neighborhoods. According to the MAR, no separate paths need to be incorporated to the Site. While not required as mitigation for the New Classroom Building, the MAR recommends secured bike parking. The need for and the operations of secured bike parking shall be determined by the School in the future.

As recommended by DTS during the pre-assessment consultation process (see letter in Appendix A), all access driveways to the Project Site will be designed with the highest pedestrian and bicycle safety measures.

4.2.6 Pedestrian Facilities

Pedestrian facilities generally consist of sidewalks, crosswalks, and pedestrian signals at signalized intersections. Within the Project study area, no paved sidewalks are provided along the immediate school frontage areas on Waipiʻo Point Access Road, therefore all students walking to and from campus are walking in the unpaved pathways and roadway shoulders. Sidewalks are provided on Farrington Highway east and west of Kahualiʻi Street/Waipiʻo Point Access Road, however the sidewalks terminate after a short distance on the east leg of the intersection.

Marked crosswalks are provided on the north, west, and south legs of the intersection of Farrington Highway and Kahualiʻi Street/Waipiʻo Point Access Road. No crosswalk is provided on the east leg of the intersection. A crosswalk is provided across the right turn slip lane that serves as the mauka-bound right-turn lane from Waipiʻo Point Access Road to eastbound Farrington Highway. This crosswalk connects WHS and a large raised median island/pedestrian plaza with a transit stop serving eastbound routes along Farrington Highway. Crosswalks are also provided on the west and south legs of the Waipiʻo Point Access Road/Awalai Street intersection.

Each corner of the Farrington Highway/Kahualiʻi Street-Waipiʻo Point Access Road intersection includes a right-turn lane with a raised median between the right-turn and through lanes. The raised medians between the right-turn and through lanes increases the visibility of pedestrians to drivers and provides a dedicated waiting area for pedestrians. Marked crosswalks and advance stop bars are painted across each of the channelized right turn lanes on the north, west and south legs of the intersection.

Pedestrian access to WHS is currently provided at two locations: (1) the Waipiʻo Point Access Road/Awalai Street entrance and (2) the school frontage entrance along Waipiʻo Point Access Road immediately south of Farrington Highway, directly across from the median and TheBus transit stops along Farrington Highway.

Morning and afternoon peak period pedestrian counts were collected at each of the study intersections, as summarized in Figure 4 of the MAR (Appendix D). At Farrington Highway/Kahualiʻi Street-Waipiʻo Point Access Road, approximately 1,160 pedestrians approached the school campus via the Waipiʻo Point Access Road crosswalk just south of Farrington Highway during the morning peak hour (7:00-8:00 AM). Afternoon peak period data was collected between 2:00 and 6:00 PM. The pedestrian volume PM peak hour occurred at 2:15 – 3:15 PM with approximately 1,570 pedestrians departing the campus via the Waipiʻo Point Access Road crosswalk just south of Farrington Highway. Based on the 2016 student enrollment of 2,475 students, these pedestrian volumes equate to 47 and 63 percent of students utilizing the crosswalk in the AM and PM peak hours, respectively. Total peak hour pedestrian volume by intersection leg and direction are shown on Figure 4 of the MAR.

At the two-way stop-controlled intersection of Waipiʻo Point Access Road and Awalai Street, a total of 387 pedestrians were counted in the intersection between 6:00 and 9:00 AM. The AM peak hour occurred at 7:00-8:00 AM with 306 pedestrians. The afternoon peak hour occurred at 2:15-3:15 PM with 504 pedestrians crossing the intersection.

Currently, congestion and vehicle queues are an existing concern during the morning drop-off and afternoon pick-up periods. Based on observations and discussions with school staff, approximately 50 percent of the student body walk or take transit (TheBus) to school, resulting in very high pedestrian volumes at the intersections during the beginning and end of the school day.

Potential Impacts and Mitigation Measures

The Proposed Project is not increasing enrollment or altering current traffic patterns on site that would impact the pedestrian circulation along public ways. Campus vehicle and pedestrian circulation will remain unchanged from existing conditions due to no change in enrollment.

There are currently no paved sidewalks along the campus frontage on Waipiʻo Point Access Road. Students currently walk on the unpaved roadway shoulders or on landscaped berms. The existing crosswalk along the north side of campus that connects students from Farrington Highway to WHS lacks a protected landing area for pedestrians on the school side. While not required as mitigation for the New Classroom Building, the MAR recommends the following future options to improve pedestrian access along the school's frontage: 1) install ADA-compliant paved landing areas on each side of existing sidewalks; 2) install vertical treatments

(e.g., bollards) to enhance the visibility of pedestrians at sidewalks; and 3) install an asphalt berm and formal path along the north side of Waipi‘o Point Access Road to prevent vehicles parking in the shoulder where students walk.

If funded, the New Makai Parking Area and access road into campus will provide additional opportunities to improve the flow of traffic and multimodal access on campus. As such, the following considerations are recommended: 1) install a drop-off/pick-up zone in the new makai parking lot with loading and bypass lane (minimum length to fit 8 vehicles); and 2) install ADA-compliant sidewalks or formal pathways connecting the makai parking areas to campus.

As recommended by DTS during the pre-assessment consultation process (see letter in Appendix A), all access driveways to the Project Site will be designed with the highest pedestrian and bicycle safety measures.

4.3 NOISE

Existing noise levels at and immediately adjacent to the proposed Site are those typical of a high school campus. The Project Site is bordered on the mauka side by the existing buildings of the Waipahu High School campus. The other (makai) side of the Project will rest on a bluff overlooking the Middle Loch of Pearl Harbor.

Potential Impacts and Mitigation Measures

Construction activities for the New Classroom Building will inevitably create temporary noise impacts. The building contractor may employ mitigation measures to minimize those temporary noise impacts including the use of mufflers and implementing construction curfew periods. Pursuant to Chapter 11-46, Hawai‘i Administrative Rules, all project activities must comply with all community noise controls. Temporary air conditioning (AC) units will be provided at DOE’s discretion to help mitigate noise impacts to existing classrooms.

Once in operation, the New Classroom Building will generate noise consistent with classroom activity present at adjacent buildings. No mitigation measures are proposed as the noise generated as a result of the Proposed Project represents no substantial change from current noise occurrences.

4.4 AIR QUALITY

The State’s good air quality is largely a function of the predominant tradewinds blowing from the northeast. The typical tradewind pattern blows man-made and volcanic pollutants out from metro Honolulu toward the ocean. However, during non-tradewind periods, man-made and volcanic pollutants tend to accumulate on island impacting visibility (“vog”).

Potential Impacts and Mitigation Measures

DOE recognizes the potential for impacts to air quality during construction. This could occur from additional traffic generated by construction vehicles, machinery, and dust generated during demolition of existing parking pavement and excavation.

An effective dust control plan will be implemented as necessary. All construction activities will comply with the provisions of Title 11, Chapter 59, HAR related to Ambient Air Quality Standards and Section 11-60.1-33, HAR related to Fugitive Dust. Measures to control dust during various phases of construction include:

- Providing an adequate water source at the site prior to start-up construction activities;
- Irrigating the construction site during periods of drought or high winds;
- Landscaping and rapid covering of bare areas, including slopes, starting from the initial grading phase;
- Disturbing only the areas of construction that are in the immediate zone of construction to limit the amount of time that the areas will be subject to erosion;
- Providing adequate dust control measures during weekends, after hours, and before daily start-up of construction activities; and
- Installing silt screening in the areas of disturbance.

Temporary air conditioning (AC) units may be utilized at DOE's discretion at adjacent existing classrooms to minimize dust impacts during construction.

In the long-term, the Proposed Project is not anticipated to have an impact on air quality in the immediate vicinity.

4.5 VISUAL RESOURCES

The proposed New Classroom Building will be located makai of the existing buildings on the Waipahu High School campus. The County's Central O'ahu Sustainable Communities Plan does not recognize any view planes encompassing the site that would require consideration and accommodation.

Potential Impacts and Mitigation Measures

The congruence of the proposed construction's mass and height with those of the existing buildings at Waipahu High School will not induce adverse impacts to any recognized view planes. The nearest buildings with the potential to have view planes impacted by the New Classroom Building are existing buildings on the Waipahu High School campus. Because no adverse visual impacts are expected, no additional mitigation measures are proposed.

4.6 SOCIAL & ECONOMIC CHARACTERISTICS

According to the County's Central O'ahu Sustainable Communities Plan (COSCP) (2002):

> *"Central Oahu plays a key role in implementing the directed growth policies of the* ***General Plan of the City and County of Honolulu****.*
>
> *"The towns of Waipahu and Wahiawa serve as gateways to Ewa and the North Shore. Historically, they have been headquarters for the sugar and pineapple plantations and support centers for the military. Beginning in 1968, Central Oahu also began to play a role as a major area for housing development. At that time, Castle & Cooke began development of Mililani Town, a 3,500 acre planned low-density suburban community*

which offered affordable single family housing to first time buyers. Subsequently, additional housing has been developed above Waipahu and the H-1 Freeway in Village Park, Gentry Waipio, Waikele, Royal Kunia, and other development projects.

*"In 1989, the Honolulu City Council approved changes to the **General Plan** which designated the urban fringe areas in Central Oahu as one of Oahu's principal residential development areas. Since then, Central Oahu, along with the Primary Urban Center (PUC) and the Secondary Urban Center and urban fringe areas in Ewa, has provided the bulk of the new housing developed on the island.*

*"… In support of the **General Plan** policies, the Central Oahu Sustainable Communities Plan… Helps relieve urban development pressures on rural and urban fringe Sustainable Communities Plan Areas (Waianae, North Shore, Koʻolauloa, Koʻolaupoko, and East Honolulu) so as to preserve the 'country' lifestyle of the rural areas and sustain the stable, low density residential character of the urban fringe areas."*

The 2002 COSCP was based on the 2000 Census. According to the 2000 Census, the population of the City and County of Honolulu numbered 876,156 individuals. The population, number of housing units and number of non-construction jobs in Central Oʻahu and ʻEwa (the primary districts being served by WHS) in 2000 were as follows:

Table 4: Year 2000 Housing Units and Non-Construction Jobs

Sustainable Communities Plan/ Development Plan Area	2000 Population	Number of Housing Units in 2000	Number of Non-Construction Jobs in 2000
Central Oʻahu	148,208	45,878	44,356
ʻEwa	68,696	20,797	14,689

Potential Impacts and Mitigation Measures

The 2002 Central Oʻahu SCP is in the process of being updated to accommodate a planning horizon of the year 2030. The County Department of Planning and Permitting's consultant, Belt Collins, provided an overview of projections for the Central Oʻahu and ʻEwa Districts to the year 2030 on its website http://www.beltcollins.com/centraloahu/.

Table 5: Year 2030 Housing Units and Non-Construction Jobs

Sustainable Communities Plan/ Development Plan Area	2030 Population	Number of Housing Units in 2030	Number of Non-Construction Jobs in 2030
Central Oʻahu	196,080	65,855	66,924
ʻEwa	177,590	57,938	63,076

In the short-term, the Proposed Project will contribute positively to the construction industry. In the long-term, the Proposed Project will enhance the capacity for future school teachers at WHS to provide quality education for students. Further, there will be positive impacts for students, families, and the community at large from access to better educational resources and job/workforce skills training.

4.7 INFRASTRUCTURE AND UTILITIES

4.7.1 Water System

WHS is served by the City's Board of Water Supply (BWS) system. Water service is provided by an eight-inch main that extends from the BWS Waipahu "228" System at the intersection of Waipahu Street and Kahualena Street. Water pressures are governed by the BWS Waipahu Reservoir which has a spillway elevation of 228 feet mean sea level (msl).

Onsite fire protection is currently provided by onsite fire hydrant assemblies and an 8-inch water main, which is an extension of the 8-inch water main along Waipi'o Point Access Road. The onsite 8-inch water main traverses through the site in the 10-foot wide Easement "3709" for Water Pipeline purposes in favor of the BWS, and 15-foot wide Easement "4892" for Fire Hydrant and Water Pipeline purposes in favor of the Board of Water Supply.

The onsite domestic water system is composed of 6-inch, 4-inch, 3-inch, 2-1/2-inch, 2-inch, and 1-inch water mains, valves, reduced pressure backflow prevention devices, and appurtenances. The Project Site is currently serviced via an existing 8x2-inch FM water meter (Premise ID: 9942498488 / WM: 05182028) and 8-inch water service lateral along Waipi'o Point Access Road.

Potential Impacts and Mitigation Measures

The Project's estimated water consumption is 11,000 gallons per day (GPD) based on fixture counts and other similar DOE projects. An estimated water usage of 4,000 GPD for irrigation demand is estimated based on similar projects.

The Project's potable water system will be designed in accordance to requirements of the BWS Water System Standards, dated 2002; the 2006 Uniform Plumbing Code; and the Hawai'i Administrative Rules, Title 3, Dept. of Accounting and General Services, Subtitle 14, State Building Code Council, Chapter 183-State Plumbing Code.

During the Draft EA public review period, the BWS wrote (refer to letter in Appendix F):

> "Water conservation measures are recommended for all proposed developments. These measures include utilization of nonpotable water for irrigation using rain catchment, drought tolerant plants, xeriscape landscaping, efficient irrigation systems, such as a drip system and moisture sensors, and the use of Water Sense labeled ultra-low flow water fixtures and toilets."

During the Draft EA public review period, the CWRM wrote (refer to letter in Appendix F):

> "We recommend that water efficient fixtures be installed and water efficient practices implemented throughout the development to reduce the increased demand on the area's freshwater resources. Reducing the water usage of a home or building may earn credit towards Leadership in Energy and Environmental Design (LEED) certification. More information on LEED certification is available at http://www.usgbc.org/leed. A listing of fixtures certified by the EAP as having high water efficiency can be found at http://www.epa.gov/watersense."

> "We recommend the use of alternative water sources, wherever practicable."

The project is being designed using Leadership in Energy and Environmental Design (LEED) New Construction (NC) Silver as well as Hawai'i Collaborative on High Performing Schools (HI-CHPS) standards as general guidelines to set sustainability targets. As a result, DOE is considering the installation of water efficient fixtures and the implementation of water efficient practices, where feasible, to reduce the increased demand on the area's freshwater resources. Where practical, the use of alternative water sources such as gray water and rain catchment reuse, will be explored.

During the Draft EA public review period, the CWRM wrote (refer to letter in Appendix F):

> "We recommend adopting landscape irrigation conservation best management practices endorsed by the Landscape Industry Council of Hawaii. These practices can be found online at http://www.hawaiiscape.com/wp-content/uploads/2013/04/LICH_Irrigation_Conservation_BMPs.pdf."

> "Please consider xeriscaping or native plantings and conservation landscaping to reduce water use and educate students about outdoor water conservation. Please also consider installing raingardens as another educational and aesthetic feature that will also help to retain storm water onsite and reduce runoff."

During the pre-assessment consultation process and the Draft EA public review period, the BWS also wrote:

> "The existing water system is adequate to accommodate the proposed development. 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 the 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" (refer to letters in Appendix A and Appendix F).

During the pre-assessment consultation process, the DLNR Engineering Division wrote:

> "The applicant should include water demands and infrastructure required to meet project needs. Please note that the projects within State lands requiring water service from their local Department/Board of Water Supply system will be required to pay a resource development charge, in addition to Water Facilities Charges for transmission and daily storage."

> "The applicant is required to provide water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update projections" (see letter in Appendix A).

During the Draft EA public review period, the CWRM wrote:

> "We recommend coordination with the Engineering Division of the State Department of Land and Natural Resources to incorporate this project into the State Water Projects Plan" (refer to letter in Appendix F).

Also during the pre-assessment consultation process and the Draft EA public review period, the Honolulu Fire Department (HFD) wrote:

> "A water supply approved by the county, capable of supplying the required fire flow for fire protection, shall be provided to all premises upon which facilities or buildings, or portions thereof, are hereafter constructed, or moved into or within the county. When any portion of the facility or building is in excess of 150 feet from a water supply on a fire apparatus access road, as measured by an approved route around the exterior of the facility or building, on-site fire hydrants and mains capable of supplying the required fire flow shall be provided when required by the AHJ [Authority Having Jurisdiction]. (NFPA 1; UFC™, 2012 Edition, Section 18.3.1, as amended.)" (See letter in Appendix A.)

Close coordination will be maintained with the BWS to ensure that the water system will not be adversely impacted and to minimize interruption of water services to adjacent areas. During the design phase, the construction drawings will be submitted to the BWS for review and approval. Water demands and calculations will be provided to the DLNR Engineering Division for inclusion in the State Water Projects Plan Update projections.

When water is made available, DOE will pay the BWS Water System Facilities Charges for resource development, transmission and daily storage. BWS Cross-Connection Control and Backflow Prevention requirements will be fulfilled prior to the issuance of the building permit.

On-site fire protection requirements will be coordinated with the Fire Prevention Bureau of the Honolulu Fire Department.

4.7.2 Wastewater System

The WHS campus' existing on-site sewer system is composed of line sizes ranging between 6- to 8-inches and extends to every building that requires service. An existing 8-inch sewer line connects to the Municipal Sewer System and discharges to the Waipahu Wastewater Pump Station. Wastewater generated at WHS is conveyed by a series of gravity lines, pump stations, and force mains to the Honouliuli Wastewater Treatment Plant.

Potential Impacts and Mitigation Measures

Wastewater service for the Proposed Project will be connected to the existing wastewater collection system. The Project's sewer system will be designed in accordance to the requirements of the City and County of Honolulu Department of Environmental Services (ENV), Wastewater

System Design Standard, dated July 2017; and the Wastewater System Standard Details, dated July 2017. A sewage lift station will be added to serve the New Classroom Building.

During the pre-assessment consultation process, the DPP Wastewater Branch wrote (see Appendix A):

- "Provide information regarding all proposed wastewater discharges to the municipal sewer system."
- "Provide number of staff and projected student body counts."
- "Submit a Site Development Division Master Application Form for Sewer Connection. An Industrial Wastewater Discharge Permit will also need to be submitted."

Proposed wastewater discharges to the municipal sewer system are provided in Table 6 below, for a total of 197 staff and faculty and a 5-year projected student enrollment of approximately 2,500 (see Appendix E for the calculations prepared by the project engineer). A Sewer Connection Application (2018/SCA-1570) has been approved for the New Classroom Building. The Proposed Project is not anticipated to have any significant adverse impact on the County's wastewater collection system. No mitigation measures are proposed.

Table 6: Estimated Wastewater Discharges

Base Sanitary Flow (BSF)	67,425 gpd
Peak Base Sanitary Flow (PBSF)	337,125 gpd
Average Dry Weather Flow (ADWF)	161,820 gpd
Peak Dry Weather Flow (PDWF)	431,520 gpd
Design Flow (Qdes)	496,020 gpd

During the Draft EA public review period, DPP reiterated (see Appendix F): "Submit an Industrial Wastewater Discharge Permit application." An Industrial Wastewater Discharge Permit (IWDP) was submitted to DPP on July 9, 2019.

4.7.3 Drainage System

A network of drain inlets and pipes collects storm runoff from most of the campus and directs the storm runoff via 18-inch and 24-inch drain lines to the lower portion of the campus to daylight, sheetflow, and ultimately discharge into Pearl Harbor Middle Loch.

Potential Impacts and Mitigation Measures

During the construction phase, National Pollutant Discharge Elimination System (NPDES) permit coverage will be required for discharges of storm water associated with construction activities that disturb one (1) acre or more of total land area. The NPDES permit, if necessary, is to be applied for and approved by the State of Hawai'i, Department of Health, Clean Water Branch, prior to commencement of construction activities.

During the Draft EA public review period, the CWRM also wrote (refer to letter in Appendix F):

> "We recommend the use of best management practices (BMP) for stormwater management to minimize the impact of the project to the existing area's hydrology while maintaining on-site infiltration and preventing polluted runoff from storm events. Stormwater management BMPs may earn credit toward LEED certification. More information on stormwater BMPs can be found at http://planning.hawaii.gov/czm/initiatives/low-impact-development/"
>
> "Please also consider installing raingardens as another educational and aesthetic feature that will also help to retain storm water onsite and reduce runoff."

Construction and permanent post-construction BMPs and Low Impact Development (LID) measures will be designed, implemented, and maintained in compliance with the Administrative Rules, Title 20, Department of Planning and Permitting (DPP), Chapter 3 – Rules Relating to Water Quality, effective August 16, 2017. Onsite drainage system improvements will be designed in accordance to DPP's Storm Drainage Standards, dated August 2017. See also the discussion in Section 3.4 (Hydrology) above.

During the Draft EA public review period, the City and County of Honolulu Department of Planning and Permitting (DPP) provided the following comment (refer to Appendix F):

> "The DEA should include a narrative describing the Project's post-construction storm water quality strategic plan pursuant to Section 20-3-50 of the 'Rules Relating to Water Quality.' The strategic plan shall include a written description of the proposed development, expected activities and pollutants that will be generated by activities at the site, and low impact development site design strategies that will be used to comply with the rules. The strategic plan should also include a development schedule."
>
> "The Project's compliance with the Rules Relating to Water Quality and Storm Drainage Standards will be verified at the time that the grading/construction plans are submitted to the Department of Planning and Permitting for review."

A Storm Water Quality Report (SWQR) has been submitted to DPP, and the Project's compliance with the Rules Relating to Water Quality and Storm Drainage Standards will be verified at the time grading/construction plans are submitted to DPP for review.

4.7.4 Electrical and Telecommunications Systems

Waipahu High School is served by the Hawaiian Electric Company (HECO) for electrical service, and is served by Hawaiian Telcom for telephone service and Spectrum (formerly Oceanic Time Warner Cable) for cable TV and internet service.

Potential Impacts and Mitigation Measures

A new single feed power connection from HECO will be obtained to meet the electrical needs of the New Classroom Building. As the Project is being designed using Leadership in Energy and Environmental Design (LEED) New Construction (NC) Silver and HI-CHPS standards as

general guidelines to set sustainability targets, energy-saving features will be incorporated into its design where feasible.

The telecommunications distribution system will not be affected by the Project apart from the lines in the New Classroom Building which will need to be connected to existing telecommunications infrastructure on the WHS campus. In a pre-consultation letter, Oceanic Time Warner Cable (now Spectrum) wrote: "The subject project will have no impact to existing Oceanic Time Warner Cable's infrastructures or future planned projects in the vicinity."

4.7.5 Solid Waste

Solid waste is currently collected regularly by the City and County of Honolulu.

Potential Impacts and Mitigation Measures

During the construction phase, solid waste generated at the site is anticipated to increase over current conditions. The additional waste is expected to include materials from construction, grading, and landscaping activities. Any construction waste generated by the Project will be disposed of at a solid waste disposal facility that complies with the applicable provisions (Chapter 11-58.1, HAR "Solid Waste Management Control"). Solid waste that cannot be recycled will be disposed of at landfills, the incinerator, or transfer stations. A waste-to-energy combustor, H-POWER (Honolulu Program of Waste Energy Recovery), is located at the Campbell Industrial Park and incinerates about 1,800 tons of combustible waste per day. The electricity generated is bought by HECO. Currently, the H-POWER facility receives all residential and commercial packer truck wastes on the island. Waste contractors will be asked to submit disposal receipts and invoices to ensure proper disposal of waste. The Proposed Project will also comply with the provisions of Chapters 11-260 to 11-280, HAR, relating to hazardous waste.

In the long term, additional solid waste may be generated by the new classroom building with use of additional facilities such as classrooms, labs, sinks, and the culinary program. The amount of new solid waste can be accommodated by existing waste infrastructure. Solid waste disposal will be in accordance with the guidelines set forth by the County's Department of Environmental Services. In addition, using HI-CHPS standards as a general guideline, design elements may be considered to facilitate the separation and collection of materials for recycling.

4.8 PUBLIC SERVICES AND FACILITIES

4.8.1 Police Protection

The site is located within Honolulu Police Department (HPD) District 3, which covers the area from Aiea to Pearl City and Waipahu. WHS is located in Sector 1, which comprises Waipahu and Waikele. The nearest police station is the Pearl City District Station, located approximately 2.4 miles east of the WHS campus (Figure 12).

Potential Impacts and Mitigation Measures

The DOE does not anticipate that the Project will create an increased demand on existing police protection services. During the pre-assessment consultation process, the HPD stated: "Based on the information provided, this project should have no significant impact on the services or operations of the Honolulu Police Department at this time."

4.8.2 Fire Protection

The Pearl City, Waipahu, Waikele and Waiau Fire Stations are all located near the WHS campus (Figure 12). The nearest fire station is the Waipahu Fire Station, located at the corner of Leonui St. and Leoʻole St., approximately 2 miles west of WHS.

Potential Impacts and Mitigation Measures

As the Project is near to existing structures on an already developed parcel, and WHS has existing fire department connections and fire hydrants, the Proposed Project is not anticipated to create an increased demand on existing fire protection services.

During both the pre-assessment consultation process and the Draft EA public review period, the Honolulu Fire Department (HFD) wrote:

1. "Fire department access roads shall be provided such that any portion of the facility or any portion of an exterior wall of the first story of the building is located not more than 150 feet from fire department access roads as measured by an approved route around the exterior of the building or facility. (National Fire Protection Association [NFPA] 1; Uniform Fire Code [UFC]™, 2012 Edition, Sections 18.2.3.2.2 and 18.2.3.2.2.1.)"

   "A fire department access road shall extend to within 50 feet of at least one exterior door that can be opened from the outside that provides access to the interior of the building. (NFPA 1; UFC™, 2012 Edition, Section 18.2.3.2.1.)"

2. "A water supply approved by the county, capable of supplying the required fire flow for fire protection, shall be provided to all premises upon which facilities or buildings, or portions thereof, are hereafter constructed, or moved into or within the county. When any portion of the facility or building is in excess of 150 feet from a water supply on a fire apparatus access road, as measured by an approved route around the exterior of the facility or building, on-site fire hydrants and mains capable of supplying the required fire flow shall be provided when required by the AHJ [Authority Having Jurisdiction]. (NFPA 1; UFC™, 2012 Edition, Section 18.3.1, as amended.)"

3. "The unobstructed width and unobstructed vertical clearance of a fire apparatus access road shall meet county requirements. (NFPA 1; UFC™, 2012 Edition, Section 18.2.3.4.1.1 and 18.2.3.4.1.2, as amended.)"

4. "Submit civil drawings to the HFD for review and approval." (Refer to letters in Appendix A and Appendix F.)

The proposed fire access road through the school parking lots was coordinated and attained by a preliminary letter of approval by HFD. In addition to the fire access lane, fire department connection and a building sprinkler system are being added for this Project.

During both the pre-assessment consultation process and the Draft EA public review period, the BWS wrote: "The on-site fire protection requirements should be coordinated with the Fire Prevention Bureau of the Honolulu Fire Department" (refer to letters in Appendix A and Appendix F).

4.8.3 Health Care Services

Health care facilities located near WHS that provide emergency services include Hawai‘i Medical Center West in ‘Ewa and Kapi’olani Pali Momi Medical Center in ‘Aiea. A variety of health care providers can be found nearby in Waipahu and Pearl City (Figure 12).

Potential Impacts and Mitigation Measures

Although there may be an unavoidable and occasional need for emergency health care services by students or employees in the WHS New Classroom Building, the Project is not expected to significantly increase the need for emergency service, and is not expected to have a long-term adverse impact on emergency medical providers or their ability to service the community. No mitigation measures are proposed.

4.8.4 Recreational Facilities

Recreational facilities near the WHS campus include nearby facilities such as Waipahu District Park, Hans L’Orange and Waipahu Uka Neighborhood Parks, Ted Makalena Golf Course, and Waipi‘o Peninsula Sports (Soccer) Complex (Figure 12).

Potential Impacts and Mitigation Measures

The New Classroom Building is not anticipated to displace any existing recreational facilities or create any additional demand on recreational facilities in the vicinity of the Project. During the pre-assessment consultation process, the City and County of Honolulu Department of Parks and Recreation wrote: "the proposed project will have no impact on any program or facility of the Department" (Appendix A). No mitigation measures are proposed.

4.8.5 Schools

A number of public and private elementary and middle schools are located in the vicinity of the WHS campus including Lanakila Baptist Elementary School, August Ahrens Elementary School, St. Joseph Elementary School, Lehua Elementary School, Pearl City Elementary School, and Waipahu Intermediate School (Figure 12).

Potential Impacts and Mitigation Measures

The Project will directly benefit the school system by providing additional facilities and classrooms for students attending WHS. Currently, several classes are held in small, temporary

'portable' structures. These temporary structures put strain on students and staff, as the 'portables' are generally unsuitable for supporting the student population long-term.

During the pre-assessment consultation process, the Department of Human Services (DHS) indicated that there are two DHS child care facility licensees operating near the Project: the Honolulu Community Action Program at Waipahu District Park (approximately 0.4 mile west of Waipahu High School), and the Faith Hope & Love Childcare Center (approximately 1 mile west of WHS). Given the distance of these programs from the Project, there are no anticipated impacts to these licensees during any phase of the Project. No mitigation measures are proposed.

During the Draft EA public review period, DHS wrote that their "previous comments submitted in a letter dated May 11, 2017 were addressed in the DEA."

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DATE: 5/21/2019

LEGEND

- Project Site
- Fire Stations
- Police Stations
- Hospitals
- Private Schools
- Public Schools

Figure 12:
Public Services

WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING

State of Hawai'i - Department of Education — O'ahu

North

Linear Scale (feet)
0 500 1,000 2,000

PBR HAWAII & ASSOCIATES, INC.

Source: City and County of Honolulu, 2005 (Hospitals and Clinics), 2017 (Fire Stations, Police Stations).
State Department of Education, 2017. ESRI Online Basemaps,

5.0 LAND USE CONFORMANCE

State and County land use plans and policies and required permits and approvals relevant to the Project are described below.

5.1 STATE OF HAWAIʻI

5.1.1 State Land Use Law, Chapter 205, Hawaiʻi Revised Statutes

The State Land Use Law (Chapter 205, HRS), establishes the State Land Use Commission (LUC) and authorizes this body to designate all lands in the State into one of four districts: Urban, Rural, Agricultural, or Conservation. These districts are defined and mapped by the State Land Use Commission in order to ensure compatibility with neighboring land uses and protection of public health.

The proposed New Classroom Building is located within the State Urban District; public schools are a permitted use in the State Land Use Urban District (Figure 13).

5.1.2 Coastal Zone Management Act, Chapter 205A, Hawaiʻi Revised Statutes

The Coastal Zone Management Area, as defined in Chapter 205A, HRS, includes all the lands of the State. Therefore, the proposed New Classroom Building lies within the Coastal Zone Management Area.

The Coastal Zone Management (CZM) Program aims to provide recreational opportunities, protect historic resources, protect scenic and open space resources, protect coastal ecosystems, provide facilities for economic development, reduce hazards, and manage development. Program objectives and applicability to the proposed New Classroom Building are discussed below:

Table 7: Coastal Zone Management Act, Chapter 205A, HRS

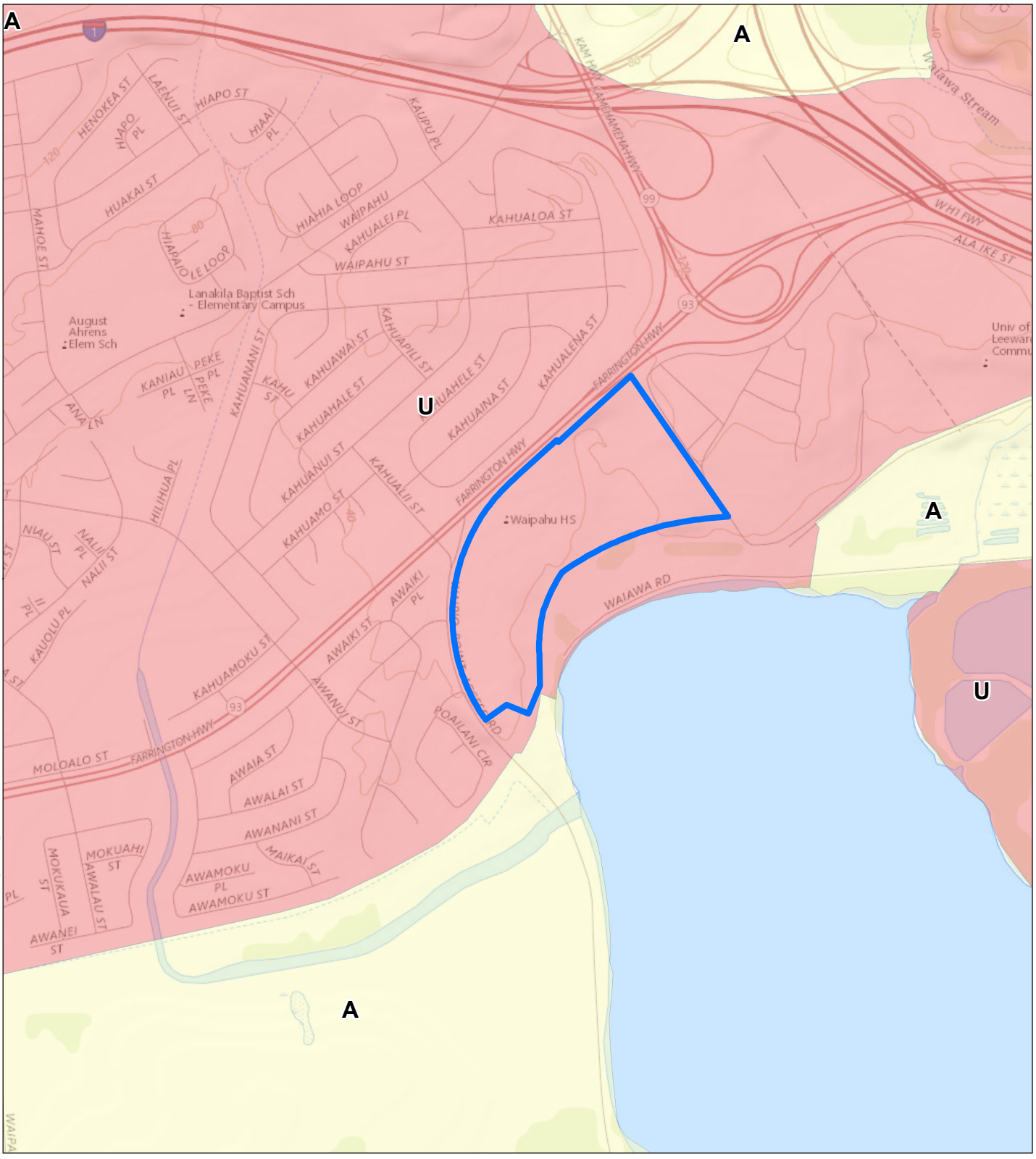
COASTAL ZONE MANAGEMENT ACT, CHAPTER 205A, HRS (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	**S**	**N/S**	**N/A**
Recreational Resources			
Objective: *(A) Provide coastal recreational opportunities accessible to the public.*			
Policies:			
(A) Improve coordination and funding of coastal recreational planning and management; and			X
(B) Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:			
(i) Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;			X
(ii) Requiring replacement of coastal resources having significant recreational value including, but not limited to, surfing sites, fishponds, and sand beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the State for recreation when replacement is not feasible or desirable;			X
(iii) *Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;*			X
(iv) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;			X

COASTAL ZONE MANAGEMENT ACT, CHAPTER 205A, HRS (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	**S**	**N/S**	**N/A**
(v) Ensuring public recreational uses of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;			X
(vi) Adopting water quality standards and regulating point and nonpoint sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;	X		
(vii) Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and			X
(viii) Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, and county authorities; and crediting such dedication against the requirements of section 46-6.			X
Discussion: The Proposed Project is not a coastal development, is not located on the coastline, and is not in the SMA. Therefore, policies regarding shoreline recreation resources and shoreline public access are not applicable. The water quality standards are discussed under the Coastal Ecosystems objectives and policies.			
Historic Resources			
Objective: *(A) Protect, preserve, and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.*			
Policies:			
(A) Identify and analyze significant archaeological resources;	X		
(B) Maximize information retention through preservation of remains and artifacts or salvage operations; and	X		
(C) Support state goals for protection, restoration, interpretation, and display of historic resources.	X		
Discussion: Due to the extensive disturbance that Waipahu High School has experienced for development of the existing campus, it is unlikely that subsurface historic resources are present. Nonetheless, an archaeological assessment and cultural impact assessment were undertaken as a part of this project, the results of which will become public as a part of this environmental assessment. Should any archaeological or cultural remains be encountered during construction, all work in the immediate vicinity of the find will cease and the State Historic Preservation Division (SHPD) will be contacted for establishment of appropriate mitigation in accordance with Chapter 6E, Hawai‘i Revised Statutes.			
Scenic and Open Space Resources			
Objective: *(A) Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources.*			
Policies:			
(A) Identify valued scenic resources in the coastal zone management area;			X
(B) Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;	X		
(C) Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and			X
(D) Encourage those developments that are not coastal dependent to locate in inland areas.	X		
Discussion: The Project is not coastal dependent, and is located on an already-developed parcel. The Project will be flush with existing buildings on the WHS campus, ensuring views to the sea are minimally impacted.			
Coastal Ecosystems			
Objective: *(A) Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.*			
Policies:			
(A) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;	X		

COASTAL ZONE MANAGEMENT ACT, CHAPTER 205A, HRS (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	**S**	**N/S**	**N/A**
(B) Improve the technical basis for natural resource management;			X
(C) Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;	X		
(D) Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and	X		
(E) Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.	X		
Discussion: The Project will have a net positive impact on coastal ecosystems, since the facilities (fish tank, biology classrooms, biotech lab, chemistry lab, natural resources lab, etc.) will provide opportunities to teach students not only about aquaculture and marine biology, but also about sustainability, coastal/natural resource management, and stewardship of coastal ecosystems.			
Economic Uses			
Objective: *(A) Provide public or private facilities and improvements important to the State's economy in suitable locations.*			
Policies:			
(A) Concentrate coastal dependent development in appropriate areas;			X
(B) Ensure that coastal dependent development such as harbors and ports, and coastal related development such as visitor industry facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and			X
(C) Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:			
(i) Use of presently designated locations is not feasible;			X
(ii) Adverse environmental effects are minimized; and			X
(iii) The development is important to the State's economy.			X
Discussion: The Proposed Project is not a coastal dependent development, is not located on the coastline, and is not in the SMA; therefore, these policies are not applicable.			
Coastal Hazards			
Objective: *(A) Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution.*			
Policies:			
(A) Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards;			X
(B) Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint source pollution hazards;			X
(C) Ensure that developments comply with requirements of the Federal Flood Insurance Program; and	X		
(D) Prevent coastal flooding from inland projects.	X		
Discussion: As the Project is on an inland bluff and not located in a flood or tsunami zone, the Project will not exacerbate coastal hazards.			

COASTAL ZONE MANAGEMENT ACT, CHAPTER 205A, HRS (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	**S**	**N/S**	**N/A**
Managing Development			
Objective: *(A) Improve the development review process, communication, and public participation in the management of coastal resources and hazards.*			
Policies:			
(A) Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;			X
(B) Facilitate timely processing of applications for development permits and resolve overlapping or conflicting permit requirements; and			X
(C) Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life cycle and in terms understandable to the public to facilitate public participation in the planning and review process.	X		
Discussion: The Project is not a coastal development, is not located on the coastline, and is not in the SMA; however, opportunities for public input are provided. Early consultation comments were obtained and are reproduced in Appendix A. In addition, this EA discusses potential impacts and mitigation measures of the Proposed Project and will provide an opportunity for input during the Draft EA Public Comment period.			
Public Participation			
Objective: *(A) Stimulate public awareness, education, and participation in coastal management.*			
Policies:			
(A) Promote public involvement in coastal zone management processes;	X		
(B) Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal issues, developments, and government activities; and			X
(C) Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.			X
Discussion: The Project is not a coastal development, is not located on the coastline, and is not in the SMA; however, opportunities for public input are provided. Early consultation comments were obtained and are reproduced in Appendix A. In addition, this EA discusses potential impacts and mitigation measures of the Proposed Project and will provide an opportunity for input during the Draft EA Public Comment period.			
Beach Protection			
Objective: *(A) Protect beaches for public use and recreation.*			
Policies:			
(A) Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion;	X		
(B) Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities; and			X
(C) Minimize the construction of public erosion-protection structures seaward of the shoreline.			X
(D) Prohibit private property owners from creating a public nuisance by inducing or cultivating the private property owner's vegetation in a beach transit corridor; and			X
(E) Prohibit private property owners from creating a public nuisance by allowing the private property owner's unmaintained vegetation to interfere or encroach upon a beach transit corridor.			X
Discussion: Aside from the erosion protection mentioned in the sections above and the location of the project on a bluff away from the shoreline, the Project has no relationship to beach protection or access.			

COASTAL ZONE MANAGEMENT ACT, CHAPTER 205A, HRS (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	**S**	**N/S**	**N/A**
Marine Resources			
Objective: *(A) Promote the protection, use, and development of marine and coastal resources to assure their sustainability.*			
Policies:			
(A) Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;			X
(B) Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency;			X
(C) Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;			X
(D) Promote research, study, and understanding of ocean processes, marine life, and other ocean resources in order to acquire and inventory information necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and	X		
(E) Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.	X		
Discussion: The New Classroom Building's aquaculture and marine biology facilities will educate students on marine and coastal resources, though no marine or coastal resources will be directly impacted by the Project.			



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DATE: 5/21/2019

LEGEND

Project Site

State Land Use District

A - Agriculture

U - Urban

Figure 13:
State Land Use District (SLUD)

WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING

State of Hawai'i - Department of Education — O'ahu

North

Linear Scale (feet)

0 250 500 1,000

PBR HAWAII & ASSOCIATES, INC.

Source: State Land Use Commission, 2016. ESRI Online Basemaps.

5.1.3 Hawai‘i State Planning Act, Chapter 226, Hawai‘i Revised Statutes

The Hawai‘i State Plan, Chapter 226 HRS (2007) provides guidelines for the future growth of the State of Hawai‘i. The Hawai‘i State Plan identifies goals, objectives, policies, and priorities for allocating the State's resources, including public funds, services, human resources, land, energy, and water. The Plan was enacted to achieve “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.” The following table outlines the New Classroom Building’s conformance with each theme, goal, objective, policy, and guideline of the Plan.

5.1.3.1 Hawai‘i State Plan, Part I: *Overall Theme, Goals, Objectives and Policies*

Table 8: Hawai‘i State Plan, Chapter 226, HRS – Part I

HAWAI‘I STATE PLAN, CHAPTER 226, HRS – PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	**S**	**N/S**	**N/A**
HRS § 226-1: Findings and Purpose			
HRS § 226-2: Definitions			
HRS § 226-3: Overall Theme.			
Hawai‘i’s people, as both individuals and groups, generally accept and live by a number of principles or values which are an integral part of society. This concept is the unifying theme of the State Plan. The following principles or values are established as the overall theme of the Hawai‘i State Plan: *(1) Individual and family self-sufficiency refers to the rights of people to maintain as much self-reliance as possible. It is an expression of the value of independence, in other words, being able to freely pursue personal interests and goals. Self-sufficiency means that individuals and families can express and maintain their own self-interest so long as that self-interest does not adversely affect the general welfare. Individual freedom and individual achievement are possible only by reason of other people in society, the institutions, arrangements and customs that they maintain, and the rights and responsibilities that they sanction.* *(2) Social and economic mobility refers to the right of individuals to choose and to have the opportunities for choice available to them. It is a corollary to self-sufficiency. Social and economic mobility means that opportunities and incentives are available for people to seek out their own levels of social and economic fulfillment.* *(3) Community or social well-being is a value that encompasses many things. In essence, it refers to healthy social, economic, and physical environments that benefit the community as a whole. A sense of social responsibility, of caring for others and for the well-being of our community and of participating in social and political life, are important aspects of this concept. It further implies the aloha spirit--attitudes of tolerance, respect, cooperation and unselfish giving, within which Hawai‘i’s society can progress.* *One of the basic functions of our society is to enhance the ability of individuals and groups to pursue their goals freely, to satisfy basic needs and to secure desired socio-economic levels. The elements of choice and mobility within society’s legal framework are fundamental rights. Society’s role is to encourage conditions within which individuals and groups can approach their desired levels of self-reliance and self-determination. This enables people to gain confidence and self-esteem; citizens contribute more when they possess such qualities in a free and open society.* *Government promotes citizen freedom, self-reliance, self-determination, social and civic responsibility and goals achievement by keeping order, by increasing cooperation among many diverse individuals and groups, and by fostering social and civic responsibilities that affect the general welfare. The greater the number and activities of individuals and groups, the more complex government’s role becomes. The function of government, however, is to assist citizens in attaining their goals. Government provides for meaningful participation by the people in decision-making and for effective access to authority as well as an equitable sharing of benefits. Citizens have a*			

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES **(Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)**	**S**	**N/S**	**N/A**
responsibility to work with their government to contribute to society's improvement. They must also conduct their activities within an agreed-upon legal system that protects human rights.			
Discussion: Education is a force that promotes self-sufficiency, social and economic mobility, and community well-being. By providing more and modern spaces for students of Waipahu High School, the New Classroom Building Project is supportive of the State's principles for a free and prosperous society.			
HRS § 226-4: State Goals.			
In order to guarantee, for the present and future generations, those elements of choice and mobility that insure that individuals and groups may approach their desired levels of self-reliance and self-determination, it shall be the goal of the State to achieve: *(1) A strong, viable economy, characterized by stability, diversity and growth that enables fulfillment of the needs and expectations of Hawai'i's present and future generations.* *(2) 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.* *(3) 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.*			
Discussion: The Waipahu High School New Classroom Building Project will provide a better standard of education for current and future students of WHS. Education is a powerful force of socio-economic mobility and will support the State's goal of mental well-being and a stable, robust society for future generations.			
HRS § 226-5: Objectives and policies for population.			
(a) Objective: *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 contained in this chapter.*			
(b) Policies:			
(1) Manage population growth statewide in a manner that provides increased opportunities for Hawai'i's people to pursue their physical, social and economic aspirations while recognizing the unique needs of each county.	X		
(2) Encourage an increase in economic activities and employment opportunities on the neighbor islands consistent with community needs and desires.	X		
(3) Promote increased opportunities for Hawai'i's people to pursue their socio-economic aspirations throughout the islands.			X
(4) Encourage research activities and public awareness programs to foster an understanding of Hawai'i's limited capacity to accommodate population needs and to address concerns resulting from an increase in Hawai'i's population.			X
(5) Encourage federal actions and coordination among major governmental agencies to promote a more balanced distribution of immigrants among the states, provided that such actions do not prevent the reunion of immediate family members.			X
(6) Pursue an increase in federal assistance for states with a greater proportion of foreign immigrants relative to their state's population.			X
(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.	X		
Discussion: The Waipahu High School New Classroom Building will provide economic opportunity by granting educators, and thereby students, 21st-Century educational technologies, as well as expanding the capacity of the high school to account for normal population growth in Waipahu. Using the existing Waipahu High School parcel for this expansion is an efficient use of land and existing infrastructure.			

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES **(Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)**	**S**	**N/S**	**N/A**
HRS § 226-6: Objectives and policies for the economy in general.			
(a) Objectives: *Planning for the State's economy in general shall be directed toward achievement of the following objectives:*			
(1) Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawai'i's people, while at the same time stimulating the development and expansion of economic activities capitalizing on defense, dual-use, and science and technology assets, particularly on the neighbor islands where employment opportunities may be limited.	X		
(2) A steadily growing and diversified economic base that is not overly dependent on a few industries, and includes the development and expansion of industries on the neighbor islands.			X
(b) Policies:			
(1) Promote and encourage entrepreneurship within Hawai'i by residents and nonresidents of the State.			X
(2) 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.			X
(3) Promote Hawai'i as an attractive market for environmentally and socially sound investment activities that benefit Hawai'i's people.			X
(4) Transform and maintain Hawai'i as a place that welcomes and facilitates innovative activity that may lead to commercial opportunities.			X
(5) Promote innovative activity that may pose initial risks, but ultimately contribute to the economy of Hawai'i.			X
(6) Seek broader outlets for new or expanded Hawai'i business investments.			X
(7) Expand existing markets and penetrate new markets for Hawai'i's products and services.			X
(8) Assure that the basic economic needs of Hawai'i's people are maintained in the event of disruptions in overseas transportation.			X
(9) Strive to achieve a level of construction activity responsive to, and consistent with, state growth objectives.			X
(10) 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.			X
(11) Encourage labor-intensive activities that are economically satisfying and which offer opportunities for upward mobility.			X
(12) Encourage innovative activities that may not be labor-intensive, but may otherwise contribute to the economy of Hawai'i.			X
(13) Foster greater cooperation and coordination between the government and private sectors in developing Hawai'i's employment and economic growth opportunities.			X
(14) Stimulate the development and expansion of economic activities which will benefit areas with substantial or expected employment problems.	X		
(15) Maintain acceptable working conditions and standards for Hawai'i's workers.			X
(16) Provide equal employment opportunities for all segments of Hawai'i's population through affirmative action and nondiscrimination measures.			X
(17) Stimulate the development and expansion of economic activities capitalizing on defense, dual-use, and science and technology assets, particularly on the neighbor islands where employment opportunities may be limited.			X
(18) Encourage businesses that have favorable financial multiplier effects within Hawai'i's economy, particularly with respect to emerging industries in science and technology.			X
(19) Promote and protect intangible resources in Hawai'i, such as scenic beauty and the aloha spirit, which are vital to a healthy economy.			X

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES **(Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)**	**S**	**N/S**	**N/A**
(20) 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.	X		
(21) Foster a business climate in Hawai'i--including attitudes, tax and regulatory policies, and financial and technical assistance programs--that is conducive to the expansion of existing enterprises and the creation and attraction of new business and industry.			X
Discussion: The new Culinary Arts and Digital Media facilities will provide students with a level of education to allow them to engage in these growing economic spheres, which will serve to both prevent skill shortages in hospitality and digital media, and provide students with economically viable skills.			
HRS § 226-7: Objectives and policies for the economy – agriculture			
(a) Objectives: *Planning for the State's economy with regard to agriculture shall be directed towards achievement of the following objectives:*			
• *Viability of Hawai'i's sugar and pineapple industries.*			X
• *Growth and development of diversified agriculture throughout the State.*			X
• *An agriculture industry that continues to constitute a dynamic and essential component of Hawai'i's strategic, economic, and social well-being.*			X
(b) Policies:			
(1) Establish a clear direction for Hawai'i's agriculture through stakeholder commitment and advocacy.			X
(2) Encourage agriculture by making best use of natural resources.			X
(3) Provide the governor and the legislature with information and options needed for prudent decision making for the development of agriculture.			X
(4) Establish strong relationships between the agricultural and visitor industries for mutual marketing benefits.			X
(5) Foster increased public awareness and understanding of the contributions and benefits of agriculture as a major sector of Hawai'i's economy.			X
(6) Seek the enactment and retention of federal and state legislation that benefits Hawai'i's agricultural industries.			X
(7) Strengthen diversified agriculture by developing an effective promotion, marketing, and distribution system between Hawai'i's food producers and consumers in the State, nation, and world.			X
(8) Support research and development activities that strengthen economic productivity in agriculture, stimulate greater efficiency, and enhance the development of new products and agricultural by-products.			X
(9) Enhance agricultural growth by providing public incentives and encouraging private initiatives.			X
(10) Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs.			X
(11) Increase the attractiveness and opportunities for an agricultural education and livelihood.	X		
(12) In addition to the State's priority on food, expand Hawai'i's agricultural base by promoting growth and development of flowers, tropical fruits and plants, livestock, feed grains, forestry, food crops, aquaculture, and other potential enterprises.	X		
(13) Promote economically competitive activities that increase Hawai'i's agricultural self-sufficiency, including the increased purchase and use of Hawai'i-grown food and food products by residents, businesses, and governmental bodies as defined under section 103D-104.			X
(14) Promote and assist in the establishment of sound financial programs for diversified agriculture.			X
(15) Institute and support programs and activities to assist the entry of displaced agricultural workers into alternative agricultural or other employment.			X

HAWAIʻI STATE PLAN, CHAPTER 226, HRS – PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES **(Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)**	**S**	**N/S**	**N/A**
(16) Facilitate the transition of agricultural lands in economically nonfeasible agricultural production to economically viable agricultural uses.			X
Discussion: The New Classroom Building's biology, aquaculture, and horticulture facilities will educate students on local flora and agricultural concepts in the state of Hawaiʻi.			
HRS § 226-8: Objectives and policies for the economy – visitor industry			
(a) Objectives: *Planning for the State's economy with regard to the visitor industry shall be directed towards the achievement of the objective of a visitor industry that constitutes a major component of steady growth for Hawai'i's economy.*			
(b) Policies:			
(1) Support and assist in the promotion of Hawai'i's visitor attractions and facilities.			X
(2) Ensure that visitor industry activities are in keeping with the social, economic, and physical needs and aspirations of Hawai'i's people.			X
(3) Improve the quality of existing visitor destination areas by utilizing Hawai'i's strengths in science and technology.			X
(4) Encourage cooperation and coordination between the government and private sectors in developing and maintaining well-designed, adequately serviced visitor industry and related developments which are sensitive to neighboring communities and activities.			X
(5) Develop the industry in a manner that will continue to provide new job opportunities and steady employment for Hawai'i's people.	X		
(6) Provide opportunities for Hawai'i's people to obtain job training and education that will allow for upward mobility within the visitor industry.	X		
(7) Foster a recognition of the contribution of the visitor industry to Hawai'i's economy and the need to perpetuate the aloha spirit.			X
(8) Foster an understanding by visitors of the aloha spirit and of the unique and sensitive character of Hawai'i's cultures and values.			X
Discussion: As one of the most important factors in the visitor industry workforce development is having a quality, up-to-date education, the Project will further 21st century educational initiatives and help strengthen Hawaiʻi's visitor industry and overall economy. In particular, by including facilities for Culinary Arts education, the Project will provide economic opportunities for students interested in the field, and provide training to those looking to enter the visitor industry after graduation.			
HRS § 226-9: Objective and policies for the economy – federal expenditures			
(a) Objective: *Planning for the State's economy with regard to federal expenditures shall be directed towards achievement of the objective of a stable federal investment base as an integral component of Hawai'i's economy.*			
(b) Policies:			
(1) Encourage the sustained flow of federal expenditures in Hawai'i that generates long-term government civilian employment.			X
(2) Promote Hawai'i's supportive role in national defense, in a manner consistent with Hawai'i's social, environmental, and cultural goals by building upon dual-use and defense applications to develop thriving ocean engineering, aerospace research and development, and related dual-use technology sectors in Hawai'i's economy.			X
(3) Promote the development of federally supported activities in Hawai'i that respect state-wide economic concerns, are sensitive to community needs, and minimize adverse impacts on Hawai'i's environment.			X
(4) Increase opportunities for entry and advancement of Hawai'i's people into federal government service.			X
(5) Promote federal use of local commodities, services, and facilities available in Hawai'i.			X
(6) Strengthen federal-state-county communication and coordination in all federal activities that affect Hawai'i.			X

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES **(Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)**	**S**	**N/S**	**N/A**
(7) Pursue the return of federally controlled lands in Hawai'i that are not required for either the defense of the nation or for other purposes of national importance, and promote the mutually beneficial exchanges of land between federal agencies, the State, and the counties.			X
Discussion: The Project has no relation to the State's goals on federal expenditures.			
HRS § 226-10: Objectives and policies for the economy – potential growth and innovative activities.			
(a) Objective: *Planning for the State's economy with regard to potential growth and innovative activities shall be directed towards achievement of the objective of development and expansion of potential growth and innovative activities that serve to increase and diversify Hawai'i's economic base.*			
(b) Policies:			
(1) Facilitate investment and employment in economic activities that have the potential to expand and diversify Hawai'i's economy, including but not limited to diversified agriculture, aquaculture, renewable energy development, creative media, health care, and science and technology-based sectors.	X		
(2) Facilitate investment in innovative activity that may pose risks or be less labor-intensive than other traditional business activity, but if successful, will generate revenue in Hawai'i through the export of services or products or substitution of imported services or products.			X
(3) Encourage entrepreneurship in innovative activity by academic researchers and instructors who may not have the background, skill, or initial inclination to commercially exploit their discoveries or achievements.			X
(4) Recognize that innovative activity is not exclusively dependent upon individuals with advanced formal education, but that many self-taught, motivated individuals are able, willing, sufficiently knowledgeable, and equipped with the attitude necessary to undertake innovative activity.			X
(5) Increase the opportunities for investors in innovative activity and talent engaged in innovative activity to personally meet and interact at cultural, art, entertainment, culinary, athletic, or visitor-oriented events without a business focus.			X
(6) Expand Hawai'i's capacity to attract and service international programs and activities that generate employment for Hawai'i's people.			X
(7) Enhance and promote Hawai'i's role as a center for international relations, trade, finance, services, technology, education, culture, and the arts.			X
(8) Accelerate research and development of new energy- related industries based on wind, solar, ocean, and underground resources and solid waste.			X
(9) Promote Hawai'i's geographic, environmental, social, and technological advantages to attract new economic activities into the State.			X
(10) Provide public incentives and encourage private initiative to attract new industries that best support Hawai'i's social, economic, physical, and environmental objectives.			X
(11) Increase research and the development of ocean-related economic activities such as mining, food production, and scientific research.	X		
(12) 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.	X		
(13) Foster a broader public recognition and understanding of the potential benefits of new, or innovative growth-oriented industry in Hawai'i.			X
(14) Encourage the development and implementation of joint federal and state initiatives to attract federal programs and projects that will support Hawai'i's social, economic, physical, and environmental objectives.			X
(15) Increase research and development of businesses and services in the telecommunications and information industries.			X

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES **(Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)**	**S**	**N/S**	**N/A**
(16) Foster the research and development of nonfossil fuel and energy efficient modes of transportation.			X
(17) Recognize and promote health care and health care information technology as growth industries.			X
Discussion: The facilities planned as a part of the Waipahu High School New Classroom Building include spaces committed to science, technology, aquaculture, and creative media, thereby promoting the development and expansion of potential growth and innovative activities that serve to increase and diversify Hawai'i's economic base.			
HRS § 226-10.5: Objectives and policies for the economy – information industry			
(a) Objective: *Planning for the State's economy with regard to telecommunications and information technology shall be directed toward recognizing that broadband and wireless communication capability and infrastructure are foundations for an innovative economy and positioning Hawai'i as a leader in broadband and wireless communications and applications in the Pacific Region.*			
(b) Policies:			
(1) Promote efforts to attain the highest speeds of electronic and wireless communication within Hawai'i and between Hawai'i and the world, and make high speed communication available to all residents and businesses in Hawai'i.			X
(2) Encourage the continued development and expansion of the telecommunications infrastructure serving Hawai'i to accommodate future growth and innovation in Hawai'i's economy.			X
(3) Facilitate the development of new or innovative business and service ventures in the information industry which will provide employment opportunities for the people of Hawai'i.	X		
(4) Encourage mainland- and foreign-based companies of all sizes, whether information technology-focused or not, to allow their principals, employees, or contractors to live in and work from Hawai'i, using technology to communicate with their headquarters, offices, or customers located out-of-state.			X
(5) Encourage greater cooperation between the public and private sectors in developing and maintaining a well-designed information industry.			X
(6) Ensure that the development of new businesses and services in the industry are in keeping with the social, economic, and physical needs and aspirations of Hawai'i's people.			X
(7) Provide opportunities for Hawai'i's people to obtain job training and education that will allow for upward mobility within the information industry.	X		
(8) Foster a recognition of the contribution of the information industry to Hawai'i's economy.			X
(9) Assist in the promotion of Hawai'i as a broker, creator, and processor of information in the Pacific.	X		
Discussion: The New Classroom Building will contain digital media facilities, which will provide resources for students wishing to enter the information industry out of high school, and provide a basis for students seeking higher education in Information Technology or Digital Media at colleges in Hawai'i.			
HRS § 226-11: Objectives and policies for the physical environment – land-based, shoreline, and marine resources.			
(a) Objectives: *Planning for the State's physical environment with regard to land-based, shoreline, and marine resources shall be directed towards achievement of the following objectives:*			
(1) Prudent use of Hawai'i's land-based, shoreline, and marine resources.	X		
(2) Effective protection of Hawai'i's unique and fragile environmental resources.			X
(b) Policies:			
(1) Exercise an overall conservation ethic in the use of Hawai'i's natural resources.	X		

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES **(Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)**	**S**	**N/S**	**N/A**
(2) Ensure compatibility between land-based and water-based activities and natural resources and ecological systems.			X
(3) Take into account the physical attributes of areas when planning and designing activities and facilities.			X
(4) Manage natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage.			X
(5) Consider multiple uses in watershed areas, provided such uses do not detrimentally affect water quality and recharge functions.			X
(6) Encourage the protection of rare or endangered plant and animal species and habitats native to Hawai'i.			X
(7) Provide public incentives that encourage private actions to protect significant natural resources from degradation or unnecessary depletion.			X
(8) Pursue compatible relationships among activities, facilities, and natural resources.			X
(9) Promote increased accessibility and prudent use of inland and shoreline areas for public recreational, educational, and scientific purposes.	X		
Discussion: By building within the existing footprint of the WHS campus, the Project furthers the State's goal of prudent land use and land conservation. The New Classroom Building uses the existing infrastructure of WHS, removing the strain on available land and natural resources that would have occurred if the new facilities were constructed elsewhere. As a place to teach students about Hawai'i's unique physical environment, the building will support the School's progressive Natural Resources curriculum and Culinary program, promoting sustainability through the use of renewable energy, the recycling of materials and wastes, and the stewardship of land-based, shoreline, and marine resources. The overall conservation ethic in the approach to reusing resources like water in the aquaculture facilities serves to inform students on sustainable natural resource management.			
HRS § 226-12: Objective and policies for the physical environment – scenic, natural beauty, and historic resources.			
(a) Objective: *Planning for the State's physical environment shall be directed towards achievement of the objective of enhancement of Hawai'i's scenic assets, natural beauty, and multi-cultural/historical resources.*			
(b) Policies:			
(1) Promote the preservation and restoration of significant natural and historic resources.			X
(2) Provide incentives to maintain and enhance historic, cultural, and scenic amenities.			X
(3) Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.			X
(4) Protect those special areas, structures, and elements that are an integral and functional part of Hawai'i's ethnic and cultural heritage.			X
(5) Encourage the design of developments and activities that complement the natural beauty of the islands.			X
Discussion: The New Classroom Building has no relationship to the promotion and/or availability of scenic and historic resources in the State of Hawai'i, as it will be flush with existing structures on campus and archaeological surveys have returned a finding of no impact on cultural/archaeological/historic resources.			
HRS § 226-13: Objectives and policies for the physical environment – land, air, and water quality.			
(a) Objectives: *Planning for the State's physical environment with regard to land, air, and water quality shall be directed towards achievement of the following objectives:*			
(1) Maintenance and pursuit of improved quality in Hawai'i's land, air, and water resources.			X
(2) Greater public awareness and appreciation of Hawai'i's environmental resources.	X		

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES **(Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)**	**S**	**N/S**	**N/A**
(b) Policies:			
(1) Foster educational activities that promote a better understanding of Hawai'i's limited environmental resources.	X		
(2) Promote the proper management of Hawai'i's land and water resources.	X		
(3) Promote effective measures to achieve desired quality in Hawai'i's surface, ground, and coastal waters.			X
(4) Encourage actions to maintain or improve aural and air quality levels to enhance the health and well-being of Hawai'i's people.			X
(5) Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters.			X
(6) Encourage design and construction practices that enhance the physical qualities of Hawai'i's communities.			X
(7) Encourage urban developments in close proximity to existing services and facilities.	X		
(8) Foster recognition of the importance and value of the land, air, and water resources to Hawai'i's people, their cultures and visitors.			X
Discussion: The New Classroom Building will provide facilities and resources for courses in biology, aquaculture, etc. which will provide Waipahu High School students with the opportunity to learn about the unique flora and fauna and other environmental resources of Hawai'i. Using the existing WHS campus for this facility follows the State's goal of encouraging development in proximity to existing services and facilities.			
HRS § 226-14: Objective and policies for facility systems – in general.			
(a) Objective: *Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives.*			
(b) Policies:			
(1) Accommodate the needs of Hawai'i's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans.	X		
(2) Encourage flexibility in the design and development of facility systems to promote prudent use of resources and accommodate changing public demands and priorities.			X
(3) Ensure that required facility systems can be supported within resource capacities and at reasonable cost to the user.			X
(4) Pursue alternative methods of financing programs and projects and cost-saving techniques in the planning, construction, and maintenance of facility systems.			X
Discussion: By maintaining the parcel's "Urban" and "High School" designations by the State and City & County, the Project is in consonance with both sets of plans.			
HRS § 226-15: Objectives and policies for facility systems – solid and liquid wastes.			
(a) Objectives: *Planning for the State's facility systems with regard to solid and liquid wastes shall be directed towards the achievement of the following objectives:*			
(1) Maintenance of basic public health and sanitation standards relating to treatment and disposal of solid and liquid wastes.			X
(2) Provision of adequate sewerage facilities for physical and economic activities that alleviate problems in housing, employment, mobility, and other areas.			X
(b) Policies:			
(1) Encourage the adequate development of sewerage facilities that complement planned growth.			X
(2) Promote re-use and recycling to reduce solid and liquid wastes and employ a conservation ethic.			X
(3) Promote research to develop more efficient and economical treatment and disposal of solid and liquid wastes.			X

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES **(Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)**	**S**	**N/S**	**N/A**
Discussion: The New Classroom Building has no relationship to the State's goals for solid and liquid wastes.			
HRS § 226-16: Objective and policies for facility systems – water.			
(a) Objective: *Planning for the State's facility systems with regard to water shall be directed towards achievement of the objective of the provision of water to adequately accommodate domestic, agricultural, commercial, industrial, recreational, and other needs within resource capacities.*			
(b) Policies:			
(1) Coordinate development of land use activities with existing and potential water supply.	X		
(2) Support research and development of alternative methods to meet future water requirements well in advance of anticipated needs.			X
(3) Reclaim and encourage the productive use of runoff water and wastewater discharges.	X		
(4) Assist in improving the quality, efficiency, service, and storage capabilities of water systems for domestic and agricultural use.	X		
(5) Support water supply services to areas experiencing critical water problems.			X
(6) Promote water conservation programs and practices in government, private industry, and the general public to help ensure adequate water to meet long-term needs.			X
Discussion: The Project, being connected to the existing Waipahu High School campus, exists within the bounds of an existing water supply. The Project is being designed using Leadership in Energy and Environmental Design (LEED) New Construction (NC) Silver as well as Hawai'i Collaborative on High Performing Schools (HI-CHPS) standards as general guidelines to set sustainability targets. As a result, DOE is considering the installation of water efficient fixtures and the implementation of water efficient practices, where feasible, to reduce the increased demand on the area's freshwater resources. Where practical, implementation of rain water catchment system for irrigation use will be explored.			
HRS § 226-17: Objectives and policies for facility systems – transportation.			
(a) Objective: *Planning for the State's facility systems with regard to energy shall be directed toward the achievement of the following objectives:*			
(1) An integrated multi-modal transportation system that services statewide needs and promotes the efficient, economical, safe, and convenient movement of people and goods.			X
(2) A statewide transportation system that is consistent with and will accommodate planned growth objectives throughout the State.			X
(b) Policies:			
(1) Design, program, and develop a multi-modal system in conformance with desired growth and physical development as stated in this chapter;			X
(2) Coordinate state, county, federal, and private transportation activities and programs toward the achievement of statewide objectives;			X
(3) Encourage a reasonable distribution of financial responsibilities for transportation among participating governmental and private parties;			X
(4) Provide for improved accessibility to shipping, docking, and storage facilities;			X
(5) Promote a reasonable level and variety of mass transportation services that adequately meet statewide and community needs;			X
(6) Encourage transportation systems that serve to accommodate present and future development needs of communities;			X
(7) Encourage a variety of carriers to offer increased opportunities and advantages to interisland movement of people and goods;			X
(8) Increase the capacities of airport and harbor systems and support facilities to effectively accommodate transshipment and storage needs;			X
(9) Encourage the development of transportation systems and programs which would assist statewide economic growth and diversification;			X

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES **(Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)**	**S**	**N/S**	**N/A**
(10) Encourage the design and development of transportation systems sensitive to the needs of affected communities and the quality of Hawai'i's natural environment;			X
(11) Encourage safe and convenient use of low-cost, energy-efficient, non-polluting means of transportation;			X
(12) Coordinate intergovernmental land use and transportation planning activities to ensure the timely delivery of supporting transportation infrastructure in order to accommodate planned growth objectives; and			X
(13) Encourage diversification of transportation modes and infrastructure to promote alternate fuels and energy efficiency.			X
Discussion: The Project has no relationship to the provision or facilitation of transportation.			
HRS § 226-18: Objectives and policies for facility systems – energy.			
(a) Objectives: *Planning for the State's facility systems with regard to energy shall be directed toward the achievement of the following objectives, giving due consideration to all:*			
(1) Dependable, efficient, and economical statewide energy systems capable of supporting the needs of the people;	X		
(2) Increased energy security and self-sufficiency through the reduction and ultimate elimination of Hawaii's dependence on imported fuels for electrical generation and ground transportation;	X		
(3) Greater diversification of energy generation in the face of threats to Hawai'i's energy supplies and systems;	X		
(4) Reduction, avoidance, or sequestration of greenhouse gas emissions from energy supply and use; and			X
(5) Utility models that make the social and financial interests of Hawaii's utility customers a priority.			X
(b) To achieve the energy objectives, it shall be the policy of this State to ensure the short- and long-term provision of adequate, reasonably priced, and dependable energy services to accommodate demand.			
(c) Other Policies:			
(1) Support research and development as well as promote the use of renewable energy sources;			X
(2) Ensure that the combination of energy supplies and energy-saving systems is sufficient to support the demands of growth;			X
(3) Base decisions of least-cost supply-side and demand-side energy resource options on a comparison of their total costs and benefits when a least-cost is determined by a reasonably comprehensive, quantitative, and qualitative accounting of their long-term, direct and indirect economic, environmental, social, cultural, and public health costs and benefits;			X
(4) Promote all cost-effective conservation of power and fuel supplies through measures including:			
(A) Development of cost-effective demand-side management programs;			X
(B) Education;			X
(C) Adoption of energy-efficient practices and technologies; and			X
(D) Increasing energy efficiency and decreasing energy use in public infrastructure;			X
(5) Ensure, to the extent that new supply-side resources are needed, that the development or expansion of energy systems uses the least-cost energy supply option and maximizes efficient technologies;			X
(6) Support research, development, demonstration, and use of energy efficiency, load management, and other demand-side management programs, practices, and technologies;			X
(7) Promote alternate fuels and transportation energy efficiency;			X
(8) Support actions that reduce, avoid, or sequester greenhouse gases in utility, transportation, and industrial sector applications;			X

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES **(Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)**	**S**	**N/S**	**N/A**
(9) Support actions that reduce, avoid, or sequester Hawai'i's greenhouse gas emissions through agriculture and forestry initiatives.			X
(10) Provide priority handling and processing for all state and county permits required for renewable energy projects;			X
(11) Ensure that liquefied natural gas is used only as a cost-effective transitional, limited-term replacement of petroleum for electricity generation and does not impede the development and use of other cost-effective renewable energy sources; and			X
(12) Promote the development of indigenous geothermal energy resources that are located on public trust land as an affordable and reliable source of firm power for Hawai'i.			X
Discussion: As the Project is being designed using Leadership in Energy and Environmental Design (LEED) New Construction (NC) Silver and HI-CHPS standards as general guidelines to set sustainability targets, energy saving design elements will be integrated into building design where feasible. By reducing Hawai'i's dependence on imported fuels for electrical generation, this Project supports the State's objectives not only for greater energy efficiency and diversification, but also for increased energy security and self-sufficiency.			
HRS § 226-18.5: Objectives and policies for facility systems – telecommunications.			
(a) Objective: *Planning for the State's telecommunications facility systems shall be directed towards the achievement of dependable, efficient, and economical statewide telecommunications systems capable of supporting the needs of the people.*			
(b) To achieve the telecommunications objective, it shall be the policy of this State to ensure the provision of adequate, reasonably priced, and dependable telecommunications services to accommodate demand.			
(c) Other Policies:			
(1) Facilitate research and development of telecommunications systems and resources;			X
(2) Encourage public and private sector efforts to develop means for adequate, ongoing telecommunications planning;			X
(3) Promote efficient management and use of existing telecommunications systems and services; and			X
(4) Facilitate the development of education and training of telecommunications personnel.			X
Discussion: Telecommunication needs will be coordinated with the DOE's Office of Information Technology Services (OITS) and the school.			
HRS § 226-19: Objectives and policies for socio-cultural advancement – housing.			
(a) Objectives: *Planning for the State's socio-cultural advancement with regard to housing shall be directed toward the achievement of the following objectives:*			
(1) Greater opportunities for Hawai'i's people to secure reasonably priced, safe, sanitary, and livable homes, located in suitable environments that satisfactorily accommodate the needs and desires of families and individuals, through collaboration and cooperation between government and nonprofit and for-profit developers to ensure that more affordable housing is made available to very low-, low- and moderate-income segments of Hawai'i's population.			X
(2) The orderly development of residential areas sensitive to community needs and other land uses.			X
(3) The development and provision of affordable rental housing by the State to meet the housing needs of Hawai'i's people.			X
(b) Policies:			
(1) Effectively accommodate the housing needs of Hawai'i's people.			X
(2) Stimulate and promote feasible approaches that increase housing choices for low-income, moderate-income, and gap-group households.			X
(3) Increase homeownership and rental opportunities and choices in terms of quality, location, cost, densities, style, and size of housing.			X

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES **(Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)**	**S**	**N/S**	**N/A**
(4) Promote appropriate improvement, rehabilitation, and maintenance of existing housing units and residential areas.			X
(5) Promote design and location of housing developments taking into account the physical setting, accessibility to public facilities and services, and other concerns of existing communities and surrounding areas.			X
(6) Facilitate the use of available vacant, developable, and underutilized urban lands for housing.			X
(7) Foster a variety of lifestyles traditional to Hawai'i through the design and maintenance of neighborhoods that reflect the culture and values of the community.			X
(8) Promote research and development of methods to reduce the cost of housing construction in Hawai'i.			X
Discussion: The Project has no relationship to the availability of housing in the State of Hawai'i.			
HRS § 226-20: Objectives and policies for socio-cultural advancement – health			
(a) Objectives: *Planning for the State's socio-cultural advancement with regard to health shall be directed towards achievement of the following objectives:*			
(1) Fulfillment of basic individual health needs of the general public.			X
(2) Maintenance of sanitary and environmentally healthful conditions in Hawai'i's communities.			X
(3) Elimination of health disparities by identifying and addressing social determinants of health.			X
(b) Policies:			
(1) Provide adequate and accessible services and facilities for prevention and treatment of physical and mental health problems, including substance abuse.			X
(2) Encourage improved cooperation among public and private sectors in the provision of health care to accommodate the total health needs of individuals throughout the State.			X
(3) Encourage public and private efforts to develop and promote statewide and local strategies to reduce health care and related insurance costs.			X
(4) Foster an awareness of the need for personal health maintenance and preventive health care through education and other measures.			X
(5) Provide programs, services, and activities that ensure environmentally healthful and sanitary conditions.			X
(6) Improve the State's capabilities in preventing contamination by pesticides and other potentially hazardous substances through increased coordination, education, monitoring, and enforcement.			X
(7) Prioritize programs, services, interventions, and activities that address identified social determinants of health to improve native Hawaiian health and well-being consistent with the United States Congress' declaration of policy as codified in title 42 United States Code section 11702, and to reduce health disparities of disproportionately affected demographics, including native Hawaiians, other Pacific Islanders, and Filipinos. The prioritization of affected demographic groups other than native Hawaiians may be reviewed every ten years and revised based on the best available epidemiological and public health data.			X
Discussion: The Project has no relationship to healthcare provision in the State of Hawai'i.			
HRS § 226-21: Objective and policies for socio-cultural advancement – education.			
(a) Objectives: *Planning for the State's socio-cultural advancement with regard to education shall be directed towards achievement of the objective of the provision of a variety of educational opportunities to enable individuals to fulfill their needs, responsibilities, and aspirations.*			

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES **(Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)**	**S**	**N/S**	**N/A**
(b) Policies:			
(1) Support educational programs and activities that enhance personal development, physical fitness, recreation, and cultural pursuits of all groups.	X		
(2) Ensure the provision of adequate and accessible educational services and facilities that are designed to meet individual and community needs.	X		
(3) Provide appropriate educational opportunities for groups with special needs.	X		
(4) Promote educational programs which enhance understanding of Hawai'i's cultural heritage.	X		
(5) Provide higher educational opportunities that enable Hawai'i's people to adapt to changing employment demands.			X
(6) Assist individuals, especially those experiencing critical employment problems or barriers, or undergoing employment transitions, by providing appropriate employment training programs and other related educational opportunities.			X
(7) Promote programs and activities that facilitate the acquisition of basic skills, such as reading, writing, computing, listening, speaking, and reasoning.	X		
(8) Emphasize quality educational programs in Hawai'i's institutions to promote academic excellence.	X		
(9) Support research programs and activities that enhance the education programs of the State.			X
Discussion: The Project will expand Waipahu High School's existing facilities to support the advancement of the State of Hawai'i's goals for education – in the realms of personal development, community facilities, special needs accommodation, computer and reading/writing education, and the new facilities will encourage new curricula in the fields of digital media, culinary arts, biology, and more.			
HRS § 226-22: Objective and policies for socio-cultural advancement – social services.			
(a) Objective: *Planning for the State's socio-cultural advancement with regard to social services shall be directed towards the achievement of the objective of improved public and private social services and activities that enable individuals, families, and groups to become more self-reliant and confident to improve their well-being.*			
(b) Policies:			
(1) Assist individuals, especially those in need of attaining a minimally adequate standard of living and those confronted by social and economic hardship conditions, through social services and activities within the State's fiscal capacities.			X
(2) Promote coordination and integrative approaches among public and private agencies and programs to jointly address social problems that will enable individuals, families, and groups to deal effectively with social problems and to enhance their participation in society.			X
(3) Facilitate the adjustment of new residents, especially recently arrived immigrants, into Hawai'i's communities.			X
(4) Promote alternatives to institutional care in the provision of long-term care for elder and disabled populations.			X
(5) Support public and private efforts to prevent domestic abuse and child molestation, and assist victims of abuse and neglect.			X
(6) Promote programs which assist people in need of family planning services to enable them to meet their needs.			X
Discussion: The Project has no relation to the provision of social services by the State of Hawai'i.			
HRS § 226-23: Objective and policies for socio-cultural advancement – leisure.			
(a) Objective: *Planning for the State's socio-cultural advancement with regard to leisure shall be directed towards the achievement of the objective of the adequate provision of resources to accommodate diverse cultural, artistic, and recreational needs for present and future generations.*			

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES **(Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)**	**S**	**N/S**	**N/A**
(b) Policies:			
(1) Foster and preserve Hawai'i's multi-cultural heritage through supportive cultural, artistic, recreational, and humanities-oriented programs and activities.			X
(2) Provide a wide range of activities and facilities to fulfill the cultural, artistic, and recreational needs of all diverse and special groups effectively and efficiently.			X
(3) Enhance the enjoyment of recreational experiences through safety and security measures, educational opportunities, and improved facility design and maintenance.			X
(4) Promote the recreational and educational potential of natural resources having scenic, open space, cultural, historical, geological, or biological values while ensuring that their inherent values are preserved.			X
(5) Ensure opportunities for everyone to use and enjoy Hawai'i's recreational resources.			X
(6) Assure the availability of sufficient resources to provide for future cultural, artistic, and recreational needs.			X
(7) Provide adequate and accessible physical fitness programs to promote the physical and mental well-being of Hawai'i's people.			X
(8) Increase opportunities for appreciation and participation in the creative arts, including the literary, theatrical, visual, musical, folk, and traditional art forms.			X
(9) Encourage the development of creative expression in the artistic disciplines to enable all segments of Hawai'i's population to participate in the creative arts.			X
(10) Assure adequate access to significant natural and cultural resources in public ownership.			X
Discussion: The Project has no direct relation to the provision of resources to accommodate diverse cultural, artistic, and recreational needs for present and future generations, aside from what may be provided through school curriculum.			
HRS § 226-24: Objective and policies for socio-cultural advancement – individual rights and personal well-being.			
(a) Objective: *Planning for the State's socio-cultural advancement with regard to individual rights and personal well-being shall be directed towards achievement of the objective of increased opportunities and protection of individual rights to enable individuals to fulfill their socio-economic needs and aspirations.*			
(b) Policies:			
(1) Provide effective services and activities that protect individuals from criminal acts and unfair practices and that alleviate the consequences of criminal acts in order to foster a safe and secure environment.			X
(2) Uphold and protect the national and state constitutional rights of every individual.	X		
(3) Assure access to, and availability of, legal assistance, consumer protection, and other public services which strive to attain social justice.			X
(4) Ensure equal opportunities for individual participation in society.	X		
Discussion: Public schools provide students with the social and intellectual capital vital to the expression of individual rights and personal well-being. By providing students with better resources, the State is empowering the next generation to fulfill their needs and aspirations, socio-economic and otherwise.			
HRS § 226-25: Objective and policies for socio-cultural advancement – culture.			
(a) Objective: *Planning for the State's socio-cultural advancement with regard to culture shall be directed toward the achievement of the objective of enhancement of cultural identities, traditions, values, customs, and arts of Hawai'i's people.*			
(b) Policies:			
(1) Foster increased knowledge and understanding of Hawai'i's ethnic and cultural heritages and the history of Hawai'i.			X

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES **(Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)**	**S**	**N/S**	**N/A**
(2) Support activities and conditions that promote cultural values, customs, and arts that enrich the lifestyles of Hawai'i's people and which are sensitive and responsive to family and community needs.			X
(3) Encourage increased awareness of the effects of proposed public and private actions on the integrity and quality of cultural and community lifestyles in Hawai'i.			X
(4) Encourage the essence of the aloha spirit in people's daily activities to promote harmonious relationships among Hawai'i's people and visitors.			X
Discussion: The Project has no direct relation to the State's goals for the advancement of culture, aside from what may be provided through school curriculum.			
HRS § 226-26: Objectives and policies for socio-cultural advancement – public safety.			
Objectives: *Planning for the State's socio-cultural advancement with regard to public safety shall be directed towards the achievement of the following objectives:*			
(1) Assurance of public safety and adequate protection of life and property for all people.			X
(2) Optimum organizational readiness and capability in all phases of emergency management to maintain the strength, resources, and social and economic well-being of the community in the event of civil disruptions, wars, natural disasters, and other major disturbances.	X		
(3) Promotion of a sense of community responsibility for the welfare and safety of Hawai'i's people.	X		
(b) Policies related to public safety:			
(1) Ensure that public safety programs are effective and responsive to community needs.			X
(2) Encourage increased community awareness and participation in public safety programs.			X
(c) Policies related to criminal justice:			
(1) Support criminal justice programs aimed at preventing and curtailing criminal activities.			X
(2) Develop a coordinated, systematic approach to criminal justice administration among all criminal justice agencies.			X
(3) Provide a range of correctional resources which may include facilities and alternatives to traditional incarceration in order to address the varied security needs of the community and successfully reintegrate offenders into the community.			X
(d) Policies related to emergency management:			
(1) Ensure that responsible organizations are in a proper state of readiness to respond to major war-related, natural, or technological disasters and civil disturbances at all times.			X
(2) Enhance the coordination between emergency management programs throughout the State.			X
Discussion: Aside from the potential for Waipahu High School to act as an emergency shelter and the promotion of a sense of community responsibility for public welfare provided by investments in education, the Project will have no relation to the State's commitments to public safety.			
HRS § 226-27: Objectives and policies for socio-cultural advancement – government.			
(a) Objectives: *Planning the State's socio-cultural advancement with regard to government shall be directed towards the achievement of the following objectives:*			
(1) Efficient, effective, and responsive government services at all levels in the State.			X
(2) Fiscal integrity, responsibility, and efficiency in the state government and county governments.			X
(b) Policies:			
(1) Provide for necessary public goods and services not assumed by the private sector.	X		
(2) Pursue an openness and responsiveness in government that permits the flow of public information, interaction, and response.			X
(3) Minimize the size of government to that necessary to be effective.			X

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART I. OVERALL THEME, GOALS, OBJECTIVES AND POLICIES (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	S	N/S	N/A
(4) Stimulate the responsibility in citizens to productively participate in government for a better Hawai'i.			X
(5) Assure that government attitudes, actions, and services are sensitive to community needs and concerns.	X		
(6) Provide for a balanced fiscal budget.			X
(7) Improve the fiscal budgeting and management system of the State.			X
(8) Promote the consolidation of state and county governmental functions to increase the effective and efficient delivery of government programs and services and to eliminate duplicative services wherever feasible.			X
Discussion: The Project will provide the public good that is an educated citizenry, and fulfills the goal of government responsiveness – specifically to the needs of the students and parents of Waipahu High School.			

5.1.3.2 Hawai'i State Plan, Part II: *Planning Coordination and Implementation*

Part II of the State Plan establishes a statewide planning system to coordinate and guide all major state and county activities and to implement the overall theme, goals, objectives, policies, and priority guidelines. The system implements the State Plan through the development of functional plans and county general plans. Functional plans, general plans, and the formulation, administration, and implementation of state programs must be in conformance with the State Plan.

- **State Functional Plans**

State Functional Plans (SFPs) set forth the policies, statewide guidelines, and priorities within a specific field of activity, when such activity or program is proposed, administered, or funded by any agency of the state. Functional plans are developed by the state agency primarily responsible for a given functional area, which include: Agriculture, Conservation Lands, Education, Employment, Energy, Health, Higher Education, Historic Preservation, Housing, Human Services, Recreation, Tourism, and Transportation. Functional plans must identify priority issues in the functional area and contain objectives, policies, and implementing actions to address those priority issues. Actions may include organizational or management initiatives, facility or physical infrastructure development initiatives, initiatives for programs and services, or legislative proposals. Functional plans are approved by the governor and serve as guidelines for funding and implementation by state and county agencies. In addition, functional plans shall be used to guide the allocation of resources for the implementation of state policies adopted by the legislature.

- **State Education Functional Plan**

The applicable functional plan is the *State Education Functional Plan* (SEFP 1989). Specific SEFP policies and goals applicable to the Proposed Project are discussed below.

A(1): Academic Excellence

- ***Policy:*** *Emphasize quality educational programs in Hawai'i's institutions to promote academic excellence. [Hawai'i State Plan, §226-21(b)(8)]*

- ***Goal:*** *Provide the public schools with encouragement and support to reach a high level of effectiveness.*

A(4): Services and Facilities

- ***Policy:*** *Ensure the provision of adequate and accessible educational services and facilities that are designed to meet individual and community needs. [Hawai'i State Plan, §226-21(b)(21)]*
- ***Goal:*** *Provide facilities that are sufficient in number, functional, well-paced [sic] and compatible with the physical surroundings.*

B(3): Increased Use of Technology

- ***Policy:*** *Increase and improve the use information technology in education and encourage programs which increase the public's awareness and understanding of the impact of information technologies on our lives. [Hawai'i State Plan, §226-107(5)]*
- ***Goal:*** *Develop a plan to pinpoint, analyze and use technology to improve classroom instruction.*

B(5): Students with Special Needs

- ***Policy:*** *Provide appropriate educational opportunities for groups with special needs. [Hawaii State Plan, §226-21(b)(3)]*
- ***Goal:*** *Assure appropriate educational services for individuals with special needs.*

Discussion: The Project is in accordance with the above policies and goals of the SEFP, as the construction of this new school facility, located appropriately on an existing high school parcel, will expand the availability of resources and classroom space for Waipahu High School's student body (including students with special needs), encouraging the development of quality educational programs such as digital media and culinary arts through the facilities mentioned in the Project Description (Section 2.3) of this environmental assessment.

- **County General Plan**

As established in the Part II of the State Plan, a statewide planning system implements the State Plan through the development of SFPs and county general plans. The applicable county general plan is the City and County of Honolulu General Plan, which is discussed in Section 5.2.1 of this EA below.

5.1.3.3 Hawai‘i State Plan, Part III: *Priority Guidelines*

Table 9: Hawai‘i State Plan, Chapter 226, HRS – Part III

HAWAI‘I STATE PLAN, CHAPTER 226, HRS – PART III. PRIORITY GUIDELINES (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	**S**	**N/S**	**N/A**
HRS § 226-101: Purpose. *The purpose of this part is to establish overall priority guidelines to address areas of statewide concern.*			
HRS § 226-102: Overall direction. *The State shall strive to improve the quality of life for Hawai‘i’s present and future present and future population through the pursuit of desirable courses of action in five major areas of statewide concern which merit priority attention: economic development, population growth and land resource management, affordable housing, crime and criminal justice, quality education, principles of sustainability, and climate change adaptation.*			
HRS § 226-103: Economic priority guidelines.			
(a) Priority guidelines to stimulate economic growth and encourage business expansion and development to provide needed jobs for Hawai‘i’s people and achieve a stable and diversified economy:			
(1) Seek a variety of means to increase the availability of investment capital for new and expanding enterprises.			X
(A) Encourage investments which:			
(i) Reflect long term commitments to the State;	X		
(ii) Rely on economic linkages within the local economy;			X
(iii) Diversify the economy;			X
(iv) Reinvest in the local economy;			X
(v) Are sensitive to community needs and priorities; and	X		
(vi) Demonstrate a commitment to provide management opportunities to Hawai‘i residents; and			X
(B) Encourage investments in innovative activities that have a nexus to the State, such as:			
(i) Present or former residents acting as entrepreneurs or principals;			X
(ii) Academic support from an institution of higher education in Hawai‘i;			X
(iii) Investment interest from Hawai‘i residents;			X
(iv) Resources unique to Hawai‘i that are required for innovative activity; and			X
(v) Complementary or supportive industries or government programs or projects.			X
(2) Encourage the expansion of technological research to assist industry development and support the development and commercialization of technological advancements.			X
(3) Improve the quality, accessibility, and range of services provided by government to business, including data and reference services and assistance in complying with governmental regulations.			X
(4) Seek to ensure that state business tax and labor laws and administrative policies are equitable, rational, and predictable.			X
(5) Streamline the processes for building and development permit and review and telecommunication infrastructure installation approval and eliminate or consolidate other burdensome or duplicative governmental requirements imposed on business, where scientific evidence indicates that public health, safety, and welfare would not be adversely affected.			X
(6) Encourage the formation of cooperatives and other favorable marketing or distribution arrangements at the regional or local level to assist Hawai‘i’s small-scale producers, manufacturers, and distributors.			X
(7) Continue to seek legislation to protect Hawai‘i from transportation interruptions between Hawai‘i and the continental United States.			X
(8) Provide public incentives and encourage private initiative to develop and attract industries which promise long-term growth potentials and which have the following characteristics:			
(A) An industry that can take advantage of Hawai‘i’s unique location and available physical and human resources.			X

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART III. PRIORITY GUIDELINES (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	**S**	**N/S**	**N/A**
(B) A clean industry that would have minimal adverse effects on Hawai'i's environment.			X
(C) An industry that is willing to hire and train Hawai'i's people to meet the industry's labor needs at all levels of employment.			X
(D) An industry that would provide reasonable income and steady employment.			X
(9) Support and encourage, through educational and technical assistance programs and other means, expanded opportunities for employee ownership and participation in Hawai'i business.			X
(10) Enhance the quality of Hawai'i's labor force and develop and maintain career opportunities for Hawai'i's people through the following actions:			
(A) Expand vocational training in diversified agriculture, aquaculture, information industry, and other areas where growth is desired and feasible.	X		
(B) Encourage more effective career counseling and guidance in high schools and post-secondary institutions to inform students of present and future career opportunities.	X		
(C) Allocate educational resources to career areas where high employment is expected and where growth of new industries is desired.	X		
(D) Promote career opportunities in all industries for Hawai'i's people by encouraging firms doing business in the State to hire residents.			X
(E) Promote greater public and private sector cooperation in determining industrial training needs and in developing relevant curricula and on-the-job training opportunities.			X
(F) Provide retraining programs and other support services to assist entry of displaced workers into alternative employment.			X
(b) Priority guidelines to promote the economic health and quality of the visitor industry:			
(1) Promote visitor satisfaction by fostering an environment which enhances the Aloha Spirit and minimizes inconveniences to Hawai'i's residents and visitors.			X
(2) Encourage the development and maintenance of well-designed, adequately serviced hotels and resort destination areas which are sensitive to neighboring communities and activities and which provide for adequate shoreline setbacks and beach access.			X
(3) Support appropriate capital improvements to enhance the quality of existing resort destination areas and provide incentives to encourage investment in upgrading, repair, and maintenance of visitor facilities.			X
(4) Encourage visitor industry practices and activities which respect, preserve, and enhance Hawai'i's significant natural, scenic, historic, and cultural resources.			X
(5) Develop and maintain career opportunities in the visitor industry for Hawai'i's people, with emphasis on managerial positions.			X
(6) Support and coordinate tourism promotion abroad to enhance Hawai'i's share of existing and potential visitor markets.			X
(7) Maintain and encourage a more favorable resort investment climate consistent with the objectives of this chapter.			X
(8) Support law enforcement activities that provide a safer environment for both visitors and residents alike.			X
(9) Coordinate visitor industry activities and promotions to business visitors through the state network of advanced data communication techniques.			X
(c) Priority guidelines to promote the continued viability of the sugar and pineapple industries:			
(1) Provide adequate agricultural lands to support the economic viability of the sugar and pineapple industries.			X
(2) Continue efforts to maintain federal support to provide stable sugar prices high enough to allow profitable operations in Hawai'i.			X
(3) Support research and development, as appropriate, to improve the quality and production of sugar and pineapple crops.			X

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART III. PRIORITY GUIDELINES (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	**S**	**N/S**	**N/A**
(d) Priority guidelines to promote the growth and development of diversified agriculture and aquaculture:			
(1) Identify, conserve, and protect agricultural and aquacultural lands of importance and initiate affirmative and comprehensive programs to promote economically productive agricultural and aquacultural uses of such lands.			X
(2) Assist in providing adequate, reasonably priced water for agricultural activities.			X
(3) Encourage public and private investment to increase water supply and to improve transmission, storage, and irrigation facilities in support of diversified agriculture and aquaculture.			X
(4) Assist in the formation and operation of production and marketing associations and cooperatives to reduce production and marketing costs.			X
(5) Encourage and assist with the development of a waterborne and airborne freight and cargo system capable of meeting the needs of Hawai'i's agricultural community.			X
(6) Seek favorable freight rates for Hawai'i's agricultural products from interisland and overseas transportation operators.			X
(7) Encourage the development and expansion of agricultural and aquacultural activities which offer long-term economic growth potential and employment opportunities.	X		
(8) Continue the development of agricultural parks and other programs to assist small independent farmers in securing agricultural lands and loans.			X
(9) Require agricultural uses in agricultural subdivisions and closely monitor the uses in these subdivisions.			X
(10) Support the continuation of land currently in use for diversified agriculture.			X
(11) Encourage residents and visitors to support Hawai'i's farmers by purchasing locally grown food and food products.			X
(e) Priority guidelines for water use and development:			
(1) Maintain and improve water conservation programs to reduce the overall water consumption rate.			X
(2) Encourage the improvement of irrigation technology and promote the use of nonpotable water for agricultural and landscaping purposes.	X		
(3) Increase the support for research and development of economically feasible alternative water sources.			X
(4) Explore alternative funding sources and approaches to support future water development programs and water system improvements.			X
(f) Priority guidelines for energy use and development:			
(1) Encourage the development, demonstration, and commercialization of renewable energy sources.	X		
(2) Initiate, maintain, and improve energy conservation programs aimed at reducing energy waste and increasing public awareness of the need to conserve energy.	X		
(3) Provide incentives to encourage the use of energy conserving technology in residential, industrial, and other buildings.	X		
(4) Encourage the development and use of energy conserving and cost-efficient transportation systems.	X		
(g) Priority guidelines to promote the development of the information industry:			
(1) Establish an information network, with an emphasis on broadband and wireless infrastructure and capability, that will serve as the foundation of and catalyst for overall economic growth and diversification in Hawai'i.			X
(2) Encourage the development of services such as financial data processing, a products and services exchange, foreign language translations, telemarketing, teleconferencing, a twenty-four-hour international stock exchange, international banking, and a Pacific Rim management center.			X
(3) Encourage the development of small businesses in the information field such as software development, the development of new information systems, peripherals, and applications; data conversion and data entry services; and home or cottage services such as computer programming, secretarial, and accounting services.			X

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART III. PRIORITY GUIDELINES (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	**S**	**N/S**	**N/A**
(4) Encourage the development or expansion of educational and training opportunities for residents in the information and telecommunications fields.	X		
(5) Encourage research activities, including legal research in the information and telecommunications fields.			X
(6) Support promotional activities to market Hawai'i's information industry services.			X
(7) Encourage the location or co-location of telecommunication or wireless information relay facilities in the community, including public areas, where scientific evidence indicates that the public health, safety, and welfare would not be adversely affected.			X
Discussion: The Project will increase available resources for vocational training in digital media, culinary arts, biology, horticulture, and aquaculture, as well as providing spaces for career counseling.			
HRS § 226-104: Population growth and land resources priority guidelines.			
(a) Priority guidelines to effect desired statewide growth and distribution:			
(1) Encourage planning and resource management to insure that population growth rates throughout the State are consistent with available and planned resource capacities and reflect the needs and desires of Hawai'i's people.			X
(2) Manage a growth rate for Hawai'i's economy that will parallel future employment needs for Hawai'i's people.			X
(3) Ensure that adequate support services and facilities are provided to accommodate the desired distribution of future growth throughout the State.	X		
(4) Encourage major state and federal investments and services to promote economic development and private investment to the neighbor islands, as appropriate.			X
(5) Explore the possibility of making available urban land, low-interest loans, and housing subsidies to encourage the provision of housing to support selective economic and population growth on the neighbor islands.			X
(6) Seek federal funds and other funding sources outside the State for research, program development, and training to provide future employment opportunities on the neighbor islands.			X
(7) Support the development of high technology parks on the neighbor islands.			X
(b) Priority guidelines for regional growth distribution and land resource utilization:			
(1) Encourage urban growth primarily to existing urban areas where adequate public facilities are already available or can be provided with reasonable public expenditures, and away from areas where other important benefits are present, such as protection of important agricultural land or preservation of lifestyles.	X		
(2) Make available marginal or nonessential agricultural lands for appropriate urban uses while maintaining agricultural lands of importance in the agricultural district.			X
(3) Restrict development when drafting of water would result in exceeding the sustainable yield or in significantly diminishing the recharge capacity of any groundwater area.			X
(4) Encourage restriction of new urban development in areas where water is insufficient from any source for both agricultural and domestic use.			X
(5) In order to preserve green belts, give priority to state capital-improvement funds which encourage location of urban development within existing urban areas except where compelling public interest dictates development of a noncontiguous new urban core.	X		
(6) Seek participation from the private sector for the cost of building infrastructure and utilities, and maintaining open spaces.			X
(7) Pursue rehabilitation of appropriate urban areas.			X
(8) Support the redevelopment of Kaka'ako into a viable residential, industrial, and commercial community.			X
(9) Direct future urban development away from critical environmental areas or impose mitigating measures so that negative impacts on the environment would be minimized.	X		
(10) Identify critical environmental areas in Hawai'i to include but not be limited to the following: watershed and recharge areas; wildlife habitats (on land and in the ocean);			X

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART III. PRIORITY GUIDELINES (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	**S**	**N/S**	**N/A**
areas with endangered species of plants and wildlife; natural streams and water bodies; scenic and recreational shoreline resources; open space and natural areas; historic and cultural sites; areas particularly sensitive to reduction in water and air quality; and scenic resources.			
(11) Identify all areas where priority should be given to preserving rural character and lifestyle.			X
(12) Utilize Hawai'i's limited land resources wisely, providing adequate land to accommodate projected population and economic growth needs while ensuring the protection of the environment and the availability of the shoreline, conservation lands, and other limited resources for future generations.	X		
(13) Protect and enhance Hawai'i's shoreline, open spaces, and scenic resources.			X
Discussion: The Project is located in an Urban district, and will address the needs of Hawai'i's families by providing much-needed classroom space for high school students. By locating the new classroom space within an existing high school campus, the Project is in line with the State's priorities for population growth and land resources.			
HRS § 226-105: Crime and criminal justice.			
Priority guidelines in the area of crime and criminal justice:			
(1) Support law enforcement activities and other criminal justice efforts that are directed to provide a safer environment.			X
(2) Target state and local resources on efforts to reduce the incidence of violent crime and on programs relating to the apprehension and prosecution of repeat offenders.			X
(3) Support community and neighborhood program initiatives that enable residents to assist law enforcement agencies in preventing criminal activities.			X
(4) Reduce overcrowding or substandard conditions in correctional facilities through a comprehensive approach among all criminal justice agencies which may include sentencing law revisions and use of alternative sanctions other than incarceration for persons who pose no danger to their community.			X
(5) Provide a range of appropriate sanctions for juvenile offenders, including community-based programs and other alternative sanctions.			X
(6) Increase public and private efforts to assist witnesses and victims of crimes and to minimize the costs of victimization.			X
Discussion: The Project has no direct relationship to criminal justice.			
HRS § 226-106: Affordable housing.			
Priority guidelines for the provision of affordable housing:			
(1) Seek to use marginal or nonessential agricultural land and public land to meet housing needs of low- and moderate-income and gap-group households.			X
(2) Encourage the use of alternative construction and development methods as a means of reducing production costs.			X
(3) Improve information and analysis relative to land availability and suitability for housing.			X
(4) Create incentives for development which would increase home ownership and rental opportunities for Hawai'i's low- and moderate-income households, gap-group households, and residents with special needs.			X
(5) Encourage continued support for government or private housing programs that provide low interest mortgages to Hawai'i's people for the purchase of initial owner-occupied housing.			X
(6) Encourage public and private sector cooperation in the development of rental housing alternatives.			X

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART III. PRIORITY GUIDELINES (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	**S**	**N/S**	**N/A**
(7) Encourage improved coordination between various agencies and levels of government to deal with housing policies and regulations.			X
(8) Give higher priority to the provision of quality housing that is affordable for Hawai'i's residents and less priority to development of housing intended primarily for individuals outside of Hawai'i.			X
Discussion: The Project has no relationship to affordable housing.			
HRS § 226-107: Quality education.			
Priority guidelines to promote quality education:			
(1) Pursue effective programs which reflect the varied district, school, and student needs to strengthen basic skills achievement;	X		
(2) Continue emphasis on general education "core" requirements to provide common background to students and essential support to other university programs;	X		
(3) Initiate efforts to improve the quality of education by improving the capabilities of the education work force;	X		
(4) Promote increased opportunities for greater autonomy and flexibility of educational institutions in their decision-making responsibilities;			X
(5) Increase and improve the use of information technology in education by the availability of telecommunications equipment for:			
(A) The electronic exchange of information;	X		
(B) Statewide electronic mail; and			X
(C) Access to the Internet.	X		
Encourage programs that increase the public's awareness and understanding of the impact of information technologies on our lives;	X		
(6) Pursue the establishment of Hawai'i's public and private universities and colleges as research and training centers of the Pacific;			X
(7) Develop resources and programs for early childhood education;			X
(8) Explore alternatives for funding and delivery of educational services to improve the overall quality of education; and	X		
(9) Strengthen and expand educational programs and services for students with special needs.	X		
Discussion: The Project will provide ample opportunities and resources to students at Waipahu High School in the realm of digital media, marine biology, culinary arts, etc. as well as providing spaces for students with special needs. All classrooms will provide modern spaces and technologies to educators and students. Providing these assets puts the Waipahu High School New Classroom Building project in line with the above State goals.			
HRS § 226-108: Sustainability.			
Priority guidelines and principles to promote sustainability shall include:			
(1) Encouraging balanced economic, social, community, and environmental priorities;	X		
(2) Encouraging planning that respects and promotes living within the natural resources and limits of the State;			X
(3) Promoting a diversified and dynamic economy;			X
(4) Encouraging respect for the host culture;			X
(5) Promoting decisions based on meeting the needs of the present without compromising the needs of future generations	X		
(6) Considering the principles of the ahupua'a system; and			X
(7) Emphasizing that everyone, including individuals, families, communities, businesses, and government, has the responsibility for achieving a sustainable Hawai'i.			X
Discussion: The Project will fill the need for classroom space at Waipahu High School, providing a community resource that will be used by future generations.			

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART III. PRIORITY GUIDELINES (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	**S**	**N/S**	**N/A**
HRS § 226-109: Climate change adaptation priority guidelines.			
Priority guidelines to prepare the State to address the impacts of climate change, including impacts to the areas of agriculture; conservation lands; coastal and nearshore marine areas; natural and cultural resources; education; energy; higher education; health; historic preservation; water resources; the built environment, such as housing, recreation, transportation; and the economy shall:			
(1) Ensure that Hawai'i's people are educated, informed, and aware of the impacts climate change may have on their communities;			X
(2) Encourage community stewardship groups and local stakeholders to participate in planning and implementation of climate change policies;			X
(3) Invest in continued monitoring and research of Hawai'i's climate and the impacts of climate change on the State;			X
(4) Consider native Hawaiian traditional knowledge and practices in planning for the impacts of climate change;			X
(5) Encourage the preservation and restoration of natural landscape features, such as coral reefs, beaches and dunes, forests, streams, floodplains, and wetlands, that have the inherent capacity to avoid, minimize, or mitigate the impacts of climate change;			X
(6) Explore adaptation strategies that moderate harm or exploit beneficial opportunities in response to actual or expected climate change impacts to the natural and built environments;			X
(7) Promote sector resilience in areas such as water, roads, airports, and public health, by encouraging the identification of climate change threats, assessment of potential consequences, and evaluation of adaptation options;			X
(8) Foster cross-jurisdictional collaboration between county, state, and federal agencies and partnerships between government and private entities and other nongovernmental entities, including nonprofit entities;			X
(9) Use management and implementation approaches that encourage the continual collection, evaluation, and integration of new information and strategies into new and existing practices, policies, and plans; and			X
(10) Encourage planning and management of the natural and built environments that effectively integrate climate change policy.			X
Discussion: The Project has no direct relationship to the State's climate change adaptation priority guidelines.			

5.1.4 State Environmental Policy, Chapter 344, Hawai'i Revised Statutes

The State Environmental Policy, as defined in Chapter 344, HRS, establishes the policy of the State of Hawai'i on natural resource conservation and the environment. The Project's consistency with the State Environmental Policy is outlined in the table below:

Table 10: State Environmental Policy, Chapter 344, HRS

State Environmental Policy, Chapter 344, Hawaii Revised Statutes (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	**S**	**N/S**	**N/A**
State Environmental Policy			
§344-3 Environmental policy. *It shall be the policy of the State, through its programs, authorities, and resources to:*			
(1) Conserve the natural resources, so that land, water, mineral, visual, air and other natural resources are protected by controlling pollution, by preserving or augmenting natural resources, and by safeguarding the State's unique natural environmental characteristics in a manner which will foster and promote the general welfare, create and maintain conditions under which humanity and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of the people of Hawaii.			X
(2) Enhance the quality of life by:			
(A) Setting population limits so that the interaction between the natural and artificial environments and the population is mutually beneficial;			X
(B) Creating opportunities for the residents of Hawaii to improve their quality of life through diverse economic activities which are stable and in balance with the physical and social environments;			X
(C) Establishing communities which provide a sense of identity, wise use of land, efficient transportation, and aesthetic and social satisfaction in harmony with the natural environment which is uniquely Hawaiian; and	X		
(D) Establishing a commitment on the part of each person to protect and enhance Hawaii's environment and reduce the drain on nonrenewable resources.	X		
Discussion: The biological, horticultural, and aquacultural facilities being developed as part of the Project will inform students on the unique environment of the Hawaiian Islands and will encourage individual responsibility in the realms of natural resource or environmental conservation.			
Guidelines			
§344-4 Guidelines. *In pursuance of the state policy to conserve the natural resources and enhance the quality of life, all agencies, in the development of programs, shall, insofar as practicable, consider the following guidelines:*			
(1) Population.			
(A) Recognize population impact as a major factor in environmental degradation and adopt guidelines to alleviate this impact and minimize future degradation;			X
(B) Recognize optimum population levels for counties and districts within the State, keeping in mind that these will change with technology and circumstance, and adopt guidelines to limit population to the levels determined.			X
Discussion: The New Classroom Building will neither encourage nor discourage population growth.			
(2) Land, water, mineral, visual, air, and other natural resources.			
(A) Encourage management practices which conserve and fully utilize all natural resources;	X		
(B) Promote irrigation and waste water management practices which conserve and fully utilize vital water resources;	X		
(C) Promote the recycling of waste water;	X		

State Environmental Policy, Chapter 344, Hawaii Revised Statutes (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	**S**	**N/S**	**N/A**
(D) Encourage management practices which conserve and protect watersheds and water sources, forest, and open space areas;			X
(E) Establish and maintain natural area preserves, wildlife preserves, forest reserves, marine preserves, and unique ecological preserves;			X
(F) Maintain an integrated system of state land use planning which coordinates the state and county general plans;			X
(G) Promote the optimal use of solid wastes through programs of waste prevention, energy resource recovery, and recycling so that all our wastes become utilized.	X		
Discussion: As a place to teach students about Hawai'i's unique physical environment, the building will support the School's progressive Natural Resources curriculum and Culinary program, promoting sustainability through the use of renewable energy, the recycling of materials and wastes, and the stewardship of natural resources. The overall conservation ethic in the approach to reusing resources like water in the aquaculture facilities serves to inform students on sustainable natural resource management. The project is being designed using Leadership in Energy and Environmental Design (LEED) New Construction (NC) Silver and HI-CHPS standards as general guidelines to set sustainability targets. As a result, DOE is considering the installation of water efficient fixtures and the implementation of water efficient practices, where feasible, to reduce the increased demand on the area's freshwater resources. Where practical, implementation of rain water catchment system for irrigation use will be explored. In addition, using HI-CHPS standards as a general guideline, design elements may be considered to facilitate the separation and collection of materials for recycling.			
(3) Flora and fauna.			
(A) Protect endangered species of indigenous plants and animals and introduce new plants or animals only upon assurance of negligible ecological hazard;	X		
(B) Foster the planting of native as well as other trees, shrubs, and flowering plants compatible to the enhancement of our environment.	X		
Discussion: The Project is not in any critical habitat areas, and will have no impact on endangered species. The selection of plants for landscaping will be from native plants or plants that support the Natural Resources and Culinary programs.			
(4) Parks, recreation, and open space.			
(A) Establish, preserve and maintain scenic, historic, cultural, park and recreation areas, including the shorelines, for public recreational, educational, and scientific uses;			X
(B) Protect the shorelines of the State from encroachment of artificial improvements, structures, and activities;			X
(C) Promote open space in view of its natural beauty not only as a natural resource but as an ennobling, living environment for its people.			X
Discussion: The New Classroom Building is located away from the shoreline, and will have no impact on available parks, recreation, and open space.			
(5) Economic development.			
(A) Encourage industries in Hawaii which would be in harmony with our environment;			X
(B) Promote and foster the agricultural industry of the State; and preserve and conserve productive agricultural lands;			X
(C) Encourage federal activities in Hawaii to protect the environment;			X
(D) Encourage all industries including the fishing, aquaculture, oceanography, recreation, and forest products industries to protect the environment;	X		

State Environmental Policy, Chapter 344, Hawaii Revised Statutes (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	**S**	**N/S**	**N/A**
(E) Establish visitor destination areas with planning controls which shall include but not be limited to the number of rooms;			X
(F) Promote and foster the aquaculture industry of the State; and preserve and conserve productive aquacultural lands.	X		
Discussion: The New Classroom Building will promote and encourage aquaculture and environmental studies by providing dedicated spaces for aquaculture, biology, and horticulture.			
(6) Transportation.			
(A) Encourage transportation systems in harmony with the lifestyle of the people and environment of the State;			X
(B) Adopt guidelines to alleviate environmental degradation caused by motor vehicles;			X
(C) Encourage public and private vehicles and transportation systems to conserve energy, reduce pollution emission, including noise, and provide safe and convenient accommodations for their users.			X
Discussion: The Project is not anticipated to have any impact on transportation systems.			
(7) Energy.			
(A) Encourage the efficient use of energy resources.	X		
Discussion: As the Project is being designed using Leadership in Energy and Environmental Design (LEED) New Construction (NC) Silver and HI-CHPS standards as general guidelines to set sustainability targets, energy saving design elements will be integrated into building design where feasible.			
(8) Community life and housing.			
(A) Foster lifestyles compatible with the environment; preserve the variety of lifestyles traditional to Hawaii through the design and maintenance of neighborhoods which reflect the culture and mores of the community;	X		
(B) Develop communities which provide a sense of identity and social satisfaction in harmony with the environment and provide internal opportunities for shopping, employment, education, and recreation;	X		
(C) Encourage the reduction of environmental pollution which may degrade a community;			X
(D) Foster safe, sanitary, and decent homes;			X
(E) Recognize community appearances as major economic and aesthetic assets of the counties and the State; encourage green belts, plantings, and landscape plans and designs in urban areas; and preserve and promote mountain-to-ocean vistas.			X
Discussion: The New Classroom Building will enhance community life in the area by providing more opportunity in secondary education for area residents, and serves to maintain Waipahu High School to the point where it can serve as a comfortable and reliable educational resource for nearby students.			
(9) Education and culture.			
(A) Foster culture and the arts and promote their linkage to the enhancement of the environment;			X
(B) Encourage both formal and informal environmental education to all age groups.	X		
Discussion: The New Classroom Building will provide spaces for biology, horticultural, and aquacultural study, encouraging formal education in these and other fields for Waipahu High School students.			

State Environmental Policy, Chapter 344, Hawaii Revised Statutes (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	S	N/S	N/A
(10) Citizen participation.			
(A) Encourage all individuals in the State to adopt a moral ethic to respect the natural environment; to reduce waste and excessive consumption; and to fulfill the responsibility as trustees of the environment for the present and succeeding generations; and	X		
(B) Provide for expanding citizen participation in the decision making process so it continually embraces more citizens and more issues.	X		
Discussion: The new facilities being constructed as part of the Project will greatly assist the State of Hawai'i to inform students and equip them with specific knowledge (biology, aquaculture, horticulture, etc.) necessary to fulfill their responsibilities as trustees of the environment. In addition, this EA discusses potential impacts and mitigation measures of the Proposed Project and will provide an opportunity for input during the Draft EA Public Comment period.			

5.2 CITY AND COUNTY OF HONOLULU

5.2.1 General Plan

The City and County of Honolulu's General Plan is the policy document for the long-range development of the Island of O'ahu. The General Plan is a statement of general conditions to be sought in the 20 year planning horizon and policies to help direct attainment of the plan's objectives. Specific General Plan goals and policies applicable to the Proposed Project are discussed below.

Health and Education

Objective B *– To provide a wide range of educational opportunities for the people of Oahu.*

Policies:

(1) Support education programs that encourage the development of employable skills.

(4) Encourage the construction of school facilities that are designed for flexibility and high levels of use.

(5) Facilitate the appropriate location of learning institutions from the preschool through university levels.

Discussion: The Project is in accordance with the City & County's goals in education, as the construction of this new school facility, located appropriately on an existing high school parcel, will expand the availability of resources and classroom space for Waipahu High School's student body, encouraging the development of employable skills such as digital media and culinary arts through the facilities mentioned in the Project Description (Section 2.3) of this environmental assessment.

5.2.2 Central O'ahu Sustainable Communities Plan

The City and County of Honolulu has adopted the Central O'ahu Sustainable Communities Plan (COSCP) as one of eight community-oriented plans to guide public policy, investment and decision making through the 2025 planning horizon. The document contains policies specific to Central O'ahu region. These policies, principles, and guidelines are then implemented through

ordinances such as the Land Use Ordinance (zoning code). The COSCP makes the following references to Waipahu High School:

Open Space and Views. *Significant views should be preserved, including views of the Koolau and Waianae Mountain Ranges from along Farrington Highway, views of Pearl Harbor from Farrington Highway in the vicinity of Waipahu High School, the view of the Waipahu Sugar Mill from the Waipahu Cultural Garden, and the view of the Waianae Mountains from the Waipahu Cultural Garden.*

Discussion: The proposed New Classroom Building is not inconsistent with the above references to Waipahu High School in the Central O'ahu SCP. The building will be consistent with the height of other buildings on the WHS campus, and will not interfere with views of Pearl Harbor from Farrington Highway.

5.2.3 Land Use Ordinance

The Land Use Ordinance (LUO), Chapter 21 of the Revised Ordinances of the City and County of Honolulu (ROH), implements the goals and objectives of the General Plan and the Central O'ahu SCP. All lands within the City and County of Honolulu are zoned into specific districts. According to the Department of Planning and Permitting, the Project Site is zoned R-5 Residential. According to the LUO Master Use Table (Table 21-3 of the LUO), public structures are permitted in all zoning districts.

Discussion: The proposed New Classroom Building is consistent with the LUO in that it is a public structure for public use, which is a permitted use in all zones, including the R-5 zone in which the Project is located.

Under the LUO, the current height limit under R-5 zoning is 25 feet. Since the proposed New Classroom Building is estimated to be a maximum of 51 feet, a Zoning Waiver application will be submitted. During the Draft EA public review period, the DPP commented (refer to letter in Appendix F): "If the proposed classroom building exceeds the allowable height limit or encroaches into any yards and/or height setbacks, an approved Zoning Waiver will be required prior to building permit approval."

During the Draft EA public review period, the DPP also wrote (refer to letter in Appendix F):

> "Provide the current Land Use Ordinance Zoning Data Table including: 1) Building Area (lot coverage) for each building or structure; 2) Off-street parking (noting parking established by Zoning Waiver No. 2005/W-4, any Department of Education portable exemption used, and additional parking shown in Building Permit Application No. A2019-05-1005); [and] 3) Off-street loading."

In a letter dated March 8, 2019 [2019/ELOG-239(JL1)], the DPP provided the following information regarding the off-street parking and loading requirements for the Project:

> "Pursuant to Land Use Ordinance (LUO) Table 21-6.1, the off-street parking requirement for public uses and structures (i.e., public high schools) is determined by the Director and is typically similar to other high schools. The off-street parking requirement for high schools is one stall per 200 square feet of classroom area plus

one stall per 400 square feet of office space. The following table shows the off-street parking requirements based upon the floor area provided. The total required off-street parking is 709 stalls. With a total of 439 existing stalls on campus, there is an overall shortage of 270 stalls. Temporary (portable) classrooms do not require off-street parking."

Table 11: LUO Off-Street Parking Requirements

Uses	Floor Area (SF)	Parking Requirement (stall/SF)	Parking Required	Existing Parking	Difference
Existing Classrooms	104,350	1 per 200	522		
Temporary Classrooms	22,586	None	--		
Proposed Classrooms	30,868	1 per 200	154		
Existing Offices	11,258	1 per 400	28		
Proposed Offices	1,721	1 per 400	4		
Totals			**709**	**439**	**270**

Notes: 1) Floor areas and parking stalls provided by DOE letter to DPP dated 1/29/19; 2) Actual floor areas and required parking will be confirmed during the building permit application process.

In the March 8, 2019 letter [2019/ELOG-239(JL1)], DPP continued:

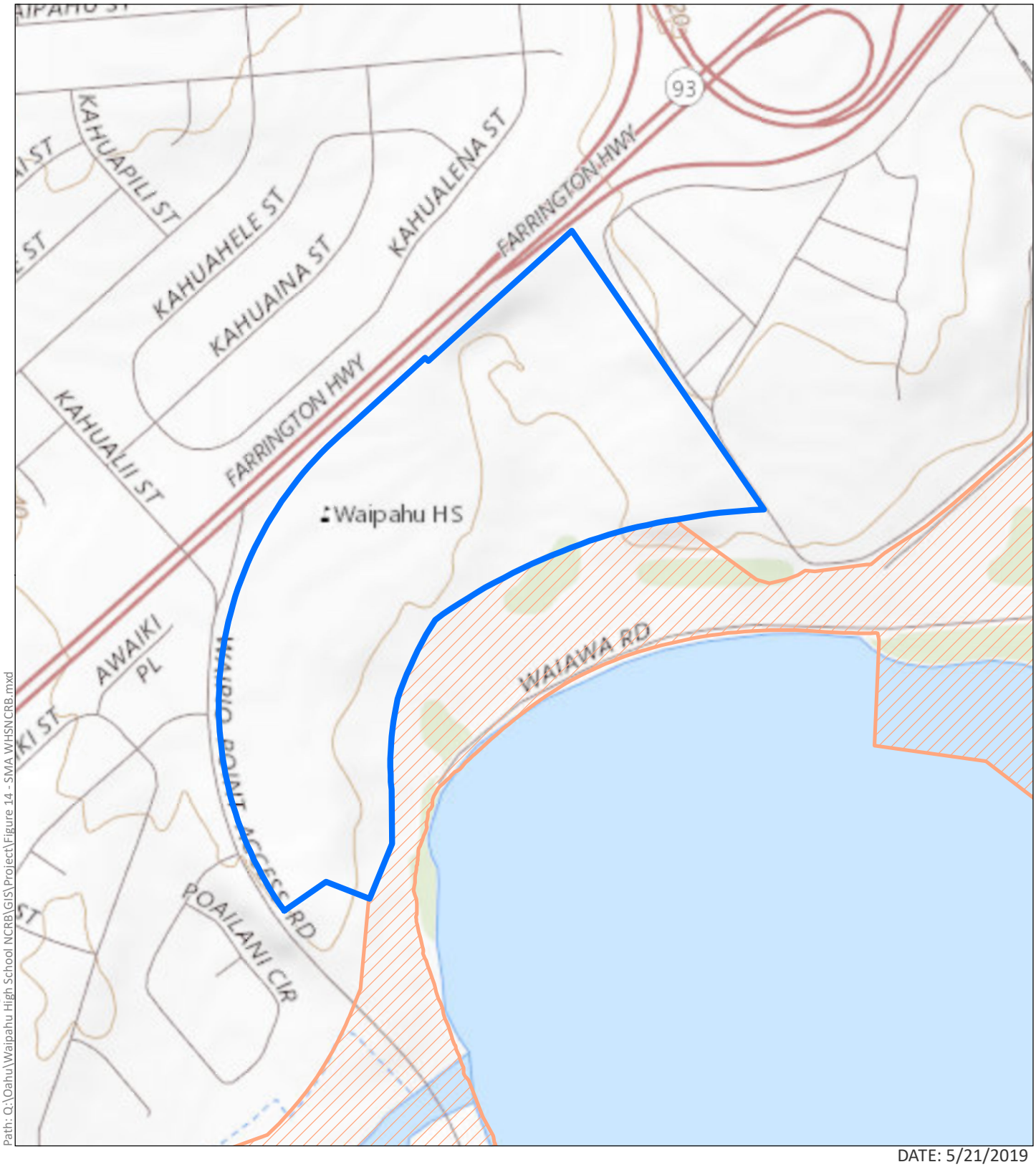
"According to your [DOE's] letter, only the existing upper campus parking lot (302 stalls) is currently utilized, while the lower campus parking lot (137 stalls) is not typically open and utilized on a daily basis. So, there seems to be more than adequate parking stalls based upon actual parking use and demand. The proposed classrooms are being added to address the program needs of the existing student enrollment and they are not anticipated to increase the student enrollment. You also mentioned that a significant portion of the existing students utilize the bus. There is also the future rail transit (Waipahu Transit Center) that will provide another means of public transportation for students and faculty, which may decrease the demand for parking. As such, based on the number of surplus parking stalls, no projected increase in student enrollment, and a majority of students utilize the bus, no additional parking stalls would be required at this time."

"Please note that off-street loading must comply with LUO Section 21-6.100 'Category B.' With 60,000 gross square feet of additional floor area for this classroom building, it would require three off-street loading stalls, which would require one additional loading stall to the two proposed loading stalls."

Actual floor areas and required parking will be confirmed during the building permit application process. Drawings showing building envelope, property lines, yards, and height setbacks, as well as numbered parking and loading stalls with typical dimensions, will be submitted to DPP with the permit applications.

5.2.4 Special Management Area

As shown in Figure 14, the Project is not located in the Special Management Area (SMA), and is thus not subject to the provisions of Chapter 25, ROH.



DATE: 5/21/2019

PDF: Q:\Oahu\Waipahu High School NCRB\PDF
Path: Q:\Oahu\Waipahu High School NCRB\GIS\Project\Figure 14 - SMA WHSNCRB.mxd

LEGEND

- Project Site
- Special Management Area

Figure 14:
Special Management Area (SMA)

WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING

State of Hawai'i - Department of Education — O'ahu

North

Linear Scale (feet)

0 125 250 500

PBR HAWAII & ASSOCIATES, INC.

Source: City & County of Honolulu, 2018. ESRI Online Basemaps.

5.2.5 Complete Streets

Complete streets are part of a transportation and design approach that aims to create a comprehensive, integrated network of streets that are safe and convenient for all people whether traveling by foot, bicycle, transit, or automobile, and regardless of age or ability. Complete Streets move away from streets designed with a singular focus on automobiles toward a design approach that is context-sensitive, multimodal, and integrated with the community's vision and sense of place. The end result is a road network that provides safe travel, promotes public health, and creates stronger communities.

The City and County of Honolulu is committed to complete streets solutions that improve safety, accessibility, and comfort for all users, encourage physical activity, and reflect community needs and character. In 2009, State Act 54, Session Laws of Hawai‘i (SLH) 2009 was passed, requiring all Counties and the State DOT to adopt a Complete Streets policy. The Honolulu Complete Streets Ordinance was passed by City Council and signed into law in 2012 as Ordinance 12-15 (Revised Ordinances of Honolulu (ROH) Chapter14, Article 33), establishing the complete streets policy for the City and County of Honolulu. In 2016, the City and County of Honolulu finalized its Complete Streets Design Manual and hired a Complete Streets Program Administrator to move toward implementation of improvements that make Honolulu’s streets and neighborhoods safe and inviting for all users, regardless of age or ability.

During the pre-assessment consultation process, DTS wrote:

> “To the extent practicable, the design of the project should be consistent with the City's Complete Streets ordinance and include features to encourage walking, bicycling and public transit.” (see letter in Appendix A).

The Complete Streets policy and principles are discussed below:

ROH §14-33.2 Complete streets policy; principles

(a) There is hereby established a complete streets policy and principles for the City and County of Honolulu to guide and direct more comprehensive and balanced planning, design, and construction of city transportation systems. Under this policy, the city hereby expresses its commitment to encourage the development of transportation facilities or projects that are planned, designed, operated, and maintained to provide safe mobility for all users. Every transportation facility or project, whether new construction, reconstruction, or maintenance, provides the opportunity to implement complete streets policy and principles. This policy provides that a context sensitive solution process and multi-modal approach be considered in all planning documents and for the development of all city transportation facilities and projects.

(b) Complete streets principles consist of the following objectives:
- *(1) Improve safety;*
- *(2) Apply a context sensitive solution process that integrates community context and the surrounding environment, including land use;*
- *(3) Protect and promote accessibility and mobility for all;*
- *(4) Balance the needs and comfort of all modes and users;*

(5) Encourage consistent use of national industry best practice guidelines to select complete streets design elements;
(6) Improve energy efficiency in travel and mitigate vehicle emissions by providing non-motorized transportation options;
(7) Encourage opportunities for physical activity and recognize the health benefits of an active lifestyle;
(8) Recognize complete streets as a long-term investment that can save money over time;
(9) Build partnerships with stakeholders and organizations statewide; and
(10) Incorporate trees and landscaping as integral components of complete streets.

Discussion: To the extent practicable, the design of the Proposed Project will be consistent with the City's Complete Streets ordinance and include features to encourage walking, bicycling and public transit. As discussed in Sections 4.2.5 (Bicycle Facilities) and 4.2.6 (Pedestrian Facilities) above, potential measures to protect and promote accessibility and mobility for all include the installation of new bike racks, as well as the addition of pedestrian paths, sidewalks, and bollards to highlight the presence of pedestrians, particularly at each of the crosswalks that connect to the campus.

5.3 LIST OF REQUIRED PERMITS AND APPROVALS

Anticipated permits and approvals that may be required are outlined in Table 12, below.

Table 12: Required Permits and Approvals

AGENCY	PERMIT/APPROVAL
State of Hawai'i	
Office of Environmental Quality Control	• Chapter 343, HRS Compliance
Department of Health	• National Pollutant Discharge Elimination System (NPDES) Permit (if necessary) • Dust Control Plan • Noise Permit (if necessary)
Department of Health – Disability and Communication Access Board	• Americans with Disabilities Act Compliance
Department of Land and Natural Resources, Historic Preservation Division	• Section 6E, HRS Review
Department of Transportation	• Highways Division Permit
City and County of Honolulu	
Department of Environmental Services	• Industrial Wastewater Discharge Permit (application submitted)
Department of Planning and Permitting	• Zoning Waiver (building height) • Grading, Grubbing, and Stockpiling Permits • Occupancy Permit • Building Permit (electrical, plumbing,

AGENCY	PERMIT/APPROVAL
	civil) • Site Development Master Application for Sewer Connection • Storm Drain Connection License (if necessary) • Storm Water Quality Strategic Plan • Rules Relating to Water Quality and Storm Drainage Standards Compliance
Department of Transportation Services	• Street Usage Permit

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6.0 ALTERNATIVES

In compliance with the provisions of Section 11-200-17(f), HAR relating to Environmental Impact Statements, an environmental assessment must discuss potential alternatives to the proposed action which could attain the objectives of the action in sufficient detail to explain why they were rejected. The alternatives considered include:

6.1 NO ACTION

The no-action alternative is no change to the existing site. Under this alternative the proposed Waipahu High School New Classroom Building will not be constructed. Without the Proposed Project, Waipahu High School will continue providing *ad hoc* classroom trailers and will continue to experience a shortage of classroom space and overcrowding of existing facilities.

6.2 ALTERNATIVES

Several alternatives were considered for the New Classroom Building in terms of building heights, the number and configurations of buildings, and phasing. One-, two-, and three-story alternatives were studied, each with its advantages and disadvantages.

Alternative 1: Single one-story building

A single one-story building would have the largest footprint and create the largest area of impervious surfaces, while also necessitating interior hallways. In addition, the alternative of single one-story building to accommodate the entire program would exceed the site boundary for the New Classroom Building.

Alternative 2: Two-story building

Two- and three-story options were also studied, which resulted in two or three buildings in various configurations. The two-story building option allowed for a smaller footprint but still utilized a large portion of the site with little room for at-grade gardens and improvements.

Alternative 3: Three-story building

The three-story option, with variations for stepping down to two-stories, allowed for a balance of at-grade garden space and terracing to allow for secured above-grade patios and programming. This alternative is the most-preferred by the DOE as it would attain the objectives of the proposed action while involving the smallest physical footprint.

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7.0 FINDINGS, SUPPORTING REASONS, AND ANTICIPATED DETERMINATION

To determine whether the Waipahu High School New Classroom Building may have a significant impact on the physical and human environment, all phases and expected consequences of the Proposed Project have been evaluated, including potential primary, secondary, short-range, long-range, and cumulative impacts. Based on this evaluation, the Approving Agency (State of Hawai‘i, Department of Education) anticipates issuing a Finding of No Significant Impact (FONSI) for the New Classroom Building. The supporting rationale for this anticipated finding is presented in this chapter.

7.1 PROBABLE IMPACT, INCLUDING CUMULATIVE IMPACTS

Cumulative impacts are impacts on the environment that result from the action when added to other past, present, and foreseeable future actions by other agencies or persons. Examples of possible cumulative impacts of a proposed action could be those related to increased traffic and greater demand on water, sanitary sewer and storm drainage capacity.

On June 26, 2006, Governor Lingle signed HB2175, which requires each State agency to design and construct buildings to meet the LEED Silver certified level, or a comparable standard. The law applies to all new State-owned construction of buildings 5,000 square feet or greater, including K-12 public schools. As a result, the design of all new school buildings must include resource conservation through energy efficiency, water conservation, recycling and other environmentally sensible practices. The Proposed Project is being designed using LEED-NC standards as general guidelines to set sustainability targets. In addition, all new buildings are subject to an Environmental Assessment and the development of the projects will include appropriate mitigation measures to address any impacts. Regarding the exact sustainable design features of the New Classroom Building, various energy- and water-saving technologies will be incorporated.

Based on the fact that it is now DOE’s additional initiative to replace and renovate existing structures using environmentally sensible design and construction, it is assumed that the cumulative impacts from the proposed New Classroom Building will be minimal.

Social-economic impacts resulting from the proposed DOE project are anticipated to be beneficial. Construction generates employment and economic opportunities. The New Classroom Building will provide WHS with the additional classroom space and improved facilities necessary to address the current classroom shortage while continuing to deliver quality education to its students. Overall, the net cumulative impact is expected to have a positive effect on high school students and the broader community.

7.2 SIGNIFICANCE CRITERIA

Based upon the previous information presented in this document the proposed permitting and construction of the New Classroom Building will likely have no significant environmental

impacts. This determination is based upon the thirteen Significance Criteria outlined in Chapter 343, HRS, as amended and Title 11 Chapter 200 HAR 1996, discussed below.

(1) Involves an irrevocable commitment to loss or destruction of any natural or cultural resource;

The Site's status as an existing paved and landscaped area, plus prior land disturbance suggests that the Site is absent any resources potentially subject to irrevocable loss as a result of construction.

(2) Curtails the range of beneficial uses of the environment;

The New Classroom Building will not curtail the range of beneficial uses of the environment as the Site is currently developed.

(3) Conflicts 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 Environmental Policies enumerated in Chapter 344, HRS promote conservation of natural resources, and an enhanced quality of life for all citizens. As detailed in Section 5.1.4 above, the proposed New Classroom Building does not conflict with the State's long-term environmental policies, goals, or guidelines as expressed in Chapter 344, HRS, and will not significantly impact natural resources due to the fact that the Site is already developed has been subject to intense human utilization since WHS's move to the current location in 1969.

(4) Substantially affects the economic or social welfare of the community or State;

The New High School Building will positively influence social welfare by facilitating the education of students at Waipahu High School.

(5) Substantially affects public health;

The potential impacts related to noise, air or water quality during construction will be addressed through construction management practices in compliance with Federal, State and County requirements. The Department of Education's initiative to build sustainably will help to ensure that the proposed New Classroom Building will not negatively affect public health.

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

The Department of Education anticipates no increase in student population as a result of the proposed New Classroom Building. The Project is proposed to address needs at the current and planned enrollment levels. The new facilities provided by the new structure will help students learn and succeed in the 21st century, especially in the rapidly growing fields of biology/environmental science and hospitality/culinary arts.

The New Classroom Building would include state-of-the-art materials and resources (books, computers, equipment, supplies, etc.) available for use by students and faculty to enhance their instructional needs. The space would include a variety of individual and group study/work

configuration spaces and would promote the use of various forms of activities as needed by courses and instructors.

(7) Involves a substantial degradation of environmental quality;

No substantial environmental degradation is anticipated. The Department of Education has committed itself to a development initiative of environmental sustainability. The project will need to meet minimum applicable statutes and regulations as well as the more stringent self-imposed sustainability requirements.

(8) Is individually limited but cumulatively has considerable effect on the environment, or involves a commitment for larger actions;

The proposed action will not have any substantial negative secondary impacts on the environment. Implementation of the Proposed Project will not commit the Department of Education to any other larger actions, and will not generate any additional actions having a cumulative effect on the environment.

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

The New Classroom Building will occupy a site that is already committed to a portion of an existing paved courtyard, basketball courts, and lawn, and the proposed future New Parking Area will involve an undeveloped portion of campus; however, due to intense human utilization since WHS's move to the current location in 1969, the proposed improvements are not anticipated to have any impact on endangered flora or faunal species. The site contains no habitat for rare, threatened or endangered plant or animal species.

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

Air Quality: No State or Federal air quality standards will be violated during or after the construction of the New Classroom Building.

Water Quality: No State or Federal water quality standards will be violated during or after the construction of the New Classroom Building.

Ambient Noise Levels: Construction activities for the Proposed Project will inevitably create temporary noise impacts. The developer may employ mitigation measures to minimize those temporary noise impacts including the use of mufflers and implementing construction curfew periods. Pursuant to Chapter 11-46, Hawai'i Administrative Rules, the project activities will comply with all community noise controls.

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

The Project Site does not lie in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, estuary, freshwater or coastal waters. Likewise, the New Classroom Building is not anticipated to have any impact on any natural hazard conditions.

(12) Substantially affects scenic vistas and view planes identified in County or State plans or studies; or,

Adverse effects to mauka views will not occur due to the surrounding built environment (the existing buildings of the Waipahu High School campus).

(13) Requires substantial energy consumption.

The Proposed Project will not require substantial energy consumption. As mentioned above, energy saving design elements will be integrated into building design using LEED NC Silver and HI-CHPS standards as general guidelines to set sustainability targets.

7.3 DETERMINATION

On the basis of impacts and mitigation measures examined in this document and analyzed under the above criteria, it is anticipated that the New Classroom Building will not have a significant effect on the physical or human environments. Pursuant to Chapter 343, HRS, the approving agency, the State of Hawai‘i, Department of Education, will issue a Finding of No Significant Impact (FONSI).

8.0 REFERENCES

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APPENDIX A
Pre-Assessment Consultation Comment Letters & Responses

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DAVID Y. IGE
GOVERNOR

RODERICK K. BECKER
Comptroller

AUDREY HIDANO
Deputy Comptroller

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

(P)1194.7

MAY 12 2017

Mr. Dalton Ribble
PBR Hawaii & Associates, Inc.
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484

Dear Mr. Ribble:

Subject: Waipahu High School New Classroom Building
TMK: (1) 9-4-008:020 (por.)

Thank you for the opportunity to comment on the subject project. We have no comments to offer at this time as the proposed project does not impact any of the Department of Accounting and General Services' projects or existing facilities.

If you have any questions, your staff may call Mr. Kimo Marion of the Public Works Division at 586-0491.

Sincerely,

RODERICK K. BECKER
Comptroller

PBR HAWAII
& ASSOCIATES, INC.

May 28, 2019

Mr. Curt Otaguro
Comptroller
Department of Accounting and General Services
State of Hawai‘i
P.O. Box 119
Honolulu, Hawai‘i 96810-0119

Attn: Mr. Kimo Marion, Public Works Division

SUBJECT: PRE-ASSESSMENT CONSULTATION FOR A HRS CHAPTER 343 ENVIRONMENTAL ASSESSMENT – WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING, WAIPAHU TMK (1) 9-4-008:020 (POR.) & 025 (POR.)

Dear Mr. Otaguro:

Thank you for your agency's letter dated May 12, 2017 (your reference number (P)1194.7) regarding the subject project. As the planning sub-consultant for the State of Hawai‘i Department of Education (DOE), we acknowledge that the Department of Accounting and General Services (DAGS) has no comments at this time as the proposed Project will not impact any of the DAGS's projects or existing facilities.

We value your participation in the environmental review process. Your letter will be reproduced in the forthcoming Draft Environmental Assessment (EA).

Sincerely,
PBR HAWAII

Greg Nakai
Planner

cc: Karynn Yoneshige, DOE
Rochelle Nagata-Wu, WRNS

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O:\Job24\2472.30 DOE Waipahu HS New Classroom Bldg\EA\Pre-Consultation\Responses\State - DAGS Response.docx

OFFICE OF PLANNING
STATE OF HAWAII

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Ref. No. P-15608

May 17, 2017

Mr. Dalton Ribble
Planner
PBR HAWAII & Associates, Inc.
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-2484

Dear Mr. Ribble:

Subject: Pre-Assessment Consultation for a HRS Chapter 343 Environmental Assessment – Waipahu High School New Classroom Building, Waipahu TMK: (1) 9-4-008: 020 (por)

Thank you for the opportunity to provide comments on this pre-consultation request for the preparation of a Draft Environmental Assessment (Draft EA) for a new classroom building at Waipahu High School (WHS), Island of Oahu. The pre-consultation request material was transmitted to our office via letter dated April 27, 2017.

It is our understanding that the proposed construction of a new on-campus building will create an additional 18 classrooms that will provide space for courses in biology, chemistry, aquaculture, horticulture, general education rooms, and a digital media classroom with modern multimedia equipment. Additionally, the new building will have an industrial kitchen and a restaurant-style cafeteria, which will provide the students of WHS with hands-on experience in a culinary program.

The material transmitted to our office states that the proposed building will help alleviate the shortage of classroom space that Waipahu High School currently faces. The new multi-purpose building will eliminate the need for WHS to utilize temporary modular buildings for instructional space for students and staff.

The Office of Planning (OP) has reviewed the transmitted material and has the following comments to offer:

1. Pursuant to Hawaii Administrative Rules (HAR) § 11-200-10(4) – general description of the action's technical, economic, social, and environmental characteristics; this project must demonstrate that it is consistent with a number of state environmental, social, economic goals, and policies for land use. Hawaii Revised Statutes (HRS) Chapter 226, the Hawaii State Planning Act, provides goals, objectives, policies, and

priority guidelines for growth, development, and the allocation of resources throughout the state in areas of state interest.

The analysis on the Hawaii State Planning Act should include a discussion on the project's ability to meet all of the goals, objectives, policies, and priority guidelines or clarify where it is in conflict with them. If any of these themes are not applicable to the project, the Draft EA should affirmatively state such determination, followed by discussion paragraphs.

2. The coastal zone management (CZM) area is defined as "all lands of the State and the area extending seaward from the shoreline to the limit of the State's police power and management authority, including the U.S. territorial sea" (see HRS § 205A-1).

   HRS Chapter 205A-5(b) requires all state and county agencies to enforce the CZM objectives and policies. The Draft EA should include an assessment as to how the proposed action conforms to the goals and objectives of the Hawaii CZM program as listed in HRS § 205A-2. Compliance with HRS § 205A-2 is an important component for satisfying the requirements of HRS Chapter 343.

3. Pursuant to HAR § 11-200-10(6) – the identification and summary of impacts and alternatives considered; in order to ensure that the natural resources and coastal areas within the State of Hawaii remain protected, the Draft EA should summarize the potential impact to nearshore marine resources and actions proposed to ensure the coastal ecosystems are protected and potential hazards mitigated. The marine water quality classification, should be considered when developing mitigation measures to protect the coastal ecosystem. The Draft EA should detail proposed safeguards and best management practices (BMPs) used to protect water quality, and prevent sediment, soils, and construction debris from impacting surface water resources and the marine ecosystem.

   The Draft EA should examine potential benefits and/or negative impacts resulting from this project on coastal and marine resources. Issues to consider include, but are not limited to, site characteristics of the project in relation to erosion controls, undeveloped open spaces, and the absorption characteristics of nearby soil. Furthermore, it should differentiate between the existing permeable surfaces versus hardened surfaces that have a cumulative effect on the volume and speed of storm runoff. These items, as well as the marine water quality classification, should be considered when developing mitigation measures to protect the coastal ecosystem.

Because this project may increase the amount of impervious surfaces within an urbanized area of Waipahu, please consider the use of low impact development (LID) design features. LID features that can be considered include options not solely for the new building, but may be employed campus wide. Proven LID features include runoff control techniques such as bioretention basins; grassed swales; permeable surfaces for walkways, driveways, and parking areas; and onsite infiltration techniques that treat stormwater in place, rather than allow rainfall to flow offsite.

OP has a number of resources available to assist in the development of projects which may assist in the mitigation of sediment loss and stormwater control, thus protecting the nearshore environment. OP recommends consulting these guidance documents and stormwater evaluative tools when developing strategies to address polluted runoff. They offer useful techniques to keep land-based pollutants and sediment in place and prevent contaminating nearshore waters.

- Stormwater Impact Assessments can be used to identify and evaluate information on hydrology, stressors, sensitivity of aquatic and riparian resources, and management measures to control runoff, as well as consider secondary and cumulative impacts to the area http://files.hawaii.gov/dbedt/op/czm/initiative/stomwater_imapct/final_stormwater_impact_assessments_guidance.pdf
- Low Impact Development (LID), A Practitioners Guide covers a range of structural best management practices for stormwater control management, onsite infiltration techniques, water reuse methods, and building layout designs that minimize negative environmental impacts http://files.hawaii.gov/dbedt/op/czm/initiative/lid/lid_guide_2006.pdf

If you have any questions regarding this comment letter, please contact Joshua Hekekia of our office at (808) 587-2845.

Sincerely,

Leo R. Asuncion
Director

PBR HAWAII
& ASSOCIATES, INC.

THOMAS S. WITTEN, FASLA
Chairman / Principal

R. STAN DUNCAN, ASLA
President / Principal

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printed on recycled paper

May 28, 2019

Ms. Mary Alice Evans
Planning Program Administrator II, Planning Division
State of Hawai‘i, Office of Planning
P.O. Box 2359
Honolulu, Hawai‘i 96804

Attn: Joshua Hekekia

SUBJECT: PRE-ASSESSMENT CONSULTATION FOR A HRS CHAPTER 343 ENVIRONMENTAL ASSESSMENT – WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING, WAIPAHU TMK (1) 9-4-008:020 (POR.) & 025 (POR.)

Dear Ms. Evans:

Thank you for your agency’s letter dated May 17, 2017 (your reference number P-15608) regarding the subject project. As the planning sub-consultant for the State of Hawai‘i Department of Education (DOE), we acknowledge your comments and provide the following response.

The Draft Environmental Assessment (EA) will include a(n):

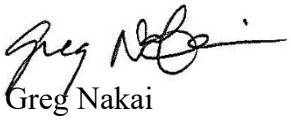
1. Discussion on the project's ability to meet all parts of Hawai‘i Revised Statutes (HRS) Chapter 226 (the Hawai‘i State Planning Act), pursuant to Hawai‘i Administrative Rules (HAR) § 11-200-10(4). This analysis will be in tabular format, with discussions of applicability as requested;

2. Assessment as to how the proposed action conforms to each of the goals and objectives of the Coastal Zone Management (CZM) program, as listed in HRS Chapter 205A-2; and

3. Summary of impacts and alternatives of the Project with regard to natural resource and coastal area/ecosystem hazards; this will include detailing the Best Management Practices (BMPs) used to protect the environment from potential impacts resulting from the Project. Likewise, potential benefits and/or negative impacts resulting from the Project on coastal and marine resources will be fully assessed in the Draft EA. The use of low impact development (LID) design features will be taken into consideration.

We value your participation in the environmental review process. Your letter will be reproduced in the forthcoming Draft EA.

Sincerely,
PBR HAWAII



Greg Nakai
Planner

cc: Karynn Yoneshige, DOE
Rochelle Nagata-Wu, WRNS

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DAVID Y. IGE
GOVERNOR

ARTHUR J. LOGAN
MAJOR GENERAL
ADJUTANT GENERAL

KENNETH S. HARA
BRIGADIER GENERAL
DEPUTY ADJUTANT GENERAL

STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE ADJUTANT GENERAL
3949 DIAMOND HEAD ROAD
HONOLULU, HAWAII 96816-4495

May 18, 2017

Mr. Dalton Ribble
PBR Hawaii & Associates, Inc.
1001 Bishop Street, Suite 650
Honolulu, HI 96813-3484

Dear Mr. Ribble:

Subject: Pre-assessment Consultation for a HRS Chapter 343 Environmental Assessment - Waipahu High School New Classroom Building, Waipahu, TMK: (1) 9-4-008: 020 (Por.)

Thank you for the opportunity to comment on the above project. The State of Hawaii Department of Defense has no comments to offer relative to the project.

Should you have any questions or concerns, please have your staff contact Ms. Shao Yu Lee, our Land Manager on Oahu, at (808) 733-4250.

Sincerely,

NEAL S. MITSUYOSHI, P.E.
Colonel, Hawaii National Guard
Chief Engineering Officer

c: Mr. David Kennard, Hawaii Emergency Management Agency (HI-EMA)
Ms. Havinne Okamura, HI-EMA
Mr. Albert Chong, HI-EMA

PBR HAWAII
& ASSOCIATES, INC.

May 28, 2019

Colonel Neal S. Mitsuyoshi, P.E.
Chief Engineering Officer
Office of the Adjutant General
State of Hawai‘i, Department of Defense
3949 Diamond Head Road
Honolulu, Hawai‘i 96816-4495

Attn: Ms. Shao Yu Lee, O‘ahu Land Manager

SUBJECT: PRE-ASSESSMENT CONSULTATION FOR A HRS CHAPTER 343 ENVIRONMENTAL ASSESSMENT – WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING, WAIPAHU TMK (1) 9-4-008:020 (POR.) & 025 (POR.)

Dear Colonel Mitsuyoshi:

Thank you for your letter dated May 18, 2017, regarding the subject project. As the planning sub-consultant for the State of Hawai‘i Department of Education (DOE), we acknowledge that the Department of Defense has no comments to offer relative to the project.

We value your participation in the environmental review process. Your letter will be reproduced in the forthcoming Draft Environmental Assessment (EA).

Sincerely,
PBR HAWAII

Greg Nakai
Planner

cc: Karynn Yoneshige, DOE
Rochelle Nagata-Wu, WRNS

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HONOLULU OFFICE
1001 Bishop Street, Suite 650
Honolulu, Hawai'i 96813-3484
Tel: (808) 521-5631
Fax: (808) 523-1402
E-mail: sysadmin@pbrhawaii.com

DAVID Y. IGE
GOVERNOR
STATE OF HAWAII

SHAN S. TSUTSUI
LT. GOVERNOR
STATE OF HAWAII

JOBIE M. K. MASAGATANI
CHAIRMAN
HAWAIIAN HOMES COMMISSION

WILLIAM J. AILA, JR.
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P. O. BOX 1879
HONOLULU, HAWAII 96805

May 12, 2017

PBR Hawaii & Associates, Inc.
Attn: Dalton Ribble
1001 Bishop Street, Suite 650
Honolulu, HI 96813-3484

Dear Mr. Ribble:

Subject: Pre-Assessment Consultation for a HRS Chapter 343 Environmental Assessment—Waipahu High School New Classroom Building, Waipahu TMK (1) 9-4-008: 020 (Por.)

The Department of Hawaiian Home Lands acknowledges receiving the request for comments on the above-cited project. After reviewing the materials submitted, due to its lack of proximity to Hawaiian Home Lands, we do not anticipate any impacts to our lands or beneficiaries from the project.

However, we highly encourage all agencies to consult with Hawaiian Homestead community associations and other (N)native Hawaiian organizations when preparing environmental assessments in order to better assess potential impacts to cultural and natural resources, access and other rights of Native Hawaiians.

Mahalo for the opportunity to provide comments. If you have any questions, please call Sharde Freitas, at 620-9485 or contact via email at sharde.k.freitas@hawaii.gov.

Sincerely,

M. Kaleo Manuel
Acting Planning Program Manager

PBR HAWAII
& ASSOCIATES, INC.

THOMAS S. WITTEN, FASLA
Chairman / Principal

R. STAN DUNCAN, ASLA
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Vice-President / Principal

TOM SCHNELL, AICP
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ANN MIKIKO BOUSLOG, PhD
Project Director

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Cultural Sustainability Planner

RAYMOND T. HIGA, ASLA
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MARC SHIMATSU, ASLA
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Associate

NATHALIE RAZO
Associate

GRACE ZHENG, ASLA, LEED® GA, SITES® AP
Associate

BRIAN WOLF, ASLA, LEED® AP
Associate

May 28, 2019

Mr. Andrew H. Choy
Acting Planning Program Manager
State of Hawai‘i
Department of Hawaiian Home Lands
P.O. Box 1879
Honolulu, Hawai‘i 96805

Attn: Sharde Freitas

SUBJECT: PRE-ASSESSMENT CONSULTATION FOR A HRS CHAPTER 343 ENVIRONMENTAL ASSESSMENT – WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING, WAIPAHU TMK (1) 9-4-008:020 (POR.) & 025 (POR.)

Dear Mr. Choy:

Thank you for your agency's letter dated May 12, 2017, regarding the subject project. As the planning sub-consultant for the State of Hawai‘i Department of Education (DOE), we acknowledge your comment that you do not anticipate any impacts to Hawaiian Home Lands or beneficiaries. Per your comment, Hawaiian Homestead community associations in close proximity and other (N)native Hawaiian organizations will be consulted in the preparation of this environmental assessment (EA).

We value your participation in the environmental review process. Your letter will be reproduced in the forthcoming Draft EA.

Sincerely,
PBR HAWAII

Greg Nakai
Planner

cc: Karynn Yoneshige, DOE
Rochelle Nagata-Wu, WRNS

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1001 Bishop Street, Suite 650
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DAVID Y. IGE
GOVERNOR OF HAWAII

VIRGINIA PRESSLER, M.D.
DIRECTOR OF HEALTH

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

In reply, please refer to:
File:

EPO 17-109

May 16, 2017

Mr. Dalton Ribble, Planner
PBR HAWAII & Associates, Inc.
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484
Email: sysadmin@pbrhawaii.com

Dear Mr. Ribble:

SUBJECT: Pre-Assessment Consultation Environmental Assessment (PAC EA) for Waipahu High School New Classroom Building
TMK: (1) 9-4-008: 020 (por)

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your PAC EA to our office on May 2, 2017.

We understand from your PAC DEA that *"The proposed Project involves 18 new classrooms, comprising new biology, chemistry, natural resource, aquaculture, and horticulture facilities (to include a fish tank and greenhouse); culinary classrooms with industrial kitchens and restaurant-style cafeteria space; digital media classrooms with modern computers and multimedia equipment; and general education classrooms."*

In the development and implementation of all projects, EPO strongly recommends regular review of State and Federal environmental health land use guidance. State standard comments and available strategies to support sustainable and healthy design are provided at: http://health.hawaii.gov/epo/landuse. Projects are required to adhere to all applicable standard comments. EPO has recently updated the environmental Geographic Information System (GIS) website page. It now compiles various maps and viewers from our environmental health programs. The eGIS website page is continually updated so please visit it regularly at: http://health.hawaii.gov/epo/egis

In 2015, Hawaii passed Act 97 which amended Hawaii's Renewable Portfolio Standards by setting a goal for Hawaii to become one hundred percent renewable by the year 2045. To reach this goal Hawaii should transform its transportation sector from the use of fossil fuels to renewable fuel, electric vehicles (EV)s, and public transit systems including bikeshare programs. To address "range anxiety" and facilitate the adoption of EVs, it is essential that EV charging stations be added to any planned parking areas open to the EV driving public. All future plans should strive to encourage the use of personal bicycles though the development of designated bike lanes and class A bike trails. All efforts should be made to reduce harmful vehicle emissions, reduce vehicle miles travelled (VMT's), encourage alternative modes of transport and increase physical activity.

EPO also encourages you to examine and utilize the Hawaii Environmental Health Portal at: https://eha-cloud.doh.hawaii.gov. This site provides links to our e-Permitting Portal, Environmental Health Warehouse, Groundwater Contamination Viewer, Hawaii Emergency Response Exchange, Hawaii State and Local Emission Inventory System, Water Pollution Control Viewer, Water Quality Data, Warnings, Advisories and Postings.

We suggest you review the requirements of the Clean Water Branch (Hawaii Administrative Rules {HAR}, Chapter 11-54-1.1, -3, 4-8) and/or the National Pollutant Discharge Elimination System (NPDES) permit (HAR, Chapter 11-55) at: http://health.hawaii.gov/cwb. If you have any questions, please contact the Clean Water Branch (CWB), Engineering

Section at (808) 586-4309 or cleanwaterbranch@doh.hawaii.gov. If your project involves waters of the U.S., it is highly recommended that you contact the Army Corps of Engineers, Regulatory Branch at: (808) 835-4303.

Please note that all wastewater plans must conform to applicable provisions (HAR, Chapter 11-62, "Wastewater Systems"). We reserve the right to review the detailed wastewater plans for conformance to applicable rules. Should you have any questions, please review online guidance at: http://health.hawaii.gov/wastewater and contact the Planning and Design Section of the Wastewater Branch (WWB) at (808) 586-4294.

Any construction waste generated by the project needs to be disposed of at a solid waste disposal facility that complies with the applicable provisions (HAR, Chapter 11-58.1 "Solid Waste Management Control"). The open burning of any of these wastes, on or off site, is strictly prohibited. Additional information is accessible at: http://health.hawaii.gov/shwb. For specific questions call (808) 586-4226.

If temporary fugitive dust emissions could be emitted when the project site is prepared for construction and/or when construction activities occur, we recommend you review the need and/or requirements for a Clean Air Branch (CAB) permit (HAR, Chapter 11-60.1 "Air Pollution Control"). Effective air pollution control measures need to be provided to prevent or minimize any fugitive dust emissions caused by construction work from affecting the surrounding areas. This includes the off-site roadways used to enter/exit the project. The control measures could include, but are not limited to, the use of water wagons, sprinkler systems, and dust fences. For questions contact the Clean Air Branch via e-mail at: Cab.General@doh.hawaii.gov or call (808) 586-4200.

If noise created during the construction phase of the project may exceed the maximum allowable levels (HAR, Chapter 11-46, "Community Noise Control") then a noise permit may be required and needs to be obtained before the commencement of work. Relevant information is online at: http://health.hawaii.gov/irhb/noise EPO recommends you contact the Indoor and Radiological Health Branch (IRHB) at (808) 586-4700 with any specific questions.

A phase I Environmental Site Assessment (ESA) and site investigation should be conducted for residential development or redevelopment projects in current or formerly used industrial areas and on formerly and currently zoned agricultural land used for growing sugar, pineapple or other agricultural products. If the investigation shows that a release of petroleum, hazardous substance, pollutants or contaminants may have occurred at the site, the site should be properly characterized through an approved Hawaii State Department of Health (DOH)/Hazard Evaluation and Emergency Response Office (HEER) soil and/or groundwater sampling plan. Please refer to Sections 3 and 4 of the HEER Office Technical Guidance Manual http://www.hawaiidoh.org. If the site is found to be contaminated, then all removal and remedial actions to clean up hazardous substance or oil releases by past and present owners/tenants must comply with State Law (HRS, Chapter 128D, "Environmental Response Law", Chapter 451, "State Contingency Plan"). To identify HEER records related to the property, visit http://eha-web.doh.hawaii.gov/eha-cma/Leaders/HEER/public-records. For information on site assessment and cleanup programs review: http://eha-web.doh.hawaii.gov/eha-cma/Leaders/HEER/site-assessment-and-cleanup-programs. Any specific questions should be directed to the HEER office at (808) 586-4249.

You may also wish to review the draft Office of Environmental Quality Control (OEQC) viewer at: http://eha-web.doh.hawaii.gov/oeqc-viewer. This viewer geographically shows where some previous Hawaii Environmental Policy Act (HEPA) {Hawaii Revised Statutes, Chapter 343} documents have been prepared.

To better protect public health and the environment, the U.S. Environmental Protection Agency (EPA) has developed a new environmental justice (EJ) mapping and screening tool called EJSCREEN. It is based on nationally consistent

data and combines environmental and demographic indicators in maps and reports. EPO encourages you to explore, launch and utilize this powerful tool in planning your project. The EPA EJSCREEN tool is available at: http://www.epa.gov/ejscreen.

We request that you utilize all this information on your proposed project to increase sustainable, innovative, inspirational, transparent and healthy design. Thank you for the opportunity to comment.

Mahalo nui loa,

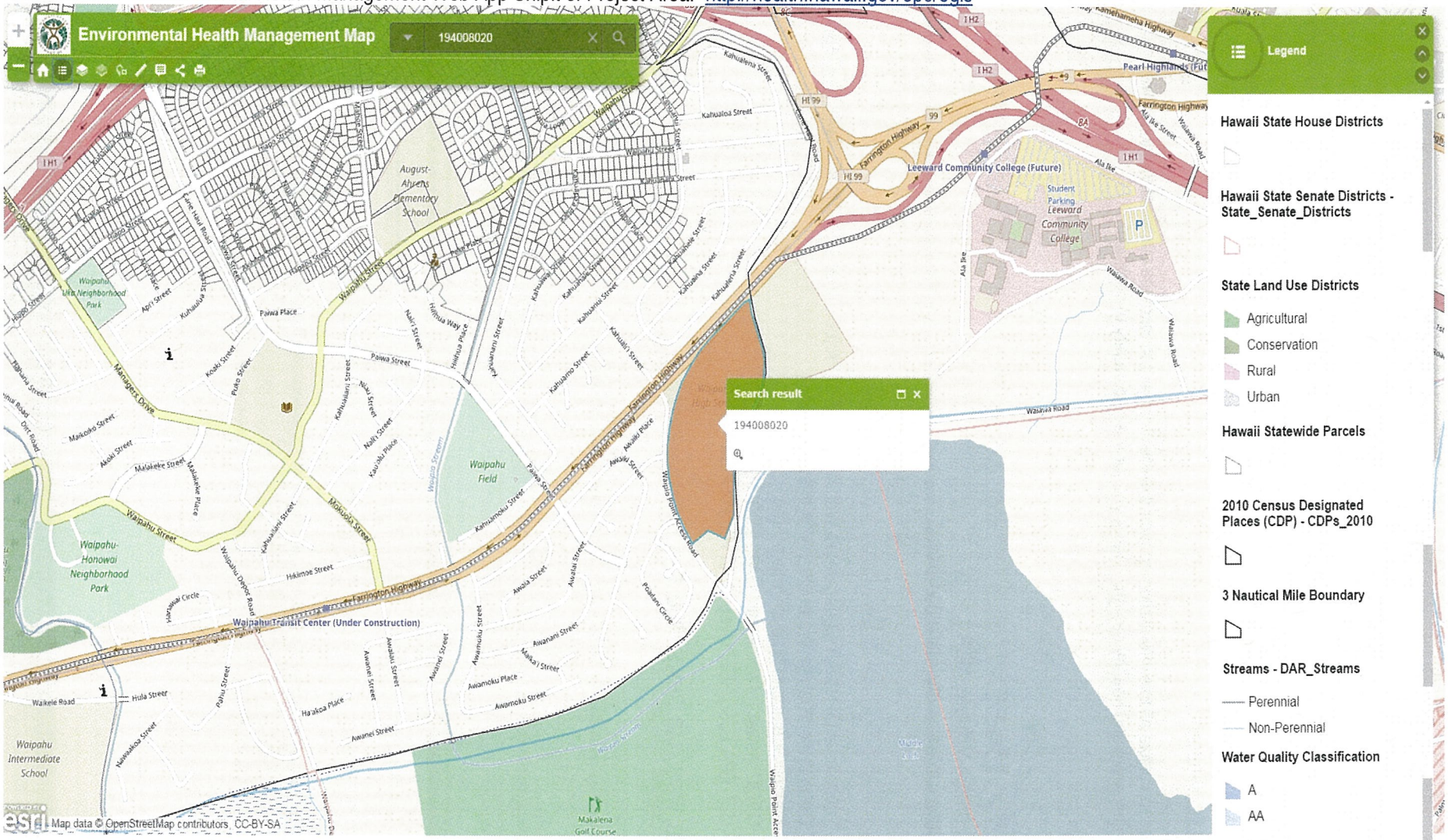
Laura Leialoha Phillips McIntyre, AICP
Program Manager, Environmental Planning Office

LM:nn

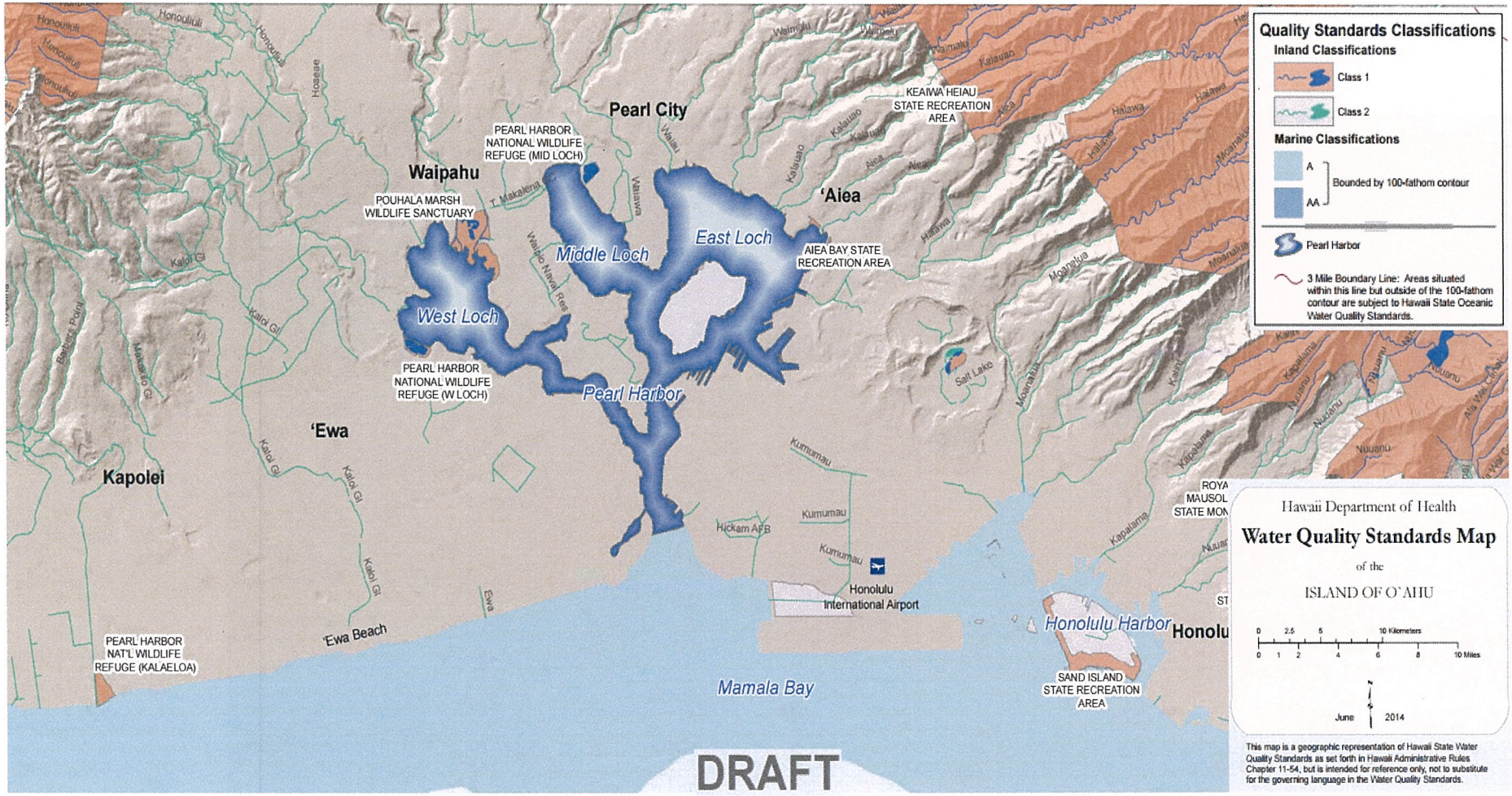
Attachment 1: Environmental Health Management Web App Snipit of Project Area: http://health.hawaii.gov/epo/egis
Attachment 2: Clean Water Branch: Water Quality Standards Map
Attachment 3: Historic Sugarcane Map of Project Area
Attachment 4: OEQC viewer (of some past EA's, EIS's in area)
Attachment 5: U.S. EPA EJSCREEN Report for Project Area

c: DOH: CWB, WWB, CAB, SHWB, IRHB, SAN, HEER {via email only}

Attachment 1: Environmental Health Management Web App Snipit of Project Area: http://health.hawaii.gov/epo/egis



Attachment 2: Clean Water Branch: Water Quality Standards Map



Attachment 3: Historic Sugarcane Map of Project Area

Attachment 4: OEQC viewer (of some past EA's, EIS's in area)

Attachment 5: U.S. EPA EJSCREEN Report for Project Area

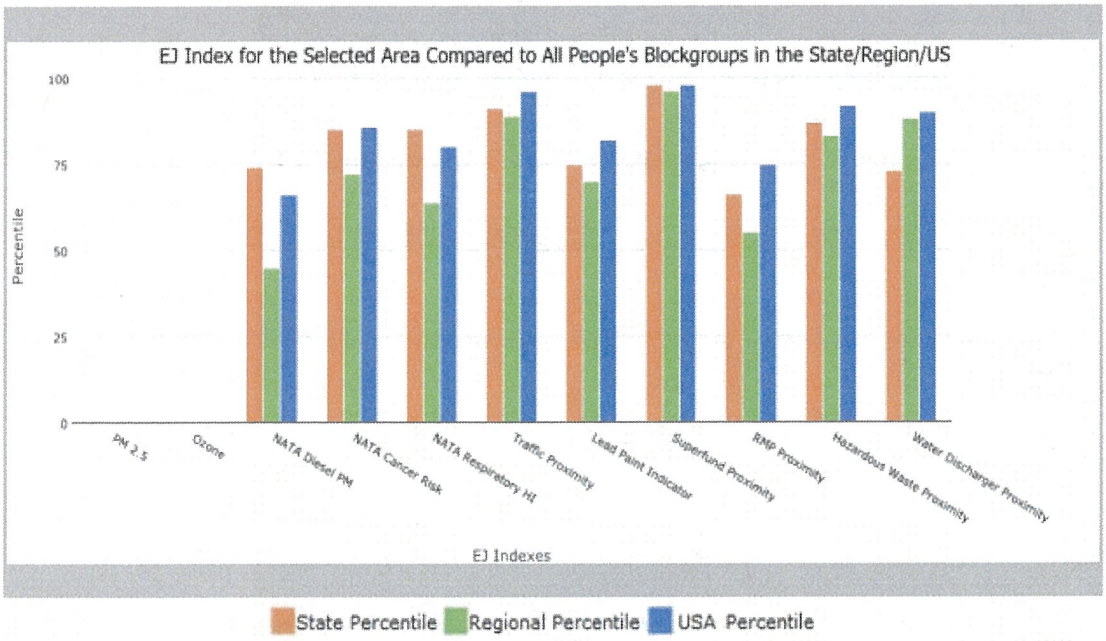
EJSCREEN Report (Version 2016)

1 mile Ring Centered at 21.389094,-157.992571, HAWAII, EPA Region 9

Approximate Population: 24,417

Input Area (sq. miles): 3.14

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
EJ Indexes			
EJ Index for PM2.5	N/A	N/A	N/A
EJ Index for Ozone	N/A	N/A	N/A
EJ Index for NATA* Diesel PM	74	45	66
EJ Index for NATA* Air Toxics Cancer Risk	85	72	86
EJ Index for NATA* Respiratory Hazard Index	85	64	80
EJ Index for Traffic Proximity and Volume	91	89	96
EJ Index for Lead Paint Indicator	75	70	82
EJ Index for Superfund Proximity	98	96	98
EJ Index for RMP Proximity	66	55	75
EJ Index for Hazardous Waste Proximity*	87	83	92
EJ Index for Water Discharger Proximity	73	88	90



This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

EJSCREEN Report (Version 2016)

1 mile Ring Centered at 21.389094,-157.992571, HAWAII, EPA Region 9

Approximate Population: 24,417

Input Area (sq. miles): 3.14

Sites reporting to EPA	
Superfund NPL	1
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0
National Pollutant Discharge Elimination System (NPDES)	0

EJSCREEN Report (Version 2016)

1 mile Ring Centered at 21.389094,-157.992571, HAWAII, EPA Region 9

Approximate Population: 24,417

Input Area (sq. miles): 3.14

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in µg/m³)	N/A	N/A	N/A	9.37	N/A	9.32	N/A
Ozone (ppb)	N/A	N/A	N/A	51	N/A	47.4	N/A
NATA* Diesel PM (µg/m³)	0.106	0.149	59	0.978	<50th	0.937	<50th
NATA* Cancer Risk (lifetime risk per million)	38	34	78	43	<50th	40	<50th
NATA* Respiratory Hazard Index	1.2	1	75	2	<50th	1.8	<50th
Traffic Proximity and Volume (daily traffic count/distance to road)	2200	990	87	1100	85	590	94
Lead Paint Indicator (% Pre-1960 Housing)	0.15	0.16	59	0.24	51	0.3	44
Superfund Proximity (site count/km distance)	0.69	0.098	98	0.15	97	0.13	97
RMP Proximity (facility count/km distance)	0.092	0.19	48	0.57	17	0.43	24
Hazardous Waste Proximity+ (facility count/km distance)	0.17	0.14	87	0.14	81	0.11	85
Water Discharger Proximity (facility count/km distance)	0.29	0.34	63	0.2	84	0.31	74
Demographic Indicators							
Demographic Index	58%	52%	71	47%	66	36%	80
Minority Population	93%	77%	79	58%	86	37%	92
Low Income Population	23%	26%	48	36%	34	35%	35
Linguistically Isolated Population	12%	6%	84	9%	70	5%	86
Population With Less Than High School Education	16%	9%	82	17%	56	14%	67
Population Under 5 years of age	6%	6%	55	7%	48	6%	52
Population over 64 years of age	17%	15%	62	13%	78	14%	72

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

+ The hazardous waste environmental indicator and the corresponding EJ index will appear as N/A if there are no hazardous waste facilities within 50 km of a selected location.

For additional information, see: www.epa.gov/environmentaljustice

PBR HAWAII
& ASSOCIATES, INC.

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Executive Vice-President / Principal

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Vice-President / Principal

TOM SCHNELL, AICP
Principal

KIMI MIKAMI YUEN, LEED® AP BD+C
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ANN MIKIKO BOUSLOG, PhD
Project Director

RAMSAY R. M. TAUM
Cultural Sustainability Planner

RAYMOND T. HIGA, ASLA
Senior Associate

CATIE CULLISON, AICP
Senior Associate

MARC SHIMATSU, ASLA
Senior Associate

DACHENG DONG, LEED® AP
Senior Associate

MICAH McMILLEN, ASLA, LEED® AP
Associate

NATHALIE RAZO
Associate

GRACE ZHENG, ASLA, LEED® GA, SITES® AP
Associate

BRIAN WOLF, ASLA, LEED® AP
Associate

May 28, 2019

Mr. Keith Kawaoka
Deputy Director for Environmental Health
Environmental Health Administration
State of Hawai‘i, Department of Health
P.O. Box 3378
Honolulu, Hawai‘i 96801-3378

SUBJECT: PRE-ASSESSMENT CONSULTATION FOR A HRS CHAPTER 343 ENVIRONMENTAL ASSESSMENT – WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING, WAIPAHU TMK (1) 9-4-008:020 (POR.) & 025 (POR.)

Dear Mr. Kawaoka:

Thank you for the Department of Health (DOH) Environmental Planning Office's (EPO's) letter dated May 16, 2017 (your reference EPO 17-109) regarding the subject project. As the planning sub-consultant for the State of Hawai‘i Department of Education (DOE), we acknowledge your comments and offer the following responses:

Clean Air Branch

We acknowledge that there is a potential for fugitive dust emissions during all phases of construction. The Draft Environmental Assessment (EA) will address construction-related impacts related to fugitive dust. All construction activities will comply with the provisions of Section 11-60.1-33, Hawai‘i Administrative Rules (HAR) related to Fugitive Dust. Adequate measures to control dust during various phases of construction will be required to be implemented by whatever contractor is employed by The Department of Education to effect the project's development.

Clean Water Branch

We reviewed and understand the standard comments provided by the Clean Water Branch (CWB).

1. **Potential Impacts to State Waters.** The Draft EA identifies the waters of the Pearl Harbor National Wildlife Refuge (Middle Loch) as Class 1, Inland Waters. Any potential impacts to these waters caused by the construction and/or operation of the proposed project will meet the provisions of the: a) anti-degradation policy (Chapter 11-54-1.1, HAR); b) designated uses (Chapter 11-54-3, HAR); and c) water quality criteria (Chapter 11.54-4 through 11-54-8, HAR). However, direct discharges of storm water runoff into State waters are not expected to occur due to Best Management Practices to reduce airborne dust and waterborne silt during construction.

2. **National Pollutant Discharge Elimination System permit coverage.** If soil disturbance exceeds one acre in area, a National Pollutant Discharge Elimination System (NPDES) permit for Storm Water Associated with Construction Activity will be necessary.

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1001 Bishop Street, Suite 650
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Tel: (808) 521-5631
Fax: (808) 523-1402
E-mail: sysadmin@pbrhawaii.com

3. **Clean Water Act.** Pursuant to the "Clean Water Act," a Section 401 Water Quality Certification from the State Department of Health, Clean Water Branch will be obtained if it is determined that the project may result in any discharge into navigable waters or as otherwise triggered.

4. **State Water Quality Standards (Chapter 11-54 and 11-55, HAR).** All discharges related to the construction and operation of the proposed project will comply with the State's Water Quality requirements contained in Chapters 11-54 and 11-55, HAR.

Hazard Evaluation and Emergency Response Office

We understand that the Hazard Evaluation and Emergency Response (HEER) Office provides leadership, support, and partnership in preventing, planning for, responding to, and enforcing environmental laws relating to releases or threats of releases of hazardous substances. We do not expect hazardous substances, pollutants, or contaminants to be present at the project site. However, if any of these are found at the project site, HEER will be contacted to determine the appropriate actions to comply with the relevant environmental laws.

Indoor and Radiological Health (IRH) Branch

The proposed new classroom building will comply with the following Hawai'i Administrative Rules:

- Chapter 11-39 Air Conditioning and Ventilation
- Chapter 11-46 Community Noise Control

If noise created during the construction phase of the project is expected to exceed the maximum allowable levels (Chapter 11-46, HAR), then a noise permit will be obtained before the commencement of work.

However, the proposed project is not expected to trigger the need to comply with Chapter 11-45, HAR ("Radiation Control"), or Chapters 11-501 through 11-504, HAR, regarding asbestos.

Safe Drinking Water Branch

We note that the Safe Drinking Water Branch administers programs to protect drinking water sources from contamination.

1. **Public Water System.** A public water system will not be developed as part of the proposed project. Potable water will be supplied by the City and County of Honolulu Board of Water Supply, which draws water from a series of groundwater wells and shafts.

2. **Underground Injection Control.** Wastewater generated by the users of the proposed new classroom building will be collected by the County wastewater system.

Solid and Hazardous Waste Branch

Any construction waste generated by the project will be disposed of at a solid waste disposal facility that complies with the applicable provisions (Chapter 11-58.1, HAR "Solid Waste Management Control"). Solid waste that cannot be recycled will be disposed of at landfills, the incinerator, or transfer stations. A waste-to-energy combustor, H-POWER (Honolulu Program of Waste Energy Recovery) located at the Campbell Industrial Park incinerates about 1,800 tons of combustible waste per day. The electricity generated is bought by Hawaiian Electric Company. Currently, the H-POWER facility receives all residential and commercial packer truck wastes on the island. Waste contractors will be asked to submit disposal receipts and invoices to ensure proper disposal of waste. The proposed new classroom building will also comply with the provisions of Chapters 11-260 to 11-280, HAR, relating to hazardous waste.

Wastewater Branch

Wastewater generated at Waipahu High School will be collected by the County wastewater system. No cesspool is being proposed. All wastewater plans will conform to applicable provisions (Chapter 11-62, HAR, "Wastewater Systems").

In addition to the State standard comments addressed above, we have reviewed the environmental Geographic Information System (eGIS) resources on the Department of Health (DOH) Environmental Planning Office (EPO) website for applicability to the Waipahu High School New Classroom Building. We have also reviewed the Hawai‘i Environmental Health Portal and its links to various sources of state environmental data. Additionally, we have reviewed the materials available on EJSCREEN, as well as the draft Office of Environmental Quality Control (OEQC) viewer.

We acknowledge your comment regarding the State's goal to transition to one hundred percent renewable energy by the year 2045, and your recommendation to reduce harmful vehicle emissions, reduce vehicle miles traveled (VMTs), encourage alternative modes of transport, and increase physical activity. As the new classroom building will not increase enrollment, it is not anticipated to increase vehicle emissions or VMTs. Moreover, a number of sustainable features will be incorporated into the design of the building in order to support the State's goal to transition to one hundred percent renewable energy.

We value your participation in the environmental review process. Your letter will be reproduced in the forthcoming Draft EA.

Sincerely,
PBR HAWAII

Greg Nakai
Planner

cc: Karynn Yoneshige, DOE
Rochelle Nagata-Wu, WRNS

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DAVID Y. IGE
GOVERNOR

PANKAJ BHANOT
DIRECTOR

BRIDGET HOLTHUS
DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF HUMAN SERVICES
Benefit, Employment and Support Services Division
820 Mililani Street, Suite 606
Honolulu, Hawai'i 96813

May 11, 2017

Re: 17-0214

PBR Hawaii & Associates, INC.
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484
Attn: Dalton Ribble

Dear Mr. Ribble:

SUBJECT: Pre-Assessment Consultation for a HRS Chapter 343 Environmental Assessment – Waipahu High School New Classroom Building, Waipahu TMK (1) 9-4-008: 020 (por.)

This is in response to your letter dated April 27, 2017 requesting the Department of Human Services (DHS) review and comment on the above-named project.

The DHS has reviewed the map of the proposed classroom building for Waipahu High School. A check on DHS' internal data system and Google Maps has found DHS licensed group child care facilities as well as a licensed Before and After School in the one mile vicinity of Waipahu High School that may be affected during the construction phase of the classroom building.

Please be advised that Rachel Wong resigned from her position as director. Mr. Pankaj Bhanot is the DHS director effective September 1, 2016.

If you should have any question regarding this matter, please contact Ms. Lisa Galino, Child Care Program Specialist at (808) 586-5234.

Sincerely,

Scott Nakasone
Assistant Division Administrator

c: Pankaj Bhanot, Director

PBR HAWAII
& ASSOCIATES, INC.

May 28, 2019

Mr. Scott Nakasone
Assistant Division Administrator
Benefit, Employment and Support Services Division
State of Hawai‘i, Department of Human Services
820 Mililani Street, Suite 606
Honolulu, Hawai‘i 96813

Attn: Ms. Lisa Galino, Child Care Program Specialist

SUBJECT: PRE-ASSESSMENT CONSULTATION FOR A HRS CHAPTER 343 ENVIRONMENTAL ASSESSMENT – WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING, WAIPAHU TMK (1) 9-4-008:020 (POR.) & 025 (POR.)

Dear Mr. Nakasone:

Thank you for your letter dated May 11, 2017 (your reference number 17-0214) regarding the subject project. Our contact lists have been updated with your noted change of director. As the planning sub-consultant for the State of Hawai‘i Department of Education (DOE), we acknowledge your comment that there are two Department of Human Services (DHS) licensees within one mile of the Project site that may be affected during the construction phase of the Project.

In a follow-up phone conversation with Ms. Lisa Galino on June 6, 2017, the two DHS licensees were identified as the Honolulu Community Action Program at Waipahu District Park (TMK: (1) 9-4-017:003), as well as the Faith Hope & Love Childcare Center (TMK: (1) 9-4-011:080). The Draft Environmental Assessment (EA) will include this information.

We value your participation in the environmental review process. Your letter will be reproduced in the forthcoming Draft EA.

Sincerely,
PBR HAWAII

Greg Nakai
Planner

cc: Karynn Yoneshige, DOE
Rochelle Nagata-Wu, WRNS

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HONOLULU OFFICE
1001 Bishop Street, Suite 650
Honolulu, Hawai‘i 96813-3484
Tel: (808) 521-5631
Fax: (808) 523-1402
E-mail: sysadmin@pbrhawaii.com

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
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

May 26, 2017

PBR HAWAII & Associates, Inc.
Attention: Mr. Dalton Ribble, Planner
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484

Dear Mr. Ribble:

SUBJECT: Pre-Assessment Consultation for Waipahu High School New Classroom Building

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

At this time, enclosed are comments from the (a) Engineering Division and (b) Land Division – Oahu District on the subject matter. Should you have any questions, please feel free to call Lydia Morikawa at 587-0410. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosure(s)
cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
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

May 2, 2017

RECEIVED
'17 MAY -2 AM 10:37 ENGINEERING
LAND DIVISION

DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII
2017 MAY 11 AM 10:24

MEMORANDUM

TO:

DLNR Agencies:
___Div. of Aquatic Resources
___Div. of Boating & Ocean Recreation
From: X Engineering Division
___Div. of Forestry & Wildlife
___Div. of State Parks
X Commission on Water Resource Management
___ Office of Conservation & Coastal Lands
X Land Division – Oahu District
X Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Pre-Assessment Consultation for Waipahu High School New Classroom Building
LOCATION: Waipahu, Island of Oahu; TMK: (1) 9-4-008:020 (por.)
APPLICANT: State Department of Education

Transmitted for your review and comment is information on the above-referenced project. We would appreciate your comments on this project. Please submit any comments by **May 25, 2017**.

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 Lydia Morikawa at 587-0410. Thank you.

Attachments

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

Signed:

Print Name: Carty S. Chang, Chief Engineer
Date: 5/9/17

cc: Central Files

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LD/Russell Y. Tsuji
Ref: Pre-Assessment Consultation for Waipahu High School New Classroom Building

COMMENTS

The rules and regulations of the National Flood Insurance Program (NFIP), Title 44 of the Code of Federal Regulations (44CFR), are in effect when development falls within a designated Flood Hazard.

The owner of the project property and/or their representative is responsible to research the Flood Hazard Zone designation for the project. Flood Hazard Zone designations can be found using the Flood Insurance Rate Map (FIRM), which can be accessed through the Flood Hazard Assessment Tool (FHAT) (http://gis.hawaiinfip.org/FHAT).

Be advised that 44CFR reflects the minimum standards as set forth by the NFIP. Local community flood ordinances may take precedence over the NFIP standards as local designations prove to be more restrictive. If there are questions regarding the local flood ordinances, please contact the applicable County NFIP Coordinators below:

- Oahu: City and County of Honolulu, Department of Planning and Permitting (808) 768-8098.
- Hawaii Island: County of Hawaii, Department of Public Works (808) 961-8327.
- Maui/Molokai/Lanai County of Maui, Department of Planning (808) 270-7253.
- Kauai: County of Kauai, Department of Public Works (808) 241-4846.

The applicant should include water demands and infrastructure required to meet project needs. Please note that the projects within State lands requiring water service from their local Department/Board of Water Supply system will be required to pay a resource development charge, in addition to Water Facilities Charges for transmission and daily storage.

The applicant is required to provide water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update projections.

Signed: _____
CARTY S. CHANG, CHIEF ENGINEER

Date: 5/9/17

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
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

May 2, 2017

MEMORANDUM

RECEIVED
LAND DIVISION
2017 MAY -3 PM 2:41
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

TO: **DLNR Agencies:**
___Div. of Aquatic Resources
___Div. of Boating & Ocean Recreation
_X_Engineering Division
___Div. of Forestry & Wildlife
___Div. of State Parks
_X_Commission on Water Resource Management
___ Office of Conservation & Coastal Lands
_X_Land Division – Oahu District
_X_Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Pre-Assessment Consultation for Waipahu High School New Classroom Building
LOCATION: Waipahu, Island of Oahu; TMK: (1) 9-4-008:020 (por.)
APPLICANT: State Department of Education

Transmitted for your review and comment is information on the above-referenced project. We would appreciate your comments on this project. Please submit any comments by **May 25, 2017**.

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 Lydia Morikawa at 587-0410. Thank you.

Attachments

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

Signed: Darlene Bryant-Takamatsu
Print Name: Darlene Bryant-Takamatsu
Date: 5/3/17

cc: Central Files

PBR HAWAII
& ASSOCIATES, INC.

May 28, 2019

Mr. Russel Tsuji
Land Administrator
State of Hawai‘i
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawai‘i 96809

ATTN: Lydia Morikawa; Carty S. Chang, Engineering Division; Darlene Bryant-Takamatsu, Land Division – O‘ahu District

SUBJECT: PRE-ASSESSMENT CONSULTATION FOR A HRS CHAPTER 343 ENVIRONMENTAL ASSESSMENT – WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING, WAIPAHU TMK (1) 9-4-008:020 (POR.) & 025 (POR.)

Dear Mr. Tsuji:

Thank you for your letter dated May 26, 2017, regarding the subject project. As the planning sub-consultant for the State of Hawai‘i Department of Education (DOE), we provide the following responses to the comments from the Department of Land and Natural Resources (DLNR) Divisions listed below:

Engineering Division. We acknowledge that the rules and regulations of the National Flood Insurance Program (NFIP) Title 44 of the Code of Federal Regulations are in effect when development falls in high risk areas. The Draft Environmental Assessment (EA) will include a Flood Insurance Rate Map (FIRM) indicating that the project is located within Zone D, an unstudied area.

The Draft EA will include information on water demands and infrastructure required to meet project needs, and will also include your note regarding Water Facilities Charges for transmission and daily storage. Water demands and calculations will be provided to the DLNR Engineering Division for inclusion in the State Water Projects Plan Update projections.

Land Division – O‘ahu District. We acknowledge that the Land Division – O‘ahu District has no comments.

We value your participation in the environmental review process. Your letter will be reproduced in the forthcoming Draft EA.

Sincerely,
PBR HAWAII

Greg Nakai
Planner

cc: Karynn Yoneshige, DOE
Rochelle Nagata-Wu, WRNS

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HONOLULU OFFICE
1001 Bishop Street, Suite 650
Honolulu, Hawai‘i 96813-3484
Tel: (808) 521-5631
Fax: (808) 523-1402
E-mail: sysadmin@pbrhawaii.com

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BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843
www.boardofwatersupply.com

May 16, 2017

Mr. Dalton Ribble
PBR Hawaii & Associates, Inc.
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484

Dear Mr. Ribble:

Subject: Your Letter Dated April 27, 2017 Requesting Comments on the Pre-Assessment Consultation for Waipahu High School's New Classroom Building - Tax Map Key: 9-4-008: 020

Thank you for the opportunity to comment on the proposed school improvement project.

The existing water system is adequate to accommodate the proposed development. 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 the 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.

If you have any questions, please contact Robert Chun, Project Review Branch of our Water Resources Division at 748-5443.

Very truly yours,

for ERNEST Y. W. LAU, P.E.
Manager and Chief Engineer

PBR HAWAII
& ASSOCIATES, INC.

May 28, 2019

Mr. Ernest Y.W. Lau, P.E.
Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawai‘i 96843

Attn: Mr. Robert Chun, Project Review Branch, Water Resources Division

SUBJECT: PRE-ASSESSMENT CONSULTATION FOR A HRS CHAPTER 343 ENVIRONMENTAL ASSESSMENT – WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING, WAIPAHU TMK (1) 9-4-008: 020 (POR.) & 025 (POR.)

Dear Mr. Lau:

Thank you for your letter dated May 16, 2017, regarding the subject project. As the planning sub-consultant for the State of Hawai‘i Department of Education (DOE), we acknowledge your comments and provide the following response.

We appreciate the information that the existing water system is adequate to accommodate the proposed building. However, we also acknowledge that the Board of Water Supply’s (BWS's) final decision on the availability of water will be confirmed when the building permit application is submitted for approval.

The Draft Environmental Assessment (EA) will note that there are BWS Water System Facilities Charges for resource development, transmission, and daily storage.

The Draft EA will also note that “on-site fire protection requirements should be coordinated with the Fire Prevention Bureau of the Honolulu Fire Department.”

We value your participation in the environmental review process. Your letter will be reproduced in the forthcoming Draft EA.

Sincerely,
PBR HAWAII

Greg Nakai
Planner

cc: Karynn Yoneshige, DOE
Rochelle Nagata-Wu, WRNS

HONOLULU OFFICE
1001 Bishop Street, Suite 650
Honolulu, Hawai‘i 96813-3484
Tel: (808) 521-5631
Fax: (808) 523-1402
E-mail: sysadmin@pbrhawaii.com

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

KIRK CALDWELL
MAYOR

ROBERT J. KRONING, P.E.
DIRECTOR

MARK YONAMINE, P.E.
DEPUTY DIRECTOR

June 1, 2017

PBR Hawaii & Associates, Inc.
Attn: Dalton Ribble
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484

Dear Mr. Ribble,

Subject: Pre-Assessment Consultation for a HRS Chapter 343 Environmental Assessment- Waipahu High School New Classroom Building, Waipahu TMK (1) 9-4-008:020(Por.)

Thank you for the opportunity to review and comment. The Department of Design and Construction has no comments at this time.

If you have any other questions, please call me at 768-8480.

Sincerely,

Robert J. Kroning, P.E.
Director

RJK:ms(688316)

PBR HAWAII
& ASSOCIATES, INC.

May 28, 2019

Robert Kroning, P.E.
Director
City and County of Honolulu
Department of Design and Construction
650 South King Street, 11th Floor
Honolulu, Hawai‘i 96813

SUBJECT: PRE-ASSESSMENT CONSULTATION FOR A HRS CHAPTER 343 ENVIRONMENTAL ASSESSMENT – WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING, WAIPAHU TMK (1) 9-4-008:020 (POR.) & 025 (POR.)

Dear Mr. Kroning:

Thank you for your letter dated June 1, 2017, regarding the subject project. As the planning sub-consultant for the State of Hawai‘i Department of Education (DOE), we acknowledge that the Department of Design and Construction (DDC) has no comments to offer relative to the project at this time.

We value your participation in the environmental review process. Your letter will be reproduced in the forthcoming Draft EA.

Sincerely,
PBR HAWAII

Greg Nakai
Planner

cc: Karynn Yoneshige, DOE
Rochelle Nagata-Wu, WRNS

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HONOLULU OFFICE
1001 Bishop Street, Suite 650
Honolulu, Hawai'i 96813-3484
Tel: (808) 521-5631
Fax: (808) 523-1402
E-mail: sysadmin@pbrhawaii.com

DEPARTMENT OF FACILITY MAINTENANCE

CITY AND COUNTY OF HONOLULU

1000 Ulu'ohia Street, Suite 215, Kapolei, Hawaii 96707
Phone: (808) 768-3343 • Fax: (808) 768-3381
Website: www.honolulu.gov

KIRK CALDWELL
MAYOR

ROSS S. SASAMURA, P.E.
DIRECTOR AND CHIEF ENGINEER

EDUARDO P. MANGLALLAN
DEPUTY DIRECTOR

IN REPLY REFER TO:
DRM 17-308

May 24, 2017

Mr. Dalton Ribble
Planner
PBR Hawaii & Associates, Inc.
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484

Dear Mr. Ribble:

SUBJECT: Pre-Assessment Consultation for a HRS Chapter 343 Environmental Assessment – Waipahu High School New Classroom Building, Waipahu TMK (1) 9-4-008: 020 (POR.)

Thank you for allowing us the opportunity to review and comment on your letter dated April 27, 2017, on the above subject.

We have no comments as we do not have any facilities or easements on the subject property.

If you have any questions, please contact Mr. Kyle Oyasato of the Division of Road Maintenance at 768-3697.

Sincerely,

Ross S. Sasamura, P.E.
Director and Chief Engineer

PBR HAWAII
& ASSOCIATES, INC.

THOMAS S. WITTEN, FASLA
Chairman / Principal

R. STAN DUNCAN, ASLA
President / Principal

RUSSELL Y. J. CHUNG, FASLA, LEED® AP BD+C
Executive Vice-President / Principal

VINCENT SHIGEKUNI
Senior Vice-President / Principal

GRANT T. MURAKAMI, AICP, LEED® AP BD+C
Vice-President / Principal

TOM SCHNELL, AICP
Principal

KIMI MIKAMI YUEN, LEED® AP BD+C
Principal

W. FRANK BRANDT, FASLA
Chairman Emeritus

ANN MIKIKO BOUSLOG, PhD
Project Director

RAMSAY R. M. TAUM
Cultural Sustainability Planner

RAYMOND T. HIGA, ASLA
Senior Associate

CATIE CULLISON, AICP
Senior Associate

MARC SHIMATSU, ASLA
Senior Associate

DACHENG DONG, LEED® AP
Senior Associate

MICAH McMILLEN, ASLA, LEED® AP
Associate

NATHALIE RAZO
Associate

GRACE ZHENG, ASLA, LEED® GA, SITES® AP
Associate

BRIAN WOLF, ASLA, LEED® AP
Associate

May 28, 2019

Mr. Ross S. Sasamura, P.E.
Director and Chief Engineer
Department of Facility Maintenance
City & County of Honolulu
1000 Ulu‘ohia Street, Suite 215
Kapolei, Hawai‘i 96707

Attn: Mr. Kyle Oyasato, Division of Road Maintenance

SUBJECT: PRE-ASSESSMENT CONSULTATION FOR A HRS CHAPTER 343 ENVIRONMENTAL ASSESSMENT – WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING, WAIPAHU TMK (1) 9-4-008:020 (POR.) & 025 (POR.)

Dear Mr. Sasamura:

Thank you for your letter dated May 24, 2017 (your reference number DRM 17-308), regarding the subject project. As the planning sub-consultant for the State of Hawai‘i Department of Education (DOE), we acknowledge that the Department of Facility Maintenance (DFM) has no comments as there are no DFM facilities or easements on the subject property.

We value your participation in the environmental review process. Your letter will be reproduced in the forthcoming Draft EA.

Sincerely,
PBR HAWAII

Greg Nakai
Planner

cc: Karynn Yoneshige, DOE
Rochelle Nagata-Wu, WRNS

HONOLULU OFFICE
1001 Bishop Street, Suite 650
Honolulu, Hawai‘i 96813-3484
Tel: (808) 521-5631
Fax: (808) 523-1402
E-mail: sysadmin@pbrhawaii.com

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DEPARTMENT OF PARKS & RECREATION

CITY AND COUNTY OF HONOLULU

1000 Uluohia Street, Suite 309, Kapolei, Hawaii 96707
Phone: (808) 768-3003 • Fax: (808) 768-3053
Website: www.honolulu.gov

KIRK CALDWELL
MAYOR

MICHELE K. NEKOTA
DIRECTOR

JEANNE C. ISHIKAWA
DEPUTY DIRECTOR

May 10, 2017

Mr. Dalton Ribble
PBR Hawaii & Associates
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484

Dear Mr. Ribble:

SUBJECT: Pre-Assessment Consultation for a HRS Chapter 343
Environmental Assessment (EA)
Waipahu High School New Classroom Building
TMK (1) 9-4-008:020 (POR.)

Thank you for the opportunity to review and comment on the subject Pre-Assessment Consultation.

The Department of Parks and Recreation has no comment. As the proposed project will have no impact on any program or facility of the Department, you may remove us as a consulted party to the balance of the EA process.

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

Sincerely,

Michele K, Nekota
Director

MKN:jr
(688534)

PBR HAWAII
& ASSOCIATES, INC.

THOMAS S. WITTEN, FASLA
Chairman / Principal

R. STAN DUNCAN, ASLA
President / Principal

RUSSELL Y. J. CHUNG, FASLA, LEED® AP BD+C
Executive Vice-President / Principal

VINCENT SHIGEKUNI
Senior Vice-President / Principal

GRANT T. MURAKAMI, AICP, LEED® AP BD+C
Vice-President / Principal

TOM SCHNELL, AICP
Principal

KIMI MIKAMI YUEN, LEED® AP BD+C
Principal

W. FRANK BRANDT, FASLA
Chairman Emeritus

ANN MIKIKO BOUSLOG, PhD
Project Director

RAMSAY R. M. TAUM
Cultural Sustainability Planner

RAYMOND T. HIGA, ASLA
Senior Associate

CATIE CULLISON, AICP
Senior Associate

MARC SHIMATSU, ASLA
Senior Associate

DACHENG DONG, LEED® AP
Senior Associate

MICAH McMILLEN, ASLA, LEED® AP
Associate

NATHALIE RAZO
Associate

GRACE ZHENG, ASLA, LEED® GA, SITES® AP
Associate

BRIAN WOLF, ASLA, LEED® AP
Associate

May 28, 2019

Ms. Michele K. Nekota
Director
Department of Parks & Recreation
City and County of Honolulu
1000 Ulu‘ōhi‘a Street, Suite 309
Kapolei, Hawai‘i 96707

Attn: Mr. John Reid, Planner

SUBJECT: PRE-ASSESSMENT CONSULTATION FOR A HRS CHAPTER 343 ENVIRONMENTAL ASSESSMENT – WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING, WAIPAHU TMK (1) 9-4-008:020 (POR.) & 025 (POR.)

Dear Ms. Nekota:

Thank you for your letter dated May 10, 2017 (your reference number 688534) regarding the subject project. As the planning sub-consultant for the State of Hawai‘i Department of Education (DOE), we acknowledge that the Department of Parks and Recreation (DPR) has no comments. DPR will be removed as a consulted party to the balance of the Environmental Assessment (EA) process.

We value your participation in the environmental review process. Your letter will be reproduced in the forthcoming Draft EA.

Sincerely,
PBR HAWAII

Greg Nakai
Planner

cc: Karynn Yoneshige, DOE
Rochelle Nagata-Wu, WRNS

HONOLULU OFFICE
1001 Bishop Street, Suite 650
Honolulu, Hawai‘i 96813-3484
Tel: (808) 521-5631
Fax: (808) 523-1402
E-mail: sysadmin@pbrhawaii.com

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DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 768-8000 • FAX: (808) 768-6041
DEPT. WEB SITE: www.honoluludpp.org • CITY WEB SITE: www.honolulu.gov

KIRK CALDWELL
MAYOR

KATHY K. SOKUGAWA
ACTING DIRECTOR

TIMOTHY F. T. HIU
DEPUTY DIRECTOR

2017/ELOG-890(GT)

May 30, 2017

Mr. Dalton Ribble
PBR Hawaii & Associates, Inc.
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484

Dear Mr. Ribble:

SUBJECT: Pre-Assessment Consultation for
Draft Environmental Assessment (DEA)
Chapter 343, Hawaii Revised Statutes
Waipahu High School – New Classroom Building
1211 Farrington Highway – Waipahu
Tax Map Key 9-4-008: 020

This is in response to your letter (received April 28, 2017), requesting comments on the pre-assessment consultation for the proposed Waipahu High School New Classroom Building. We have reviewed the information provided and offer the following comments:

1. Planning Division, Development Plans and Zone Change Branch:

   a. The DEA should include a discussion of the consistency of the Project with the Oahu General Plan, and the Central Oahu Sustainable Communities Plan.

   b. The DEA should include an analysis of the possible impact of sea level rise on the Project. If it is likely that sea level rise will increase the risk of flooding during the life of the Project structures, the DEA should discuss how the design of the Project and proposed operations at the Project site will address that risk and provide resilience in recovering from any flooding.

   c. The national standard for making such project assessments has been developed by the U. S. Army Corps of Engineers (USACE). The USACE issued an Engineering Regulation (ER 1100-2-8162) on December 13, 2013, which provides "guidance for incorporating the direct and indirect physical effects of projected future sea level change across the project life cycle in managing, planning, engineering, designing, constructing, operating, and maintaining USACE projects." The guidance in the regulation can be used as the basis for assessing the "potential relative sea level change" that might be experienced by projects in shoreline areas, and is required to be used for all USACE civil works. See http://www.corpsclimate.us/rccslca.cfm for

more details, including use of an online sea-level calculator which can be used to produce Oahu specific projections of sea level rise through 2100.

2. Wastewater Branch:

   a. Provide information regarding all proposed wastewater discharges to the municipal sewer system.

   b. Provide number of staff and projected student body counts.

   c. Submit a Site Development Division Master Application Form for Sewer Connection. An Industrial Wastewater Discharge Permit will also need to be submitted.

3. The DEA should discuss the following:

   a. Off-street parking and loading requirements.

   b. Surface drainage.

4. The DEA should list all permits required.

Should you have any questions, please contact Gerald Toyomura of our staff at 768-8056.

Very truly yours,

FOR Kathy K. Sokugawa
Acting Director

Doc 1459296

PBR HAWAII
& ASSOCIATES, INC.

May 28, 2019

Kathy Sokugawa, Acting Director
City and County of Honolulu
Department of Planning and Permitting
650 South King Street, 7th Floor
Honolulu, Hawai‘i 96813

Attn: Gerald Toyomura

SUBJECT: PRE-ASSESSMENT CONSULTATION FOR A HRS CHAPTER 343 ENVIRONMENTAL ASSESSMENT – WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING, WAIPAHU TMK (1) 9-4-008:020 (POR.) & 025 (POR.)

Dear Ms. Sokugawa:

Thank you for your letter dated May 30, 2017 (your reference number 2017/ELOG-890(GT)), regarding the subject project. As the planning sub-consultant for the State of Hawai‘i Department of Education (DOE), we acknowledge your comments and offer the following responses.

The Draft Environmental Assessment (EA) will include a discussion of the consistency of the Project with the O‘ahu General Plan and the Central O‘ahu Sustainable Communities Plan. It will also include an analysis of the impacts of sea level rise and climate change on the Project.

Additionally, the DEA will provide information regarding wastewater discharges to City sewers, projected student body and staff counts, off-street parking and loading requirements; 4) surface drainage; and 5) all permits the Project will require, including a Site Development Division Master Application Form for Sewer Connection and an Industrial Wastewater Discharge Permit.

We value your participation in the environmental review process. Your letter will be reproduced in the forthcoming Draft EA.

Sincerely,
PBR HAWAII

Greg Nakai
Planner

cc: Karynn Yoneshige, DOE
Rochelle Nagata-Wu, WRNS

O:\Job24\2472.30 DOE Waipahu HS New Classroom Bldg\EA\Pre-Consultation\Responses\County - DPP Response.docx

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DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 3RD FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8305 • Fax: (808) 768-4730 • Internet: www.honolulu.gov

KIRK CALDWELL
MAYOR

WES FRYSZTACKI
DIRECTOR

JON Y. NOUCHI
DEPUTY DIRECTOR

TP4/17-688325R

May 23, 2017

Mr. Dalton Ribble
Planner
PBR Hawaii & Associates, Inc.
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484

Dear Mr. Ribble:

SUBJECT: Pre-Assessment Consultation Draft Environmental Assessment (DEA) for Waipahu High School New Classroom Building, Waipahu, Oahu, Hawaii

In response to your letter dated April 27, 2017, we have the following comments:

1. To the extent practicable, the design of the project should be consistent with the City's Complete Streets ordinance and include features to encourage walking, bicycling and public transit.

2. The DEA should include a traffic impact study to evaluate existing traffic conditions of the surrounding City roadways, possible increase in traffic and pedestrian volumes as a result of the project, including short-term impacts during construction and long-term impacts after construction, and measures to mitigate these impacts by applying complete streets principles whenever possible.

3. The DEA should also include a discussion regarding the existing safety and traffic operational concerns in the area, including school parking needs, student drop off and pick up in the morning and afternoon peak hours, and pedestrian and bicycle access along adjacent City roadways with corresponding measures to mitigate these concerns.

4. The Honolulu Authority for Rapid Transportation should be informed of this project. They have a project called the Middle Loch Connector that involves constructing a multi-use path connecting Waipahu High School to Leeward Community College. The construction schedules should be coordinated to ensure minimal impacts on City streets.

5. Any damage to the existing roadway, sidewalk and driveway areas caused by the project should be repaired to current City standards.

6. All access driveways to the project site should be designed with the highest pedestrian and bicycle safety measures.

7. Best Management Practice controls should be included at construction site to prevent trailing of dirt and debris on City roadways.

8. All parking needs for the proposed facility (employees, visitors and students) should be handled on-site.

9. The area Neighborhood Board, as well as the area residents, businesses, emergency personnel (fire, ambulance and police), Oahu Transit Services, Inc. (TheBus and The Handi-Van), etc., should be kept apprised of the details of the proposed project and the impacts that the project may have on the adjoining local street area network.

10. Construction materials and equipment should be transferred to and from the project site during off-peak traffic hours (8:30 a.m. to 3:30 p.m.), but not during school dismissal periods for the safety of the students and to minimize any possible disruption to the local streets.

11. A street usage permit from the City's Department of Transportation Services should be obtained for any construction-related work that may require the temporary closure of any traffic lane on a City street.

We reserve further comment pending review of the DEA.

Thank you for the opportunity to review this matter. Should you have any questions, please contact Renee Yamasaki of my staff at 768-8383.

Very truly yours,

Wes Frysztacki
Director

PBR HAWAII
& ASSOCIATES, INC.

May 28, 2019

Wes Frysztacki, Director
City & County of Honolulu
Department of Transportation Services
650 South King Street, 3rd Floor
Honolulu, Hawai‘i 96813

Attn: Renee Yamasaki

SUBJECT: PRE-ASSESSMENT CONSULTATION FOR A HRS CHAPTER 343 ENVIRONMENTAL ASSESSMENT – WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING, WAIPAHU TMK (1) 9-4-008:020 (POR.) & 025 (POR.)

Dear Mr. Frysztacki:

Thank you for your letter dated May 23, 2017 (your reference number TP4/17-688325R), regarding the subject project. As the planning sub-consultant for the State of Hawai‘i Department of Education (DOE), we acknowledge the Department of Transportation Services’ (DTS’s) comments and provide the following response.

The Draft Environmental Assessment (EA) will include:

1. A description of the aspects of the Project design which encourage walking, bicycling, and public transit, and which are consistent with the policy and principles of the City’s Complete Streets ordinance.

2. A transportation impact (mobility) study to evaluate existing and anticipated traffic conditions and impacts, including any short-term and long-term impacts on traffic and pedestrian volumes as a result of the project, and measures to mitigate these impacts by applying complete streets principles whenever possible or feasible;

3. A discussion of any existing safety and traffic operational concerns in the area, such as school parking needs, student drop off and pick up during peak hours, pedestrian and bicycle access, and any relevant mitigation measures needed to address these concerns; and

4. Your recommendations/requirements that:

    a. The Honolulu Authority for Rapid Transportation (HART) be informed of this project, and that construction schedules be coordinated to ensure minimal impacts on City streets;

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b. Any damage to the existing roadways, sidewalks, and driveways caused by the project during the construction phases be repaired to current City standards;

c. All access driveways to the project site be designed with the highest pedestrian and bicycle safety measures;

d. Best Management Practice controls be included at the construction site to prevent the trailing of dirt and debris on City roadways;

e. All parking needs for the proposed facility (for employees, visitors, and students) be handled on-site;

f. The Waipahu Neighborhood Board No. 22, area residents, businesses, emergency personnel (fire, ambulance, and police), and Oahu Transit Services, Inc. (TheBus and TheHandi-Van), be kept apprised of the proposed project and the potential impacts that the project may have on the adjoining local street area network;

g. Construction materials and equipment be transferred to and from the project site during off-peak traffic hours to minimize traffic disruption; and

h. A street usage permit be obtained from DTS should closures be deemed necessary for any construction-related work on a City street.

We value your participation in the environmental review process. Your letter will be reproduced in the forthcoming DEA.

Sincerely,
PBR HAWAII

Greg Nakai
Planner

cc: Karynn Yoneshige, DOE
Rochelle Nagata-Wu, WRNS

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

KIRK CALDWELL
MAYOR

MANUEL P. NEVES
FIRE CHIEF

LIONEL CAMARA JR.
DEPUTY FIRE CHIEF

May 11, 2017

Mr. Dalton Ribble, Planner
PBR Hawaii & Associates, Inc.
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813

Dear Mr. Ribble:

Subject: Preenvironmental Assessment Consultation
New Classroom Building for Waipahu High School

In response to your letter dated April 27, 2017, regarding the above-mentioned subject, the Honolulu Fire Department requires that the following be complied with:

1. Fire department access roads shall be provided such that any portion of the facility or any portion of an exterior wall of the first story of the building is located not more than 150 feet from fire department access roads as measured by an approved route around the exterior of the building or facility. (National Fire Protection Association [NFPA] 1; Uniform Fire Code [UFC]™, 2012 Edition, Sections 18.2.3.2.2 and 18.2.3.2.2.1.)

   A fire department access road shall extend to within 50 feet of at least one exterior door that can be opened from the outside that provides access to the interior of the building. (NFPA 1; UFC™, 2012 Edition, Section 18.2.3.2.1.)

2. A water supply approved by the county, capable of supplying the required fire flow for fire protection, shall be provided to all premises upon which facilities or buildings, or portions thereof, are hereafter constructed, or moved into or within the county. When any portion of the facility or building is in excess of 150 feet from a water supply on a fire apparatus access road, as measured by an approved route around

the exterior of the facility or building, on-site fire hydrants and mains capable of supplying the required fire flow shall be provided when required by the AHJ [Authority Having Jurisdiction]. (NFPA 1; UFC™, 2012 Edition, Section 18.3.1, as amended.)

3. The unobstructed width and unobstructed vertical clearance of a fire apparatus access road shall meet county requirements. (NFPA 1; UFC™, 2012 Edition, Section 18.2.3.4.1.1 and 18.2.3.4.1.2, as amended.)

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

Should you have questions, please contact Battalion Chief Wayne Masuda of our Fire Prevention Bureau at 723-7151 or wmasuda@honolulu.gov.

Sincerely,

Socrates D. Bratakos

SOCRATES D. BRATAKOS
Assistant Chief

SDB/SY:ps

PBR HAWAII
& ASSOCIATES, INC.

THOMAS S. WITTEN, FASLA
Chairman / Principal

R. STAN DUNCAN, ASLA
President / Principal

RUSSELL Y. J. CHUNG, FASLA, LEED® AP BD+C
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Vice-President / Principal

TOM SCHNELL, AICP
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MARC SHIMATSU, ASLA
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Associate

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printed on recycled paper

May 28, 2019

Mr. Socrates D. Bratakos
Assistant Chief
Fire Department
City and County of Honolulu
801 South Beretania Street
Honolulu, Hawai'i 96843

Attn: Wayne Masuda, Battalion Chief – Fire Prevention Bureau

SUBJECT: PRE-ASSESSMENT CONSULTATION FOR A HRS CHAPTER 343 ENVIRONMENTAL ASSESSMENT – WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING, WAIPAHU TMK (1) 9-4-008:020 (POR.) & 025 (POR.)

Dear Mr. Brakatos:

Thank you for your letter dated May 11, 2017, regarding the pre-assessment consultation for the subject project. As the planning sub-consultant for the State of Hawai'i Department of Education (DOE), we acknowledge your comments and offer the following response.

The following information will be included in the Draft Environmental Assessment (EA):

1. The proposed new classroom building will comply with requirements regarding fire department access roads (NFPA 1; UFC, 2012 Edition, Sections 18.2.3.2.2 and 18.2.3.2.1).

2. The proposed new classroom building will provide an adequate county-approved water supply for the required fire flow for fire protection (NFPA 1; UFC, 2012 Edition, Section 18.3.1, as amended).

3. The proposed new classroom building will comply with requirements regarding the unobstructed width and vertical clearance of fire apparatus access roads (NFPA 1; UFC, 2012 Edition, Section 18.2.3.4.1.1 and 18.2.3.4.1.2, as amended).

4. Civil drawings will be submitted to the HFD for review and approval at the appropriate stage in the development process.

We value your participation in the environmental review process. Your letter will be reproduced in the forthcoming Draft EA.

Sincerely,
PBR HAWAII

Greg Nakai
Planner

cc: Karynn Yoneshige, DOE
Rochelle Nagata-Wu, WRNS

POLICE DEPARTMENT

CITY AND COUNTY OF HONOLULU

801 SOUTH BERETANIA STREET · HONOLULU, HAWAII 96813
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KIRK CALDWELL
MAYOR

~~LOUIS M. KEALOHA~~
CHIEF

CARY OKIMOTO
JERRY INOUYE
DEPUTY CHIEFS

OUR REFERENCE MT-DK

May 11, 2017

Mr. Dalton Ribble
Planner
PBR HAWAII & Associates, Inc.
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484

Dear Mr. Ribble:

This is in response to your letter of April 27, 2017, requesting comments on a Pre-Assessment Consultation, Draft Environmental Assessment, for the Waipahu High School New Classroom Building project.

Based on the information provided, this project should have no significant impact on the services or operations of the Honolulu Police Department at this time.

If there are any questions, please call Major Dagan Tsuchida of District 3 (Pearl City) at 723-8803.

Thank you for the opportunity to review this project.

Sincerely,

CARY OKIMOTO
Acting Chief of Police

By
MARK TSUYEMURA
Management Analyst VI
Office of the Chief

PBR HAWAII
& ASSOCIATES, INC.

THOMAS S. WITTEN, FASLA
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Project Director

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NATHALIE RAZO
Associate

GRACE ZHENG, ASLA, LEED® GA, SITES® AP
Associate

BRIAN WOLF, ASLA, LEED® AP
Associate

May 28, 2019

Ms. Susan Ballard
Chief of Police
Honolulu Police Department
City and County of Honolulu
801 South Beretania Street
Honolulu, Hawai‘i 96813

Attn: Major Dagan Tsuchida, District 3 (Pearl City)

SUBJECT: PRE-ASSESSMENT CONSULTATION FOR A HRS CHAPTER 343 ENVIRONMENTAL ASSESSMENT – WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING, WAIPAHU TMK (1) 9-4-008:020 (POR.) & 025 (POR.)

Dear Chief Ballard:

Thank you for your Department's letter dated May 11, 2017 (your reference MT-DK) regarding the subject project. As the planning sub-consultant for the State of Hawai‘i Department of Education (DOE), we acknowledge your comment that the Project will have no significant impact on the services or operations of the Honolulu Police Department.

We value your participation in the environmental review process. Your letter will be reproduced in the forthcoming Draft Environmental Assessment (EA).

Sincerely,
PBR HAWAII

Greg Nakai
Planner

cc: Karynn Yoneshige, DOE
Rochelle Nagata-Wu, WRNS

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Oceanic
Time Warner Cable

May 8, 2017

PBR Hawaii & Associates, Inc.
Attn: Dalton Ribble
1001 Bishop Street, Suite 650
Honolulu, HI 96813-3484

Subject: **PRE-ASSESSMENT CONSUTATION FOR A HRS CHAPTER 343 ENVIRONMENT ASSESSMENT – WAIPAHU HIGH SCHOLL NEW CLASSROOM BUILDING, WAIPAHU TMK (1) 9-4-008:020**

Thank you for the opportunity to review and comment on the subject project. The subject project will have no impact to existing Oceanic Time Warner Cable's infrastructures or future planned projects in the vicinity.

If you have any questions, please call me at 625-8378 or email me at tuan.nguyen1@charter.com.

Sincerely,

Tuan Nguyen

200 Akamainui Street Mililani, Hawaii 96789-3999 Tel (808) 625-2100 Fax (808) 625-5888

PBR HAWAII
& ASSOCIATES, INC.

May 28, 2019

Tuan Nguyen
Spectrum
200 Akamainui Street
Mililani, Hawai‘i 96789

SUBJECT: PRE-ASSESSMENT CONSULTATION FOR A HRS CHAPTER 343 ENVIRONMENTAL ASSESSMENT – WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING, WAIPAHU TMK (1) 9-4-008:020 (POR.) & 025 (POR.)

Dear Mr. Nguyen:

Thank you for your letter dated May 8, 2017, regarding the subject project. As the planning sub-consultant for the State of Hawai‘i Department of Education (DOE), we acknowledge your comment that the Project will have no impact to existing Spectrum (formerly Oceanic Time Warner Cable) infrastructure or future planned projects in the vicinity.

We value your participation in the environmental review process. Your letter will be reproduced in the forthcoming Draft Environmental Assessment (EA).

Sincerely,
PBR HAWAII

Greg Nakai
Planner

cc: Karynn Yoneshige, DOE
Rochelle Nagata-Wu, WRNS

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APPENDIX B
Archaeological Inventory Survey

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An Archaeological Inventory Survey for Campus Improvements at Waipahu High School

Portions of TMKs: (1) 9-4-008:020 and 025

Waipiʻo Ahupuaʻa
ʻEwa District
Island of Oʻahu

DRAFT VERSION

Prepared By:

Teresa Gotay, M.A.
and
Robert B. Rechtman, Ph.D.

Prepared For:

PBR Hawaiʻi
1001 Bishop St.
Honolulu, HI 96813

August 2019

ASM affiliates
Archaeology • History • Anthropology • Architectural History
Hilo Office: (808) 969-6066 Fax: (808) 443-0065
507-A E. Lanikaula Street, Hilo, HI 96720
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ASM Project Number 27800.00

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An Archaeological Inventory Survey for Campus Improvements at Waipahu High School

TMKs: (1) 9-4-008:020 and 025 (por.)

Waipiʻo Ahupuaʻa
ʻEwa District
Island of Oʻahu

ASM affiliates

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EXECUTIVE SUMMARY

At the request of PBR Hawai‘i, on behalf of the State of Hawai‘i Department of Education (DOE), ASM Affiliates (ASM) conducted an archaeological inventory survey (AIS) of a roughly 17-acre area within the southern and eastern portions of Tax Map Keys (TMKs): (1) 9-4-008:020 and 025 in Waipi‘o Ahupua‘a, ‘Ewa District, Island of O‘ahu. The subject parcels are located at 94-1211 Farrington Highway and comprise the upper and lower campuses of Waipahu High School. The current study will accompany an Environmental Assessment (EA). The DOE, using state funds, plans to construct a new U-shaped classroom building around pre-existing basketball courts and make additional site improvements to an area adjacent to the basketball courts; in addition, the DOE proposes to construct two additional parking areas within the currently undeveloped southeastern end of the study area and fire/vehicular/parking access roads from Waipio Point Access Road or the Honolulu Authority for Rapid Transportation (HART) access Road.

ASM conducted fieldwork for an earlier iteration of the current project in February of 2017, at which time Robert B. Rechtman, Ph.D. and David Crowell, M.S. conducted an initial archaeological surface inspection of the study area. This initial inspection was followed by a systematic pedestrian survey conducted by David Crowell on February 17, 2017. ASM has also prepared a separate Cultural Impact Assessment (CIA) in support of the EA (Gotay and Rechtman 2018). Beginning on August 28, 2018, Teresa Gotay, M.A. and Ryan Gross, M.A. conducted pedestrian survey of the expanded survey area; the remaining inventory fieldwork for the expanded study area was conducted over six days between September 3 and October 1, 2018 by Teresa Gotay, M.A., Ryan Gross, M.A., and Deidra Moore, B.A. under the supervision of Robert B. Rechtman, Ph.D. During the archaeological field survey, the entire (100%) ground surface of study area was visually inspected by field technicians walking roughly northeast/southwest oriented transects at 5-meter intervals. When archaeological features were encountered, their positions were plotted on a map of the current study area using a Trimble GeoX7 handheld GPS unit (set to the NAD 83 Zone 5 North). Identified features located within the current study area were then cleared of vegetation, photographed (both with and without a meter stick for scale), depicted on a scaled plan map, and described using standardized feature record forms.

As a result of the fieldwork for the current study a single newly identified site (SIHP Site 50-80-09-08778) comprising four features (Features A-D) was recorded within the study area. Features A-D comprise multiple subfeatures, which include the following: a series of discontinuous dry-stacked rock retaining walls (Subfeatures A1, A2, B1, B2, B3, and B4), concrete reinforced stone masonry (CRM) steps (Subfeature A3), a combination dry-stacked rock and concrete block retaining wall (Subfeature C1), a concrete block wall with associated concrete pads and steps (Subfeature C2), and a large concrete box/vault (Feature D). Site 8778, a Historic Period agricultural station, is considered significant under Criterion d for the information it has yielded relative to the early to middle twentieth century activities associated with the former HSPA Experiment Substation in Waipio. The research and fieldwork conducted during the current study has been sufficient to exhaust the information potential of Site 8778. Thus, no further work is the recommended treatment for Site 8778. Because the current study has mitigated any potential future adverse effects to this site, the HRS Chapter 6E-review determination of effects for the current project is “no historic properties affected.” In consultation with the SHPD, it is recommended that precautionary archaeological monitoring be conducted during all ground-disturbing activities associated with this project. As such, an archaeological monitoring plan shall be prepared in accordance with Hawai‘i Administrative Rules (HAR) 13§13-279-4 and submitted to the SHPD for review and acceptance.

CHAPTERS

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FIGURES

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TABLES

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1. INTRODUCTION

At the request of PBR Hawai‘i, on behalf of the State of Hawai‘i Department of Education (DOE), ASM Affiliates (ASM) conducted an archaeological inventory survey (AIS) of a roughly 17-acre area within the southern and eastern portions of Tax Map Keys (TMKs): (1) 9-4-008:020 and 025 (owned by the City and County of Honolulu and the State of Hawai‘i, respectively) in Waipi‘o Ahupua‘a, ‘Ewa District, Island of O‘ahu (Figures 1, 2, and 3). The subject parcels are located at 94-1211 Farrington Highway and comprise the upper and lower campuses of Waipahu High School. The DOE plans to use state funds to construct a new U-shaped classroom building around pre-existing basketball courts and make additional site improvements to an area adjacent to the basketball courts; in addition, the DOE proposes to construct two additional parking areas within the currently undeveloped southeastern end of the study area and fire/vehicular/parking access roads from Waipio Point Access Road or the Honolulu Authority for Rapid Transportation (HART) access Road (Figure 4). Thus, the current study included visual inspection of all potential road alignments, as well as potential laydown, staging, and construction areas for the proposed project.

The current study will accompany an Environmental Assessment (EA) being prepared in compliance with Hawai‘i Revised Statues (HRS) Chapter 343 and has been prepared in accordance with Hawai‘i Administrative Rules (HAR) §13-275 (*Rules Governing Procedures for Historic Preservation Review to Comment on Section 6E-8, HRS Projects)*. The AIS was performed in compliance with the *Rules Governing Minimal Standards for Archaeological Inventory Surveys and Reports* as contained in HAR §13-276. ASM has also prepared a separate Cultural Impact Assessment (CIA) in support of the EA (Gotay and Rechtman 2018).

The current report contains background information outlining the study area’s physical and cultural contexts, a summary of relevant previous archaeological work conducted in the vicinity of the current study area, and survey expectations based upon the background information and the previous archaeological work. Also presented is an explanation of the archaeological field methods, a detailed description of the archaeological features encountered, interpretation and evaluation of the features, and treatment recommendations for the documented site.

STUDY AREA DESCRIPTION

The irregularly shaped study area comprises developed and undeveloped portions of the Waipahu High School campus; and extends northward from Waipio Access Road near the Waipahu Aloha Clubhouse property, along the *mauka* edge of Cane Haul Road until it reaches the lower campus athletic fields, at which point the study area extends to include portions of the extant HART-built access road and terminates near Farrington Highway (see Figure 4). The study area is bound to the north by Farrington Highway, to the east by Cane Haul Road and athletic fields, to the west by existing Waipahu High School campus structures, and to the south by Waipahu Aloha Clubhouse and undeveloped land (see Figure 3).

Figure 1. Study area location plotted on a portion of USGS 1998, 7.5-Minute series Waipahu Quadrangle (source USGS).

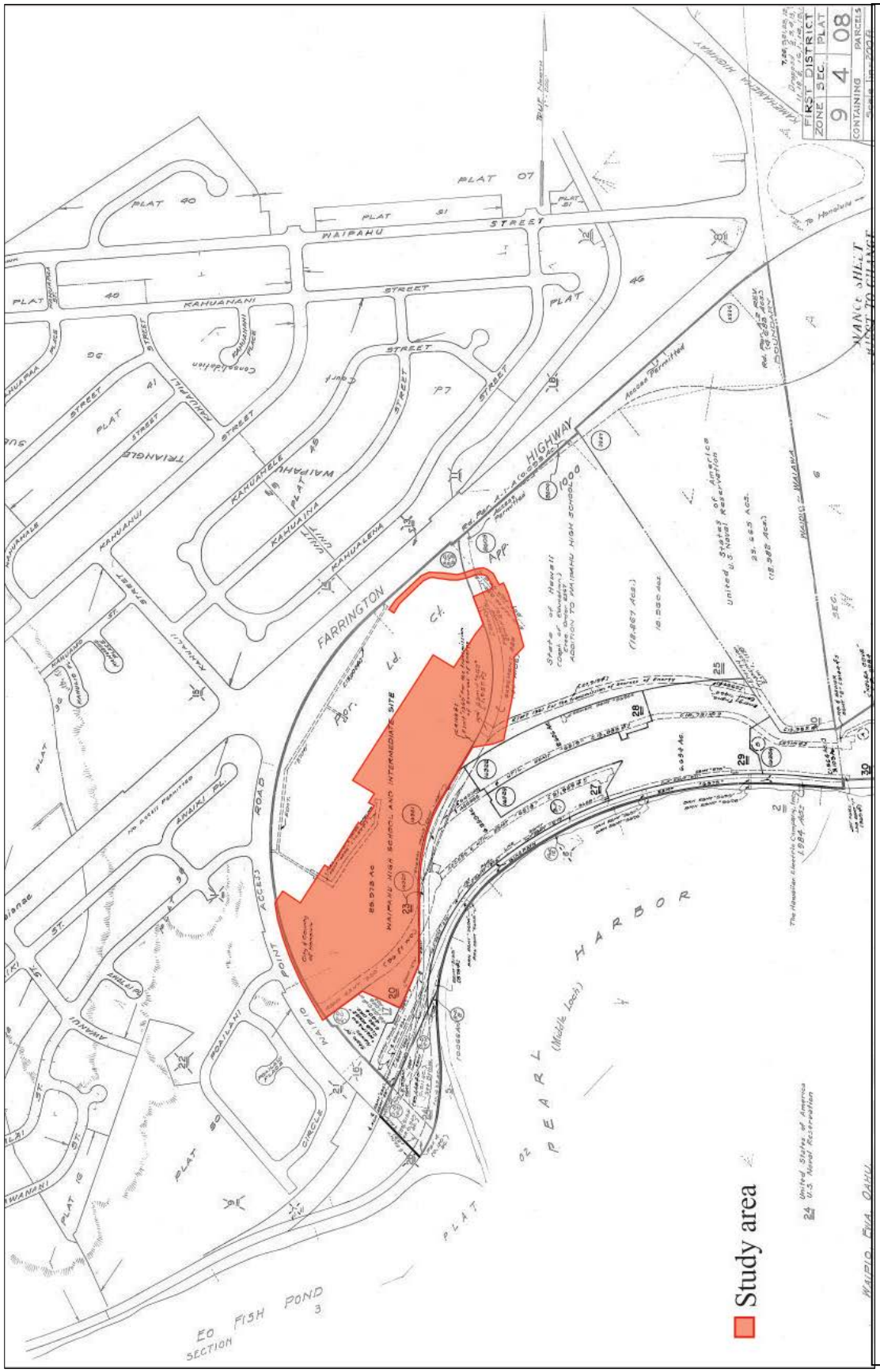

Figure 2. Tax Map Key (TMK) map (1) 9-4-008 showing the current study area (source: Honolulu Real Property Assessment and Tax Billing Information).

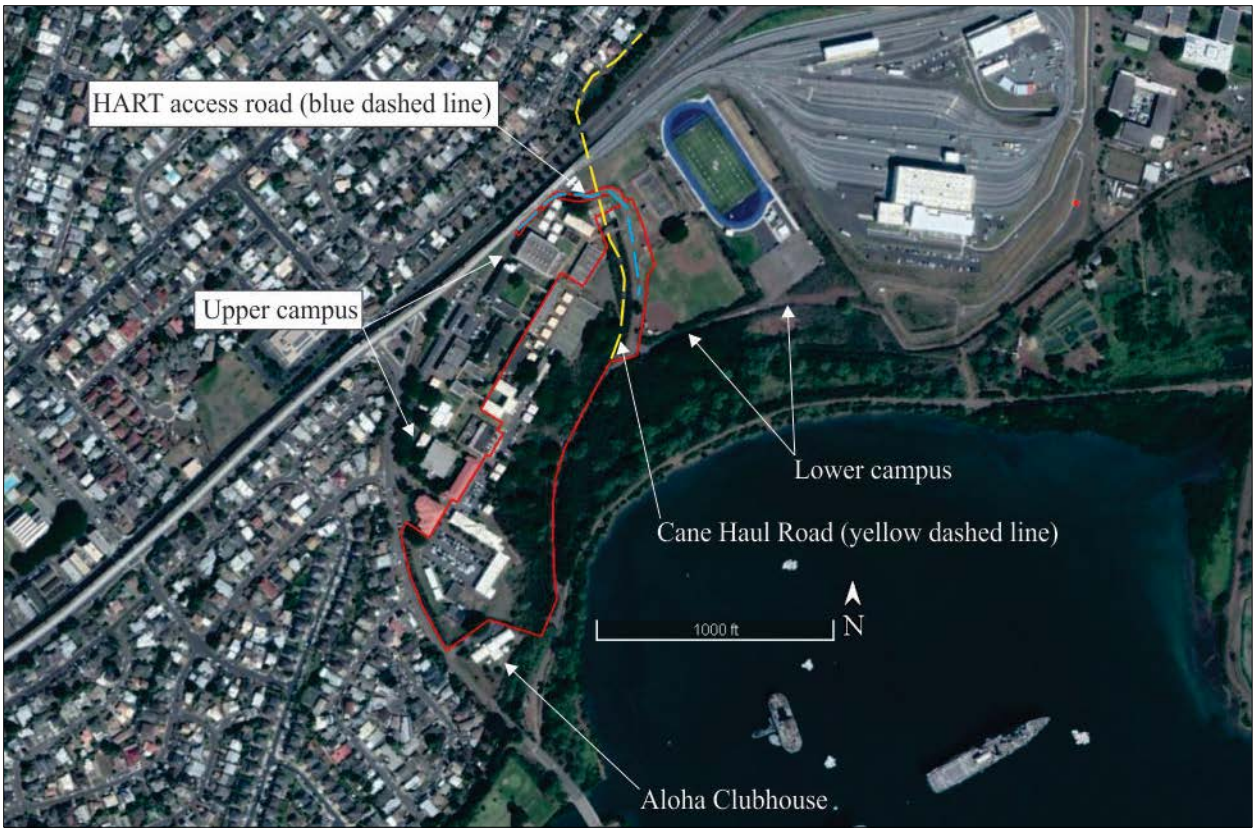

Figure 3. Google Earth™ satellite image dated December 17, 2017 with reference points mentioned in the text and study area outlined in red.

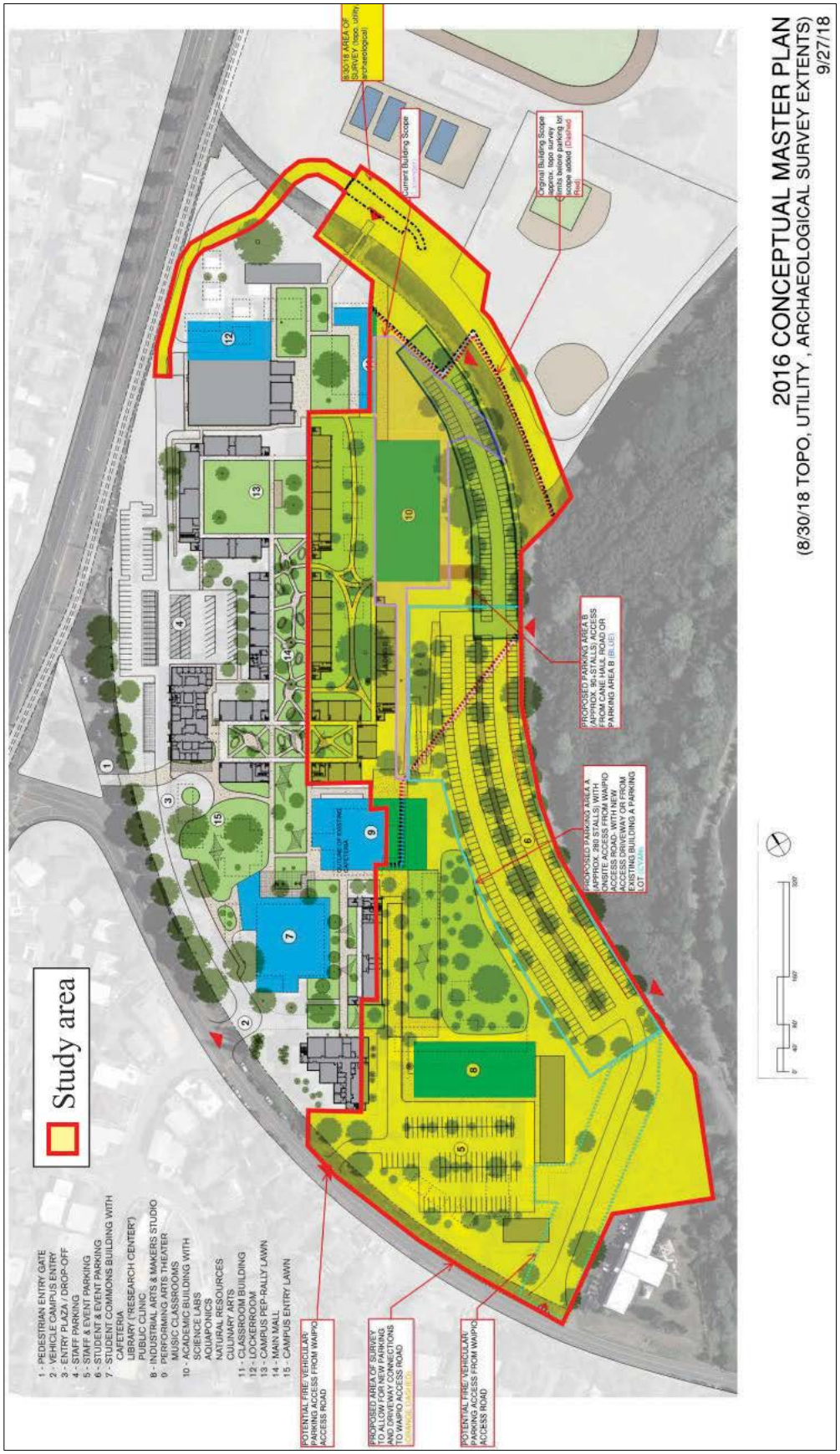

Figure 4. Conceptual master plan as of September 27, 2018 showing study area outlined in red (source: WRNS Studio 2018).

The study area is located within Waipahu Plain, part of the large coastal ʻEwa Plain that predominates much of southwestern Oʻahu. Elevation ranges from 10 feet above sea level at the southeastern end of the study area to 65 feet above sea level at the northwestern end of the study area. The climate in the area is generally hot and dry with very little seasonal rainfall and a monthly rainfall average of three inches (Giambelluca et al. 2013). The native soil in the study area is classified as Waipahu silty clay, 0 to 2 percent slopes (WzA), which "is used for sugarcane and homesites;" permeability of this soil, "is moderately slow, runoff is slow or very slow, and the erosion hazard is none to slight" (Foote et al. 1972:134).

The current study area is a mostly modern landscape, which has undergone extensive modification through episodic ground-disturbing activities associated with commercial sugar cultivation since the late 1800s, and the development of Waipahu High School since the late 1960s. Historic and ongoing ground-disturbing activities in the study area include the following: vegetation clearing, grubbing, cutting and filling, terracing, grading (Figure 5), and facility and utility construction (Figures 6, 7, 8, and 9). For instance, the former natural slope that descended to the nearby shores of the Middle Loch of Pearl Harbor exhibits evidence of mechanical terracing, and bulldozer push-piles were also observed throughout the undeveloped area to the east of the campus; some comprised soil and vegetation while others included broken concrete, concrete slabs, metal, pipes, and/or wooden utility poles (Figure 10).

The former Cane Haul Road extends through a portion of the study area near the northern end, and a pedestrian bridge spans this former railroad alignment and connects the upper and lower campuses (Figure 11). Recent development activities with associated ground disturbance within the northern portion of the study area include a concrete ramp and paved two-lane access road that connects the athletic fields and the upper campus at the northern end of the study area (Figure 12), as well as a cleared and graded area for fire drills/emergency evacuations (Figure 13) located to the northeast of the extant basketball courts across from the athletic fields. Additional development activities were carried out by HART as part of the ongoing rail project. Vegetation in the undeveloped portions of the study area comprises weeds and grasses and *koa haole* (Figures 14 and 15) of various ages closer to campus, which is evidence of prior clearing events. Additionally, transient camp sites were also observed near the southern end of the undeveloped portion of the study area and assorted modern rubbish was noted along both sides of Cane Haul Road (Figure 16) and throughout the vegetated portions of the study area.

Figure 5. Cleared and graded area at the southwest end of upper campus, view to the southwest.

Figure 6. Parking lot along eastern edge of study area near center of campus, view to the west.

Figure 7. Buildings along HART access road at northeast end of upper campus, view to the southwest.

Figure 8. View of upper campus from pedestrian bridge, view to the northwest.

Figure 9. Basketball courts and campus buildings at proposed new building site, view to the south.

Figure 10. Bulldozer push-pile near campus with concrete slab and utility pole fragments, view to the southwest.

Figure 11. Cane Haul Road and pedestrian bridge connecting upper and lower campuses, view to the north.

Figure 12. Ramp and stairs crossing Cane Haul Road with HART access road beyond in northern portion of study area, view to the north.

Figure 13. Recently cleared and graded evacuation area at northeast end of upper campus, view to the south.

Figure 14. Representative vegetation in undeveloped portion of study area between Cane Haul Road and campus, view to the west.

Figure 15. Vegetation in swale in southwestern portion of the study area, view to the southeast.

Figure 16. Rubbish along trails near southern end of survey area, view to the west.

2. BACKGROUND

To generate a set of expectations regarding the nature of archaeological resources that might be encountered within the current study area, and to establish an environment within which to assess the significance of any such resources, a general culture-historical context for ʻEwa District that includes specific information regarding the known history of Waipiʻo and the study area vicinity is presented. This is followed by a discussion of relevant prior archaeological studies conducted near the study area. The reader is referred to the CIA that ASM has prepared for this project (Gotay and Rechtman 2018) for further details regarding the cultural context of the study area.

CULTURE-HISTORICAL CONTEXT

As previously mentioned, the current study area is located within ʻEwa, a district on the south-central coast of Oʻahu that extends from Honouliuli Ahupuaʻa in the west to Halawa Ahupuaʻa in the east. ʻEwa encompasses the estuary of Pearl Harbor, known to the ancient Hawaiians as "Ke-awa-lua- o-Puʻuloa, The- many (*lau*)-harbors (*awa*)-of Puʻuloa. Puʻuloa was the rounded area projecting into the sea at the long narrow entrance of the harbor" (Handy et al. 1972:469). ʻEwa translates literally as "crooked" (Pūkuʻi et al. 1974:28). Much of ʻEwa is watered by streams that flow from the Koʻolau Mountains, although the western plains are arid.

The subject *ahupuaʻa* of Waipiʻo translates literally as "curved water" (Pūkuʻi et al. 1974:227), which may be a reference to legendary Kīpapa Stream or to the waters of Pearl Harbor that wrap around Waipiʻo Peninsula. Handy made the following observations during the 1930s of what Waipiʻo once looked like and how it appeared to him at the time:

> Between West Loch of Pearl Harbor and Loko Eo the lowlands were filled with terraces which extended for over a mile up into the flats along Waikele Stream. The lower terraces, were formerly irrigated partly from Waipahu Spring, which Hawaiians believe came all the way through the mountains from Kahuku. It is said that terraces formerly existed on the flats in Kipapa Gulch for at least 2 miles upstream above its junction with Waikele. Wild taros grow in abundance in upper Kipapa Gulch. (1940:82)

During the Precontact Period, Waipiʻo was also home to *aliʻi* and royalty. For instance, in Volume II of *An Account of the Polynesian Race* by Fornander (1880), Waipiʻo is mentioned, along with Waiawā and Manana in ʻEwa, as one of the places where Kakuhihewa, the Oʻahu King spent much of his childhood and had one of his royal residences. Waipiʻo and neighboring Waikele and Hōʻaeʻae *ahupuaʻa* to the west comprise the region of Waipahu, which extends from modern day Pearl City to Honouliuli *ahupuaʻa*. Waipahu translates as "bursting water" (Pūkuʻi et al. 1974:227), which refers to the many freshwater springs in the area.

Legendary Accounts

Traditional *moʻolelo* or legends were passed down orally through the generations and many tales focus on *wahi pana* or legendary places. There are many legends of ʻEwa, most of which are associated with the waters of Pearl Harbor and the neighboring *ahupuaʻa* of Honouliuli and Puʻuloa. For instance, it is believed that the first breadfruit planted in the Hawaiian Islands was brought from Upolo Samoa and planted at Puʻuloa in ʻEwa by Kahaʻi (Fornander 1916-1917:392), the grandson of the great navigator and *aliʻi nui* Moikeha (Emerson 1893). The legend associated with Waipahu Spring also deserves mention here, for it provides the inspiration for the place name itself. According to the legend, a woman lost her tapa anvil in a stream in Kahuku, on the other side of the Koʻolau and she later found it in Waikele bursting forth from the ground at the outlet of an underground stream known as Waipahu Spring (Sterling and Summers 1978).

Historical Accounts

Hawaiian historian Ioane (John) Kaneiakama Papa ʻĪʻī was born at Kumelewai in Waipiʻio, on August 3, 1800 on the land of his uncle and namesake Papa ʻĪʻī. In his writings, ʻĪʻī makes several interesting references to Waipiʻo (ʻĪʻī 1959). For instance, ʻĪʻī recounts that when Kaumualiʻi of Kauaʻi sailed to Oʻahu to meet with Kamehameha I, he received "*tapa* made of *mamaki* bark" (1959:83) from Waipiʻo in ʻEwa as a gift. Of daily life, he mentions that the family would go to "Kipapa from Kumelewai by way of upper Waipio to make ditches for the farms" (ibid.:28). Lastly, ʻĪʻī provides the following account of a famine that struck Waipiʻo:

> Here is a wonderful thing about the land of Waipio. After a famine had raged in that land, the removal of new crops from the taro patches and gardens was prohibited until all of the people had gathered and the farmers had joined in thanks to the gods. This prohibition was called *kapu ʻohiʻa*

> because, while the famine was upon the land, the people had lived on mountain apples (*ʻohiʻa ʻai*), tis, yams, and other upland foods. On the morning of Kane an offering of taro greens and other things was made to remove the *ʻohiʻa* prohibition, after which each farmer took of his own crops for the needs of his family. (ibid.:77)

According to McAllister (1933), many *aliʻi* used to reside on an eastern point of Waipiʻo Peninsula known as Lepau. ʻĪʻī also mentions Waipiʻo as a place for chiefly residence, "in late 1803 or early 1804, while he was living with the chiefs at Hālaulani, Waipio, Ewa, the king became ill" (ibid.:33). Thus, Kamehameha I resided for a time in Waipiʻo with the local chiefs. The literal translation of the place name Hālaulani is "high-born chief's large house", however Hālaulani also refers to a land division within Waipiʻo (Pūkuʻi et al. 1974:36). The current study area appears to fall within this land division as depicted on the map by Sterling and Summers (1978). Also, Handy et al. attributed the location of the *aliʻi* stronghold within Waipiʻo Peninsula to the existence of the numerous fishponds throughout Pearl Harbor:

> The Pearl Harbor ponds were stocked with various kinds of fish, but especially mullet, because these inland waters were the summer home of the mullet of Oahu. There were traps in which deep-sea fish, especially *akule*, were caught. . . (1972:470)

The *Māhele ʻĀina* of 1848

The profound religious, socioeconomic, and demographic changes that took place in the early 1800s resulted in the establishment of a Euro-American style of land tenure, and the *Māhele ʻĀina* of 1848 or Great *Māhele* was the vehicle used to divide the land between the crown, government, *konohiki*, and native tenants. Prior to this land reformation, all the land and natural resources of Hawaiʻi were held in trust by the *aliʻi* who, in concert with *konohiki* land agents, meted out use rights to the native tenants at will. During the *Māhele* all lands were placed in one of three categories: Crown Lands (for the occupant of the throne), Government Lands, or *Konohiki* Lands; all three types of land were subject to the rights of the native tenants therein.

During the *Māhele*, Ioane (John) ʻĪʻī received the *ahupuaʻa* of Waipiʻo as a *konohiki* award (LCAw. 8241; R.P. 5732), which covered 20,546 acres. The current study area falls within this awarded land. According to foreign testimony ʻĪʻī's land contained eleven *loʻi* in one piece and "He received the land from Kekaha in the time of Kamehameha and has held quiet possession of the same until the present time" (F.T. reel 3 Vol. 9 Image 52: p. 159). In his testimony, ʻĪʻī also listed 110 heads of household of Waipiʻo by name and included the number of children—244 (N.R. 5:512-516). One can safely assume that well over 350 people were residing in Waipiʻo at the time of the *Māhele* because ʻĪʻī's figures did not account for spouses or other extended family members. According to the Waihona ʻĀina database, seventy-eight of 121 claims were awarded in Waipio Ahupuaʻa.

Kuleana were often divided into sections or *ʻāpana*, typically between two and four. Although no *kuleana* parcels were awarded within the current study area, several *ʻāpana* were awarded nearby (Figure 17); three to the north, *makai* of the railroad along the edge of the Middle Loch of Pearl Harbor and seven to the south. Still more *kuleana* were awarded to the west/southwest of the study area. Interestingly, most of the LCAw. applicants' claims were filed under the same award (LCAw. 8241) to ʻĪʻī, but were assigned a unique alphabetical designation and separate Royal Patent numbers (see Figure 17). A review of foreign testimony for those LCAw. located closest to the current study area revealed that the majority of the *kuleana* contained between four and fourteen *loʻi* of various sizes (LCAw. 8241CM, 8241CW). In some cases, the *kuleana* also contained a house lot (LCAw. 8241SM), or *kula* (dry-land farming fields; LCAw. 8241PN, 3794, 8241SS), or simply one or two *loko* (fishponds) and a *kula* (LCAw. 8241GG, 8241LN). These individual *kuleana* claims for *loʻi* and *kula* lands during the *Māhele* indicate that some Waipiʻo residents still performed both dryland and wetland agriculture during the mid-1800s.

Rice Cultivation in Waipahu (1875-1942)

During the late 1800s, Waipiʻo and neighboring Waikele *ahupuaʻa* were the sites of the most productive rice fields in the Hawaiian Islands (Chong 1998). In 1892, 333 acres in Waipahu (Waipiʻo, Waikele, Honouliuli, and Waiawa) were dedicated to rice production,

> most of it was worked by two dozen or so major rice cooperative companies and the balance cultivated by approximately three dozen smaller group or family operations. Many of these smaller operations combined their efforts during the planting and harvesting seasons and bonded socially through traditional arranged marriages between their children. (Chong 1998:16).

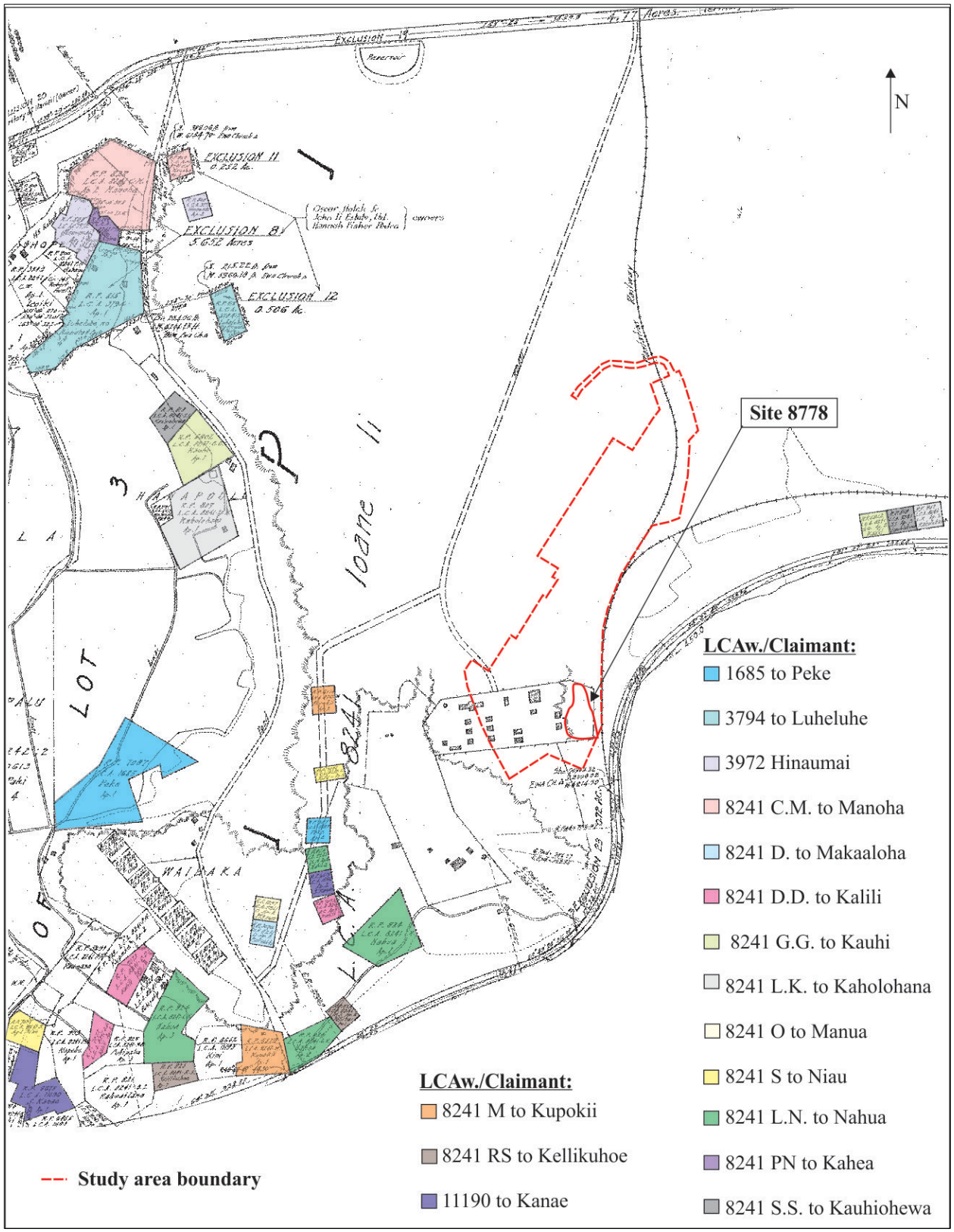

Figure 17. Land Court App. 1000 Map Number 2 (ca. 1928) showing locations of *kuleana* awarded relative to the current study area (no bar scale in original; source: DAGS).

According to Chong (1998), Homaikaia in Waipiʻo was the site of one of the earliest documented rice plantations begun in 1875. Subsequently, Chinese planters leased abandoned *loʻi* and unused *kuleana* lands from Hawaiian families, taking advantage of the many artesian wells in ʻEwa District that were located between the coast and the inland plains. Chong states, "vast tracts of old and new, reclaimed land surrounding Waipahu from Pearl City to ʻEwa eventually were engulfed in a blanket of green rice fields. By the early 1890s several rice mills were operating" (1998:15). Initially the Waipahu rice was taken by horse-drawn carriage to market in Honolulu; but with the advent of the railroad around 1889, rice was transported by train. Chong reports that in 1890 "more than ten million pounds of rice were exported, raised on sixteen thousand acres of rice paddies" (ibid.:15), which marked the peak of Hawaiian rice production.

Per the census of 1900 there were sixty-one rice farms in Waipahu, including forty-nine family operated rice farms; by 1910 the numbers decreased to fifty-five total farms of which only twenty-two were family operated (Chong 1998:18). Various systems of cooperative farming were implemented by the Waipahu Chinese. The largest and most complex of these systems was the *fun kung* (*or fung goong*). Six major *fung goong* cooperatives averaging around 40 acres each were operated in Waipiʻo until the late 1920s, located to the west of the current study area. During the decades leading up to World War II, rice production suffered a steady decline due to increasing rental costs, blight, insect infestations, and less demand for rice locally exacerbated by cheaper rice production on the mainland U.S. As first-generation farmers encouraged their offspring to purse business endeavors rather than continue rice farming, by 1942 only scant traces of the rice farming industry were evident in Waipiʻo.

The Oahu Railway and Land Company (1888-1947)

The following discussion is drawn largely from Paul T. Yardley's biography on the career of B. F. (Benjamin Franklin or "Frank") Dillingham (Yardley 1981). In the late 1880s Honolulu businessman B.F. Dillingham leased some of James Campbell's 40,000 acres in ʻEwa (and Kahuku) to develop sugar plantations and a railroad to service the plantations and transport people and goods to and from Honolulu Harbor (Yardley 1981). With the public support of Hawaiian voters and Charles A. Brown, husband of Irene ʻĪʻī, who controlled most (18,000 acres) of the Waipiʻo lands of the ʻĪʻī estate, King David Kalākaua signed a bill in favor of the development of Dillingham's railroad in September 1888. Although railroads, largely associated with the sugar industry, were already in operation around Hawaiʻi Island, Oʻahu was undeveloped in comparison, and the Pearl Harbor region was not a sugar production area. Furthermore, "the great dry plains of Ewa produced nothing but cattle and firewood" (ibid.:130).

The main landholders of ʻEwa, were all amenable to the planned railroad and the promise of an increase in value of their holdings. On February 4, 1889 Lorrin A. Thurston, Minister of the Interior, issued a charter for a railroad and land development company—the Oahu Railway and Land Company or O. R. and L. (Yardley 1981:137). Railroad construction commenced in March of 1889 and by August of 1890, the full fifteen-mile section that was a condition of the charter was completed (ibid.:158). By 1894, Dillingham arranged to lease Brown's ʻĪʻī lands at Waipiʻo. In 1895, the O. R. and L. reached Waianae on the leeward coast. The O. R. and L. reached the Waialua sugar mill in 1898 and the 74-mile main line to the Kahuku Plantation was completed in 1899 (ibid.:199).

In 1905, work began on extending the line ten miles inland from the Waipahu sugar mill (to the southwest of the current study area) to Wahiawā; this section of rail was completed during the summer of 1906 and was extremely profitable thanks to the booming pineapple industry (ibid.) The railway continued to flourish through the end of World War II, and provided transport for millions of passengers and freight during the war proving itself indispensable to the U.S. Army and Navy. However, after the war as infrastructure improvements to Oʻahu roadways were implemented and a shift to automobiles, trucks, and buses for the transport of people and goods was underway, the O. R. and L. could not compete. The year 1947 marked the close of the main line while limited operations between the docks and pineapple canneries continued before complete abandonment of the railway a few years later.

Without the O. R. and L., it is likely that leeward O'ahu would not be as it is today, nor would it have been possible to plant the parched ʻEwa plains with commercially cultivated sugarcane. In the early 1900s, Dillingham summarized his feelings regarding the link between his railway and the sugar industry in his report to the directors of the railroad thusly, "It is not too much to say that the development of the sugar industry on this Island [Oʻahu] since 1890, is directly due to the presence of . . . railway transportation" (ibid. 212). According to Yardley, another aspect of Dillingham's legacy was his hand in bringing water to the ʻEwa plains,

> . . . thousands of green acres which had produced nothing but kiawe and cactus in the years before the railroad, while out on the Ewa plain the great pumps sucked water out of the earth to give life to the land. . . he had brought life and prosperity to that part of Oahu which stretched from Pearl Harbor to Kahuku. (ibid.:316)

The Sugar Industry in Waipahu (1897-1995)

Once Dillingham had completed the original fifteen miles of rail he promised to his investors and the people of Oʻahu, he turned his sights on the commercial cultivation of sugarcane, which took over much of the ʻEwa area. However, the first few years of Ewa Plantation were barely productive, which cut into the O. R. and L.'s profits because the low crop yield meant less sugar to haul. The Ewa Plantation included Honouliuli lands up to 200 feet in elevation. However, by late 1896, Dillingham hoped to plant sugar at higher elevations using water pumped from artesian wells had been plotted, a plan which laid the groundwork for Oahu Sugar Company (OSC) Plantation at Waipahu. By the end of 1894, he had arranged to lease Brown's ʻĪʻī lands at Waipiʻo between Waiawā and Robinson's holdings (Yardley 1981). OSC was incorporated on March 3, 1897 (Chong 1998:63).

The following information was gathered from a 1928 publication titled *Concerning—Oahu Sugar Company Limited Waipahu, Oahu* written by E. W. Greene, manager of the plantation. The acreage of OSC extended eight miles from Waiawa to Honouliuli and from "tidewater on the Waipio Peninsula to Robinson, eight miles on a northeasterly line" (Greene 1928:5). OSC covered 12,000 acres (roughly 20 square miles) of which 11,350 acres were planted with sugar cane, the remaining acreage was comprised of "village sites, roads, and waste lands" (ibid.). The plantation was divided into seventy-seven cane fields between 50 and 280 acres each, situated at elevations ranging from "10 feet above sea level on the Waipio Peninsula to 650 to 700 feet above sea level at the Waiahole ditch, which is its upper boundary" (ibid.). Nearly ninety-seven percent of the OSC plantation lands were leased (11,622 acres). The ʻĪʻī Brown Estate were the lessors of 4,912 acres and the O. R. and L. were the lessors of 4,080 acres owned by the Bishop and Campbell Estates, while the Robinson Estate were the lessors for 2,630 acres.

The current study area lies within the south-central portion of the OSC plantation, just *mauka* of the O. R. and L. railroad tracks, as depicted in a tracing of an early undated map of the OSC plantation by Monsarrat, reproduced as Figure 18 below. Specifically, the current study area is located in portions of former cane fields (Number 6), located along the southeastern edge of the plantation, as seen in a portion of the 1925 map of OSC reproduced as Figure 19 below. An earlier map of OSC from 1909 reports the area of field 6 as 146.10 acres (Greene 1928: frontispiece). While the earlier, undated Monsarrat map (see Figure 18) labels the study area vicinity as 121.7 acres. The O. R. and L. tracks are visible along the southern edge of Field 6 as well as a portion of the plantation railroad system (see Figure 19), which in 1928 consisted of "56 miles of main line track. . . with eight locomotives and 860 cane cars" (Greene 1928:9).

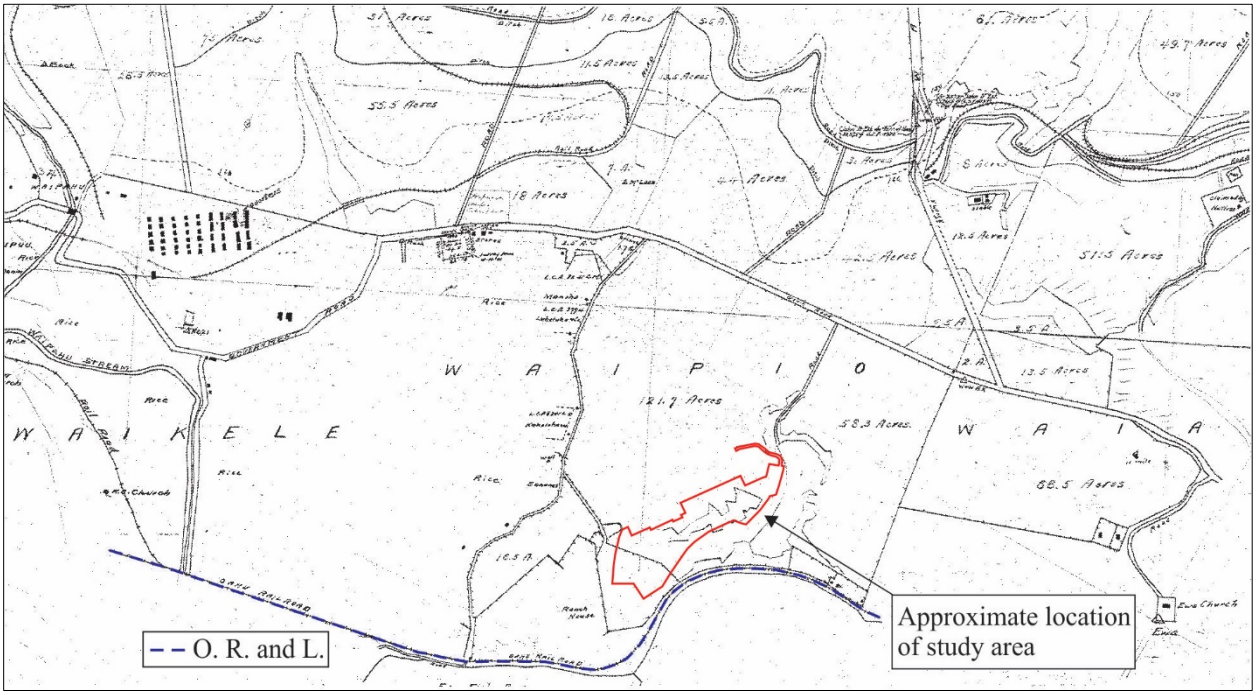

Figure 18. Portion of Hawaiʻi Registered Map No. 2081 (no date) titled "Oahu Plantation" by Monsarratt (no bar scale in original).

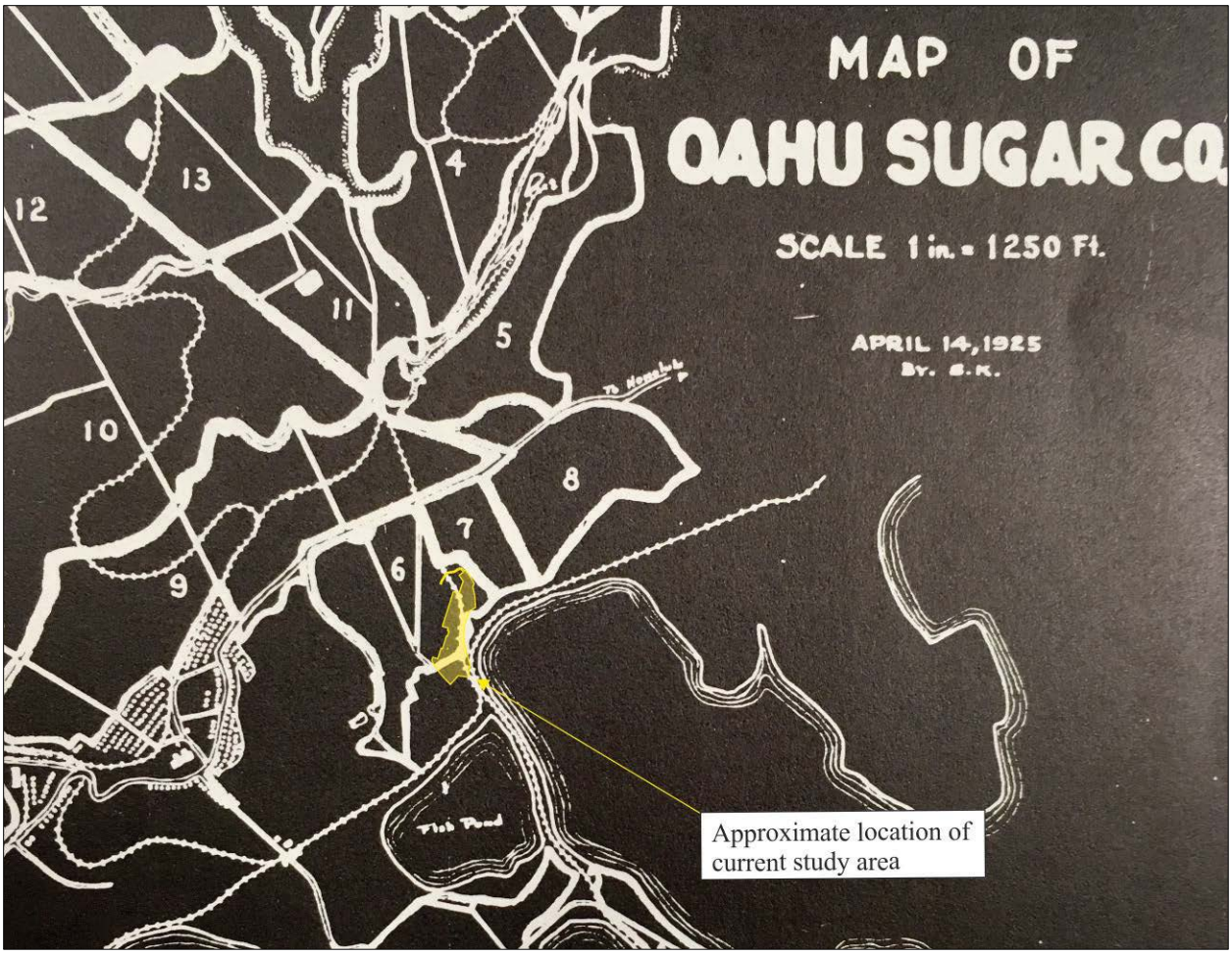

Figure 19. Portion of 1925 map of OSC showing the current study area shaded in yellow (Condé and Best 1973:317).

OSC harvested its first crop in 1899 and by 1928 the Waipahu mill had "a normal daily capacity of 3,200 tons of cane producing about 425 tons of sugar" (Greene 1928:23). In 1928, OSC broke a world record for their average output of 12.02 tons of sugar per acre largely due to the twelve-roller mill, the first of its kind, which had been installed in 1907 (Saito 1984). OSC continued to produce high yields for over sixty years. The aforementioned Chinese community of Waipahu provided much of the workforce for the thriving OSC and additional laborers came from all over the world to work in the fields and the mill, primarily from the Philippines, Japan, Portugal, and Norway (Saito 1984). By 1920, as a result of the booming sugar industry, Waipahu had become the second largest city in Oʻahu with a population of roughly 4,000 (Yamamoto et al. 2005:50). Regarding daily life on the plantation, the Hawaiian Sugar Planter's Association, (HSPA), now known as Hawaii Agriculture Research Center (HARC), recounts the following details:

> Each employee received a house free of charge, complete with firewood, fuel, and water for domestic purposes. By the 1930s, garbage collection, street cleaning and sewage disposal were provided. . . OSC provided clubhouses, athletic field, and playgrounds. . . The Company donated labor and materials to local schools. A hospital was built in 1920. . . By 1925, the population of the plantation ranged between 9,500-10,000 people. There were approximately 2,850 names on the payroll and it was estimated that at least ¾ of the residents of Waipahu earned a living in connection with the production of sugar. (Saito 1984:2-3)

The Waipahu sugar mill was located to the west of the current study area, in neighboring Waikele Ahupuaʻa, as seen in a 1954 USGS map, a portion of which is reproduced as Figure 20 below. Also on this map, occupying the southwestern portion of the current study area are buildings labeled "Hawaii Sugar Planters Association," which refers to the former Waipio Experiment Substation that will be discussed below.

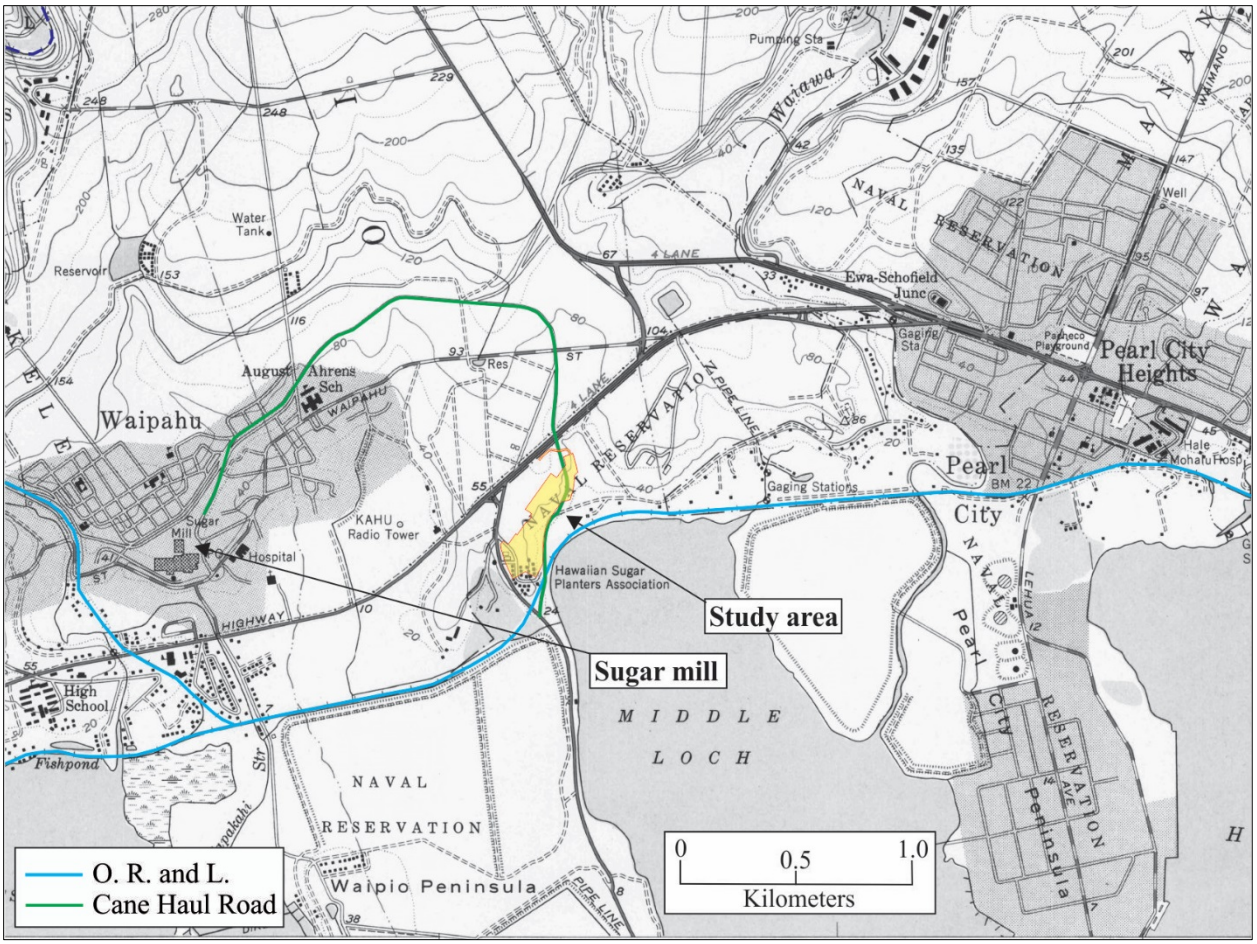

Figure 20. Portion of 1954 USGS 7.5-Minute series Waipahu Quadrangle showing relevant landmarks from discussion.

In 1947, OSC acquired Honolulu Plantation, which was also referred to as Aiea Plantation or Halawa Plantation (Yamamoto et al. 2005:42). By 1950, harvesting using cane haul trucks completely supplanted the plantation railroad system, and the plantation railroad was eliminated by the end of 1951 (Condé and Best 1973:316). In 1961, AMFAC, Inc. (formerly American Factors, Ltd.), originally a Hawaiian land development company founded in 1849 under the name H. Hackfield & Company, Ltd., acquired OSC (Harvard Business School-Lehman Brothers Collection, Contemporary Business Archives 2017). In 1970, OSC was merged with the ʻEwa Plantation when it was unable to renew its lease for the Campbell Estate lands (Yardley 1981); and became the second largest sugar plantation in Hawaiʻi and third largest in the U.S. until the Waipahu Mill finally closed in 1995 (Yamamoto et al. 2005).

According to Yardley, "no other deal which B. F. Dillingham ever put together did so much to enhance his prosperity and prestige and that of the railroad as did the formation of the Oahu Sugar Company" (1981:191). The early success of OSC was directly tied to that of the O. R. and L. in a mutually beneficial relationship. However, the price of sugar plummeted in the early 1900s, which affected commercial sugar production across the Hawaiian Islands. In early 1904, in order to rescue the industry from collapse Dillingham and his son Walter organized the Sugar Factors Company (predecessor of the California and Hawaiian Sugar Refining Company [C&H]), a cooperative jointly owned by the plantations, which shipped raw sugar to a refinery in Crockett, California. Yardley suggests, "it is doubtful that the industry could have survived for the next seventy years without this established outlet for its product" (ibid.:257). OSC continued to produce high yields well into the 1980s and the Waipahu sugar mill was in operation until April 8, 1995. Dillingham's arrangement with C&H did guarantee the future of the Hawaiian sugar industry up until very recently; for the last shipment of raw sugar (from the last remaining sugar plantation on Maui) to set sail from the Hawaiian Islands bound for the Crockett refinery was delivered on January 17, 2017, a full 111 years after the refinery opened its doors (*East Bay Times*: January 19, 2017).

The HSPA Experiment Substation at Waipio (1911-1962)

As previously mentioned, the majority of the current study area coincides with the northeastern portion of the former Hawaii Sugar Planters' Association or HSPA Experiment Substation at Waipio. The HSPA had their original Experiment Station in Makiki, to the east of the study area near Waikīkī. In 1910, the HSPA Experiment Station Committee spoke of their need to secure the following as soon as possible:

> . . . a larger Experiment Station Field located on land in the vicinity of one of the plantations near Honolulu, so as not to be far removed from the Experiment Station, and near a convenient shipping center, where the propagation and distribution in considerable quantities of new varieties of cane can be carried out to better advantage than is possible in the small space now available at the [Makiki] Station for this purpose. (Wodehouse 1911)

Thus, HSPA established the Waipio Substation in 1911 by subleasing 145 acres of I'ī Estate lands leased to OSC (Lease #35), designated OSC Field 6 in a diagram included in a report dated April 15, 1911 by C.F. Eckart (Director of the HSPA Experiment Station) reproduced as Figure 21 below.

Figure 21. Diagram of proposed Waipio Substation (Eckart 1911a:2; no bar sale in original).

Beginning on November 30, 1911 the lease agreement was entered into by the Treasurer and Trustee for the HSPA, William O. Smith, "for the use and benefit of said Association and its Experiment Station" (Lease Agreement dated November 30, 1911:7). The 145-acre 'I'ī Estate Lease # 35 was later divided into Lease 1-A (132 acres) and Lease 1-B (13 acres) as depicted in Figure 22. Initially only about 70 acres in the southern half of Lease 1-A was planted for experimental purposes. The 13 acres that comprise Lease 1-B, located along the northern edge of the OSC railroad line, coincide with the northeastern portion of the current study area and newly identified site (SIHP Site 50-80-09-08778; see Figure 22). The remaining 75 acres of Leases 1-A and 1-B were planted in 1914 (Grammer 1947); the reason for initially taking over only half of the area was "to obtain proper rotation in the starting of new experiments each year without having to fallow, in the start, a large portion of the field, while paying a high rent for the same: (Eckart 1911a:3).

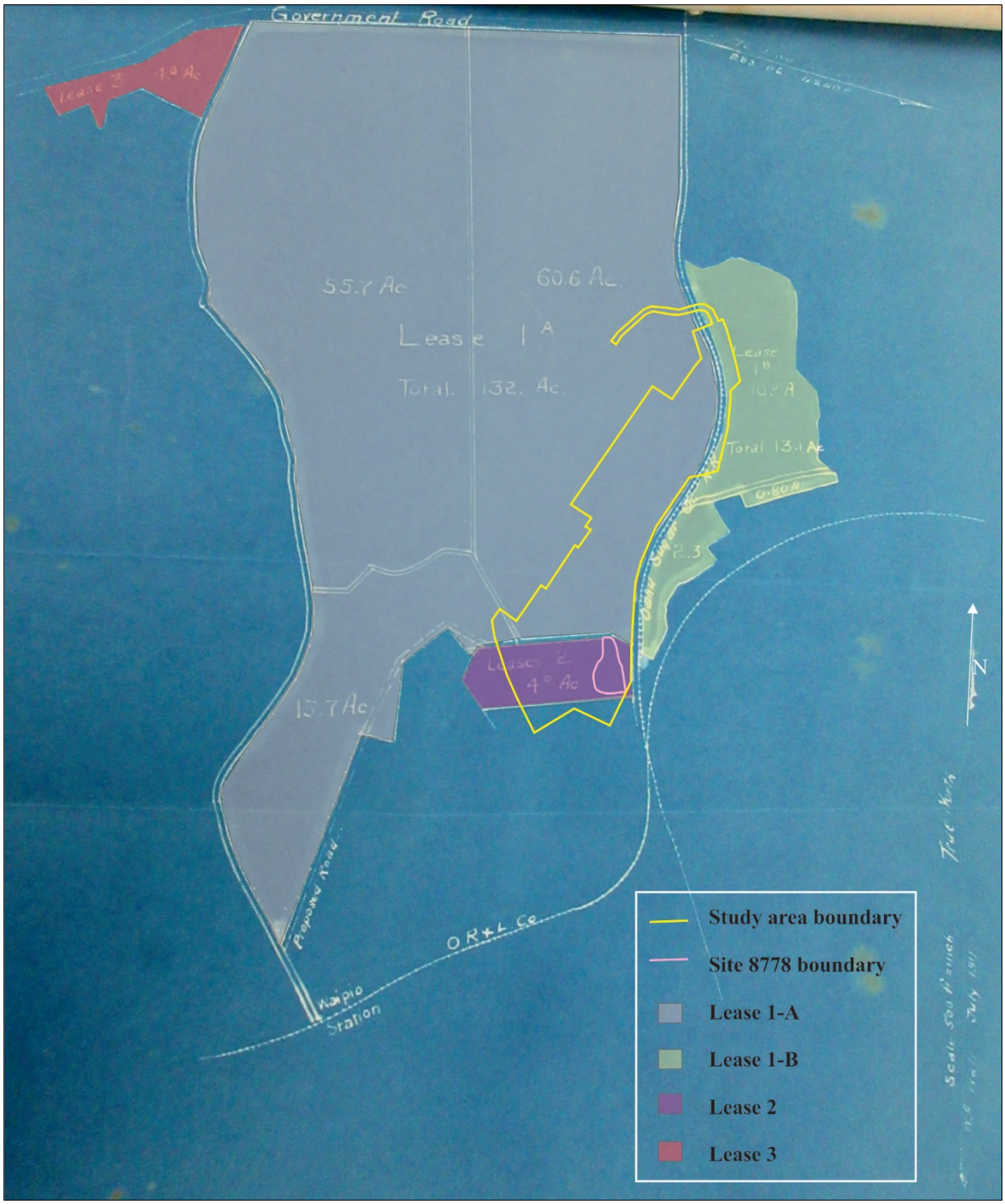

Figure 22. 1911 survey map of original lease boundaries showing approximate location of current study area and Site 8778 within the former substation building site (Lease 2) (no bar scale in original; source: HARC archive).

Regarding their planting methodology, HSPA reported the following:

> To have arranged these experiments under the Hawaiian system of irrigation as ordinarily practiced, we would have met with a field of curved rows conforming in general to curved and unparallel [*sic*] level ditches and interspersed with small rows. . . It is fortunate therefore that after due consideration it was found possible on a large portion of the available area to utilize straight and parallel level ditches, rows, and water courses, without in any way altering the principle of the general practice of irrigation. (1913:31)

HSPA continues their discussion of the experiment substation methodology as follows: Agriculturists Agee and Naquin measured off the planting rows "en bloc—that is, in making five-foot rows, ten equidistant rows were placed within a 50-foot strip" (1913:31). Their next step was to adopt an equal length for the rows between water courses, which resulted in 51 rows between level ditches, with one row *mauka* of each level ditch "left unplanted as a pathway, so there remain 48 rows for experimental plants plus a guard row at each end" (ibid.:32). Experimentation focused on irrigation—watering intervals, fertilization—timing of fertilizer application and using molasses as fertilizer, timing of planting for different varieties, and variety tests—in which the viability of different varieties of cane were compared, etc. (ibid.).

Prior to planting the experimental plots within OSC Field 6, HSPA staff planted seed cane in a 4-acre portion of OSC Field 9, located to the southwest of the study area and *makai* of the Government Road (Lease 3 in Figure 22), which they acquired via a two-year lease (from 1911-1913) solely to yield two crops of seed cane (Eckart 1911a:8). Another important aspect of the preliminary work at the Waipio Substation was the development of a separate four-acre parcel located to the east of Lease 1-A, also belonging to the ʻĪʻī Estate, for the construction of support buildings and infrastructure for the substation (Lease 2 in Figure 22). In his April 15, 1911 report, Eckart mentioned that the strip of land had been selected as the site for the substation buildings because it was more cost effective than the high rates charged by OSC for the acreage within Field 6 (Eckart 1911a:6). Located immediately *makai* of OSC Field 6, this parcel of land comprised a portion of the Ranch House Lot (or Ranch Yard) of the ʻĪʻī Estate (see Figure 21), which coincides with the mostly undeveloped southeastern portion of the current study area behind the Waipahu High School campus buildings where State Inventory of Historic Places (SIHP) Site 50-80-09-08778, a newly identified site that was recorded during fieldwork for the current study, is situated (see Figure 22).

Apparently, the title to both Field 6 and the Ranch Yard were under litigation at that time, which resulted in the following stipulation on behalf of the ʻĪʻī Estate:

> ... they will not give a right of way to the R. R. Station at Waipio through the ranch premises, and this will necessitate the construction of a road along the makai border of the shaded portion of Field 6 shown in the sketch [see Figure 21], this road to connect with the plantation road connecting with the Government road and Wapio Station. (Eckart 1911a:7)

By the middle of 1912, the substation appears to have been host to a fair amount of laborers, for a letter from the ʻĪʻī Estate on behalf of the Chinese caretaker at the nearby Ranch House complained of "the laborers at your Station, there, going through our lot on their way to the Waipio railroad station" and "that they are constantly taking cocoanuts which have fallen from the trees and even take them off the trees" (Letter from C. Holloway to C. Eckart; June 19, 1912). According to the letter, the ʻĪʻī Estate and HSPA had a prior understanding that the substation workers would use the road *makai* of the experiment station fields rather than the ranch house as a right of way (ibid.). Based on Sustenance Accounts for the Waipio Clubhouse between February and June of 1917, up to 384 meals were served per month. A review of historical documents associated with the Waipio Experiment Substation revealed that there were at least four mules, one horse, and a dairy cow on the property during the early years of operation.

In his April 15, 1911 report, Eckart also addressed the water supply for the substation buildings, which would come from the Waipahu Mill and have to travel a mile though the rice fields of Waipiʻo and would "require the installation of a small pump at the mill, and construction of a 10,000 gallon storage tank on the building premises" (1911a:7). In addition to the water tank, buildings at the experiment substation included the following: a superintendent's house, an overseer's house, laborers' quarters, a stable, a warehouse, a mill and weighing shed, and a small laboratory (ibid.); as well as an office, garage, cook's house, and work shop (HSPA Substation semi-monthly report; April 18, 1912). Undated historical photographs found in an HSPA album housed at HARC captioned "Waipio susbstation, analysis" show what appears to be the laboratory (Figure 23) and equipment (Figure 24); building exteriors at the Substation (Figures 25 and 26); and laborers planting flats in the field (Figure 27).

According to a letter dated September 22, 1911 the ʻĪʻī Estate granted the right-of-way for the proposed pipeline to get water from the Waipahu Mill to the substation buildings at no cost to the HSPA, "in view of the benefit which should be derived from the installation of the Experiment Station, at Waipio" (Letter from C.S. Holloway to Experiment Station; September 22, 1911). Construction work on the pipeline commenced in December of 1911 (Letter from E.K. Bull to C.F. Eckart; December 21, 1911). The pipeline passed through ʻĪʻī Estate lands including portions of the OSC mill yard and the following *kuleana* parcels: LCAw. 7260 B:2, LCAw. 1613, LCAw. 1614:1, LCAw. 10613:2, and LCAw. 8241 M:2. In addition to the installation of the water pipeline between the Waipahu Mill and the substation camp, new roads were developed within Field 6 (Letter from W.A. Wall to C.F. Eckart; December 30, 1911); another road between the buildings and the public road was graded during the week ending March 30, 1912 (HSPA Substation semi-monthly report; April 1, 1912); and a reservoir, located near the Government Road in the central portion of Field 6, was installed and in use by April 10, 1912 (HSPA semi-monthly report; April 18, 1912).

Figure 23. Undated photograph of analysis at Waipio Substation.

Figure 24. Undated photograph of analysis at Waipio Substation.

Figure 25. Undated photograph of entrance to Waipio Substation.

Figure 26. Undated photograph of buildings at Waipio Substation.

Figure 27. Undated photograph captioned "Taking planting flats to field" at Waipio Substation.

Near the end of 1923, HSPA expanded the experiment substation land to include 8.32 acres from the ʻĪʻī Estate, located adjacent to the road between the Government Road and Waipio Station (Letter from G. Brown to HSPA; December 8, 1923). The accompanying survey map is reproduced as Figure 28 below, and the lease began officially on April 1, 1924.

Roughly a decade later, HSPA considered reducing the size of the Waipio Substation. A 1932 map of Waipio Substation (Figure 29) shows how HSPA divided the experiment substation into two halves: the western or Waipahu side (shaded red) and the eastern or Honolulu side (shaded green) within which Site 8778 is located. The accompanying letter dated June 15, 1933 from HSPA to the manager of OSC refers to changes at the substation and a mix-up regarding previously proposed arrangements for HSPA to retain only one half of the property. It appears that OSC mistakenly thought HSPA would retain the Waipahu side; when in fact, HSPA meant to retain the Honolulu side and had already conducted their variety planting on the sixty acres therein (Letter from H. Agee to E. Greene; June 15, 1933:1). HSPA explained their preference for the Honolulu side thusly:

> There are a number of reasons why the Waipahu side is less desirable for our purposes and if we can not [*sic*] have the Honolulu side we would be inclined to negotiate with you for another area, but before coming to that it seems appropriate to ask for your reconsideration and decision on the piece of land that we thought we were to have. (ibid.)

The correspondence regarding the reduction of the acreage of the Waipio Substation also included the following recommendations against the establishment of additional substations in leeward Maui and Kauaʻi:

> It is felt that regional stations under these conditions would, of necessity, duplicate the work being done at Waipio, in that the same varieties would have to be tried at all these stations. It is proposed that selections from Field Test No. 2 be made as heretofore, at Waipio, and that the best canes from these selections be shipped direct to the leeward plantations on Maui and Kauai. (ibid.:12a)

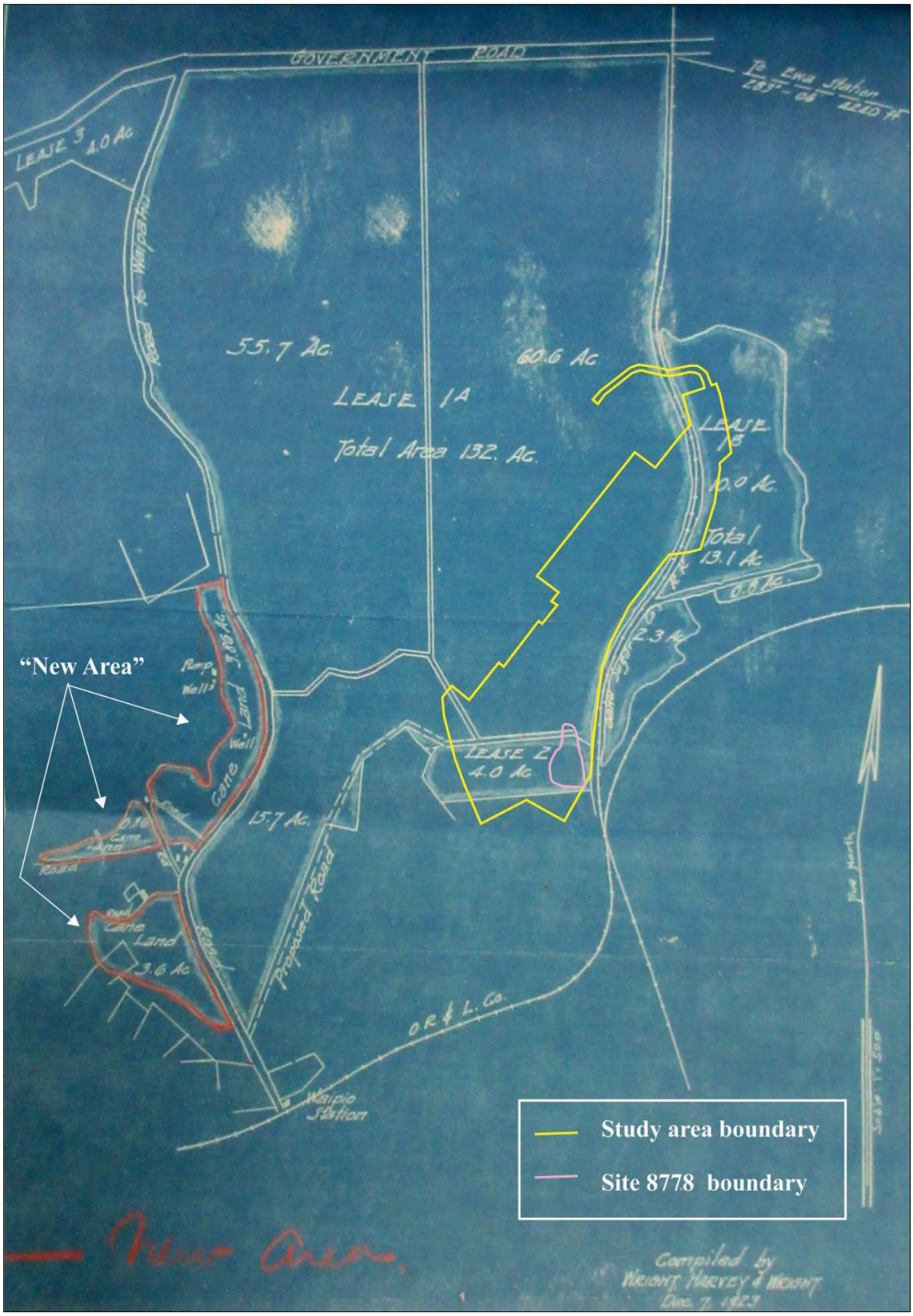

Figure 28. 1923 survey map of Waipio Substation expansion.

Figure 29. 1933 Waipio Substation map overlaid with study area and Site 8778 location (no bar scale in original; source: HARC archive).

This document also contains a request to renew the rental for "the office and skilled quarters at Waipio" so they can be retained as long as possible "unless some more economical arrangement can be made with Oahu Sugar Company, for providing labor and labor quarters" (ibid.). A Memo to Dr. Mangelsdorf dated July 8, 1935 refers to a counter proposition from OSC's Greene in which HSPA retains the entirety of the acreage under a "70-30 cane sales contract," which was preferable to the terms of their prior contract with OSC (Memo from H. Agee to Dr. Mangelsdorf; July 8, 1935). HSPA Director Agee summed up the benefits of keeping the entire acreage as follows:

> It seems to me that an institution with a staff payroll amounting annually to nearly $250,000, places itself under an unnecessary handicap unless it provides its staff with some land where they can try out new and extreme ideas. It is in this way that we learn.
>
> There can be no doubt about the fact that the work at Waipio led the way to 12 ton sugar yields (that could be repeated consistently) in the Pearl Harbor districts and elsewhere, and thereby has meant millions of dollars to the industry. People are quick to forget about these things, and perhaps some of the younger men who have come into power do not know about this work -- so perhaps we should pass on an occasional reminder.
>
> Personally I am very strongly in favor of providing an expensive technical staff with some land to be used as that staff sees fit.
>
> Perhaps Waipio is not the very best of locations, but it has certain advantages, and the cost of operating 134 acres will be but little more than 60 acres. I would be in favor of accepting Mr. Greene's offer provided certain minor points can be settled satisfactorily. . . (ibid.)

Based on a review of historical aerial images from 1952, 1959, and 1962 (Figure 30), it appears that HSPA retained the entire acreage of the Waipio Substation as depicted in the 1933 map (see Figure 29). One can clearly see the experimental planting area within the boundaries of OSC Field 6; as well as the half-moon shaped reservoir on the *makai* side of the former Government Road in the center of the property and access roads throughout (see Figure 30). The alignment of the former Cane Haul Road clearly defines the eastern boundary of the Waipio Substation property and the current study area. In addition, the substation buildings and some trees are evident to the south of the experimental fields of the substation, located within the 4-acre portion of the ʻĪʻī Estate Ranch Yard property in the 1952 and 1959 images; but in the December 1962 image there seem to be less buildings at the site. By 1968 (Figure 31), the substation buildings appear to have been replaced by different buildings and there is evidence of vegetation clearing and grading where the Waipahu Aloha Clubhouse is located today, just beyond (to the south of) the study area.

The individual experimental field boundaries appear clearly across the entirety of the acreage in the 1952 and 1959 images; however, these divisions appear less distinct within the Waipahu side (western half) in the 1962 aerial image, which suggests that HSPA may have let that half go fallow around that time. In contrast, the Honolulu side (eastern half) of the substation planting area shows active fields in the same image. The evidence of a reduction in the operations in the 1962 aerial image makes sense, for it was during that year that the Waipio Substation was abandoned. The final issue of the HSPA's serial publication *Hawiian Planters' Record* (first published a century before, in July of 1909 [Grammer 1947]) includes the following information regarding the demise of the experimental substation location at Waipio:

> On October 18, 1962, the executive committee met to consider the problem of relocating the Oahu substation. They discussed the opinion of the association attorney that HSPA was subject to eviction from its present location, Waipio, because of termination of the basic lease by Oahu Sugar Company. They agreed to issue a proper document canceling and surrendering the sublease on the property. (HSPA 2009:28)

Thus, in December of 1962, the HSPA executive committee agreed to lease a piece of land from Campbell Estate on a 16-year lease as the new location of the Oahu Substation and by March of 1963, plans for the new substation were completed and funds appropriated (HSPA 2009:29). Residential development swiftly took over the former experiment substation fields as can be seen in a 1968 aerial image (see Figure 31). In 1996, HSPA changed its name to Hawaii Agriculture Research Center (HARC) to reflect a shift in focus to diversified agriculture. Since 2008, their Experiment Station laboratories and administrative offices have been housed off Kunia Road in Waipahu.

Figure 30. Series of early USGS aerial images showing study area outlined in red (source: USGS 1952, 1959, 1962, 1977).

Figure 31. Series of later USGS and NOAA aerial images showing study area outlined in red (source: USGS 1968 and 1977;NOAA 1993).

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Military Use of the Study Area Vicinity (1901-present day)

In the early 20th century, in addition to the development of sugar plantations in Waipiʻo, the U.S. government acquired coastal lands surrounding Pearl Harbor to develop a new naval station to replace the Naval Station/Reservation in Honolulu Harbor. Under the Appropriation Act of 3 March 1901, "Congress approved the acquisition of lands for the development of a naval station at Pearl Harbor and the improvement of the channel to the Lochs" (Naval History and Heritage Command, internet resource: https://www.history.navy.mil/research/library/online-reading-room/title-list-alphabetically/u/the-us-navy-and-hawaii-a-historical-summary/development-of-the-naval-establishment-in-hawaii.html, accessed November 15, 2018). In 1905, the government appropriated fifty acres at Waipiʻo Peninsula from the ʻĪʻī Estate (ibid.).

A small airfield that was active during World War II was constructed at some point on the Peninsula and most of the structures built there were temporary in nature (Freeman 2018). During World War II, the OSC lands were undisturbed; however, the military did utilize the O. R and L. and existing plantation rail system to transport ammunition to and from Pearl Harbor; the OSC manager made the following remarks in 1944 "We have continued to haul large quantities of ammunition over our railroad tracks and are continuing to supply the Armed Forces with buildings and electricity" (Condé and Best 1973:315). The Waipio Naval Reservation appears on the 1954 USGS map (see Figure 20) and still occupies portions of Waipio Peninsula and borders the current study area to the south and east (see Figure 1).

Waipahu High School (1938-present)

Waipahu High School was founded in 1938 under the Sessions Laws of 1937 and Act 191 of 1938 at another location, which today is home to Waipahu Intermediate School (94-455 Farrington Highway). The original location of Waipahu High School was at the west end of the community of Waipahu in Waikele Ahupuaʻa. The school was the first high school in west Oʻahu and provided education to students from the greater ʻEwa area including the communities of Aiea, Waipahu, Nanakuli, Waianae, and Pearl City. As illustrated in the aerial photographs (see Figures 30 and 31), urbanization of Waipiʻo expanded significantly beginning in the early 1960s. The establishment of the nearby Mililani Town community in 1968 added still more development and an increase in the Waipahu area population. It was around this time that the initial Waipahu High School buildings were constructed within the study area (see Figure 31).

In 1969, Waipahu High School was moved to its current location, which includes the current study area, at the far east end of Waipahu (94-1211 Farrington Highway). The first graduating class at the new location was the class of 1970. By 1977, additions to the high school campus and further expansion of the surrounding residential development are visible, as are portions of the H-1 Interstate Highway, which was built ca. 1971 (see Figure 31). The 1993 aerial image shows still more additions to the Waipahu High facility including sports fields to the east of the study area (see Figure 31). In addition to the expansion of residential developments near the current study area, mixed commercial development was also expanding, which included retail and tourist attractions such as the Waipahu Cultural Garden and Plantation Village (established in 1984), Waipahu Town Center (established in 1988), and the Waipahu Civic Center (established in 1996), among others.

PREVIOUS ARCHAEOLOGICAL STUDIES

Records on file at the Department of Land and Natural Resources, State Historic Preservation Division (DLNR-SHPD) indicate that the study area was not previously surveyed for archaeological resources, although several studies have been conducted on adjacent properties and in the vicinity. Table 1 and Figure 32 detail the archaeological studies previously completed closest the current study area.

Table 1. Previous archaeological studies.

Year	*Author*	*Type of Study*
1985	Hammatt and Borthwick	Archaeological Reconnaissance
2004	Hammatt et al.	Archaeological and Cultural Assessment
2004	Perzinski et al.	Archaeological Inventory Survey
2005	Rainalter et al.	Archaeological Inventory Survey
2010	Hammatt	Archaeological Inventory Survey
2012	Sroat et al.	Archaeological Inventory Survey

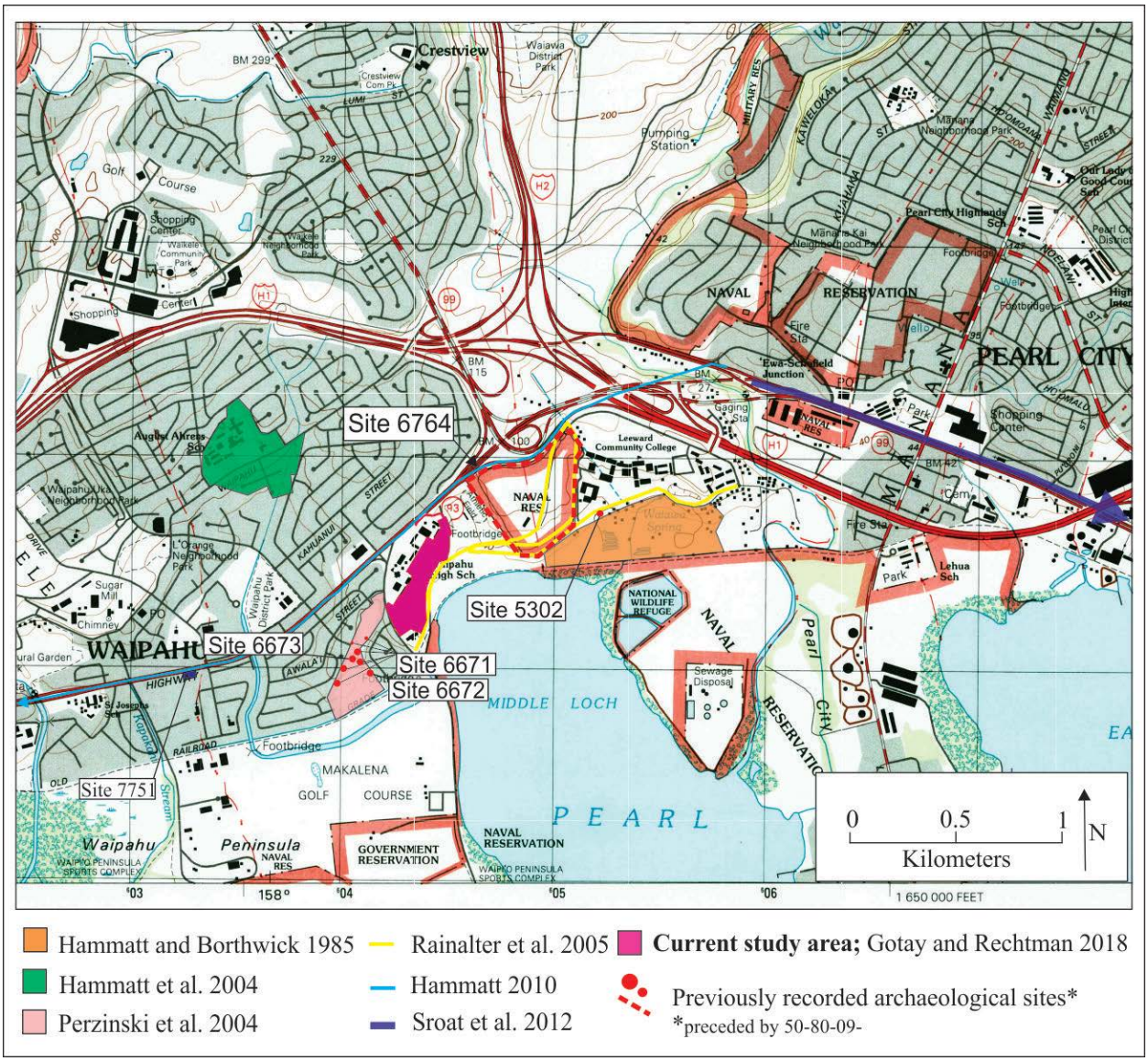

Figure 32. Previous archaeological studies conducted near the current study area plotted on a portion of USGS 1998, 7.5-Minute series Waipahu Quadrangle.

In 1985, Cultural Surveys Hawai‘i, Inc. (CSH) conducted an archaeological reconnaissance survey (Hammatt and Borthwick 1985) of a 37-acre parcel located to the east of the current study area along the northeast cost of the Middle Loch of Pearl Harbor in Waiawa Ahupua‘a (see Figure 32). Their investigation did not identify any cultural resources and severe, modern modification of the landscape was observed throughout the study area.

In 2003, CSH conducted an archaeological and cultural assessment (Hammatt et al. 2004) of roughly 38 acres, located to the northwest of the current study area in Waipahu Town (see Figure 32), for a then proposed drainage improvement project. Their entire project area had undergone extensive modification and urbanization, which resulted in a complete absence of surface archaeological resources and traditional practices.

In 2004, CSH conducted an Archaeological Inventory Survey (Perzinski et al. 2004) of roughly 13 acres (the Queen Emma Foundation Parcel), located adjacent and to the west-southwest of the current study area (see Figure 32). The pedestrian survey and subsurface testing (thirty-three backhoe trenches) recorded three sites (SIHP Sites 50-80-09-6671 thru 6673). Site 6671 consists of the remains of the former ‘Ī‘ī-Brown Estate; no further work was the recommended treatment for this Historic site. Site 6672 comprises three buried cultural layers containing abundant charcoal and midden, and a cowry shell lure were interpreted as a Precontact habitation site and was recommended for Data Recovery. Site 6673, a cultural layer with two associated individual primary burials encountered in the

northern portion of their study area, was situated within LCAw. 8241LN:4 and LCAW. 1685:2 (Perzinski et al. 2004:68). Based on radiocarbon dates from samples within the burial pits and analysis of associated artifacts, the authors suggest that occupation and/or utilization of the site could have begun as early as A.D. 1300, with occupation/use extending into the Historic Period well after the Māhele. It was recommended that a Burial Treatment Plan (BTP) be prepared and submitted to DLNR-SHPD for Site 6673. Thus, CSH prepared a BTP (Hammatt et al. 2004) as well as a Data Recovery Plan (Perzinski and Hammatt 2004) later that same year. As a result, CSH conducted Data Recovery at Site 6672 and Burial Recovery at Site 6673 in February and March 2005, respectively (Perzinski et al. 2006). The remains were slated to be reburied at an undisclosed location further inland on lands also owned by the Queen Emma Foundation.

In 2004, CSH conducted an AIS (Rainalter et al. 2005) of four proposed alignments of an access road for the Leeward Community College, located immediately to the south of the current study area (see Figure 32), extending southeastward from Waipio Point Access Road. Pedestrian survey of the 5.8-acre project area revealed two archaeological sites: a previously recorded burial site (SIHP Site 50-80-09-5302) and the ʻEwa Junction Navy Fuel Drum Site (SIHP Site 50-80-09-6764). Site 5302, was an inadvertent discovery revealed during a sewer line excavation located to the south of the Leeward College tennis courts recorded by Chaffee and Anderson (1995). Rainalter et al. (2005) reported that the discovery consisted of a secondary pit burial containing five individuals and a separate coffin burial. Site 5302 was assessed as significant under Criteria d and e, and avoidance was the recommended treatment for the site. Site 6764, the ʻEwa Junction Navy Fuel Drum Site, is located within naval reservation property and was built in 1943 as part of the Pearl Harbor Naval Complex to store fuel for automobiles and aircraft in two separate underground storage tanks. Site 6764 was assessed as significant under Criterion d and Historic America Building Survey/Historic American Engineering record-type documentation and evaluation was the recommended mitigation measure, if necessary.

In 2010, CSH conducted an AIS (Hammatt 2010) for Phase I of the then proposed Honolulu High-Capacity Transit Corridor Project (HHCTCP), which crossed various parcels throughout portions of Honouliuli, Hōʻaeʻae, Waikele, Waipiʻo, Waiawa, and Manana *ahupuaʻa* (see Figure 32). Pedestrian survey of the roughly 7.4-mile long alignment, limited Ground Penetrating Radar survey, and over ninety subsurface test excavations, resulted in the identification of a single intact cultural deposit (SIHP Site 7751). Site 7751, a subsurface deposit of *loʻi* sediments was discovered at the proposed location for the Waipahu Transit Station, roughly 1.2 kilometers southwest of the current study area. The site was interpreted as a Precontact agricultural feature and CSH prepared a Data Recovery Plan for the site (O'Hare et al. 2011).

In 2011, CSH conducted an AIS (Sroat et al. 2012) for Phase II of the then proposed HHCTCP, which entailed the construction of the various transit stations and structures adjacent to the proposed corridor (see Figure 32). As a result of combined pedestrian survey and subsurface testing a single site, SIHP Site 7150, an agricultural sediment deposit, was encountered in Waiau Ahupuaʻa, well to the east of the current study area.

Between August of 2017 and November of 2018, ASM conducted historical documentary research and consultation as part of the preparation of a Cultural Impact Assessment study (Gotay and Rechtman 2018) for the current proposed Waipahu High School campus improvement project. No traditional cultural places or resources nor any traditional cultural practices (ancient or ongoing) were documented to exist within the current study area. Additionally, none of the interviewees expressed any cultural concerns relative to the proposed improvements project. Thus, ASM concluded that development activities associated with the campus improvements project would not result in any cultural impacts.

3. STUDY AREA EXPECTATIONS

Based on the results of prior archaeological fieldwork conducted near the current study area and the review of historical documentary material presented above, a comprehensive set of study area expectations is presented. The lands encompassed by the current study area were used as cane fields by OSC beginning in the late 1800s, and later as the experimental substation for HSPA, until 1962. Although evidence of such Historic land use such as access roads, irrigation lines, fence lines, and associated infrastructure and buildings could theoretically still be visible within the current study area, much of the current study area comprises modern campus buildings and associated infrastructure. Construction for the Waipahu High School campus seems to have begun by 1968, and the facility welcomed students in 1969 to the current location. Thus, remnants of the study area's agricultural past would only be expected in the small unmodified portions of the study area.

Unfortunately, the widespread land clearing associated with the Historic Period use of the study area vicinity for commercial sugar cultivation had a destructive impact on the Precontact cultural landscape, as evidenced by the limited nature of traditional Hawaiian cultural resources recorded as a result of prior archaeological investigations. The scant evidence of Precontact or early Historic Period land use recorded nearby includes the following site types: agricultural or *loʻi* sediment deposits (Hammatt 2010; and Sroat et al. 2011); U.S. military infrastructure (Rainalter et al. 2005); and human burials (Perzinski et al. 2004; Rainalter et al. 2005). Thus, it is unlikely that intact Precontact or early Historic Period surface features will be encountered within the current study area. However, there is the potential for remnants from the U.S. Navy's use of the property since the 1930s to be present. In addition, there is a chance that some of the buildings or associated infrastructure from the HSPA Waipio Experiment Substation may still exist within the undeveloped portions of the Waipahu Campus property.

4. FIELDWORK

ASM conducted fieldwork for an earlier iteration of the current project beginning on February 7, 2017, at which time Robert B. Rechtman, Ph.D. and David Crowell, M.S. conducted an initial archaeological surface inspection of the study area. This initial inspection was followed by a systematic pedestrian survey conducted by David Crowell on February 17, 2017. On August 28, 2018, Teresa Gotay, M.A. and Ryan Gross, M.A. met on-site with design team members (including representatives for WRNS Studio and PBR Hawaii, as well as civil engineers, landscape architects, and land surveyors) to discuss the additional proposed development activity and the expanded survey area. Pedestrian survey of the expanded study area was conducted that same day by Teresa Gotay, M.A. and Ryan Gross, M.A.. The remaining inventory fieldwork for the expanded study area was conducted over six days between September 3 and October 1, 2018 by Teresa Gotay, M.A., Ryan Gross, M.A., and Deidra Moore, B.A under the supervision of Robert R. Rechtman, Ph.D. A total of 128 labor hours were expended on the fieldwork for this project.

FIELD METHODS

During the archaeological field survey, the entire (100%) ground surface of study area was visually inspected by field technicians walking roughly northeast/southwest oriented transects at 5-meter intervals. When archaeological features were encountered, their positions were plotted on a map of the current study area using a Trimble GeoX7 handheld GPS unit (set to the NAD 83 Zone 5 North) with submeter accuracy. Identified features located within the current study area were then cleared of vegetation, photographed (both with and without a meter stick for scale), depicted on a scaled plan map, and described using standardized feature record forms. No subsurface testing was undertaken as part of the current study because there were no indications from prior archaeological studies or historical maps that anything other than the infrastructure for the experimental substation was present and testing was not necessary to determine the function of the recorded features.

FINDINGS

As a result of the fieldwork for the current study, a single Historic Period site (Table 2) was recorded. The location of this site relative to the current study area boundary is presented in Figure 33 (and Appendix A). The site is described below.

Table 2. SIHP Site 50-80-09-08778.

Feature	*Type*	*Function*
A	Stacked rock walls/CRM steps	Retaining walls
B	Stacked rock walls	Retaining walls
C	Stacked rock walls/concrete structural elements	Retaining walls/foundation
D	Concrete box/vault	Septic tank

SIHP SITE 50-80-09-08778

Site 8778 (Figure 34) consists of four features (Features A-D) that comprise multiple subfeatures, which include the following: a series of discontinuous dry-stacked rock retaining walls comprised primarily of angular basalt boulders and cobbles (Subfeatures A1, A2, B1, B2, B3, and B4), concrete reinforced stone (angular basalt) masonry (CRM) steps (Subfeature A3), a combination dry-stacked rock (angular and rounded basalt cobbles and boulders) and concrete block retaining wall (Subfeature C1), a concrete block wall with associated concrete pads and steps (Subfeature C2), and a large concrete box/vault (Feature D). Features A, B, and C extend roughly 70 meters to the north and south (and roughly 40 meters east-west) of a swale (see Figure 15) within the southeastern extreme of the study area, behind Building B (garage) of the Waipahu High School. Feature D is located roughly 30 meters to the east of the southern end of Subfeature A1, to the north of the Waipahu Aloha Clubhouse facility. The stacked rock constructions comprise a single stack or one rock in thickness and on average measure 30 centimeters thick throughout the site.

Elevations within Site 8778 range from 16 to 44 feet above mean sea level (*amsl*). The site is located 50-75 meters inland of the present shoreline of the Middle Loch of Pearl Harbor and is situated on a gently-sloping plain with an eastern aspect. Vegetation within Site 8778 includes a golden shower tree, immature *haole koa*, cane grass, weeds, and vines. The site is in good condition although the retaining walls are collapsed in several areas; impacts to the site include erosion, pedestrian activities along adjacent trails, and transient encampments, whose residents have removed rocks to incorporate into the encampments located within and beyond the site. Detailed feature descriptions are presented below.

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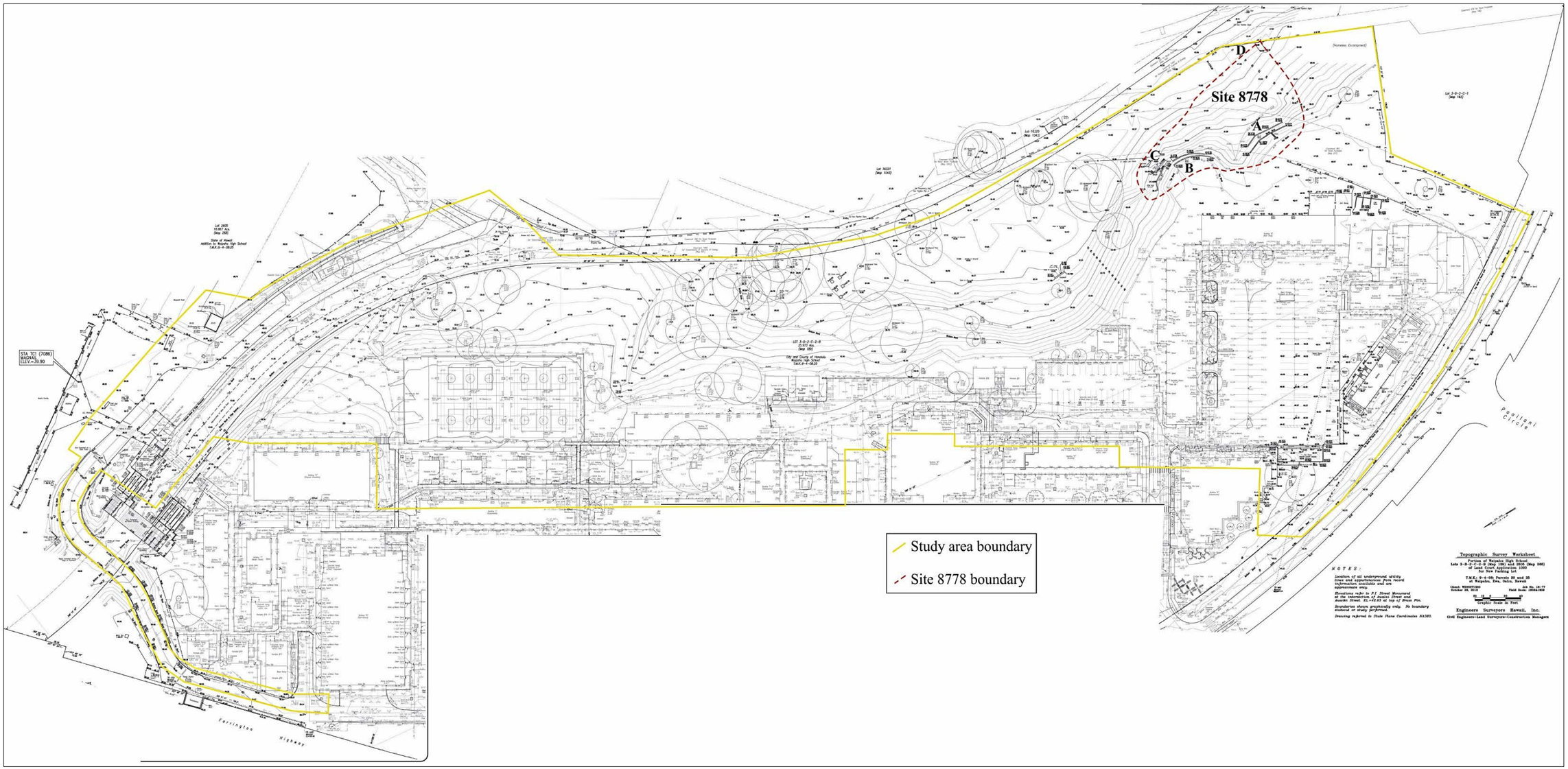

Figure 33. Location of Site 8778 within the current study area on a topographic survey worksheet (source: Engineers Surveyors Hawaii, Inc. October 26, 2018).

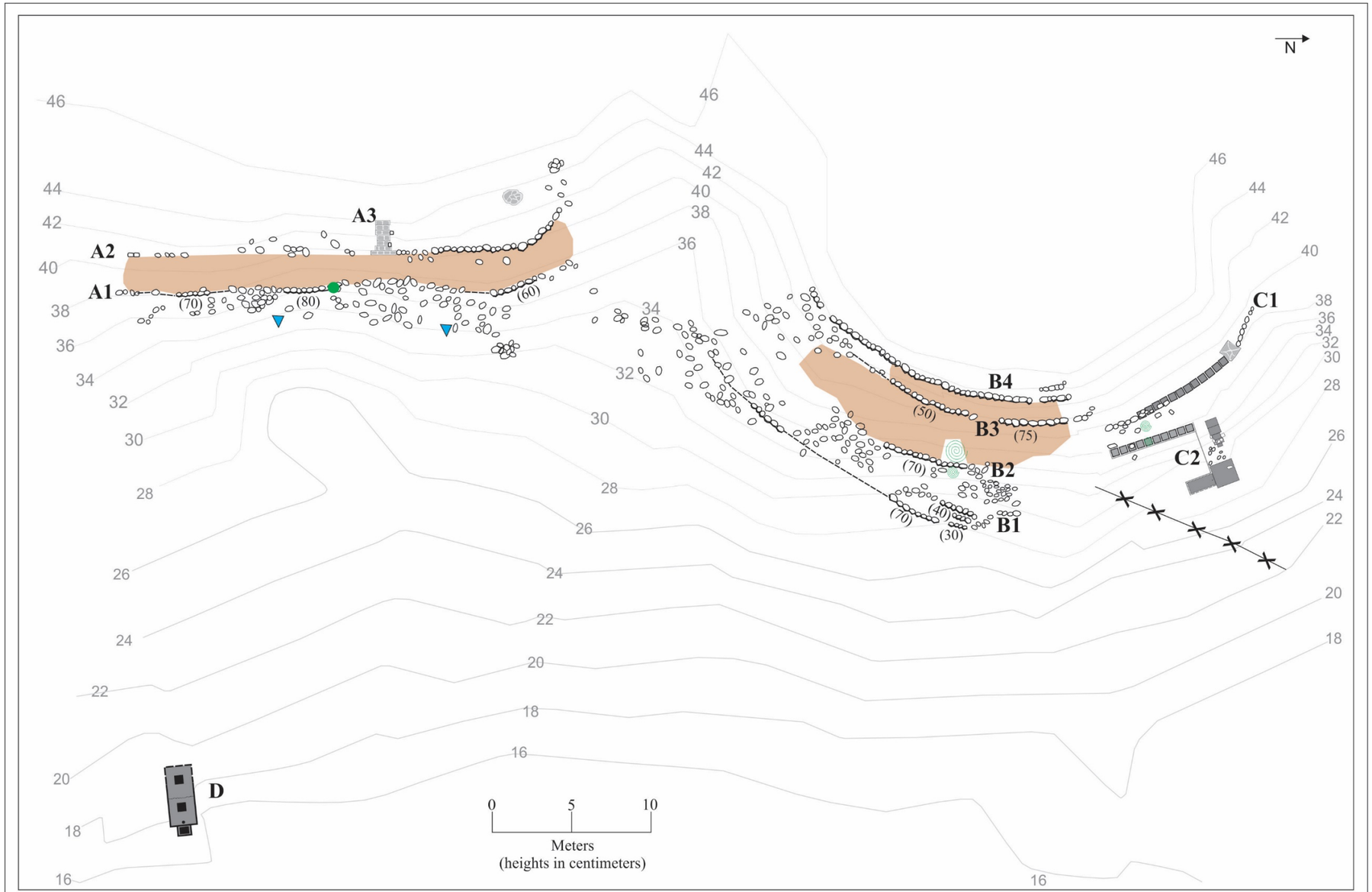

Figure 34. Site 8778 plan view site map.

Feature A

Feature A consists of two dry-stacked rock alignments with a soil area in between and a set of seven concrete reinforced stone masonry steps leading upslope from the soil area, located within the southwestern portion of Site 8778 to the south of the swale (see Figure 34). For ease of discussion this Feature has been divided into three subfeatures, which are described in detail below.

Subfeature A1

Subfeature A1 is a dry-stacked rock construction that extends in a linear fashion roughly north-south for 25 meters before curving to the northwest for an additional 6 meters, situated along the base of a 45° slope (see Figure 34). Subfeature A1 comprises three sections of mostly intact dry stacking that measure a total length of roughly 9 meters, made up of between one and four courses to reach an average height of 50 centimeters; with a maximum height of 80 centimeters in some places. The southernmost section of well-preserved stacking, located roughly four meters north of the southern terminus, presents a maximum height of 70 centimeters (Figure 35). The remaining 22 meters of Subfeature A1 comprise rough alignments of unstacked stones or bare earthen gaps between the well-preserved sections of the alignment. Collections of loose boulders and cobbles also appear downslope of the alignment (Figure 36), which are likely the result of tumbling from their former position within the rock construction. The northernmost well-preserved section of dry-stacked construction (3 meters long by 60 centimeters tall) parallels the curvilinear orientation of Subfeature A2 (discussed below) and terminates in tumbled stones scattered in a rough extension of the better-preserved alignment at the southern margin of a swale (Figure 37).

This handmade construction is located downslope of a flat soil area that extends between 1.5 to 2 meters before abutting Subfeature A2 (Figure 38).

Figure 35. Well-preserved section near the northern end of Site 8778 Subfeature A1, view to the northwest.

Figure 36. Collection of loose boulders and cobbles immediately downslope of Site 8778 Subfeature A1, view to the northwest.

Figure 37. Site 8778 Subfeature A1 near its northern terminus with Waipahu campus building in background, view to the northwest.

Figure 38. Site 8778 Subfeature A1 in foreground with Site 8778 Subfeature A2, note nearly level soil area in between, view to the southwest.

Subfeature A2

Subfeature A2 is a dry-stacked rock alignment that acts as a retaining wall, located roughly two meters to the west (upslope) of Subfeature A1 (see Figures 34 and 38). Subfeature A2 appears to have formerly extended a total length of approximately 28 meters, oriented roughly north-south and parallel to Subfeature A1 for most of its length. Like Subfeature A1, the stacked construction extends northwest in a curvilinear fashion roughly 25 meters from its southern terminus (Figure 39). The preservation of this construction is best at its northern end; thus, this description will proceed from north to south. The height of Subfeature A2 is 50 centimeters on average, made up of between one and three courses, as it extends a distance of roughly 9 meters from its northern terminus (Figure 40); at which point the stacking becomes disorganized and the boulders and large cobbles follow the incline of the slope rather than a vertical orientation for about 3 meters (Figure 41) before it connects with the bottom-most of 7 concrete reinforced stone masonry steps (Subfeature A3 described below). Subfeature A2 is barely recognizable to the south of Subfeature A3—loose boulders and cobbles separated by large gaps and exposed soil are all that is visible extending between 13.5 and 24 meters from the northern terminus of Subfeature A2. The final two meters near the southern end of Subfeature A2 contain boulders and cobbles approximating a linear organization that coincides with the former alignment. All that remains at the southern end of Subfeature A2 are two adjacent block-shaped rocks that measure 20 centimeters high (Figure 42), which resemble the stones that comprise the nearby steps. However, these stones were not reinforced with concrete and no additional stones were encountered above or below these two rocks which suggests they were likely part of the retaining wall construction rather than part of another set of stairs.

Figure 39. Curvilinear portion of Site 8778 Subfeature A2 near the northern terminus, note soil area with Site 8778 Subfeature A1 to the right, view to the northwest.

Figure 40. Well-preserved section near the northern end of Site 8778 Subfeature A2, view to the southwest.

Figure 41. Gap in alignment of Site 8778 Subfeature A2 between the northern section and steps (Subfeature A3), view to the northwest.

Figure 42. Detail view of stones at the southern terminus of Site 8778 Subfeature A2, view to the west.

Subfeature A3

Subfeature A3 is a set of seven steps (Steps 1-7) composed of concrete reinforced stone masonry (Figure 43) located to the west of Subfeature A1, along the slope in the southern portion of the study area (see Figure 34). The stones that comprise these steps are all similar in shape (roughly rectangular) and size (Figure 44). Except for Step 1, the depth of the steps is consistently 35centimeters (Table 2). Thus, the stones appear to have been selected based upon their similarities and function to facilitate access to Subfeature A1, located downslope.

Table 3. Overall dimensions of steps.

Step#	*Height (cm)*	*Width (m)*	*Depth (cm)*
1	13	1.64	20
2	28	1	35
3	23	.77	35
4	24	.77	35
5	18	.81	35
6	30	.88	35
7	25	.81	35

Step 1 is the lowest of the steps and consists of three conjoined stones. The stones within this first step are flush with the stones that comprise Subfeature A1 (see Figure 43). Step 2 comprises two complete stones connected with fragmented stone via mortar at both ends. Step 3 is made up of two stones and a third stone that appears to formerly have been part of Step 3 based on the presence of mortar on the exposed surface of the northernmost stone; this third stone is currently situated between Step 2 and Step 3. Step 4 is made up of two stones and has a small amount of mortar at its southern end, which suggests at one point it had included another stone. Step 5 consists of three intact stones; the middle and northernmost stones are separated by the root action of a young *haole koa* tree growing within Step 6 above. The three stones that comprise Step 6 are interrupted by the *haole koa* tree growing near the northern end of the step, which has displaced the northernmost stone. Step 7, which is the highest in the set of steps, comprises two stones.

Figure 43. Subfeature A3; note the connection with Site 8778 Subfeature A1, view to the west.

Figure 44. Detail view of concrete reinforced stone masonry of Site 8778 Subfeature A3, view to the west.

Based on the distribution of the *in situ* stones of Subfeature A3, it appears that these steps were originally tapered with the narrowest step at the top (Step 7); gradually increasing in width towards the widest step at the bottom (Step 1). At the very top of the set of stairs, above Step 7, is a 45-centimeter soil layer (Figure 45). This previously disturbed soil layer appears to be the result of grading activities associated with the development of the Waipahu High School campus.

Figure 45. Extant ground surface above the uppermost step of Site 8778 Subfeature A3, view to the west.

Feature B

Feature B comprises multiple discontiguous dry-stacked rock constructions set into the natural slope within the northern half of Site 8778, to the north of the swale (see Figure 34). For ease of discussion this Feature has been divided into four subfeatures, which are described in detail below.

Subfeature B1

Subfeature B1 is a series of dry-stacked rock alignment segments comprising between one and four courses, oriented roughly southwest to northeast that extend from the northern margin of the swale over a combined distance of approximately 27 meters (see Figure 34), including gaps of exposed soil and tumbled cobbles and small boulders. At the north end of Subfeature B1 is a 1.5-meter long alignment, made up of rocks that average 30 centimeters in height, and extends southward (Figure 46). Roughly 1.2 meters downslope from the northernmost alignment is another less organized alignment that extends 1.7 meters south/southeast to a point where it splits into three short retaining walls/alignments:

(1) the easternmost retaining wall is located 1.5 meters southeast of the northernmost alignment of Subfeature B1 and comprises a small segment of tightly stacked angular cobbles that measures 1 meter long by roughly 20 centimeters wide, and 30 centimeters high (Figure 47)

(2) immediately to the south of this is another retaining wall made up of larger, more rounded stones that measures 3.7 meters long by 20-35 centimeters wide, and 50-70 centimeters high (Figure 48), located at the bottom of the slope; this construction curves slightly inward (to the southwest) and pinches off at its southern end where bare earth extends for about 5 meters.

(3) The westernmost segment from the split point continues southward from the crudely aligned rocks on two levels adjacent to one another (Figure 49) that are on average 40 centimeters high; the lowermost extends roughly 1 meter while the uppermost extends roughly 2.5 meters south before it becomes a less organized/rough alignment—this construction has some concrete slab pieces incorporated near the top (Figure 50); this section runs into the previously described easternmost section (described as 1 above).

Figure 46. Crude alignment at northern end of Site 8778 Subfeature B1, view to the west.

Figure 47. Angular cobble construction within eastern section of Site 8778 Subfeature B1, view to the west.

Figure 48. Rounded stone cobble construction within eastern section of Site 8778 Subfeature B1, view to the west.

Figure 49. Double alignment within western section of Site 8778 Subfeature B1, view to the southwest.

Figure 50. Detail view of concrete fragments within uppermost alignment in western segment Site 8778 Subfeature B1, view to the west.

Another stacked alignment section appears approximately 15 meters from the north end of Subfeature B1 (Figure 51); this 2-meter long section is 40-60 centimeters high, and a maximum of 30 centimeters wide. There are tumbled rocks above and to the south of it. A concentration of tumbled rocks and small boulders occupies a space from 17 to 20 meters south of the northern terminus of Subfeature B1 (Figure 52). Within the remaining 7 meters of Subfeature B1, the alignment is barely recognizable—however, gaps and scattered rocks are visible that seem to follow the orientation of the better-preserved northern end of the feature. The soil areas present behind the alignments that comprise Subfeature B1 are sloped rather than level, like that between Subfeatures A1 and A2 previously described. These soil areas also include more rocks and cobbles on the surface and embedded in the slope than the other features observed in Site 8778.

Figure 51. Southernmost well-preserved section of Site 8778 Subfeature B1, view to the west.

Figure 52. Scattered small boulders and rocks at southern end of Site 8778 Subfeature B1, view to the northeast.

Subfeature B2

Subfeature B2 is located upslope from Subfeature B1 (see Figure 34) and oriented roughly parallel to both Subfeature B1 and Subfeature B3 (described below). This subfeature begins at its north end with a 2.5-meter long section of 4 or 5 rows of rocks embedded in the soil that appear organized and intentionally set within the slope (Figure 53); perhaps to reinforce the slope. A dry-stacked retaining wall extends 5.5 meters south of these rocks that also incorporates pieces of concrete in its construction (Figure 54); these concrete remnants may have been added after the initial construction as a means of repair. This wall segment measures between 45 and 70 centimeters tall and 30-50 centimeters wide; at its southern end, it pinches off and continues as a small boulder scatter that extends southward along the sloping ground in a disorganized fashion (Figure 55). A golden shower tree (*cassia fistula*) is growing on both the east and west (down and up slope) sides of the stacked segment of the wall.

Figure 53. Rows of stones embedded in the slope of Site 8778 Subfeature B2, view to the southwest.

Figure 54. Dry-stacked section of Site 8778 Subfeature B2 note concrete at right of frame, view to the west.

Figure 55. Rock and boulder scatter along slope at south end of Site 8778 Subfeature B2, view to the southwest.

Subfeature B3

Subfeature B3 is a dry-stacked construction located roughly 3 meters upslope of Subfeature B2. This retaining wall extends south-southwest in a slightly curvilinear fashion for roughly 15 meters including some gaps in the alignment and areas of rock tumble (see Figure 34). The stones at the northern end of this construction are collapsed and stained red from the overlying soil and runoff where a foot path interrupts the alignment (Figure 56). To the south of the foot path, a dry-stacked retaining wall in good condition extends 4 meters and stands 35-75 centimeters high, with some areas where individual stones have collapsed (Figure 57). A 1.8-meter gap in the alignment follows and ends in a tumbled rock that gives way to another well-preserved section of the dry-stacked retaining wall, which measures 5 meters long, between 20-50 centimeters tall, and 30-40 centimeters wide. This wall creates a nearly level, 11-meters long by 1-meter wide soil area (Figure 58) between it and Subfeature B4, located to the west (upslope). Some of the stones in the constructions of Subfeature B3 have cement adhering to their surface (see Figures 57 and 58), which suggests that they were formerly part of a concrete reinforced stone masonry construction before they were repurposed as part of the dry-stacked construction. This soil area becomes increasingly sloped and covered with scattered rocks and small boulders near the southern end of Subfeature B3 (Figure 59).

Figure 56. Foot trail at collapsed northern end of Site 8778 Subfeature B3, view to the west.

Figure 57. Site 8778 Subfeature B3 (foreground) with Subfeature B4 (background), near their northern end; note cement on some of the stone surfaces, view to the southwest.

Figure 58. Soil area between Site 8778 Subfeature B3 (foreground) and Subfeature B4 (background); note cement on some of the stone surfaces view to the southwest.

Figure 59. Tumbled rock scatter along the southern end of Site 8778 Subfeature B3, view to the northwest.

Subfeature B4

Subfeature B4 is a curvilinear dry-stacked rock construction located roughly 1 meter to the west of Subfeature B3. At its northern end is a 1.7-meter long section that incorporates concrete fragments and stones with cement adhered to some of their surfaces (Figure 60). This short segment shows evidence of collapse and stands only 25 centimeters tall. To the south of this section is a 10-meter long, well-preserved retaining wall that extends south-southwest and stands 30-75 centimeters tall (Figure 61). A few small areas show collapse and there is a 1.5-meter long gap at the southern end of the alignment. Subfeature B4 continues beyond this gap along the top of the slope for 3 meters and ends with a remnant alignment of rocks and small boulders (Figure 62). Tumbled rocks are also scattered downslope (to the east) of the alignment towards Subfeature B3 and to the south into the swale and towards Feature A (Figure 63).

Additionally, another 2-meter long section of dry-stacked stone construction is present about 0.5 meters west of the northern end of Subfeature B4 close to the top of the slope (see Figure 60). This short segment measures 20-40 centimeters high and dwindles at its northern and southern ends.

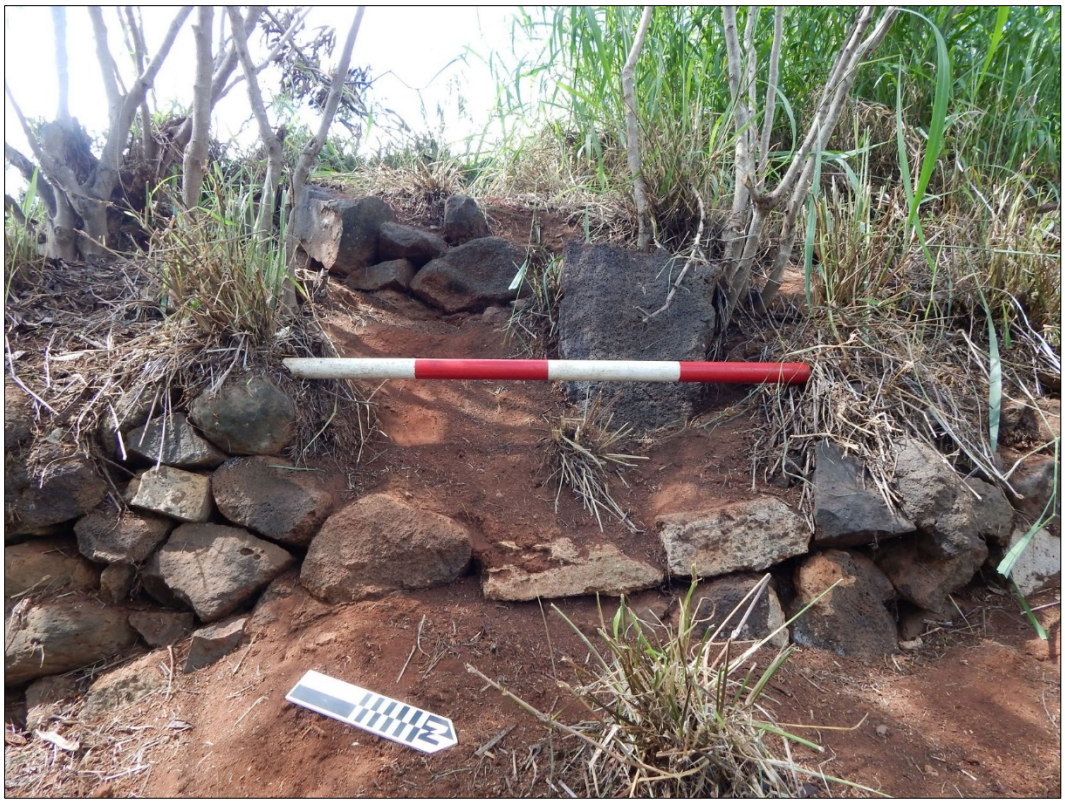

Figure 60. Northern end of Site 8778 Subfeature B4 showing concrete fragments within dry stacked rock construction, view to the southwest.

Figure 61. Well-preserved section of Site 8778 Subfeature B4 retaining wall, view to the west.

Figure 62. Remnant of Site 8778 Subfeature B4 alignment near the southern end of the wall, view to the southwest.

Figure 63. Tumbled rocks comprising the southern ends of Site 8778 Subfeatures B1, B3, and B4, view to the north.

Feature C

Feature C consists of a dry-stacked rocked construction that incorporates pre-fabricated cement/concrete blocks that appears to be a retaining wall (Subfeature C1) and the remnants of what appears to have been a Historic structure (Subfeature C2) likely associated with the former Waipio Experiment Station.

Subfeature C1

Subfeature C1 is a retaining wall that comprises a combination of dry-stacked rock alignments, a concrete block alignment, and a concrete reinforced stone masonry remnant (see Figure 34). Subfeature C1 begins about 1.5 meters northeast of the northern terminus of Subfeature B3. At its southern end, it is a dry-stacked rock construction that measures 2.5 meters long and by roughly 30 centimeters wide and up to 70 centimeters tall (Figure 64). This dry-stacked construction abuts twelve 55-centimeter square cement blocks arranged in a single (7-meter long) row that exhibits a slight curve, which is likely due to the pressure of the soil retained by them. A few large rectangular stones are placed atop these blocks along their edge (Figure 65), smaller stones are also embedded within the soil atop these blocks and additional rocks that appear to have tumbled from their former position atop these blocks are found on the ground surface in front of the block alignment. At the north end of the block alignment is a 60-centimeter wide gap; Subfeature C1 continues with a roughly 1-meter wide by 70 centimeters tall remnant of concrete reinforced stone masonry (Figure 66). Immediately to the north of it, another dry-stacked rock construction that stands 40-50 centimeters tall, extends 2 meters before pinching out completely (Figure 67), in contrast to the ends of most of the other dry-stacked alignments within Site 8778, which exhibited tumbled rock scatters.

Figure 64. Dry-stacked rock retaining wall at southern end of Site 8778 Subfeature C1, view to the west.

Figure 65. 55-centimeter concrete blocks within the central portion of Site 8778 Subfeature C1; note rocks atop blocks, view to the southwest.

Figure 66. Concrete reinforced stone masonry remnant within Site 8778 Subfeature C1, view to the southwest.

Figure 67. Dry stacked segment at northern end of Site 8778 Subfeature C1, view to the northwest.

Subeature C2

Subfeature C2 consists of a concrete block wall situated to the east of Subfeature C1 and associated concrete structural elements (see Figure 34). The block wall comprises two rows of ten blocks each, stacked atop one another, which extend roughly 5.5 meters and stand 1.8 meters tall, including an exposed 15-centimeter thick portion of the concrete footing beneath it (Figure 68). This block wall is oriented roughly northwest to southeast and does not parallel Subfeature C1; rather, the two alignments are closer together at their southern ends and gradually separate as they continue northward (see Figure 34).

A little beyond the northern end of this wall is the uppermost of a set of five steps that extend downslope (to the east-southeast) to terminate at the ground surface with a concrete pad beyond (Figure 69). These crudely built steps are in a state of disrepair and comprise different building materials (Figures 70 and 71). The top two stairs are the most intact; they measure 74 centimeters wide and 56 centimeters deep. The next step down is similar to those above it, but it is incomplete. The fourth step, from the top, is an amalgam of broken concrete and concrete reinforced stone masonry, portions of which appear to have once been incorporated as part of the step above it (the third step). The fifth step is only 45 centimeters wide and 26 centimeters deep and looks least like the others above it. Additional loose stones similar to those built into the steps are scattered over the ground surface between the steps and the concrete pad beyond.

Approximately 1 meter northeast of the bottom step, is a square concrete slab that measures 1.57 meters (Figure 72). A 2-tiered concrete kerb stone alignment extends from the southwest edge of the slab to the concrete block wall. Also extending from the square pad, is a rectangular concrete pad measuring 1.76 meters long and about 50 centimeters wide; this rectangular pad slopes towards a drain within its northern end. Brick and mortar kerbing is present along the east and south edges of the rectangular pad and appears to have been present along the western edge as well but is currently absent (Figure 73).

Figure 68. Site 8778 Subfeature C2, portion of concrete block wall with exposed concrete footing; note portion of Subfeature C1 in upper right portion of frame, view to the southwest.

Figure 69. Site 8778 Subfeature C2 concrete block wall and concrete steps in foreground with concrete pads in background, view to the southeast.

Figure 70. Mixed construction steps at north end of Site 8778 Subfeature C2 block wall, view to the west.

Figure 71. Detail view of mixed construction within Site 8778 Subfeature C2 steps.

Figure 72. Concrete pad with drain beyond of Site 8778 Subfeature C2, view to the southeast.

Figure 73. Rectangular pad with drain and brick and mortar kerbing of Site 8778 Subfeature C2, view to the southeast.

Feature D

Feature D is a concrete box/vault with an attached basin and an associated small concentration of Historic items, located in the southeast corner of Site 8778 (see Figure 34). The box/vault is partially embedded into the ground surface and may have been buried at one time (Figures 74 and 75). The dimensions of the box are 2.44 meters (north-south) by 5.49 meters (east-west) and 1.22 meters tall. The box/vault is constructed of board-molded concrete slabs approximately 15 centimeters thick and reinforced with ferrous metal (see Figure 74). Two, square-shaped openings are present within the cover; these openings are beveled inwards at sharp angles as they enter the feature (see Figure 74). These openings, approximately 76 centimeters wide, may have accommodated removable covers at one time. The interior of the tank appears to be coated in a tar-like substance, which was also used to seal cracks in the concrete.

A ferrous metal pipe segment protrudes approximately two inches from the top of the east end of the tank (Figure 76). The pipe, approximately 20 centimeters in diameter, leads down into the box/vault and aligns with a second pipe segment embedded into the east wall of the box; the segment of pipe that once connected the two segments is absent. The pipe segment embedded into the east wall exits the tank and feeds into an attached basin located on the east side of the tank (see Figure 76).

The basin measures 1.22 meters (north-south) by 0.9 meters (east-west) and is 1.22 meters tall, the base of which is set approximately 0.3 meters below that of the box/vault; the basin comprises three concrete slabs, with a concrete base, similar in construction to the tank. The words “MAY” and “1937” are inscribed in the cement that was used to face the top of the north and east walls, respectively and is assumed to signify the date of construction (see Figure 76). The basin has a weathered concrete fragment embedded within the base of its east wall that obstructs an opening in the wall, which may have acted as an outlet or reflects prior damage and subsequent repair to the structure. Graffiti is present on the interior and exterior of the tank and basin; both are filled with modern trash and debris including vehicle and bicycle parts, vegetation trimmings, rusted sheet metal, and plastic containers.

An associated scatter of roughly a dozen Historic bottle glass and ceramic fragments and a rusted metal can fragment was observed a few feet northwest of the northwest corner of the tank; some modern rubbish was also present within this scatter. This surface scatter measures roughly 50 centimeters wide in greatest dimension. While no makers marks were observed, the presence of several medicine bottle finishes and a milk glass bottle base (Figure 77) may indicate they are contemporaneous with the construction or use-period of the feature.

Figure 74. East side of Site 8778 Feature D, view to the north.

Figure 75. Site 8778 Feature D concrete vault/box, view to the east.

Figure 76. Site 8778 Feature D pipe and basin filled with debris; note “MAY 1937” inscribed on basin walls.

Figure 77. Bottle glass, porcelain, and ceramic fragments from Site 8778 Feature D.

DISCUSSION/SUMMARY

The two roughly parallel dry-stacked stone constructions that comprise Features A (Subfeatures A1 and A2) appear to function as retaining walls. The level soil area created in the space between these two walls was likely used as a trail or as a landscaping feature rather than for experimental or commercial agriculture. Based on the information gathered from the HARC archive regarding the former HSPA Waipio Experiment Substation, the experimental planting of different cane varieties began in flats that were taken out to the fields to be planted (see Figure 27) directly into the soil (Figure 78) or within isolation containers organized in rows (Figure 79) on the surface of the level cane fields. Furthermore, the narrow dimensions of the soil area between Subfeatures A1 and A2 combined with the sloping nature of the terrain above and below Subfeatures A1 and A2 are inadequate to support agricultural activity on a commercial scale.

The concrete reinforced stone masonry steps (Subfeature A3) leading upslope from Subfeature A2 likely lead to the Waipio Experiment Substation camp buildings, which formerly occupied the graded area at the top of the slope where Waipahu High School campus buildings stand beside an empty lot today. The materials and construction of these steps bear a striking resemblance to concrete reinforced stone walls that appear in a historical photograph of an unknown HSPA property (Figure 80).

Across the swale from Feature A is Feature B, another series of dry-stacked stone walls that appear to have served a similar function as Feature A. Remnants of four alignments are observable; the uppermost and best-preserved of these alignments (Subfeature B4) mimics the curvilinear form of Subfeatures A1 and A2 and also creates a roughly level soil area between it and Subfeature B3, located downslope. In contrast, Subfeatures B1 and B2 comprise less organized clusters of dry-stacked rocks and cobbles with some concrete fragments mixed in. One section of Subfeature B2 comprises rows of rocks set within the slope as what appears to be reinforcement against erosion.

Features A and B exhibit areas of collapse at both the upslope and downslope aspects. The southernmost end of Feature B, which is located closest to extant Waipahu High School Campus buildings was likely impacted during prior clearing and grading events associated with the development of Waipahu High School. The collections of boulders and rocks found downslope of both of these features may be the combined result of gravity upon stones that formerly rested within these constructions and the result of land clearing events that originated from below.

Figure 78. Undated photograph of HSPA worker planting cane from flat to field.

Figure 79. Undated HSPA photograph of experimental plantings in isolation containers.

Figure 80. Undated photograph showing unknown HSPA building with concrete reinforced stone masonry walls that are similar to Site 8778 Subfeature A3.

Feature C consists of concrete structural elements and some dry-stacked rock construction segments, located to the northeast of Feature B. Subfeature C1 is a combination dry-stacked rock and concrete block retaining wall located upslope of another retaining wall constructed entirely of concrete blocks (Subfeature C2). Subfeature C2 also includes a set of steps constructed of mixed materials (stone, concrete, and concrete reinforced stone masonry) that allowed access between the upper reaches of the block wall and the ground surface downslope. At the bottom of these steps are two concrete pads with some brick and mortar/concrete kerbing. One of these pads has what appears to be a drain located within it. During the initial pedestrian survey of the area conducted on August 28, 2018 a transient camp occupied the space between the retaining wall and the concrete pads. Stones similar to those within Features A and B and Subfeature C1 were observed within this former camp repurposed as part of the occupation of the area.

Finally, the concrete box/vault (Feature D) located to the east of Feature A at a lower elevation and closer to Cane Haul Road appears to have functioned as a septic tank. Although mostly exposed today, this concrete construction was likely buried when it was first installed over eighty years ago, based on the date "May 1937" inscribed within the concrete. The rectangular design mimics modern day septic tanks with two inspection openings of equal size within the upper surface and an inlet/outlet within the exposed (downslope) narrow end of the tank, the other end (upslope) of the tank remains buried but would likely contain another inlet/outlet opening. The associated small scatter of Historic Period bottle glass, ceramic, and porcelain fragments suggests a contemporaneous bottle dump was probably located somewhere nearby, but the erosion that has exposed the formerly buried septic tank has clearly impacted the area.

The rich and varied land use history of the study area includes having been Field 6 of OSC Plantation with the former plantation railroad crossing through and situated close to the O.R. and L. Railroad line and nearby Waipio Station. By 1911, HSPA had begun reinventing Field 6 as the Waipio Experiment Substation; where HSPA staff lived and worked for over half a century. Less than a decade later, the new Waipahu High School welcomed its first graduating class. In addition, since 1901, portions of the study area have been included as part of the U.S. Naval Reservation. We do know that the O. R. and L. was vital to the war effort in transporting ammunition, and although the historical documentary research did not reveal any such information, it is possible that military operations were carried out within the study area during World War II.

Features A-D of Site 8778 coincide with the eastern end of the 4-acre parcel (Lease No. 2) that HSPA sublet from the ʻĪʻī Estate as the site of their buildings and support infrastructure. A detailed view of the 1933 Waipio Substation map (Figure 81) shows twenty-five distinct structures within the 4-acre parcel; two of which fall within the western boundary of Site 8778. Perhaps more relevant to the findings of the current study, is the broad S-shaped curve that appears along the eastern edge of the Waipio Substation camp. Unlike the divisions between the different experimental fields, this S-shaped curve is depicted as a wide curvilinear shape that appears to follow the contour of the terrain. Features A and B likewise follow the contours of the terrain and may have once been connected to create the S-shaped curve. Thus, it appears that the dry-stacked alignments observed during the current investigation on either side of the swale at the back of the Waipahu High School Campus (Features A and B) date as far back as the 1930s and were part of the HSPA Substation camp. Furthermore, the location of the concrete box/vault (Feature D) a bit removed from the facilities within the southeastern extreme and downslope from the Substation buildings makes sense for it probably had an associated leach field, which would have been unpleasant to live/work close to. It is likely that HSPA reinforced the slope in order to minimize erosion within their living and work areas. Because no structure is depicted on the 1933 map that coincides with the concrete block wall or the concrete pads that comprise Feature C, it is likely that the structural elements of Feature C were constructed and installed sometime after 1933.

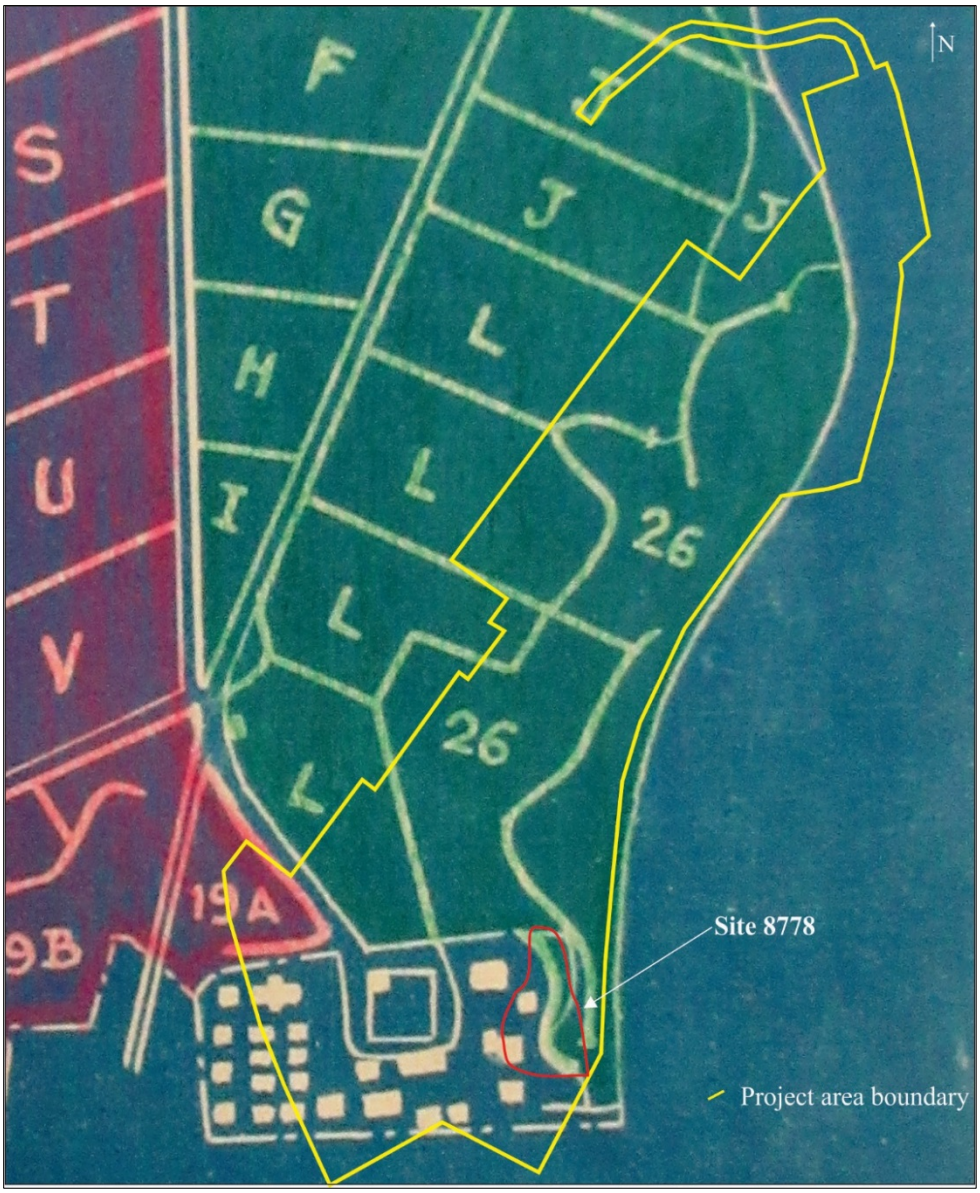

Figure 81. Detail of 1933 Waipio Substation map showing Site 8778 boundary relative to the Substation camp buildings and associated infrastructure.

5. SIGNIFICANCE EVALUATION, TREATMENT RECOMMENDATIONS, AND DETERMINATION OF EFFECTS

The recorded archaeological site is assessed for its significance based on criteria contained in the Hawai‘i Administrative Rules §13-275-6. For a resource to be considered significant it must possess integrity of location, design, setting, materials, workmanship, feeling, and association and meet one or more of the following criteria:

a Be associated with events that have made an important contribution to the broad patterns of our history;

b Be associated with the lives of persons important in our past;

c Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;

d Have yielded, or is likely to yield, information important for research on prehistory or history;

e Have an important traditional cultural value to the native Hawaiian people or to another ethnic group of the state due to associations with traditional 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 significance and recommended treatment for Site 8778 is presented in Table 4 and discussed below, along with the determination of effects.

Table 4. Site significance and treatment recommendation.

Site #	*Site Type*	*Temporal Affiliation*	*Significance*	*Recommended Treatment*
8778	Agricultural station	Historic	d	No further work

Site 8778, a Historic Period agricultural station, is considered significant under Criterion d for the information it has yielded relative to the early to middle twentieth century activities associated with the former HSPA Experiment Substation in Waipio. This site retains sufficient integrity of all categories to convey its significance under Criterion d. Based on historical research and the results of the Perzinski study to the southwest of the study area, there is no reason to believe that there are deposits from the ‘Ī‘ī ranch house within the study area; we know the study area was part of OSC before it became the HSPA substation camp – the historical research at the HARC archives provided sufficient detail to understand the extent of the substation. Thus, it is our opinion that subsurface testing will not provide information that will further our understanding of the features recorded within the study area, which were likely used as a pathway to access the facilities and navigate the sloping terrain or for landscaping based on our understanding of experimental agriculture at these stations. Therefore, the research and fieldwork conducted during the current study has been sufficient to exhaust the information potential of Site 8778; and no further work is the recommended treatment for Site 8778.

The results of the current study indicate that a single significant historic property, Site 8778, is present within the study area. Because the current study has mitigated any potential future adverse effects to this site, the HRS Chapter 6E-review determination of effects for the current project is “no historic properties affected.” In consultation with the SHPD, it is recommended that precautionary archaeological monitoring be conducted during all ground-disturbing activities associated with this project. As such, an archaeological monitoring plan shall be prepared in accordance with Hawai‘i Administrative Rules (HAR) 13§13-279-4 and submitted to the SHPD for review and acceptance.

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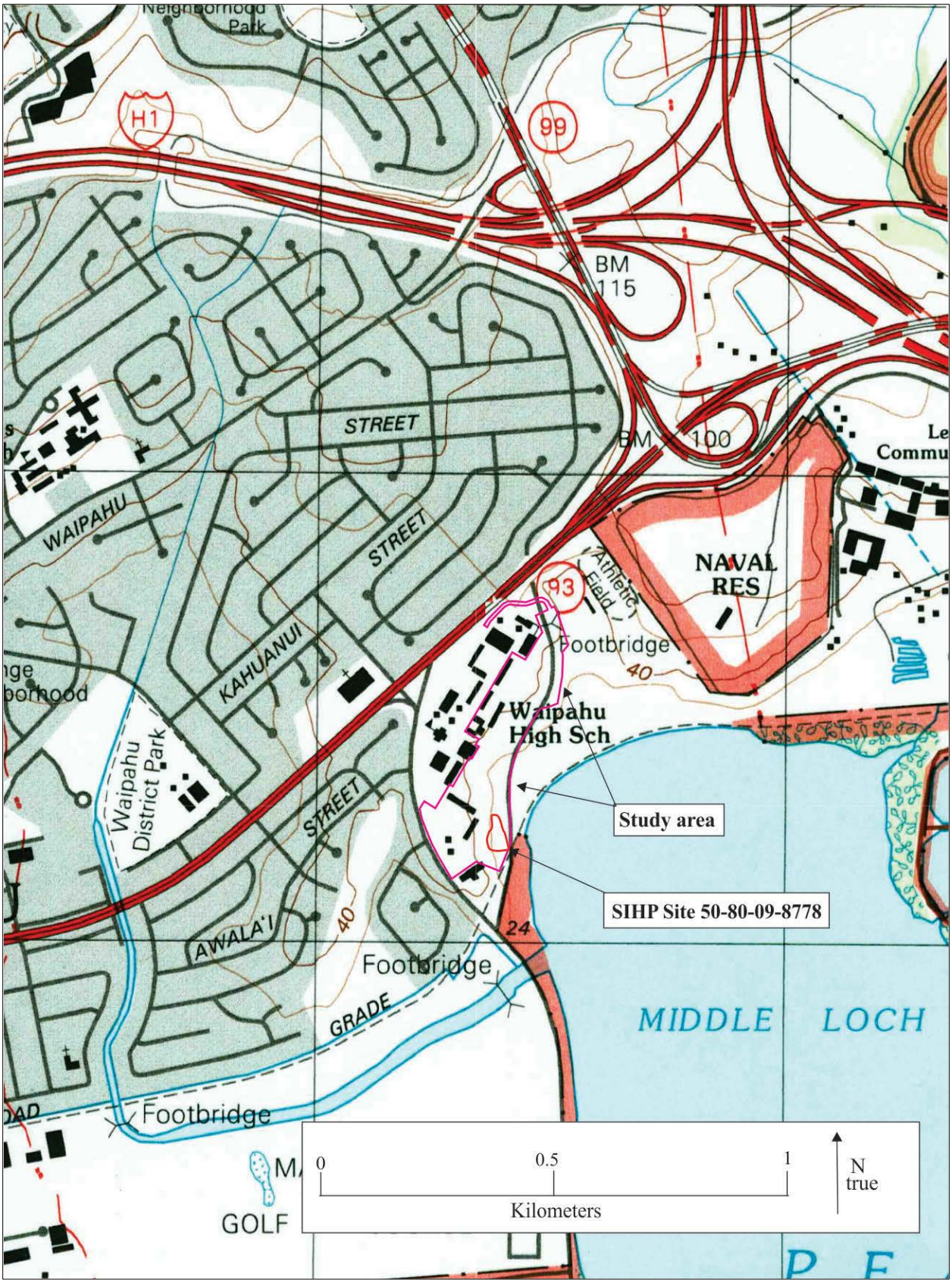
APPENDIX A

SITE LOCATION MAPPED ON USGS TOPOGRAPHIC MAP



Site location mapped on portion of USGS 1998, 7.5-Minute series Waipahu Quadrangle (source:USGS).

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APPENDIX C
Cultural Impact Assessment

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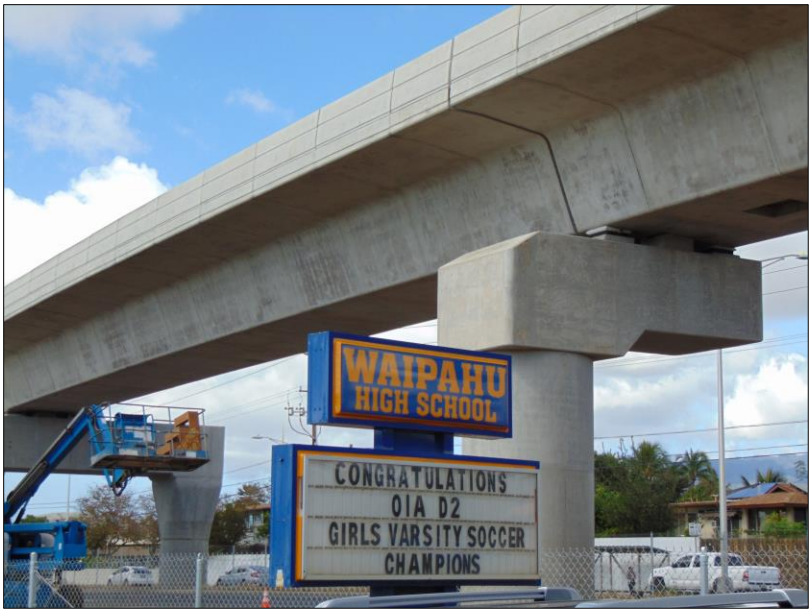
A Cultural Impact Assessment for Campus Improvements at Waipahu High School

TMKs: (1) 9-4-008:020 and 025 (por.)

Waipiʻo Ahupuaʻa
ʻEwa District
Island of Oʻahu



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A Cultural Impact Assessment for Campus Improvements at Waipahu High School

TMKs: (1) 9-4-008:020 and 025(por.)

Waipiʻo Ahupuaʻa
ʻEwa District
Island of Oʻahu

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CHAPTERS

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1. INTRODUCTION

At the request of PBR Hawai‘i, on behalf of the State of Hawai‘i Department of Education (DOE), ASM Affiliates (ASM) has prepared the current Cultural Impact Assessment (CIA) for a roughly 17-acre project area located in the southern and eastern portions of TMKs: (1) 9-4-008:020 and 025, Waipi‘o Ahupua‘a, ‘Ewa District, Island of O‘ahu (Figures 1, 2, and 3). The project area is situated within a 26-acre parcel owned by the City and County of Honolulu, which contains most of the Waipahu High School campus (94-1211 Farrington Highway). DOE plans to construct a new U-shaped classroom building around pre-existing basketball courts and make additional site improvements to an area adjacent to the basketball courts. In addition, the DOE proposes to construct two additional parking areas within the currently undeveloped southeastern end of the study area and fire/vehicular/parking access roads from Waipio Point Access Road or the HART access Road (Figure 4). The project area also includes all potential ingress and egress, laydown, staging, and construction areas for the project. The current CIA is intended to support a Hawai‘i Revised Statutes (HRS) Chapter 343 Environmental Assessment (EA) and has been prepared in compliance with the Office of Environmental Quality Control (OEQC) *Guidelines for Assessing Cultural Impact*, adopted by the Environmental Council, State of Hawai‘i, on November 19, 1997. As stated in Act 50, which was proposed and passed as Hawai‘i State House of Representatives Bill No. 2895 and signed into law by the Governor on April 26, 2000, “environmental assessments . . . should identify and address effects on Hawaii’s culture, and traditional and customary rights . . . native Hawaiian culture plays a vital role in preserving and advancing the unique quality of life and the ‘aloha spirit’ in Hawai‘i. Articles IX and XII of the state constitution, other state laws, and the courts of the State impose on governmental agencies a duty to promote and protect cultural beliefs, practices, and resources of native Hawaiians as well as other ethnic groups.”

This report contains background information outlining the project area’s physical and cultural contexts, and results of prior investigations that have been conducted in the project area vicinity. The consultation process is then described, and the results of consultation are presented. Lastly, conclusions regarding cultural impacts derived from our analysis are offered.

PROJECT AREA DESCRIPTION

The irregularly shaped project area comprises developed and undeveloped portions of the Waipahu High School campus; and extends northward from the Waipahu Aloha Clubhouse property on Waipio Access Road along the *mauka* edge of Cane Haul Road until it reaches the lower campus athletic fields, at which point the study area extends to include portions of the extant HART-built access road and terminates near Farrington Highway (see Figure 4). The study area is bound to the north by Farrington Highway, to the east by Cane Haul Road and athletic fields, to the west by existing Waipahu High School campus structures, and to the south by Waipahu Aloha Clubhouse and undeveloped land (see Figure 3).

Figure 1. Project area location on a portion of USGS 1998 7.5-Minute series Waipahu Quadrangle.

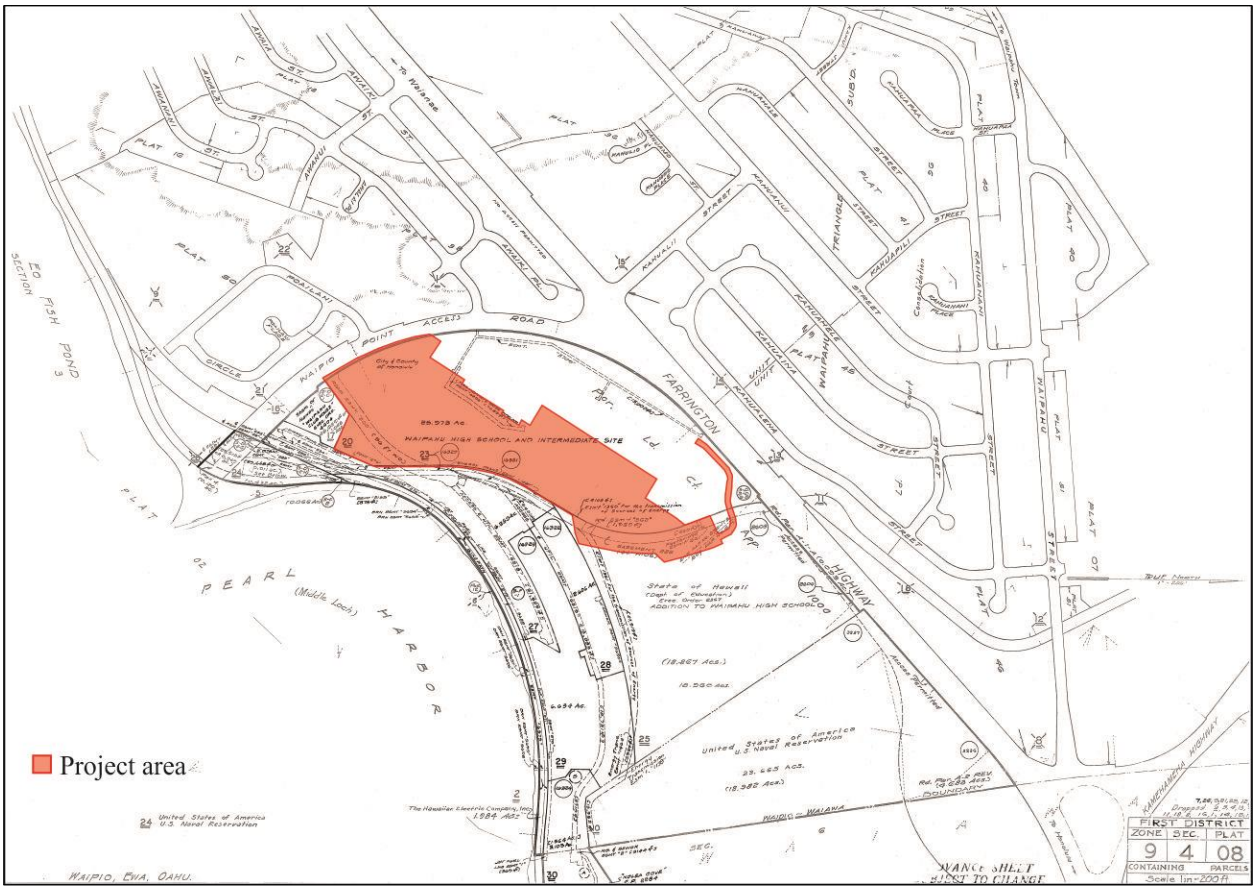

Figure 2. Portion of Tax Map Key (TMK) map (1) 9-4-008 showing current project area.

The project area is located within Waipahu Plain, part of the large coastal ʻEwa Plain that predominates much of southwestern Oʻahu. Elevation ranges from 10 feet above sea level at the southeastern end of the project area to 65 feet above sea level at the northwestern end of the project area. The climate in the area is generally hot and dry with very little seasonal rainfall and a monthly rainfall average of three inches (Giambelluca et al. 2013). The native soil in the project area is classified as Waipahu silty clay (WzA), which occurs on nearly level (0 to 2 percent slope) land and "is used for sugarcane and homesites;" permeability of this soil, "is moderately slow, runoff is slow or very slow, and the erosion hazard is none to slight" (Foote et al. 1972:134).

The project area is a mostly modern landscape, which has undergone extensive modification through episodic ground-disturbing activities associated with commercial sugar cultivation since the late 1800s, and the development of Waipahu High School since the late 1960s. Historic and ongoing ground-disturbing activities in the project area include the following: vegetation clearing, grubbing, cutting and filling, terracing, grading, and facility and utility construction (Figures 5 and 6). The former Cane Haul Road extends through a portion of the study area near the northern end (Figure 7), and a pedestrian bridge spans this former railroad alignment and connects the upper and lower campuses (Figure 8). Recent development activities with associated ground disturbance within the northern portion of the project area include a concrete ramp and paved two-lane access road that connects the athletic fields and the upper campus at the northern end of the project area (Figure 9), as well as a cleared and graded area for fire drills/emergency evacuations located to the northeast of the extant basketball courts (Figure 10) across from the athletic fields. These development activities were carried out by Honolulu Authority for Rapid Transit (HART) as part of the ongoing rail project. Vegetation in the undeveloped portions of the study area comprises weeds and grasses and *koa haole* of various ages closer to campus, which is evidence of prior clearing events (Figures 11 and 12). Additionally, transient camp sites are found near the southern end of the undeveloped portion of the project area.

Figure 3. Satellite image with current project area location outlined in red.

Figure 4. Conceptual Master Plan as of September 27, 2018 with project area outlined in red.

Figure 5. Cleared and graded area at the southwest end of upper campus, view to the southwest.

Figure 6. Buildings along HART access road at northeast end of upper campus, view to the southwest.

Figure 7. Cane Haul Road and pedestrian bridge connecting upper and lower campuses, view to the north.

Figure 8. View of upper campus from pedestrian bridge, view to the northwest.

Figure 9. HART access road, ramp, and stairs crossing Cane Haul Road in northern portion of study area, view to the north.

Figure 10. Recently cleared and graded evacuation area at northeast end of upper campus, view to the south.

Figure 11. Vegetation in swale in southwestern portion of the study area, view to the southeast.

Figure 12. Representative vegetation in undeveloped portion of study area between Cane Haul Road and campus, view to the west.

2. BACKGROUND

The chronological summary presented below begins with a synthesis of Precontact settlement patterns and Historic land use that includes legendary and historical references to Waipiʻo Ahupuaʻa, Waipahu, and the greater ʻEwa District. The discussion concludes with a review of the findings from prior investigations conducted in the project area vicinity.

CULTURE-HISTORICAL CONTEXT

As previously mentioned, the current project area is located within ʻEwa, a district on the south-central coast of Oʻahu that extends from Honouliuli Ahupuaʻa in the west to Halawa Ahupuaʻa in the east. ʻEwa encompasses the estuary of Pearl Harbor, known to the ancient Hawaiians as "Ke-awa-lua- o-Puʻuloa, The- many (*lau*)-harbors (*awa*)-of Puʻuloa. Puʻuloa was the rounded area projecting into the sea at the long narrow entrance of the harbor" (Handy et al. 1972:469). ʻEwa translates literally as "crooked" (Pūkuʻi et al. 1974:28). Much of ʻEwa is watered by streams that flow from the Koʻolau Mountains, although the western plains are arid. Many legends arise from the waters of Puʻuloa, some of which specifically mention Waipiʻo Ahupuaʻa and will be discussed in detail below.

The subject *ahupuaʻa* of Waipiʻo translates literally as "curved water" (Pūkuʻi et al. 1974:227), which may be a reference to legendary Kīpapa stream or to the waters of Pearl Harbor that wrap around Waipiʻo Peninsula. Handy made the following observations during the 1930s of what Waipiʻo once looked like and how it appeared to him at the time:

> **Waipio.** Between West Loch of Pearl Harbor and Loko Eo the lowlands were filled with terraces which extended for over a mile up into the flats along Waikele Stream. The lower terraces were formerly irrigated partly from Waipahu Spring, which Hawaiians believe came all the way through the mountains from Kahuku. It is said that terraces formerly existed on the flats in Kipapa Gulch for at least 2 miles upstream above its junction with Waikele. Wild taros grow in abundance in upper Kipapa Gulch. (1940:82)

During the Precontact Period, Waipiʻo was also home to *aliʻi* and royalty. For instance, in Volume II of *An Account of the Polynesian Race* by Fornander (1880), Waipiʻo is mentioned, along with Waiawa and Manana in ʻEwa, as one of the places where Kakuhihewa, the Oʻahu King spent much of his childhood and had one of his royal residences. Waipiʻo and neighboring Waikele and Hōʻaeʻae *ahupuaʻa* to the west comprise the region of Waipahu, which extends from modern day Pearl City to Honouliuli *ahupuaʻa*. Waipahu translates as "bursting water" (Pūkuʻi et al. 1974:227), which refers to the many freshwater springs in the area.

Early Hawaiian Settlement Patterns

While the question of the timing of the first settlement of Hawaiʻi by Polynesians remains unanswered, several theories have been offered that derive from various sources of information (i.e., archaeological, genealogical, mythological, oral-historical, and radiometric). However, none of these theories is today universally accepted because there is no archaeological evidence to support the proposed timing for the initial settlement, or colonization stage, of island occupation. More recently, with advances in palynology and radiocarbon dating techniques, Kirch (2011) and others (Athens et al. 2014; Wilmshurst et al. 2011) have convincingly argued that Polynesians arrived much later in the Hawaiian Islands, sometime between A.D. 1000 and A.D. 1200 and expanded rapidly thereafter (c.f., Kirch 2011).

The initial settlement of Hawaiʻi is believed to have originated from the southern Marquesas Islands. In these early times, Hawaiʻi's inhabitants were primarily engaged in subsistence level agriculture and fishing (Handy et al. 1972). The Settlement Period was a time of great exploitation and environmental modification, when early Hawaiian farmers developed new subsistence strategies by adapting their familiar patterns and traditional tools to their new environment (Kirch 1985; Pogue 1978). Their ancient and ingrained philosophy of life tied them to their environment and kept order; which was further assured by the conical clan principle of genealogical seniority (Kirch 1984). According to Fornander (1969), the Hawaiians brought from their homeland certain universal Polynesian customs and beliefs. Such as, the major gods Kāne, Kū, and Lono, the *kapu* system of law and order, cities of refuge, the *ʻaumakua* concept, and the concept of *mana*.

Initial permanent settlements in the islands were established at sheltered bays with access to fresh water and deep sea fisheries. The near shore fisheries and coastal fishponds, which were enriched by nutrients carried in the fresh water, also offered opportunities for resource extraction and stewardship. Communities shared extended familial

relations and there was an occupational focus on the collection of marine resources. Clusters of houses were found in these coastal areas where, over time, agricultural production first became established. During the Settlement Period, over several centuries, the areas with the richest natural resources became populated and perhaps even crowded, and inland elevations began to be used for agriculture and some habitation. Meanwhile, an increasing separation of the chiefly class from the common people began to emerge. As the environment reached its maximum carrying capacity, the result was social stress, hostility, and war between neighboring groups (Kirch 1985). Soon, large areas of O‘ahu and the neighbor islands were controlled by a few powerful chiefs.

Thus, a uniquely Hawaiian culture developed. The portable artifacts found in archaeological sites from the Developmental Period reflect an evolution of the traditional tools, as well as some distinctly Hawaiian inventions. The adze (*ko‘i*) evolved from the typical Polynesian variations of plano-convex, trapezoidal, and reverse-triangular cross-section to a very standard Hawaiian rectangular quadrangular tanged adze. The two-piece fishhook and the octopus-lure breadloaf sinker are Hawaiian inventions of this period, as are ‘*ulu maika* stones and *lei niho palaoa*. The latter was a status item worn by those of high rank, indicating a trend toward greater status differentiation (Kirch 1985).

As the population continued to expand, social stratification intensified. The Expansion Period is characterized by major socioeconomic changes, and intensive land modification. By this time, most of the ecologically favorable zones of the windward and coastal regions of all major islands were settled and the more marginal leeward areas were being developed. The greatest population growth occurred during the Expansion Period. It was during the Expansion Period that a second major migration settled in Hawai‘i, this time from Tahiti in the Society Islands. According to Kirch’s (1985) model, the concept of the *ahupua‘a* was established sometime during the A.D. 1400s, adding another component to a then well-stratified society. The implications of this model include a shift in residential patterns from seasonal, temporary occupation, to permanent dispersed occupation of both coastal and upland areas. By this time, the island of O‘ahu appears to have been divided into six traditional districts or *moku*. As previously mentioned, the current project area is located within the Waipahu region of the traditional *moku* (district) of ‘Ewa (Figure 13).

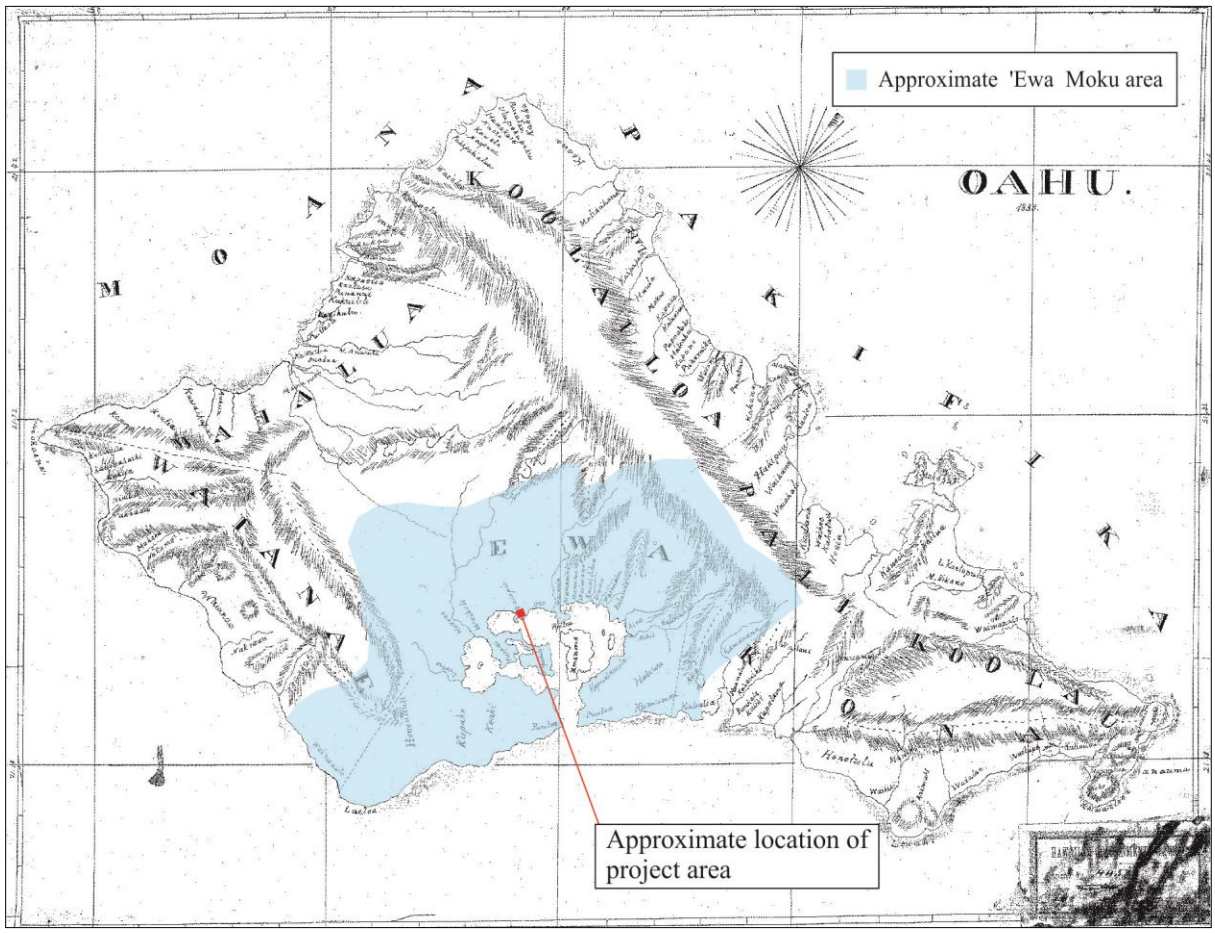

Figure 13. Hawaii Registered Map 455 (dated 1833), showing project area within ‘Ewa Moku.

Moku were further divided into distinct land units known as *ahupuaʻa*. The *ahupuaʻa* became the equivalent of a local community, with its own social, economic, and political significance. *Ahupuaʻa* were ruled by *aliʻi ʻai ahupuaʻa*; who, for the most part, had complete autonomy over this generally economically self-supporting piece of land, which was managed by a *konohiki*. The *aliʻi ʻai ahupuaʻa* in turn answered to an *aliʻi ʻai moku,* a higher chief who ruled over the *moku* and claimed the abundance of the entire district. Thus, *ahupuaʻa* resources supported not only the *makaʻāinana* (commoners) and *ʻohana* (extended families) who lived on the land, but also provided support to the ruling class of higher chiefs and ultimately the crown. *Ahupuaʻa* were usually wedge or pie-shaped, incorporating all of the eco-zones from the mountains to the sea and for several hundred yards beyond the shore, assuring a diverse subsistence resource base (Hommon 1986). The *aliʻi* and the *makaʻāinana* were not confined to the boundaries of an *ahupuaʻa*; when there was a perceived need, they also shared with their neighbor *ahupuaʻa ʻohana* (Hono-ko-hau 1974). Handy et al. described ancient ʻEwa *moku* thusly:

> This wide area anciently consisted of both seaward and high interior plains (including Wahiawa and Waiʻanae-uka, now a part of the district of Waialua), the deep leeward valleys of the Koʻolau mountain range, and the coastal region of the Waiʻanae range to the northwest. Now, although its area has been diminished by the political redivisioning of 1886 and 1909, it is still of great importance, although for different reasons. (1972:469)

The *ahupuaʻa* were further divided into smaller sections such as *ʻili, moʻoʻāina, paukūʻāina, kīhāpai, kōʻele, hakuone*, and *kuakua* (Hommon 1986, Pogue 1978). The chiefs of these land units gave their allegiance to a territorial chief or *mōʻī* (king). *Heiau* building flourished as religion became more complex and embedded in a sociopolitical climate of territorial competition. Monumental architecture, such as *heiau*, "played a key role as visual markers of chiefly dominance" (Kirch 1990:206). This form of district subdividing was integral to Hawaiian life and was the product of strictly adhered to resources management planning, in which the land provided fruits and vegetables and some meat for the diet, and the ocean provided a wealth of protein resources (Rechtman and Maly 2003). In communities with long-term royal residents there was a strict division of labor, with specialists in various occupations on land and in procurement of marine resources.

Legendary Accounts of the Project Area Vicinity

Traditional *moʻolelo* were passed down orally through the generations and many tales focus on *wahi pana* or legendary places. There are many myths and legends of ʻEwa, most of which are associated with the waters of Pearl Harbor and the neighboring *ahupuaʻa* of Honouliuli and Puʻuloa. For instance, it is believed that the first breadfruit planted in the Hawaiian Islands was brought from Upolo Samoa and planted at Puʻuloa in ʻEwa by Kahaʻi (Fornander 1916-1917:392), the grandson of the great navigator and *aliʻi nui* Moikeha (Emerson 1893). A few legendary accounts of ʻEwa make specific references to *wahi pana* in Waipiʻo Ahupuaʻa and are presented below. In addition, the locations of some of these *wahi pana* are depicted in Figure 14.

Hawaiian Historian Samuel Kamakau recounts the legend of a *moʻo* (a shape-shifting water lizard) called Kanekuaʻana who came from Kahiki and brought bounties of fish with her to the people of ʻEwa. Among these blessings bestowed upon ʻEwa, were the *pipi* or pearl oysters from which Pearl Harbor got its name, as told in the following excerpts:

> Kanekuaʻana was the *kiaʻi* [guardian]of ʻEwa, and the *kamaʻaina* from Halawa to Honouliuli relied upon her. Not all of the people of ʻEwa were her descendants, but the blessings that came to her descendants were shared by all. . . (Kamakau 1964:83)

During a time of scarcity, Kanekuaʻana's descendants erected Waihau Heiau for her and made offerings; as a result, Kamakau continues, they obtained many blessings:

> What kinds of *iʻa*? The *pipi* (pearl oyster)—strung along from Namakaohalawa to the cliffs of Honouliuli, from the *kuapa* fishponds of inland ʻEwa clear out to Kapakule [see Figure 14]. That was the oyster that came in from deep water to the mussel beds near shore, from the channel entrance of Puʻuloa to the rocks along the edges of the fishponds. They grew right on the *nahawele* mussels, and thus was this *iʻa* obtained. Not six months after the *hau* branches {that placed a kapu on these waters until the *pipi* should come in} were set up, the *pipi* were found in abundance—enough for all ʻEwa—and fat with flesh. . .
>
> What other *iʻa*? The transparent shrimp, *ʻopae huna*, and the spiked shrimp, *ʻopae kakala,* such as came from the sea into the *kuapa* and *puʻuone* fishponds. *Nehu pala* and *nehu maoli* fishes filled the lochs (*nuku awalau*) from the entrance of Puʻuloa to the inland ʻEwas. Hence the saying of the

kama‘aina of this land: *He kai puhi nehu, puhi lala ke kai o ‘Ewa e, e noho i ka lai‘i o ‘Ewa nui a La‘akona* (“A sea that blows up *nehu*, blows them up in rows, is ‘Ewa, until they rest in the calm of great ‘Ewa-a-La‘akona”). (ibid.:83-84)

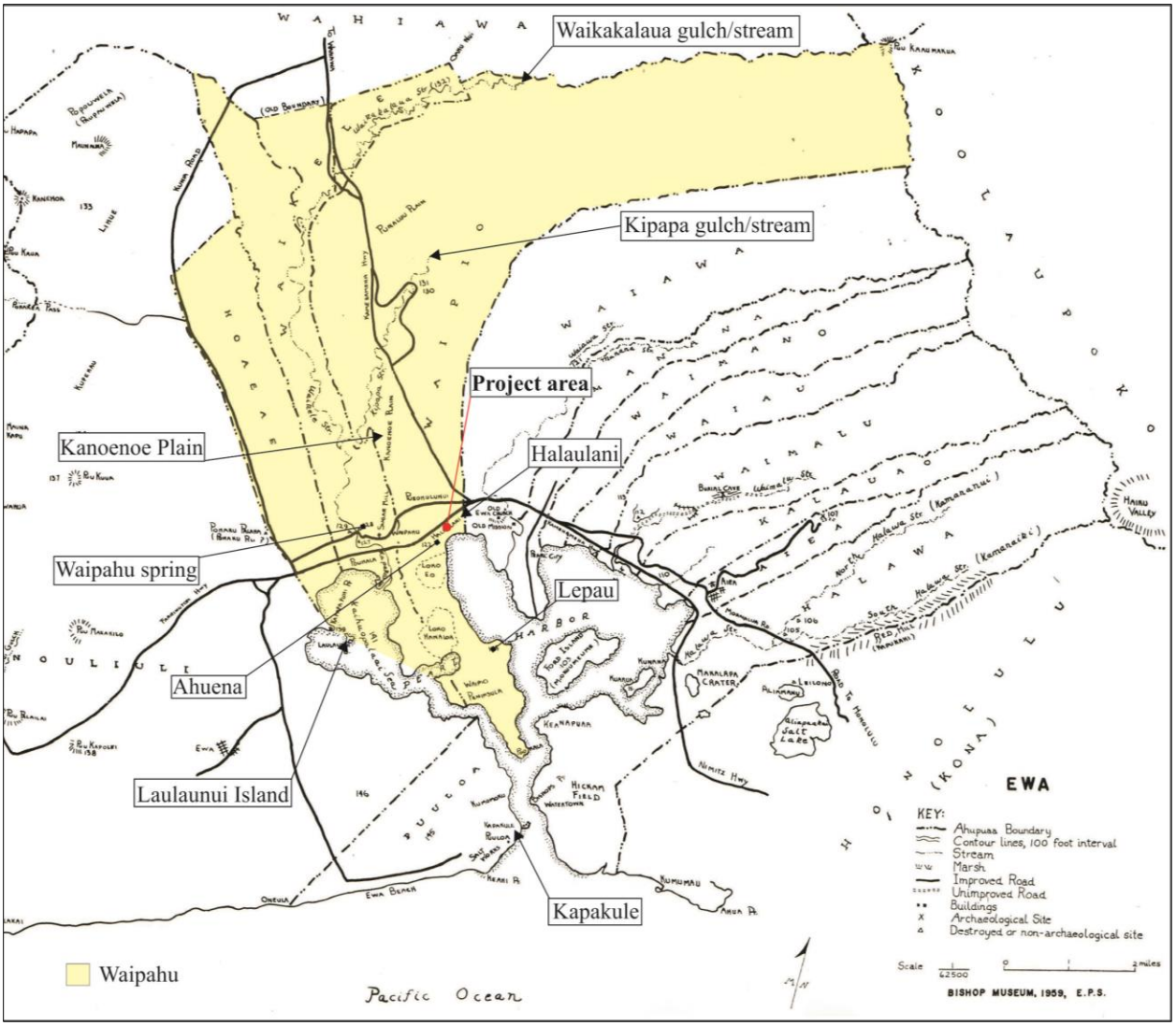

Figure 14. Sketch map of ‘Ewa from Sterling and Summers (1978:56) showing *wahi pana* mentioned in text.

Two other legends associated with fishing that refer to the project area vicinity are the legends of “Ku-ula, the Fish God of Hawaii” and “Aiai, son of Ku-ula” as told by Moke Manu, translated by M. K. Nakuina, and published by Thrum (1907:215-249) in a collection titled *Hawaiian Folk Tales*. A fish god named Ku-ula was known throughout the islands, and “had a human body, and was possessed with wonderful or miraculous power (*mana kupua*) in directing, controlling, and influencing all fish of the sea, at will” (ibid.:215). His son ‘Ai‘ai inherited these gifts from his father and was immortal. ‘Ai‘ai took his talents and traveled the Hawaiian Islands teaching people how to make various nets and fishing lines for all kinds of fishing. In addition, he measured the depth of the sea to establish *ko‘a i‘a* (fishing grounds) for deep-sea fishing. ‘Ai‘ai also established *kū‘ula* (fishing shrines), which were named after his father, for rites to attract and cause fish to multiply and to ensure a good catch. Of particular relevance to the current project area, is a *kū‘ula* called Ahuena that ‘Ai‘ai established at Waipi‘o during a visit to ‘Ewa (ibid.:249; see Figure 14). The legend of ‘Ai‘ai concludes thusly:

> In former times at most of these fishing-grounds were seen multitudes and varieties of fish, all around the islands, and occasionally deep sea kinds came close in shore, but in this new era there are not so many. Some people say it is on account of the change of the times. (ibid.)

The legend associated with Waipahu spring (see Figure 14) also deserves mention here, for it provides the inspiration for the place name itself. According to the legend, a woman lost her tapa anvil in a stream in Kahuku, on the other side of the Koʻolaus and she later found it in Waikele bursting forth from the ground at the outlet of an underground stream known as Waipahu spring (Sterling and Summers 1978). Another mention of the Waipahu region appears in a section titled "Various Heathen Prayers" in a *Collection of Hawaiian Antiquities and Folk-lore Volume VI* by Fornander (1919:46-52). This prayer depicts a ritual in which baskets are created, filled, and distributed within and throughout the islands:

> Formed is the pillar in the presence of Haumeakalani.
> Who art thou, that comes to life with the drums?
> By the drum is that chief ennobled!
> A drum that is braided is being beaten.
> The basket is finished; open the basket;
> Fill up the basket, the basket, the basket, the roomy basket.
> Two baskets for Kaeleha,
> Two (for) Mamahauuula and others;
> At Oiolele double that action and derive four,
> From four to five, from five to six;
> Six (for) Honouliuli, Hoaeae and Waikele.
> From Waikele on to Waipio until the ninth;
> At the ninth pass by the bend in the pond at Makawa,
> For Kanaloa ten;
> Ten (for) Kipahulu, ten (for) Kaupo;
> Ten (for) Honuaula, ten (for) Kula;
> For Makawao one, for the ascent of Aalaloloa two, Two for Ukumehame, two (for) Olowalu, two (for) Launiupoko; For Lahaina ten, ten (for) Kauai, Ten (for) Oahu. (Fornander 1919:46)

Sterling and Summers (1978) present a Hawaiian language article from 1899, which tells the legend of Kapuna cave located in Waipiʻo. The legend is as follows:

> . . . The cave of Kapuna used to be occupied by chiefs in ancient times. That time has passed. A new generation came later and the cave was used by the fisherman of Waikele and Waipio to this day on which the writer mentions this. It was of this cave that the famous riddle of the ancients mentioned, "To Kapuna belongs the house, the sea dwells in it." (No Kapuna ka hale noho ia e ke kai). This is the answer to the riddle, "To a brother-in-law belongs the house, a sister-in-law dwells in it.". . . There is life for the people where fire is lighted. This cave is on the Waipio side and a sea passage separates Waipio and Waikele and Waikele and Honouliuli. The passage is obstructed by three small islands, a middle one and Manana and Laulaunui [see Figure 14]. These small islands are in the middle of the passage to Honouliuli and inside and outside of these small islands is the sea of Kaihuopalaai where mullet lived till they whitened with age. (ibid.:24)

Kanoenoe Plain (see Figure 14) is also found in Waipiʻo, to the northwest of the current project area. Sterling and Summers provide the following translation of an 1899 Hawaiian language newspaper article that references this plain:

> Let us look once more at another noted place that is out of sight under the sugar cane, the plain of Kanoenoe. The plain of Kanoenoe is the plain on the western side of the Plain of Punahawele. When you go up from Kipapa stream and get to the top where the government road goes inland, the foot path down to Waipio, that is the plain of Kanoenoe. Lihue, Haleauau and Kalena are all place names in an old poem that went like this:
>
> The icy wind of Lihue plied its spurs,
> Pulling up the bridle of Haleauau,
> Speeding headlong over Kalena
> And running over the plain of Kanoenoe.
>
> This plain is covered over with the gold, diamonds and silver of idols of the missionaries. (1978:21).

Another plain in upland Waipiʻo, Keahumoe Plain (also spelled Keauhumoa in some accounts), is mentioned in the legendary tale of Kalelealuaka recounted by Emerson (1907:74-106) and published in Thrum's collection *Hawaiian Folk Tales*, mentioned above. Kalelealuaka's father Kaopele had supernatural powers that since his birth allowed him to enter a death-like trance called Niolokapu for months at a time and then revive full of life. During one

of his revived states soon after his marriage to Makalani, Kaopele planted the plain of Keahumoe full of food:

> But the instincts of a farmer were even stronger in the breast of Kaopele than the bonds of matrimony. In the middle of the night he arose, and, leaving the sleeping form of his bride, passed out into the darkness. He went *mauka* until he came upon an extensive upland plain, where he set to work clearing and making ready for planting. This done, he collected from various quarters shoots and roots of potato, *kalo*, banana, *waoke* [*sic*], *awa*, and other plants, and before day the whole plain was a plantation. (Emerson 1907:79)

Kaopele descended once again into the sacred sleep of Niolokapu while Makalani was pregnant with Kalelealuaka, but he awoke upon his son's birth. When Kalelealuaka was ten years old his wanderlust took over and his father equipped a canoe for his son to leave their home on Kaua'i and explore O'ahu. Emerson recounts the following:

> Before leaving Kauai his father had imparted to Kalelealuaka something of the topography of Oahu, and had described to him the site of his former plantation at Keahumoe. At Waianae the two travelers were treated affably by the people of the district. . . As they went along they met a party of boys amusing themselves with darting arrows; one of them asked permission to join their party. This was given, and the three turned inland. . . Then they kept on ascending, until Keahumoe lay before them, dripping with hoary moisture from the mist of the mountain, yet as if smiling through its tears. Here were standing bananas with ripened, yellow fruit, upland kalo, and sugar cane, rusty and crooked with age, while the sweet potatoes had crawled out of the earth and were cracked and dry. It was the very place where Kaopele, the father of Kalelealuaka, had years before set out the plants from which these were descended.
>
> "This is our food, and a good place, perhaps, for us to settle down," said Kalelealuaka; "but before we make up our minds to stay here let me dart an arrow; and if it drops soon we shall stay, but if it flies afar we shall not tarry here." (1907:85-86)

Kalelealuaka's arrow flew very far and he sent his companions to find it. While they were away, Kalelealuaka, built himself "a fine, large house" (ibid.:87) which would become known as Lelepua (arrow flight). Upon his friends return,

> Kalelealuaka called to his comrades, and said, "Rouse up and let us go to cultivating." To this they agreed, and each one set to work in his own way, working his own piece of ground. The ground prepared by Kalelealuaka was a strip of great length, reaching from the mountain down toward the ocean. This he cleared and planted the same day. His two companions, however, spent several days in clearing their ground, and then several days more in planting it. While these youths occupied their mountain home, the people of that region were well supplied with food. (ibid.)

After the planting, Kalelealuaka and his friend ate well and made wishes. Kalelealuaka's wish was a bold one, for he wished that the king of O'ahu Kakuhihewa would give him his daughters as wives, and build a house for them, and serve up all of his pigs, dogs, *kalo*, sugar cane, bananas, and *'awa* to them. The king overheard this boastful wish and consulted with his soldiers who felt that Kalelealuaka should suffer the penalty of death for his wish. However, the king chose to consult with his wisest *kahuna* (priest) Napuaikamao, for it occurred to him that Kalelealuaka might be able to overcome his enemy Kuali'i in battle on his behalf. Kakuhihewa told Napuaikamao, "I have sent for you to decide what is just and right in the case of these two men who lived up in the region of Waipio." (ibid.:91). To which the wise man replied, "O King, as for this man's wish. It is an ambition which will bring victory to the government. Now, then, send all your people and fetch house-timber and awa" (ibid.). Thus, the king mobilized all the people of 'Ewa to do his bidding and Kalelealuaka's wishes all came true.

About a month later, a crippled marshal delivered the news that Kuali'i "was making war at Moanalua" (ibid. :94), so Kalelealuaka was forced to leave his wives and his new coastal home to fight. Kalelealuaka proved himself a mighty warrior in three battles, killing the captains of Kuali'i's army (among others) and taking their feather helmets and cloaks: "With these he flew to the cripple, whom he lifted and bore in his flight as far as Waipio, and there dropped him at a point just below where the water bursts forth at Waipahu" (ibid.:101). Kalelealuaka went on to defeat Kuali'i's army entirely, Kuali'i surrendered and Kalelealuaka chose to spare his life. As a result, Kakuhihewa turned the kingdom over to him and peace reigned on O'ahu until his death.

Keauhumoa Plain is also mentioned in the "The Legend of Namalaokapaoo," recounted by Fornander (1918:274-283), which tells the story of a brave little boy who killed his stepfather and threw his head a distance of nearly five miles before exterminating Amau, king of O'ahu, and his men. According to the legend, Namalaokapaoo's mother

Pokai took Pualii as her husband after the birth of her son. They resided at Kula-o-Keahumoa or the plains of Keahumoa in Waipiʻo where "they lived tilling the soil. Pualii had two large potato patches which remain to this day; they are called Namakaokapaoo" (ibid.:274). In a footnote, Fornander states, "Keahumoa was the plain before reaching the Kipapa gulch" (ibid.).

References to Kīpapa Gulch (see Figure 14) appear in a few legendary accounts of the battle that inspired the place name (Sterling and Summers 1978). According to Fornander, three Hawaiʻi chiefs and one Maui chief invaded Oʻahu, "but were defeated and slain by *Mailikukahi*, the then sovereign of Oahu" (1880:70). The Battle of Kīpapa is described thusly:

> The invading force landed at first at Waikiki, but, for reasons not stated in the legend, altered their mind, and proceeded up the Ewa lagoon [Pearl Harbor] and marched inland. At Waikakalaua [see Figure 14] they met *Mailikukahi* with his forces, and a sanguinary battle ensued. The fight continued from there to the Kipapa gulch. The invaders were thoroughly defeated, and the gulch is said to have been literally paved with the corpses of the slain, and received its name, "Kipapa," from this circumstance. *Punaluu* [a Hawaiʻi chief] was slain on the plain which bears his name, the fugitives were pursued as far as Waimano, and the head of *Hilo* [a Hawaiʻi chief] was cut off and carried in triumph to Honouliuli, and stuck up at a place still called *Poo-Hilo* [Hilo head]. (ibid.:90)

The literal translation of *kīpapa* includes the following: "pavement," "to be close together, as clouds, or as taro neatly packed in a load," and "prone position on a surfboard; to assume such" (Pūkuʻi and Elbert 1986:154).

Waipiʻo and ʻEwa are also mentioned in "The Story of Kahahana," an account of the fall and death of Kahahana, the King of Oʻahu in a *Collection of Hawaiian Antiquities and Folk-lore Volume VI* by Fornander (1919:282-291). Kahahana's father Elani was of the ʻEwa line of chiefs and his mother Kaionuilalahai had familial ties to the royal families of Oʻahu and Maui. Kahahana was "handsome, brave, and gallant, he was the idol of the Maui court and the pride of the Pahu aristocracy" (ibid.:282). Around 1773, the Oʻahu chiefs elected Kahahana *mōʻī* (king) of Oʻahu to replace Kumahana even though Kumahana had been survived by adult children who could have been his successors. Kumahana, "had been deposed by the Oahu chiefs as an incompetent, indolent, penurious and unlovable chief" (ibid.:284). Kahahana went on to fight on the side of Kahekili, King of Maui, against Kalaniʻōpuʻu, King of Hawaiʻi; however, Kahekili turned on Kahahana after he refused to cede the land of Kualoa to him. Kahekili pretended to be Kahahana's ally whilst secretly undermining his reign by planting seeds of mistrust against Kahahana's high priest Kaopulupulu. Kahekili sent "his most trusted servant" Kauhi to further turn Kahahana against Kaopulupulu, which resulted in the murder of Kaopulupulu at Puʻuloa in ʻEwa in 1782 or 1783 (ibid.:287). Shortly thereafter, Kahekili invaded Oʻahu and Kahahana and his wife Kekuapoiula fled the slaughter and hid in the mountains of ʻEwa for more than two years. Kahahana sent his wife to visit her brother Kekuamanoha in Waikele, ʻEwa to negotiate for their safety; instead, Kekuamanoha told Kahekili where Kahahana could be found. As a result, Kahahana was murdered and his body placed in a canoe in the ʻEwa lagoon and transported to Kahekili in Waikiki. According to Fornander, "the death of Kahahana closed the autonomy of Oahu" (ibid.:285). Kahekili and a number of Maui chiefs had taken over the island of Oʻahu and the treachery against Kahahana inspired the Oʻahu chiefs to mount a revenge plot against Kahekili. Elani (Kahahana's father), along with Pupula and Makaioulu, lead the conspiracy to kill the Maui chiefs; Elani was to kill Kalanikūpule (son of Kahekili), Koalaukane, and Kekuamanoha who resided at ʻEwa. However, Kalanikūpule found out about the plot and sent word to his father who was able to escape his fate. The rebellion of the Oʻahu chiefs was known as the Waipiʻo *kīmopō* or the Waipiʻo assassination because it originated in Waipiʻo, ʻEwa.

Kamakau also mentions Waipiʻo in his chapter entitled "Ka-hahana Loses Oahu" (1992:128-141). He recounts,

> Ka-hekili ordered him [Kahahana] to be killed and brought to Waikiki and he sent double canoes to Halaulani [see Figure 14] at Waipiʻo in ʻEwa. Ke-ku-manoha' killed Ka-hahana and his friend Alapaʻi. wrapped them in coconut leaves, placed them on the platform of the canoes, and took them to Kahekili at Waikiki. (1992:137)

Kamakau also provides an account of the Waipiʻo *kīmopō*, which he translates as "Waipiʻo of secret rebellion" (ibid.:138). In his account,

> To throw suspicion on others the plotters said, "Death comes from Kauai," and later they said, "Death comes from Waipiʻo." But the plot came out, and when Ka-hekili learned that Elani of ʻEwa was one of the plotters, the districts of Kona and ʻEwa were attacked, and men, women, and children were massacred, until the streams of Makaho and Niuhelewai in Kona and of Kahoaʻaiʻai in ʻEwa

> were choked with the bodies of the dead, and their waters became bitter to the taste, as eyewitnesses say, from the brains that turned the water bitter. All the Oahu chiefs were killed and the chiefesses tortured. (ibid.)

In his discussion of Kamehameha I's conquest of Oʻahu ca. 1795, Fornander (1880) recounts that Kalanikūpule escaped death at the battle of Nuʻuanu by fleeing into the jungle where he hid for several months. However, he was captured in the highlands of Waipiʻo, killed and then sacrificed by Kamehameha to the war-god Kukaʻilimoku (ibid.). Kamakau (1992) provides a similar account, in which Kalanikūpule hid in the uplands for over a year before his capture and murder in Waipiʻo *mauka*.

Waipiʻo After European Contact

The arrival of Western explorers in Hawaiʻi marked the end of the Precontact Period ca. 1778, and the beginning of the Historic Period. With the arrival of foreigners such as British explorer Captain James Cook, in command of the ships *H.M.S. Resolution* and *H.M.S. Discovery*, Hawaiʻi's culture and economy underwent drastic changes. Demographic trends during the late Precontact early Historic Periods indicate population reduction in some areas, due to war and disease, yet increase in others, with relatively little change in material culture. At first there was a continued trend toward craft and status specialization, intensification of agriculture, *aliʻi* controlled aquaculture, the establishment of upland residential sites, and the enhancement of traditional oral history (Kirch 1985; Kent 1983). The Kū cult, *luakini heiau*, and the *kapu* system were at their peaks, although western influence was already altering the cultural fabric of the Islands (ibid). Foreigners very quickly introduced the concept of trade for profit, and by the time Kamehameha I had conquered Oʻahu, Maui and Molokaʻi, in 1795, Hawaiʻi had seen the beginnings of a market system economy (Kent 1983). Some of the work of the commoners shifted from subsistence agriculture to the production of foods and goods that they could trade with early visitors. Introduced foods often grown for trade with Westerners included yams, coffee, melons, Irish potatoes, Indian corn, beans, figs, oranges, guava, and grapes (Wilkes 1845). Later, as the Historic Period progressed, Kamehameha I died, the *kapu* system was abolished, Christianity established a firm foothold in the islands, and introduced diseases and global economic forces began to have a devastating impact on traditional life-ways in the Hawaiian Islands. This marked the end of the Precontact Period and the end of an era of uniquely Hawaiian culture.

Early Historical Accounts of 'Ewa and Waipiʻo

Hawaiian historian Ioane (John) Kaneiakama Papa ʻĪʻī was born in Kumelewai in Waipiʻio, on August 3, 1800 on the land of his uncle and namesake Papa ʻĪʻī who had been given the Loko of Hanaloa (Figure 15) and two other properties by Kamehameha after the battle of Nuʻuanu (ʻĪʻī 1959:20). ʻĪʻī tells of the fishponds full of mullet that also contained taro mounds (ibid.). In addition, he mentions that Liholiho, the heir to the throne, stayed at the ʻĪʻī residence in Kumelewai:

> Before the company arrived for the night, Ii was sent with a message to the dwellers of the land to be ready with fish, dogs, vegetable food, and clothing that would be of help to the travelers. Thus were all things supplied from upper Waipio to the sea. There was enough for the traveling company of the young chief, who was spending the night there, This did Ii do for the young chief and his companion Papa. (ibid:23)

Of his childhood, ʻĪʻī recounts the following:

> Because of his religious nature, the boy was sent frequently with the priests in the early dawn of Kane to relieve any trouble at the pond of Hanaloa, to make the offerings, and to present the gifts they had brought to the appropriate offering place. Such a place was called an *aoa*, a place where offerings were made to the gods for whatever concerned the ponds. (ibid.:26)

At the age of ten, ʻĪʻī was taken to Honolulu to become a member of Liholiho's court. Thence he became an attendant and companion of Kamehameha III. In one of his accounts of court activities, ʻĪʻī recalls the following details surrounding the festivities associated with a *makahiki* ceremony he witnessed during his youth. The ceremony itself was a celebration that occurred when "the *makahiki* gods went forth from the *luakini* heiau at Leahi" (ibid.:70) these gods were carried by attendants in a procession that circled the island beginning in Honolulu toward ʻEwa and beyond. The preparations and the ceremony lasted for weeks and included the implementation of various *kapu* as well as boxing matches.

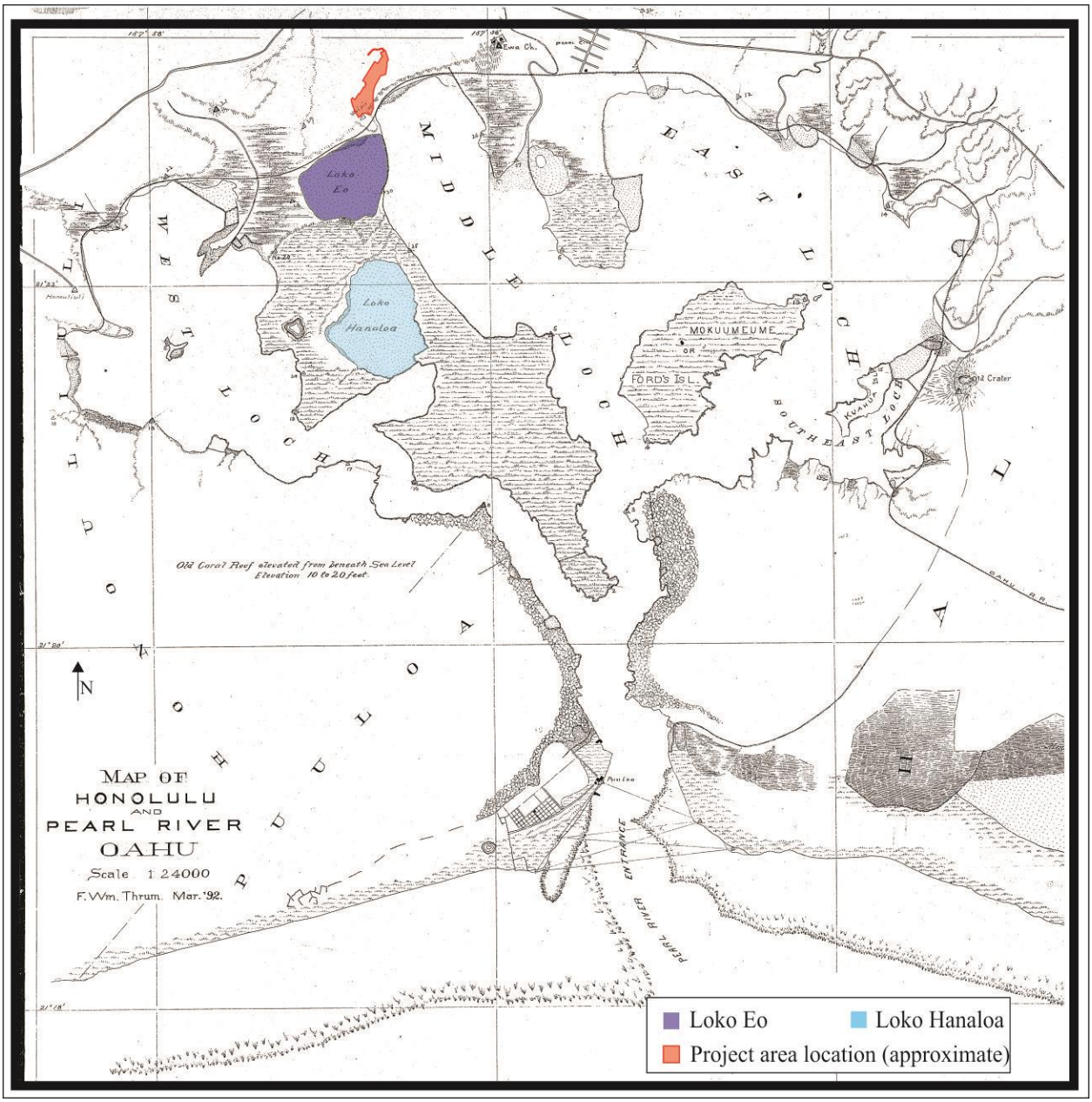

Figure 15. Reg. Map No. 1612 showing the current project area relative to places referenced in the text, ca. 1892.

ʻĪʻī learned the customs of the *makahiki* when he followed the procession from Honolulu to ʻEwa. He was very inspired by what he saw and proceeded to recreate the boxing matches and stone throwing battles he'd witnessed. A group of Waipiʻo boys squared off against a group of Waikele boys and shortly after this mock battle between the children, the adults entered into a sham battle between Honolulu and Waikele. ʻĪʻī provides the following story about the nature of the people of Waipiʻo from this period during his childhood:

> At about the time of the sham battle, a proclamation came from Kawelo, the overseer of the land of Waikele, for the men of the land to fetch the double canoe beached at Kupahu, on the northeastern side of Halaulani in Waipio. Because the proclamation came from Kawelo, who said the order was from Kalanimoku, the men of Waipio made ready to detain the canoe. They felt that the command should have come from their own leader, Papa.
>
> When Kawelo and the men of Waikele had taken their places from prow to stern of the canoe and the command, "Go ahead," was given, the canoe did not budge. It was being held back by the men of Waipio. Kawelo's men tried again to make it go forward, but to no avail, so Kawelo asked the

> Waipio men why they held on. Kaimihau answered, "You cannot do this, for we were not told of it by our leaders. If Kalanimoku had made this request through our own leaders, we should have heard of it and therefore done nothing to prevent the removal of the canoe. If you persist in the idea of taking the canoe, day may change to night and night to day without its budging from its resting place. All things left here at Waipio are protected, from the sea to the upland, and we shall not let them go unless we hear from our own leaders." O companions, see how well the people served their leader. The peace of the land of Waipio was well known while the high chiefs were in charge and up to the time of Papa's death. (ibid: 76-77)

ʻĪʻī makes a few other interesting references to Waipiʻo. For instance, he recounts that when Kaumualiʻi of Kauaʻi sailed to Oʻahu to meet with Kamehameha I, he received "*tapa* made of *mamaki* bark" (ibid.:83) from Waipiʻo in ʻEwa as a gift. Of daily life, he mentions that the family would go to "Kipapa from Kumelewai by way of upper Waipio to make ditches for the farms" (ibid.:28). Lastly, ʻĪʻī provides the following account of a famine that struck Waipiʻo:

> Here is a wonderful thing about the land of Waipio. After a famine had raged in that land, the removal of new crops from the taro patches and gardens was prohibited until all of the people had gathered and the farmers had joined in thanks to the gods. This prohibition was called *kapu ʻohiʻa* because, while the famine was upon the land, the people had lived on mountain apples (*ʻohiʻa ʻai*), tis, yams, and other upland foods. On the morning of Kane an offering of taro greens and other things was made to remove the *ʻohiʻa* prohibition, after which each farmer took of his own crops for the needs of his family.(ibid.:77)

According to McAllister (1933), many *aliʻi* used to reside on an eastern point of Waipiʻo Peninsula known as Lepau (see Figure 14). ʻĪʻī also mentions Waipiʻo as a place for chiefly residence, "in late 1803 or early 1804, while he was living with the chiefs at Halaulani, Waipio, Ewa, the king became ill" (ibid.:33). Thus, Kamehameha I resided for a time in Waipiʻo with the local chiefs. The literal translation of the place name Hālaulani is "high-born chief's large house", however Hālaulani also refers to a land division within Waipiʻo (Pūkuʻi et al. 1974:36). The current project area appears to fall within this land division as depicted on the map by Sterling and Summers (1978; see figure 14). Also, Handy et al. attributed the location of the *aliʻi* stronghold within Waipiʻo Peninsula to the existence of the numerous fishponds throughout Pearl Harbor:

> The Pearl Harbor ponds were stocked with various kinds of fish, but especially mullet, because these inland waters were the summer home of the mullet of Oahu. There were traps in which deep-sea fish, especially *akule*, were caught. . .
>
> Another attraction was the great variety of shellfish found in Pearl Harbor. The most important was the Hawaiian pearl oyster or *pipi*, which was eaten raw. The shells were valued because they furnished shanks for bonito hooks. . . (1972:470)

In addition to the abundance of marine life, the ʻEwa District had its own distinct taro variety native to the district, the ʻEwa *kai* variety (*kai o* ʻEwa). Handy et al. describe *kai o* ʻEwa as follows:

> One kind of *kai* sends off long rhizomes, hence was sometimes called *kai koi, kai*-that-pierces (Handy, 1940, p. 19). An ʻEwa *kamaʻaina* described this in 1899: "When planted, it sends up shoots, more shoots and still more shoots. Again and again it will send up new shoots, filling the mounds until they are mixed with the taro of other mounds." This description (*Ka Loea Kalaʻaina*, June 3, 1899) indicates that in the flat, wet lowlands of ʻEwa this famous taro was grown in mounds (*puʻepuʻe*) as in marshy localities. The article quoted above says that "*kai koi* multiplies itself over and over with one planting and often lasts as long as ten years." No other variety or locality can equal this. This fragrant taro was likened to a woman with whom a man falls in love. And it was said that anyone who married a native of ʻEwa would come and settle there and would never leave, because of the *kai ko*i of ʻEwa. . . (1972:471)

In 1931, Handy and his colleagues collected four varieties of *kai: kai koi*, *kai ʻulaʻula* (red *kai*), *kai ʻuliʻuli* (dark *kai*), and *kai keokeo* (white *kai*), the most fragrant *kai* variety from which the *poi* for the *aliʻi* was made.

> The area between the West Loch of Pearl harbor and Loko Eo (the fishpond at the north end of Waipiʻo peninsula) was terraced throughout, continuing for more than a mile up into Waikele Stream. The lower terraces were watered from the great spring at Waipahu. . . No area better exemplifies the industry and skills of the Hawaiian chiefs and their people than do the terraced plantation areas and numerous fishponds of ʻEwa. (ibid.:472)

The Māhele Āina of 1848

The profound religious, socioeconomic, and demographic changes that took place in the early 1800s resulted in the establishment of a Euro-American style of land tenure, and the *Māhele ʻĀina* of 1848 or Great *Māhele* was the vehicle used to divide the land between the crown, government, *konohiki*, and native tenants. Prior to this land reformation, all the land and natural resources of Hawaiʻi were held in trust by the *aliʻi* who, in concert with *konohiki* land agents, meted out use rights to the native tenants at will. During the *Māhele* all lands were placed in one of three categories: Crown Lands (for the occupant of the throne), Government Lands, or *Konohiki* Lands; all three types of land were subject to the rights of the native tenants therein.

The *aliʻi* and *konohiki* were required to present their claims to the Land Commission to receive a Land Commission Award (LCAw.) for lands provided to them by Kamehameha III. They were also required to provide commutations to the government in order to receive royal patents on their awards. The lands were identified by name only, with the understanding that the ancient boundaries would prevail until the land could be surveyed. This process expedited the work of the Land Commission and subsequent land transfers (Chinen 1961). Native commoners could also register claims for land with the Land Commission, and if substantiated, they would receive a LCAw., often referred to as a *kuleana*; upon confirmation of a claim, a survey was required before the Land Commission could issue a *kuleana* award.

Following the *Māhele,* the Hawaiian kingdom initiated a grant program in an effort to encourage more native tenants to engage in fee-simple ownership of parcels of land. These parcels consisted primarily of Government lands-those lands given outright by the King, or commuted to the Government by the *aliʻi* in lieu of paying the commutation fees on the parcels awarded them during the *Māhele*. These land grants ranged in size from roughly ten acres to many hundreds of acres. When the sales were agreed upon, Royal Patents were issued and recorded following a numerical system that remains in use today. In 1862, the Commission of Boundaries (Boundary Commission) was established to legally set the boundaries of all the *ahupuaʻa* that had been awarded as a part of the *Māhele*. However, boundary descriptions were not collected for all *ahupuaʻa*. The primary informants for the boundary descriptions were old native residents of the lands, many of which had also been claimants for *kuleana* during the *Māhele*. This information was collected primarily between 1873 and 1885 and was usually given in Hawaiian and transcribed in English as they occurred.

During the *Māhele*, Ioane ʻĪʻī received the *ahupuaʻa* of Waipiʻo as a *konohiki* award (LCAw. 8241; R.P. 5732), which covered 20,546 acres. The current project area falls within this awarded land. According to foreign testimony ʻĪʻī's land contained eleven *loʻi* in one piece and "He received the land from Kekaha in the time of Kamehameha and has held quiet possession of the same until the present time" (F.T. reel 3 Vol. 9 Image 52: p. 159). In his testimony, ʻĪʻī also listed 110 heads of household of Waipiʻo by name and included the number of children—244 (N.R. 5:512-516). One can safely assume that well over 350 people were residing in Waipiʻo at the time of the *Māhele* because ʻĪʻī's figures did not account for spouses or other extended family members. According to the Waihona ʻĀina database, seventy-eight of 121 claims were awarded in Waipio Ahupuaʻa.

Kuleana were often divided into sections or *ʻāpana*, typically between two and four. Although no *kuleana* parcels were awarded within the current project area, several *ʻāpana* were awarded nearby (Figure 16); three to the north, makai of the railroad along the edge of the Middle Loch of Pearl Harbor and seven to the south. Still more kuleana were awarded to the west/southwest of the project area as depicted in an 1879 registered map reproduced as Figure 17, below. Interestingly, most of the LCAw. applicants' claims were filed under the same award (LCAw. 8241) to ʻĪʻī, but were assigned a unique alphabetical designation and separate Royal Patent numbers (see Figure 16). A review of foreign testimony for those LCAw.'s located closest to the current project area revealed that the majority of the *kuleana* contained between four and fourteen *loʻi* of various sizes (LCAw. 8241CM, 8241CW). In some cases, the *kuleana* also contained a house lot (LCAw. 8241SM), or *kula* (dry-land farming fields; LCAw. 8241PN, 3794, 8241SS), or simply one or two *loko* (fishponds) and a *kula* (LCAw. 8241GG, 8241LN). These individual *kuleana* claims for *loʻi* and *kula* lands during the Great *Māhele* indicate that some Waipiʻo residents still performed both dryland and wetland agriculture during the mid-1800s.

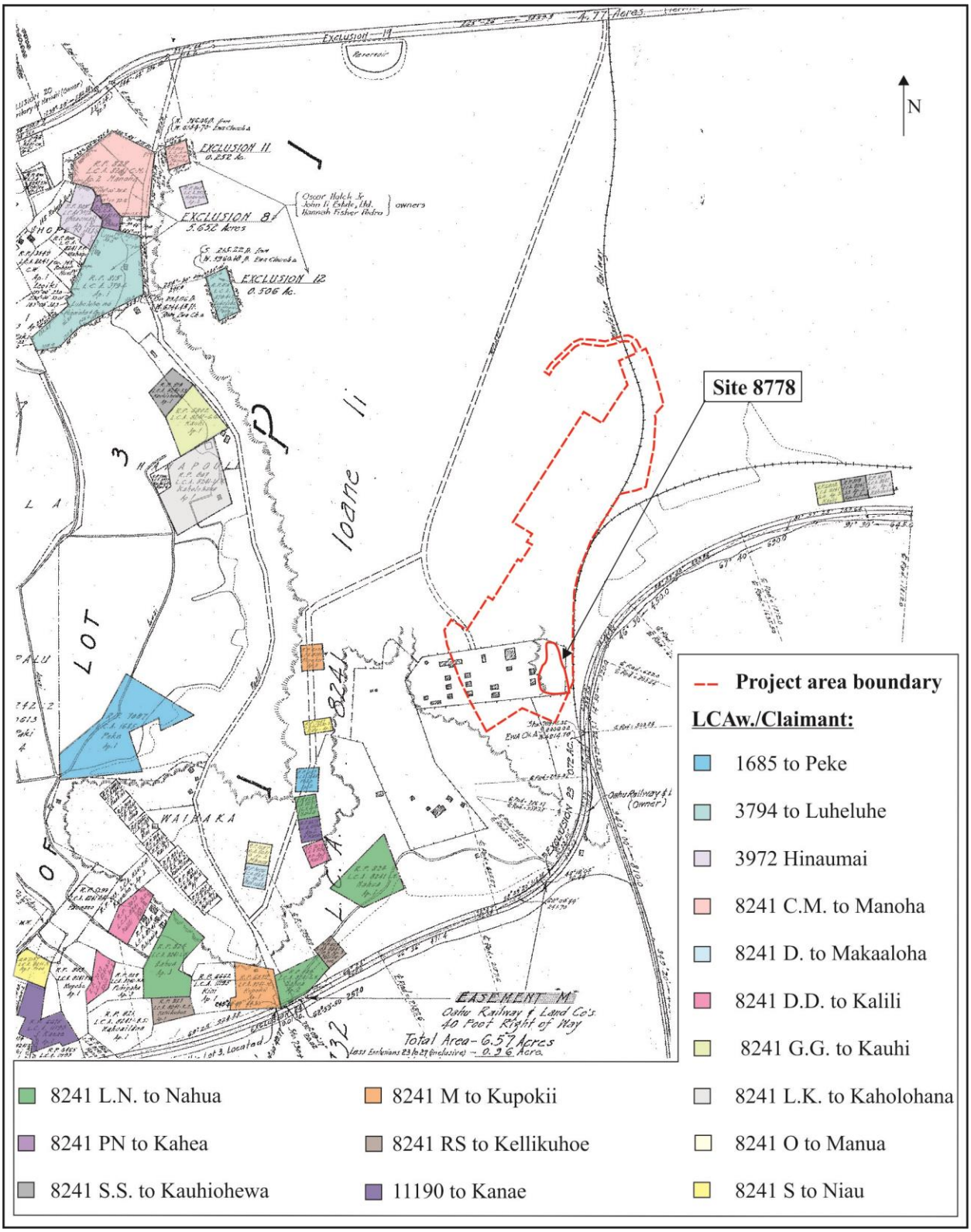

Figure 16. Land Court App. 1000 Map Number 2 (ca. 1928) showing locations of *kuleana* awarded relative to the current project area.

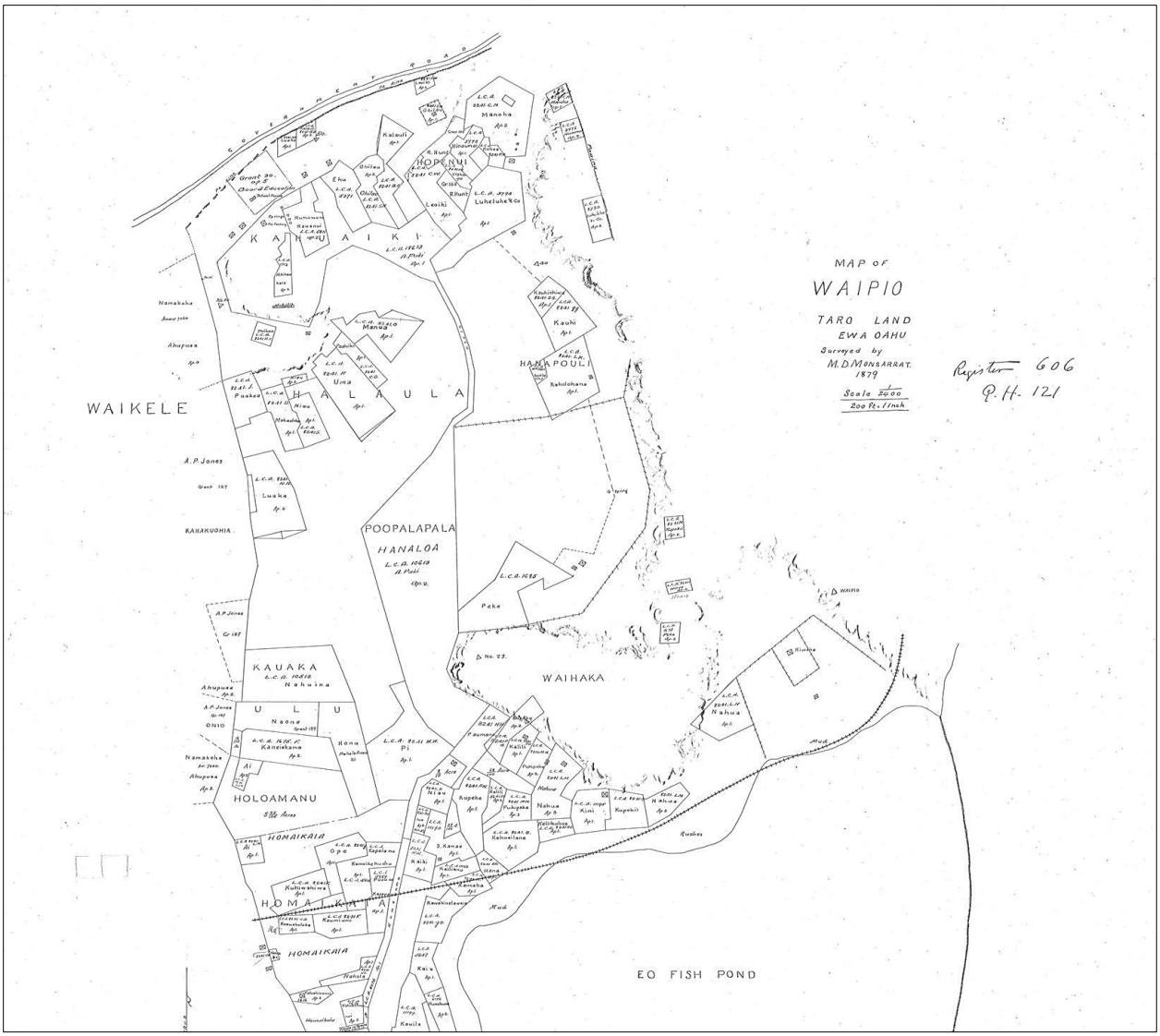

Figure 17. 1879 map showing *kuleana* awarded to the west and south of the current project area.

Rice Cultivation in Waipahu (1875-1942)

During the late 1800s, Waipiʻo and neighboring Waikele *ahupuaʻa* were the sites of the most productive rice fields in the Hawaiian Islands (Chong 1998). In 1892, 333 acres in Waipahu were dedicated to rice production,

> most of it was worked by two dozen or so major rice cooperative companies and the balance cultivated by approximately three dozen smaller group or family operations. Many of these smaller operations combined their efforts during the planting and harvesting seasons and bonded socially through traditional arranged marriages between their children. (Chong 1998:16).

According to Chong (1998), Homaikaia in Waipiʻo was the site of one of the earliest documented rice plantations begun in 1875. Subsequently, Chinese planters leased abandoned *loʻi* and unused *kuleana* lands from Hawaiian families, taking advantage of the many artesian wells in ʻEwa District that were located between the coast and the inland plains. Chong states, "vast tracts of old and new, reclaimed land surrounding Waipahu from Pearl City to ʻEwa eventually were engulfed in a blanket of green rice fields" (Figure 18), "by the early 1890s several rice mills were operating" (1998:15). Initially the Waipahu rice was taken by horse-drawn carriage to market in Honolulu; but by around 1889 rice was largely transported by train. Chong reports that in 1890 "more than ten million pounds of rice were exported, raised on sixteen thousand acres of rice paddies" (ibid.), which marked the peak of Hawaiian rice production and ranked Hawaiʻi as the third largest United States rice producer behind Louisiana and South Carolina.

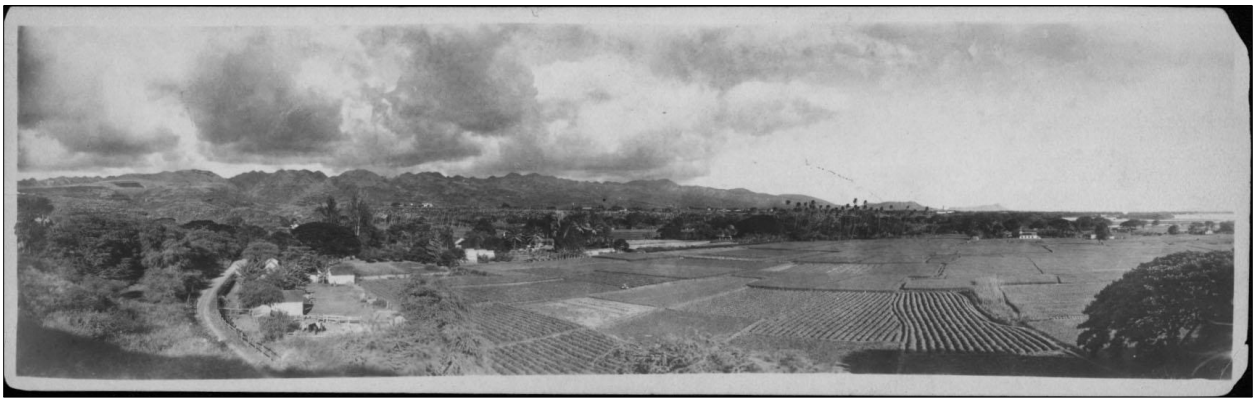

Figure 18. Rice field east of Waipahu sugar mill in Waipiʻo (HSA digital collection PP-61-2-011).

According to the census of 1900 there were sixty-one rice farms in Waipahu (Waipiʻo, Waikele, Honouliuli, and Waiawa) including forty-nine family operated rice farms; by 1910 the numbers decreased to fifty-five total farms of which only twenty-two were family operated (Chong 1998:18). Various systems of cooperative farming were implemented by the Waipahu Chinese. The largest and most complex of these systems was the *fun kung* (*or fung goong*) in which the "owner or lessee provided land and agricultural equipment, including all farm machinery and necessary animals, while laborers gave their energy and time to till the soil and raise the crop while supplying their own rations" (ibid.:16). Depending on the contract or agreement, both parties divided the crop or the money from its sale at the end of the season, "the laborers were bonded to a share of the profit," which "depended in part on the laborers' endeavors to carry the crop to a successful harvest, providing them an incentive for greater efficiency and responsibility" (ibid.).

Six major *fung goong* cooperatives averaging around 40 acres each were operated in Waipiʻo until the late 1920s. The first of these *fung goong* to be established was called Wai Pio Wai (also known as Wai Pew Wai, Wai Byeau Ui), and extended over more than forty acres near the ʻĪʻī Brown estate, *mauka* of the railroad tracks near and to the west of the current project area (Figure 19); in 1910, Wai Pio Wai employed twenty-one laborers (ibid.:21). In addition, one smaller family operated rice farm or *hop-pun* was located to the north of Wai Pio Wai and to the west of the current project area. This small rice farm was started by a man named Shak Kin at the turn of the twentieth century (ibid.:37). Shak Kin's daughter recounted to historian Douglas Chong the following details about her childhood home on the rice farm: "It was a two-bedroom wooden house with a parlor, an outside cookhouse and a bunkhouse attached to one side of the house where her father's five workers slept" (ibid.). During the decades leading up to World War II, rice production suffered a steady decline due to increasing rental costs, blight, insect infestations, and less demand for rice locally exacerbated by cheaper rice production on the mainland. First generation farmers encouraged their offspring to purse business endeavors rather than continue rice farming. By 1942, only scant traces of the rice farming industry were evident in Waipiʻo.

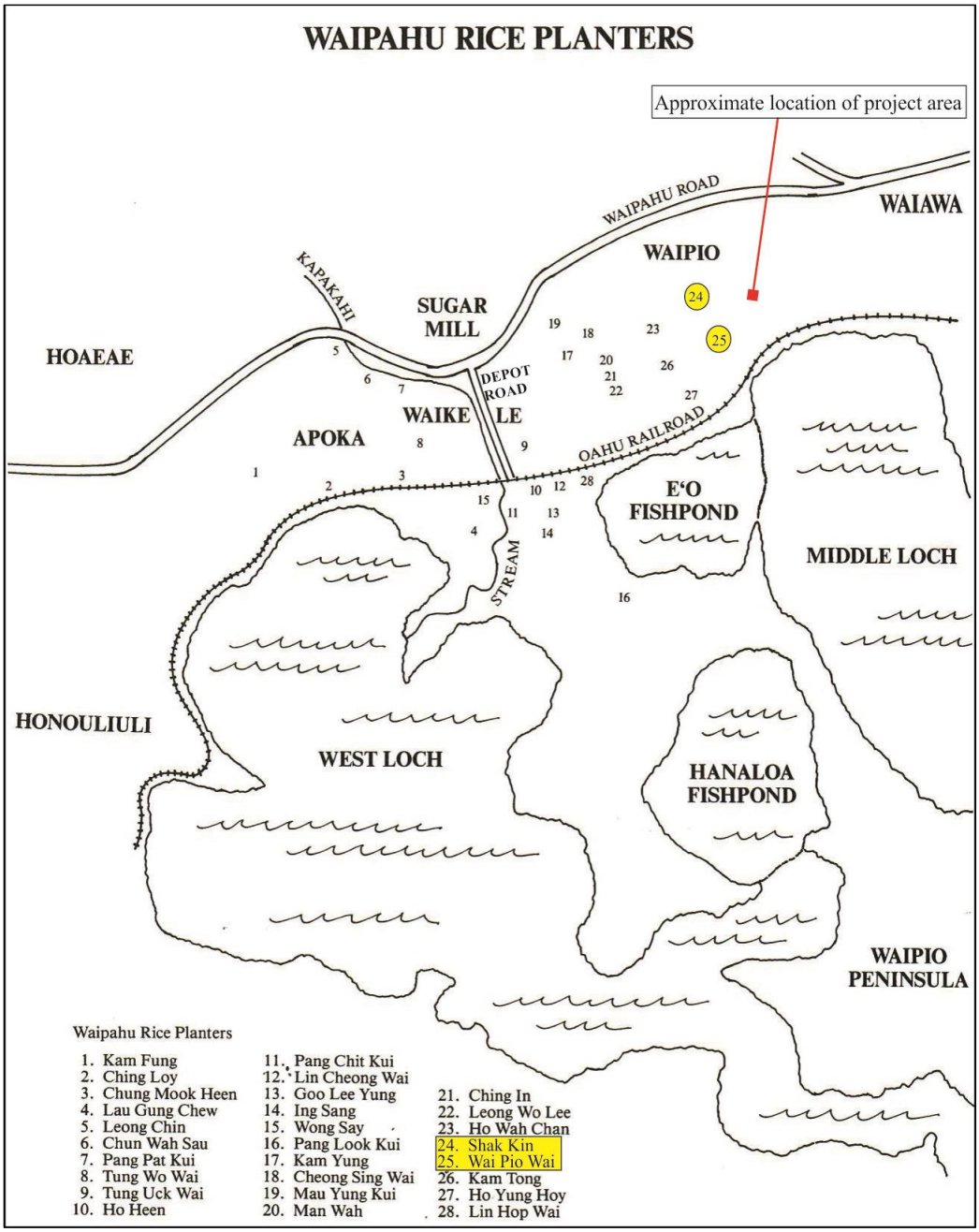

Figure 19. Locations of rice farms listed by owner relative to project area (Chong 1998:28).

The Legacy of Frank Dillingham and The Oahu Railway and Land Company (1888-1947)

The history of the Oahu Railway and Land Company began in June of 1888, when William R. Castle introduced a bill that did the following:

> . . . it specifically empowered the Minister of the Interior "to contract with B.F. Dillingham, his associates and successors and their assigns, or such corporation as shall be formed and organized by him or them under the laws of this Kingdom. . . for constructing and operating on the island of Oahu a steam railroad or railroads of not less than three feet gauge, for the carriage of passengers and freight." The bill allowed B.F. Dillingham eighteen months in which to give "satisfactory guarantees" to the government that he would build a steam railroad to connect Honolulu with Pearl River lagoon within three years of the passage of the bill; he would have exclusive rights to whatever territory (excluding Honolulu) the railroad covered within three years. (Yardley 1981:125)

The following discussion is drawn largely from Paul T. Yardley's biography on the career of B. F. (Benjamin Franklin or "Frank") Dillingham (Yardley 1981). Frank Dillingham was an entrepreneur from Massachusetts, who came to Hawai'i as a first mate aboard the *Whistler* at the age of twenty-one in July of 1865. He made landfall at Honolulu and shortly after was injured in an accident while on horseback, his recovery lasted forty-five days and caused him to be left behind when the *Whistler* set sail on her return voyage. This accident would change his life forever. Shortly after being stranded on O'ahu, Dillingham married Emma Smith, daughter of the Reverend Lowell Smith, a missionary stationed in the Hawaiian Islands. Then, in April of 1869 Frank Dillingham opened Dillingham and Company, a hardware store, with his business partner Alfred Castle. Alfred's father, Samuel Castle, had secured the funding for the young men. Five years later, Alfred Castle died suddenly and Samuel Castle and Dillingham begrudgingly entered a partnership that would last over twenty years. In 1879, Dillingham acquired fourteen acres of land at the corner of Beretania and Punahou Streets. This lot would become his family's home, known as Woodlawn, where they would remain for forty years. More importantly, this land acquisition inspired another venture of Dillingham's which would become the largest dairy in the Hawaiian Kingdom in 1886. Despite the moderate success of the hardware store and dairy, which despite its size failed to deliver profits, and a few successful real estate deals, Dillingham accumulated mounting debts. In 1885, in a desperate effort to pay off his creditors (including Castle), Dillingham set up a land holding company, which failed miserably by 1888. His so-called Great Land Colonization Scheme offered investors stock in his Hawaiian Colonization Land and Trust Co. but fell flat for lack of interest, due in part to the kingdom-wide depression spurred by falling sugar prices.

The Dillingham Bill, reproduced above, was not approved as it was initially proposed. Whilst the government drafted another bill, Dillingham received strong public backing from Charles A. Brown. Brown's wife, Irene ʻĪʻī, was the only child of John Papa Īʻī; thus, "through her, Brown controlled the immense estate of Waipio, including Waipio Peninsula in Pearl Harbor. Brown's prestige with the Hawaiians was thought to be immense" (ibid.:127). When put to a vote, Hawaiian voters supported Dillingham while *haole* voters voted primarily against him; however, on September 11, 1888 King Kalakaua signed the railroad bill in favor of Dillingham (ibid.). According to Yardley, "Kalakaua's signing of the railroad bill signaled the start of a year and a half of frenetic activity during which B. F. Dillingham changed the map of Oahu forever" (ibid.:131).

Although railroads, largely associated with the sugar industry, were already in operation around Hawai'i Island, O'ahu was undeveloped in comparison, and the Pearl Harbor region was not a sugar production area. Furthermore, according to Yardley, "the great dry plains of Ewa produced nothing but cattle and firewood" (ibid.:130). Yardley describes Dillingham's seemingly fool-hardy venture thusly:

> Frank planned to open up a whole new district and make its economy thrive on account of the railroad. The satirist who described the Oahu railway as "starting nowhere and ending up a tree" was really not far shy of the mark. (ibid.:129)

The main landholders of ʻEwa (Brown, Mark Robinson, and James Campbell) were all amenable to the planned railroad and the promise of increasing the value of their holdings. By November of 1888, Charles H Kluegel had begun surveying the narrow-gauge railroad right-of-way. Kluegel estimated the cost for fifteen miles of 3-foot gauge railroad at $241,000 (ibid.:133).

On February 4, 1889, Lorrin A. Thurston, Minister of the Interior, issued a charter for the Oahu Railway and Land Company (O. R. and L.) as a railroad as well as a land development company. As Yardley described:

> This charter ran for fifty years, provided for an original capitalization of $700,000 increasable to $5 million, and empowered the corporation not only to buikld and operate a rtailroad burt also to purchase, own, develop, sell, lease, and otherwise deal in lands "along and near the line or lines of the railway. . . for the purpose of inducing the settlement of population along or near said line. (ibid.:137)

On March 8, 1889, the formal groundbreaking took place at Moanalua near the intersection of Middle Street and Kamehameha Highway. This location was chosen because the spoils from the cut were needed to fill in the underwater parts of the proposed line; 148 men were working by May (ibid.:140). Once again, Dillingham struggled to secure funding and Samuel Castle's investment kept him afloat, "without Mr. Castle's backing the whole railroad project might never have got off the ground" (ibid.:142). Once funds were secured, Dillingham ordered two Baldwin locomotives and various cars for the new line.

On September 4, 1889, nearly 150 people rode a little over a mile from the terminal at Iwelei Road to the rice fields in Kapālama. The *Pacific Commercial Advertiser* reported the event under the headline "A Successful Experimental Excursion, and the Redemption of Mr. B.F. Dillingham's Promise Given One Year Ago" (ibid.:145). Interestingly, the Baldwin locomotives did not arrive in time for Dillingham to make good on his promise and this excursion was made possible only because a small eight-ton locomotive called the *Kailua*, intended for use on Honolulu's then existing mule-car tracks, was available for his use.

A few months after the first ride of the O. R. and L., Dillingham hosted opening day for the railroad and provided free rides for nearly 4,000 passengers on November 16, 1889 (ibid.:146). By this time, the two Baldwin locomotives *Kaala* and *Leahi* had arrived and the railroad extended eight miles from the Honolulu depot to Hālawa near present day Aloha Stadium. By January of 1890, the railroad extended to Pearl City and seven months later, the full fifteen-mile section Dillingham originally promised was complete; and on July 1, 1890, the railroad reached Hōʻaeʻae, to the east of the current project area (ibid.:158). As 1890 was ending, Dillingham shifted his focus to developing portions of Campbell's 60,000 acres in ʻEwa into sugar plantations and constructing a wharf in Honolulu Harbor that could accommodate ships loaded with sugar for export, as well as imports for transport by rail. Dillingham continued to run parts of the Campbell lands as ranches while renting out portions for other uses, which resulted in the establishment of Ewa Plantation Company. In addition, he began selling lots in Pearl City for residential development. As a means of mitigating his financial troubles, in 1891 Dillingham incorporated the Hawaiian Construction Company and in 1892 went to the mainland to try and secure more funding for his various projects. Construction of the rail had gone dormant since 1890; but in 1893, Dillingham secured a contract to extend the O. R. and L. to Waianae and beyond to Kahuku, a total of fifty-four miles. This extension suffered many delays and it took more than two years before the rail line was completed from Ewa Mill to Waianae. On July 4th, 1895 the railroad celebrated its completion to Waianae, which "made it possible to reach the remote Waianae coast in an hour and a half, instead of by a day's ride on horseback, and ended the isolation of this remote corner of Oahu" (ibid.:189). In June of 1898 the O. R. and L. finally reached Waialua Mill and by January 1st, 1899, the main line was complete having reached Kahuku Plantation, seventy-one miles from Honolulu (ibid.:199). Yardley summarized the success of the O. R. and L around this time thusly:

> The "toy railroad," as Frank liked to refer to it, now served six flourishing sugar plantations and all the thousands of workers who lived on them. During the year 1899 it carried 236,000 passengers and nearly 200,000 tons of freight, and earned a net profit of $212,000. (ibid.:199)

The railroad took advantage of the wave of prosperity that swept through the islands near the turn of the twentieth century and re-laid the rail line between Ewa mill and Honolulu with upgraded steel rails. In 1905, work began on extending the line ten miles inland from the Waipahu sugar mill (to the southwest of the current project area) to Wahiawa. This section of rail was completed during the summer of 1906 and was extremely profitable thanks to the booming pineapple industry. The profits allowed for Dillingham to cover his outstanding debts. Then in 1908, the O. R. and L. hooked up with the naval railway and constructed branches that extended off the Wahiawa line to reach pineapple fields in Waipiʻo, Schofield Barracks, Kunia and Halemano. The completed railway is shown in Figure 20 below. The railway continued to flourish through the end of World War II and provided transport for millions of passengers and freight during the war proving itself indispensable to the U.S. Army and Navy. However, after the war as infrastructure improvements to Oʻahu roadways were implemented and a shift to automobiles, trucks, and buses for the transport of people and goods was underway, the O. R. and L. could not compete. The year 1947 marked the close of the main line while limited operations between the docks and pineapple canneries continued before complete abandonment of the railway a few years later.

Without the O. R. and L., it is likely that leeward O'ahu would not be as it is today, nor would it have been possible to plant the parched ʻEwa plains with commercially cultivated sugarcane. In the early 1900s, Dillingham summarized his feelings regarding the link between his railway and the sugar industry in his report to the directors of the railroad thusly, "It is not too much to say that the development of the sugar industry on this Island [Oʻahu] since 1890, is directly due to the presence of . . . railway transportation" (ibid. 212). According to Yardley, another aspect of Dillingham's legacy was his hand in bringing water to the ʻEwa plains,

> . . . thousands of green acres which had produced nothing but kiawe and cactus in the years before the railroad, while out on the Ewa plain the great pumps sucked water out of the earth to give life to the land. This had been his life work: more than any other man, he had brought life and prosperity to that part of Oahu which stretched from Pearl Harbor to Kahuku. (ibid.:316)

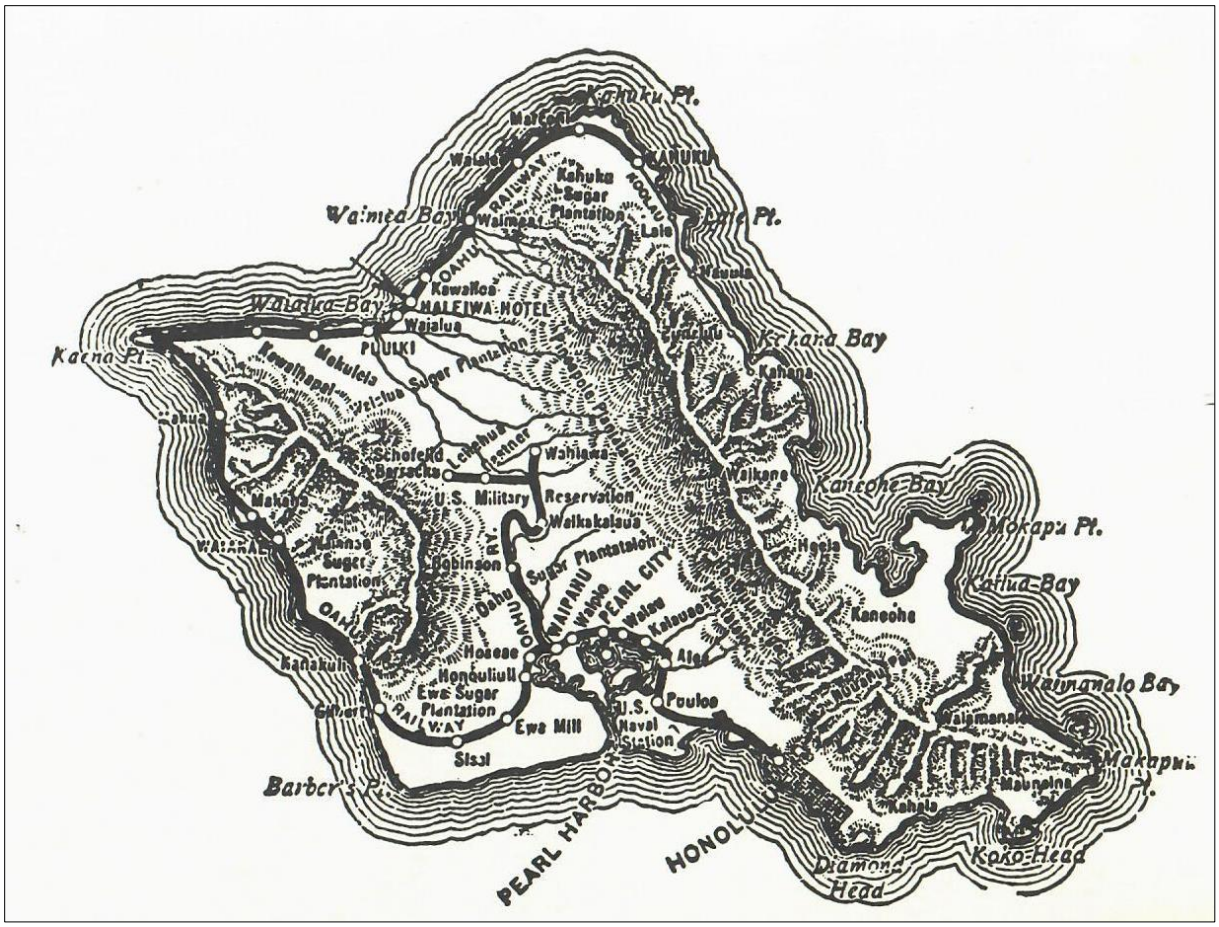

Figure 20. Map of O. R. and L railroad.

The Sugar Industry in Waipahu (1897-1995)

Once Dillingham had completed the original fifteen miles of rail he promised to his investors and the people of Oʻahu, he set his sights on the commercial cultivation of sugarcane, which took over much of the ʻEwa area. Around 1892, Dillingham set up a coal elevator near the dock he had built between the O. R. and L. railroad terminal and Honolulu Harbor. This venture provided the sugar plantations with coal to run their irrigation pumps and locomotives. However, the first few years of Ewa Plantation were barely productive, which cut into the O. R. and L.'s profits because the low crop yield meant less sugar to haul. Ewa Plantation included Honouliuli lands up to 200 feet in elevation. However, by late 1896 Dillingham had plotted to plant sugar at higher elevations using water pumped from artesian wells, a plan which laid the groundwork for Oahu Sugar Company (OSC) at Waipahu. By the end of 1894, he had arranged to lease Brown's ʻĪʻī lands at Waipiʻo between Waiawa and Robinson's holdings (Yardley 1981). OSC was incorporated on March 3, 1897 (Chong 1998:63). OSC appears in a 1902 Hawaii Territory Survey map by Walter E. Wall labeled "Oahu Plantation" reproduced as Figure 21 below.

The following information was gathered from a 1928 publication titled *Concerning—Oahu Sugar Company Limited Waipahu, Oahu* written by E. W. Greene, manager of the plantation. The acreage of OSC extended eight miles from Waiawa to Honouliuli and from "tidewater on the Waipio Peninsula to Robinson, eight miles on a northeasterly line" (Greene 1928:5). OSC covered 12,000 acres (roughly 20 square miles) of which 11,350 acres were planted with sugar cane, the remaining acreage was comprised of "village sites, roads, and waste lands" (ibid.). The plantation was divided into seventy-seven cane fields between 50 and 280 acres each, situated at elevations ranging from "10 feet above sea level on the Waipio Peninsula to 650 to 700 feet above sea level at the Waiahole ditch, which is its upper boundary" (ibid.). Nearly ninety-seven percent of the OSC plantation lands were leased (11,622 acres). The ʻĪʻī Brown Estate were the lessors of 4,912 acres and the O. R. and L. were the lessors of 4,080 acres owned by the Bishop and Campbell Estates, while the Robinson Estate were the lessors for 2,630 acres. The remaining lands were owned by OSC in fee simple and were primarily not part of the cane fields; rather, these lands were host to the following:

> the mill, office, hospital, store sites, and a portion of the section occupied by skilled men's residences, the main labor village, the land occupied by five of the small pumping stations, a small area of cane land, and several small parcels in the village of Waipahu. (ibid.)

The current project area fell within the south-central portion of the OSC plantation as depicted in a tracing of an early undated map of the OSC plantation by Monsarrat, reproduced as Figure 22, below.

Figure 21. 1902 map of project area vicinity showing OSC lands and the O.R. and L. railroad.

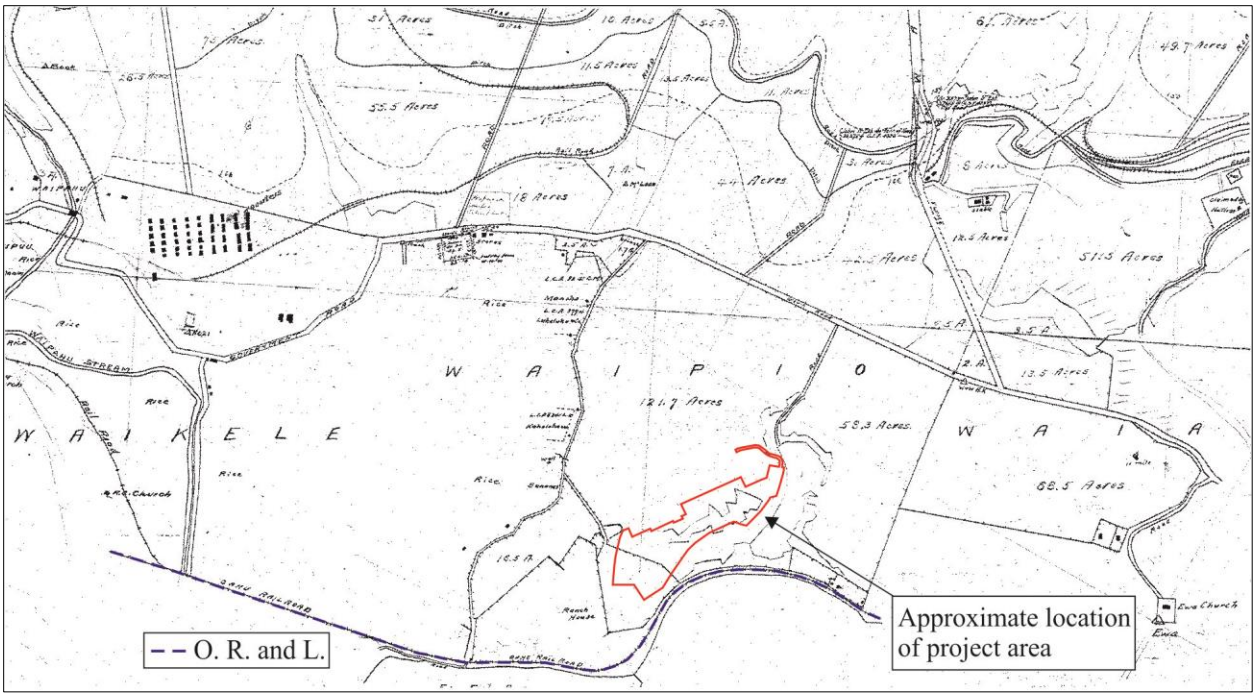

Figure 22. Hawai‘i Registered Map No. 2081 (no date) titled “Oahu Plantation.”

Specifically, the current project area was located in former OSC cane field number 6 as seen in a portion of the 1925 Map of OSC reproduced as Figure 23, below. An earlier map of OSC from 1909 reports the area of Field 6 as 146.10 acres (Greene 1928: frontispiece), while the undated Monsarrat map (see Figure 22) labels the project area vicinity as 121.7 acres. The O. R. and L. tracks are visible along the southern edge of Field 6 as well as a portion of the plantation railroad system (see Figure 23), which in 1928 consisted of “56 miles of main line track. . . with eight locomotives and 860 cane cars” (Greene 1928:9). The Waipahu sugar mill was located to the southwest of the current project area, in neighboring Waikele Ahupua‘a, as seen in a 1954 USGS map, a portion of which is reproduced as Figure 24 below. The OSC mill yard with rice fields beyond are depicted in a historical photograph (Figure 25). Also on this map, occupying the southwestern portion of the current study area are buildings labeled “Hawaii Sugar Planters Association,” which refers to the former Waipio Experiment Substation that will be discussed separately in an upcoming section.

OSC harvested its first crop in 1899 and by 1928 the Waipahu mill had “a normal daily capacity of 3,200 tons of cane producing about 425 tons of sugar” (ibid.:23). In 1928, OSC broke a world record for their average output of 12.02 tons of sugar per acre largely due to the twelve-roller mill, the first of its kind, which had been installed in 1907 (Saito 1984). OSC continued to produce high yields for over sixty years. A key development that contributed to the longevity of OSC was the construction of a water tunnel to transport water from the windward side of O‘ahu, through the Ko‘olau Mountains to irrigate the arid ‘Ewa plains (Chong 1998). This massive feat of engineering took three years to complete (from 1913 to 1916). All 12,000 acres were dependent on irrigation for successful cultivation. The average daily amount of pumped water delivered to the fields was 11,000,000 gallons (Greene 1928:9). Greene makes the following observation regarding the scale of the irrigation, “more water is pumped daily, on an average by the Oahu Sugar Company, Limited, than by many of the larger cities in the United States” (ibid.:9). In addition to the pumped water, 32,000,000 gallons of water from surface intakes and collection tunnels were also utilized daily depending on seasonal variations (ibid.).

The aforementioned Chinese community of Waipahu provided much of the workforce for the thriving OSC plantation. In addition to providing labor to the plantation, the Chinese also provided for the needs of the plantation, “supplying rice, fresh fruits, vegetables, poultry, pork, and fish” (Chong 1998:xiv). Additional laborers came from all over the world to work in the fields and the mill, primarily from the Philippines, Japan, Portugal, and Norway (Saito 1984). By 1920, as a result of the booming sugar industry, Waipahu had become the second largest city in O‘ahu with a population of roughly 4,000 (Yamamoto et al. 2005:50).

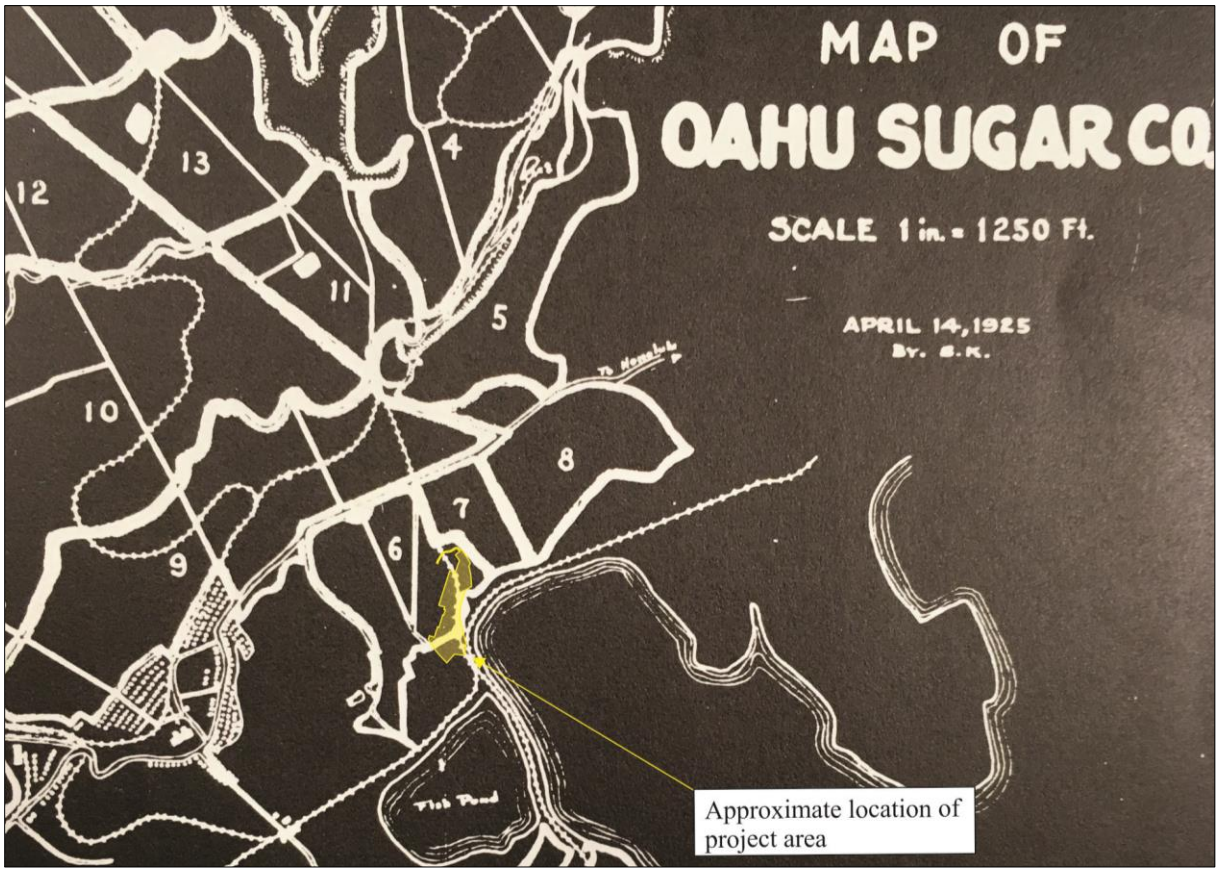

Figure 23. Project area within field 6 of OSC plantation ca. 1925.

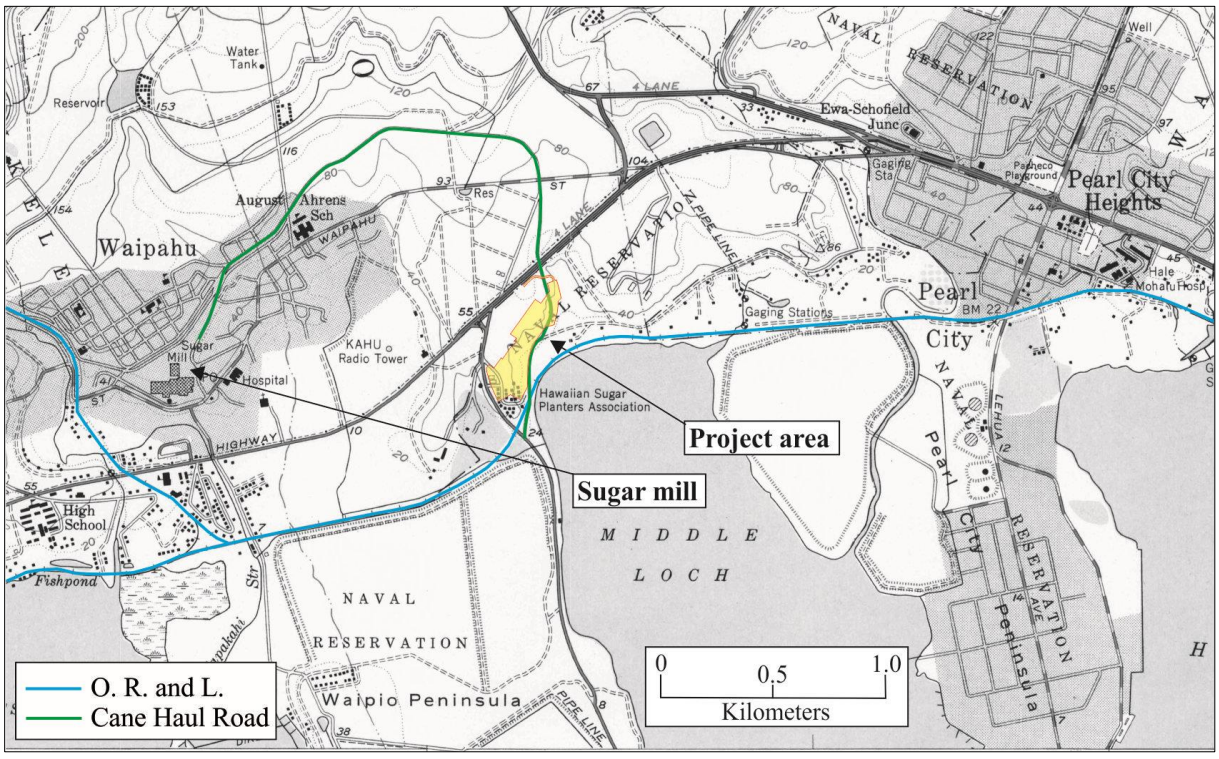

Figure 24. Portion of 1954 USGS 7.5-Minute series Waipahu Quadrangle showing relevant landmarks from discussion.

Figure 25. OSC mill yard, dispensary, and plantation store with rice fields in background (Bishop museum Photo in Chong 1998:34).

Regarding daily life on the plantation, the Hawaiian Sugar Planters' Association (HSPA) now known as Hawaii Agriculture Research Center (HARC), recounts the following details:

> Each employee received a house free of charge, complete with firewood, fuel, and water for domestic purposes. By the 1930s, garbage collection, street cleaning and sewage disposal were provided. . . OSC provided clubhouses, athletic fields, and playgrounds. . . The Company donated labor and materials to local schools. A hospital was built in 1920. . . By 1925, the population of the plantation ranged between 9,500-10,000 people. There were approximately 2,850 names on the payroll and it was estimated that at least ¾ of the residents of Waipahu earned a living in connection with the production of sugar. (Saito 1984:2)

In 1947, OSC acquired Honolulu Plantation, which was also referred to as Aiea Plantation or Halawa Plantation (Yamamoto et al. 2005:42). In 1961, AMFAC, Inc. (formerly American Factors, Ltd.), originally a Hawaiian land development company founded in 1849 under the name H. Hackfield & Company, Ltd., acquired OSC (Harvard Business School-Lehman Brothers Collection, Contemporary Business Archives 2017). Since its incorporation in 1918, AMFAC's acquisitions primarily comprised Hawaiian sugar plantations across the islands (ibid.). In 1970, shortly after AMFAC took over, OSC merged with Ewa Plantation when it was unable to renew its lease for the Campbell Estate lands (Yardley 1981). As a result of the merger, OSC became "the second largest sugar plantation in Hawaii and the third largest in the U.S." (Yamamoto et al. 2005:43). By 1982, OSC covered fifty-five square miles of land with 15,488 cultivated acreage (ibid.). In 1928, Greene summarized the then success of OSC and what he saw as the plantation's contributions to O'ahu and the Hawaiian Islands as a whole thusly:

> In the thirty-one years of its corporate existence it has transformed an arid cattle range into highly productive farming property. It has drilled artesian wells into the earth, and has pierced a mountain range with tunnels in order to develop an adequate and reliable supply of water for irrigation.
>
> It has not exploited natural resources, but has conserved and developed them. This is demonstrated by the fact that the crops yielded by the land today, after thirty-one years of continuous one-crop

> agriculture, are considerably larger than they were when cultivation was commenced on virgin soil. The sources of its water supply have not been depleted.
>
> It provides year-round employment at good wages to a large number of men.
>
> Through taxes paid to the territorial and Federal Governments, it bears its full share of the public expense. (1928:27)

In the early 20th century, in addition to the development of sugar plantations in Waipiʻo, the U.S. government purchased coastal lands surrounding Pearl Harbor to develop a naval base. The government appropriated the Waipiʻo Peninsula from the ʻĪʻī Estate and the military extended their land holdings *mauka* of the peninsula in the 1930s, including portions of Kīpapa Gulch (Perzinski et al. 2004). The OSC lands were undisturbed during World War II; however, the military utilized the existing rail system leading to the sugar fields to haul ammunition to and from Pearl Harbor (Hammatt et al. 2004).

According to Yardley, "no other deal which B. F. Dillingham ever put together did so much to enhance his prosperity and prestige and that of the railroad as did the formation of the Oahu Sugar Company" (1981:191). The early success of OSC was directly tied to that of the O. R. and L. in a mutually beneficial relationship. However, the price of sugar plummeted in the early 1900s, which affected commercial sugar production across the Hawaiian Islands. In early 1904, in order to rescue the industry from collapse Dillingham and his son Walter organized the Sugar Factors Company (predecessor of the California and Hawaiian Sugar Refining Company [C&H]), a cooperative jointly owned by the plantations, which shipped raw sugar to a refinery in Crockett, California. Yardley suggests, "it is doubtful that the industry could have survived for the next seventy years without this established outlet for its product" (ibid.:257). OSC continued to produce high yields well into the 1980s and the Waipahu sugar mill was in operation until April 8, 1995. Dillingham's arrangement with C&H did guarantee the future of the Hawaiian sugar industry up very recently; for the last shipment of raw sugar (from the last remaining sugar plantation on Maui) to set sail from the Hawaiian Islands bound for the Crockett refinery was delivered on January 17, 2017, a full 111 years after the refinery opened its doors (*East Bay Times*: January, 19 2017).

The HSPA Experiment Substation at Waipio (1911-1962)

As previously mentioned, the majority of the current project area coincides with the northeastern portion of the former HSPA Experiment Substation at Waipio. The HSPA had their original Experiment Station in Makiki, to the east of the study area near Waikīkī. However, in 1910, the HSPA Experiment Station Committee spoke of their need to secure the following as soon as possible:

> . . . a larger Experiment Station Field located on land in the vicinity of one of the plantations near Honolulu, so as not to be far removed from the Experient Station, and near a convenient shipping center, where the propagation and distribution in considerable quantities of new varieties of cane can be carried out to better advantage than is possible in the small space now available at the [Makiki] Station for this purpose. (Wodehouse 1911)

In 1911 HSPA established the Waipio Substation by subleasing 145 acres of Iʻī Estate lands leased to OSC (Lease #35), namely OSC Field 6 (Figure 26).

Beginning on November 30, 1911 the lease agreement was entered into by the Treasurer and Trustee for the HSPA, William O. Smith,"for the use and benefit of said Association and its Experiment Station" (Lease Agreement dated November 30, 1911:7). Initially only about 70 acres in the southern half of the 132-acre ʻIʻī Estate Lease # 35 (OSC Field 6), referred to as Lease 1-A was planted for experimental purposes (Figure 27). The remaining 13 acres (Field 7) were located along the northern edge of the OSC railroad line, referred to as Lease 1-B, which coincides with the northeastern portion of the project area (see Figure 27). The remaining 75 acres of Lease 1-A (Field 6) were planted in 1914 (Grammer 1947); the reason for initially taking over only half of the area was "to obtain proper rotation in the starting of new experiments each year without having to fallow, in the start, a large portion of the field, while paying a high rent for the same: (Eckart 1911a:3).

HSPA reported the following information regarding their planting methodology at the Waipio Substation:

> To have arranged these experiments under the Hawaiian system of irrigation as ordinarily practiced, we would have met with a field of curved rows conforming in general to curved and unparallel [*sic*] level ditches and interspersed with small rows. . . It is fortunate therefore that after due consideration it was found possible on a large portion of the available area to utilize straight and parallel level ditches, rows, and water courses, without in any way altering the principle of the general practice of irrigation. (1913:31)

Figure 26. Sketch map of proposed Waipio Substation (Eckart 1911a:2).

HSPA continues their discussion of the experiment substation methodology as follows: Agriculturists Agee and Naquin measured off the planting rows "en bloc—that is, in making five-foot rows, ten equidistant rows were placed within a 50-foot strip" (1913:31). Their next step was to adopt an equal length for the rows between water courses, which resulted in 51 rows between level ditches, with one row *mauka* of each level ditch "left unplanted as a pathway, so there remain 48 rows for experimental plants plus a guard row at each end" (ibid.:32). Experimentation focused on irrigation—watering intervals, fertilization—timing of fertilizer application and using molasses as fertilizer, timing of planting for different varieties, and variety tests—in which the viability of different varieties of cane were compared, etc. (ibid.).

Prior to planting the experimental plots within OSC Field 6, HSPA staff planted seed cane in a 4-acre portion of OSC Field 9, located to the southwest of the project area and *makai* of the Government Road (Lease 3 in Figure 27), which they acquired via a two-year lease (from 1911-1913) solely to yield two crops of seed cane (Eckart 1911a:8). Another important aspect of the preliminary work at the Waipio Substation was the development of a separate four-acre parcel located to the east of Lease 1-A, also belonging to the ʻĪʻī Estate, for the construction of support buildings and infrastructure for the substation (Lease 2 in Figure 27). In a report dated April 15, 1911, C.F. Eckart (Director of the HSPA Experiment Station) mentioned that the strip of land had been selected as the site for the substation buildings because it was more cost effective than the high rates charged by OSC for the acreage within Field 6 (Eckart 1911a:6). This parcel of land comprised a portion of the Ranch House Lot (or Ranch Yard) of the ʻĪʻī Estate (see Figure 26), located immediately *makai* of OSC Field 6, which coincides with the mostly undeveloped southeastern portion of the project area where SIHP Site 50-80-09-08778 is situated (see Figure 22); behind the Waipahu High School campus buildings.

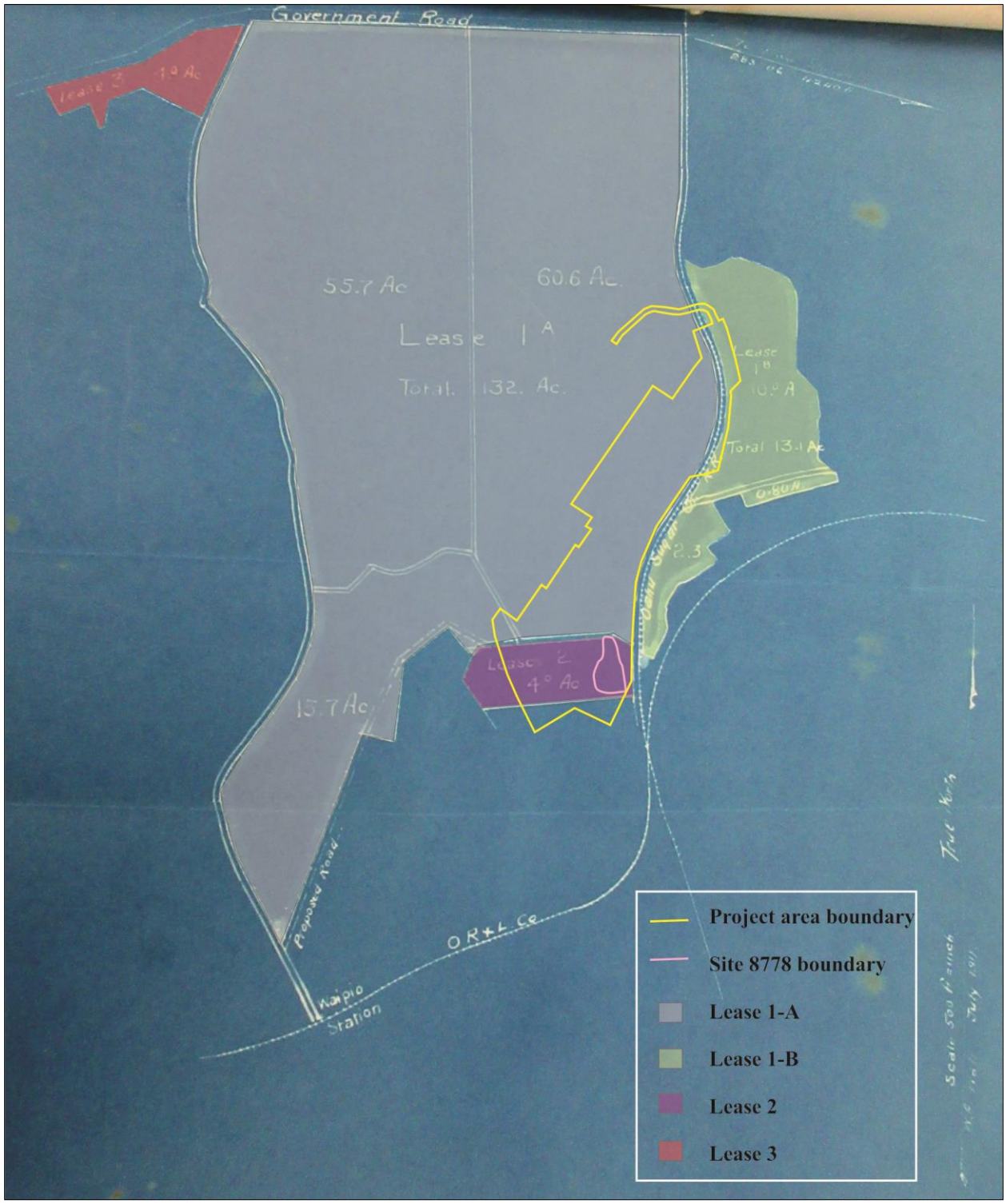

Figure 27. 1911 survey map of original lease boundaries showing approximate location of current project area and Site 8778 within the former substation building site (Lease 2).

Apparently, the title to both Field 6 and the Ranch Yard were under litigation at that time, which resulted in the following stipulation on behalf of the‘Ī‘ī Estate:

> ... they will not give a right of way to the R. R. Station at Waipio through the ranch premises, and this will necessitate the construction of a road along the makai border of the shaded portion of Field 6 shown in the sketch [see Figure 26], this road to connect with the plantation road connecting with the Government road and Wapio Station. (Eckart 1911a:7)

By the middle of 1912, the substation appears to have been host to a fair amount of laborers, for a letter from the ‘Ī‘ī Estate on behalf of the Chinese caretaker at the nearby Ranch House complained of "the laborers at your Station, there, going through our lot on their way to the Waipio railroad station" and "that they are constantly taking cocoanuts which have fallen from the trees and even take them off the trees" (Letter from C. Holloway to C. Eckart; June 19, 1912). According to the letter, the ‘Ī‘ī Estate and HSPA had a prior understanding that the substation workers would use the road *makai* of the experiment station fields rather than the ranch house as a right of way (ibid.). Based on Sustenance Accounts for the Waipio Clubhouse between February and June of 1917, up to 384 meals were served per month. A review of historical documents associated with the Waipio experimental substation revealed that there were at least four mules, one horse, and a dairy cow on the property during the early years of operation.

In his April 15, 1911 report, Eckart also addressed the water supply for the substation buildings, which would come from the Waipahu Mill and have to travel a mile though the rice fields of Waipi‘o and would "require the installation of a small pump at the mill, and construction of a 10,000 gallon storage tank on the building premises" (1911a:7). In addition to the water tank, buildings at the experiment substation included the following: a superintendent's house, an overseer's house, laborers' quarters, a stable, a warehouse, a mill and weighing shed, and a small laboratory (ibid.); as well as an office, garage, cook's house, and work shop (HSPA Substation semi-monthly report; April 18, 1912). Undated historical photographs found in an HSPA album housed at HARC captioned "Waipio susbstation, analysis" show what appears to be the laboratory (Figure 28) and equipment (Figure 29); building exteriors at the Substation (Figures 30 and 31); and laborers planting flats in the field (Figure 32).

According to a letter dated September 22, 1911 the ‘Ī‘ī Estate granted the right-of-way for the proposed pipeline to get water from the Waipahu Mill to the substation buildings at no cost to the HSPA, "in view of the benefit which should be derived from the installation of the Experiment Station, at Waipio" (Letter from C.S. Holloway to Experiment Station; September 22, 1911). Construction work on the pipeline commenced in December of 1911 (Letter from E.K. Bull to C.F. Eckart; December 21, 1911). The pipeline passed through ‘Ī‘ī Estate lands including portions of the OSC mill yard and the following *kuleana* parcels: LCAw. 7260 B:2, LCAw. 1613, LCAw. 1614:1, LCAw. 10613:2, and LCAw. 8241 M:2. In addition to the installation of the water pipeline between the Waipahu Mill and the substation camp, new roads were developed within Field 6 (Letter from W.A. Wall to C.F. Eckart; December 30, 1911); another road between the buildings and the public road was graded during the week ending March 30, 1912 (HSPA Substation semi-monthly report; April 1, 1912); and a reservoir, located near the Government Road in the central portion of Field 6, was installed and in use by April 10, 1912 (HSPA semi-monthly report; April 18, 1912).

Near the end of 1923, HSPA expanded the experiment substation land to include 8.32 acres from the ‘Ī‘ī Estate, located adjacent to the road between the Government Road and Waipio Station (Letter from G. Brown to HSPA; December 8, 1923). The accompanying survey map is reproduced as Figure 33 below, and the lease began officially on April 1, 1924.

Roughly a decade later, HSPA considered reducing the size of the Waipio Substation. A 1932 map of Waipio Substation (Figure 34) shows how HSPA divided the experiment substation into two halves: the western or Waipahu side (shaded red) and the eastern or Honolulu side (shaded green). The accompanying letter dated June 15, 1933 from HSPA to the manager of OSC refers to changes at the substation and a mix-up regarding previously proposed arrangements for HSPA to retain only one half of the property. It appears that OSC mistakenly thought HSPA would retain the Waipahu side; when in fact, HSPA meant to retain the Honolulu side and had already conducted their variety planting on the sixty acres therein (Letter from H. Agee to E. Greene; June 15, 1933:1). HSPA explained their preference for the Honolulu side thusly:

> There are a number of reasons why the Waipahu side is less desirable for our purposes and if we can not [*sic*] have the Honolulu side we would be inclined to negotiate with you for another area, but before coming to that it seems appropriate to ask for your reconsideration and decision on the piece of land that we thought we were to have. (ibid.)

Figure 28. Undated photograph of analysis at Waipio Substation.

Figure 29. Undated photograph of analysis at Waipio Substation.

Figure 30. Entrance to Waipio Substation.

Figure 31. Buildings at Waipio Subtation.

Figure 32. Undated historical photo captioned "Taking planting flats to field" at Waipio Substation.

The correspondence regarding the reduction of the acreage of the Waipio Substation also included the following recommendations against the establishment of additional substations in leeward Maui and Kauaʻi:

> It is felt that regional stations under these conditions would, of necessity, duplicate the work being done at Waipio, in that the same varieties would have to be tried at all these stations. It is proposed that selections from Field Test No. 2 be made as heretofore, at Waipio, and that the best canes from these selections be shipped direct to the leeward plantations on Maui and Kauai. (ibid.:12a)

This document also contains a request to renew the rental for "the office and skilled quarters at Waipio" so they can be retained as long as possible "unless some more economical arrangement can be made with Oahu Sugar Company, for providing labor and labor quarters" (ibid.). A Memo to Dr. Mangelsdorf dated July 8, 1935 refers to a counter proposition from OSC's Greene in which HSPA retains the entirety of the acreage under a "70-30 cane sales contract," which was preferable to the terms of their prior contract with OSC (Memo from H. Agee to Dr. Mangelsdorf; July 8, 1935). HSPA Director Agee summed up the benefits of keeping the entire acreage as follows:

> It seems to me that an institution with a staff payroll amounting annually to nearly $250,000, places itself under an unnecessary handicap unless it provides its staff with some land where they can try out new and extreme ideas. It is in this way that we learn.
>
> There can be no doubt about the fact that the work at Waipio led the way to 12 ton sugar yields (that could be repeated consistently) in the Pearl Harbor districts and elsewhere, and thereby has meant millions of dollars to the industry. People are quick to forget about these things, and perhaps some of the younger men who have come into power do not know about this work -- so perhaps we should pass on an occasional reminder.
>
> Personally I am very strongly in favor of providing an expensive technical staff with some land to be used as that staff sees fit.
>
> Perhaps Waipio is not the very best of locations, but it has certain advantages, and the cost of operating 134 acres will be but little more than 60 acres. I would be in favor of accepting Mr. Greene's offer provided certain minor points can be settled satisfactorily. . . (ibid.)

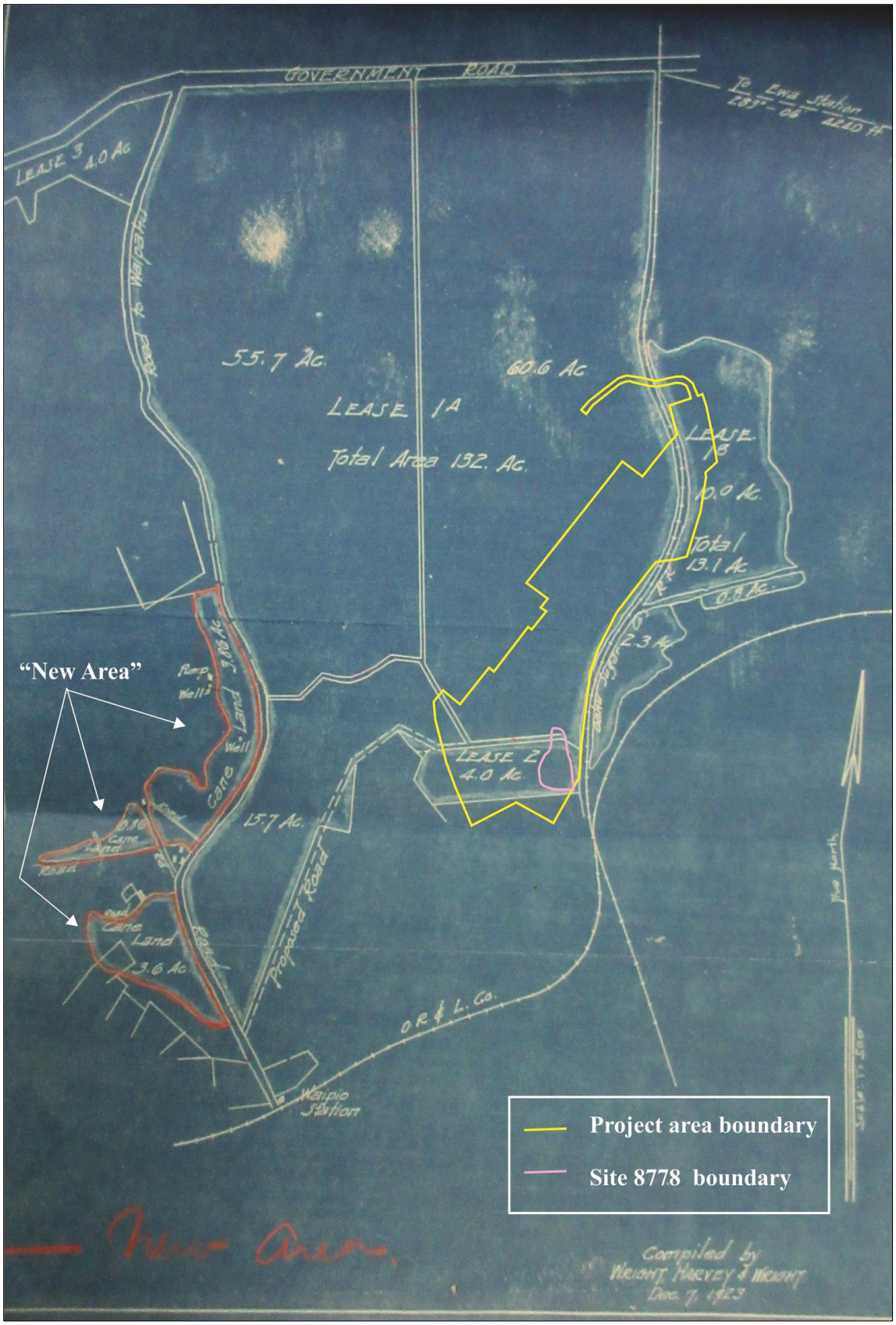

Figure 33. 1923 survey map of Waipio Substation expansion.

Figure 34. 1933 Waipio Substation map overlaid with project area and Site 8778 location.

Based on a review of historical aerial images from 1952, 1959, and 1962 (Figure 35), it appears that HSPA retained the entire acreage of the Waipio Substation as depicted in the 1933 map (see Figure 34). One can clearly see the experimental planting area within the boundaries of OSC Field 6; as well as the half-moon shaped reservoir on the *makai* side of the former Government Road in the center of the property and access roads throughout (see Figure 35). The alignment of the former Cane Haul Road clearly defines the eastern boundary of the Waipio Substation property and the project area. In addition, the substation buildings and some trees are evident to the south of the experimental fields of the substation, located within the 4-acre portion of the ʻĪʻī Estate Ranch Yard property in the 1952 and 1959 images; but in the December 1962 image there seem to be less buildings at the site. By 1968 (Figure 36), the substation buildings appear to have been replaced by different buildings and there is evidence of vegetation clearing and grading where the Waipahu Aloha Clubhouse is located today, just beyond (to the south of) the project area.

The individual experimental field boundaries appear clearly across the entirety of the acreage in the 1952 and 1959 images; however, these divisions appear less distinct within the Waipahu side (western half) in the 1962 aerial image, which suggests that HSPA may have let that half go fallow around that time. In contrast, the Honolulu side (eastern half) of the substation planting area shows active fields in the same image. The evidence of a reduction in operations in the 1962 aerial image makes sense, for it was during that year that the Waipio Substation was abandoned. The final issue of the HSPA's serial publication *Hawiian Planters' Record* (first published a century before, in July of 1909 [Grammer 1947]) includes the following information regarding the demise of the experimental substation location at Waipio:

> On October 18, 1962, the executive committee met to consider the problem of relocating the Oahu substation. They discussed the opinion of the association attorney that HSPA was subject to eviction from its present location, Waipio, because of termination of the basic lease by Oahu Sugar Company. They agreed to issue a proper document canceling and surrendering the sublease on the property. (HSPA 2009:28)

Thus, in December of 1962, the HSPA executive committee agreed to lease a piece of land from Campbell Estate on a 16-year lease as the new location of the Oahu Substation and by March of 1963, plans for the new substation were completed and funds appropriated (HSPA 2009:29). Residential development swiftly took over the former experimental station fields as can be seen in a 1968 aerial image (see Figure 36). In 1996, HSPA changed its name to Hawaii Agriculture Research Center (HARC) to reflect a shift in focus to diversified agriculture. Since 2008, their Experiment Station laboratories and administrative offices have been housed off Kunia Road in Waipahu.

Waipahu High School (1938-present) and Waipahu During Recent Years

Waipahu High School was founded in 1938 under the Sessions Laws of 1937 and Act 191 of 1938 at another location, which today is home to Waipahu Intermediate School (94-455 Farrington Highway). The original location of Waipahu High School was at the west end of the community of Waipahu in Waikele Ahupuaʻa. The school was the first high school in west Oʻahu and provided education to students from the greater ʻEwa area including the communities of Aiea, Waipahu, Nanakuli, Waianae, and Pearl City. As illustrated in the aerial photographs (see Figures 35 and 36), urbanization of Waipiʻo expanded significantly beginning in the early 1960s. The establishment of the nearby Mililani Town community in 1968 added still more development and an increase in the Waipahu area population. It was around this time that the initial Waipahu High School buildings were constructed within the project area (see Figure 36).

In 1969, Waipahu High School was moved to its current location, which includes the current study area, at the far east end of Waipahu (94-1211 Farrington Highway). The first graduating class at the new location was the class of 1970. By 1977, additions to the high school campus and further expansion of the surrounding residential development are visible, as are portions of the H-1 Interstate Highway, which was built ca. 1971 (see Figure 36). The 1993 aerial image shows still more additions to the Waipahu High facility including sports fields to the east of the study area (see Figure 31). In addition to the expansion of residential developments near the project area, mixed commercial development was also expanding, which included retail and tourist attractions such as the Waipahu Cultural Garden and Plantation Village (established in 1984), Waipahu Town Center (established in 1988), and the Waipahu Civic Center (established in 1996), among others.

Figure 35. Series of early USGS aerial images showing project area outlined in red.

Figure 36. Series of later USGS aerial images showing project area outlined in red.

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PREVIOUS STUDIES

The earliest archaeological study in the vicinity of the current project area appears to be that of Thomas G. Thrum, who created a list of the *heiau* of ancient Hawai‘i in the early 1900s. Thrum published his list of *heiau* in a series of entries in the *Hawaiian Almanac and Annual*, beginning with the 1907 edition. Of his investigations, Thrum noted the following:

> This much is being realized, and expressions of regret have been freely made, that we are at least fifty years too late in entering upon these investigations for a complete knowledge of the matter, for there are no natives now living that have more than hear-say information on the subject, not a little of which proves conflicting if not contradictory. . . While these difficulties may delay the result of our study of the subject, there is nevertheless much material of deep interest attending the search and listing of the temples of these islands that warrants a record thereof for reference and preservation. (1906:49-50)

Thrum and his associates compiled information on over seventy *heiau* on O‘ahu. One must take into consideration that Thrum included data on *heiau* that had already been destroyed prior to his data collection efforts in the early 1900s. The results of his investigations relative to the subject *ahupua‘a* are reproduced in Table 1 below.

Table 1. *Heiau* and *heiau* sites recorded by Thrum (1906) in the vicinity of the current project area.*

Name	*Location*	*Thrum's Remarks*
Keaiwa	Waikele, Ewa	Site not identified. Heiau pookanaka, where the chief Hao was surprised during temple worship and slain with his priest and attendant chiefs by direction of the Moi of Oahu, about 1650.
Keaiwa	Waimalu, Ewa	Built by Naulu-a-Maihea in 12th century. Class and size unknown. Foundations were noticeable in 1880; site now lost.
Ahuena	Waipi‘o, Ewa	Foundations still traceable. Hon. John Ii used to be the custodian of its idols.

*Adapted from Thrum (1906:46)

The earliest formal archaeological survey of O'ahu was conducted by J. Gilbert McAllister on behalf of the Bishop Museum during nine months in 1930. McAllister's purpose was "to collect information regarding the archaeology of Oahu" (McAllister 1933:3) and he made it clear that his investigation was a beginning rather than a complete account of all the cultural resources on O‘ahu. The results of McAllister's investigations relative to Waipi‘o Ahupua‘a are reproduced in Table 2 below. McAllister also made the following statement in his introduction regarding the state of cultural resources on O‘ahu at the time:

> As the archaeological remains are those of the people found in Hawaii by the early voyagers, contact with Hawaiians was an indispensable part of the work. Not only are the sites being destroyed by the changes wrought by European culture, but with the introduction of exotic vegetation many sites have been completely hidden. Such remains would be as good as lost, were it not for the knowledge of them still treasured by old residents (*kamaaina*) of Oahu. With the passing of these old people most of this information will disappear. (ibid.)

During the decades that followed McAllister's initial survey of O‘ahu, no archaeological studies of Waipi‘o Ahupua‘a were produced. However, beginning in the late 1970s, lands within Waipi‘o Ahupua‘a and the vicinity became the subject of multiple archaeological investigations related to the ongoing residential development of the area.

Since the 1980s, various archaeological investigations have been conducted in Waipi‘o Ahupua‘a. However, the majority of these study parcels are located well *mauka* of the subject parcel (Cleghorn et al. 1992; Stride and Hammatt 1992, among others). Many of these studies reported extensive agriculture related modification to the landscape. In particular, commercial pineapple cultivation, which resulted in the absence of observable cultural resources not associated with Historic sugar cultivation (Barrera 1985; Rosendahl 1987; Hammatt et al. 1996 and 2004). The storied Waikakalaua Gulch, which extends into neighboring Waikele Ahupua‘a, has been the focus of multiple studies (Hommon and Ahlo 1983; Sinoto 1990; Moore and Kennedy 1994). As well as Kīpapa Gulch and the Kīpapa Military Reservation, located to the north of the current project area and east of Mililani Town (Rosendahl 1987; Hammatt and Borthwick 1988).

Table 2. Sites recorded by McAllister (1933) in the vicinity of the project area.*

Site #	*Site Name*	*Location*	*McAllister's Remarks*
122	Ahuena Heiau	Halaulani, Waipio, just seaward of the Experiment Station of the Hawaiian Sugar Planters' Association	Only a small portion of paving of very small waterworn stones at the edge of the 25-foot elevation remains of what must have been an important heiau, the site is known and remembered by all the old Hawaiians in the district. There is a vague memory that this heiau was formerly located in the mountains in Honouliuli at Punahawele.
123	Loko Eo fishpond	At the north end of Waipio Peninsula	The pond covers 137 acres. It is surrounded on three sides by land with a wall approximately 2040 feet in extent on the fourth side. The wall was about 6 feet wide of coral stone and about 4 feet high, with six *makaha*. The wall has been greatly widened now, forming a railroad track bed for the plantation train.
124		Lepau	The populous dwelling place of the alii was formerly located on an east point of Waipio Peninsula known as Lepau.
125	Hanaloa fishpond	The center of Waipio Peninsula	The pond covers 195 acres. All but 900 feet of this area is inclosed [*sic*] by land. The wall averages 5 feet in width and about 4 feet in height, with six *makaha*. It is perfectly straight, connecting two projecting points of land, and built of coral slabs.
126	Kaaukuu and Pouhala ponds	Waikele	(The ponds formerly adjoined) According to Cobb [1901,1902], Kaakuu was 41 acres in extent and Pouhala was 22 acres. The ponds have now been made into a number of smaller ponds and rice fields.
127	Mokoula Heiau	Southwest of the main road in the village of Waipahu	The heiau has been completely destroyed for building purposes of the neighborhood. The site is at the edge of a 50-foot elevation which projects out into the present rice fields and was pointed out by Kaluawai, a *kamaaina* undoubtedly more than 100 years old.
128	Waipahu spring		Famous in tradition as the place at which the tapa mallet appeared after having been lost in Kahuku. A pump has been placed over the site
129	Hapupu heiau	Waipahu	The Waipahu plantation stables on the mountain side of the road across from the schoolhouse west of the town now occupy the site of the former heiau at Waikele. Nothing remains of the heiau. According to Thrum [79,4], it was a "heiau pookanaka, where the chief Hao was surprised during temple worship and slain with his priest and attendant chiefs by direction of the moi of Oahu, about 1650." The site was pointed out by Kapano.
130	Moaula heiau	Kipapa Gulch	The Honolulu side of Kipapa Gulch just above Heiau o Umi, to which it is said to be a companion structure. The site is now covered with cane.
131	Heiau o Umi	Kipapa Gulch	Was just northeast of the government road in the bottom of Kipapa Gulch, on the slight elevation at the foot of the pali on the Honolulu side. The level elevation can still be seen, though planted in cane.
132	Waikakalaua and Kipapa Gulches		Waikakalaua is the place where the invading chiefs from Hawaii met Mailikukahi, moi of Oahu, in battle.

*Adapted from McAllister (1933:106-107)

In addition, a couple of studies have been conducted to the west of the current project area. In 1989, International Archaeological Research Institute, Inc. conducted a reconnaissance survey and archaeological monitoring (Nagaoka and Davis 1989) for the construction of Pupuʻole Park in Waipahu, located near the Waipahu intermediate school. No sites were recoded as a result of their study. Also, in 1998, Pacific Legacy conducted a 200-acre Archaeological Inventory Survey or AIS (Goodman and Cleghorn 1998) for the then-proposed Waipio Sports Complex (currently Waipio Peninsula Soccer Park), located on various parcels within Waipiʻo and Waikele *ahupuaʻa* to the southwest of the current project area, south of Makalena Golf Course. As a result of their study, a section of the O. R. and L. railroad right-of-way (SIHP Site 50-80-12-9714), and two previously unrecorded sites were encountered. The SIHP Site designation 50-80-09-123 was assigned to a stone wall remnant, although it was described as follows: "This wall appears to be a recent wall, that is less than 50 years old" (ibid.:20) and assessed as not significant (ibid.:34). SIHP Site 50-80-13-5597, a sugar irrigation complex comprising two features associated with Oahu Sugar Company: a pumping station built in 1937 with associated lined ditches (Feature 1) and another pumping station built in 1919 and associated pipes and ditches (Feature 2). This site was assessed as significant under criteria a and d (ibid.:35). Subsurface testing consisting of five trenches revealed only culturally sterile soils.

The results of previous archaeological studies conducted within closer proximity to the current project area than the aforementioned investigations are discussed in detail below, and their locations relative to the current project area are presented in Figure 37.

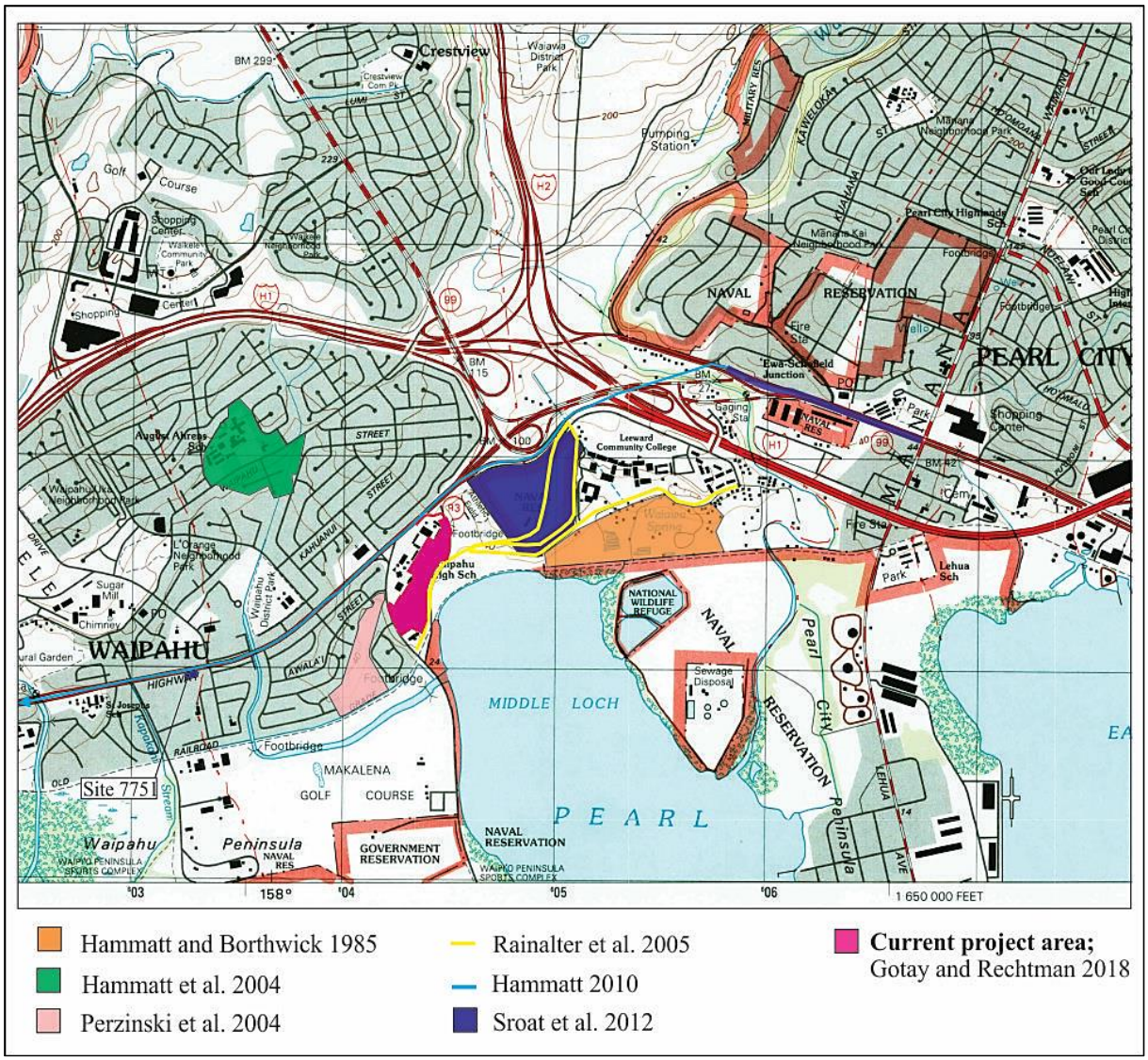

Figure 37. Locations of prior studies within the current project area vicinity.

In 1985, Cultural Surveys Hawai‘i, Inc. (CSH) conducted an archaeological reconnaissance survey (Hammatt and Borthwick 1985) of a 37-acre parcel in Waiawa Ahupua‘a, located to the east of the current project area along the northeast coast of the Middle Loch of Pearl Harbor (see Figure 37). As a result of their investigation, no cultural resources were encountered, and severe modern modification was recorded throughout their study area.

In 2003, CSH conducted an archaeological and cultural assessment (Hammatt et al. 2004) of roughly 38 acres in Waipahu Town for a then proposed drainage improvement project, located to the northwest of the current project area (see Figure 37). Their entire project area had undergone extensive modification and urbanization, which resulted in a complete absence of surface archaeological resources and traditional practices.

In 2004, CSH conducted an AIS (Perzinski et al. 2004) of roughly 13 acres (the Queen Emma Foundation Parcel), located adjacent to the west-southwest of the current project area (see Figure 37). As a result of pedestrian survey and subsurface testing (thirty-three backhoe trenches), three sites were recorded (SIHP Sites 50-80-09-6671 thru 6673). Site 6671 consists of the remains of the former ‘Ī‘ī-Brown Estate; no further work was the recommended treatment for this Historic site. Site 6672, comprises three buried cultural layers interpreted as a Precontact habitation site and was recommended for Data Recovery. Site 6673, a cultural layer with two associated primary burials, is situated within two LCAw. 8241LN:4 and LCAw. 1685:2 (Perzinski et al. 2004:68). Based on radiocarbon dates from samples within the burial pits and analysis of associated artifacts, the authors suggest that occupation and/or utilization of the site could have begun as early as A.D. 1300, with occupation/use extending into the Historic Period well after the *Māhele*. It was recommended that a Burial Treatment Plan (BTP) be prepared and submitted to SHPD for Site 6673. CSH prepared a BTP (Hammatt and Shideler 2004) as well as a Data Recovery Plan (Perzinski and Hammatt 2004) later that same year. As a result, CSH conducted Data Recovery at Site 6672 and Burial Recovery at Site 6673 in February and March 2005, respectively (Perzinski et al. 2006). The remains were slated to be reburied at an undisclosed location further inland on lands also owned by the Queen Emma Foundation.

In 2004, CSH conducted an AIS (Rainalter et al. 2005) of four proposed alignments of an access road for the Leeward Community College, located immediately to the south of the current project area, extending southeastward from Waipio Point Access Road (see Figure 37). Pedestrian survey of the 5.8-acre project area revealed two archaeological sites: a previously recorded burial site (SIHP Site 50-80-09-5302) and the ‘Ewa Junction Navy Fuel Drum Site (SIHP Site 50-80-09-6764). Site 5302, was an inadvertent discovery revealed during a sewer line excavation located to the south of the Leeward College tennis courts recorded by Chaffee and Anderson (1995). Rainalter et al. (2005) report that the discovery consisted of a secondary pit burial containing five individuals and a separate coffin burial. Site 5302 was assessed as significant under Criteria d and e, and avoidance was the recommended treatment for the site. Site 6764, the ‘Ewa Junction Navy Fuel Drum Site, is located within naval reservation property, and was built in 1943 as part of the Pearl Harbor Naval Complex to store fuel for automobiles and aircraft in two separate underground storage tanks. Site 6764 was assessed as significant under Criterion d and Historic America Building Survey/Historic American Engineering record-type documentation and evaluation was the recommended mitigation measure, if necessary.

In 2010, CSH conducted an AIS (Hammatt 2010) for Phase I of the then proposed Honolulu High-Capacity Transit Corridor Project (HHCTCP), which crossed various parcels throughout portions of Honouliuli, Hō‘ae‘ae, Waikele, Waipi‘o, Waiawa, and Manana *ahupua‘a* (see Figure 37). Pedestrian survey of the roughly 7.4 -mile long alignment, limited Ground Penetrating Radar survey, and over ninety subsurface test excavations, resulted in the identification of a single intact cultural deposit (SIHP Site 7751). Site 7751, a subsurface deposit of *lo‘i* sediments, was interpreted as a Precontact agricultural feature; as a result, CSH prepared a Data Recovery Plan for Site 7751 (O’Hare et al. 2011), which was discovered at the proposed location for the Waipahu Transit Station, roughly 1.2 kilometers southwest of the current project area.

In 2011, CSH conducted an AIS (Sroat et al. 2012) for Phase II of the then proposed HHCTCP, which entailed the construction of the various transit stations and structures adjacent to the corridor (see Figure 37). As a result of combined pedestrian survey and subsurface testing a single site, SIHP Site 7150, a deposit of agricultural sediment, was encountered in Waiau Ahupua‘a, well to the east of the current project area.

In support of the current project, ASM conducted an archaeological inventory survey of the proposed development area (Gotay and Rechtman 2018). A single Historic Period Site (Site 50-80-09-08778) comprising four features (Features A-D) was recorded within the study area. Site 8778 is considered significant under Criterion d for the information it has yielded relative to the early to middle twentieth century activities associated with the former HSPA Waipio Experiment Substation. No further work was the recommended treatment.

3. CONSULTATION

As stated in the OEQC Guidelines for Assessing Cultural Impacts, the goal of the oral interview process is to identify potential cultural resources, practices, and beliefs associated with the affected project area. It is the present authors' further contention that the oral interviews should also be used to augment the process of assessing the significance of any traditional cultural properties that may be identified within the project area. It is the researcher's responsibility, therefore, to use the gathered information to identify and describe potential cultural impacts and propose appropriate mitigation as necessary. Interviewees were selected based on their personal connection to the land within the current project area. In addition to gathering their memories related to the project area, a primary focus of the interviews was to elicit each informant's reaction to the proposed project.

In a letter response to a request for comments related to the proposed project dated May 12, 2017, M. Kaleo Manuel of the Department of Hawaiian Home Lands (DHHL) informed PBR Hawaii & Associates, Inc. that DHHL "do not anticipate any impacts to our lands or beneficiaries from the project." This determination was based on the project area's "lack of proximity to Hawaiian Home Lands." However, Manuel did encourage consultation with community organizations and Native Hawaiian Organizations (NHO) to assess potential impacts.

To that end, the authors contacted Shad Kane of the NHO Kalaeloa Heritage and Legacy Foundation, and *moku* representative for ʻEwa District for the Aha Moku Council of Oʻahu, who himself did not have any information regarding cultural places or practices specific to the project area. Mr. Kane referred the author to Tony Chance, the caretaker and facilitator of several cultural landscapes in Waipahu and the ʻEwa area, including Pouhala and Kapapaphui. Mr. Chance is the founder and Executive Director of Hui O Hoʻohonua (HOH808), a non-profit, community-development networking organization based in ʻEwa District. Although very knowledgeable about the region, Mr. Chance did not have any personal knowledge of traditional cultural places or practices within the project area. Mr. Chance did provide connections to other Waipahu community members. One such individual, Ron Shaedel a Waipahu High School alum and *kahu* for the Waipahu area, presented the author's request for information regarding cultural practices to still more Waipahu community members; no one came forward with any such knowledge. A request for information was also emailed to the Waipahu Community Association, but there was no response.

Through email correspondence with Robert G. Castro of Hawaii Plantation Village museum the land use history as presented above was corroborated, but he was unable to provide any knowledge of traditional cultural places or practices past or present within the current project area.

In August, 2017 one of the authors conducted a phone consultation with Meryl Matsumura, acting Vice Principal of Waipahu High School, to find out if any traditional cultural practices were being carried out currently by the students in an academic or extracurricular setting. The conversation revealed that there are no current efforts to preserve the particular history and culture of the Waipahu High School property. Rather, some of the students are engaged in accumulating general knowledge that they can take with them and apply to other aspects of their lives. For instance, students who partake in the Natural Resources Academy are currently growing seedlings of native Hawaiian plant species, which they transfer from the on-campus greenhouse for replanting in the *mauka* forests. In addition, *hula* classes and Hawaiian language classes are offered. According to Ms. Matsumura, such experience-based education, with an emphasis on community and sustainability, is geared towards career-oriented preparation, with little focus on the immediate school environment. When asked specifically about whether any outside individuals and/or organizations have requested access to the school property for cultural practices, she replied in the negative.

4. DISCUSSION OF POTENTIAL CULTURAL IMPACTS

The OEQC guidelines identify several possible types of cultural practices and beliefs that are subject to assessment. These include subsistence, commercial, residential, agricultural, access-related, and recreational, as well as religious and spiritual customs. The guidelines also identify the types of potential cultural resources, associated with cultural practices and beliefs that are subject to assessment. Essentially these are natural features of the landscape and historic sites, including traditional cultural properties. A working definition of traditional cultural property is:

> any historic property associated with the traditional practices and beliefs of an ethnic community or members of that community for more than fifty years. These traditions shall be founded in an ethnic community's history and contribute to maintaining the ethnic community's cultural identity. Traditional associations are those demonstrating a continuity of practice or belief until present or those documented in historical source materials, or both.

The origin of the concept of traditional cultural property is found in National Register Bulletin 38 published by the U.S. Department of Interior-National Park Service. "Traditional" as it is used, implies a time depth of at least 50 years, and a generalized mode of transmission of information from one generation to the next, either orally or by act. "Cultural" refers to the beliefs, practices, lifeways, and social institutions of a given community. The use of the term "Property" defines this category of resource as an identifiable place. Traditional cultural properties are not intangible, they must have some kind of boundary; and are subject to the same kind of evaluation as any other historic resource, with one very important exception. By definition, the significance of traditional cultural properties should be determined by the community that values them. However, an inherent contradiction lies within the definition of "Property" because it is precisely the concept of boundaries that runs counter to the traditional Hawaiian belief system, which results in difficulties in the process of identification and evaluation of Hawaiian traditional cultural properties. The sacredness of a particular landscape feature is often cosmologically tied to the rest of the landscape as well as to other features on it. To limit a property to a specifically defined area may separate it from what makes it significant. However offensive the concept of boundaries may be, it is nonetheless the regulatory benchmark for defining and assessing traditional cultural properties. As the OEQC guidelines do not contain criteria for assessing the significance for traditional cultural properties, this study will adopt the state criteria for evaluating the significance of historic properties, of which traditional cultural properties are a subset. To be significant the potential historic property or traditional cultural property must possess integrity of location, design, setting, materials, workmanship, feeling, and association and meet one or more of the following criteria:

> a Be associated with events that have made an important contribution to the broad patterns of our history;
>
> b Be associated with the lives of persons important in our past;
>
> c Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;
>
> d Have yielded, or is likely to yield, information important for research on prehistory or history;
>
> e 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.

While it is the practice of the DLNR-SHPD to consider most historic properties significant under Criterion d at a minimum, it is clear that traditional cultural properties by definition would also be significant under Criterion e. A further analytical framework for addressing the preservation and protection of customary and traditional native practices specific to Hawaiian communities resulted from the *Ka Pa'akai O Ka 'Āina* v Land Use Commission court case. The court decision established a three-part process relative to evaluating such potential impacts: first, to identify whether any valued cultural, historical, or natural resources are present; and identify the extent to which any traditional and customary native Hawaiian rights are exercised; second, to identify the extent to which those resources and rights will be affected or impaired; and third, specify any mitigative actions to be taken to reasonably protect native Hawaiian rights if they are found to exist.

A single Historic Period archaeological site (SIHP Site 8778) that comprises remnants of the HSPA Waipio Experiment Substation was identified during a recent AIS (Gotay and Rechtman 2018) of the project area. This site was determined significant under Criterion d with a treatment of no further work. As a result of the archival research and the oral-historical interviews, there were no traditionally valued cultural, historical, or natural resources documented to exist within the current project area; nor were any traditional and customary practices associated with the study area identified. None of the interviewees expressed any cultural concerns relative to the proposed improvements project. Thus, it is our conclusion that development activities associated with the proposed Waipahu High School campus improvements project will not result in any cultural impacts.

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APPENDIX D
Mobility Assessment Report

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Mobility Assessment Report for Proposed Improvements to Waipahu High School Waipahu, HI

Prepared for:
PBR Hawaii & Associates

May 17, 2019

SD18-0279

FEHR PEERS

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1.0 EXECUTIVE SUMMARY

This report presents the results of the mobility assessment report (MAR) for the proposed construction of additional educational facilities at Waipahu High School (WHS) located on the south side of the island of Oahu. The proposed educational facilities include a new building that is intended to fill existing classroom deficiencies.

WHS currently faces a shortage of classroom space. The 2018 student population was approximately 2,680 students supported by 160 teachers and staff. In recent years, WHS has set up portable classrooms to accommodate the existing enrollment. The intent of the proposed new classroom building project is to alleviate overcrowding of existing facilities and allow for the future removal of substandard portable buildings. The proposed new classroom building project is not expected to increase the use of the campus or increase the number of trips currently being generated by the existing site. However, a traffic operational analysis was completed for the potential increase in student enrollment and associated future trips in response to concerns from City and County of Honolulu Department of Transportation Services (DTS) staff.

The existing operations of two intersections were evaluated during the weekday morning (AM) and afternoon (PM) peak hours in August 2017 while school was in session. The results of the existing conditions assessment revealed the intersection of Waipio Point Access Road /Farrington Highway currently operates at LOS D in the AM peak hour and LOS C in the PM peak hour. Waipio Point Access Road/Awalai Street is a two-way stop-controlled intersection that operates at LOS F during the AM and PM peak hours. Heavy congestion and queueing occurs for approximately 15 to 20 minutes during the morning and afternoon peak periods.

With the addition of forecasted project-generated trips from the new classroom building, the Existing Plus Project analysis showed no change in operating level of service compared to existing conditions. The LOS F conditions and delay currently experienced at Waipio Point Access Road/Awalai Street during drop-off and pick-up is anticipated to remain the same or slightly worsen if the project results in new trips. However, the impacts are considered temporary and occur for approximately 20 minutes during each weekday peak period.

While not required as mitigation, the following options are recommended to improve the flow of traffic and pedestrian access along the school's frontage:

- Install ADA-compliant paved landing areas on each side of existing crosswalks
- Install vertical treatments (ex. bollards) to enhance the visibility of pedestrians at crosswalks

- Analyze feasibility of replacing the existing raised median with a northbound left-turn lane from Waipio Point Access Road to Ewa-bound Farrington Highway
- Install an asphalt berm and formal path along the north side of Waipio Point Access Road to prevent vehicles parking in the shoulder where students walk

In addition to the proposed new classroom building, and dependent upon future funding, the Department of Education (DOE) is also seeking to construct two new makai parking areas with approximately 214 parking spaces to address the existing shortage of onsite parking. Existing on-site parking includes approximately 285 spaces reserved for staff and visitors; no on-site student parking is provided. During field observations it was observed that students driving to school park along the unpaved grassy shoulder along the northbound side of Waipio Point Access Road where students then walk towards the campus. No paved sidewalks or paths are provided along WHS frontage.

If funding is provided in the future for the new makai parking areas, the new parking will help alleviate:

- Poor circulation and long traffic queues combined with heavy pedestrian traffic during drop-off (AM) and pick-up (PM) periods
- Insufficient on-site parking causing students to park along the unpaved shoulder of Waipio Point Access Road

If funded, the new makai parking area and access road into campus will provide additional opportunities to improve the flow of traffic and multimodal access on campus. As such, the following considerations are recommended:

- Install a drop-off/pick-up zone in the new parking lot with loading and bypass lane (minimum length to fit 8 vehicles)
- Install ADA-compliant sidewalks or formal pathways connecting the parking areas to campus

2.0 INTRODUCTION

This mobility assessment report (MAR) presents the results of a traffic and multi-modal circulation study conducted by Fehr & Peers in support of the Environmental Assessment for the proposed Waipahu High School (WHS) New Classroom Building project. This MAR was conducted in accordance with the guidelines and standards of the affected government agencies and addresses the potential impact of the project on all modes of travel.

WHS is located on the south side of Oahu along Farrington Highway, ewa of Leeward Community College (LCC) and adjacent to several residential neighborhoods. WHS serves approximately 2,680 students and 160 faculty and staff members based on 2018 enrollment data. Staff has indicated that the school enrollment exceeds the facility's capacity, including a shortage of classroom space and parking.

The proposed project includes construction of a new Natural Sciences classroom building that will be provide up to 42,300 square feet of net new classroom space. It is possible that a future iteration of the design may yield a lower net square footage, in which case this report may serve as a conservative maximum. The new classroom building is proposed to be constructed where the existing basketball courts are located. In recent years, WHS has set up portable classrooms to accommodate the existing overage in enrollment. The intent of the new classroom building is to alleviate overcrowding of existing facilities, allow for the future removal of substandard portable buildings, and provide modern facilities and laboratory space to enhance learning for the student body.

In addition, DOE proposes to construct new makai parking area and access driveway to address the on-site shortage of parking if funding becomes available in the future. Therefore, the addition of the new parking area and access driveway were also analyzed as a part of this MAR. The Existing Plus Project Plus New Makai Parking Area scenario includes the construction of the new classroom building and new makai parking lots that will include approximately 214 spaces. This potential scenario is discussed and analyzed in **Chapter 8**.

The purpose of this MAR is to evaluate existing operations within and around campus, review planned improvements, and recommend supplemental infrastructure modifications to enhance the safety of students and minimize impacts to traffic flows and parking. The proposed new classroom building project and, if funded and constructed, the future makai parking area are not intended to increase current enrollment levels at the school. However, in response to City and County of Honolulu's DTS staff request to address the potential of new trips, this MAR assesses existing and potential future trips generated by the proposed improvements.

2.1 PROJECT DESCRIPTION AND LOCATION

The proposed new classroom building project will provide 24 classrooms to help alleviate the existing shortage of classrooms and provide necessary facilities to support the needs of the current student body and the evolving Natural Sciences, Culinary, and Hospitality programs. The new facilities will provide specialized spaces including science classrooms, culinary kitchens, computer and design thinking rooms, and a flexible indoor/outdoor dining area. A new fire access road from the existing campus parking to the New Classroom Building will also be added.

Proposed new construction includes a new approximately 42,300 square foot building located at existing basketball courts to fill existing classroom deficiencies. It is possible that a future iteration of the design may yield less classroom space, in which case the analysis within this report may serve as a conservative maximum.

WHS is located at 94-1211 Farrington Highway in the Waipahu area on the island of Oahu. Surrounding land uses include residential neighborhoods to the north and west, Pearl Harbor open space and wetlands to the south, and a HART Rail Operations Center to the east, immediately adjacent to LCC. The location of the project site and surrounding study area is shown on **Figure 1**. The site plan showing the proposed new classroom building location along with future makai parking area is illustrated on **Figure 2**.

2.2 STUDY SCENARIOS

The study analyzed the potential for project-related traffic impacts under existing conditions during typical AM and PM peak hour weekday traffic conditions. The peak hour is defined as the highest one-hour total of traffic volumes between 6:00 am and 9:00 am in the morning and 2:00 pm to 6:00 pm in the evening on a weekday. The operations of the study intersections were evaluated during the weekday AM and PM peak hours for the following scenarios:

- **Existing Conditions** – The analysis of existing traffic conditions was based on 2017 counts collected during the typical weekday peak hours and existing roadway and intersection configurations. The existing conditions evaluation also includes an overview of current pedestrian, bicycle, and transit facilities and services near the site.
- **Existing Plus Project (New Classroom Building) Conditions** – The analysis of existing traffic plus the addition of forecast project-generated trips resulting from the new classroom building construction. This scenario includes existing roadway and intersection configurations.

- **Existing Plus Project (New Classroom Building) Plus New Makai Parking Lot Conditions** - The analysis of existing traffic plus project plus the new makai parking lot conditions. This scenario is included in the event that funding becomes available for the parking areas. This scenario includes the same forecasted trip generation than Existing Plus Project but redistributes project trips to the new parking lot and access road.

The proposed project is intended to serve the existing student body and is not anticipated to increase the volume of vehicle trips being generated by the school. Therefore, the forecasted increase in vehicle trips analyzed under the Existing Plus Project Conditions is considered conservative.

2.3 PROJECT STUDY AREA

Access to WHS is provided along Farrington Highway at Waipio Point Access Road. The transportation analysis evaluated the operations at two study intersections in the immediate vicinity of the proposed project, including:

1. Waipio Point Access Road-Kahualii Street / Farrington Highway
2. Waipio Point Access Road / Awalai Street

The study analyzed existing operations on a typical weekday morning and afternoon during AM and PM peak hour traffic conditions when school was in session. The peak hour represents the highest one-hour total of traffic between 6:00 am and 9:00 am in the morning and between 2:00 pm and 6:00 pm in the late afternoon. Traffic counts were collected for all modes of travel, including vehicles, pedestrians, and bicycles.

On-site observations were conducted at WHS for one morning (drop-off) period and one afternoon (pick-up) period during the school year. The assessment of operations included observations of existing inbound and outbound circulation, drop-off and pick-up operations, transit activity, pedestrian paths of travel, multi-modal access, and existing facilities.

Waipahu High School Site

Figure 1
Project Location

April 2019

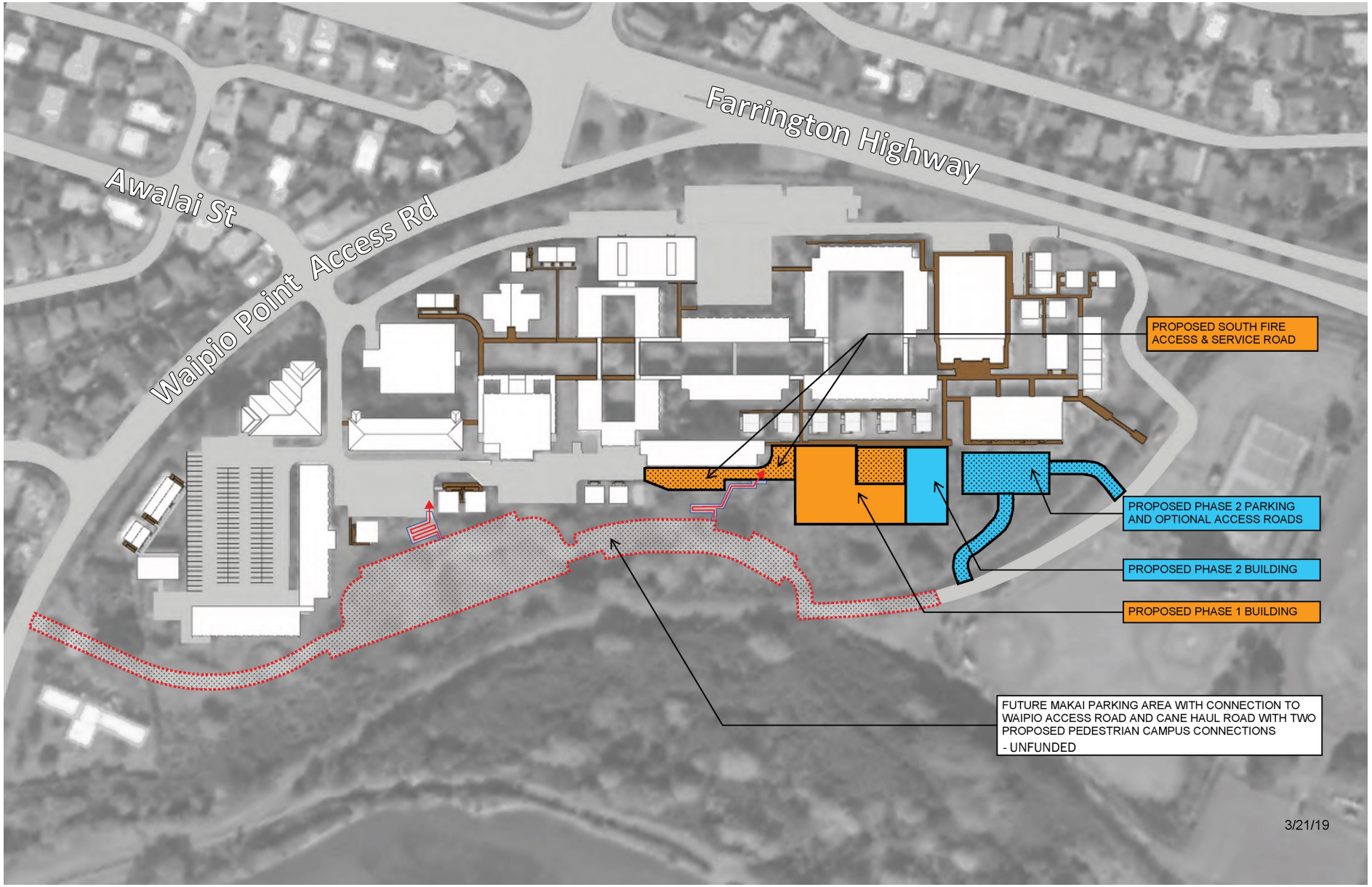


Figure 2
Proposed Site Plan

2.4 TRAFFIC ASSESSMENT METHODOLOGY

The analysis of traffic operations performed for this study is based on procedures presented in the *Highway Capacity Manual* (HCM), published by the Transportation Research Board in 2016. The operations of roadway facilities are described with the term level of service (LOS). LOS is a qualitative description of traffic flow based on such factors as speed, travel time, delay, and freedom to maneuver. Six levels are defined from LOS A, with the least congested operating conditions, to LOS F, with the most congested operating conditions. LOS E represents "at-capacity" operations. Operations are designated as LOS F when volumes exceed capacity, resulting in stop-and-go conditions. The methodologies for signalized and unsignalized intersections are described below.

2.4.1 SIGNALIZED INTERSECTIONS

The method described in Chapter 19 of the *Highway Capacity Manual 6th Edition* (*HCM*) was used to prepare the LOS calculations for the signalized study intersection of Waipio Point Access Road- Kahualii Street / Farrington Highway. This LOS method analyzes the operation of a signalized intersection based on average control delay per vehicle. Control delay alone is used to characterize LOS for the entire intersection or an approach. Control delay includes the initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The average control delay for signalized intersections is calculated using Synchro 10.0 analysis software and is correlated to a LOS designation as shown in **Table 1**.

2.4.2 UNSIGNALIZED INTERSECTIONS

The operations of the unsignalized intersection of Waipio Point Access Road / Awalai Street were evaluated using the method contained in Chapter 20: Two-Way Stop-Controlled Intersections of the *HCM*. LOS ratings for stop-sign-controlled intersections are based on the average control delay expressed in seconds per vehicle. At all-way stop-controlled intersections the overall intersection delay and LOS is reported, and the LOS is characterized solely on control delay. At two-way or side-street-controlled (TWSC) intersections, the average control delay is calculated for each minor-street stopped movement and the major-street left turns, not for the intersection as a whole. For approaches composed of a single lane, the control delay is computed as the average of all movements in that lane. For approaches with multiple lanes, the control delay is computed for each movement; the movement with the worst (i.e., longest) delay is presented for TWSC. The average control delay for unsignalized intersections is calculated using Synchro 10.0 analysis software and is correlated to a LOS designation as shown in **Table 2**.

TABLE 1: SIGNALIZED INTERSECTION LOS DEFINITIONS

Level of Service	Description	Delay in Seconds
A	Progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	≤ 10.0
B	Progression is good, cycle lengths are short, or both. More vehicles stop than with LOS A, causing higher levels of average delay.	> 10.0 to 20.0
C	Higher congestion may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level, though many still pass through the intersection without stopping.	> 20.0 to 35.0
D	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	> 35.0 to 55.0
E	This level is considered by many agencies to be the limit of desirable delay. These high delay values generally indicate poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	> 55.0 to 80.0
F	This level is considered undesirable with oversaturation, which is when arrival flow rates exceed the capacity of the intersection. This level may also occur at high V/C ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be contributing factors to such delay levels.	> 80.0

Source: *Highway Capacity Manual*, Transportation Research Board, 2016.

TABLE 2: UNSIGNALIZED INTERSECTION LEVEL OF SERVICE DEFINITIONS

Level of Service	Description	Average Control Delay Per Vehicle (Seconds)
A	Little or no delay.	≤ 10.0
B	Short traffic delay.	> 10.0 to 15.0
C	Average traffic delays.	> 15.0 to 25.0
D	Long traffic delays.	> 25.0 to 35.0
E	Very long traffic delays.	> 35.0 to 50.0
F	Extreme traffic delays with capacity exceeded.	> 50.0

Source: *Highway Capacity Manual*, Transportation Research Board, 2016.

Notes: [1] For approach-based and intersection-wide assessments, such as that used for AWSC intersections, LOS is defined solely by control delay.

2.4.3 SIGNIFICANT IMPACT CRITERIA

The analysis of Existing Plus Project Conditions compares existing operations with conditions when the project is fully built out to determine whether or not the forecasted project trips resulting from the new classroom building is expected to result in a significant impact on the surrounding roadways. Based on previous studies conducted for the City & County of Honolulu Department of Planning and Permitting (DPP) Traffic Review Branch (TRB), the minimum desired operating standard for a signalized intersection is typically LOS D. Additionally, the Hawaii Department of Transportation (HDOT) strives to maintain LOS D intersection operations for State facilities, such as Farrington Highway. Both agencies typically define a significant intersection impact when the operation of an intersection or turning movement changes from LOS D or better to LOS E or F. Impacts are also defined to occur when the addition of project traffic exacerbates locations already operating or projected to operate at LOS E or F. When evaluating intersection operations at any location, other factors are considered in the analysis, such as traffic volumes, volume-to-capacity (V/C) ratios (should ideally be less than 1.00), and potential secondary impacts to pedestrian, bicycle, and transit travel.

3.0 EXISTING CONDITIONS

This chapter describes the existing mobility network and includes a discussion of current roadway, bicycle, pedestrian, and transit facilities located in the project study area. This chapter also includes a discussion of the existing intersection LOS results and field observations by the project team to verify the traffic data with on-the-ground operations.

3.1 EXISTING TRANSPORTATION FACILITIES

Traffic data was collected to identify existing transportation conditions in the vicinity of the proposed project. The assessment of existing conditions includes an inventory of the street system, traffic volumes, and operating conditions at key intersections. Existing public transit service, bicycle, and pedestrian facilities are also described.

3.1.1 EXISTING ROADWAY SYSTEM

The key roadways providing access to or in the vicinity of the site are described below.

Farrington Highway is operated and maintained by HDOT and is a two-lane highway mauka of the project site. Farrington Highway is located south of, and parallel to, H1 freeway extending between Kapolei and Waipahu. The posted speed limit is 30 miles per hour (mph) along Farrington Highway and 25 mph along the school frontage zone. TheBus has two transit stops along Farrington Highway in front of WHS.

Waipio Point Access Road is a two-lane, approximately 1.6-mile long roadway between Farrington Highway and the Ted Makalena Golf Course. Waipio Point Access Road provides access between Farrington Highway and adjacent residential neighborhoods, the Ted Makalena Golf Course, Waipio Peninsula Soccer Park, as well as direct access to WHS. The posted speed limit on this street is 25 mph. The intersection at Farrington Highway is controlled by a traffic signal with channelized right-turn lanes in each direction, with the mauka-bound right-turn lane controlled by a stop sign. Marked pedestrian crosswalks are provided on the north, west, and south legs of the intersection. Pedestrian crossing is prohibited on the east side of the intersection along Farrington Highway where a fence is posted along the median. The intersection of Waipio Access Road and Awalai Street is two-way stop controlled with marked pedestrian crosswalks on the west and south legs of the intersection.

3.1.2 EXISTING TRANSIT FACILITIES AND SERVICES

TheBus is the main public transportation service on the Island of Oahu. Within the project study area, Routes 81, W1, W2, A, 40, 42, and 43 provide service along Farrington Highway with two transit stops located immediately in front of the high school.

Routes 81, W1, and W2 are express routes providing service between commercial or employment centers and residential areas. Route 81 (Waipahu Express) provides local stops between central Waipahu and downtown Honolulu. Route W1 (Waipahu Via Farrington Hwy Express) provides service between Ewa Beach and Waikiki. Route W2 (Waipahu Via Paiwa Express) provides service between Waipahu and Waikiki.

Routes 40, 42, and 43 are regular service bus routes that serve the local area, including WHS. Route 40 traverses the perimeter of Oahu starting in Makaha and travels southeast along Farrington Highway to Pearl City where it continues along Kamehameha Highway to Downtown Honolulu. Complementary eastbound service is also provided in the reverse direction. Route 42 originates in Ewa Beach providing local stops through Waipahu, Pearl Harbor, Downtown Honolulu and Waikiki, where the route continues in the reverse direction with complementary service. Route 43 provides local stops in Waipahu, traveling along Farrington Highway and Moanalua Freeway to Downtown Honolulu. Complementary service to Waipahu is provided in the reverse direction. Route A begins in Waipahu and travels along Farrington Highway and Kamehameha Highway to Downtown Honolulu and the University of Hawaii. Complementary service to Waipahu is provided in the reverse direction. The existing transit schedules are summarized in **Table 3**.

Two bus stops adjacent to the project site are located on Farrington Highway mauka of WHS. The westbound stop is located on the mauka side of Farrington Highway and the eastbound stop is located on the makai side of the highway. The westbound stop encroaches into the free right turn lane causing vehicles turning onto Kahualii Street to stop during bus passenger loading/unloading. The eastbound stop is adjacent to a pedestrian plaza and includes a turnout lane, which allows eastbound vehicles to pass the bus while it is stopped to load or unload passengers. During field observations, some private vehicles would stop in the turnout to drop-off or pick-up WHS students, which interrupted buses trying to access the transit stop. **Figure 3** depicts the existing transit routes and bus stops near the project site.

TABLE 3: EXISTING TRANSIT SERVICES

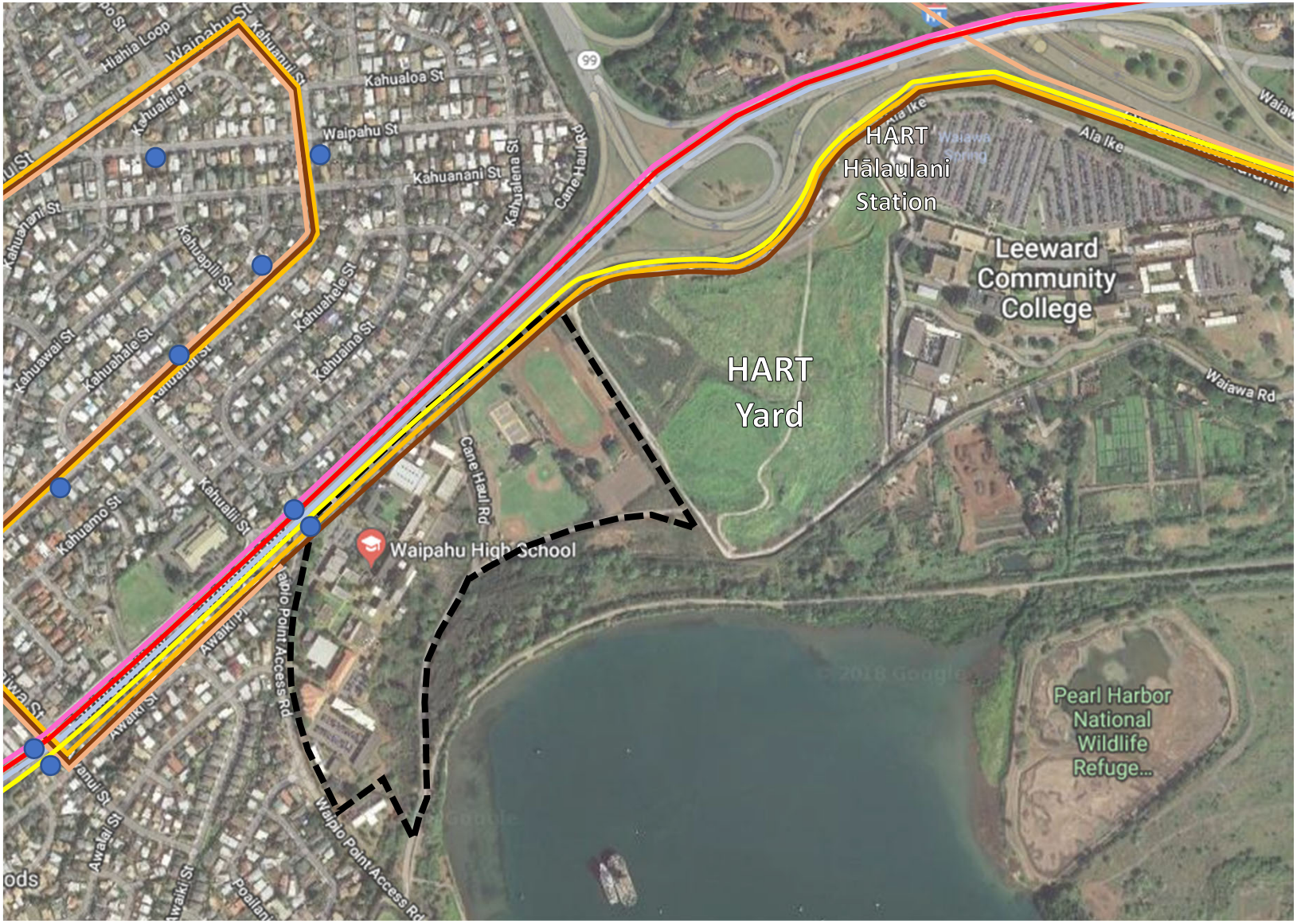
Route	From	To	Weekdays			Weekends	
			Operating Hours[1]	Headway (Minutes)[2]		Operating Hours[1]	Headway (Minutes)[2]
				Peak	Midday		
81	Downtown	Waipahu	4:25 AM to 8:40 AM and 3:00 PM to 7:15 AM	15	-	No weekend service	
W1	Waikiki	Waipahu & Ewa Beach	4:45 AM to 7:25 AM and 4:00 PM to 6:35 PM	20	-	5:00 AM to 6:59 AM and 4:00 PM to 5:54 PM	20
W2	Waikiki	Waipahu	5:00 AM to 7:00 AM and 4:10 PM to 5:55 PM	20	-	5:00 AM to 6:53 AM and 4:10 PM to 5:28 PM	30
A	Waipahu	University of Hawaii via Kalihi	4:40 AM to 10:35 AM	15	15	4:49 AM to 10:46 (Saturdays) and 5:19 AM to 9:36 (Sundays)	15 to 30
40	Makaha	Honolulu	12:50 AM to 3:50 AM	30	30	1:06 AM to 3:53 AM	30 to 60
42	Ewa Beach	Waikiki	4:05 AM to 3:00 AM	30	30	4:26 AM to 2:55 AM	30 to 60
43	Waipahu Street	Alapai Transit Center (Honolulu)	7:00 AM to 6:10 PM	30	30	No weekend service	

Source: TheBus, September 2018.

Notes:

[1] Operating hours rounded to the nearest five minutes.

[2] Headways are defined as the time between transit vehicles on the same route (e.g., time between two Route 40 buses stopping at Waipahu Transit Center).



Waipahu High School Site

Route A
Route W1
Route W2
Route 40
Route 42
Route 43
Route 81
Bus Stop

Figure 3
Transit Facilities

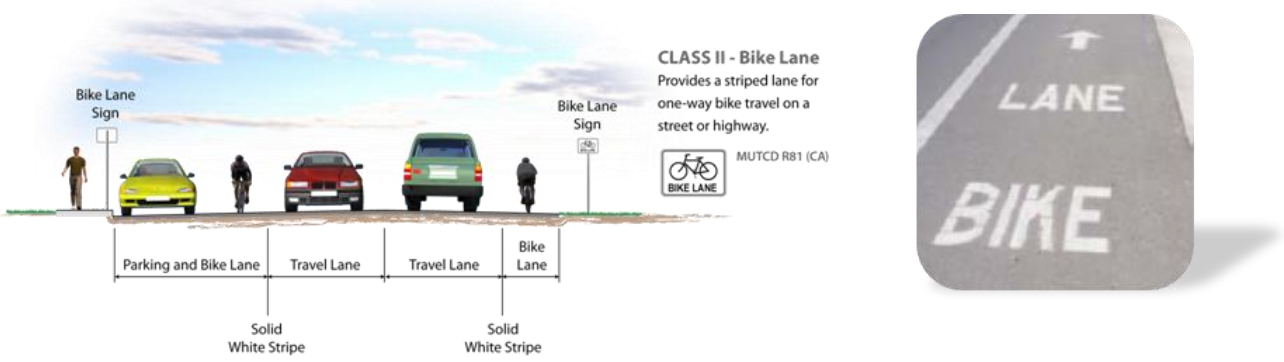
April 2019

3.1.3 EXISTING BICYCLE FACILITIES AND ACTIVITY

Bicycle facilities generally consist of four types of facilities, which are outlined below:

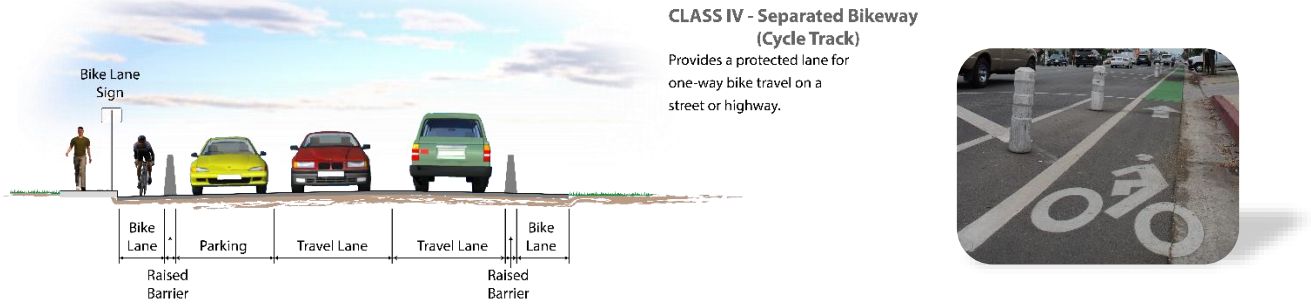
- *Bike or Multi-Use Paths* provide a completely separate right-of-way and are designated for the exclusive use of bicycles and pedestrians with vehicle and pedestrian cross-flow minimized. Generally, the recommended pavement width for a two-directional shared use path is ten (10) feet.

- *Bike Lanes* provide a restricted right-of-way and are designated for the use of bicycles with a striped lane on a street or highway. Bicycle lanes are generally five (5) feet wide. Adjacent vehicle parking and vehicle/pedestrian cross-flow are permitted.



- *Bike Route or Signed Shared Roadways* provide for a right-of-way designated by signs or shared lane pavement markings, or "sharrows," for shared use with pedestrians or motor vehicles.

- *Separated Bikeways or Cycle Tracks* provide a restricted right-of-way with physical separation and are designated for the use of bicycles with a raised barrier such as curbs or bollards. Separated bikeways are generally five (5) feet wide with a three (3) foot minimum horizontal and vertical separation area. Adjacent vehicle parking is permitted, and vehicle/pedestrian cross-flow is restricted to selected locations (e.g., driveways) indicated by breaks in the barrier and buffer.



The only off-street facility in the immediate vicinity of the school is the Pearl Harbor Bike Path located makai of WHS between the school and Middle Loch of Pearl Harbor. No separate bicycle lanes are provided on Waipio Point Access Road or on other roadways in the immediate vicinity of the project site.

Based on weekday peak period counts conducted during at the same time as traffic counts, the number of bicyclists in the area is limited. At the Waipio Point Access Road-Kahualii Street/Farrington Highway intersection there were a total of three (3) bicyclists during the AM peak hour. No bicyclists were observed during the PM peak hour. At the Waipio Point Access Road and Awalai Street intersection there were a total of eight (8) bicyclists during the AM (5 bicyclists) and PM (3 bicyclists) peak hours.

3.1.4 EXISTING PEDESTRIAN FACILITIES AND ACTIVITY

Pedestrian facilities generally consist of sidewalks, crosswalks, and pedestrian signals at signalized intersections. Within the project study area, no paved sidewalks are provided along the immediate school frontage areas on Waipio Point Access Road, therefore all students walking to and from campus are walking in the unpaved pathways and roadway shoulders. Sidewalks are provided on Farrington Highway east and west of Kahualii Street/Waipio Point Access Road, however the sidewalks terminate after a short distance on the east leg of the intersection.

Marked crosswalks are provided on the north, west, and south legs of the intersection of Farrington Highway and Kahualii Street/Waipio Point Access Road. No crosswalk is provided on the east leg of the intersection. A crosswalk is provided across the right turn slip lane that serves as the mauka-bound right-turn lane from Waipio Point Access Road to eastbound Farrington Highway. This crosswalk connects WHS and a large

raised median island/pedestrian plaza with a transit stop serving eastbound routes along Farrington Highway. Crosswalks are also provided on the west and south legs of the Waipio Point Access Road/Awalai Street intersection.

Each corner of the Waipio Point Access Road-Kahualii Street/Farrington Highway intersection includes a right-turn lane with a raised median between the right-turn and through lanes. The raised medians between the right-turn and through lanes increases the visibility of pedestrians to drivers and provides a dedicated waiting area for pedestrians. Marked crosswalks and advance stop bars are painted across each of the channelized right turn lanes on the north, west and south legs of the intersection.

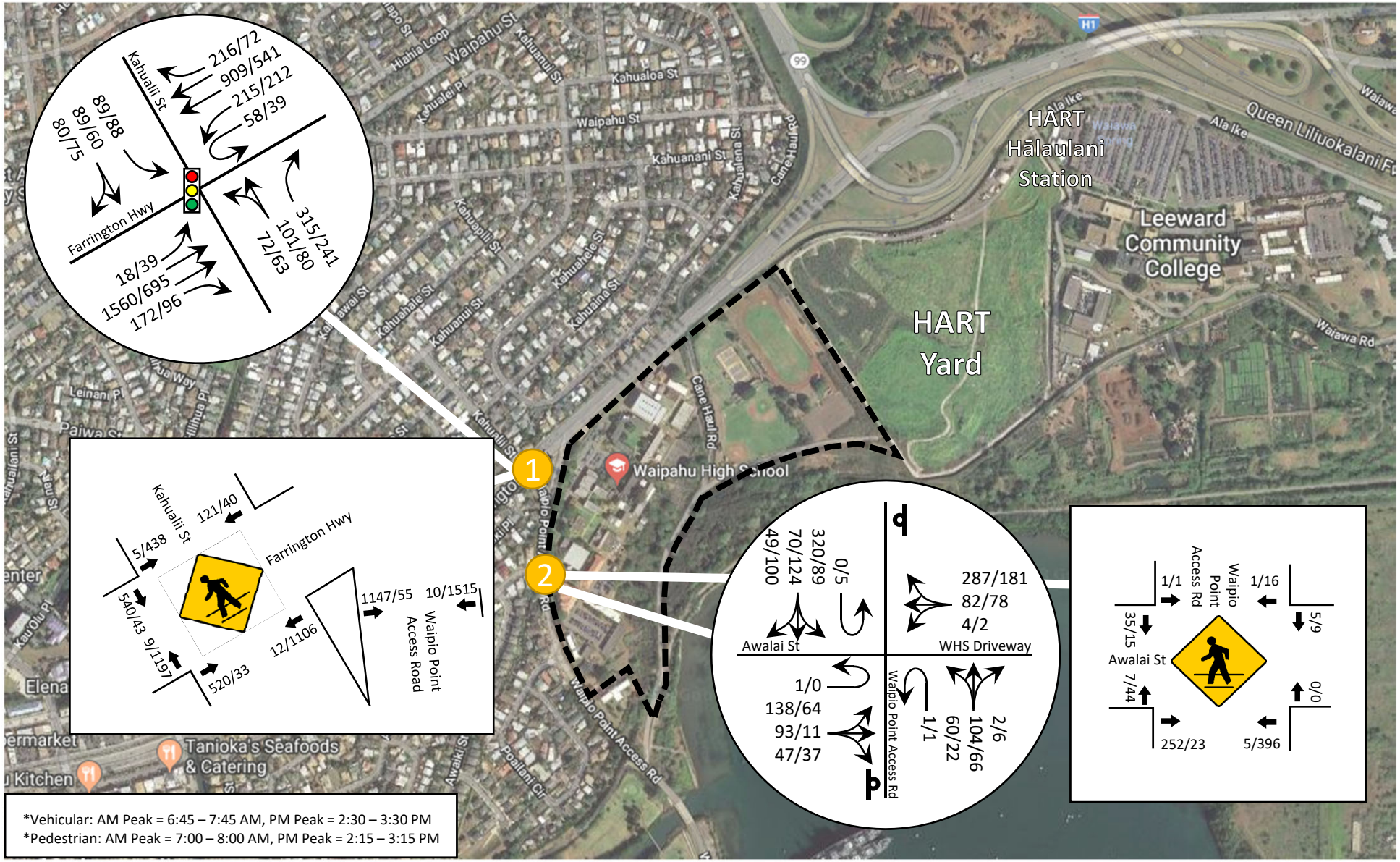
Morning and afternoon peak period pedestrian counts were collected at each of the study intersections. At Waipio Point Access Road-Kahualii Street/Farrington Highway, approximately 1,160 pedestrians approached the school campus via the Waipio Point Access Road crosswalk just south of Farrington Highway during the morning peak hour (7:00-8:00 AM). Afternoon peak period data was collected between 2:00 and 6:00 PM. The pedestrian volume PM peak hour occurred at 2:15 to 3:15 PM with approximately 1,570 pedestrians departing the campus via the Waipio Point Access Road crosswalk just south of Farrington Highway. Based on the current student enrollment, pedestrian volumes equate to approximately 43 and 59 percent of students utilizing the crosswalk in the AM and PM peak hours, respectively, or a combined average of 51 percent. Total peak hour pedestrian volume by intersection leg and direction are shown on **Figure 4**.

At the two-way stop-controlled intersection of Waipio Point Access Road and Awalai Street, a total of 387 pedestrians were counted in the intersection between 6:00 and 9:00 AM. The AM peak hour occurred at 7:00-8:00 AM with 306 pedestrians. The afternoon peak hour occurred at 2:15 to 3:15 PM with 504 pedestrians crossing the intersection.

3.2 EXISTING INTERSECTION VOLUMES/LANE CONFIGURATIONS

The operations of the two existing study intersections were evaluated during weekday AM and PM peak periods (6:00 – 9:00 AM and 2:00 PM – 6:00 PM). Traffic counts were collected during the weekday AM and PM peak periods at the study intersections in August 2017 when local schools were in session. The morning peak hour of traffic for the study area occurred between 7:00 and 8:00 AM. The afternoon peak hour of traffic occurred between 2:15 and 3:15 PM.

Existing lane configurations and signal controls were obtained through field observations. **Figure 4** presents the existing AM and PM peak period turning movement volumes, corresponding lane configurations, and traffic control devices. Traffic count data sheets are provided in **Appendix A**.



Waipahu High School Site

1 Study Intersections

XX/XX AM/PM Peak Hour Volumes*

Signal

Stop Control

Figure 4

Peak Hour Traffic Volumes and Lane Configurations – Existing (2017) Conditions

April 2019

3.3 FIELD OBSERVATIONS

Field observations were conducted to identify existing traffic operational deficiencies and to verify the accuracy of calculated LOS. The purpose of this effort was to (1) to identify any existing traffic problems that may not be directly related to intersection level of service and (2) to identify any locations where the LOS calculation does not accurately reflect observed operations in the field. Field observations were conducted on a weekday in August 2017 as well as on a weekday in August 2018.

Vehicle queues, pedestrian activity, and parking on Waipio Point Access Road were observed during morning drop-off and afternoon pick-up times. Slow moving northbound queues were observed at select times during the peak hour on Waipio Point Access Road makai of Farrington Highway, resulting in queue blockages to the mauka-bound right-turn movement (towards Pearl City). Queues were observed to extend past the WHS driveway at Awalai Street. Each signal cycle served less than five (5) vehicles making the mauka-bound left-turn onto Farrington Highway due to the high pedestrian volumes; however, the actual vehicle delay experienced by drivers lasted approximately 20 minutes during the heaviest peak activity. At other times during the peak hour, traffic on the highway was not delayed and experienced little or no additional delay traveling along the project site frontage.

The following observations were made during field visits to the site:

- Observed signal phasing at Farrington Highway/Waipio Point Access Road includes east/west protected left-turns and permitted north/south left-turns. Traffic signal cycles were approximately 200 seconds.

- Consistent with the traffic count data, heavy pedestrian volumes were observed in the morning and afternoon peak periods. The high volume of pedestrians combined with a permitted northbound left turn signal phase at Farrington Highway/Waipio Point Access Road and the single northbound shared through-left lane restricts the northbound left-turn movement, causing a long northbound queue along Waipio Point Access Road. Fewer than five (5) vehicles were able to

make this northbound left-turn per signal cycle.

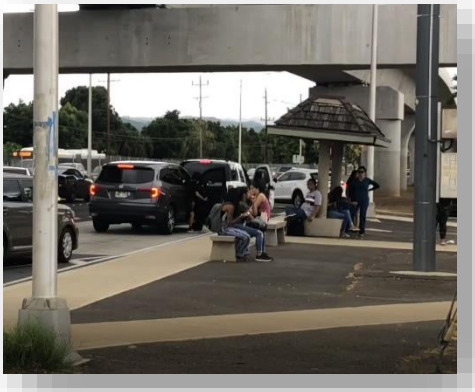
- Students park perpendicular on the unpaved, grass shoulder of Waipio Point Access Road adjacent to the school and walk along the unpaved shoulder or in the roadway towards the school entrance. This presents conflicts with the northbound queue on Waipio Point Access Road when the vehicles exit the spaces.

- Vehicle queues are significant on Waipio Point Access Road during drop-off and pick-up peak periods.

- Southbound vehicles on Waipio Point Access Road make illegal left turns at Farrington Highway onto the northbound slip-lane to drop-off and pick-up students.

- Some vehicles drop-off and pick-up students at the eastbound transit stop on Farrington Highway

- Some vehicles drop-off and pick-up students on the school frontage along the entire length of Waipio Point Access Road between Awalai Street and Farrington Highway (including along the channelized right-turn lane to eastbound Farrington Highway). This section currently includes "No Parking Any Time" signs, which do not preclude passenger loading activities.



- The intersection was reconfigured as part of the HART rail project, but a separate northbound left-turn lane was not included as part of this modification. As such, the northbound right-turn lane is frequently blocked by the northbound through/left queue at Farrington Highway during the peak 20 minutes during student drop-off and pick-up. A separate lane of even 75 feet in length would expedite vehicle flows and reduce delays by providing queue storage for three to four left-turning vehicles.

- Some vehicles park on the shoulder of the southbound side of Waipio Point Access Road during the afternoon pick-up periods, blocking pedestrians that utilize that side of the road.

- Staff monitors inbound and outbound traffic at the main entrance.

3.4 EXISTING INTERSECTION LEVELS OF SERVICE

Peak hour intersection capacity analysis was performed for the study intersections using the methodology described in Section 2.3 and the recently collected traffic count data. **Table 4** below shows the results of the intersection operations analysis for Existing Conditions. The detailed LOS Worksheets are provided in **Appendix B.**

TABLE 4: EXISTING CONDITIONS
PEAK HOUR INTERSECTION LEVEL OF SERVICE

Intersection	Traffic Control[1]	Peak Hour	Existing Conditions	
			(sec/veh)[2]	LOS[3,4]
Waipio Point Access Road-Kahualii Street & Farrington Highway	Signalized	AM	35.4	D
		PM	22.1	C
Waipio Point Access Road & Awalai Street	SSSC	AM	**> 100.0**	**F**
		PM	**>100.0**	**F**

Source: Fehr & Peers, 2018

[1] SSSC = side-street stop-controlled

[2] Whole intersection weighted average stopped delay expressed in seconds per vehicle for signalized intersections. Worst movement delay reported for side-street-stop-controlled intersections.

[3] LOS calculations performed using the *Highway Capacity Manual 6th Edition* method

[4] Undesirable LOS and seconds of delay per vehicle are highlighted in **bold.**

As shown, the intersection of Waipio Point Access Road/ Farrington Highway currently operates at LOS D during the AM peak hour and LOS C during the PM peak hour. As noted under field observations, drivers experience delays at this intersection during morning drop-off and afternoon pick-up periods at the school particularly for the left-turn movements. Based on the operational level of service for each turning movement, the left-turn movements in all directions operate at LOS E or F due to the permitted left-turn phasing and high number of pedestrians crossing the intersection. Overall operations at the intersection meet or exceed the minimum desirable LOS D due to the lesser delays in the through and channelized right-turn movements, most of which are not controlled by the signal.

The intersection of Waipio Point Access Road/Awalai Street is two-way stop controlled. Due to the concentrated vehicle and high pedestrian volumes at the intersection during the peak hours, which occurs during drop-off and pick-up periods, vehicle delay on Awalai Street and the school driveway results in

oversaturated conditions, and Synchro does not calculate a delay for such conditions. The result is LOS F operations which was confirmed during field observations.

3.4.1 OTHER PLANNED IMPROVEMENTS

Transportation-related planning documents that included the Waipahu area were reviewed for this project, including any future planned bicycle, pedestrian, or transit improvements. The following documents were reviewed along with identified improvements within and surrounding the study area:

Waipahu Town Action Plan (September 2017) - The *Waipahu Town Action Plan* outlines planned infrastructure that will provide access to the Waipahu Transit Center Station. A portion of the potential projects included in this plan have received funding. No projects immediately near Waipahu High School were identified. However, nearby improvements include:

- More direct pedestrian connections between Waipahu District Park to the town core to improve transit access, walkability, economic activity, and access to existing open space.
- Multi-modal connections between Old Waipahu Town and the Pearl Harbor Historic Trail by paving the shoulders of Waipahu Depot Street and at the terminal segment of the Pearl Harbor Historic Trail as it approaches Waipahu Depot Street. Improvements may also include new lighting, signage, and landscaping and shade.
- Area-wide wayfinding

Waipahu Neighborhood TOD Plan (April 2014) - The *Waipahu Neighborhood Transit Oriented Development (TOD) Plan* summarizes the planning effort for the areas surrounding two future fixed-rail stations (Farrington and Leoku Station, Farrington and Mokuola Station). The plan focuses on the creation of mixed-use areas around the stations and provides plans for infrastructure to support these new uses. Pedestrian improvements on Farrington Highway are proposed, as well as, restoring Kapakahi Stream with a stream walk to connect the Pouhala Marsh and the Pearl Harbor Historic Trail and restoring the drainage canal between Leokane and Leoleo Streets as a natural greenway.

Oahu Bike Plan (August 2012) - The *Oahu Bike Plan* proposes various bike lanes, bike paths, and bike routes throughout Oahu. The plan also provides the estimated cost associated with each facility. The following facilities are proposed that will provide connections to or around Waipahu High School:

- A bike lane along Farrington Hwy and Leeward Community College (Ala Ike Street)
- Bike paths along Cane Haul Road (South), Waipio Point Access Road (Northern Section), Pearl Harbor Bike Path Connector to LCC, and Awanui Street that connect to the existing Pearl Harbor Bike Path (south of the High School).

4.0 PROJECT TRAFFIC ESTIMATES

As noted previously, the intention of the proposed new classroom building project is to serve the existing student body with modern learning facilities and to ultimately replace dilapidated temporary structures. With the existing overcrowding, the additional space will allow decompression for the existing student body, and it is not intended to provide new capacity for future students. However, DTS staff requested that a typical evaluation of the proposed project improvements be conducted to provide a conservative evaluation. Thus, trip generation calculations were conducted to determine the potential forecasted growth in vehicle trips resulting from the addition of the new classroom building. This section describes the potential number of vehicle trips and distribution of future trips that could result from construction of the proposed project assuming that the campus student enrollment increases proportionally with the increased space.

Future traffic added to the roadway system by the project is estimated using a three-step process: (1) project trip generation, (2) trip distribution, and (3) trip assignment. The first step estimates the amount of project-generated traffic that would be added to the roadway network. The second step estimates the direction of travel to and from the project site. The new trips are assigned to specific street segments and intersection turning movements during the third step. This process is described in more details in the following sections.

4.1 PROJECT TRIP GENERATION ESTIMATES

Vehicle trip rates presented in *Trip Generation 10th Edition* (Institute of Transportation Engineers, 2017) were used to estimate the number of trips to and from the proposed project site. "Institutional" rates for High School (ITE Code 530) land use were used to develop the project's trip generation. The forecasted potential trip generation for the proposed project is shown in **Table 5.**

As shown, the project is forecast to generate up to 595 new daily vehicle trips, including 148 new AM peak hour trips and 91 PM peak hour trips based on the proposed net new square footage. The estimated trip generation is conservative and does not account for higher usage rates of non-automobile modes of transportation (such as students walking or taking transit) as is currently experienced in Waipahu. Based on the traffic counts collected for this assessment, verified field observations, and discussions with WHS staff, approximately half or 50 percent of the students walk or take transit to school, which is higher than observed at many Mainland high schools upon which the ITE rates are based. Therefore, the forecast project trip generation is considered conservative for this analysis.

TABLE 5: PROJECT TRIP GENERATION ESTIMATES

Land Use	Quantity	Units[1]	Daily[2]	AM Peak Hour[2]			PM Peak Hour[2]		
				In	Out	Total	In	Out	Total
High School	42.3	ksf	595	105	43	148	28	63	91
NEW VEHICLE TRIPS			**595**	**105**	**43**	**148**	**28**	**63**	**91**

Source: Fehr & Peers, 2018
Notes:
[1] ksf = 1,000 square feet
[2] Based on rates from *ITE Trip Generation (*10th Edition)

4.2 PROJECT TRIP DISTRIBUTION AND ASSIGNMENT

The distribution of traffic generated by the project onto the roadway system was based on the school service boundary and existing traffic patterns. Based on these factors, the vehicle trip distribution of the project-generated traffic is estimated to be:

- 25% to/from the North
- 10% to/from the East
- 65% to/from the West

Figure 5 illustrates the project trip distribution pattern described above. Based on the existing travel patterns, approximately 20 percent of cars from the west are forecast to use Awanui Street towards Awalai Street as an alternate route to campus. Access to the proposed project would remain along Waipio Point Access Road and it is assumed that a similar proportion of trips that are currently using this driveway will continue with the addition of project trips.

Using the estimated trip generation and the trip distribution patterns, the forecasted trips generated by the proposed project was assigned to the study intersections and the individual turning movements. **Figure 6** shows the project trip assignment for the AM and PM peak hours.

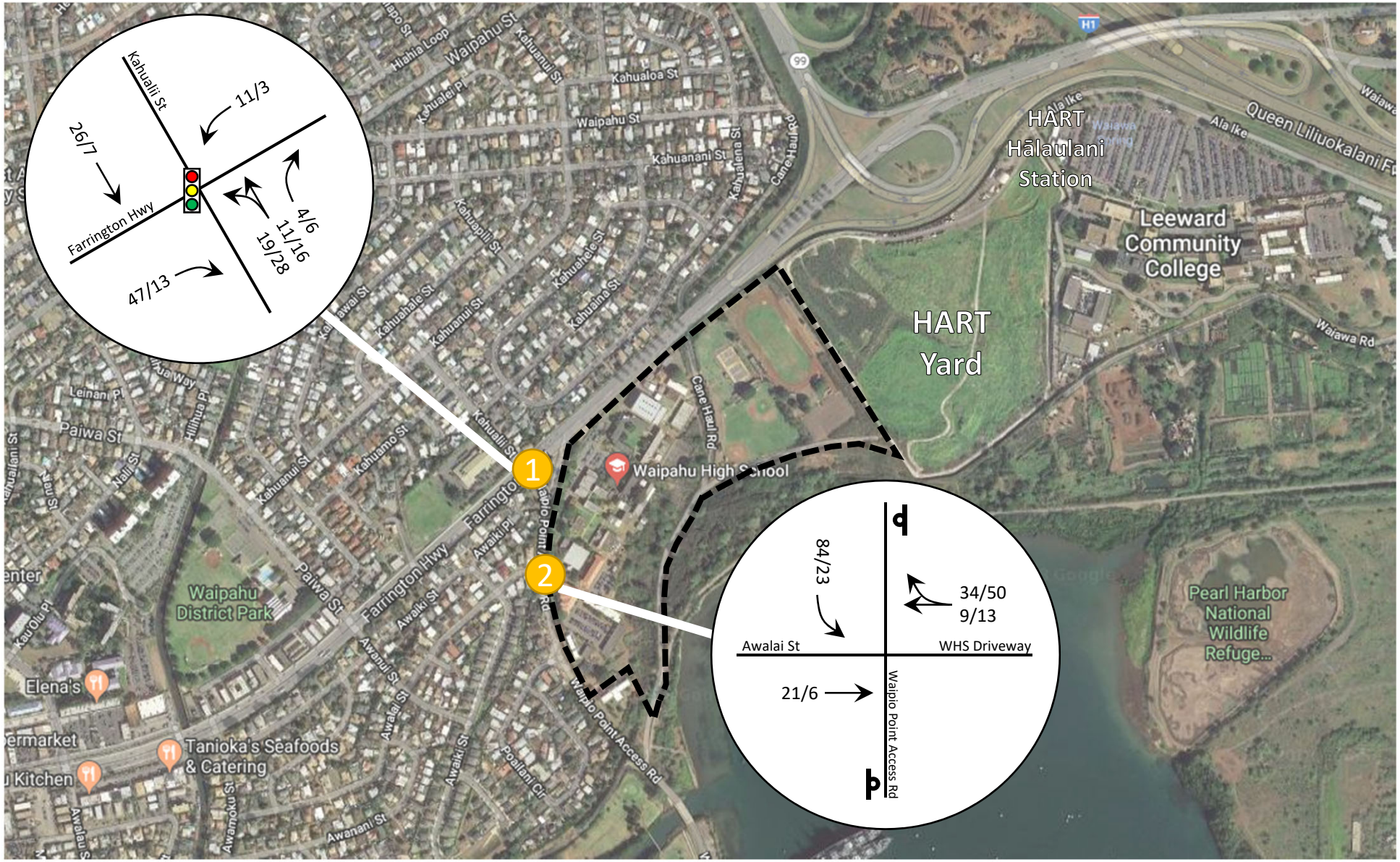
Waipahu High School Site

1 Study Intersections

Figure 5

Project Trip Distribution

April 2019



Waipahu High School Site

1 Study Intersection

XX/XX AM/PM Project Trips

Signal

Stop Control

Figure 6

Project Trip Assignment

April 2019

5.0 EXISTING PLUS PROJECT CONDITIONS

The forecasted project trip generation and distribution were added to existing volumes to estimate Existing Plus Project scenario traffic conditions. No infrastructure changes or improvements are assumed within the analysis of the proposed new classroom building project.

5.1 POTENTIAL TRAFFIC IMPACTS WITH STUDENT INCREASE

The proposed project is intended to serve the existing student body at WHS and is not anticipated to generate new vehicle trips. However, this analysis conservatively presents potential impacts if the project generated new trips based on the additional capacity of the proposed land use (as discussed in Section 4). **Table 6** presents the intersection operations analysis results of Existing (no project) and Existing Plus Project Conditions. As shown, intersection LOS is forecast to remain the same under Existing and Existing Plus Project conditions. Based upon HDOT and TRB significance criteria and the results of the operations analysis, the proposed project is not expected to result in a significant traffic impact to the Waipio Point Access Road /Farrington Highway intersection. While some movements would experience minor increases in delay, the overall intersection LOS would still be D or better during both peak hours. During the AM peak hour with the higher overall delay, the addition of 118 total vehicles to various movements during the AM peak hour would add 2.0 seconds of delay per vehicle or a 5.6% increase.

At the Waipio Point Access Road/Awalai Street intersection, which is side-street stop-controlled, the existing and forecasted future LOS conditions are LOS F during both AM and PM peak periods. The amount of vehicle delay cannot be calculated by the Synchro software due to oversaturated conditions during the peak 20-minute period when student drop-off and pick-up activities are at their highest during the peak hours. In other words, the high concentration of vehicles and frequent, intermittent pedestrian crossings during the peak periods results in incomputable operational averages in delay for such conditions. However, conditions were observed to occur for approximately 20 minutes and are not expected to be substantially different with the addition of forecasted project-generated trips.

TABLE 6: EXISTING PLUS PROJECT CONDITIONS
PEAK HOUR INTERSECTION LEVEL OF SERVICE

Intersection	Traffic Control[1]	Peak Hour	Existing Conditions		Existing Plus Project Conditions		Delay Change	Sig. Impact ?
			(sec/veh)[2]	LOS[3,4]	(sec/veh)[2]	LOS[3,4]		
Waipio Point Access Road & Farrington Highway	Signalized	AM	35.4	D	37.4	D	2.0	No
		PM	22.1	C	22.2	C	0.0	No
Waipio Point Access Road & Awalai Street	SSSC	AM	**>100.0**	**F**	**>100.0**	**F**	**N/A**	No
		PM	**>100.0**	**F**	**>100.0**	**F**	**N/A**	No

Source: Fehr & Peers, 2018

[1] SSSC = side-street stop-controlled

[2] Whole intersection weighted average stopped delay expressed in seconds per vehicle for signalized intersections. Worst movement delay reported for side-street-stop-controlled intersections.

[3] LOS calculations performed using the *Highway Capacity Manual 6th Edition* method

[4] Undesirable LOS and seconds of delay per vehicle are highlighted in **bold.**

N/A = Not available. Delay is not calculated by Synchro 10 software due to oversaturated conditions.

6.0 SITE ACCESS AND ON-SITE CIRCULATION

This chapter includes a review of the site access and on-site circulation for vehicles, bicyclists and pedestrians.

6.1 VEHICLE SITE ACCESS

Primary vehicle access to the site is currently provided by the existing driveway on Waipio Point Access Road at Awalai Street. With construction of the proposed new classroom building, existing access and circulation patterns will remain the same as existing conditions. Drop-off and pick-up congestion patterns are anticipated to continue for approximately 20-minute increments. As such, no modifications to vehicular site access are necessary to support the new classroom building. However, funding for construction of the future makai parking area and accompanying driveway is recommended to optimize site access, improve flow, and provide parking for students.

6.2 ON-SITE PEDESTRIAN AND BICYCLE CIRCULATION

There are currently no paved sidewalks along the campus frontage on Waipio Point Access Road. Students currently walk on the unpaved roadway shoulders or on landscaped berms. The existing crosswalk along the north side of campus that connects students from Farrington Highway to WHS lacks a protected landing area for pedestrians on the school side. Given that approximately half of students arrive to campus by walking or transit, sidewalks or formal paths are recommended along the school frontage to provide a defined pedestrian area and to prevent vehicle intrusion. Vertical elements such as bollards and posted signs are recommended to highlight the presence of pedestrians, particularly at each of the crosswalks that connect to the campus.

Students on bicycles are also expected to access the project site from the adjacent neighborhoods. While no separate paths need to be incorporated to the site, secure bike parking should be provided. At a minimum, this would include bike racks at key locations to encourage the use of non-automobile travel.

7.0 RECOMMENDED IMPROVEMENTS

Based on the review of the proposed project and findings in this MAR, the recommended off-site improvements for the project are discussed below. The off-site improvements are recommended to improve general circulation in the project vicinity but are not mitigation measures. Rather, it is recommended that the DOE and the City and County of Honolulu partner to seek funding for the improvements discussed below.

The proposed project is not intended to increase the use of the campus or increase the number of existing trips currently being generated by the campus. However, based on the existing constraints and the opportunity to improve the flow of users on and around campus, several multimodal improvements are recommended to enhance access and circulation. Recommendations include:

- Install ADA-compliant paved landing areas on each side of existing crosswalks
- Install vertical treatments (ex. bollards) to enhance the visibility of pedestrians at crosswalks
- Analyze feasibility of replacing the existing raised median with a northbound left-turn lane from Waipio Point Access Road to Ewa-bound Farrington Highway
- Install an asphalt berm and formal path along the north side of Waipio Point Access Road to prevent vehicles parking in the shoulder where students walk

Additional recommended improvements for consideration are discussed in more detail below.

7.1 RECOMMENDED PEDESTRIAN FACILITIES

The project site is located on Farrington Highway bounded by unimproved shoulders and separate pedestrian facilities are not consistently provided along the length of the highway. For this project, it is recommended that a sidewalk or shared-use path is provided along the entire length of campus frontage along Waipio Point Access Road. This will provide students a separate facility to walk to and from campus. The path should include a high visibility crosswalk across the new project site driveway.

To improve pedestrian conditions and to enhance safety, overhead beacons or in-pavement lighting are candidate improvements for the existing crosswalk locations. Other treatments for consideration include RRFBs, high visibility crosswalk markings, advance yield lines, and signage.

7.2 RECOMMENDED VEHICULAR FACILITIES

To improve vehicular circulation at Waipio Point Access Road/Farrington Highway, it is recommended to evaluate replacement of the raised median on the northbound (or south) leg with an ewa-bound left-turn pocket. Providing a northbound left-turn pocket would allow more vehicles to get through the intersection during each cycle, thus would reduce existing queues and improve circulation through the intersection. If a left-turn pocket is installed, signal timing should be adjusted to include protected north/south left-turn phase to better balance the flow of traffic and reduce queues.

7.3 RECOMMENDED TRANSIT FACILITIES

The existing east and westbound bus stops on Farrington Highway in front of WHS have adequate space and amenities. For students crossing the highway between the transit stops and the school, crosswalks are provided but lack a paved landing upon arrival to the campus. Paved, ADA-compliant landings are recommended at each landing area of the existing crosswalks to provide an accessible path of travel for all users.

7.4 RECOMMENDED BICYCLE FACILITIES

Implementation of the proposed project is not expected to conflict with any existing or planned bicycle facility. Bicyclists will be able to access the site via the existing site driveway or from the Pearl Harbor Bike Path. While no separate paths or facilities are recommended, secure bike parking should be provided.

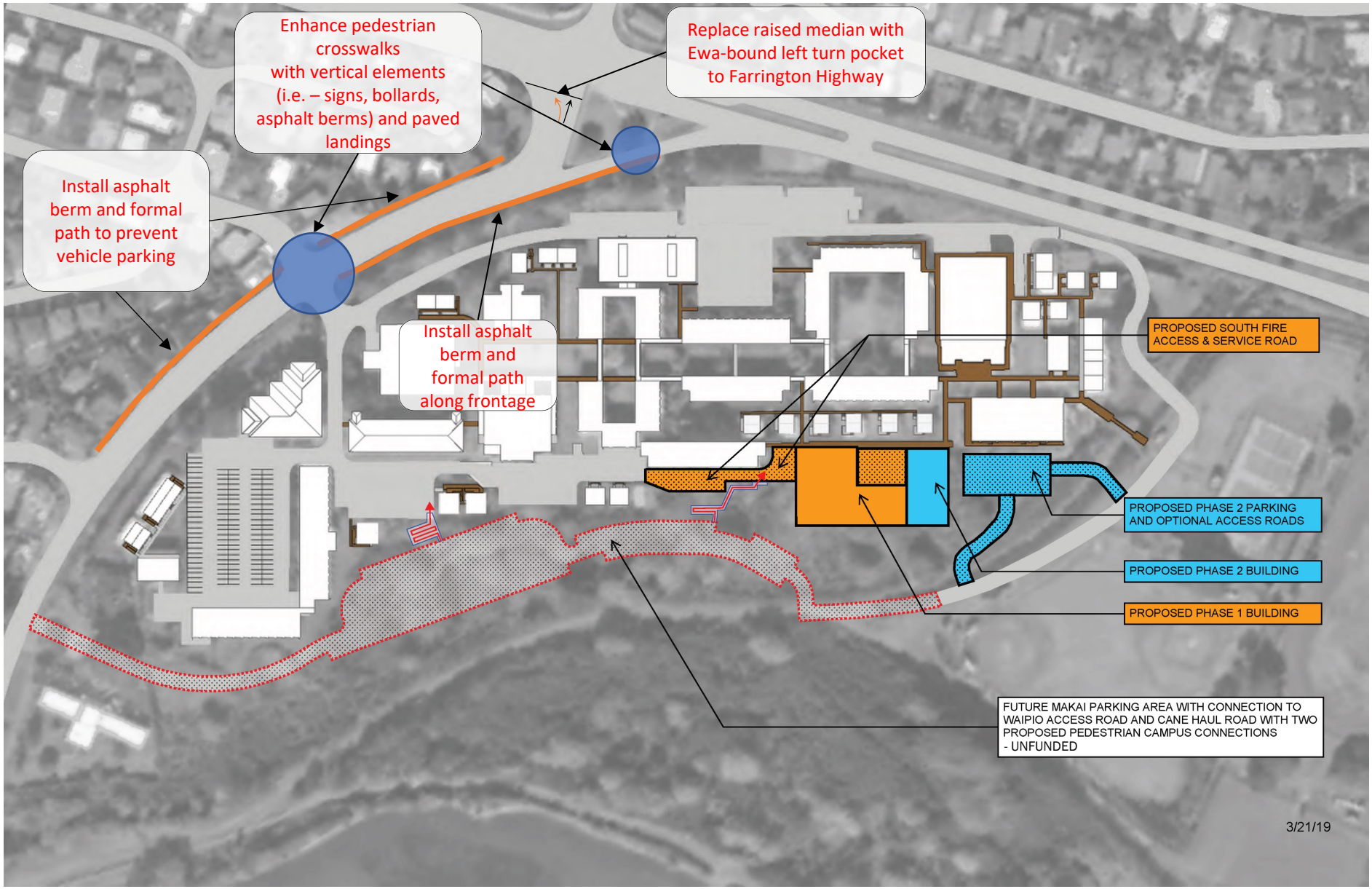


Figure 7

Recommended Off-Site Multimodal Enhancements

8.0 EXISTING PLUS PROJECT PLUS NEW MAKAI PARKING AREA (UNFUNDED)

In addition to the proposed new classroom building, and dependent upon future funding, DOE is also seeking to construct two new makai parking areas with approximately 214 parking spaces to address the existing shortage of onsite parking. The new parking areas would be constructed within the currently undeveloped southeastern (makai) portion of the campus and includes new fire/vehicular/parking access roads from Waipio Point Access Road or the HART access road. If funding is provided in the future for the new makai parking areas, the new parking will help alleviate:

- Poor circulation and long traffic queues combined with heavy pedestrian traffic during drop-off (AM) and pick-up (PM) periods
- Insufficient on-site parking causing students to park along the unpaved shoulder of Waipio Point Access Road

This analysis scenario is included in the MAR in the event that funding is secured for the additional parking improvements. It should be noted that the proposed new classroom building project and new makai parking areas are independent projects. Funding for the makai parking area is not currently available or identified. A schematic design study for the proposed parking areas has been completed but no further design work is anticipated until funding is available.

If funded, the future proposed access road would be located south of Poailani Circle on Waipio Point Access Road to connect to the new parking area with approximately 214 parking spaces. This additional scenario was analyzed as Existing Plus Project Plus New Makai Parking conditions. The layout of the future makai parking area is shown as a hatched area in **Figure 2**.

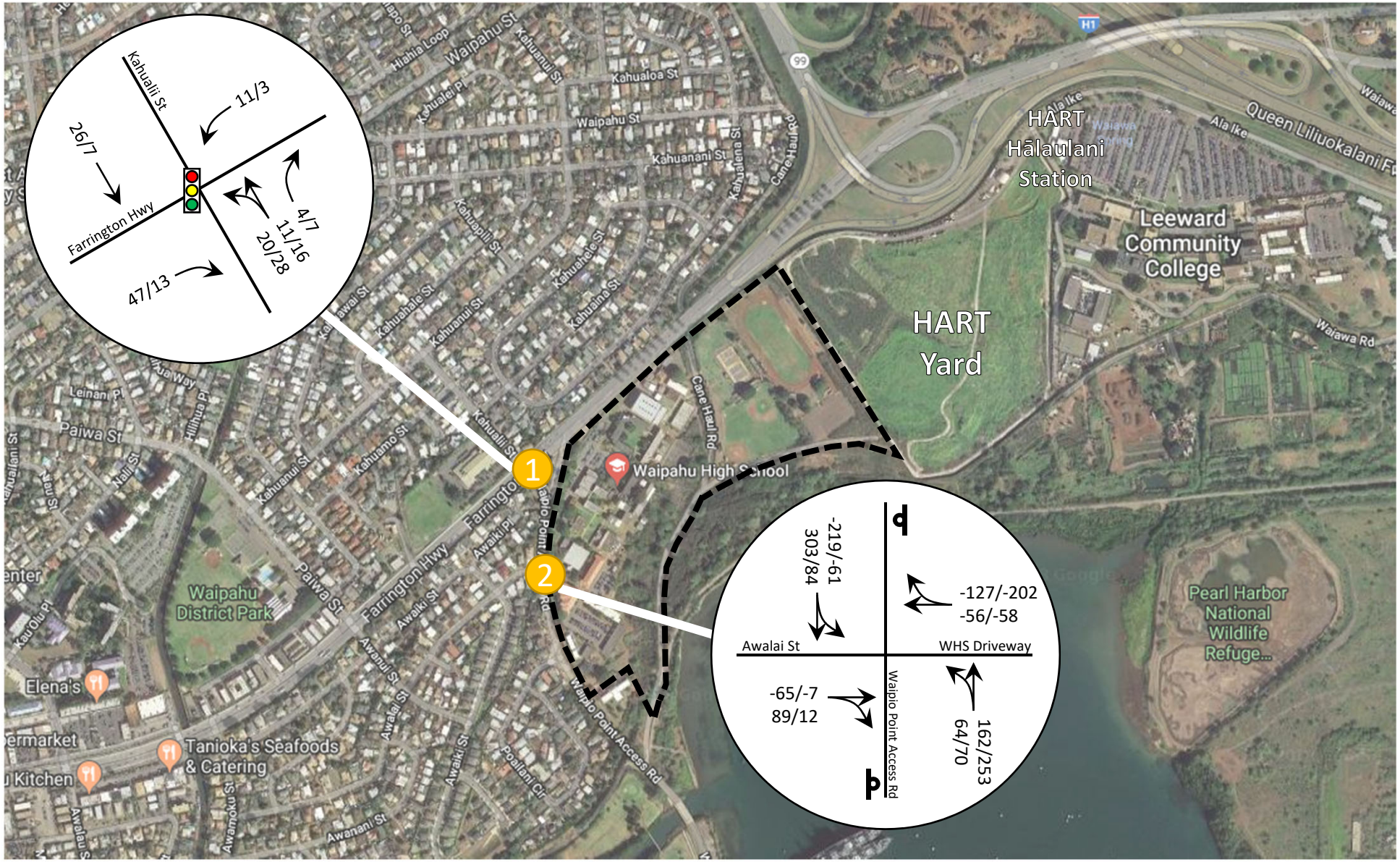
8.1 PROJECT PLUS NEW MAKAI PARKING AREA TRIP GENERATION ESTIMATES

As mentioned previously, the proposed new classroom building project has the potential to generate up to 595 new daily vehicle trips, including 148 new AM peak hour trips and 91 PM peak hour trips. The same forecasted number of trips was utilized throughout the analysis of the Project Plus New Makai Parking Area scenario, since the parking area is not a trip-generating land use and would serve the existing campus. The proposed new makai parking areas would serve the existing students on campus. Therefore, the addition of the makai parking area to the proposed project does not result in any additional project trip generation forecasted in this assessment.

8.2 PROJECT PLUS NEW MAKAI PARKING AREA TRIP DISTRIBUTION AND ASSIGNMENT

The trip distribution for the Project Plus New Makai Parking Area scenario is the same as the proposed project trip distribution, which includes 25% to/from the North, 10% to/from the East, and 65% to/from the West. However, the addition of the new parking area and driveway would be expected to disperse traffic and queueing along Waipio Point Access Road. For the purposes of the Project Plus New Makai Parking Area scenario assessment, it was conservatively assumed that 75 percent of the existing and future project trips will enter the school at the new makai driveway and parking area.

Using the estimated project trip generation and the distribution patterns, the forecasted traffic under the Project Plus New Makai Parking Area scenario was assigned to the study intersections and the individual turning movements. **Figure 8** shows the project trip assignment under the Project Plus New Makai Parking Area scenario for the AM and PM peak hours. Negative values at select turning movements represent the anticipated shift in traffic from the existing driveway to the new driveway and parking lot.



Waipahu High School Site

1 Study Intersection

XX/XX AM/PM Project Trips

Signal

Stop Control

Figure 8

Project Plus New Makai Parking Area Trip Assignment

April 2019

8.3 EXISTING PLUS PROJECT PLUS NEW MAKAI PARKING AREA CONDITIONS

Table 7 presents the intersection operations analysis comparing Existing Conditions (no project) and Existing Plus Project Plus New Makai Parking Area Conditions. The detailed LOS Worksheets are provided in **Appendix C.**

TABLE 7: EXISTING PLUS PROJECT PLUS NEW MAKAI PARKING AREA CONDITIONS PEAK HOUR INTERSECTION LEVEL OF SERVICE

Intersection	Traffic Control[1]	Peak Hour	Existing Conditions (No Project)		Existing Plus Project Plus Makai Parking Area Conditions		Delay Change	Sig. Impact ?
			(sec/veh)[2]	LOS[3,4]	(sec/veh)[2]	LOS[3,4]		
Waipio Point Access Road/ & Farrington Highway	Signalized	AM	35.4	D	37.4	D	2.0	No
		PM	22.1	C	22.1	C	0.0	No
Waipio Point Access Road & Awalai Street	SSSC	AM	**>100.0**	**F**	**>100.0**	**F**	**N/A**	No
		PM	**>100.0**	**F**	**>100.0**	**F**	**N/A**	No

Source: Fehr & Peers, 2018

[1] SSSC = side-street stop-controlled

[2] Whole intersection weighted average stopped delay expressed in seconds per vehicle for signalized intersections. Worst movement delay reported for side-street-stop-controlled intersections.

[3] LOS calculations performed using the *Highway Capacity Manual 6th Edition* method

[4] Undesirable LOS and seconds of delay per vehicle are highlighted in **bold.**

N/A = Not available. Delay is not calculated by Synchro 10 software due to oversaturated conditions.

The results of this analysis were very similar to the analysis conducted for the proposed project. However, the benefit of inbound traffic heading makai on Waipio Point Access Road is that traffic would continue past Awalai Street and access campus at the new project driveway. This is anticipated to reduce delays for eastbound traffic on Awalai Street, where school-bound traffic would be able to turn right (south) instead of having to proceed across Waipio Point Access Road into the existing campus entrance. Merging with makai-bound vehicles will result in less delay than having to wait for gaps in traffic in both directions.

A potential traffic-related concern if the new access driveway is constructed is that peak period traffic exiting the site would travel mauka-bound on Waipio Point Access Road instead of turning right out of (and queueing within) the existing driveway. This may result in queueing on Waipio Point Access Road when a vehicle waiting to turn left from Waipio Point Access Road to Awalai Street will block the through-bound vehicles behind it until a gap in opposing through traffic is available. Given that the existing queues from the signalized intersection at Farrington Highway periodically extend back to Awalai Street during the peak 20-minute periods in the morning and afternoon, it is likely that the temporary blockage by left-turns at Awalai Street will not cause a substantial operational problem.

Should the northbound left-turn blockage become an issue, two options are available to minimize this potential impact:

1. Prohibit left-turns from mauka-bound Waipio Point Access Road to Awalai Street during the peak student drop-off and pick-up hours (e.g., on weekdays between 7:30am and 8:00am, and from 2:00pm to 2:30pm), or

2. Construct a separate left-turn pocket of at least 75 feet plus transition to provide storage for vehicles.

Given the very focused and relatively short duration of school-related congestion, the turn prohibition is recommended but only if verified as needed to minimize delays at this location.

8.4 PROJECT PLUS NEW MAKAI PARKING AREA SITE ACCESS

Primary vehicle access to the site is currently provided by the existing driveway on Waipio Point Access Road at Awalai Street. With future construction of the new makai parking area, the existing access will be maintained and additional access will be provided by the new driveway to be located approximately 200 feet makai of Poailani Circle (just mauka of the Waipahu Club house building).

Overall, the proposed driveway and access connections will provide adequate capacity to serve project traffic, and no modifications to site access issues are recommended. The construction of the new driveway along Waipio Point Access Road will require a future line of sight assessment to ensure adequate visibility for all drivers of vehicles using this intersection. Assuming a posted speed limit of 25mph is maintained, the design speed for purposes of calculating sight distance is 30mph. Based on data in the AASHTO "A Policy on Geometric Design of Highways and Streets" (aka Green Book) 6th Edition, this would require that a minimum of 200 feet of stopping sight distance be provided, and that a clear sight line of 335 feet be provided to the extent feasible for drivers exiting the new driveway. This information should be verified

once more detailed design of the site is initiated. The project design should also adhere to the policies and principles outlined in the *City and County of Honolulu Complete Streets Design Manual* (September 2016).

8.5 ON-SITE VEHICLE CIRCULATION FOR THE PROJECT PLUS NEW MAKAI PARKING AREA SCENARIO

The new makai parking area is proposed to include two-way parking and drive aisles with no "dead-end" aisles. All of the parking spaces can be readily accessed and are not expected to result in vehicle circulation problems.

8.6 PROJECT PLUS NEW MAKAI PARKING AREA SCENARIO RECOMMENDATIONS

Based on the review of the Project Plus New Makai Parking Area scenario and the finding of the analysis of the Project Plus New Makai Parking Area scenario, the following on-site improvements are recommended. It should be noted that these recommendations are not considered mitigation measures, but rather supplemental improvements to circulation and access.

- Install a drop-off/pick-up zone in the new parking lot with loading and bypass lane (minimum length to fit 8 vehicles)
- Install ADA-compliant sidewalks or formal pathways connecting the parking areas to campus

Off-site improvements for the Project Plus New Makai Parking Area scenario should be consistent with those recommended for the proposed project in **Chapter 7**.

APPENDIX A: TRAFFIC COUNT DATA

National Data & Surveying Services

Intersection Turning Movement Count

Location: Kahualii St & Farrington Hwy
City: Waipahu
Control: Signalized

Project ID: 17-08073-001
Date: 8/30/2017

Total

NS/EW Streets:	Kahualii St				Kahualii St				Farrington Hwy				Farrington Hwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	1	0	1	0.5	0.5	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	2	2	42	0	74	11	4	0	1	472	4	0	21	89	9	1	732
6:15 AM	0	5	54	0	76	5	8	0	2	457	3	0	33	107	9	6	765
6:30 AM	10	3	54	0	73	10	5	0	2	431	8	0	37	124	7	3	767
6:45 AM	14	12	52	0	61	16	15	0	1	435	13	0	59	136	9	8	831
7:00 AM	16	22	62	0	51	23	25	0	5	400	38	0	53	108	7	5	815
7:15 AM	18	19	65	0	43	26	25	0	5	377	54	0	60	117	24	7	840
7:30 AM	15	27	62	0	34	24	15	0	7	348	67	0	40	180	32	19	870
7:45 AM	17	17	58	0	52	35	10	0	7	275	46	0	46	170	15	21	769
8:00 AM	14	16	20	0	38	11	8	0	5	202	7	0	40	161	12	6	540
8:15 AM	4	7	20	0	22	5	9	0	7	169	8	0	42	134	13	17	457
8:30 AM	11	1	30	0	31	7	8	0	5	167	7	0	38	129	15	10	459
8:45 AM	10	5	16	0	31	4	4	0	4	128	5	0	50	161	21	15	454
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	131	136	535	0	586	177	136	0	51	3861	260	0	519	1616	173	118	8299
APPROACH %'s :	16.33%	16.96%	66.71%	0.00%	65.18%	19.69%	15.13%	0.00%	1.22%	92.55%	6.23%	0.00%	21.39%	66.61%	7.13%	4.86%	
PEAK HR :	06:45 AM - 07:45 AM				06:45 AM	36	33	44									TOTAL
PEAK HR VOL :	63	80	241	0	189	89	80	0	18	1560	172	0	212	541	72	39	3356
PEAK HR FACTOR :	0.875	0.741	0.927	0.000	0.775	0.856	0.800	0.000	0.643	0.897	0.642	0.000	0.883	0.751	0.563	0.513	0.964
	0.923				0.904				0.974				0.797				

NS/EW Streets:	Kahualii St				Kahualii St				Farrington Hwy				Farrington Hwy				
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	1	0	1	0.5	0.5	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
2:00 PM	5	9	22	0	11	8	17	0	9	158	11	0	50	169	34	14	517
2:15 PM	8	16	25	0	20	9	15	0	13	116	24	0	55	168	44	22	535
2:30 PM	8	34	57	0	29	17	27	0	10	161	36	0	61	230	48	16	734
2:45 PM	19	35	75	0	23	16	20	0	13	176	25	0	34	212	62	6	716
3:00 PM	17	21	104	0	22	19	10	0	12	185	19	0	67	246	62	16	800
3:15 PM	28	11	79	0	14	8	18	0	4	173	16	0	53	221	44	20	689
3:30 PM	21	16	50	0	14	8	15	0	5	175	17	0	51	209	41	13	635
3:45 PM	5	8	34	0	15	6	12	0	8	173	22	0	67	246	57	9	662
4:00 PM	14	8	27	0	19	21	13	0	6	180	19	0	63	264	52	6	692
4:15 PM	7	11	38	0	17	53	9	0	7	152	24	0	77	267	76	11	749
4:30 PM	16	11	45	0	18	46	15	0	2	136	14	0	57	264	70	9	703
4:45 PM	9	8	34	0	11	15	7	0	7	173	17	0	69	245	51	12	658
5:00 PM	15	6	31	0	17	10	9	0	10	153	3	0	50	254	48	3	609
5:15 PM	13	11	26	0	22	7	11	0	2	125	22	0	52	277	44	8	620
5:30 PM	10	6	29	0	19	5	15	0	6	160	18	0	50	236	45	6	605
5:45 PM	10	10	23	0	13	15	14	0	11	123	26	0	54	261	29	6	595
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	205	221	699	0	284	263	227	0	125	2519	313	0	910	3769	807	177	10519
APPROACH %'s :	18.22%	19.64%	62.13%	0.00%	36.69%	33.98%	29.33%	0.00%	4.23%	85.19%	10.59%	0.00%	16.07%	66.55%	14.25%	3.13%	
PEAK HR :	02:30 PM - 03:30 PM																TOTAL
PEAK HR VOL :	72	101	315	0	88	60	75	0	39	695	96	0	215	909	216	58	2939
PEAK HR FACTOR :	0.643	0.721	0.757	0.000	0.759	0.789	0.694	0.000	0.750	0.939	0.667	0.000	0.802	0.924	0.871	0.725	0.918
	0.859				0.764				0.961				0.894				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Kahualii St & Farrington Hwy
City: Waipahu
Control: Signalized

Project ID: 17-08073-001
Date: 8/30/2017

Cars

NS/EW Streets:	Kahualii St				Kahualii St				Farrington Hwy				Farrington Hwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	1	0	1	0.5	0.5	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	1	2	41	0	74	11	4	0	1	463	3	0	21	88	9	1	719
6:15 AM	0	4	53	0	76	5	8	0	2	453	2	0	33	104	8	6	754
6:30 AM	9	3	54	0	73	10	5	0	2	424	7	0	35	122	7	3	754
6:45 AM	14	12	50	0	61	15	15	0	1	425	13	0	58	127	8	8	807
7:00 AM	15	22	61	0	51	22	24	0	5	394	38	0	53	105	6	5	801
7:15 AM	18	18	64	0	43	25	24	0	5	369	54	0	60	112	24	7	823
7:30 AM	15	26	61	0	34	24	14	0	7	333	66	0	40	173	27	19	839
7:45 AM	17	17	58	0	52	34	10	0	7	267	44	0	46	167	15	21	755
8:00 AM	13	15	20	0	37	11	7	0	5	193	6	0	39	154	12	6	518
8:15 AM	4	5	20	0	22	5	9	0	7	162	7	0	41	122	13	17	434
8:30 AM	11	1	28	0	31	7	8	0	5	162	6	0	36	124	15	10	444
8:45 AM	9	5	15	0	31	4	4	0	4	118	5	0	46	150	21	15	427
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	126	130	525	0	585	173	132	0	51	3763	251	0	508	1548	165	118	8075
APPROACH %'s :	16.13%	16.65%	67.22%	0.00%	65.73%	19.44%	14.83%	0.00%	1.25%	92.57%	6.17%	0.00%	21.72%	66.18%	7.05%	5.04%	
PEAK HR :	06:45 AM - 07:45 AM																TOTAL
PEAK HR VOL :	62	78	236	0	189	86	77	0	18	1521	171	0	211	517	65	39	3270
PEAK HR FACTOR :	0.86	0.750	0.922	0.000	0.775	0.860	0.802	0.000	0.643	0.895	0.648	0.000	0.879	0.747	0.602	0.513	0.974
	0.922				0.907				0.974				0.803				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	1	0	1	0.5	0.5	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
2:00 PM	5	9	22	0	11	8	17	0	9	154	10	0	47	166	33	14	505
2:15 PM	7	14	23	0	20	8	15	0	11	111	22	0	55	159	43	22	510
2:30 PM	8	32	54	0	29	15	27	0	10	157	35	0	60	225	46	16	714
2:45 PM	19	34	72	0	22	16	20	0	13	168	24	0	34	203	62	6	693
3:00 PM	17	21	102	0	21	19	10	0	12	181	19	0	67	241	61	16	787
3:15 PM	28	9	78	0	14	7	17	0	4	167	16	0	53	217	44	20	674
3:30 PM	20	16	50	0	14	8	15	0	5	168	17	0	50	206	41	13	623
3:45 PM	5	8	34	0	15	6	12	0	8	167	21	0	65	243	57	9	650
4:00 PM	14	8	25	0	19	21	13	0	6	175	19	0	61	256	52	6	675
4:15 PM	7	11	34	0	17	53	9	0	7	146	23	0	77	264	75	11	734
4:30 PM	16	11	44	0	18	46	15	0	2	133	14	0	57	257	70	9	692
4:45 PM	9	8	34	0	11	15	7	0	7	168	17	0	68	242	50	12	648
5:00 PM	15	6	31	0	17	10	9	0	10	150	3	0	50	250	48	3	602
5:15 PM	13	11	26	0	22	7	11	0	2	120	22	0	52	269	44	8	607
5:30 PM	10	6	29	0	19	5	15	0	6	157	18	0	50	231	45	6	597
5:45 PM	10	10	23	0	13	15	14	0	11	119	26	0	53	256	29	6	585
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	203	214	681	0	282	259	226	0	123	2441	306	0	899	3685	800	177	10296
APPROACH %'s :	18.49%	19.49%	62.02%	0.00%	36.77%	33.77%	29.47%	0.00%	4.29%	85.05%	10.66%	0.00%	16.17%	66.27%	14.39%	3.18%	
PEAK HR :	02:30 PM - 03:30 PM																TOTAL
PEAK HR VOL :	72	96	306	0	86	57	74	0	39	673	94	0	214	886	213	58	2868
PEAK HR FACTOR :	0.64	0.706	0.750	0.000	0.741	0.750	0.685	0.000	0.750	0.930	0.671	0.000	0.799	0.919	0.859	0.725	0.911
	0.846				0.764				0.950				0.890				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Kahualii St & Farrington Hwy
City: Waipahu
Control: Signalized

Project ID: 17-08073-001
Date: 8/30/2017

HT

NS/EW Streets:	Kahualii St				Kahualii St				Farrington Hwy				Farrington Hwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	1	0	1	0.5	0.5	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	1	0	1	0	0	0	0	0	0	9	1	0	0	1	0	0	13
6:15 AM	0	1	1	0	0	0	0	0	0	4	1	0	0	3	1	0	11
6:30 AM	1	0	0	0	0	0	0	0	0	7	1	0	2	2	0	0	13
6:45 AM	0	0	2	0	0	1	0	0	0	10	0	0	1	9	1	0	24
7:00 AM	1	0	1	0	0	1	1	0	0	6	0	0	0	3	1	0	14
7:15 AM	0	1	1	0	0	1	1	0	0	8	0	0	0	5	0	0	17
7:30 AM	0	1	1	0	0	0	1	0	0	15	1	0	0	7	0	0	26
7:45 AM	0	0	0	0	0	1	0	0	0	8	2	0	0	3	0	0	14
8:00 AM	1	1	0	0	1	0	1	0	0	9	1	0	1	7	0	0	22
8:15 AM	0	2	0	0	0	0	0	0	0	7	1	0	1	12	0	0	23
8:30 AM	0	0	2	0	0	0	0	0	0	5	1	0	2	5	0	0	15
8:45 AM	1	0	1	0	0	0	0	0	0	10	0	0	4	11	0	0	27
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	5	6	10	0	1	4	4	0	0	98	9	0	11	68	3	0	219
APPROACH %'s :	23.81%	28.57%	47.62%	0.00%	11.11%	44.44%	44.44%	0.00%	0.00%	91.59%	8.41%	0.00%	13.41%	82.93%	3.66%	0.00%	
PEAK HR :	06:45 AM - 07:45 AM																TOTAL
PEAK HR VOL :	1	2	5	0	0	3	3	0	0	39	1	0	1	24	2	0	81
PEAK HR FACTOR :	0.250	0.500	0.625	0.000	0.000	0.750	0.750	0.000	0.000	0.650	0.250	0.000	0.250	0.667	0.500	0.000	0.779
		1.000				0.750				0.625				0.614			

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	1	0	1	0.5	0.5	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
2:00 PM	0	0	0	0	0	0	0	0	0	4	1	0	3	3	1	0	12
2:15 PM	1	2	2	0	0	1	0	0	2	5	2	0	0	9	1	0	25
2:30 PM	0	2	3	0	0	2	0	0	0	4	1	0	1	5	2	0	20
2:45 PM	0	1	3	0	1	0	0	0	0	8	1	0	0	9	0	0	23
3:00 PM	0	0	2	0	1	0	0	0	0	4	0	0	0	5	1	0	13
3:15 PM	0	2	1	0	0	1	1	0	0	6	0	0	0	4	0	0	15
3:30 PM	1	0	0	0	0	0	0	0	0	7	0	0	1	3	0	0	12
3:45 PM	0	0	0	0	0	0	0	0	0	6	1	0	2	3	0	0	12
4:00 PM	0	0	2	0	0	0	0	0	0	5	0	0	2	8	0	0	17
4:15 PM	0	0	4	0	0	0	0	0	0	6	1	0	0	3	1	0	15
4:30 PM	0	0	1	0	0	0	0	0	0	3	0	0	0	7	0	0	11
4:45 PM	0	0	0	0	0	0	0	0	0	5	0	0	1	3	1	0	10
5:00 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	4	0	0	7
5:15 PM	0	0	0	0	0	0	0	0	0	5	0	0	0	8	0	0	13
5:30 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	5	0	0	8
5:45 PM	0	0	0	0	0	0	0	0	0	4	0	0	1	5	0	0	10
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	2	7	18	0	2	4	1	0	2	78	7	0	11	84	7	0	223
APPROACH %'s :	7.41%	25.93%	66.67%	0.00%	28.57%	57.14%	14.29%	0.00%	2.30%	89.66%	8.05%	0.00%	10.78%	82.35%	6.86%	0.00%	
PEAK HR :	02:30 PM - 03:30 PM																TOTAL
PEAK HR VOL :	0	5	9	0	2	3	1	0	0	22	2	0	1	23	3	0	71
PEAK HR FACTOR :	0.00	0.625	0.750	0.000	0.500	0.375	0.250	0.000	0.000	0.688	0.500	0.000	0.250	0.639	0.375	0.000	0.772
		0.700				0.750				0.667				0.750			

National Data & Surveying Services

Intersection Turning Movement Count

Location: Kahualii St & Farrington Hwy
City: Waipahu
Control: Signalized

Project ID: 17-08073-001
Date: 8/30/2017

Bikes

NS/EW Streets:	Kahualii St				Kahualii St				Farrington Hwy				Farrington Hwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	1	0	1	0.5	0.5	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	2
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	1	1	0	0	0	1	0	0	1	0	0	0	4
APPROACH %'s :					50.00%	50.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	
PEAK HR :	06:45 AM - 07:45 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	3
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.250	0.000	0.000	0.250	0.000	0.000	0.000	0.375
					0.250				0.250				0.250				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	1	0	1	0.5	0.5	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%									
PEAK HR :	02:30 PM - 03:30 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

National Data & Surveying Services

Intersection Turning Movement Count

Location: Kahualii St & Farrington Hwy
City: Waipahu

Project ID: 17-08073-001
Date: 8/30/2017

Pedestrians (Crosswalks)

NS/EW Streets:	Kahualii St		Kahualii St		Farrington Hwy		Farrington Hwy		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
6:00 AM	0	0	5	0	8	0	1	3	17
6:15 AM	0	2	6	1	10	5	3	5	32
6:30 AM	2	4	19	1	38	0	3	16	83
6:45 AM	2	3	33	0	66	0	3	29	136
7:00 AM	2	18	69	6	146	6	5	74	326
7:15 AM	2	38	146	1	278	2	2	131	600
7:30 AM	1	55	169	1	351	1	2	196	776
7:45 AM	0	10	136	4	372	1	0	139	662
8:00 AM	2	5	19	2	57	13	3	23	124
8:15 AM	2	5	8	4	15	4	3	10	51
8:30 AM	3	1	5	1	7	32	2	6	57
8:45 AM	2	2	3	0	3	0	1	2	13
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	18	143	618	21	1351	64	28	634	2877
APPROACH %'s :	11.18%	88.82%	96.71%	3.29%	95.48%	4.52%	4.23%	95.77%	
PEAK HR :	06:45 AM - 07:45 AM								TOTAL
PEAK HR VOL :	7	114	417	8	841	9	12	430	1838
PEAK HR FACTOR :	0.875	0.518	0.617	0.333	0.599	0.375	0.600	0.548	0.592
	0.540		0.625		0.604		0.558		

2364

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
2:00 PM	2	0	1	1	1	3	3	1	12
2:15 PM	51	1	2	265	4	357	250	3	933
2:30 PM	280	15	11	632	23	1001	703	11	2676
2:45 PM	78	17	7	167	18	138	208	17	650
3:00 PM	29	7	13	42	10	19	36	12	168
3:15 PM	24	4	5	18	2	6	21	7	87
3:30 PM	11	4	0	7	2	3	11	4	42
3:45 PM	3	4	4	9	2	0	8	5	35
4:00 PM	3	7	2	4	0	0	4	7	27
4:15 PM	7	3	1	8	1	3	10	1	34
4:30 PM	2	8	3	2	0	1	1	7	24
4:45 PM	1	0	2	1	3	0	2	3	12
5:00 PM	0	4	1	2	1	0	2	3	13
5:15 PM	2	6	2	0	1	0	0	9	20
5:30 PM	2	2	0	12	1	2	8	2	29
5:45 PM	0	7	2	4	3	0	0	6	22
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	495	89	56	1174	72	1533	1267	98	4784
APPROACH %'s :	84.76%	15.24%	4.55%	95.45%	4.49%	95.51%	92.82%	7.18%	
PEAK HR :	02:30 PM - 03:30 PM								TOTAL
PEAK HR VOL :	411	43	36	859	53	1164	968	47	3581
PEAK HR FACTOR :	0.367	0.632	0.692	0.340	0.576	0.291	0.344	0.691	0.335
	0.385		0.348		0.297		0.355		

4427

Prepared by National Data & Surveying Services

Kahualii St & Farrington Hwy

Peak Hour Turning Movement Count

ID: 17-08073-001
City: Waipahu

Day: Wednesday
Date: 08/30/2017

PEAK HOURS

AM: 06:45 AM - 07:45 AM
NOON: NONE
PM: 02:30 PM - 03:30 PM

COUNT PERIODS

AM: 06:00 AM - 09:00 AM
NOON: NONE
PM: 02:00 PM - 06:00 PM

Kahualii St — SOUTHBOUND

AM	80	89	189	0	170	AM
NOON	0	0	0	0	0	NOON
PM	75	60	88	0	356	PM
	0.5	0.5	1	0		

Farrington Hwy — EASTBOUND

AM	NOON	PM		
684	0	1056		
0	0	0	0	
18	0	39	1	
1560	0	695	2	
172	0	96	1	
AM	NOON	PM		

CONTROL

Signalized

TEV	3356	0	2939
	AM	NOON	PM
PHF	0.96		0.92

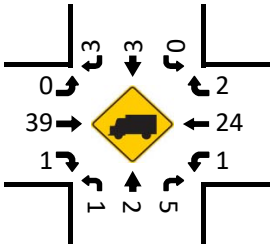
WESTBOUND — Farrington Hwy

	PM	NOON	AM
1	216	0	72
2	909	0	541
1	215	0	212
0	58	0	39
	1156	0	2029
	PM	NOON	AM

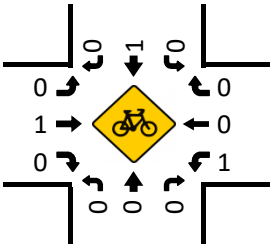
Kahualii St — NORTHBOUND

	0	0	1	1		
PM	371	0	72	101	315	PM
NOON	0	0	0	0	0	NOON
AM	473	0	63	80	241	AM

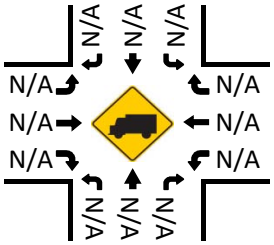
HT (AM)



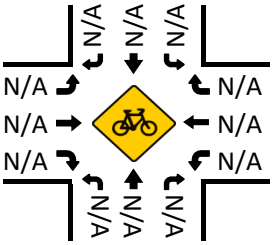
Bikes (AM)



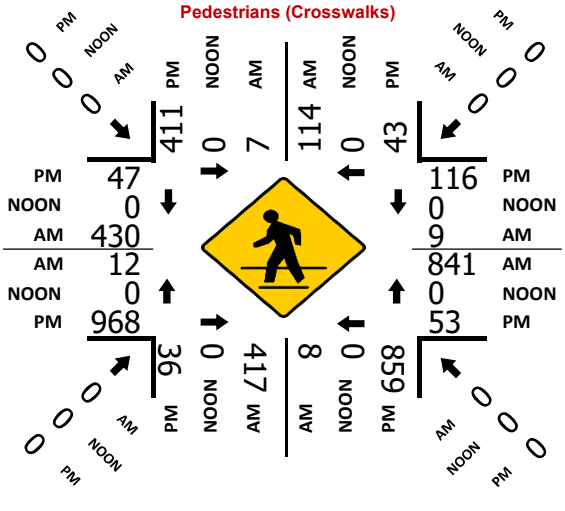
HT (NOON)



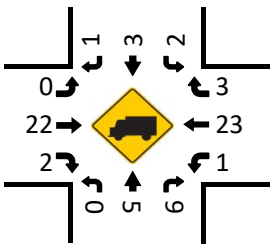
Bikes (NOON)



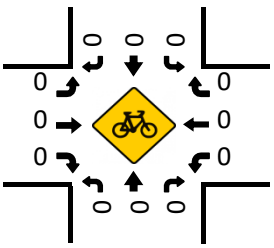
Pedestrians (Crosswalks)



HT (PM)



Bikes (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: Waipio Point Access Rd & Awalai St
City: Waipahu
Control: 2-Way Stop(EB/WB)

Project ID: 17-08073-002
Date: 8/30/2017

Total

NS/EW Streets:	Waipio Point Access Rd				Waipio Point Access Rd				Awalai St				Awalai St				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	1	14	0	0	11	22	3	0	28	8	9	0	0	1	3	0	100
6:15 AM	3	11	0	0	17	16	4	0	49	12	11	0	0	1	2	0	126
6:30 AM	3	11	0	0	29	12	4	0	45	11	14	0	0	2	11	0	142
6:45 AM	3	10	0	0	46	25	5	0	48	21	14	0	0	4	19	0	195
7:00 AM	9	18	3	0	75	16	9	0	49	21	13	0	1	11	39	0	264
7:15 AM	7	19	2	1	96	19	9	0	32	26	7	0	0	14	46	0	278
7:30 AM	3	13	1	0	82	11	12	0	33	30	17	0	1	29	48	0	280
7:45 AM	3	16	0	0	67	24	19	0	24	16	10	1	0	24	48	0	252
8:00 AM	2	16	1	0	22	22	10	0	8	7	4	0	1	5	8	0	106
8:15 AM	3	12	2	0	7	19	5	0	15	2	3	0	0	3	10	0	81
8:30 AM	4	22	0	0	20	21	7	0	11	2	5	0	0	0	8	0	100
8:45 AM	5	16	0	0	12	24	8	0	6	2	6	0	0	2	4	0	85
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	46	178	9	1	484	231	95	0	348	158	113	1	3	96	246	0	2009
APPROACH %'s :	19.66%	76.07%	3.85%	0.43%	59.75%	28.52%	11.73%	0.00%	56.13%	25.48%	18.23%	0.16%	0.87%	27.83%	71.30%	0.00%	
PEAK HR :	**07:00 AM - 08:00 AM**				07:00 AM	37	33	44									TOTAL
PEAK HR VOL :	22	66	6	1	320	70	49	0	138	93	47	1	2	78	181	0	1074
PEAK HR FACTOR :	0.611	0.868	0.500	0.250	0.833	0.729	0.645	0.000	0.704	0.775	0.691	0.250	0.500	0.672	0.943	0.000	0.959
	0.792				0.885				0.840				0.837				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
2:00 PM	5	18	0	0	13	22	13	2	10	2	6	0	0	3	10	0	104
2:15 PM	7	18	3	0	26	13	17	0	15	1	2	0	1	7	20	0	130
2:30 PM	23	31	0	1	30	26	44	0	23	8	2	0	1	12	44	0	245
2:45 PM	16	22	2	0	13	22	21	0	20	0	24	0	0	24	84	0	248
3:00 PM	14	25	0	0	34	47	20	1	12	2	7	0	3	27	93	0	285
3:15 PM	7	26	0	0	12	29	15	4	9	1	4	0	0	19	66	0	192
3:30 PM	25	54	0	0	5	43	15	0	5	1	8	0	0	8	18	0	182
3:45 PM	5	25	0	0	5	59	19	1	12	2	9	0	1	2	13	0	153
4:00 PM	7	35	1	0	5	80	13	0	7	1	12	0	0	1	12	0	174
4:15 PM	6	40	0	0	1	134	6	0	10	0	33	0	0	2	4	0	236
4:30 PM	12	56	0	0	4	95	11	0	9	1	18	0	0	0	6	0	212
4:45 PM	8	34	1	0	5	62	20	1	10	1	8	0	1	0	3	0	154
5:00 PM	10	43	1	0	2	49	19	0	9	0	13	0	0	1	1	0	148
5:15 PM	8	40	2	0	7	46	19	0	3	1	1	0	2	0	5	0	134
5:30 PM	6	31	0	0	14	32	20	0	11	1	10	0	0	1	3	0	129
5:45 PM	10	23	0	0	33	38	18	0	6	1	14	0	0	2	13	0	158
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	169	521	10	1	209	797	290	9	171	23	171	0	9	109	395	0	2884
APPROACH %'s :	24.11%	74.32%	1.43%	0.14%	16.02%	61.07%	22.22%	0.69%	46.85%	6.30%	46.85%	0.00%	1.75%	21.25%	77.00%	0.00%	
PEAK HR :	**02:30 PM - 03:30 PM**																TOTAL
PEAK HR VOL :	60	104	2	1	89	124	100	5	64	11	37	0	4	82	287	0	970
PEAK HR FACTOR :	0.652	0.839	0.250	0.250	0.654	0.660	0.568	0.313	0.696	0.344	0.385	0.000	0.333	0.759	0.772	0.000	0.851
	0.759				0.779				0.636				0.758				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Waipio Point Access Rd & Awalai St
City: Waipahu
Control: 2-Way Stop(EB/WB)

Project ID: 17-08073-002
Date: 8/30/2017

Cars

NS/EW Streets:	Waipio Point Access Rd				Waipio Point Access Rd				Awalai St				Awalai St				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	1	14	0	0	10	22	3	0	28	8	9	0	0	1	1	0	97
6:15 AM	3	10	0	0	17	15	4	0	48	11	11	0	0	1	2	0	122
6:30 AM	3	11	0	0	28	11	4	0	45	11	14	0	0	2	10	0	139
6:45 AM	2	9	0	0	46	23	4	0	47	21	14	0	0	4	18	0	188
7:00 AM	9	18	3	0	74	16	9	0	48	20	13	0	1	11	39	0	261
7:15 AM	7	17	2	1	95	19	9	0	31	24	6	0	0	13	46	0	270
7:30 AM	3	12	1	0	82	10	12	0	33	29	16	0	1	25	48	0	272
7:45 AM	3	16	0	0	64	24	19	0	24	16	10	1	0	23	47	0	247
8:00 AM	2	15	1	0	21	21	10	0	8	6	4	0	1	5	8	0	102
8:15 AM	3	12	2	0	7	19	5	0	15	1	3	0	0	1	7	0	75
8:30 AM	4	21	0	0	17	19	7	0	11	2	4	0	0	0	8	0	93
8:45 AM	4	15	0	0	12	20	8	0	6	1	5	0	0	1	3	0	75
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	44	170	9	1	473	219	94	0	344	150	109	1	3	87	237	0	1941
APPROACH %'s :	19.64%	75.89%	4.02%	0.45%	60.18%	27.86%	11.96%	0.00%	56.95%	24.83%	18.05%	0.17%	0.92%	26.61%	72.48%	0.00%	
PEAK HR :	07:00 AM - 08:00 AM																TOTAL
PEAK HR VOL :	22	63	6	1	315	69	49	0	136	89	45	1	2	72	180	0	1050
PEAK HR FACTOR :	0.61	0.875	0.500	0.250	0.829	0.719	0.645	0.000	0.708	0.767	0.703	0.250	0.500	0.720	0.938	0.000	0.965
	0.767				0.880				0.836				0.858				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
2:00 PM	4	18	0	0	12	18	13	2	10	1	5	0	0	3	10	0	96
2:15 PM	7	15	3	0	23	13	17	0	13	1	2	0	1	7	18	0	120
2:30 PM	22	30	0	1	30	22	44	0	23	7	2	0	1	12	42	0	236
2:45 PM	15	21	1	0	12	22	21	0	19	0	24	0	0	23	82	0	240
3:00 PM	14	25	0	0	34	47	20	1	11	2	7	0	3	24	91	0	279
3:15 PM	7	25	0	0	12	28	15	4	9	1	4	0	0	19	65	0	189
3:30 PM	25	54	0	0	4	43	15	0	5	1	8	0	0	8	17	0	180
3:45 PM	5	25	0	0	5	58	17	1	12	2	9	0	1	2	13	0	150
4:00 PM	7	30	1	0	4	80	12	0	6	1	12	0	0	1	12	0	166
4:15 PM	6	40	0	0	1	133	6	0	10	0	33	0	0	2	4	0	235
4:30 PM	12	55	0	0	4	95	11	0	9	1	18	0	0	0	6	0	211
4:45 PM	8	34	1	0	5	62	19	1	10	1	8	0	1	0	3	0	153
5:00 PM	10	43	1	0	2	49	19	0	9	0	13	0	0	1	1	0	148
5:15 PM	8	40	2	0	7	46	19	0	3	1	1	0	2	0	5	0	134
5:30 PM	6	31	0	0	14	32	20	0	11	1	10	0	0	1	3	0	129
5:45 PM	10	23	0	0	33	38	17	0	6	1	14	0	0	2	13	0	157
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	166	509	9	1	202	786	285	9	166	21	170	0	9	105	385	0	2823
APPROACH %'s :	24.23%	74.31%	1.31%	0.15%	15.76%	61.31%	22.23%	0.70%	46.50%	5.88%	47.62%	0.00%	1.80%	21.04%	77.15%	0.00%	
PEAK HR :	02:30 PM - 03:30 PM																TOTAL
PEAK HR VOL :	58	101	1	1	88	119	100	5	62	10	37	0	4	78	280	0	944
PEAK HR FACTOR :	0.66	0.842	0.250	0.250	0.647	0.633	0.568	0.313	0.674	0.357	0.385	0.000	0.333	0.813	0.769	0.000	0.846
	0.759				0.765				0.634				0.767				

National Data & Surveying Services

Intersection Turning Movement Count

Location: Waipio Point Access Rd & Awalai St
City: Waipahu
Control: 2-Way Stop(EB/WB)

Project ID: 17-08073-002
Date: 8/30/2017

HT

NS/EW Streets:	Waipio Point Access Rd				Waipio Point Access Rd				Awalai St				Awalai St				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	3
6:15 AM	0	1	0	0	0	1	0	0	1	1	0	0	0	0	0	0	4
6:30 AM	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	3
6:45 AM	1	1	0	0	0	2	1	0	1	0	0	0	0	0	1	0	7
7:00 AM	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	3
7:15 AM	0	2	0	0	1	0	0	0	1	2	1	0	0	1	0	0	8
7:30 AM	0	1	0	0	0	1	0	0	0	1	1	0	0	4	0	0	8
7:45 AM	0	0	0	0	3	0	0	0	0	0	0	0	0	1	1	0	5
8:00 AM	0	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0	4
8:15 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	2	3	0	6
8:30 AM	0	1	0	0	3	2	0	0	0	0	1	0	0	0	0	0	7
8:45 AM	1	1	0	0	0	4	0	0	0	1	1	0	0	1	1	0	10
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	2	8	0	0	11	12	1	0	4	8	4	0	0	9	9	0	68
APPROACH %'s :	20.00%	80.00%	0.00%	0.00%	45.83%	50.00%	4.17%	0.00%	25.00%	50.00%	25.00%	0.00%	0.00%	50.00%	50.00%	0.00%	
PEAK HR :	07:00 AM - 08:00 AM																TOTAL
PEAK HR VOL :	0	3	0	0	5	1	0	0	2	4	2	0	0	6	1	0	24
PEAK HR FACTOR :	0.000	0.375	0.000	0.000	0.417	0.250	0.000	0.000	0.500	0.500	0.500	0.000	0.000	0.375	0.250	0.000	0.750
		0.375				0.500				0.500				0.438			

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
2:00 PM	1	0	0	0	1	4	0	0	0	1	1	0	0	0	0	0	8
2:15 PM	0	3	0	0	3	0	0	0	2	0	0	0	0	0	2	0	10
2:30 PM	1	1	0	0	0	4	0	0	0	1	0	0	0	0	2	0	9
2:45 PM	1	1	1	0	1	0	0	0	1	0	0	0	0	1	2	0	8
3:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	3	2	0	6
3:15 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	3
3:30 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	2
3:45 PM	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	3
4:00 PM	0	5	0	0	1	0	1	0	1	0	0	0	0	0	0	0	8
4:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
4:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:45 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	3	12	1	0	7	11	5	0	5	2	1	0	0	4	10	0	61
APPROACH %'s :	18.75%	75.00%	6.25%	0.00%	30.43%	47.83%	21.74%	0.00%	62.50%	25.00%	12.50%	0.00%	0.00%	28.57%	71.43%	0.00%	
PEAK HR :	02:30 PM - 03:30 PM																TOTAL
PEAK HR VOL :	2	3	1	0	1	5	0	0	2	1	0	0	0	4	7	0	26
PEAK HR FACTOR :	0.50	0.750	0.250	0.000	0.250	0.313	0.000	0.000	0.500	0.250	0.000	0.000	0.000	0.333	0.875	0.000	0.722
		0.500				0.375				0.750				0.550			

National Data & Surveying Services

Intersection Turning Movement Count

Location: Waipio Point Access Rd & Awalai St
City: Waipahu
Control: 2-Way Stop(EB/WB)

Project ID: 17-08073-002
Date: 8/30/2017

Bikes

NS/EW Streets:	Waipio Point Access Rd				Waipio Point Access Rd				Awalai St				Awalai St				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
6:30 AM	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
7:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	3	0	1	0	0	2	0	0	0	1	2	0	0	0	0	0	9
APPROACH %'s :	75.00%	0.00%	25.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	33.33%	66.67%	0.00%					
PEAK HR :	07:00 AM - 08:00 AM																TOTAL
PEAK HR VOL :	1	0	1	0	0	2	0	0	0	0	1	0	0	0	0	0	5
PEAK HR FACTOR :	0.250	0.000	0.250	0.000	0.000	0.250	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.625
	0.250				0.250				0.250								

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:00 PM	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
4:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	2	3	0	0	0	0	0	0	0	0	3	0	1	0	0	0	9
APPROACH %'s :	40.00%	60.00%	0.00%	0.00%					0.00%	0.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%	
PEAK HR :	02:30 PM - 03:30 PM																TOTAL
PEAK HR VOL :	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3
PEAK HR FACTOR :	0.25	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.375
	0.500								0.250								

National Data & Surveying Services

Intersection Turning Movement Count

Location: Waipio Point Access Rd & Awalai St
City: Waipahu

Project ID: 17-08073-002
Date: 8/30/2017

Pedestrians (Crosswalks)

NS/EW Streets:	Waipio Point Access Rd		Waipio Point Access Rd		Awalai St		Awalai St			
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG			
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL	
6:00 AM	0	0	0	0	0	0	1	0	1	
6:15 AM	0	0	2	0	0	0	3	0	5	
6:30 AM	0	0	5	0	0	0	4	2	11	
6:45 AM	0	0	10	1	0	2	2	3	18	
7:00 AM	0	1	32	4	0	3	0	6	46	
7:15 AM	0	0	39	0	0	0	1	13	53	
7:30 AM	0	0	80	0	0	1	3	13	97	
7:45 AM	1	0	101	1	0	1	3	3	110	306
8:00 AM	0	0	10	3	0	3	4	5	25	
8:15 AM	1	0	0	2	0	4	2	4	13	
8:30 AM	0	0	1	0	0	1	0	4	6	
8:45 AM	0	0	1	0	0	0	1	0	2	
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL	
TOTAL VOLUMES :	2	1	281	11	0	15	24	53	387	
APPROACH %'s :	66.67%	33.33%	96.23%	3.77%	0.00%	100.00%	31.17%	68.83%		
PEAK HR :	07:00 AM - 08:00 AM								TOTAL	
PEAK HR VOL :	1	1	252	5	0	5	7	35	306	79%
PEAK HR FACTOR :	0.250	0.250	0.624	0.313		0.417	0.583	0.673	0.695	
	0.500		0.630		0.417		0.656			

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG			
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL	
2:00 PM	0	0	0	0	0	0	1	0	1	
2:15 PM	0	1	1	129	0	3	8	0	142	
2:30 PM	0	15	9	209	0	3	13	2	251	
2:45 PM	0	0	7	44	0	2	17	8	78	
3:00 PM	1	0	6	14	0	1	6	5	33	504
3:15 PM	0	1	1	3	0	1	2	2	10	
3:30 PM	0	0	2	0	0	0	0	1	3	
3:45 PM	0	0	0	0	0	0	0	4	4	
4:00 PM	0	0	0	0	0	0	2	1	3	
4:15 PM	0	0	1	0	0	0	1	1	3	
4:30 PM	0	0	2	1	0	1	0	4	8	
4:45 PM	0	0	0	1	0	0	1	0	2	
5:00 PM	0	0	0	0	0	0	2	0	2	
5:15 PM	0	0	3	0	0	0	0	6	9	
5:30 PM	0	0	2	2	0	2	0	5	11	
5:45 PM	0	0	1	0	0	0	1	9	11	
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL	
TOTAL VOLUMES :	1	17	35	403	0	13	54	48	571	
APPROACH %'s :	5.56%	94.44%	7.99%	92.01%	0.00%	100.00%	52.94%	47.06%		
PEAK HR :	02:30 PM - 03:30 PM								TOTAL	
PEAK HR VOL :	1	16	23	270	0	7	38	17	372	
PEAK HR FACTOR :	0.250	0.267	0.639	0.323		0.583	0.559	0.531	0.371	
	0.283		0.336		0.583		0.550			

Prepared by National Data & Surveying Services

Waipio Point Access Rd & Awalai St

Peak Hour Turning Movement Count

ID: 17-08073-002
City: Waipahu

Day: Wednesday
Date: 08/30/2017

PEAK HOURS
AM: 07:00 AM - 08:00 AM
NOON: NONE
PM: 02:30 PM - 03:30 PM

COUNT PERIODS
AM: 06:00 AM - 09:00 AM
NOON: NONE
PM: 02:00 PM - 06:00 PM

Waipio Point Access Rd — SOUTHBOUND

AM	49	70	320	0	385	AM
NOON	0	0	0	0	0	NOON
PM	100	124	89	5	460	PM

Awalai St — EASTBOUND

AM	NOON	PM		
150	0	242	⇦	
1	0	0	↶	0
138	0	64	↱	0
93	0	11	→	1
47	0	37	↴	0
AM	NOON	PM		

CONTROL

2-Way Stop(EB/WB)

TEV	1074 AM	0 NOON	970 PM
PHF	0.96		0.85

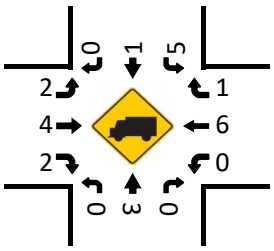
WESTBOUND — Awalai St

PM	NOON	AM		
287	0	181	↰	0
82	0	78	←	1
4	0	2	↰	0
0	0	0	↶	0
102	0	419	⇨	
PM	NOON	AM		

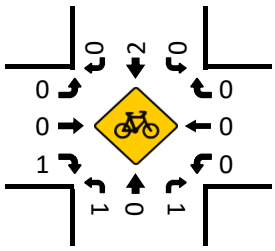
NORTHBOUND — Waipio Point Access Rd

PM	166	1	60	104	2	PM
NOON	0	0	0	0	0	NOON
AM	120	1	22	66	6	AM

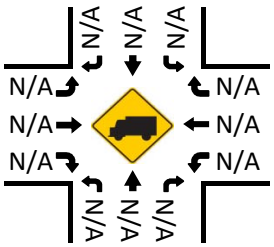
HT (AM)



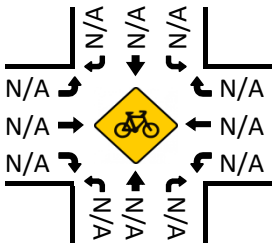
Bikes (AM)



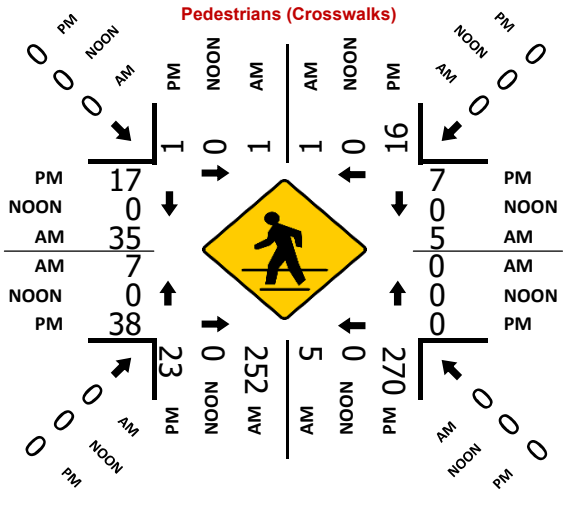
HT (NOON)



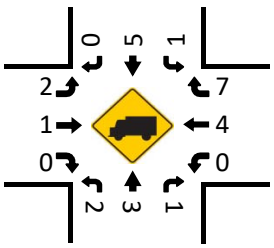
Bikes (NOON)



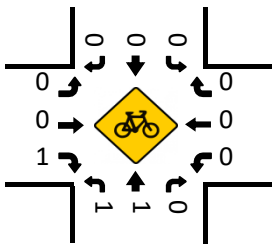
Pedestrians (Crosswalks)



HT (PM)



Bikes (PM)



APPENDIX B: EXISTING LOS WORKSHEETS

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	18	1560	172	39	212	541	72	63	80	241	189	89
Future Volume (veh/h)	18	1560	172	39	212	541	72	63	80	241	189	89
Initial Q (Qb), veh	0	0	0		0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00		1.00		1.00	0.75		1.00	0.69	
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No				No			No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870		1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	19	1625	0		221	564	0	66	83	0	197	93
Peak Hour Factor	0.96	0.96	0.96		0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2		2	2	2	2	2	2	2	2
Cap, veh/h	33	1930			248	2359		144	168		219	416
Arrive On Green	0.02	0.54	0.00		0.14	0.66	0.00	0.22	0.22	0.00	0.22	0.22
Sat Flow, veh/h	1781	3554	1585		1781	3554	1585	484	757	0	908	1870
Grp Volume(v), veh/h	19	1625	0		221	564	0	149	0	0	197	93
Grp Sat Flow(s),veh/h/ln	1781	1777	1585		1781	1777	1585	1241	0	0	908	1870
Q Serve(g_s), s	1.5	54.6	0.0		17.3	9.0	0.0	10.6	0.0	0.0	15.1	5.8
Cycle Q Clear(g_c), s	1.5	54.6	0.0		17.3	9.0	0.0	16.4	0.0	0.0	31.5	5.8
Prop In Lane	1.00		1.00		1.00		1.00	0.44		0.00	1.00	
Lane Grp Cap(c), veh/h	33	1930			248	2359		313	0		219	416
V/C Ratio(X)	0.57	0.84			0.89	0.24		0.48	0.00		0.90	0.22
Avail Cap(c_a), veh/h	220	2470			396	2822		313	0		219	416
HCM Platoon Ratio	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00		1.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	69.0	27.3	0.0		59.9	9.5	0.0	49.6	0.0	0.0	58.7	45.1
Incr Delay (d2), s/veh	14.7	2.2	0.0		14.0	0.1	0.0	1.1	0.0	0.0	35.1	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	23.6	0.0		8.8	3.5	0.0	4.9	0.0	0.0	9.4	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	83.7	29.5	0.0		73.9	9.6	0.0	50.7	0.0	0.0	93.8	45.4
LnGrp LOS	F	C			E	A		D	A		F	D
Approach Vol, veh/h		1644	A			785	A		149	A		290
Approach Delay, s/veh		30.1				27.7			50.7			78.3
Approach LOS		C				C			D			E

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	24.3	81.4		36.0	7.1	98.6		36.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	31.5	98.5		31.5	17.5	112.5		31.5				
Max Q Clear Time (g_c+I1), s	19.3	56.6		33.5	3.5	11.0		18.4				
Green Ext Time (p_c), s	0.5	20.4		0.0	0.0	4.5		0.7				

Intersection Summary			
HCM 6th Ctrl Delay		35.4	
HCM 6th LOS		D	

Notes

User approved ignoring U-Turning movement.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	80
Future Volume (veh/h)	80
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1870
Adj Flow Rate, veh/h	0
Peak Hour Factor	0.96
Percent Heavy Veh, %	2
Cap, veh/h	
Arrive On Green	0.00
Sat Flow, veh/h	0
Grp Volume(v), veh/h	0
Grp Sat Flow(s),veh/h/ln	0
Q Serve(g_s), s	0.0
Cycle Q Clear(g_c), s	0.0
Prop In Lane	0.00
Lane Grp Cap(c), veh/h	
V/C Ratio(X)	
Avail Cap(c_a), veh/h	
HCM Platoon Ratio	1.00
Upstream Filter(I)	0.00
Uniform Delay (d), s/veh	0.0
Incr Delay (d2), s/veh	0.0
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	0.0
Unsig. Movement Delay, s/veh	
LnGrp Delay(d),s/veh	0.0
LnGrp LOS	
Approach Vol, veh/h	A
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	

Intersection	
Int Delay, s/veh	3.3

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↕			↕				↕			↕	
Traffic Vol, veh/h	1	138	93	49	2	78	181	1	22	66	6	320	70	49
Future Vol, veh/h	1	138	93	49	2	78	181	1	22	66	6	320	70	49
Conflicting Peds, #/hr	0	44	0	299	262	0	7	0	299	0	262	7	0	44
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	-	None	-	-	None	-	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	-	0	-	-	0	-	-	-	0	-	-	0	-
Grade, %	-	-	0	-	-	0	-	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	144	97	51	2	81	189	1	23	69	6	333	73	51

Major/Minor	Minor2				Minor1			Major1				Major2		
Conflicting Flow All	0	1361	1449	697	1518	1471	378	-	423	0	0	337	0	0
Stage 1	0	1064	1064	-	380	382	-	-	-	-	-	-	-	-
Stage 2	0	297	385	-	1138	1089	-	-	-	-	-	-	-	-
Critical Hdwy	-	7.12	6.52	6.22	7.12	6.52	6.22	-	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	3.518	4.018	3.318	3.518	4.018	3.318	-	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	~ 125	131	441	98	127	669	-	1136	-	-	1222	-	-
Stage 1	0	270	300	-	642	613	-	-	-	-	-	-	-	-
Stage 2	0	712	611	-	245	291	-	-	-	-	-	-	-	-
Platoon blocked, %	-									-	-		-	-
Mov Cap-1 Maneuver	0	-	~ 43	226	-	~ 41	481	~ -24	~ -24	-	-	917	-	-
Mov Cap-2 Maneuver	0	-	~ 43	-	-	~ 41	-	-	-	-	-	-	-	-
Stage 1	0	270	131	-	642	460	-	-	-	-	-	-	-	-
Stage 2	0	342	458	-	21	127	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	+	+	+	8.1
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	+	-	-	-	-	917	-	-
HCM Lane V/C Ratio	-	-	-	-	-	0.364	-	-
HCM Control Delay (s)	-	-	-	-	-	11.2	0	-
HCM Lane LOS	-	-	-	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	-	-	-	1.7	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	39	695	96	58	215	909	216	72	101	315	88	60
Future Volume (veh/h)	39	695	96	58	215	909	216	72	101	315	88	60
Initial Q (Qb), veh	0	0	0		0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00		1.00		1.00	0.64		1.00	0.67	
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No				No			No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870		1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	42	755	0		234	988	0	78	110	0	96	65
Peak Hour Factor	0.92	0.92	0.92		0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2		2	2	2	2	2	2	2	2
Cap, veh/h	69	1082			286	1515		233	303		396	667
Arrive On Green	0.04	0.30	0.00		0.16	0.43	0.00	0.36	0.36	0.00	0.36	0.36
Sat Flow, veh/h	1781	3554	1585		1781	3554	1585	464	850	0	857	1870
Grp Volume(v), veh/h	42	755	0		234	988	0	188	0	0	96	65
Grp Sat Flow(s),veh/h/ln	1781	1777	1585		1781	1777	1585	1314	0	0	857	1870
Q Serve(g_s), s	1.8	14.2	0.0		9.6	16.7	0.0	4.2	0.0	0.0	0.0	1.8
Cycle Q Clear(g_c), s	1.8	14.2	0.0		9.6	16.7	0.0	7.0	0.0	0.0	6.6	1.8
Prop In Lane	1.00		1.00		1.00		1.00	0.41		0.00	1.00	
Lane Grp Cap(c), veh/h	69	1082			286	1515		536	0		396	667
V/C Ratio(X)	0.61	0.70			0.82	0.65		0.35	0.00		0.24	0.10
Avail Cap(c_a), veh/h	412	4623			741	5280		610	0		446	778
HCM Platoon Ratio	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00		1.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	35.8	23.2	0.0		30.7	17.3	0.0	17.7	0.0	0.0	17.8	16.2
Incr Delay (d2), s/veh	8.4	0.8	0.0		5.7	0.5	0.0	0.4	0.0	0.0	0.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	5.9	0.0		4.4	6.4	0.0	2.4	0.0	0.0	1.2	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.2	24.1	0.0		36.4	17.7	0.0	18.1	0.0	0.0	18.1	16.3
LnGrp LOS	D	C			D	B		B	A		B	B
Approach Vol, veh/h		797	A			1222	A		188	A		161
Approach Delay, s/veh		25.1				21.3			18.1			17.4
Approach LOS		C				C			B			B

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	16.7	27.6		31.5	7.4	36.8		31.5				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	31.5	98.5		31.5	17.5	112.5		31.5				
Max Q Clear Time (g_c+I1), s	11.6	16.2		8.6	3.8	18.7		9.0				
Green Ext Time (p_c), s	0.6	6.9		0.9	0.1	9.5		1.3				

Intersection Summary			
HCM 6th Ctrl Delay		22.1	
HCM 6th LOS		C	

Notes

User approved ignoring U-Turning movement.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	75
Future Volume (veh/h)	75
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1870
Adj Flow Rate, veh/h	0
Peak Hour Factor	0.92
Percent Heavy Veh, %	2
Cap, veh/h	
Arrive On Green	0.00
Sat Flow, veh/h	0
Grp Volume(v), veh/h	0
Grp Sat Flow(s),veh/h/ln	0
Q Serve(g_s), s	0.0
Cycle Q Clear(g_c), s	0.0
Prop In Lane	0.00
Lane Grp Cap(c), veh/h	
V/C Ratio(X)	
Avail Cap(c_a), veh/h	
HCM Platoon Ratio	1.00
Upstream Filter(I)	0.00
Uniform Delay (d), s/veh	0.0
Incr Delay (d2), s/veh	0.0
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	0.0
Unsig. Movement Delay, s/veh	
LnGrp Delay(d),s/veh	0.0
LnGrp LOS	
Approach Vol, veh/h	A
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	

Intersection	
Int Delay, s/veh	273.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations		↕			↕				↕				↕	
Traffic Vol, veh/h	64	11	37	4	82	287	1	60	104	2	5	89	124	100
Future Vol, veh/h	64	11	37	4	82	287	1	60	104	2	5	89	124	100
Conflicting Peds, #/hr	72	0	348	300	0	24	0	348	0	300	0	24	0	72
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	75	13	44	5	96	338	1	71	122	2	6	105	146	118

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	1317	1343	901	1357	1401	495	-	612	0	0	-	424	0	0
Stage 1	763	775	-	565	567	-	-	-	-	-	-	-	-	-
Stage 2	554	568	-	792	834	-	-	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	-	4.12	-	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	-	2.218	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	134	152	337	126	140	575	-	967	-	-	-	1135	-	-
Stage 1	397	408	-	510	507	-	-	-	-	-	-	-	-	-
Stage 2	517	506	-	382	383	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	-	73	151	37	~ 67	383	~ -67	~ -67	-	-	0	0	-	-
Mov Cap-2 Maneuver	-	73	-	37	~ 67	-	-	-	-	-	-	-	-	-
Stage 1	397	273	-	510	362	-	-	-	-	-	-	-	-	-
Stage 2	~ 42	361	-	173	256	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s		$ 710.7		
HCM LOS	-	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	+	-	-	-	179	-	-	-
HCM Lane V/C Ratio	-	-	-	-	2.452	-	-	-
HCM Control Delay (s)	-	-	-	-	$ 710.7	-	-	-
HCM Lane LOS	-	-	-	-	F	-	-	-
HCM 95th %tile Q(veh)	-	-	-	-	36.9	-	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	18	1560	219	39	223	541	72	82	91	245	189	115
Future Volume (veh/h)	18	1560	219	39	223	541	72	82	91	245	189	115
Initial Q (Qb), veh	0	0	0		0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00		1.00		1.00	0.78		1.00	0.74	
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No				No			No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870		1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	19	1625	0		232	564	0	85	95	0	197	120
Peak Hour Factor	0.96	0.96	0.96		0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2		2	2	2	2	2	2	2	2
Cap, veh/h	33	1923			259	2374		140	144		213	411
Arrive On Green	0.02	0.54	0.00		0.15	0.67	0.00	0.22	0.22	0.00	0.22	0.22
Sat Flow, veh/h	1781	3554	1585		1781	3554	1585	469	657	0	959	1870
Grp Volume(v), veh/h	19	1625	0		232	564	0	180	0	0	197	120
Grp Sat Flow(s),veh/h/ln	1781	1777	1585		1781	1777	1585	1126	0	0	959	1870
Q Serve(g_s), s	1.5	55.5	0.0		18.4	9.0	0.0	15.3	0.0	0.0	8.5	7.7
Cycle Q Clear(g_c), s	1.5	55.5	0.0		18.4	9.0	0.0	23.0	0.0	0.0	31.5	7.7
Prop In Lane	1.00		1.00		1.00		1.00	0.47		0.00	1.00	
Lane Grp Cap(c), veh/h	33	1923			259	2374		284	0		213	411
V/C Ratio(X)	0.58	0.85			0.90	0.24		0.63	0.00		0.92	0.29
Avail Cap(c_a), veh/h	217	2439			391	2786		284	0		213	411
HCM Platoon Ratio	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00		1.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	69.9	27.8	0.0		60.3	9.4	0.0	54.0	0.0	0.0	59.8	46.7
Incr Delay (d2), s/veh	14.9	2.4	0.0		16.2	0.1	0.0	4.5	0.0	0.0	41.2	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	24.0	0.0		9.5	3.5	0.0	6.6	0.0	0.0	9.8	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	84.8	30.2	0.0		76.4	9.5	0.0	58.5	0.0	0.0	100.9	47.1
LnGrp LOS	F	C			E	A		E	A		F	D
Approach Vol, veh/h		1644	A			796	A		180	A		317
Approach Delay, s/veh		30.8				29.0			58.5			80.6
Approach LOS		C				C			E			F

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	25.4	82.2		36.0	7.2	100.4		36.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	31.5	98.5		31.5	17.5	112.5		31.5				
Max Q Clear Time (g_c+I1), s	20.4	57.5		33.5	3.5	11.0		25.0				
Green Ext Time (p_c), s	0.5	20.2		0.0	0.0	4.5		0.6				

Intersection Summary			
HCM 6th Ctrl Delay		37.4	
HCM 6th LOS		D	

Notes

User approved ignoring U-Turning movement.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	80
Future Volume (veh/h)	80
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1870
Adj Flow Rate, veh/h	0
Peak Hour Factor	0.96
Percent Heavy Veh, %	2
Cap, veh/h	
Arrive On Green	0.00
Sat Flow, veh/h	0
Grp Volume(v), veh/h	0
Grp Sat Flow(s),veh/h/ln	0
Q Serve(g_s), s	0.0
Cycle Q Clear(g_c), s	0.0
Prop In Lane	0.00
Lane Grp Cap(c), veh/h	
V/C Ratio(X)	
Avail Cap(c_a), veh/h	
HCM Platoon Ratio	1.00
Upstream Filter(I)	0.00
Uniform Delay (d), s/veh	0.0
Incr Delay (d2), s/veh	0.0
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	0.0
Unsig. Movement Delay, s/veh	
LnGrp Delay(d),s/veh	0.0
LnGrp LOS	
Approach Vol, veh/h	A
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	

Intersection	
Int Delay, s/veh	4

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↕			↕				↕			↕	
Traffic Vol, veh/h	1	138	114	49	2	87	215	1	22	66	6	404	70	49
Future Vol, veh/h	1	138	114	49	2	87	215	1	22	66	6	404	70	49
Conflicting Peds, #/hr	0	44	0	299	262	0	7	0	299	0	262	7	0	44
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	-	None	-	-	None	-	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	-	0	-	-	0	-	-	-	0	-	-	0	-
Grade, %	-	-	0	-	-	0	-	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	144	119	51	2	91	224	1	23	69	6	421	73	51

Major/Minor	Minor2				Minor1			Major1				Major2		
Conflicting Flow All	0	1560	1625	697	1705	1647	378	-	423	0	0	337	0	0
Stage 1	0	1240	1240	-	380	382	-	-	-	-	-	-	-	-
Stage 2	0	320	385	-	1325	1265	-	-	-	-	-	-	-	-
Critical Hdwy	-	7.12	6.52	6.22	7.12	6.52	6.22	-	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	3.518	4.018	3.318	3.518	4.018	3.318	-	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	~ 91	~ 102	441	72	99	669	-	1136	-	-	1222	-	-
Stage 1	0	214	247	-	642	613	-	-	-	-	-	-	-	-
Stage 2	0	692	611	-	192	240	-	-	-	-	-	-	-	-
Platoon blocked, %	-									-	-		-	-
Mov Cap-1 Maneuver	0	-	~ 28	226	-	~ 27	481	~ -24	~ -24	-	-	917	-	-
Mov Cap-2 Maneuver	0	-	~ 28	-	-	~ 27	-	-	-	-	-	-	-	-
Stage 1	0	214	~ 89	-	642	460	-	-	-	-	-	-	-	-
Stage 2	0	285	458	-	-	~ 86	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	+	+	+	9.4
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	+	-	-	-	-	917	-	-
HCM Lane V/C Ratio	-	-	-	-	-	0.459	-	-
HCM Control Delay (s)	-	-	-	-	-	12.2	0	-
HCM Lane LOS	-	-	-	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	-	-	-	2.4	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	39	695	109	58	218	909	216	100	117	321	88	67
Future Volume (veh/h)	39	695	109	58	218	909	216	100	117	321	88	67
Initial Q (Qb), veh	0	0	0		0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00		1.00		1.00	0.64		1.00	0.70	
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No				No			No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870		1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	42	755	0		237	988	0	109	127	0	96	73
Peak Hour Factor	0.92	0.92	0.92		0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2		2	2	2	2	2	2	2	2
Cap, veh/h	69	1082			289	1520		250	268		387	665
Arrive On Green	0.04	0.30	0.00		0.16	0.43	0.00	0.36	0.36	0.00	0.36	0.36
Sat Flow, veh/h	1781	3554	1585		1781	3554	1585	509	754	0	882	1870
Grp Volume(v), veh/h	42	755	0		237	988	0	236	0	0	96	73
Grp Sat Flow(s),veh/h/ln	1781	1777	1585		1781	1777	1585	1263	0	0	882	1870
Q Serve(g_s), s	1.8	14.2	0.0		9.8	16.7	0.0	8.0	0.0	0.0	0.0	2.0
Cycle Q Clear(g_c), s	1.8	14.2	0.0		9.8	16.7	0.0	10.3	0.0	0.0	7.5	2.0
Prop In Lane	1.00		1.00		1.00		1.00	0.46		0.00	1.00	
Lane Grp Cap(c), veh/h	69	1082			289	1520		518	0		387	665
V/C Ratio(X)	0.61	0.70			0.82	0.65		0.46	0.00		0.25	0.11
Avail Cap(c_a), veh/h	411	4611			739	5266		590	0		440	776
HCM Platoon Ratio	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00		1.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	35.9	23.3	0.0		30.7	17.2	0.0	18.7	0.0	0.0	18.2	16.4
Incr Delay (d2), s/veh	8.4	0.8	0.0		5.7	0.5	0.0	0.6	0.0	0.0	0.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	5.9	0.0		4.5	6.4	0.0	3.2	0.0	0.0	1.2	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.3	24.2	0.0		36.5	17.7	0.0	19.4	0.0	0.0	18.5	16.5
LnGrp LOS	D	C			D	B		B	A		B	B
Approach Vol, veh/h		797	A			1225	A		236	A		169
Approach Delay, s/veh		25.2				21.3			19.4			17.6
Approach LOS		C				C			B			B

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	16.8	27.6		31.5	7.4	37.0		31.5				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	31.5	98.5		31.5	17.5	112.5		31.5				
Max Q Clear Time (g_c+I1), s	11.8	16.2		9.5	3.8	18.7		12.3				
Green Ext Time (p_c), s	0.6	6.9		0.9	0.1	9.5		1.7				

Intersection Summary			
HCM 6th Ctrl Delay		22.2	
HCM 6th LOS		C	

Notes

User approved ignoring U-Turning movement.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	75
Future Volume (veh/h)	75
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1870
Adj Flow Rate, veh/h	0
Peak Hour Factor	0.92
Percent Heavy Veh, %	2
Cap, veh/h	
Arrive On Green	0.00
Sat Flow, veh/h	0
Grp Volume(v), veh/h	0
Grp Sat Flow(s),veh/h/ln	0
Q Serve(g_s), s	0.0
Cycle Q Clear(g_c), s	0.0
Prop In Lane	0.00
Lane Grp Cap(c), veh/h	
V/C Ratio(X)	
Avail Cap(c_a), veh/h	
HCM Platoon Ratio	1.00
Upstream Filter(I)	0.00
Uniform Delay (d), s/veh	0.0
Incr Delay (d2), s/veh	0.0
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	0.0
Unsig. Movement Delay, s/veh	
LnGrp Delay(d),s/veh	0.0
LnGrp LOS	
Approach Vol, veh/h	A
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	

Intersection	
Int Delay, s/veh	386.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations		↕			↕				↕				↕	
Traffic Vol, veh/h	64	17	37	4	95	337	1	60	104	2	5	112	124	100
Future Vol, veh/h	64	17	37	4	95	337	1	60	104	2	5	112	124	100
Conflicting Peds, #/hr	72	0	34	300	0	24	0	348	0	300	0	24	0	72
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	75	20	44	5	112	396	1	71	122	2	6	132	146	118

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	1408	1397	853	1366	1455	495	-	612	0	0	-	424	0	0
Stage 1	817	829	-	565	567	-	-	-	-	-	-	-	-	-
Stage 2	591	568	-	801	888	-	-	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	-	4.12	-	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	-	2.218	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	116	141	359	124	130	575	-	967	-	-	-	1135	-	-
Stage 1	370	385	-	510	507	-	-	-	-	-	-	-	-	-
Stage 2	493	506	-	378	362	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	-	67	171	36	~ 62	~ 383	~ -67	~ -67	-	-	0	0	-	-
Mov Cap-2 Maneuver	-	67	-	36	~ 62	-	-	-	-	-	-	-	-	-
Stage 1	370	258	-	510	362	-	-	-	-	-	-	-	-	-
Stage 2	-	361	-	186	242	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s		$ 940.4		
HCM LOS	-	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	+	-	-	-	173	-	-	-
HCM Lane V/C Ratio	-	-	-	-	2.965	-	-	-
HCM Control Delay (s)	-	-	-	-	-$ 940.4	-	-	-
HCM Lane LOS	-	-	-	-	F	-	-	-
HCM 95th %tile Q(veh)	-	-	-	-	46.6	-	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

APPENDIX C: EXISTING+PROJECT+MAKAI PARKING LOT LOS WORKSHEETS

HCM 6th Signalized Intersection Summary
1: Waipio Point Access Rd/Kahualii St & Farrington Hwy

AM Peak Hour

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	18	1560	188	39	269	541	72	69	89	265	189	110
Future Volume (veh/h)	18	1560	188	39	269	541	72	69	89	265	189	110
Initial Q (Qb), veh	0	0	0		0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00		1.00		1.00	0.77		1.00	0.72	
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No				No			No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870		1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	19	1625	0		280	564	0	72	93	0	197	115
Peak Hour Factor	0.96	0.96	0.96		0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2		2	2	2	2	2	2	2	2
Cap, veh/h	32	1893			304	2435		125	150		195	388
Arrive On Green	0.02	0.53	0.00		0.17	0.69	0.00	0.21	0.21	0.00	0.21	0.21
Sat Flow, veh/h	1781	3554	1585		1781	3554	1585	439	721	0	939	1870
Grp Volume(v), veh/h	19	1625	0		280	564	0	165	0	0	197	115
Grp Sat Flow(s),veh/h/ln	1781	1777	1585		1781	1777	1585	1161	0	0	939	1870
Q Serve(g_s), s	1.6	59.7	0.0		23.5	9.0	0.0	13.8	0.0	0.0	9.8	7.9
Cycle Q Clear(g_c), s	1.6	59.7	0.0		23.5	9.0	0.0	21.7	0.0	0.0	31.5	7.9
Prop In Lane	1.00		1.00		1.00		1.00	0.44		0.00	1.00	
Lane Grp Cap(c), veh/h	32	1893			304	2435		275	0		195	388
V/C Ratio(X)	0.59	0.86			0.92	0.23		0.60	0.00		1.01	0.30
Avail Cap(c_a), veh/h	205	2307			370	2634		275	0		195	388
HCM Platoon Ratio	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00		1.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	73.9	30.5	0.0		61.9	8.9	0.0	57.3	0.0	0.0	65.2	50.8
Incr Delay (d2), s/veh	15.8	3.0	0.0		25.0	0.0	0.0	3.6	0.0	0.0	67.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	26.3	0.0		12.8	3.5	0.0	6.3	0.0	0.0	11.3	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	89.7	33.5	0.0		87.0	9.0	0.0	60.9	0.0	0.0	132.6	51.2
LnGrp LOS	F	C			F	A		E	A		F	D
Approach Vol, veh/h		1644	A			844	A		165	A		312
Approach Delay, s/veh		34.1				34.8			60.9			102.6
Approach LOS		C				C			E			F

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	30.4	85.4		36.0	7.3	108.5		36.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	31.5	98.5		31.5	17.5	112.5		31.5				
Max Q Clear Time (g_c+I1), s	25.5	61.7		33.5	3.6	11.0		23.7				
Green Ext Time (p_c), s	0.4	19.1		0.0	0.0	4.5		0.6				

Intersection Summary			
HCM 6th Ctrl Delay		43.0	
HCM 6th LOS		D	

Notes

User approved ignoring U-Turning movement.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	80
Future Volume (veh/h)	80
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1870
Adj Flow Rate, veh/h	0
Peak Hour Factor	0.96
Percent Heavy Veh, %	2
Cap, veh/h	
Arrive On Green	0.00
Sat Flow, veh/h	0
Grp Volume(v), veh/h	0
Grp Sat Flow(s),veh/h/ln	0
Q Serve(g_s), s	0.0
Cycle Q Clear(g_c), s	0.0
Prop In Lane	0.00
Lane Grp Cap(c), veh/h	
V/C Ratio(X)	
Avail Cap(c_a), veh/h	
HCM Platoon Ratio	1.00
Upstream Filter(I)	0.00
Uniform Delay (d), s/veh	0.0
Incr Delay (d2), s/veh	0.0
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	0.0
Unsig. Movement Delay, s/veh	
LnGrp Delay(d),s/veh	0.0
LnGrp LOS	
Approach Vol, veh/h	A
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	

Intersection	
Int Delay, s/veh	3.3

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↕			↕				↕			↕	
Traffic Vol, veh/h	1	138	93	60	2	80	190	1	24	96	6	346	138	49
Future Vol, veh/h	1	138	93	60	2	80	190	1	24	96	6	346	138	49
Conflicting Peds, #/hr	0	44	0	299	262	0	7	0	299	0	262	7	0	44
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	-	None	-	-	None	-	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	-	0	-	-	0	-	-	-	0	-	-	0	-
Grade, %	-	-	0	-	-	0	-	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	144	97	63	2	83	198	1	25	100	6	360	144	51

Major/Minor	Minor2				Minor1			Major1				Major2		
Conflicting Flow All	0	1527	1609	768	1684	1631	409	-	494	0	0	368	0	0
Stage 1	0	1189	1189	-	415	417	-	-	-	-	-	-	-	-
Stage 2	0	338	420	-	1269	1214	-	-	-	-	-	-	-	-
Critical Hdwy	-	7.12	6.52	6.22	7.12	6.52	6.22	-	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	3.518	4.018	3.318	3.518	4.018	3.318	-	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	~ 96	105	402	75	101	642	-	1070	-	-	1191	-	-
Stage 1	0	229	261	-	615	591	-	-	-	-	-	-	-	-
Stage 2	0	676	589	-	206	254	-	-	-	-	-	-	-	-
Platoon blocked, %	-									-	-		-	-
Mov Cap-1 Maneuver	0	-	~ 31	206	-	~ 30	462	~ -26	~ -26	-	-	894	-	-
Mov Cap-2 Maneuver	0	-	~ 31	-	-	~ 30	-	-	-	-	-	-	-	-
Stage 1	0	229	102	-	615	443	-	-	-	-	-	-	-	-
Stage 2	0	301	442	-	3	99	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	+	+	+	7.6
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	+	-	-	-	-	894	-	-
HCM Lane V/C Ratio	-	-	-	-	-	0.403	-	-
HCM Control Delay (s)	-	-	-	-	-	11.7	0	-
HCM Lane LOS	-	-	-	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	-	-	-	2	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 6th Signalized Intersection Summary
1: Waipio Point Access Rd/Kahualii St & Farrington Hwy

PM Peak Hour

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	39	695	100	58	230	909	216	81	114	350	88	66
Future Volume (veh/h)	39	695	100	58	230	909	216	81	114	350	88	66
Initial Q (Qb), veh	0	0	0		0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00		1.00		1.00	0.64		1.00	0.68	
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No				No			No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870		1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	42	755	0		250	988	0	88	124	0	96	72
Peak Hour Factor	0.92	0.92	0.92		0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2		2	2	2	2	2	2	2	2
Cap, veh/h	69	1078			302	1543		229	298		384	657
Arrive On Green	0.04	0.30	0.00		0.17	0.43	0.00	0.35	0.35	0.00	0.35	0.35
Sat Flow, veh/h	1781	3554	1585		1781	3554	1585	464	849	0	865	1870
Grp Volume(v), veh/h	42	755	0		250	988	0	212	0	0	96	72
Grp Sat Flow(s),veh/h/ln	1781	1777	1585		1781	1777	1585	1313	0	0	865	1870
Q Serve(g_s), s	1.8	14.4	0.0		10.4	16.7	0.0	5.7	0.0	0.0	0.0	2.0
Cycle Q Clear(g_c), s	1.8	14.4	0.0		10.4	16.7	0.0	8.5	0.0	0.0	7.5	2.0
Prop In Lane	1.00		1.00		1.00		1.00	0.42		0.00	1.00	
Lane Grp Cap(c), veh/h	69	1078			302	1543		528	0		384	657
V/C Ratio(X)	0.61	0.70			0.83	0.64		0.40	0.00		0.25	0.11
Avail Cap(c_a), veh/h	406	4556			730	5204		601	0		434	767
HCM Platoon Ratio	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00		1.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	36.4	23.7	0.0		30.8	17.0	0.0	18.6	0.0	0.0	18.6	16.8
Incr Delay (d2), s/veh	8.5	0.8	0.0		5.8	0.4	0.0	0.5	0.0	0.0	0.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	6.0	0.0		4.8	6.4	0.0	2.8	0.0	0.0	1.3	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.9	24.5	0.0		36.6	17.5	0.0	19.1	0.0	0.0	18.9	16.9
LnGrp LOS	D	C			D	B		B	A		B	B
Approach Vol, veh/h		797	A			1238	A		212	A		168
Approach Delay, s/veh		25.6				21.3			19.1			18.0
Approach LOS		C				C			B			B

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	17.5	27.8		31.5	7.5	37.9		31.5				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	31.5	98.5		31.5	17.5	112.5		31.5				
Max Q Clear Time (g_c+I1), s	12.4	16.4		9.5	3.8	18.7		10.5				
Green Ext Time (p_c), s	0.7	6.9		0.9	0.1	9.5		1.5				

Intersection Summary			
HCM 6th Ctrl Delay		22.3	
HCM 6th LOS		C	

Notes

User approved ignoring U-Turning movement.

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	75
Future Volume (veh/h)	75
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	1.00
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1870
Adj Flow Rate, veh/h	0
Peak Hour Factor	0.92
Percent Heavy Veh, %	2
Cap, veh/h	
Arrive On Green	0.00
Sat Flow, veh/h	0
Grp Volume(v), veh/h	0
Grp Sat Flow(s),veh/h/ln	0
Q Serve(g_s), s	0.0
Cycle Q Clear(g_c), s	0.0
Prop In Lane	0.00
Lane Grp Cap(c), veh/h	
V/C Ratio(X)	
Avail Cap(c_a), veh/h	
HCM Platoon Ratio	1.00
Upstream Filter(I)	0.00
Uniform Delay (d), s/veh	0.0
Incr Delay (d2), s/veh	0.0
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	0.0
Unsig. Movement Delay, s/veh	
LnGrp Delay(d),s/veh	0.0
LnGrp LOS	
Approach Vol, veh/h	A
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	

Intersection	
Int Delay, s/veh	326.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations		↕			↕				↕				↕	
Traffic Vol, veh/h	64	11	40	4	85	300	1	63	148	2	5	96	142	100
Future Vol, veh/h	64	11	40	4	85	300	1	63	148	2	5	96	142	100
Conflicting Peds, #/hr	72	0	348	300	0	24	0	348	0	300	0	24	0	72
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	75	13	47	5	100	353	1	74	174	2	6	113	167	118

Major/Minor	Minor2			Minor1			Major1				Major2			
Conflicting Flow All	1422	1438	922	1453	1496	547	-	633	0	0	-	476	0	0
Stage 1	800	812	-	623	625	-	-	-	-	-	-	-	-	-
Stage 2	622	626	-	830	871	-	-	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	-	4.12	-	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	-	2.218	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	114	133	327	108	123	537	-	950	-	-	-	1086	-	-
Stage 1	379	392	-	474	477	-	-	-	-	-	-	-	-	-
Stage 2	474	477	-	364	368	-	-	-	-	-	-	-	-	-
Platoon blocked, %									-	-			-	-
Mov Cap-1 Maneuver	-	64	146	29	~ 59	357	~ -71	~ -71	-	-	0	0	-	-
Mov Cap-2 Maneuver	-	64	-	29	~ 59	-	-	-	-	-	-	-	-	-
Stage 1	379	262	-	474	341	-	-	-	-	-	-	-	-	-
Stage 2	~ 4	341	-	157	246	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s		$ 889.7		
HCM LOS	-	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	+	-	-	-	161	-	-	-
HCM Lane V/C Ratio	-	-	-	-	2.843	-	-	-
HCM Control Delay (s)	-	-	-	-	-$ 889.7	-	-	-
HCM Lane LOS	-	-	-	-	F	-	-	-
HCM 95th %tile Q(veh)	-	-	-	-	41.2	-	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

APPENDIX E
Proposed Wastewater Flow Computation

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PROPOSED WASTEWATER FLOW COMPUTATION

PROJECT: WAIPAHU HS NEW CLASSROOM BLDG

Based on the Wastewater System, Design Standards, City and County of Honolulu, dated July 2017

BASE SANITARY FLOW (BSF)

DENSITY(2,500-STUDENTS/197-FACULTY)		
CAPITA	2,697	CAPITA
AVERAGE DAILY PER CAPITA WASTEWATER FLOW:	25	GALLONS PER DAY PER CAPITA*

**Based on discussions with the Wastewater Branch, DPP*

BASE SANITARY FLOW (BSF)	**67,425**	**GALLONS PER DAY**

PEAK BASE SANITARY FLOW (PBSF)

BASE SANITARY FLOW	67,425	GALLONS PER DAY
FLOW FACTOR	5	
PEAK BASE SANITARY FLOW (PBSF)	**337,125**	**GALLONS PER DAY**

AVERAGE DRY WEATHER FLOW (ADWF)

BASE SANITARY FLOW (BSF)	67,425	GALLONS PER DAY
GROUNDWATER INFILTRATION(GWI)	35	GPCD
CAPITA PER DAY	2,697	CAPITA
AVERAGE DRY WEATHER FLOW (ADWF)	**161,820**	**GALLONS PER DAY**

PEAK DRY WEATHER FLOW (PDWF)

PEAK BASE SANITARY FLOW (PBSF)	337,125	GALLONS PER DAY
GROUNDWATER INFILTRATION(GWI)	35	GPCD
CAPITA PER DAY	2,697	CAPITA
PEAK DRY WEATHER FLOW (PDWF)	**431,520**	**GALLONS PER DAY**

DESIGN FLOW (Qdes)

PEAK DRY WEATHER FLOW (PDWF)	431,520	GALLONS PER DAY
WET WEATHER INFILTRATION/INFLOW (I/I)	3,000	GPAD
AVERAGE CAPITA	21.5	ACRE(S)
DESIGN FLOW	**496,020**	**GALLONS PER DAY**

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APPENDIX F
Draft EA Comment Letters & Responses

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DAVID Y. IGE
GOVERNOR

PANKAJ BHANOT
DIRECTOR

CATHY BETTS
DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF HUMAN SERVICES
Benefit, Employment and Support Services Division
1010 Richards Street, Suite 512
Honolulu, Hawai'i 96813

June 24, 2019

Re: 19-0254

PBR Hawaii & Associates, INC.
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813
Attn: Greg Nakai

Dear Mr. Nakai:

SUBJECT: Draft Environmental Assessment (DEA) – Waipahu High School New Classroom Building, Waipahu TMK (1) 9-4-008: 020 (por.) and 025 (por.)

This is in response to your letter dated June 7, 2019 requesting the Department of Human Services (DHS) review and comment on the above named project.

The DHS has reviewed the DEA for Waipahu High School new classroom. At this time, DHS has no comments. Previous comments submitted in a letter dated May 11, 2017 were addressed in the DEA.

If you should have any question regarding this matter, please contact Ms. Lisa Galino, Child Care Program Specialist at (808) 586-5712.

Sincerely,

for Scott Nakasone
Assistant Division Administrator

c: Pankaj Bhanot, Director

PBR HAWAII
& ASSOCIATES, INC.

August 9, 2019

Mr. Scott Nakasone
Assistant Division Administrator
Benefit, Employment and Support Services Division
State of Hawai‘i, Department of Human Services
820 Mililani Street, Suite 606
Honolulu, Hawai‘i 96813

Attn: Ms. Lisa Galino, Child Care Program Specialist

SUBJECT: HRS CHAPTER 343 DRAFT ENVIRONMENTAL ASSESSMENT FOR WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING, WAIPAHU, TMK (1) 9-4-008:020 (POR.) & 025 (POR.)

Dear Mr. Nakasone:

Thank you for your letter dated June 24, 2019 (your reference number 19-0254), regarding the subject project. As the planning sub-consultant for the State of Hawai‘i Department of Education (DOE), we acknowledge that the previous comments submitted by the Department of Human Services (DHS) on May 11, 2017, have been addressed in the Draft Environmental Assessment (EA) and that DHS has no further comments to offer at this time.

We value your participation in the environmental review process. Your letter will be reproduced in the forthcoming Final EA.

Sincerely,
PBR HAWAII

Greg Nakai
Planner

cc: Karynn Yoneshige, DOE
Rochelle Nagata-Wu, WRNS

O:\Job24\2472.30 DOE Waipahu HS New Classroom Bldg\EA\DEA\Comments + Responses\Responses\State - DHS Response.docx

HONOLULU OFFICE
1001 Bishop Street, Suite 650
Honolulu, Hawai‘i 96813-3484
Tel: (808) 521-5631
Fax: (808) 523-1402
E-mail: sysadmin@pbrhawaii.com

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
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

LD 976

July 5, 2019

PBR HAWAII & Associates, Inc.
Attn: Mr. Greg Nakai, Planner
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813

via email: gnakai@pbrhawaii.com

Dear Mr. Nakai:

SUBJECT: Draft Environmental Assessment (**DEA**) **for the Waipahu High School New Classroom Building** located at Waipahu, Island of Oahu; TMK Nos. (1) 9-4-008:020 (por.) and -025 (por.)

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

At this time, enclosed are comments from the (a) Engineering Division, (b) Division of Forestry & Wildlife, and (c) Land Division – Oahu District on the subject matter. Should you have any questions, please feel free to contact Barbara Lee at (808) 587-0453 or by email at barbara.j.lee@hawaii.gov. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosure(s)
cc: State of Hawaii, Department of Education (w/copies)
Office of School Facilities and Support Services
Facilities Development Branch
Attn: Ms. Karynn Yoneshige
email: Karynn_Yoneshige/FacilDev/HIDOE@notes.k12.hi.us
Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
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

'19 JUN 13 PM 1104 ENGINEERING

June 12, 2019

MEMORANDUM

LD 976

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LAND DIVISION
2019 JUN 19 AM 11:11
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

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

FROM: Russell Y. Tsuji, Land Administrator

SUBJECT: Draft Environmental Assessment (**DEA**) **for the Waipahu High School New Classroom Building**

LOCATION: Waipahu, Island of Oahu; TMK Nos. (1) 9-4-008:020 (por.) and -025 (por.)

APPLICANT: PBR Hawaii & Associates, Inc. on behalf of Hawaii Department of Education

Transmitted for your review and comment is information on the above-referenced project. The DEA was published in OEQC's official publication, The Environmental Notice (TEN), on June 08, 2019. This issue of the TEN and a link to the DEA can be found at: http://oeqc2.doh.hawaii.gov/The_Environmental_Notice/2019-06-08-TEN.pdf

Please submit any comments by **July 03, 2019.** 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 Barbara Lee by phone at 587-0453 or by email at barbara.j.lee@hawaii.gov with copy to darlene.k.nakamura@hawaii.gov. Thank you.

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

Signed: _____

Print Name: Carty S. Chang, Chief Engineer

Date: 6/12/19

Attachments
Cc: Central Files

19805

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
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

June 12, 2019

MEMORANDUM

LD 976

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LAND DIVISION
2019 JUN 20 AM 11:01
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

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

FROM: Russell Y. Tsuji, Land Administrator

SUBJECT: Draft Environmental Assessment (**DEA**) **for the Waipahu High School New Classroom Building**

LOCATION: Waipahu, Island of Oahu; TMK Nos. (1) 9-4-008:020 (por.) and -025 (por.)

APPLICANT: PBR Hawaii & Associates, Inc. on behalf of Hawaii Department of Education

Transmitted for your review and comment is information on the above-referenced project. The DEA was published in OEQC's official publication, The Environmental Notice (TEN), on June 08, 2019. This issue of the TEN and a link to the DEA can be found at: http://oeqc2.doh.hawaii.gov/The_Environmental_Notice/2019-06-08-TEN.pdf

Please submit any comments by **July 03, 2019.** 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 Barbara Lee by phone at 587-0453 or by email at barbara.j.lee@hawaii.gov with copy to darlene.k.nakamura@hawaii.gov. Thank you.

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

Signed: _____

DAVID G. SMITH, Administrator

Print Name: _____

Date: 6/18/19

Attachments
Cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
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

June 12, 2019

MEMORANDUM

LD 976

TO: **DLNR Agencies:**
___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
___Office of Conservation & Coastal Lands
_X_ Land Division – Oahu District
_X_ Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator
SUBJECT: Draft Environmental Assessment (**DEA**) **for the Waipahu High School New Classroom Building**
LOCATION: Waipahu, Island of Oahu; TMK Nos. (1) 9-4-008:020 (por.) and -025 (por.)
APPLICANT: PBR Hawaii & Associates, Inc. on behalf of Hawaii Department of Education

Transmitted for your review and comment is information on the above-referenced project. The DEA was published in OEQC's official publication, The Environmental Notice (TEN), on June 08, 2019. This issue of the TEN and a link to the DEA can be found at: http://oeqc2.doh.hawaii.gov/The_Environmental_Notice/2019-06-08-TEN.pdf

Please submit any comments by **July 03, 2019.** 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 Barbara Lee by phone at 587-0453 or by email at barbara.j.lee@hawaii.gov with copy to darlene.k.nakamura@hawaii.gov. Thank you.

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

Signed: _____

Print Name: Patti E. Miyashiro
Date: June 14, 2019

Attachments
Cc: Central Files

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
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

LD 976

July 16, 2019

PBR HAWAII & Associates, Inc.
Attn: Mr. Greg Nakai, Planner
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813

via email: gnakai@pbrhawaii.com

Dear Mr. Nakai:

SUBJECT: Additional Comments on Draft Environmental Assessment (**DEA**) **for the Waipahu High School New Classroom Building** located at Waipahu, Island of Oahu; TMK Nos. (1) 9-4-008:020 (por.) and -025 (por.)

Thank you for the opportunity to review and comment on the subject matter. In addition to our previous comments dated July 05, 2019, enclosed are comments from the Commission on Water Resource Management of the Department of Land and Natural Resources (DLNR). Should you have any questions, please feel free to contact Barbara Lee at (808) 587-0453 or by email at barbara.j.lee@hawaii.gov. Thank you.

Sincerely,

Russell Y. Tsuji
Land Administrator

Enclosure(s)
cc: State of Hawaii, Department of Education (w/copies)
Office of School Facilities and Support Services
Facilities Development Branch
Attn: Ms. Karynn Yoneshige
email: Karynn_Yoneshige/FacilDev/HIDOE@notes.k12.hi.us
Central Files

LD 1248

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

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HONOLULU, HAWAII 96809

June 12, 2019

MEMORANDUM

LD 976

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DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

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

FROM: Russell Y. Tsuji, Land Administrator

SUBJECT: Draft Environmental Assessment (**DEA**) **for the Waipahu High School New Classroom Building**

LOCATION: Waipahu, Island of Oahu; TMK Nos. (1) 9-4-008:020 (por.) and -025 (por.)

APPLICANT: PBR Hawaii & Associates, Inc. on behalf of Hawaii Department of Education

Transmitted for your review and comment is information on the above-referenced project. The DEA was published in OEQC's official publication, The Environmental Notice (TEN), on June 08, 2019. This issue of the TEN and a link to the DEA can be found at: http://oeqc2.doh.hawaii.gov/The_Environmental_Notice/2019-06-08-TEN.pdf

Please submit any comments by **July 03, 2019.** 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 Barbara Lee by phone at 587-0453 or by email at barbara.j.lee@hawaii.gov with copy to darlene.k.nakamura@hawaii.gov. Thank you.

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

Signed: /s/ M. Kaleo Manuel

Print Name: Deputy Director

Date: July 15, 2019

Attachments
Cc: Central Files

RFD. 4592.3
21598

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

July 15, 2019

REF: RFD.4592.3

TO: Mr. Russell Tsuji, Administrator
Land Division

FROM: M. Kaleo Manuel, Deputy Director
Commission on Water Resource Management

SUBJECT: Draft Environmental Assessment (DEA) for the Waipahu High School New Classroom Building

FILE NO.: RFD.4592.3
TMK NO.: (1) 9-4-008:020 (por.) and 025 (por.)

Thank you for the opportunity to review the subject document. The Commission on Water Resource Management (CWRM) is the agency responsible for administering the State Water Code (Code). Under the Code, all waters of the State are held in trust for the benefit of the citizens of the State, therefore all water use is subject to legally protected water rights. CWRM strongly promotes the efficient use of Hawaii's water resources through conservation measures and appropriate resource management. For more information, please refer to the State Water Code, Chapter 174C, Hawaii Revised Statutes, and Hawaii Administrative Rules, Chapters 13-167 to 13-171. These documents are available via the Internet at http://dlnr.hawaii.gov/cwrm.

Our comments related to water resources are checked off below.

- [ ] 1. We recommend coordination with the county to incorporate this project into the county's Water Use and Development Plan. Please contact the respective Planning Department and/or Department of Water Supply for further information.
- [X] 2. We recommend coordination with the Engineering Division of the State Department of Land and Natural Resources to incorporate this project into the State Water Projects Plan.
- [ ] 3. We recommend coordination with the Hawaii Department of Agriculture (HDOA) to incorporate the reclassification of agricultural zoned land and the redistribution of agricultural resources into the State's Agricultural Water Use and Development Plan (AWUDP). Please contact the HDOA for more information.
- [X] 4. We recommend that water efficient fixtures be installed and water efficient practices implemented throughout the development to reduce the increased demand on the area's freshwater resources. Reducing the water usage of a home or building may earn credit towards Leadership in Energy and Environmental Design (LEED) certification. More information on LEED certification is available at http://www.usgbc.org/leed. A listing of fixtures certified by the EAP as having high water efficiency can be found at http://www.epa.gov/watersense.
- [X] 5. We recommend the use of best management practices (BMP) for stormwater management to minimize the impact of the project to the existing area's hydrology while maintaining on-site infiltration and preventing polluted runoff from storm events. Stormwater management BMPs may earn credit toward LEED certification. More information on stormwater BMPs can be found at http://planning.hawaii.gov/czm/initiatives/low-impact-development/
- [X] 6. We recommend the use of alternative water sources, wherever practicable.
- [ ] 7. We recommend participating in the Hawaii Green Business Program, that assists and recognizes businesses that strive to operate in an environmentally and socially responsible manner. The program description can be found online at http://energy.hawaii.gov/green-business-program.
- [X] 8. We recommend adopting landscape irrigation conservation best management practices endorsed by the Landscape Industry Council of Hawaii. These practices can be found online at http://www.hawaiiscape.com/wp-content/uploads/2013/04/LICH_Irrigation_Conservation_BMPs.pdf.

☐ 9. There may be the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality.

☐ 10. The proposed water supply source for the project is located in a designated water management area, and a Water Use Permit is required prior to use of water. The Water Use Permit may be conditioned on the requirement to use dual line water supply systems for new industrial and commercial developments.

☐ 11. A Well Construction Permit(s) is (are) are required before the commencement of any well construction work.

☐ 12. A Pump Installation Permit(s) is (are) required before ground water is developed as a source of supply for the project.

☐ 13. There is (are) well(s) located on or adjacent to this project. If wells are not planned to be used and will be affected by any new construction, they must be properly abandoned and sealed. A permit for well abandonment must be obtained.

☐ 14. Ground-water withdrawals from this project may affect streamflows, which may require an instream flow standard amendment.

☐ 15. A Stream Channel Alteration Permit(s) is (are) required before any alteration can be made to the bed and/or banks of a steam channel.

☐ 16. A Stream Diversion Works Permit(s) is (are) required before any stream diversion works is constructed or altered.

☐ 17. A Petition to Amend the Interim Instream Flow Standard is required for any new or expanded diversion(s) of surface water.

☐ 18. The planned source of water for this project has not been identified in this report. Therefore, we cannot determine what permits or petitions are required from our office, or whether there are potential impacts to water resources.

☒ OTHER: The report notes that the building will adhere to LEED principles, will use water efficient fixtures, implement water efficient practices and use alternative resources where practicable. Please consider xeriscaping or native plantings and conservation landscaping to reduce water use and educate students about outdoor water conservation. Please also consider installing raingardens as another educational and aesthetic feature that will also help to retain storm water onsite and reduce runoff.

If you have any questions, please contact Lenore Ohye of the Commission staff at 587-0216.

PBR HAWAII
& ASSOCIATES, INC.

August 9, 2019

Mr. Russell Tsuji
Land Administrator
Land Division
State of Hawai‘i
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawai‘i 96809

ATTN: Ms. Barbara Lee; Carty S. Chang (Engineering Division); David G. Smith (DOFAW); Patti E. Miyashiro (Land Division – O‘ahu District); M. Kaleo Manuel (CWRM)

SUBJECT: HRS CHAPTER 343 DRAFT ENVIRONMENTAL ASSESSMENT FOR WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING, WAIPAHU, TMK (1) 9-4-008: 020 (POR.) & 025 (POR.)

Dear Mr. Tsuji:

Thank you for the Department of Land and Natural Resources' (DLNR's) letters dated July 5 and 16, 2019 (your reference number LD 976) regarding the subject project. As the planning sub-consultant for the State of Hawai‘i Department of Education (DOE), we acknowledge your comments and provide the following responses.

1. **Engineering Division:** We acknowledge that Engineering Division has no additional comments.

2. **Division of Forestry and Wildlife (DOFAW):** We acknowledge that DOFAW has no comments.

3. **Land Division – O‘ahu District:** We acknowledge that Land Division – O‘ahu District has no objections or comments.

4. **Commission on Water Resource Management (CWRM):** The Final Environmental Assessment (EA) will note your recommendations to:

   - Coordinate with the DLNR Engineering Division to incorporate this project into the State Water Projects Plan.
   - Install water efficient fixtures and implement water efficient practices throughout the development to reduce the increased demand on the area's freshwater resources. We acknowledge your comment that reducing the water usage of a home or building may earn credit towards Leadership in Energy and Environmental Design (LEED) certification.

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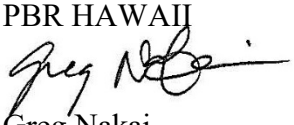
- Use best management practices (BMP) for stormwater management to minimize the impact of the project to the existing area's hydrology while maintaining on-site infiltration and preventing polluted runoff from storm events. We acknowledge your comment that stormwater management BMPs may earn credit toward LEED certification.
- Use alternative water sources, wherever practicable.
- Adopt landscape irrigation conservation BMPs endorsed by the Landscape Industry Council of Hawai‘i.
- Consider xeriscaping or native plantings and conservation landscaping to reduce water use and educate students about outdoor water conservation.
- Consider installing raingardens as another educational and aesthetic feature that will also help to retain storm water onsite and reduce runoff.

We value your participation in the environmental review process. Your letter will be reproduced in the forthcoming Final EA.

Sincerely,
PBR HAWAII



Greg Nakai
Planner

cc: Karynn Yoneshige, DOE
Rochelle Nagata-Wu, WRNS

U.S. Department of Homeland Security
FEMA Region IX
1111 Broadway, Suite 1200
Oakland, CA. 94607-4052

FEMA

July 8, 2019

Greg Nakai, Planner
PBR Hawaii & Associates, Inc.
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813

Dear Mr. Nakai:

This is in response to your request for comments regarding the Draft Environmental Assessment (DEA), Waipahu High School New Classroom Building, TMK (1) 9-4-008:02 (por) and (1) 9-4-008:25 (por).

Please review the current effective Flood Insurance Rate Maps (FIRMs) for the City and County of Honolulu (Community Number 150001), Maps revised November 5, 2014. Please note that the City and County of Honolulu, Hawaii is a participant in the National Flood Insurance Program (NFIP). The minimum, basic NFIP floodplain management building requirements are described in Vol. 44 Code of Federal Regulations (44 CFR), Sections 59 through 65.

A summary of these NFIP floodplain management building requirements are as follows:

- All buildings constructed within a riverine floodplain, (i.e., Flood Zones A, AO, AH, AE, and A1 through A30 as delineated on the FIRM), must be elevated so that the lowest floor is at or above the Base Flood Elevation level in accordance with the effective Flood Insurance Rate Map.

- If the area of construction is located within a Regulatory Floodway as delineated on the FIRM, any ***development*** must not increase base flood elevation levels. **The term *development* means any man-made change to improved or unimproved real estate, including but not limited to buildings, other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, and storage of equipment or materials.** A hydrologic and hydraulic analysis must be performed *prior* to the start of development, and must demonstrate that the development would not cause any rise in base flood levels. No rise is permitted within regulatory floodways.

- All buildings constructed within a coastal high hazard area, (any of the "V" Flood Zones as delineated on the FIRM), must be elevated on pilings and columns, so that the lowest horizontal structural member, (excluding the pilings and columns), is elevated to or above the base flood elevation level. In addition, the posts and pilings foundation and the structure attached thereto, is anchored to resist flotation, collapse and lateral movement due to the effects of wind and water loads acting simultaneously on all building components.

- Upon completion of any development that changes existing Special Flood Hazard Areas, the NFIP directs all participating communities to submit the appropriate hydrologic and hydraulic data to FEMA for a FIRM revision. In accordance with 44 CFR, Section 65.3, as soon as practicable, but not later than six months after such data becomes available, a community shall notify FEMA of the changes by submitting technical data for a flood map revision. To obtain copies of FEMA's Flood Map Revision Application Packages, please refer to the FEMA website at http://www.fema.gov/business/nfip/forms.shtm.

Please Note:

Many NFIP participating communities have adopted floodplain management building requirements which are more restrictive than the minimum federal standards described in 44 CFR. Please contact the local community's floodplain manager for more information on local floodplain management building requirements. The City and County of Honolulu floodplain manager can be reached by calling Mario Sui-Li, NFIP Planner, at (808) 768-8098.

If you have any questions or concerns, please do not hesitate to call me at (510) 627-7186.

Sincerely,

Gregor Blackburn, CFM, Branch Chief
Floodplain Management and Insurance Branch

cc:
Mario Sui-Li, NFIP Coordinator, City and County of Honolulu
Carol Tyau-Beam, State NFIP Coordinator, Hawaii Department of Land & Natural Resources
Gregor Blackburn, CFM, Branch Chief, Floodplain Management and Insurance Branch, DHS/FEMA Region IX
Alessandro Amaglio, Environmental Officer, DHS/FEMA Region IX

PBR HAWAII
& ASSOCIATES, INC.

August 9, 2019

Mr. Gregor Blackburn, CFM
Branch Chief
Floodplain Management and Insurance Branch
FEMA, Region IX
1111 Broadway, Suite 1200
Oakland, CA 94607-4052

SUBJECT: HRS CHAPTER 343 DRAFT ENVIRONMENTAL ASSESSMENT FOR WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING, WAIPAHU, TMK (1) 9-4-008:020 (POR.) & 025 (POR.)

Dear Mr. Blackburn:

Thank you for your letter dated July 8, 2019, regarding the subject project. As the planning sub-consultant for the State of Hawai‘i Department of Education (DOE), we acknowledge your comments and provide the following response.

We acknowledge the information provided regarding the current effective FIRM and the NFIP floodplain management building requirements (44 CFR). According to the FIRM, the subject project is located within Zone D (unstudied area). The project site is not located within a riverine floodplain, a Regulatory Floodway, nor within a coastal high hazard area. In addition, the subject project will not alter existing Special Flood Hazard Areas.

We also acknowledge the information provided regarding local floodplain management building requirements and will coordinate with the City and County of Honolulu floodplain manager if necessary.

We value your participation in the environmental review process. Your letter will be reproduced in the forthcoming Final EA.

Sincerely,
PBR HAWAII

Greg Nakai
Planner

cc: Karynn Yoneshige, DOE
Rochelle Nagata-Wu, WRNS

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BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843
www.boardofwatersupply.com

June 21, 2019

Mr. Greg Nakai
PBR Hawaii & Associates, Inc.
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813

Dear Mr. Nakai:

Subject: Your Letter Dated June 7, 2019 Requesting Comments on the Draft Environmental Assessment for the Proposed New Classroom Building at Waipahu High School, Tax Map Key: 9-4-008: 020 and 025

Thank you for the opportunity to comment on the proposed classroom building project.

The existing water system is adequate to accommodate the proposed development. 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 the 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.

Water conservation measures are recommended for all proposed developments. These measures include utilization of nonpotable water for irrigation using rain catchment, drought tolerant plants, xeriscape landscaping, efficient irrigation systems, such as a drip system and moisture sensors, and the use of Water Sense labeled ultra-low flow water fixtures and toilets.

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

If you have any questions, please contact Robert Chun, Project Review Branch of our Water Resources Division at 748-5443.

Very truly yours,

ERNEST Y. W. LAU, P.E.
Manager and Chief Engineer

cc: Karyn Yoneshige, State of Hawaii, Department of Education

PBR HAWAII
& ASSOCIATES, INC.

August 9, 2019

Mr. Ernest Y.W. Lau, P.E.
Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawai‘i 96843

Attn: Mr. Robert Chun, Project Review Branch, Water Resources Division

SUBJECT: HRS CHAPTER 343 DRAFT ENVIRONMENTAL ASSESSMENT FOR WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING, WAIPAHU, TMK (1) 9-4-008: 020 (POR.) & 025 (POR.)

Dear Mr. Lau:

Thank you for your letter dated June 21, 2019, regarding the subject project. As the planning sub-consultant for the State of Hawai‘i Department of Education (DOE), we acknowledge your comments and provide the following response.

We appreciate the information that the existing water system is adequate to accommodate the proposed building. However, we also acknowledge that the Board of Water Supply’s (BWS's) final decision on the availability of water will be confirmed when the building permit application is submitted for approval.

We acknowledge that there are BWS Water System Facilities Charges for resource development, transmission, and daily storage. This is discussed in section 4.7.1 of the Draft Environmental Assessment (EA) and will be included in the Final EA.

We also acknowledge the BWS recommended water conservation measures for proposed developments. Water efficient fixtures and practices will be considered for the subject project, which are discussed in section 4.7.1 of the Draft EA and will also be included in the Final EA.

The Draft EA also notes in section 4.7.1 that “on-site fire protection requirements will be coordinated with the Fire Prevention Bureau of the Honolulu Fire Department.” This will also be included in the Final EA.

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We value your participation in the environmental review process. Your letter will be reproduced in the forthcoming Final EA.

Sincerely,
PBR HAWAII

Greg Nakai
Planner

cc: Karynn Yoneshige, DOE
Rochelle Nagata-Wu, WRNS

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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

KIRK CALDWELL
MAYOR

ROBERT J. KRONING, P.E.
DIRECTOR

MARK YONAMINE, P.E.
DEPUTY DIRECTOR

July 8, 2019

PBR Hawaii & Associates, Inc.
ATTN: Greg Nakai, Planner
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813

Dear Mr. Nakai,

Subject: Draft Environmental Assessment for the Waipahu High School New Classroom Building

Thank you for the opportunity to review and comment. The Department of Design and Construction does not have any comments at this time.

If there are any further questions, please contact me at 768-8480.

Sincerely,

Robert J, Kroning, P.E.
Director

RJK:ms
(775268)

cc: State of Hawaii, Department of Education, Karynn Yoneshige

PBR HAWAII
& ASSOCIATES, INC.

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Chairman / Principal

R. STAN DUNCAN, ASLA
President / Principal

RUSSELL Y. J. CHUNG, FASLA, LEED® AP BD+C
Executive Vice-President / Principal

VINCENT SHIGEKUNI
Senior Vice-President / Principal

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Vice-President / Principal

TOM SCHNELL, AICP
Principal

KIMI MIKAMI YUEN, LEED® AP BD+C
Principal

W. FRANK BRANDT, FASLA
Chairman Emeritus

ANN MIKIKO BOUSLOG, PhD
Project Director

RAMSAY R. M. TAUM
Cultural Sustainability Planner

RAYMOND T. HIGA, ASLA
Senior Associate

CATIE CULLISON, AICP
Senior Associate

MARC SHIMATSU, ASLA
Senior Associate

DACHENG DONG, LEED® AP
Senior Associate

MICAH McMILLEN, ASLA, LEED® AP
Associate

NATHALIE RAZO
Associate

GRACE ZHENG, ASLA, LEED® GA, SITES® AP
Associate

BRIAN WOLF, ASLA, LEED® AP
Associate

August 9, 2019

Mr. Robert Kroning, P.E.
Director
Department of Design and Construction
City & County of Honolulu
650 South King Street, 11th Floor
Honolulu, Hawai‘i 96813

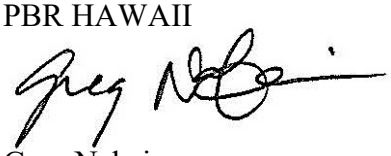
SUBJECT: HRS CHAPTER 343 DRAFT ENVIRONMENTAL ASSESSMENT FOR WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING, WAIPAHU, TMK (1) 9-4-008:020 (POR.) & 025 (POR.)

Dear Mr. Kroning:

Thank you for your letter dated July 8, 2019 (your reference number RJK:ms (775268)), regarding the subject project. As the planning sub-consultant for the State of Hawai‘i Department of Education (DOE), we acknowledge that the Department of Design and Construction (DDC) has no comments to offer at this time.

We value your participation in the environmental review process. Your letter will be reproduced in the forthcoming Final EA.

Sincerely,
PBR HAWAII



Greg Nakai
Planner

cc: Karynn Yoneshige, DOE
Rochelle Nagata-Wu, WRNS

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DEPARTMENT OF FACILITY MAINTENANCE

CITY AND COUNTY OF HONOLULU

1000 Ulu'ohia Street, Suite 215, Kapolei, Hawaii 96707
Phone: (808) 768-3343 • Fax: (808) 768-3381
Website: www.honolulu.gov

KIRK CALDWELL
MAYOR

ROSS S. SASAMURA, P.E.
DIRECTOR AND CHIEF ENGINEER

EDUARDO P. MANGLALLAN
DEPUTY DIRECTOR

IN REPLY REFER TO:
DRM 19-321

June 19, 2019

Mr. Greg Nakai, Planner
PBR Hawaii & Associates, Inc.
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813-3484

Dear Mr. Nakai:

Subject: Draft Environmental Assessment for
Waipahu High School New Classroom Building,
TMK: (1) 9-4-008:020, and 025,

Thank you for the opportunity to review and comment on the subject project.

We have no comments at this time.

If you have any questions, please call Mr. Kyle Oyasato of the Division of Road Maintenance at 768-3697.

Sincerely,

Ross S. Sasamura, P.E.
Director and Chief Engineer

PBR HAWAII
& ASSOCIATES, INC.

THOMAS S. WITTEN, FASLA
Chairman / Principal

R. STAN DUNCAN, ASLA
President / Principal

RUSSELL Y. J. CHUNG, FASLA, LEED® AP BD+C
Executive Vice-President / Principal

VINCENT SHIGEKUNI
Senior Vice-President / Principal

GRANT T. MURAKAMI, AICP, LEED® AP BD+C
Vice-President / Principal

TOM SCHNELL, AICP
Principal

KIMI MIKAMI YUEN, LEED® AP BD+C
Principal

W. FRANK BRANDT, FASLA
Chairman Emeritus

ANN MIKIKO BOUSLOG, PhD
Project Director

RAMSAY R. M. TAUM
Cultural Sustainability Planner

RAYMOND T. HIGA, ASLA
Senior Associate

CATIE CULLISON, AICP
Senior Associate

MARC SHIMATSU, ASLA
Senior Associate

DACHENG DONG, LEED® AP
Senior Associate

MICAH McMILLEN, ASLA, LEED® AP
Associate

NATHALIE RAZO
Associate

GRACE ZHENG, ASLA, LEED® GA, SITES® AP
Associate

BRIAN WOLF, ASLA, LEED® AP
Associate

August 9, 2019

Mr. Ross S. Sasamura, P.E.
Director and Chief Engineer
Department of Facility Maintenance
City & County of Honolulu
1000 Ulu‘ohia Street, Suite 215
Kapolei, Hawai‘i 96707

Attn: Mr. Kyle Oyasato, Division of Road Maintenance

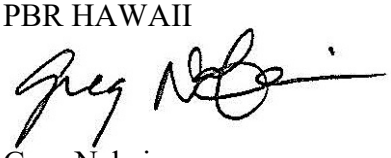
SUBJECT: HRS CHAPTER 343 DRAFT ENVIRONMENTAL ASSESSMENT FOR WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING, WAIPAHU, TMK (1) 9-4-008:020 (POR.) & 025 (POR.)

Dear Mr. Sasamura:

Thank you for your letter dated June 19, 2019 (your reference number DRM 19-321), regarding the subject project. As the planning sub-consultant for the State of Hawai‘i Department of Education (DOE), we acknowledge that the Department of Facility Maintenance (DFM) has no comments to offer at this time.

We value your participation in the environmental review process. Your letter will be reproduced in the forthcoming Final Environmental Assessment (EA).

Sincerely,
PBR HAWAII



Greg Nakai
Planner

cc: Karynn Yoneshige, DOE
Rochelle Nagata-Wu, WRNS

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DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
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PHONE: (808) 768-8000 • FAX: (808) 768-6041
DEPT. WEB SITE: www.honoluludpp.org • CITY WEB SITE: www.honolulu.gov

KIRK CALDWELL
MAYOR

KATHY K. SOKUGAWA
ACTING DIRECTOR

TIMOTHY F. T. HIU
DEPUTY DIRECTOR

EUGENE H. TAKAHASHI
DEPUTY DIRECTOR

July 8, 2019

2019/ELOG-1152(GT)

Mr. Greg Nakai
PBR Hawaii & Associates, Inc.
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813

Dear Mr. Nakai:

SUBJECT: Review Comments
Draft Environmental Assessment (DEA)
Waipahu High School - New Classroom Building
94-1211 Farrington Highway - Waipahu
Tax Map Keys 9-4-008: 020 (por.) and 025 (por.)

This responds to your request for comments, received June 10, 2019, regarding the above-mentioned Project. The Applicant proposes a classroom building (approximately 60,700 gross square feet) with 24 classrooms. The facilities will provide specialized spaces including science classrooms, culinary kitchens, computer and design thinking rooms, and a flexible indoor/outdoor dining area, as well as general classrooms, an administrative suite, and a fully self-contained special education classroom. There will also be a proposed fire access road and a small parking area. The proposed makai parking area (with approximately 214 parking stalls) located within the currently undeveloped makai portion of the upper campus parcel will be for a future phase. We have reviewed the Project and have the following comments:

1. Climate Change & Sea Level Rise: The discussion on Climate Change & Sea Level Rise should state that the Project is outside of the 3.2' Sea Level Rise Exposure Area (SLR-XA), as shown in Figure 9. As a disclosure document and for planning purposes, the DEA should also include in Figure 9 the 6' SLR-XA, which is anticipated to affect properties toward the end of the century, and indicate if the Project is in or out of the 6' SLR-XA.

2. Storm Water Quality: The DEA should include a narrative describing the Project's post-construction storm water quality strategic plan pursuant to

Section 20-3-50 of the "Rules Relating to Water Quality." The strategic plan shall include a written description of the proposed development, expected activities and pollutants that will be generated by activities at the site, and low impact development site design strategies that will be used to comply with the rules. The strategic plan should also include a development schedule.

The Project's compliance with the Rules Relating to Water Quality and Storm Drainage Standards will be verified at the time that the grading/construction plans are submitted to the Department of Planning and Permitting for review.

3. Wastewater:

   a. The Design Standard and Standard Details should be the Department of Environmental Services "Wastewater System Design Standard", dated July 2017, and "Wastewater System Standard Details", dated July 2017.

   b. Submit an Industrial Wastewater Discharge Permit application.

   c. The Municipal Sewer System discharges to the Waipahu Wastewater Pump Station, not the Pearl City Wastewater Pump Station.

4. Traffic: It is our understanding that the proposed Project is needed to support the existing enrollment and will not affect the existing traffic patterns. However, the Mobility Assessment Report (MAR) will need to be updated once the proposed new makai parking area is funded and scheduled. The new makai parking area will change the traffic patterns around the school and the MAR will need to be updated to reflect the current traffic conditions and enrollment at that time.

5. Zoning:

   a. Provide the current Land Use Ordinance Zoning Data Table including:

      1. Building Area (lot coverage) for each building or structure.

      2. Off-street parking (noting parking established by Zoning Waiver No. 2005/W-4, any Department of Education portable exemption used, and additional parking shown in Building Permit Application No. A2019-05-1005).

      3. Off-street loading.

   b. Number all parking and loading stalls with typical dimensions.

c. Show building envelope, property lines, yards, and height setbacks. If the proposed classroom building exceeds the allowable height limit or encroaches into any yards and/or height setbacks, an approved Zoning Waiver will be required prior to building permit approval.

Should you have any questions, please contact Gerald Toyomura, of our Urban Design Branch, at 768-8056.

Very truly yours,

FOR Kathy K. Sokugawa
Acting Director

cc: Karynn Yoneshige, Project Coordinator,
Facilities Development Branch
Office of School Facilities and Support Services
State of Hawaii, Department of Education

PBR HAWAII
& ASSOCIATES, INC.

HONOLULU OFFICE
1001 Bishop Street, Suite 650
Honolulu, Hawai'i 96813-3484
Tel: (808) 521-5631
Fax: (808) 523-1402
E-mail: sysadmin@pbrhawaii.com

August 9, 2019

Ms. Kathy Sokugawa
Acting Director
Department of Planning and Permitting
City & County of Honolulu
650 South King Street, 7th Floor
Honolulu, Hawai'i 96813

ATTN: Mr. Gerald Toyomura, Urban Design Branch

SUBJECT: HRS CHAPTER 343 DRAFT ENVIRONMENTAL ASSESSMENT FOR WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING, WAIPAHU, TMK (1) 9-4-008:020 (POR.) & 025 (POR.)

Dear Ms. Sokugawa:

Thank you for your letter dated July 8, 2019 (your reference code 2019/ELOG-1152(GT)), regarding the subject project. As the planning sub-consultant for the State of Hawai'i Department of Education (DOE), we acknowledge your comments and offer the following responses.

1. Climate Change & Sea Level Rise: As suggested, the discussion on Climate Change & Sea Level Rise will be revised in the Final Environmental Assessment (EA) to state that the Project is outside of the 3.2' Sea Level Rise Exposure Area (SLR-XA), as shown in Figure 9 of the EA. The figure will also be revised to include the 6' SLR line, and the EA will note that the Project is also located outside the 6' SLR area.

2. Storm Water Quality: The Final EA will indicate that a Storm Water Quality Report (SWQR) has already been submitted to the Department of Planning and Permitting (DPP) and that the Project's compliance with the Rules Relating to Water Quality and Storm Drainage Standards will be verified at the time grading/construction plans are submitted to DPP for review.

3. Wastewater:

    a. The Final EA will be revised to note the correct Design Standard and Standard Details (July 2017).

    b. The Final EA will note that an Industrial Wastewater Discharge Permit (IWDP) has already been submitted.

    c. The Final EA will be revised to note the correct wastewater pump station.

4. Traffic: The Final EA will note that the Mobility Assessment Report (MAR) will need to be updated once the makai parking area is funded and scheduled.

5. Zoning:

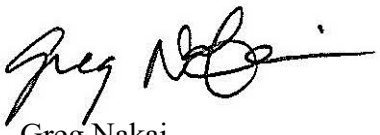
   a. The Final EA will include the Land Use Ordinance (LUO) Zoning information regarding off-street parking and off-street loading, as had been provided by DPP in a determination letter dated March 8, 2019 [2019/ELOG-239(JL1)]. However, actual building areas (lot coverage), floor areas, and required parking will be confirmed during the building permit application process.

   b. Drawings showing numbered parking and loading stalls with typical dimensions will be submitted to DPP with the permit applications.

   c. Drawings showing the building envelope, property lines, yards, and height setbacks will be submitted to DPP with the permit applications. As stated in Section 5.2.3 of the EA, the proposed classroom building will exceed the 25-foot height limit for the underlying R-5 zoning district; consequently, a Zoning Waiver permit application will be submitted.

We value your participation in the environmental review process. Your letter will be reproduced in the forthcoming Final EA.

Sincerely,
PBR HAWAII



Greg Nakai
Planner

cc: Karynn Yoneshige, DOE
Rochelle Nagata-Wu, WRNS

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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

KIRK CALDWELL
MAYOR

MANUEL P. NEVES
FIRE CHIEF

LIONEL CAMARA JR.
DEPUTY FIRE CHIEF

June 28, 2019

Mr. Greg Nakai, Planner
PBR HAWAII & Associates, Inc.
1001 Bishop Street, Suite 650
Honolulu, Hawaii 96813

Dear Mr. Nakai:

Subject: Draft Environmental Assessment
Waipahu High School New Classroom Building
94-1211 Farrington Highway
Waipahu, Hawaii 96797
Tax Map Key: 9-4-008: 020 (Portion) and 025 (Portion)

In response to your letter dated June 7, 2019, regarding the abovementioned subject, the Honolulu Fire Department (HFD) reviewed the submitted information and requires that the following be complied with:

1. Fire department access roads shall be provided such that any portion of the facility or any portion of an exterior wall of the first story of the building is located not more than 150 feet from fire department access roads as measured by an approved route around the exterior of the building or facility. National Fire Protection Association [NFPA] 1; 2012 Edition, Sections 18.2.3.2.2 and 18.2.3.2.2.1.)

   A fire department access road shall extend to within 50 feet of at least one exterior door that can be opened from the outside and that provides access to the interior of the building. (NFPA 1; 2012 Edition, Section 18.2.3.2.1.)

2. A water supply approved by the county, capable of supplying the required fire flow for fire protection, shall be provided to all premises upon which facilities or buildings, or portions thereof, are hereafter

constructed, or moved into or within the county. When any portion of the facility or building is in excess of 150 feet from a water supply on a fire apparatus access road, as measured by an approved route around the exterior of the facility or building, on-site fire hydrants and mains capable of supplying the required fire flow shall be provided when required by the AHJ [Authority Having Jurisdiction]. (NFPA 1; 2012 Edition, Section 18.3.1, as amended.)

3. The unobstructed width and unobstructed vertical clearance of a fire apparatus access road shall meet county requirements. (NFPA 1; 2012 Edition, Sections 18.2.3.4.1.1 and 18.2.3.4.1.2, as amended.)

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

Should you have questions, please contact Battalion Chief Wayne Masuda of our Fire Prevention Bureau at 723-7151 or wmasuda@honolulu.gov.

Sincerely,

Socrates D. Bratakos

SOCRATES D. BRATAKOS
Assistant Chief

SDB/TC:bh

cc: Karynn Yoneshige, Department of Education
State of Hawaii

PBR HAWAII
& ASSOCIATES, INC.

THOMAS S. WITTEN, FASLA
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printed on recycled paper

August 9, 2019

Mr. Socrates Bratakos
Assistant Chief
Honolulu Fire Department
City & County of Honolulu
636 South Street
Honolulu, Hawai'i 96813-5007

SUBJECT: HRS CHAPTER 343 DRAFT ENVIRONMENTAL ASSESSMENT FOR WAIPAHU HIGH SCHOOL NEW CLASSROOM BUILDING, WAIPAHU, TMK (1) 9-4-008:020 (POR.) & 025 (POR.)

Dear Mr. Bratakos:

Thank you for your letter dated June 28, 2019 (your reference SDB/TC:bh), regarding the subject project. As the planning sub-consultant for the State of Hawai'i Department of Education (DOE), we acknowledge your comments and offer the following response:

1. A new fire access road will be added from the existing campus parking to the New Classroom Building. The proposed fire access road through the school parking lots was coordinated and attained by a preliminary letter of approval by HFD.

2. The proposed new classroom building will provide an adequate county-approved water supply for the required fire flow for fire protection (NFPA 1; UFC, 2012 Edition, Section 18.3.1, as amended). On-site fire protection requirements will be coordinated with the Fire Prevention Bureau of the Honolulu Fire Department.

3. The proposed new classroom building will comply with requirements regarding the unobstructed width and vertical clearance of fire apparatus access roads (NFPA 1; UFC, 2012 Edition, Section 18.2.3.4.1.1 and 18.2.3.4.1.2, as amended). The proposed fire access road through the school parking lots was coordinated and attained by a preliminary letter of approval by HFD.

4. Civil drawings will be submitted to the HFD for review and approval at the appropriate stage in the development process.

We value your participation in the environmental review process. Your letter will be reproduced in the forthcoming Final EA.

Sincerely,
PBR HAWAII

Greg Nakai
Planner

cc: Karynn Yoneshige, DOE
Rochelle Nagata-Wu, WRNS