JOSH GREEN, M.D.
GOVERNOR

RIKI FUJITANI
EXECUTIVE DIRECTOR

Hawai'i School Facilities Authority

2759 S. KING STREET, ROOM H201
HONOLULU, HAWAI'I 96826

January 26, 2026

Ms. Mary Alice Evans, Director
Environmental Review Program
Office of Planning and Sustainable Development
235 South Beretania Street, Room 702
Honolulu, HI 96813

RE: DRAFT ENVIRONMENTAL ASSESSMENT AND ANTICIPATED FINDING OF NO SIGNIFICANT IMPACT FOR THE HAWAI'I SCHOOL FACILIITES AUTHORITY KAMAILE ACADEMY PRE-KINDERGARTEN HUB CLASSROOMS AND ADMINISTRATION BUILDING FACILITY, WAIANAE, O'AHU, HAWAI'I, TMKs (1) 8-5-002: 053 AND (1) 8-5-026: 107

Dear Ms. Evans:

With this letter, the State of Hawai'i School Facilities Authority hereby transmits the Draft Environmental Assessment and Anticipated Finding of No Significant Impact (DEA-AFONSI) for the proposed Kamaile Academy Pre-Kindergarten Hub Classrooms and Administration Building Facility situated on TMKs (1) 8-5-002: 053 AND (1) 8-5-026: 107, on the island of O'ahu, for publication in the February 8, 2026 edition of *The Environmental Notice*.

The official publication request form has been uploaded with the required applicable publication information.

Should you have any questions, please contact Brian Canevari at (808) 896-5070, or our authorized agent of this project, Taeyong Kim, of Environmental Communications, Inc. at (808) 528-4661.

Mahalo,

Brian Canevari
Project Manager

Cc: Taeyong Kim, Environmental Communications, Inc. environcom1@gmail.com
Doug Cullison, SFA PreK Program Manager, doug.cullison@hisfa.org
Carl Akai, AM Partners, Inc. carla@ampartners.com
Jesse Souki, Deputy Superintendent, Department of Education jesse.souki@k12.hi.us

From: dbedt.opsd.erp@hawaii.gov
To: DBEDT OPSD Environmental Review Program
Subject: New online submission for The Environmental Notice
Date: Thursday, January 29, 2026 3:43:08 PM

Action Name

Kamaile Academy Pre-Kindergarten Hub Classroom and Administration Building Facility

Type of Document/Determination

Draft environmental assessment and anticipated finding of no significant impact (DEA-AFNSI)

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

Waiʻanae, Oʻahu

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

(1)8-5-002:053 and (1)8-5-026:107

Action type

Agency

Other required permits and approvals

Building Permits

Proposing/determining agency

Hawaii School Facilities Authority

Agency jurisdiction

State of Hawaiʻi

Agency contact name

Brian Canevari

Agency contact email (for info about the action)

brian.canevari@hisfa.org

Email address for receiving comments

brian.canevari@hisfa.org

Agency contact phone

(808) 528-4661

Agency address

2759 S. King Street
Honolulu, HI 96826
United States
Map It

Is there a consultant for this action?

Yes

Consultant

Environmental Communications, Inc.

Consultant contact name

Taeyong Kim

Consultant contact email

tkim@environcom.com

Consultant contact phone

(808) 528-4661

Consultant address

P.O. Box 236097, Honolulu, HI 96823
Honolulu, HI 96823
United States
Map It

Action summary

The proposed project improvements are located adjacent to the Kamaile Academy Public Charter School site; a public facility operated as a charter school under the administrative authority of the Department of Education. Parcel 8-5-002: 053 consists of an open space presently used for unmarked staff parking, and Parcel 8-5-026: 107 consists of a remnant parcel that is not used for any activity and secured by boulders. This parcel is located at the outside curve of Ala Akau Street.

The proposed action consists of an educational facility that addresses the needs of pre-kindergarten aged children. This project will significantly advance the State's mission focusing on needs identified for early education and early success in the process of learning. The Pre-Kindergarten Hub will consist of eight (8) classrooms, an administration building and related appurtenant facilities as well as a dedicated parking area. The project will be funded and operated by the Hawaii School Facilities Authority (HISFA) on vacant land that presently serves as an informal and unimproved parking area. This pre-kindergarten hub will be an addition to the State's "Ready Keiki" program.

Reasons supporting determination

The proposed action will significantly further the State of Hawaii's Ready Keiki by providing a highly needed and desirable early learning facility serving Oahu's West Side. Located adjacent to an existing Charter School site, the Pre-Kindergarten Hub is complementary and consistent with land use policy, will minimally impact the surrounding area, and fulfills State educational objectives.

Attached documents (signed agency letter & EA/EIS)

- Draft-EA-letter-January-26-2026-signed3.pdf
- SFA-Kamaile-DEA-v1B2-corrected-orientation1.pdf

ADA Compliance certification (HRS §368-1.5):

The authorized individual listed below acknowledges that they retain the responsibility for ADA compliance and are knowingly submitting documents that are unlocked, searchable, and may not be in an ADA compliant format for publication. Audio files do not include transcripts, captions, or alternative descriptions. The project files will be published without further ADA compliance changes from ERP, with the following statement included below the project summary in The Environmental Notice: "If you are

experiencing any ADA compliance issues with the above project, please contact (authorized individual submitting the project at email)."

Action location map

- Kamaile-Location3.zip

Authorized individual

Taeyong Kim

Authorized individual email

tkim@environcom.com

Authorized individual phone

(808) 528-4661

Authorization

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

DRAFT ENVIRONMENTAL ASSESSMENT

HAWAIʻI SCHOOL FACILITIES AUTHORITY
KAMAILE ACADEMY PRE-KINDERGARTEN HUB
CLASSROOMS AND ADMINISTRATION BUILDING FACILITY
PROJECT NO. SP-0001-25

TMK 8-5-002: 053 AND 8-5-026: 107
85-180 ALA AKAU STREET
WAIʻANAE, OʻAHU, HAWAIʻI

THIS DOCUMENT IS PREPARED PURSUANT TO CHAPTER 343, HAWAIʻI REVISED STATUTES

APPROVING AGENCY:
STATE OF HAWAIʻI
HAWAIʻI SCHOOL FACILITIES AUTHORITY

JANUARY 2025

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DRAFT ENVIRONMENTAL ASSESSMENT
HAWAIʻI SCHOOL FACILITIES AUTHORITY
KAMAILE ACADEMY PRE-KINDERGARTEN HUB
CLASSROOMS AND ADMINISTRATION BUILDING FACILITY
PROJECT NO. SP-0001-25

TMK 8-5-002: 037, 053 AND 8-5-026: 107
85-180 ALA AKAU STREET
WAIʻANAE, OʻAHU, HAWAIʻI

This document is prepared in compliance with the requirements of Chapter 343, Hawai'i Revised Statutes and Title 11-200, Hawai'i Administrative Rules, Department of Health, State of Hawai'i.

Prepared for:

Hawai'i School Facilities Authority
State of Hawai'i
2759 S. King Street
Honolulu, HI 96816

Prepared by:

AM Partners, Inc.
560 N. Nimitz Highway, Suite 202
Honolulu, HI 96817

and

Environmental Communications, Inc.
P.O. Box 236097
Honolulu, HI 96823

December 2025

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TABLE OF CONTENTS

LIST OF FIGURES

APPENDICES

ACRONYMS AND ABBREVIATIONS

343	Environmental Lawa Hawaii Revised Statutes (343 HRS)
AAQS	Ambient Air Quality Standards
AGL	Above Ground Level
ANSI	American National Standards Institute
BLNR	Board of Land and Natural Resources
BMPs	Best Management Practices
BWS	Board of Water Supply
CDUP	Conservation District Use Permit
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CFR	Code of Federal Regulations
CIC	Clean Islands Council
City	City and County of Honolulu
CO	Carbon Monoxide
CO_2	Carbon Dioxide
COC	Contaminant of Concern
COPC	Contaminant of Potential Concern
CT	Census Tract
CWA	Clean Water Act of 1977
CZMA	Coastal Zone Management Act
DA	Department of the Army
dB	Decibel
dBA	Decibels A-Weighted Scale
DBEDT	Dept. of Business, Economic Development and Tourism
DHS	U.S. Department of Homeland Security
DLM	Department of Land Management (City and County of Honolulu)
DLNR	Department of Land and Natural Resources
DNL	Day-night sound level
DOA	Department of Agriculture (State of Hawaii)
DOD	U.S. Department of Defense
DOE	Department of Education (State of Hawaii)
DOH	Department of Health (State of Hawaii)
DOT-A	Department of Transportation, Airports Division (State of Hawaii)
DOT-H	Department of Transportation, Harbors Division (State of Hawaii)
DPP	Department of Planning and Permitting (City and County of Honolulu)
DU	Decision Units
EA	Environmental Assessment
EFH	Essential Fish Habitats
EHE	Environmental Health Evaluation
EHMP	Environmental Hazard Management Plan
EIS	Environmental Impact Statement
EISPN	Environmental Impact Statement Preparation Notice
EMS	Emergency Medical Services (City and County of Honolulu)
EO	Executive Order(s)

EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act of 1973
ESA	Environmental Site Assessment
F	Fahrenheit
FAA	Federal Aviation Administration
FAQ	Frequently Asked Questions
FAR	Federal Aviation Regulations
FEMA	Federal Emergency Management Agency
FHA	Federal Housing Administration
FIRM	Flood Insurance Rate Map(s)
FONSI	Finding of No Significant Impact
FR	Federal Register
FWCA	Fish and Wildlife Coordination Act
GHG	Greenhouse gas
GHGRP	Greenhouse Gas Reporting Program
GWP	Global warming potential
H_2S	Hydrogen Sulfide
HAR	Hawai‘i Administrative Rules
HART	Honolulu Authority for Rapid Transit
HCDA	Hawaii Community Development Authority (State of Hawaii)
HCM	Highway Capacity Manual
HECO	Hawaiian Electric Company
HEER	Hazard Evaluation and Emergency Response Office (State of Hawaii) HEPA Hawaii Environmental Policy Act
HFD	Honolulu Fire Department (City and County of Honolulu)
HHFDC	Hawaii Housing Finance and Development Corporation (State of Hawaii)
HIA	Honolulu International Airport
HISC	Hawaii Invasive Species Council
HISFA	Hawaii School Facilities Authority
HPD	Honolulu Police Department (City and County of Honolulu)
HRS	Hawaii Revised Statutes
HTCO	Hawaiian Telcom
HUD	U.S. Department of Housing and Urban Development
IBC	International Building Code
IPCC	Intergovernmental Panel on Climate Change
JBPHH	Joint Base Pearl Harbor-Hickam
kV	Kilovolt
LED	Light emitting diode
Leq	Equivalent sound level
LIHTC	State Low Income Housing Tax Credits
LOS	Level of Service
LUC	Land Use Commission (State of Hawaii)
LUO	Land Use Ordinance
MHHW	Mean higher high water
MLLW	Mean lower low water
MS4	Municipal Separate Storm Sewer System

MSL	Mean sea level
MUS	Management Unit Species
NAAQS	National Ambient Air Quality Standards
NAS	National Airspace System
NEC	Network Enterprise Center
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service (National Oceanic and Atmospheric Administration)
NO_2	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
O_3	Ozone
OCCL	Office of Conservation and Coastal Lands (State of Hawaii)
OEQC	Office of Environmental Quality Control
OHA	Office of Hawaiian Affairs (State of Hawaii)
OMPO	Oahu Metropolitan Planning Organization
ORMP	Ocean Resources Management Plan (State of Hawaii)
OU1C	Operating Unit 1C
Pb	Lead
PCB	Polychlorinated biphenyl
PCS	Public Charter School
PET	Polyethylene terephthalate
PUC	Public Utilities Commission
PVC	Polyvinyl chloride
RFP	Request for Proposals
RHRF	Rental Housing Revolving Fund
ROI	Region of influence
ROW	Right of way
SB	Senate Bill
SHPD	State Historic Preservation Division
SLUC	State Land Use Commission
SMA	Special Management Area
SOEST	School of Ocean and Earth Science and Technology (University of Hawaii)
SO_2	Sulfur dioxide
SPS	Sewage Pump Station
State	State of Hawaii
SVOC	Semi-volatile organic compounds
SWMP	Storm Water Management Plan
TMDL	Total Maximum Daily Load(s)
TMK	Tax Map Key
UH	University of Hawaii
US	United States
USACE	U.S. Army Corps of Engineers

USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	Underground storage tanks
VA	U.S. Department of Veterans Affairs
VOC	Volatile organic compound
VPH	Vehicles per hour
WQC	Water Quality Certification

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SECTION ONE
PROJECT SUMMARY

PROPOSING/ ACCEPTING AGENCY:	Hawai‘i School Facilities Authority 2759 S. King Street Honolulu, Hawai‘i 96826
AGENT:	Environmental Communications, Inc. P.O. Box 236097 Honolulu, Hawai‘i 96823
PROJECT NAME:	Kamaile Academy Pre-Kindergarten Hub Classrooms and Administration Building Project No. SP-0001-25
PROJECT LOCATION:	85-180 Ala Akau Street Wai‘anae, O‘ahu, Hawai‘i The project site consist of the existing Kamaile Academy Public Charter School parcel and an unimproved parking area located adjacent to the current campus grounds.
TAX MAP KEY:	[1] 8-5-002: 053 and [1] 8-5-026: 107
LOT AREA:	8-5-002: 053 -87,120 square feet/ 2.0 acres 8-5-026: 107 – 2,341 square feet/ 0.0537 acres
OWNERSHIP:	8-5-002: 053 – Department of Education 8-5-026: 107 – Hawaii Housing Finance and Development Corporation
ZONING:	Parcel 053 is designated as Agriculture (AG-2) under the City and County of Honolulu Zoning Maps. Remnant parcel 107 is zoned Residential District (R-5).
HEIGHT LIMIT:	25 feet
SPECIAL DISTRICT:	The project is not located in a Special District
STATE LAND USE:	Urban
EXISTING LAND USE:	The proposed project improvements are located adjacent to the Kamaile Academy Public Charter School site; a public facility operated as a charter

	school under the administrative authority of the Department of Education. Parcel 8-5-002: 053 consists of an open space presently used for unmarked staff parking, and Parcel 8-5-026: 107 consists of a remnant parcel that is not used for any activity and secured by boulders. This parcel is located at the outside curve of Ala Akau Street.
NATURE OF DEVELOPMENT:	The proposed action consists of an educational facility that addresses the needs of pre-kindergarten aged children. This project will significantly advance the State's mission focusing on needs identified for early education and early success in the process of learning. The Pre-Kindergarten Hub will consist of eight (8) classrooms, an administration building and related appurtenant facilities as well as a dedicated parking area. The project will be funded and operated by the Hawaii School Facilities Authority (HISFA) on vacant land that presently serves as an informal and unimproved parking area. This pre-kindergarten hub will be an addition to the State's "Ready Keiki" program.
TOTAL PROJECT COST:	The Pre-Kindergarten Hub project has an estimated planning, design and construction budget of approximately $16,000,000.
PROJECT SCHEDULE:	The first phase of the master planned improvements are anticipated to commence in the Fall of 2026 and is anticipated to be completed in Fall of 2027.
PERMITS REQUIRED:	City and County of Honolulu Building Permits City and County of Honolulu Joint Development Agreement National Pollutant Discharge Elimination System (NPDES) Joint Development Conditional Use Permit for the use of parcel 8-5-026: 107 for driveway and access use.
NEED FOR ASSESSMENT:	Chapter 343, Hawaii Revised Statutes Use of State funds and County Lands
ACTION DETERMINATION:	Anticipated Finding of No Significant Impact
PROJECT CONTACT:	Brian Canevari, Program Manager

Hawai‘i School Facilities Authority
2759 S. King Street
Honolulu, HI 96826
brian.canevari@hisfa.org

A copy of all correspondence should also be sent to:

Taeyong Kim
Environmental Communications, Inc.
P.O. Box 236097
Honolulu, HI 96823
tkim@environcom.com

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SECTION TWO
PROPOSED PROJECT AND STATEMENT OF OBJECTIVES

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SECTION TWO
PROPOSED PROJECT AND STATEMENT OF OBJECTIVES

2.1 PROJECT LOCATION

The project site is located adjacent to the former Kamaile Elementary which was converted in 2007 from a Department of Education standard school to a charter school. The site is bounded to the west by the Kamaile Academy, and to the north and east by a large solar energy array. Two story townhome apartments are located to the south directly across Ala Akau Street. The Kamaile Academy Public Charter School is located on Tax Map Key: 8-5-002: 037 and presently consists of classrooms, administrative offices, library, cafeteria, playfield areas and parking. The parcel is owned by the State of Hawaii. The proposed pre-kindergarten hub will be located on Tax Map Key: 8-5-002: 053 located adjacent to the existing Kamaile Academy Public Charter School campus. The proposed Pre-Kindergarten project is not operationally a part of the Kamaile Academy Public Charter School Master Plan which is being developed by the Department of Education; however, it is recognized as an adjacent educational facility and is considered in long-term planning as future operations may involve integrated or shared uses. Remnant parcel Tax Map Key: 8-5-026: 107 is located on the outside curve of Ala Akau Street and will be incorporated into the Master Plan area.

The project area can be considered the educational core of the Waianae community with Waianae High School located approximately 0.2 miles to the south west, and Waianae Intermediate School located less than 0.5 miles to the south east. Makaha Elementary School is located approximately 2 miles to the northeast, and the closest elementary school in the *'Ewa* direction is Waianae Elementary School located almost 2 miles to the south east. Residential areas are located west and south of the project site while a large solar array is located to the north of the site.

In general, the Waianae district has been transitioned from an agricultural community to an area of mixed residential and commercial uses. This is enabled by the State and County models of urban development which promote mixed use growth in west Oahu. The proposed improvements will incrementally provide for the changing needs for elementary to high school education and supporting facilities as this dynamic community evolves.

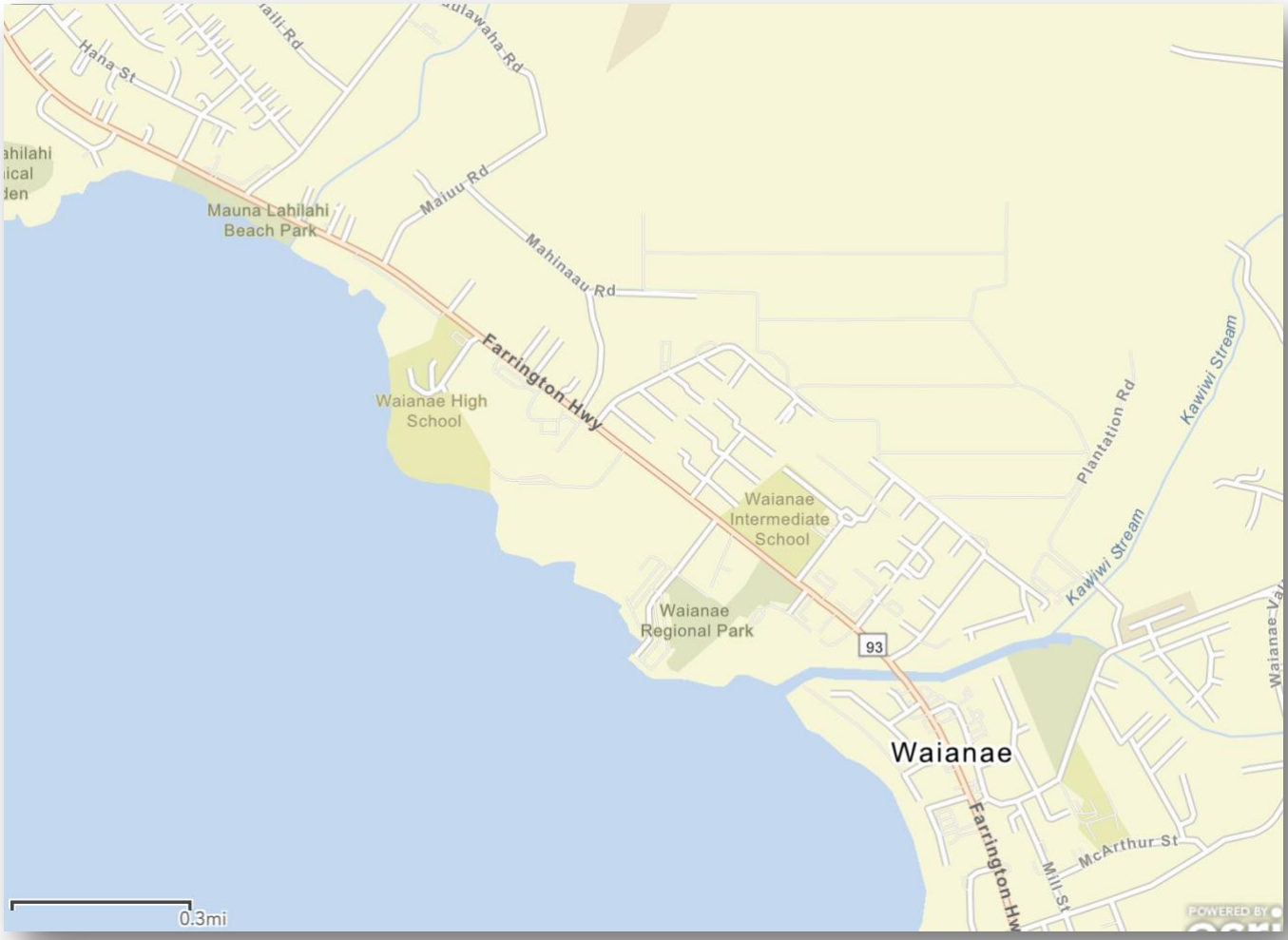

Figure 1: Project Location Map Source: City and County of Honolulu

Figure 2: Aerial View of Kamaile Academy and Pre-Kindergarten Hub

Source: Google Earth

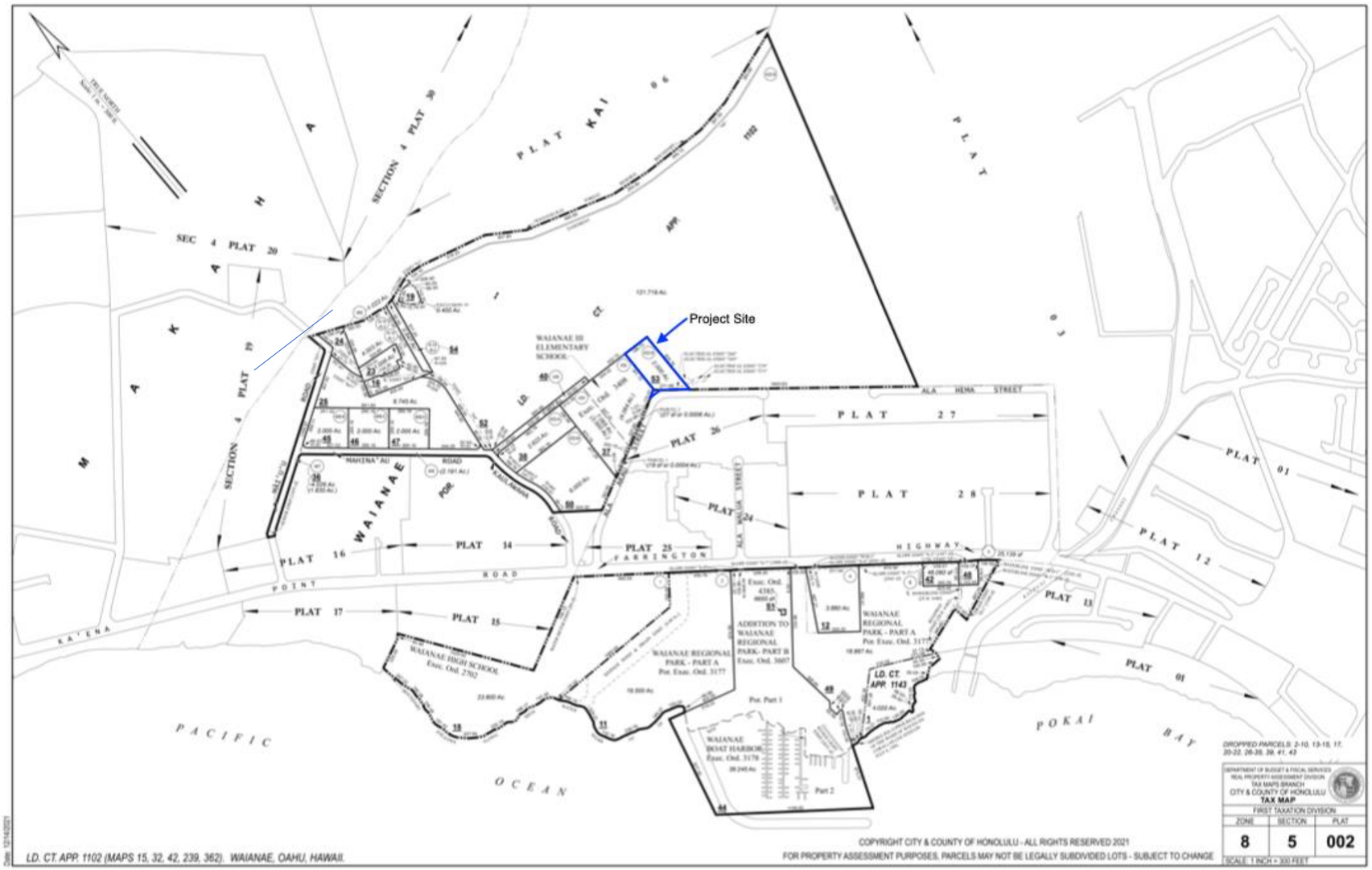

Figure 3: Tax Map Plat

Source: City and County of Honolulu

2.2 PROJECT DESCRIPTION

2.2.1 PROJECT NEED AND PURPOSE OF THIS DOCUMENT

The project subject of this document is part of a new State of Hawaii early education initiative to promote and support early education activities. This initiative provides affordable and high-quality education throughout the State of Hawaii. It is recognized by the State of Hawaii that access to childcare services are constrained by high cost, availability and geographic constraints. This Pre-Kindergarten hub will serve the west side of Oahu and will significantly contribute to early educational opportunities where at present, few opportunities exist.

The scope of improvements are in alignment with the Hawai‘i School Facilities Guidelines and works in consonance with the State of Hawaii Department of Education objectives.

The proposed Pre-Kindergarten improvements are subject to Chapter 343, Hawaii Revised Statutes and Title 11, Chapter 200, Hawaii Administrative Rules. The proposed action is triggered by the use of State funds and County lands.

2.2.2 EXISTING SITE USE

The project site is located immediately adjacent to the Kamile Academy Public Charter School campus but is not physically incorporated into the Academy campus. While certain activities could be shared or incorporated with the Academy, the Pre-Kindergarten Hub will be physically maintained and operationally conducted by the Hawai‘i School Facilities Authority rather than the Department of Education.

The project site presently consists of vacant unimproved land that have been cleared and serves as temporary parking. The site is not paved nor are parking stalls marked on this site. The site is otherwise devoid of any buildings or significant vegetation.

The Pre-Kindergarten facility is intended to serve the West Side of Oahu but more specific to the area, the school uniquely provides for students to begin their earliest school age years and matriculate on adjacent campuses therefore it is important that the campus be planned to consider the needs of students throughout their educational journey at Kamaile Academy Public Charter School as well as the Kamaile Academy Pre-Kindergarten Hub.

2.2.3 PROPOSED PRE-KINDERGARTEN SITE COMPONENTS

The proposed plan provides a graphic showing the proposed improvements in relation to the adjacent Kamaile Academy which is undergoing its own master planning process. It was deemed important that the proposed pre-kindergarten planning remain cognizant that the adjacent Kamaile Academy's future master plan be recognized and thoughtfully considered as the pre-kindergarten and the Kamaile Academy build-outs will cumulatively impact the surrounding area.

Pre-Kindergarten Classrooms and Administration Building

- Eight (8) Pre-kindergarten classrooms will be constructed. These classrooms will include toilets and utility rooms. A total of 160 students will be accommodated by these new classrooms in two separate buildings identified as Building K and L. These classroom buildings will include classrooms, toilets and appurtenant support spaces.
- An Administration facility for the Pre-kindergarten hub and will include offices, storage, toilets and a health room. This building is identified as Building M.

Site Improvements

- The classroom buildings and administration building will be placed to create a secure interior courtyard space suitable for pre-kindergarten aged children.
- Additional learning and play areas will be located along the southern boundary of the site.
- The entire site will be secured by security fencing and heavily landscaped to create friendly learning spaces that are both attractive and secure.
- The entry point into the facility from the dedicated parking lot is located further north where students will pass by the administration building on their way to the classrooms. This is for both security reasons as well as the convenience of parents who are anticipated to frequent the administration building.

Parking Improvements

- A dedicated parking lot and drop off area will be located along the western boundary of the site. This parking lot will have 29 parking stalls and 5 dedicated drop-off stalls along the curb.
- Parcel 8-5-026: 107 which is an irregular triangular shaped parcel joins both the Kamaile Academy and the Kamaile Academy Pre-School Hub. This small lot will be used for a driveway to the parking lot and for additional landscaping. The lot is located at the apex of Ala Akau Street.
- The pre- kindergarten hub will increase the number of students on the overall site by 80 pre-kindergarten students and associated staff.

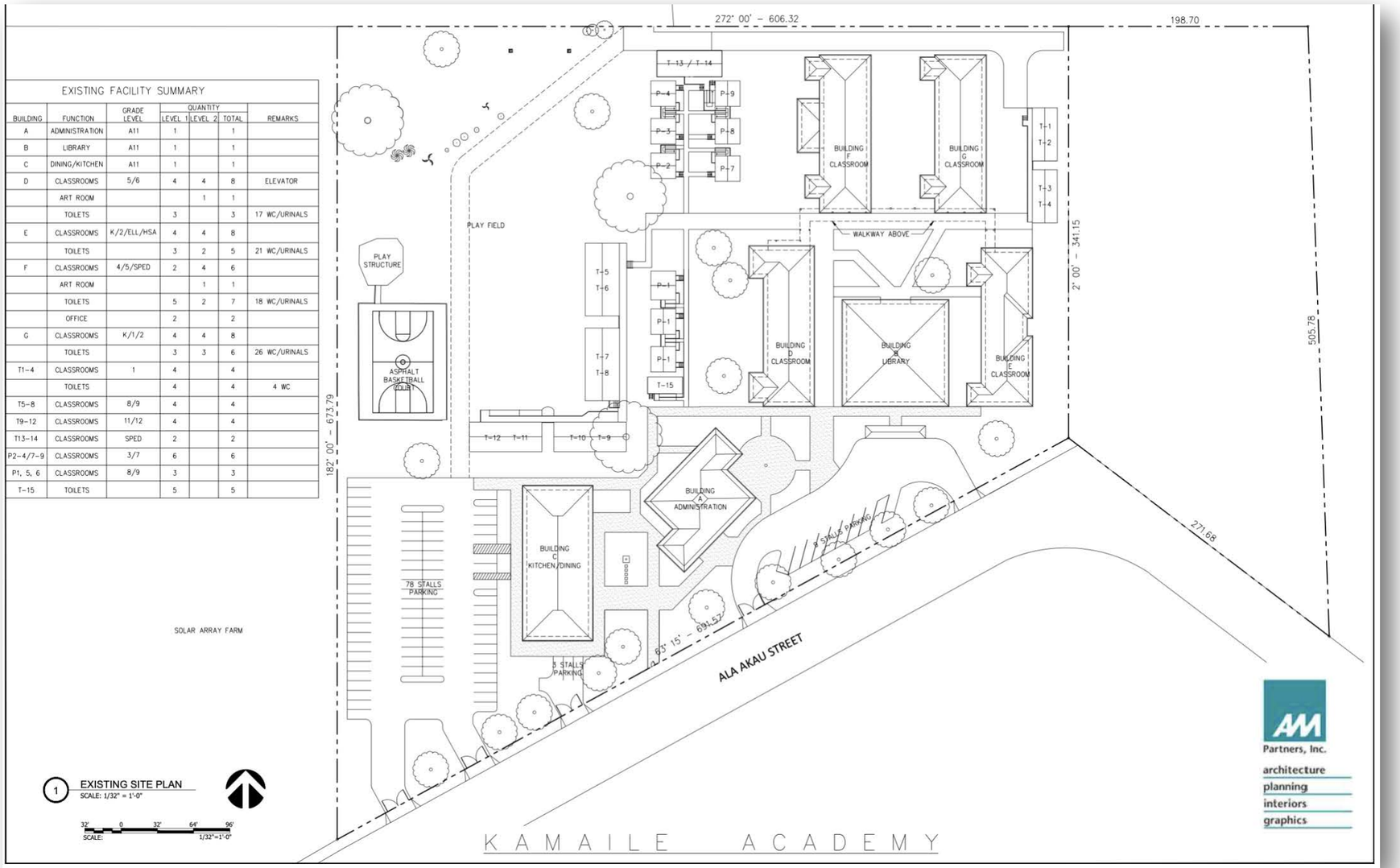

Figure 4: Existing Site Plan of Kamile Academy and the Kamaile Academy Pre-Kindergarten Hub Site

Source: AM Partners, Inc.

Figure 5: Kamaile Academy Master Plan in Relation to the Proposed Pre-Kindergarten Facility

Source: AM Partners, Inc.

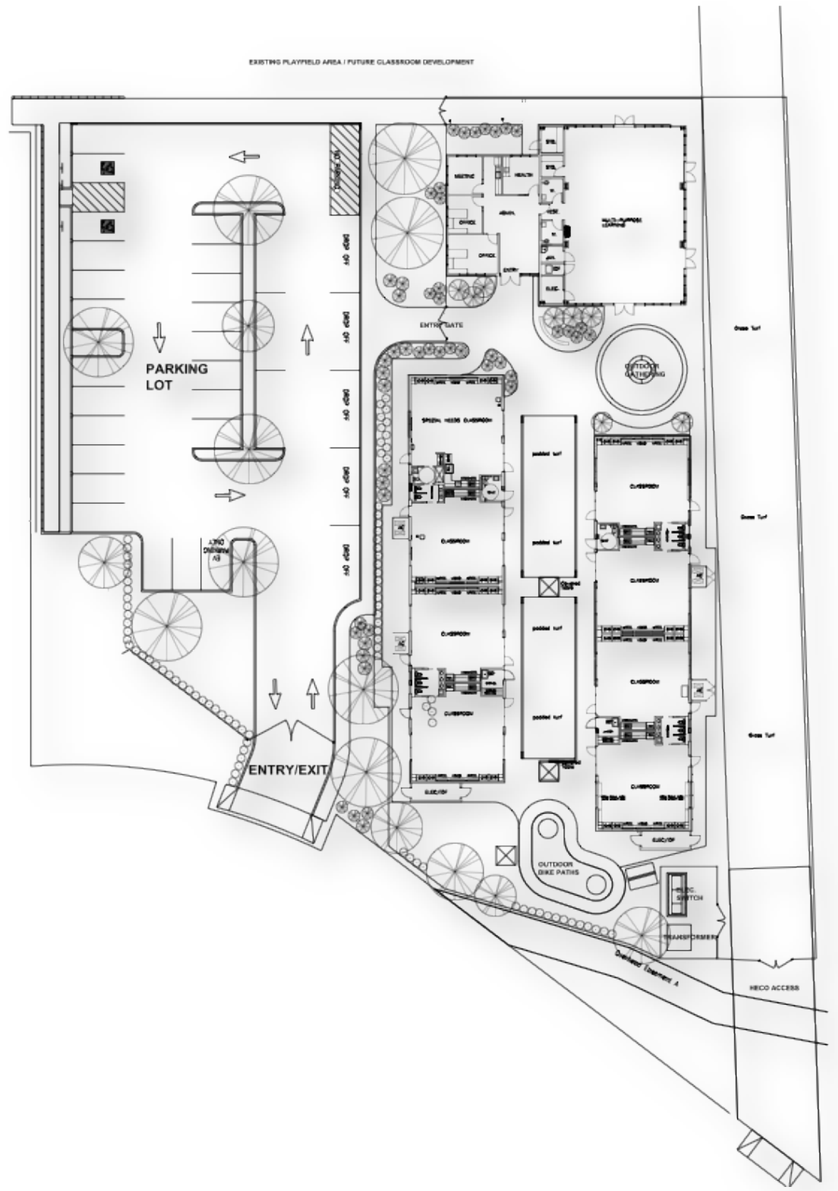

Figure 6: Proposed Pre-Kindergarten Site Plan

Source: AM Partners, Inc.

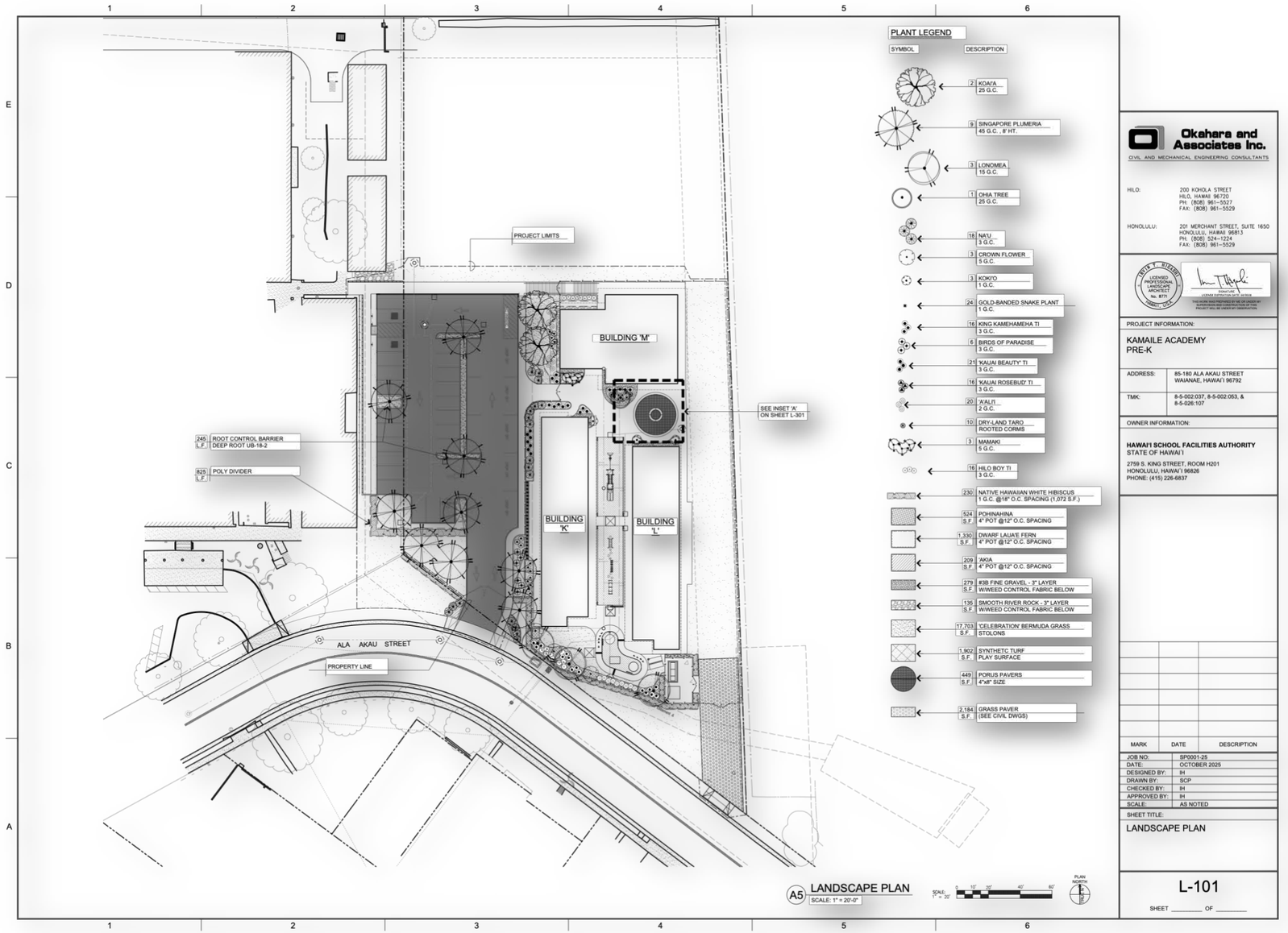

Figure 7: Proposed Landscape Plan, Ground Level

Source: Okahara and Associates Inc.

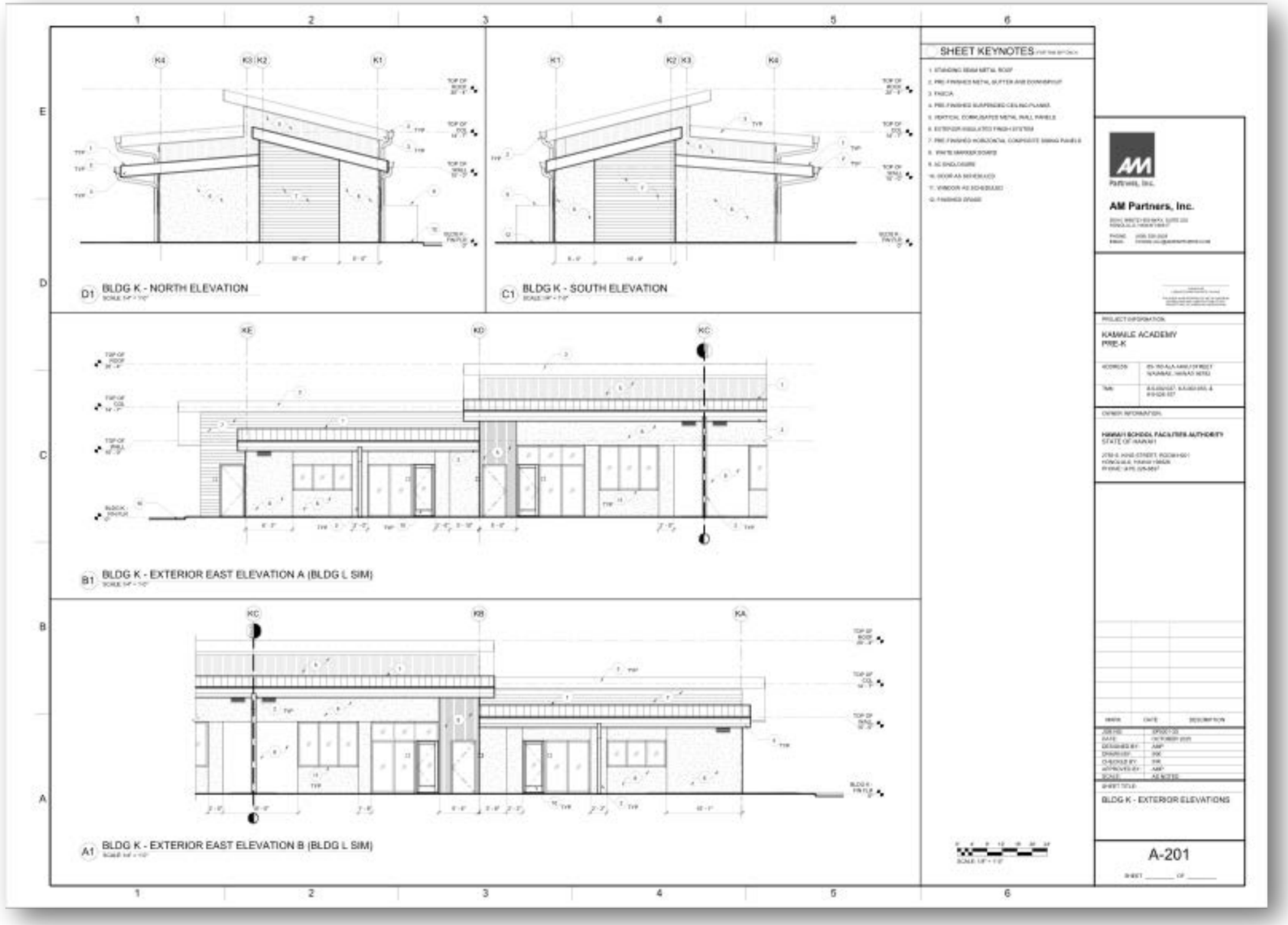

Figure 8: Classroom Building Elevations

Source: AM Partners, Inc.

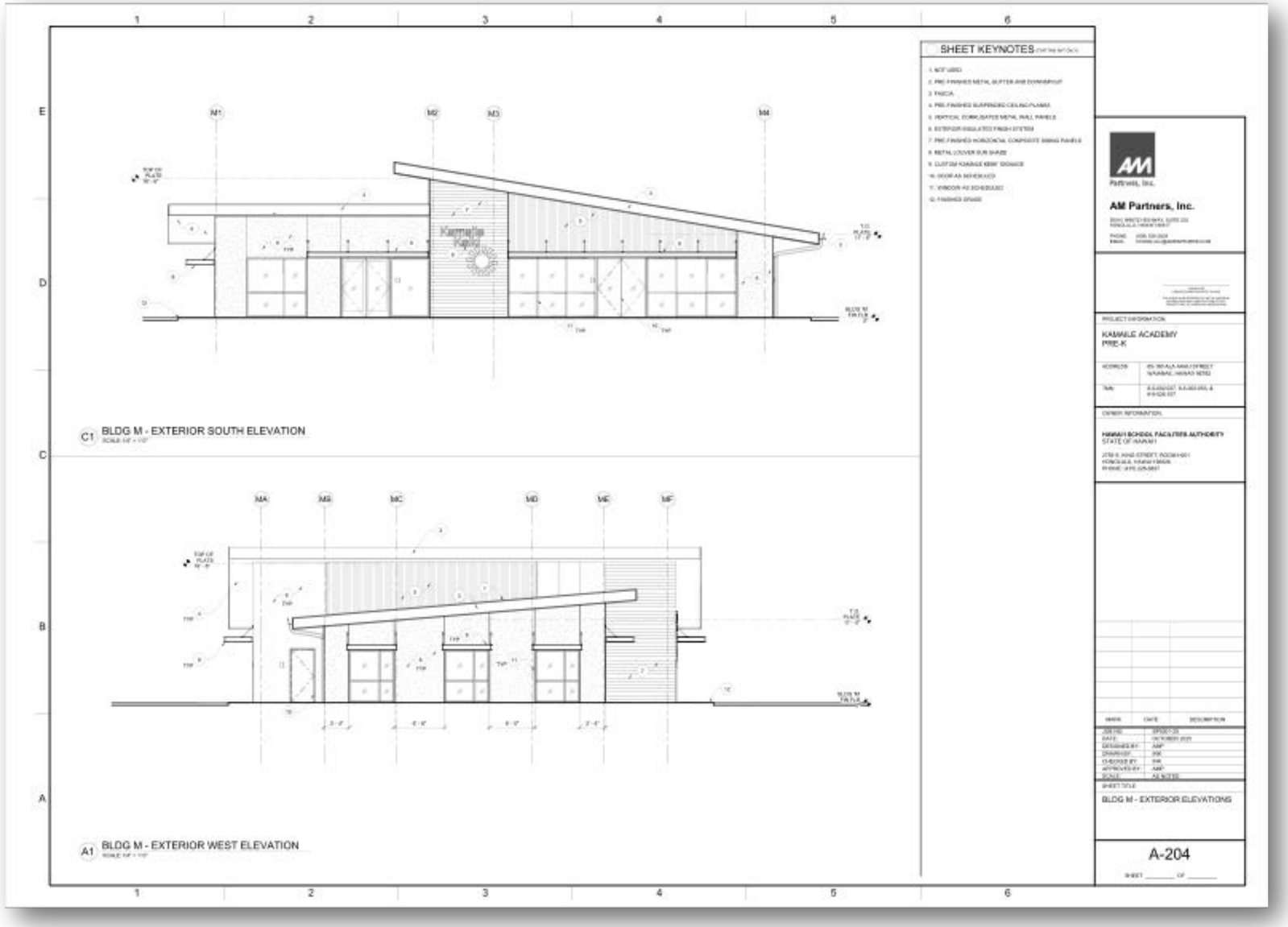

Figure 9: Administration Building Elevations

Source: AM Partners, Inc.

2.3 ALTERNATIVES CONSIDERED

Alternative considered the project were primarily limited to State of Hawaii owned properties. Suitable lands in the vicinity are not available and the adjacency to an existing State of Hawai‘i charter school make the site well suited for the proposed Pre-Kindergarten use. While alternative locations within the site were considered, the proposed site layout is considered optimal and functional ensuring that the functions of both the Pre-Kindergarten and the Kamaile Academy are well served.

Other alternatives considered were largely regarding infrastructure components. These alternatives included extension of a perimeter fire lane loop, location of electrical utilities, and shared common areas between the Kamaile Academy Public Charter School and the Pre-school complex. It was determined during the planning phase that the Kamaile Academy Public Charter School and Pre-school complex should be developed and operated as independently as possible both physically and administratively as both components are funded and administrated independently. This document address both collectively rather than separately to provide an overview of the complex in total for the purposes of addressing impacts cumulatively.

The “no action” alternative was rejected as not meeting or furthering the objectives of the Hawaii School Facilities Authority’s mission and its ideal co-location with the Kamaile Academy Charter school. The proposed master plan presented in this document was selected as optimal to meet program requirements of both entities.

2.4 PROJECT OBJECTIVE

The objective of the proposed project is to provide much need affordable early education opportunities to the West Oahu. The demand for educational services and facilities in this community is significant and compels the State of Hawaii to accommodate these needs within the limited State owned parcel suitable for educational use.

2.5 FUNDING AND SCHEDULE

The project master plan will be funded incrementally. Current appropriations will allow for the construction of the Pre-kindergarten classroom improvements which is anticipated to cost $16,000,000. .

Upon completion of the Environmental Assessment process, the project will be required to obtain standard construction related permits from the State of Hawaii and the City and County of Honolulu. The anticipated construction start date is during the Fall of 2026. The project is anticipated to be completed in the Fall of 2027. The project will be conducted in a single, continuous phase.

SECTION THREE

DESCRIPTION OF ENVIRONMENT, ANTICIPATED IMPACTS AND MITIGATION MEASURES

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SECTION THREE
DESCRIPTION OF ENVIRONMENT, ANTICIPATED IMPACTS AND MITIGATION MEASURES

3.1 ENVIRONMENTAL SETTING

The project site represents seven acre parcel that is located within a urbanized area located within central Waiʻanae Town. Originally a Hawaiian settlement area, the Waiʻanae west coast area was known as an area of early fishing village settlements which became cultivated for agricultural use and finally urbanized as a residential area. Since the decline of agriculture, Waiʻanae became a bedroom community that consists primarily of low-density residential uses and supporting commercial areas. The Waiʻanae district has established a strong sense of identity and community.

Originally established in 1989 as the Kamaile Elementary School, the subject property was constructed in accordance with the Department of Education (DOE) standards in effect at that time. In 2007, the community converted the DOE Kamaile Elementary School to a public charter school covering grades K through 12. With this expanded service role, the facilities that were originally meant to serve grades K to 6 were supplemented with temporary structures to accommodate the growing student body.

The project site is notable as it is centrally located in Waiʻanae Town, it is also surrounded by a large solar panel array. This unique location allows the school to be especially secure with only one side of the school located along street and public access.

3.2 SURROUNDING USES

Adjacent uses are consists of a low-density housing two story townhome complex located along the entire ʻEwa side of Ala Akau Street and the aforementioned solar array located to the west, north and east. Further north lie additional residential areas and the town of Makaha, to the west lies the Waiʻanae High School, and a mix of residential and commercial uses further in the southerly direction.

The Eurus solar panel array is located along the northern and eastern boundaries of the Kamaile campus. This array account for almost 200 acres of land and is a major contributor to Hawaii's energy independence initiative. A smaller array is located on approximately two acres of land located directly west of the campus boundary.

The southern and south eastern boundary is located along Ala Akau Street which separates the campus from the Hawaii Housing and Finance Development Corporation's multi-family dwelling complex. Waianae Intermediate School lies further to the south east while the Waianae High School is located across Farrington Highway to the west.

3.3 RELATIONSHIP TO KAMAILE ACADEMY SITE

The Kamaile Academy Pre-Kindergarten and Kamaile Academy as separately operated campuses but the adjacent locations warrant consideration of the cumulative impacts when viewed as a larger educational complex. The Kamaile Academy Pre-Kindergarten is independent but exist on a 2-acre parcel that may include a parking lot and portions of future classroom buildings serve the adjacent Kamaile Academy. This parking lot, which will be maintained by the Department of Education, will be accessed through the Pre-Kindergarten parking lot and ingress/egress location off Ala Akau Street. The future parking lot and potential classroom area are not funded at present and will remain as vacant land until such funding is available for the Kamaile Academy master planned components.

3.4 ENVIRONMENTAL CONSIDERATIONS

3.4.1 GEOLOGICAL CHARACTERISTICS

Topography

The project site consists of flat urban land that this is in use as an existing kindergarten to high school campus. Previously, the site was extensively disturbed when the site was used for cane cultivation and grazing. The majority of the surrounding areas are graded, and are in use for a large solar panel array. The adject residential blocks located to the south consists of the low-rise townhome complex. The project site is an active school campus. The classroom buildings proposed either replace temporary wooden portable structures or are located on smaller open lands within the campus.

Climate

The geography of the Wai‘anae District is typically warm and dry in climate. Prevailing trade winds arrive from the northeast. According to the National Weather Service Honolulu Office, over a period of 30 years, normal monthly high temperatures range from 80 degrees in January to a high of 89 degrees in August for an average of 84 degrees. Normal month low temperatures range from a low of 63 degrees in February and a high of 72 degrees in August for a monthly average of 67 degrees. Precipitation typically ranges from 0.40 inches in August to a high of 3.3 inches in December. The annual average rainfall in Ewa is 19 inches per year.

USDA Soil Survey Report and Detailed Land Classification – Island of O‘ahu

The project site is located on soils classified Coral Outcrop (CR), according to Panel 36 of the Soil Survey of Islands of Kauai, O‘ahu, Maui, Molokai, and Lanai, State of Hawai‘i by the U.S. Department of Agriculture Soil Conservation Service. This land type consists of coral or cemented calcareous sand.

The project site is classified as "U" Urban on Map No. 248 of the Detailed Land Classification – Island of O'ahu by the University of Hawai'i Land Study Bureau.

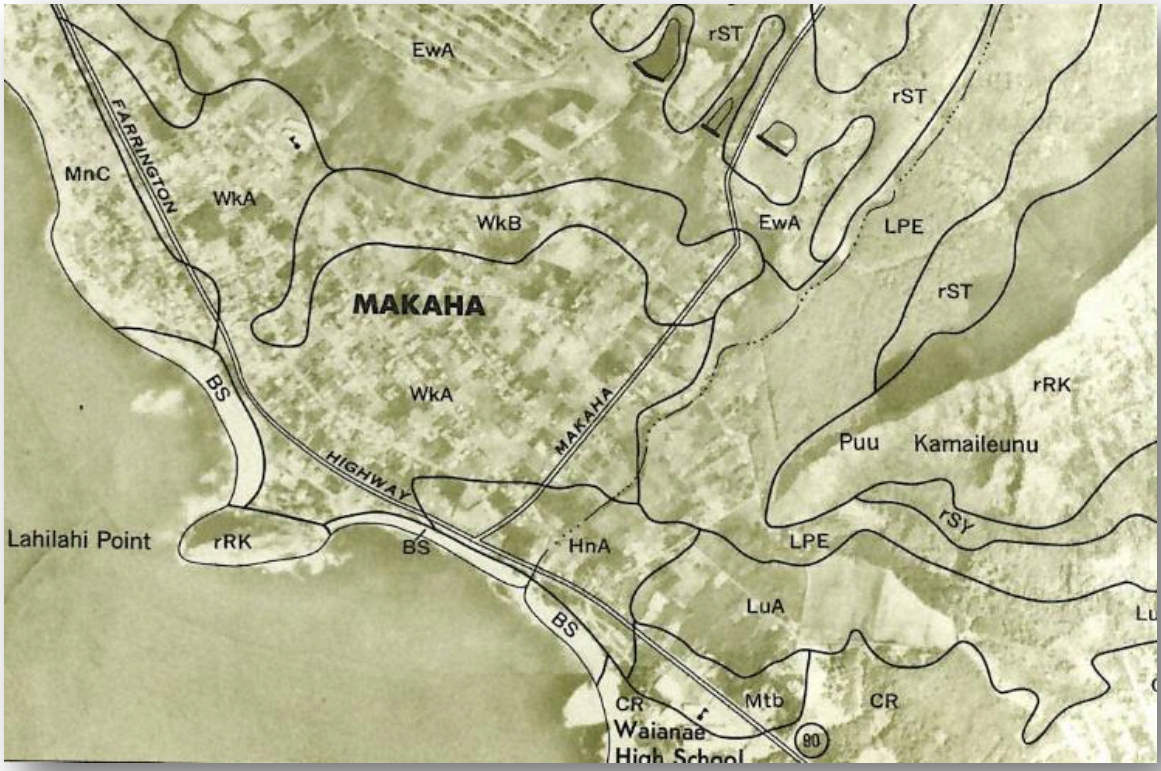


Figure 10: Soils Map Source: USDA Soil Conservation Service

3.4.2 WATER RESOURCES

Hydrologic Hazards and Resources

According to Panel 150003 C 0183 H of the Federal Emergency Management Agency Flood Insurance Rate Map, the project site is located in Zone X, an area not in the special flood hazard zone an area unlikely to be affected by severe flooding.

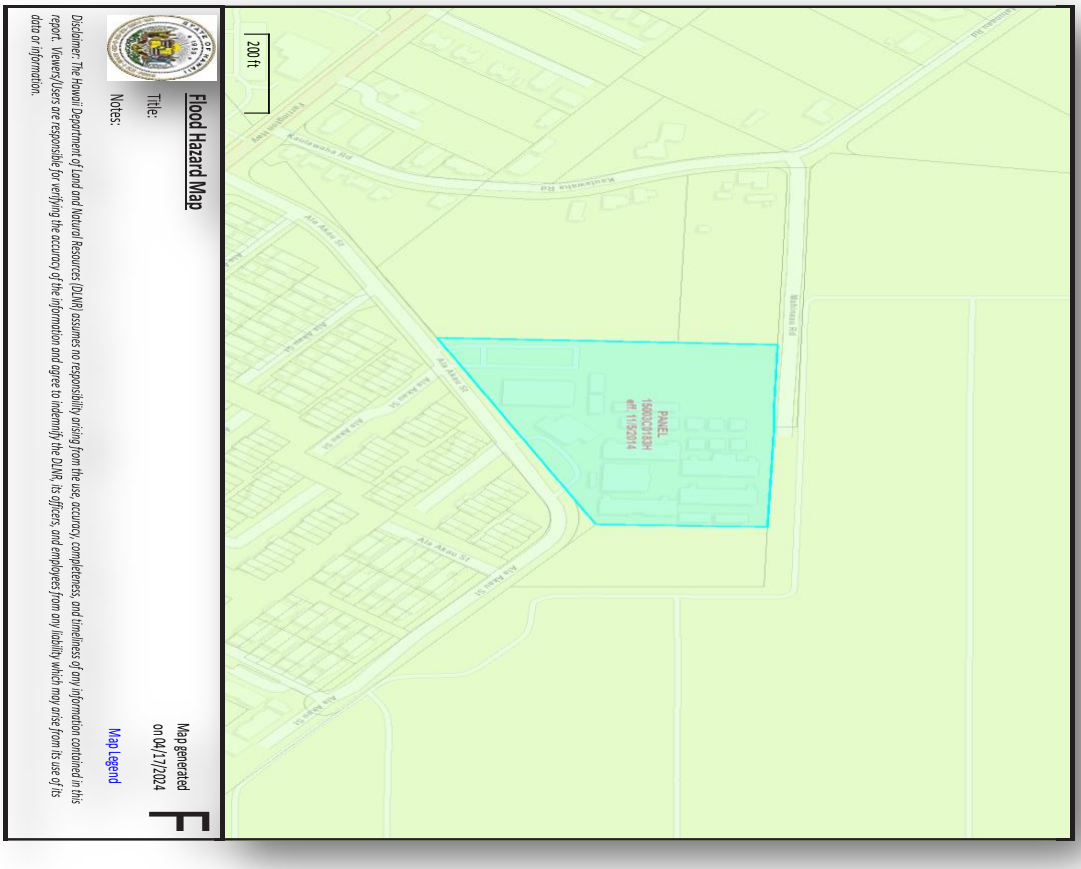


Figure 11: Flood Hazard Map Source: State of Hawaii FHAT

The project site lies at an elevation of approximately 13.5 feet above mean sea level.

Using the Hawai'i Sea Level Rose Vulnerability and Adaption Report, dated December 2017, and its companion tool, the Hawai'i Sea Level Rise Viewer, one is able to identify areas vulnerable to variations in sea level rise based upon three hazards – passive flooding, annual high wave flooding and coastal erosion. The Report projects sea level rise for four time periods as shown in the table below. Changes in global climate conditions can also influence the projections.

The Sea Level Rise Viewer depicts areas susceptible to sea level rise caused by the aforementioned three hazards and notes these areas as "Sea Level Rise Exposure Area." The project site is not located in a Sea Level Rise Exposure Area

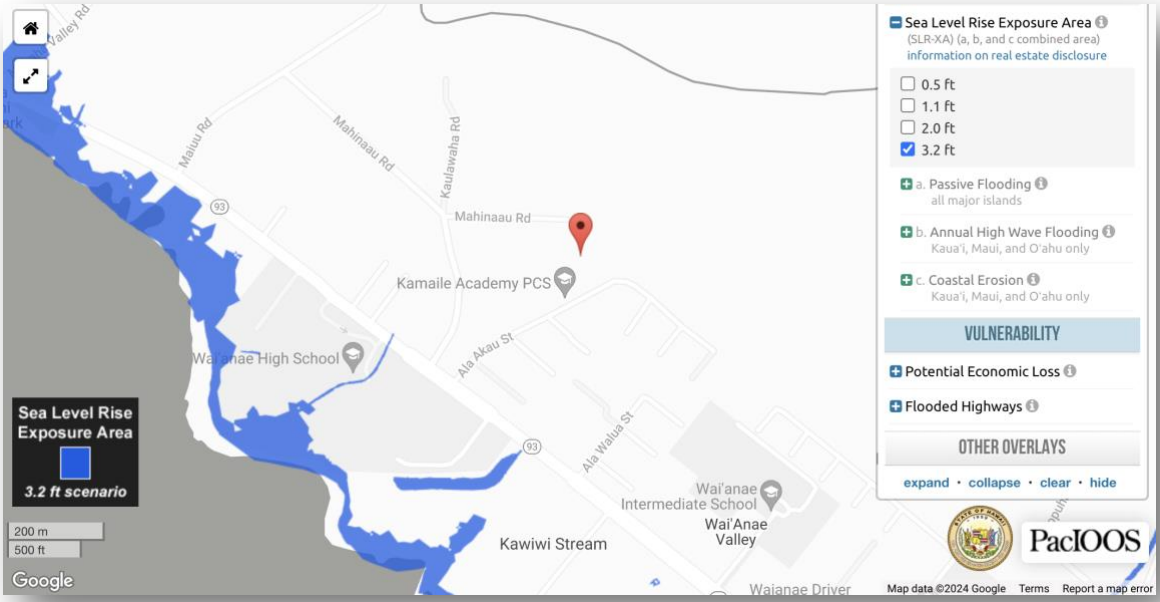


Figure 12: Sea Level Rise Viewer Source PacIOOS

Global Sea Level Rise Projection		
Year	**Feet**	**Meters**
2030	0.5	0.16601
2050	1.1	0.3224
2075	2	0.5991
2100	3.2	0.9767

Source: Hawai'i Sea Level Rise Vulnerability and Adaptation Report, December 2017

Tsunami Inundation

According to the National Ocean and Atmospheric Administration (NOAA), the project site is not located in the extreme evacuation area of the Tsunami Hazard Map.

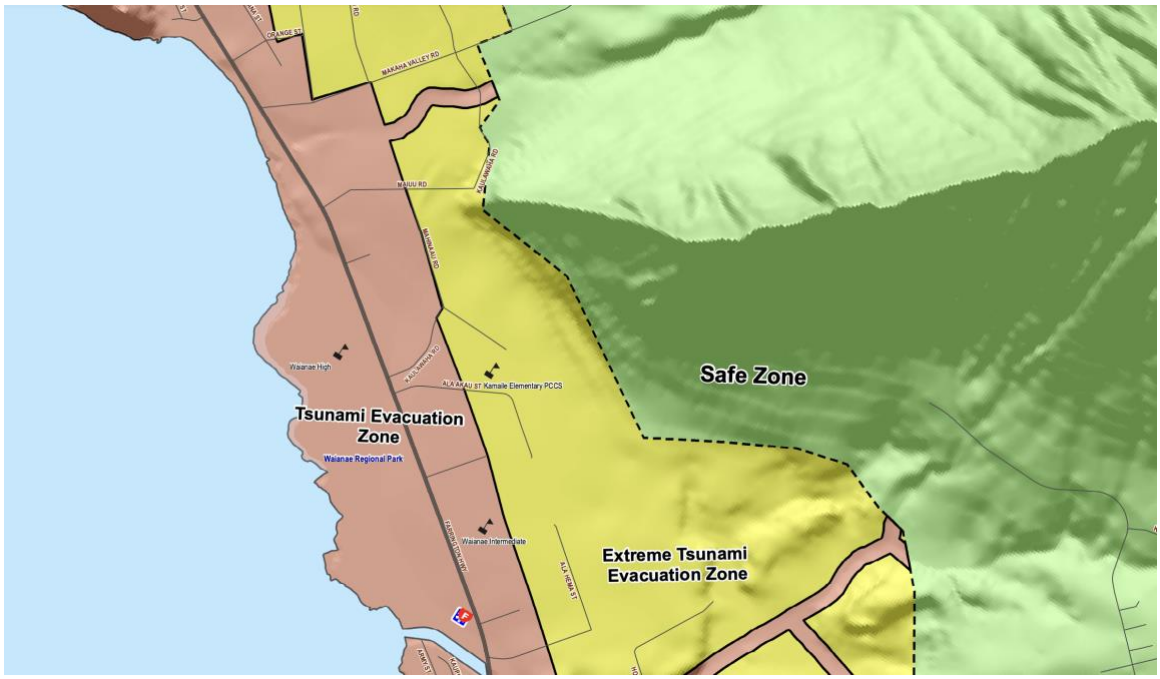


Figure 13: Tsunami Hazard Map Source: NOAA

Special Management Area

The project site is not located within the boundaries of the Special Management Area (SMA) Map.

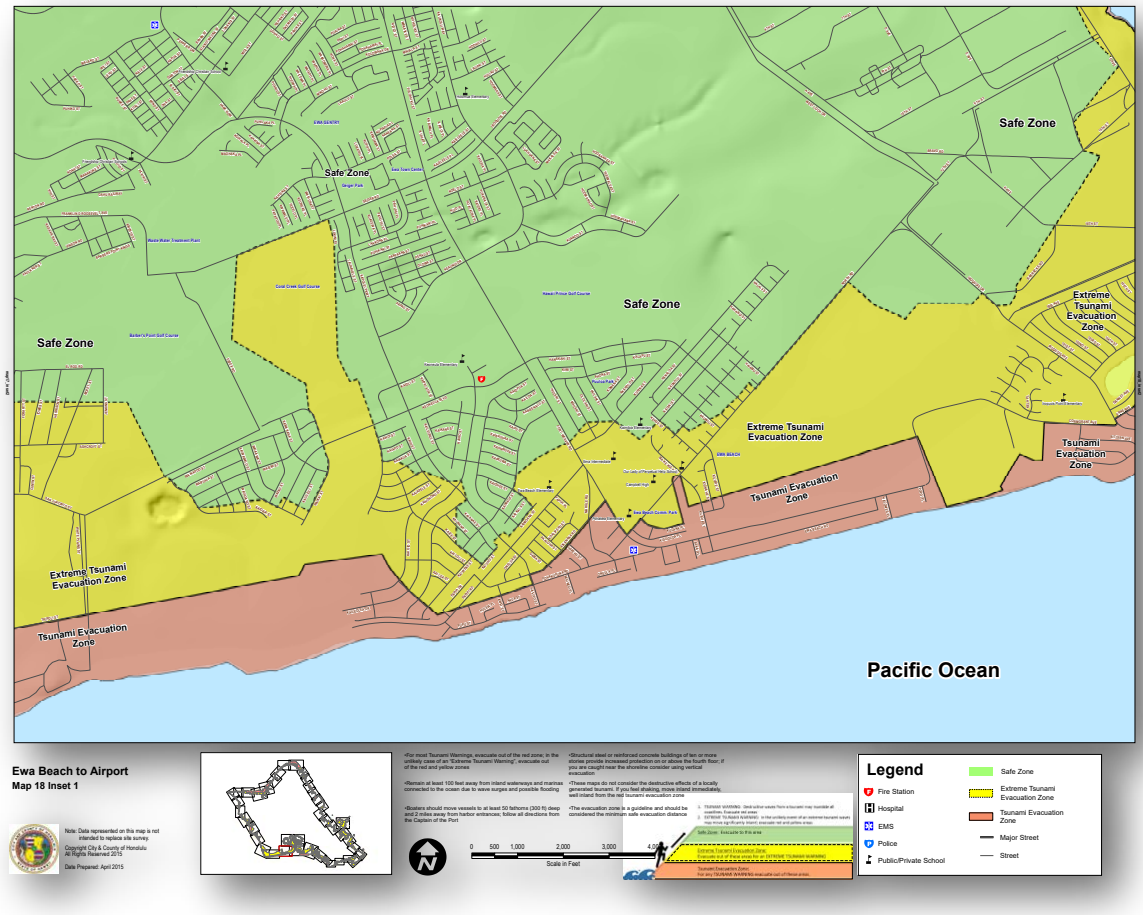


Figure 14 – Tsunami Hazard Map Source: City and County of Honolulu

3.4.3 HISTORICAL AND ARCHAEOLOGY

Kamaile Academy Public Charter School, which is located immediately adject to the project site, was reverentially named based upon the history of the surrounding area. In a brief history presented in Kamaile Academy Public Charter School's website, the history of Kamaile is as follows:

Kamaile was a little known Hawaiian settlement on the Wai `anae Coast that once was boasted as being an integral component of the Wai 'anae Ahupua'a complex. Before the coming of Westernization, four extensive taro terrace sections were watered by Kiko`o Springs at Kamaile. This blessing of precious water in an arid region helped to sustain a highly developed community with a large population only second to Wai 'anae Kai.

The significance of Kamaile`s history was that the entire complex, consisting of Kamaile Heiau- Kaneikapualena and Kuka`au`au Cave, a habitation complex, and

Kiko`o Springs had an enormous research and interpretive potential. These prehistoric archaeological sites were important links to our understanding of the ancient Hawaiian religion, philosophy, and social practices and beliefs.

The water was the source of life for Kamaile. The name of this unusual spring was Kiko'o. Being from an underground origin, Kiko'o was one of the few year-round water sources on the Wai ʻanae Coast. Throughout prehistoric and modern history, Kiko`o Springs played a major factor in the life and development of Wai ʻanae. What remains of Kiko'o today is a short running spring that quickly vanishes into the ground from where it came.

The proposed project site is located on an area that has been heavily altered during the construction of the school campus and surrounding developments. The proposed improvements will occur entirely on areas that were previously altered and no impacts to any area of historic significance or archaeological importance are anticipated. The area was formerly vacant but was urbanized over the years and no longer retains any character of its former uses. Based upon a map dated 1902 created by M.D. Monsarrat's Map of Waianae, the project site is located on formerly owned private lands that were acquired by the State of Hawaii.

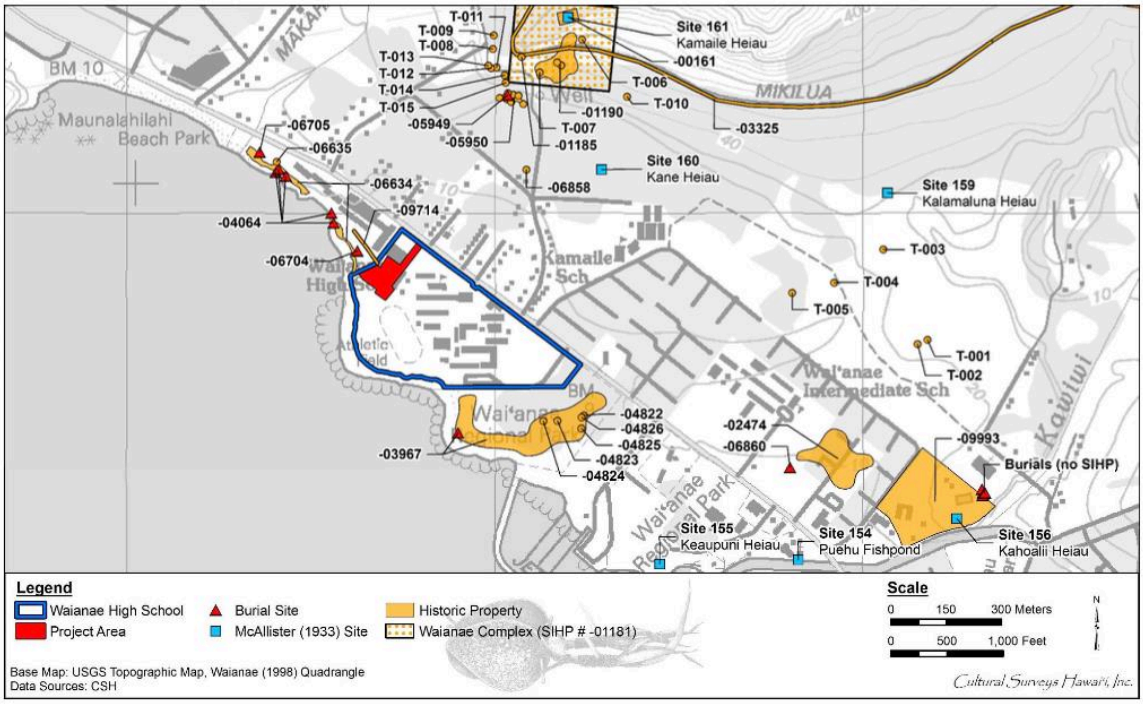
Source: Ava Konohiki, Leeward Community College

In 2017, Cultural Surveys Hawai‘i, Inc. (CSH) conducted a literature review of historic information for the nearby Waianae High School site. The study was designed to identify, document, and perform significance assessment of any historic properties in the project area, as well as to comply with the State's historic preservation review under Hawai‘i Revised Statutes (HRS) §6E-8, Hawai‘i Administrative Rules (HAR) §13-13-275, and the project's environmental review under HRS §343.

The study titled *Archaeological Literature Review and Field Inspection Report for the Wai‘anae High School Connection of Buildings SP and T Project, Wai‘anae Ahupua'a, Wai‘anae District, O‘ahu, TMKs: (1) 8-5-002:018* was prepared by Cultural Surveys Hawaii, Inc... A summary of the findings of the area indicate that Wai‘anae coast was largely populated by fishing communities but during the 1800‘s, areas away from the coastline were used for grazing, and later for sugar cane cultivation.

Figure 24 of the report depicts all previously documented historic properties within the project area. None are identified on the Kamaile Academy Public Charter School project site.

In the unlikely event that any artifacts or remains are uncovered during the construction process, all work will cease and the appropriate agencies will be contacted for further instruction.



Source: Cultural Surveys Hawaii

The non-historic wall located along the northern most boundary of parcel 8-5-002: 53 will be retained. While this wall is not of original construction and was made in recent times, it consists of rocks that were removed from a wall located on the adjacent solar farm. The purpose of the wall is to replicate a small segment of cattle wall for viewing by interested persons. The wall is situated on Department of Education property and as of this date, no permission has been requested to view this replica wall.

3.4.4 CULTURAL IMPACT ASSESSMENT

A study titled *Cultural Resource Assessment for the Kamaile Academy Public Charter School Master Expansion Plan, Waiʻanae District, Oʻahu Island TMK: [1] 8-5-002:037* is being prepared by Honua Consulting. The findings of the study are applicable to the project site. No cultural impacts to historic cultural practices are expected.

The school campus has been constructed in 1963 as Kamaile Elementary School under the Hawaii State Department of Education. For over 60 years this facility has remained in school use and has not been used for traditional hunting and gathering purposes. It has been a cultural center for events related to school age children and continues to do so as a Charter school.

3.4.5 TRAFFIC CONDITIONS

A Traffic Assessment for the proposed Pre-Kindergarten facility and the master plan of the Kamaile Academy was conducted by The Traffic Management Consultant. The cumulative impacts of both the Academy and the Pre-Kindergarten are included in the report. The proposed Master Planned expansion improvements may have local traffic impacts at well as impact upon the Ala Akau Street / Farrington Highway intersection. While improvements to the Kamaile Academy Public Charter School will not increase student enrollment or increase staffing, the Pre-kindergarten complex will bring in 80 new students and supporting staff. A Traffic Impact Assessment has been prepared by The Traffic Management Consultant and is summarized as follows and is included in its entirety in Appendix D.

The trip generation characteristics for the Kamaile Academy Public Charter School Pre-K and K-12th grade expansion were based upon the ITE trip rates for a daycare center and a K-12th grade charter school, respectively. The ITE vehicle trip generation were higher than the observed conditions, due to the large number of walk trips and the Kamaile Academy Public Charter School bus trips. The trip generation characteristics for the Kamaile Academy Public Charter School Pre-Kindergarten and K-12th grade, adjusted for the observed conditions, are summarized in Tables 7 and 8, respectively. The proposed Kamaile Academy Public Charter School expansion is expected to generate totals of 183 vph and 151 vph, during the AM and mid-afternoon peak hours, respectively.

<u>Trip Distribution AM and PM</u>

1. The traffic assignments are based upon the modified traffic circulation patterns, where Pre-K children are dropped-off and picked up in the proposed Mauka Parking Lot. The traffic circulation has been further modified where the left-turn movement from eastbound Ala Akau Street into the Entry Driveway has been restricted and redirected to turnaround in the proposed Preschool Parking Lot and turn right into the Entry Driveway from westbound Ala Akau Street.

2. During the Year 2027 AM peak hour of traffic with the proposed project, the intersection of Farrington Highway and Ala Akau Street is expected to operate at the same Levels of Service as during the Year 2027 AM peak hour of traffic without the proposed project.

Table 7. Pre-Kindergarten Trip Generation Characteristics				
Peak Hour	**Direction**	**Current Design Enrollment**	**Expansion Total**	**Increase**
AM Peak Hour	**Enter**	23	50	27
	Exit	19	40	21
	Total	42	90	48
PM Peak Hour	**Enter**	14	29	15
	Exit	20	43	23
	Total	34	72	38

Table 8. K-12th Grade Trip Generation Characteristics				
Peak Hour	**Direction**	**Current Design Enrollment**	**Expansion Total**	**Increase**
AM Peak Hour	**Enter**	268	286	18
	Exit	216	231	15
	Total	484	517	33
PM Peak Hour	**Enter**	153	164	11
	Exit	229	246	17
	Total	384	410	28

The other intersections in the study area are expected to operate at satisfactory Levels of Service, during the Year 2027 AM peak hour of traffic with the proposed project.

Mid-Afternoon Peak Hour Transportation Impact Analysis With Project

The intersection of Farrington Highway and Ala Akau Street is expected to continue to operate at LOS "C", during the Year 2027 mid-afternoon peak hour of traffic with the proposed project. The left-turn movements, from southbound Farrington Highway onto Ala Akau Street and from Ala Akau Street onto southbound Farrington Highway, are expected to continue to operate at LOS "E".

During the Year 2027 mid-afternoon peak hour of traffic with the proposed project, the other study intersections are expected to continue to operate at satisfactory Levels of Service. The mid-afternoon queuing analysis indicates that a minimum of nine (9) spaces in the proposed Mauka Parking Lot will be required for picking up the Pre-K children after school.

Recommendations and Conclusions

A. Recommendations

1. The left-turn movement from westbound Ala Akau Street at the Preschool Entry Driveway should be prohibited before and after school hours. Eastbound school traffic should be directed to turn around within the proposed Mauka Parking Lot and queue in the curb lane on westbound Ala Akau Street and turn right into the Entry Driveway.
2. A convenient and safe vehicle turnaround pattern should be provided in the proposed Mauka Parking Lot.

3. A minimum of eight (8) curbside pick-up spaces and ten (10) parking stalls should be provided in the proposed Mauka Parking Lot for parents/guardians picking up Pre-K children after school.
4. Active staff-assisted curbside loading should be considered to minimize children walking through the parking lot.
5. Parking along the Kamaile Academy Public Charter School frontage on Ala Akau Street should be restricted to active loading and unloading only, before and after school hours, to facilitate the safe drop-off and pick-up operations.
6. Concrete sidewalks should be constructed along the Kamaile Academy Public Charter School frontage on Ala Akau Street, in accordance with the City and County of Honolulu Complete Street standards.
7. American Disability Act (ADA) compliant pedestrian ramps should be constructed at the existing midblock crosswalk on Ala Akau Street at Kamaile Academy Public Charter School, in accordance with the City and County of Honolulu Complete Street standards.

B. Conclusions

The intersection of Farrington Highway and Ala Akau Street is not expected to be significantly impacted by the proposed expansion of Kamaile Academy Public Charter School. The existing AM peak hour and mid-afternoon peak hour traffic operations were affected by the queuing on eastbound Ala Akau Street from the Entry Driveway to the drop-off/pick-up area. Full enrollment/attendance and the proposed expansion of Kamaile Academy Public Charter School are expected to further increase the queuing on eastbound Ala Akau Street.

The proposed “No Left-Turn” restriction from eastbound Ala Akau Street into the Entry Driveway will eliminate the queuing on eastbound Ala Akau Street. Relocating the Pre-K drop-off/pick-up to the proposed Mauka Parking Lot is expected to reduce the traffic demands at the existing drop-off/pick-up area. The proposed sidewalk improvements and parking restrictions along the north side of Ala Akau Street are expected to provide safer and more convenient curbside drop-off and pick-up operations for Kamaile Academy Public Charter School.

3.4.6 NOISE ENVIRONMENT

Development of the project areas will involve excavation, grading, and other typical construction activities during construction. The use of impact equipment is not anticipated, as the foundation will be pre-drilled to avoid any need for pile driving. The actual noise levels produced during construction will be a function of the methods employed during each stage of the construction process. Earthmoving equipment, e.g., bulldozers and diesel-powered trucks, will probably be the loudest equipment used during construction. In cases where construction noise is expected to exceed the HDOH "maximum permissible" property line noise levels, a permit must be obtained to allow the operation of construction equipment.

In cases where construction noise exceeds, or is expected to exceed the State's "maximum permissible" property line noise levels, a permit must be obtained from HDOH to allow the operation of vehicles, cranes, construction equipment, power tools, etc., which emit noise levels in excess of the "maximum permissible" levels.

In order for HDOH to issue a construction noise permit, the contractor must submit a noise permit application to HDOH, which describes the construction activities for the project. Prior to issuing the noise permit, HDOH may require action by the contractor to incorporate noise mitigation into the construction plan. HDOH may also require the contractor to conduct noise monitoring or community meetings inviting the neighboring residents and business owners to discuss construction noise. The contractor should use reasonable and standard practices to mitigate noise, such as using mufflers on diesel and gasoline engines, using properly tuned and balanced machines, etc. However, HDOH may require additional noise mitigation, such as temporary noise barriers, or time of day usage limits for certain kinds of construction activities.

The proposed improvements are not anticipated to have any significant negative effect on the noise environment above those experienced in an school setting. Activities occurring on-site must conform with Department of Health Community Noise Standards.

3.4.7 AIR QUALITY AND HAZARDOUS MATERIALS

The proposed project will have short-term and long-term effect on ambient air quality. During demolition and excavation, dust will be generated however fugitive dust is generally controlled by frequent watering and perimeter screening. Best management practices will be used to ensure that dust control during demolition of the existing paving and during construction of the new building are kept to a minimum. These impacts are typical of any new construction project.

3.4.8 BIOLOGICAL CHARACTERISTICS

Flora

The project site presently features a number of landscaping plants and trees. The landscaping plant materials are in good condition and compliment the site. Some plants may be required to be moved in favor of the new buildings but it is expected that the materials can be relocated onsite. Plants and trees identified onsite include: Kukui, Manila Palm, Loulu Palm, Croton, Red Ti, Pandanus, Hibiscus, Greet Ti, Koa Haole, Monkey Pod, Guinea Grass, Mountain Ebony, and Plumeria

Fauna

The site does not serve as a wildlife habitat although avifauna, feral cats, and rodents may be found on-site although none were observed during site inspections.

3.4.9 INFRASTRUCTURE AND UTILITIES

The proposed improvements are readily serviced by existing utilities presently serving the campus. All existing utilities are located underground and any improvements to utility lines will remain underground. A power main is presently located overhead between parcels 8-5-002: 037 and 053. This line will be rerouted to the eastern boundary of parcel 053. No significant impacts on infrastructure and utilities are expected from the proposed improvements.

Water

The project will continue to be serviced by the existing water system. The proposed plan will result in an increase in water with the addition of classrooms and additional restrooms. The new domestic water and fire protection water meters to serve the project are expected to be upgraded as part of the development. Water conservation efforts are likely to be implemented where practicable. This may include water efficient fixtures and the use of xeriscape or low water requirement landscaping.

Stormwater

The site is presently naturally drained with runoff entering a stormwater box drain in the project area. The proposed project will be required to control drainage according to prevailing drainage regulations. All storm water runoff from the proposed improvements will be reviewed for conformance with City and County of Honolulu Ordinance 96-34 regarding peak runoff.

Best Management Practices (BMPs) will be put in to place prior to the start of any construction to ensure that runoff in the storm drain system are treated for minimal impact into State receiving waters. Additionally, Low Impact Design feature will be considered for the project.

Wastewater

Approval from City and County of Honolulu Department of Planning and Permitting for municipal sewer system connection to accommodate the proposed project will be required. Sewer mains are located along each street frontage and an appropriate sewage connection system will be designed in consideration of the most effective connection points.

Solid Waste

It is expected that private refuse collection service will be used to service the project location. The project operator may implement recycling programs upon project completion.

Telecommunication and Electrical Services

Telephone and electrical services are available to the site. Coordination with the local electric and telephone service providers will be expected during the design and construction phases. Telecommunication services are available through existing service located with Akau Road. Electrical service presently serves Kamaile Academy Public Charter School but in order to accommodate the Pre-kindergarten facility, electrical utility poles and lines that presently run between parcels 8-5-002: 037 and 053 must be relocated along the north and east boundaries of parcel 037prior to any new construction. A new transformer box will be located at the southeastern most corner of parcel 037.

3.4.10 PUBLIC FACILITIES

The Waianae Fire Station No. 26 provides fire protection service to the project area. The station is located at 85-645 Farrington Highway, approximately .75 miles from the project site. Response time to the site is less than 5 minutes. Fire protection access has been extensively reviewed to ensure that fire equipment is provided unimpeded access to all portions of the site. Fire equipment vehicles may access the site through the east parking lot and travel along a perimeter west and north boundary fire lane where a hammerhead turn around point at the north eastern corner of parcel 8-5-002: 037. Access to all facilities on parcel 8-5-002: 053 are accessed through the Pre-kindergarten parking lot ingress/egress driveway.

Police service is provided by the Honolulu Police Department (HPD) District 8, which is administratively based in Kapolei with a substation located in Waianae. This station is located at 85-939 Farrington Highway. Police services are provided by patrolling officers and response time to the site is less than 5 minutes.

The Waiʻanae Coast Comprehensive Health Center is the closest comprehensive health care facility in the area. It is located at 86-260 Farrington Highway and includes emergency care. This facility is located approximately 3.0 miles from the project site. The nearest hospital providing full medical services is the Queens Medical Center – West Oahu which is located approximately 19 miles from the project site. The address of this facility, which also serves as the base for Emergency Medical Response is 91-2139 Fort Weaver Road, ʻEwa Beach.

Public and private Schools located near the project site include Makaha Elementary School, Waiʻanae Elementary School, Waiʻanae Intermediate School and Waiʻanae High School. The proposed improvements will not have any impact on these schools.

SECTION FOUR

RELATIONSHIP TO PLANS, CODES AND ORDINANCES

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SECTION FOUR
RELATIONSHIP TO PLANS, CODES AND ORDINANCES

4.1 STATE OF HAWAII PLANS

State Land Use Boundary

The State Land Use Commission Boundary Maps identify the project site as being within the Urban area. This is consistent with the surrounding uses that include commercial uses and medium to low-density residential developments.

Coastal Zone Management Act

Hawai‘i Revised Statutes (HRS) § 205A-1 states that the entire State is located within the coastal zone management area. The proposed master plan improvements are generally consistent with all objectives of the CZM. The project does not directly affect coastal recreational, historic, costal ecosystems. The project will minimally decrease open space but will significantly increase the benefit the school and users of the facility. Overall, the project should be considered an important improvement both from a policy perspective as well as in terms of function and efficiency.

Hawaii State Plan

The project is also consistent with the Hawai‘i State Plan, HRS Chapter 226. While the project does affect the physical environment, the project will not affect the natural beauty and historic resource of Hawai‘i (12(b)(5) and 12(b)(7)) as the site is and has been within a highly urban environment designated for urban development. The project does provide significant educational and socio-cultural advancement by providing a fully integrated multi-function complex that is supportive of Department of Education policies.

HRS 226-21 elaborates on the State’s plan for socio-cultural advancement as it relates to education. In this regard the Plan specifically states the following:

(1) Support educational programs and activities that enhance personal development, physical fitness, recreation, and cultural pursuits of all groups.

(2) Ensure the provision of adequate and accessible educational services and facilities that are designed to meet individual and community needs.

(3) Provide appropriate educational opportunities for groups with special needs.

(4) Promote educational programs which enhance understanding of Hawaii's cultural heritage.

(5) Provide higher educational opportunities that enable Hawaii's people to adapt to changing employment demands.

(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.

(7) Promote programs and activities that facilitate the acquisition of basic skills, such as reading, writing, computing, listening, speaking, and reasoning.

(8) Emphasize quality educational programs in Hawaii's institutions to promote academic excellence.

(9) Support research programs and activities that enhance the education programs of the State.

The proposed improvements are consistent and further promote each object or has no conflict with any objective within the State Plan.

4.2 CITY AND COUNTY OF HONOLULU PLANS

City and County of Honolulu General Plan

The City and County of Honolulu General Plan provides the overall vision for the island of O‘ahu and broadly outlines the objectives and policies shaping future growth. While the proposed action is consistent with Chapter IX, Health and Education: Objective B: To provide a wide range of educational opportunities for the people of O‘ahu. Policy 4: Encourage the construction of school facilities that are designed for flexibility and high levels of use. Policy 5: Facilitate the appropriate location of learning institutions from the preschool through the university levels.

City and County of Honolulu Wai‘anae Sustainable Communities Plan

The City’s Wai‘anae Sustainable Communities Plan 2012 development plan guides development in the Wai‘anae District of O‘ahu. While the project is generally consistent with all aspects of the Waianae SCP, particularly relevant to the proposed project is Section 4.7 School Facilities. The Plan states that the Ewa district has an enormous shortfall in meeting educational facilities for this district. In this regard, the proposed improvements fully align with objectives and policies by providing educational opportunities and facilities which are part of the basic programs of the Department of Education.

SECTION FIVE

IMPACTS, ALTERNATIVES AND MITIGATION MEASURES

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SECTION FIVE
IMPACTS, ALTERNATIVES AND MITIGATION MEASURES

5.1 PROBABLE IMPACT ON THE ENVIRONMENT

The proposed project represents an aligned change in use of a parking lot to an early learning educational facility. This vacant site is under Department of Education ownership and was used as additional school related parking. Under the proposed plan, the site will continue to served educational purposes as well as parking use albeit in an improved form. The early education center represents a new focus in educational priorities and essentially furthers the objectives of the Department of Education as well as the Hawaii School Facilities Authority.

The project is consistent with surrounding land uses and the intent of the Hawaii School Facilities Authority and prevailing Department of Education plans for the Waiʻane Area Complex. Impacts associated with the proposed project have generally been determined to be negligible. Upon completion, the new facility will greatly benefit pre-kindergarten aged young students and their families through the provision of low cost education and day care service. It is also expected that the provision of such service will prepare young students for their kindergarten and following years.

When viewed in the cumulative with the other components proposed for the adjacent Kamaile Academy campus, impacts to the environment will be more significant. In addition to significantly improving the campus for the campus for both academic and physical recreation activities, the campus plant will be significantly improved over the no-action alternative.

Positive environmental impacts are expected as a result of the proposed short and long-term improvements. Students will directly benefit by the proposed improvements.

5.2 ADVERSE IMPACTS WHICH CANNOT BE AVOIDED

Adverse impacts that cannot be avoided are generally related to short-term construction impacts. These impacts can be minimized by sound construction practices, Best Management Practices (BMPs) adherence to applicable construction regulations as prescribed by the Department of Health, and coordination with applicable County agencies. Primary construction related impacts are discussed in greater detail in the air quality and nose impact sections of this document.

5.3 ALTERNATIVES TO THE PROPOSED ACTION

No significant alternatives beyond the non-action and alternative site locations were considered for this project. Non-action was considered and rejected due to the State's priority for early learning educational facilities. State of Hawaii owned sites suitable

for pre-kindergarten use were not identified and the adjacency to an existing Department of Education supported the decision to collocate a campus with the existing Kamaile Academy. This preferred site is in an already established school zone and also supports families with multiple children creating a highly desirable complement of facilities.

Within the scope of proposed improvements, alternative density configurations were considered however the proposed improvements are considered the most minimally invasive and will allow for continued use of the campus with minimal disruption.

The Pre-kindergarten facility did consider more classrooms which would allow for more students however due to the programmatic requirements of a Pre-kindergarten to high school complex, it was determined that spatial limitations and would limit the Pre-kindergarten enrollment to not adversely affect existing Kamaile Academy Public Charter School operations.

5.4 MITIGATION MEASURES

Long-term impacts resulting from the proposed improvements are expected to be minimal or non-existent based upon the subject environmental assessment. Long-term traffic, air and noise impacts are not expected to change significantly after improvements are completed. Short-term construction related noise and air quality impact mitigation measures include general good housekeeping practices and scheduled maintenance to avoid a prolonged construction period. The contractor will be directed to use best management practices (BMP) wherever applicable. Construction materials and equipment will be transported to the project site during non-peak traffic hours. In the event that existing roadways or sidewalks are damaged during construction activities, the roadways and sidewalks will be restored to original or better condition.

5.5 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Implementation of the proposed project will result in the irreversible and irretrievable commitment of resources in the use of non-recyclable energy expenditure and labor. Materials used for new construction may have salvage value; however, it is unlikely that such efforts will be cost-effective. The expenditure of these resources is offset by gains in construction-related wages, increased tax base and tertiary spending.

5.6 UNRESOLVED ISSUES

No unresolved issues are noted for the proposed project.

SECTION SIX

NECESSARY PERMITS AND APPROVALS

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6.0 NECESSARY PERMITS AND APPROVALS

Permits and approvals that may be required are contingent upon the actual design of the proposed project. All permits and approvals are generally ministerial in nature. Permits listed below represent a general list that represents permits and approvals that will be required for the project.

State Agencies

Permit or Approval	Approving Agency
National Pollutant Discharge Elimination System (NPDES) Permit	Dept. of Health
Community Noise Permit / Variance	Dept. of Health

County Agencies

Permit or Approval	Approving Agency
Building Permits	Dept. of Planning and Permitting
Certificate of Occupancy	Dept. of Planning and Permitting
Construction Dewatering Permit	Dept. of Planning and Permitting
Conditional Use Minor Permit for Joint Development (JDA)	Dept. of Planning and Permitting
Grading and Stockpiling Permits	Dept. of Planning and Permitting
Sewer Connection Permit	Dept. of Environmental Services
Trenching Permit	Dept. of Planning and Permitting

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SECTION SEVEN

FINDINGS AND REASONS SUPPORTING ANTICIPATED FINDING OF NO SIGNIFICANT IMPACT

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7.0. FINDNGS AND REASONS SUPPORTING ANTICIPATED DETERMINATION OF FINDING OF NO SIGNIFICANT IMPACT

As stated in Section 11-200-13, EIS Rules, Significance Criteria: in determining whether an action may have a significant effort on the environment, every phase of a proposed action shall be considered. The expected consequences of an action, both primary and secondary, and the cumulative as well as the short-term and long-term effects must be assessed in determining if an action shall have significant effect on the environment. Each of the significance criteria is listed below and is followed by the means of compliance or conflict (if extant).

- Involves an irrevocable commitment to the loss or destruction of any natural or cultural resource.

The proposed action will occur on an existing vacant site and will not impact any topographical resources. Subsurface archaeological artifacts are an unlikely possibility; therefore, in the event that any archaeological remains are uncovered during the course of construction, all work will stop and the State Historic Preservation Office will be contacted for appropriate action.

- Curtails the range of beneficial uses of the environment.

The proposed improvements will result in a change from its existing uses but represents a significant upgrade in facilities to the Kamaile Academy school as well as the Pre-kindergarten facility. The proposed project will not curtail beneficial uses of the environment. The proposed project will provide needed facilities and is considered a highest and best use in the public interest.

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

The proposed action is consistent with the goals and guidelines expressed in Chapter 344, Hawai‘i Revised Statutes and NEPA. The proposed action is triggered by the use of State lands and funds. The subject Environmental Assessment has been developed in compliance with the Chapter 343.

- Substantially affects the economic welfare, social welfare, and cultural practices of the community or State.

The proposed action will make a positive contribution to the welfare and economy of the State and City by providing desirable and needed educational facilities to the State of Hawai‘i. The proposed use will provide an improved learning environment and will significantly improve early learning opportunities through the addition of the Pre-kindergarten facility. The facility will also contribute positively to the community through the use of goods and services in the area, through construction related employment, and through secondary and tertiary spending and taxes. The proposed action will not have any impact on any native cultural practices as the site has been in urban use for over 60 years.

The adjacent Kamaile Academy Public Charter School is a public charter school that was created specifically to provide unique learning experiences relevant to the community it serves. While originally created as an elementary school, the campus presently serves kindergarten through high school education creating an opportunity for students to experience a cohesive and familiar educational experience. The addition of the HISFA Pre-kindergarten facility will further enhance this experience and most importantly, will provide children with an educational head start improving their educational opportunities.

- Substantially affects public health.

The proposed improvements are not expected to have any direct impact on public health but will provide significantly improved health related facilities to students and visitors of the school. No recreational resources for the public will be impacted by the project, nor will the project increase any undesirable environmental impacts.

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

The proposed action will not increase the population within the community. The project as proposed will significantly improve public educational facilities for this rapidly growing area.

- Involves a substantial degradation of environmental quality.

The proposed action will not degrade environmental quality. Impacts associated with the project, such as traffic impact and noise quality have been assessed to be minimal. The project is located in a highly urban environment that is expected to be heavily developed in the future. In that respect, the project is consistent with the overall land use of the district. The expansion area for the Pre-kindergarten facility is presently in unimproved parking lot use. Newly created parking areas will decrease the possibility of adverse environmental impacts caused by site degradation.

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

The proposed facilities improvements represent improvements necessary for this high growth school. The site is appropriately entitled for the proposed activities and does not serve as a component of a larger development, but rather, provides a comprehensive vision of future improvements to the school.

- Substantially affects a rare, threatened or endangered species, or its habitat.

The proposed action will not affect any rare, threatened or endangered species of flora or fauna, nor is it known to be near or adjacent to any known wildlife sanctuaries.

- Detrimentally affects air or water quality or ambient noise levels.

The proposed action will not impact air or water quality. The change in noise level is expected to be negligible and will not significantly affect surrounding properties beyond its existing levels.

Minimal impacts on air quality and noise are anticipated during construction, but will be limited by normal construction practices and Department of Health construction mitigation standards.

- 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 will not have any impact on an environmentally sensitive area.

- Substantially affects scenic vistas and view planes identified in County or State plans or studies.

The proposed action will not affect any scenic vistas or view planes.

- Requires substantial energy consumption.

The project will require a small increase in electrical energy consumption over the existing use due to the size of the improvement over the existing facilities This increase is expected to be partially offset through energy conservation measures such as energy efficient light fixtures. General conservation goals include: meeting State energy conservation goals, using energy saving design practices and technologies, and recycling and using recycled-content products.

Based on the above stated criteria, the proposed Kamaile Academy Pre-kindergarten Hub project is not expected to have a significant effect on the environment beyond those associated with a master planned educational facility supporting the surrounding community. As such, a Finding of No Significant Impact (FONSI) is anticipated the project by Department of Education.

SECTION EIGHT

PARTIES CONSULTED DURING THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT

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8.0 PARTIES CONSULTED DURING THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT

State Agencies

Department of Education

The project site plan was developed in coordination with the Department of Education through video meetings and correspondences.

Department of Land and Natural Resources
Historic Preservation Division

The project site plan was developed in consultation with DLNR regarding the preservation of a recreated stone wall. The project will not affect the re-created wall.

Department of Land and Natural Resources
Land Division

Verbal consultation with DLNR Land Division has conducted to determine joint development agreement requirements.

Hawaii Housing Finance and Development Corporation

Verbal consultation with HHFDC has conducted to determine joint development agreement requirements.

City and County Agencies

Department of Planning and Permitting

Zoning and land use checks were discussed with DPP for verification of zoning requirements.

Honolulu Fire Department

Confirmation of station numbers.

Honolulu Police Department

General patrol information with the Waianae Station.

Other Agencies

Hawaiian Electric Company

Project engineers consulted with Hawaiian Electric Company regarding electrical line locations.

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SECTION NINE

LIST OF PARTIES TO BE CONSULTED DURING THE DRAFT ENVIRONMENTAL ASSESSMENT REVIEW PROCESS

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9.0 LIST OF PARTIES TO BE CONSULTED DURING THE DRAFT ENVIRONMENTAL ASSESSMENT REVIEW PROCESS

Agencies with ministerial or specific interests regarding the proposed project were contacted for their comments regarding the proposed project. Parties contacted are listed and the date of their comments are listed below.

Comment Date

Federal Agencies

US Environmental Protection Agency
Region IX Administrator

State Agencies

Department of Accounting and General Services
Department of Business Economic Development & Tourism
Energy, Resources & Technology Division
Department of Defense
Department of Education
Department of Health
Department of Health Clean Water Branch
Department of Land and Natural Resources
Department of Land and Natural Resources
State Historic Preservation Officer
Department of Transportation
Disability and Communication Access Board
Hawai‘i Community Development Authority
Office of Environmental Quality Control
Office of Hawaiian Affairs
Office of Planning
University of Hawai‘i at Manoa Environmental Center

County Agencies

Board of Water Supply
Department of Community and Social Services
Department of Design and Construction
Department of Environmental Services
Department of Facilities Maintenance
Department of Planning and Permitting
Department of Parks and Recreation
Department of Transportation Services
Fire Department
Police Department

Officials and Organizations

Neighborhood Board

APPENDIX A

SITE PHOTOGRAPHS

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APPENDIX C

Archaeological Literature Review and Field Inspection Report for Waianae High School Cultural Surveys Hawaii

APPENDIX B

Traffic Impact Assessment
The Traffic Management Consultant

APPENDIX C

Archaeological Literature Review and Field Inspection Report for Waianae High School Cultural Surveys Hawaii

APPENDIX A

SITE PHOTOGRAPHS

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View of Pre-K site looking north

View of Pre-K site looking east

View of Pre-K site looking northeast

View of Existing Academy buildings looking southwest

APPENDIX B

Traffic Impact Assessment
The Traffic Management Consultant

TRANSPORTATION ASSESSMENT REPORT

FOR THE PROPOSED

KAMAILE ACADEMY EXPANSION

WAIANAE, OAHU, HAWAI`I

TAX MAP KEY: 8-5-002: 037 & 053

PREPARED FOR

AM PARTNERS, INC.

NOVEMBER 26, 2025

PREPARED BY

TMC THE TRAFFIC MANAGEMENT CONSULTANT

TRANSPORTATION ASSESSMENT REPORT

FOR THE PROPOSED

KAMAILE ACADEMY EXPANSION

WAIANAE, OAHU, HAWAI`I

TAX MAP KEY: 8-5-002: 037 & 053

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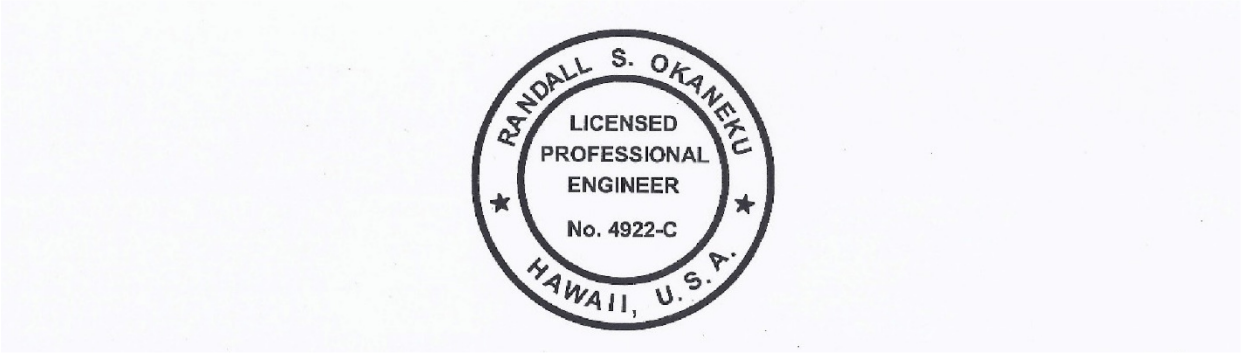


PREPARED BY

THE TRAFFIC MANAGEMENT CONSULTANT
RANDALL S. OKANEKU, P.E., PRINCIPAL * 1188 BISHOP STREET, SUITE 1907 * HONOLULU, HI 96813

Table of Contents

Table of Contents (Cont'd.)

Page

List of Figures

Page

TRANSPORTATION ASSESSMENT REPORT

FOR THE PROPOSED

KAMAILE ACADEMY EXPANSION

WAIANAE, OAHU, HAWAI`I

TAX MAP KEY: 8-5-002: 037 & 053

I. Introduction

A. Project Description

Kamaile Academy is a pre-kindergarten (Pre-K) to 12th grade conversion charter school, which is located at 85-180 Ala Akau Street in Waianae, Oahu, Hawai`i. The school site is identified as Tax Map Key: 8-5-002: 037 & 053. Figure 1 depicts the project location and study area.

Kamaile Academy employs 180 staff members. The current design enrollment is 1,060 students. The Spring 2024 Kamaile Academy enrollment, reported by the Kamaile Academy administration, was 950 students. Table 1 summarizes the existing enrollment for Kamaile Academy.

Table 1. Spring 2024 Enrollment

Grades	Students
Pre-K	62
Kindergarten	89
1st	117
2nd – 12th	682
Total	**950**

Access to Kamaile Academy is provided by seven (7) driveways located on the north side of Ala Akau Street. Two (2) one-way (enter/exit) driveways provide access to the 78-stall parking lot (hereinafter referred to as the Makai Parking Lot), which is located on the west (makai) side of the school site. The third driveway is located in front of the cafeteria (Building C), which provides access to the loading area and three (3) parking stalls. A second pair of one-way (enter/exit) driveways, hereinafter referred to as the Entry and Exit Driveways, provide access to the main drop-off/pick-up area, fronting the school entrance. The drop-off/pick-up area contains about six (6) curbside spaces, two (2) bus loading spaces, a passing lane, and nine (9) angle parking stalls for Kamaile Academy staff.

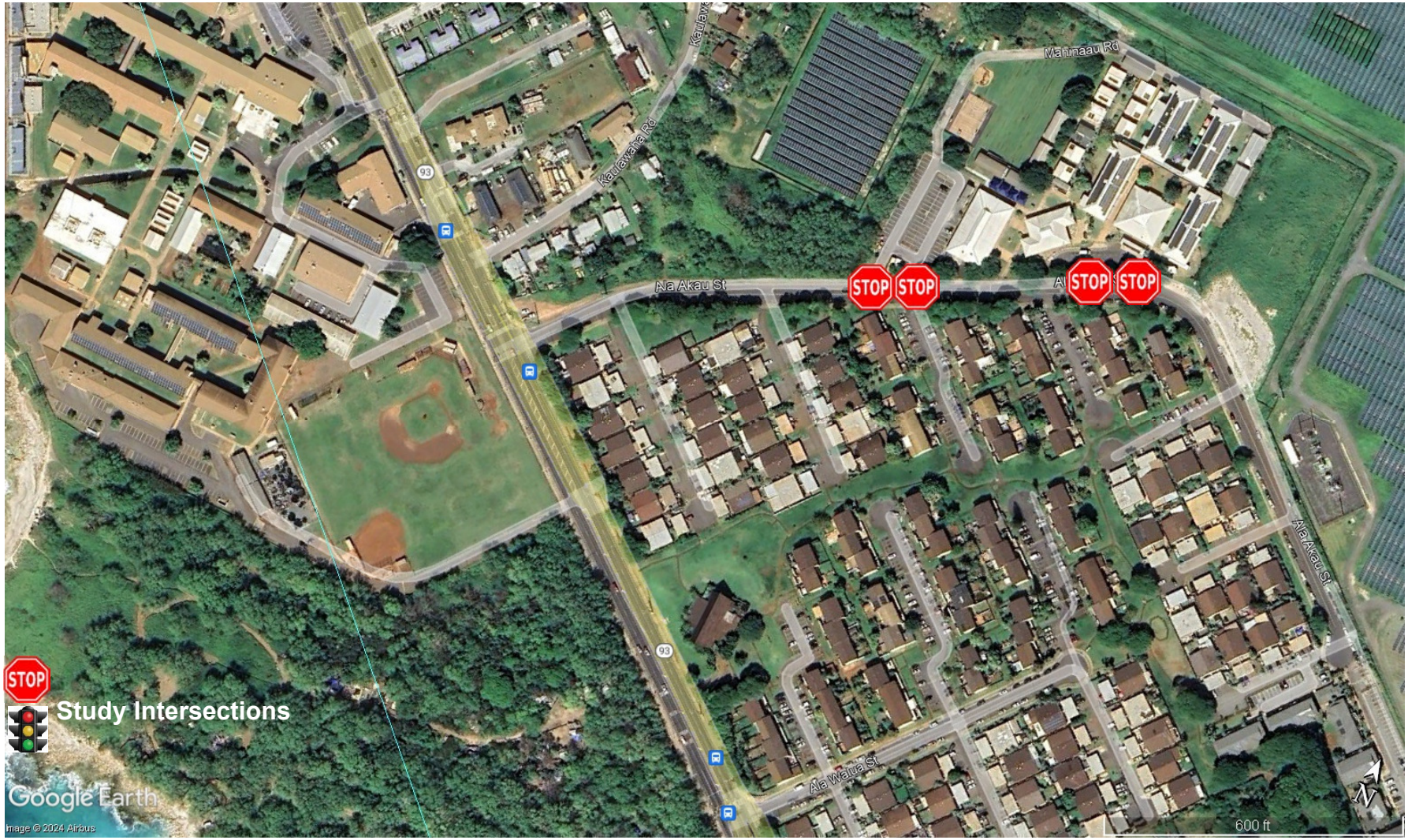


Figure 1. Location Map and Study Area

Two (2) driveways provide access to an existing gravel parking lot, which is located on the east side of the school site. The gravel lot is provided for the Kamaile Academy staff parking. The gravel parking lot is the site of the proposed Mauka Parking Lot. The existing Kamaile Academy site is depicted in Figure 2.

The Hawai`i State Department of Education proposes to expand and upgrade the Kamaile Academy facilities to accommodate 160 Pre-K students and 1,060 K-12th grade students, bringing the total Kamaile Academy design enrollment to 1,220 students. The Makai Parking Lot will be expanded to 97 parking stalls. The existing drop-off/pick-up parking area will be expanded to 14 parking stalls. The proposed Mauka Parking Lot will contain 96 parking stalls and about eight (8) space curbside spaces in drop-off/pick-up zone, fronting the Pre-K classrooms. The proposed Kamaile Academy expansion is expected to be completed by the Year 2027. Figure 3 depicts the proposed site plan.

B. Purpose and Scope of the Study

The purpose of this study is to analyze the transportation impacts resulting from the development of the proposed expansion of Kamaile Academy. This report presents the methodologies, findings, and recommendations of the study. The scope of this study includes:

1. Description of the existing transportation operations of Kamaile Academy.
2. Description of the proposed expansion.
3. Evaluation of existing roadways and transportation conditions.
4. Analysis of future transportation conditions without the proposed project.
5. Identification and analysis of the transportation impacts resulting from the development of the proposed Kamaile Academy expansion project.
6. Recommendations of improvements, as necessary, which would mitigate the transportation impacts identified in this study.

C. Methodologies

1. Capacity Analysis Methodology

The highway capacity analysis, performed in this study, is based upon procedures presented in the Highway Capacity Manual (HCM), published by the Transportation Research Board. HCM defines the Level of Service (LOS) as "a quantitative stratification of a performance measure or measures representing quality of service." HCM defines six (6) Levels of Service from the traveler's perspective, ranging from the best LOS "A" to the worst LOS "F". LOS translates the complex mathematical results of the highway capacity analysis into an A through F grading system to simplify the roadway performance for decision-makers.

EXISTING FACILITY SUMMARY

BUILDING	FUNCTION	GRADE LEVEL	QUANTITY LEVEL 1	QUANTITY LEVEL 2	QUANTITY TOTAL	REMARKS
A	ADMINISTRATION	A11	1		1	
B	LIBRARY	A11	1		1	
C	DINING/KITCHEN	A11	1		1	
D	CLASSROOMS	5/6	4	4	8	ELEVATOR
	ART ROOM			1	1	
	TOILETS		3		3	17 WC/URINALS
E	CLASSROOMS	K/2/ELL/HSA	4	4	8	
	TOILETS		3	2	5	21 WC/URINALS
F	CLASSROOMS	4/5/SPED	2	4	6	
	ART ROOM			1	1	
	TOILETS		5	2	7	18 WC/URINALS
	OFFICE		2		2	
G	CLASSROOMS	K/1/2	4	4	8	
	TOILETS		3	3	6	26 WC/URINALS
T1-4	CLASSROOMS	1	4		4	
	TOILETS		4		4	4 WC
T5-8	CLASSROOMS	8/9	4		4	
T9-12	CLASSROOMS	11/12	4		4	
T13-14	CLASSROOMS	SPED	2		2	
P2-4/7-9	CLASSROOMS	3/7	6		6	
P1, 5, 6	CLASSROOMS	8/9	3		3	
T-15	TOILETS		5		5	

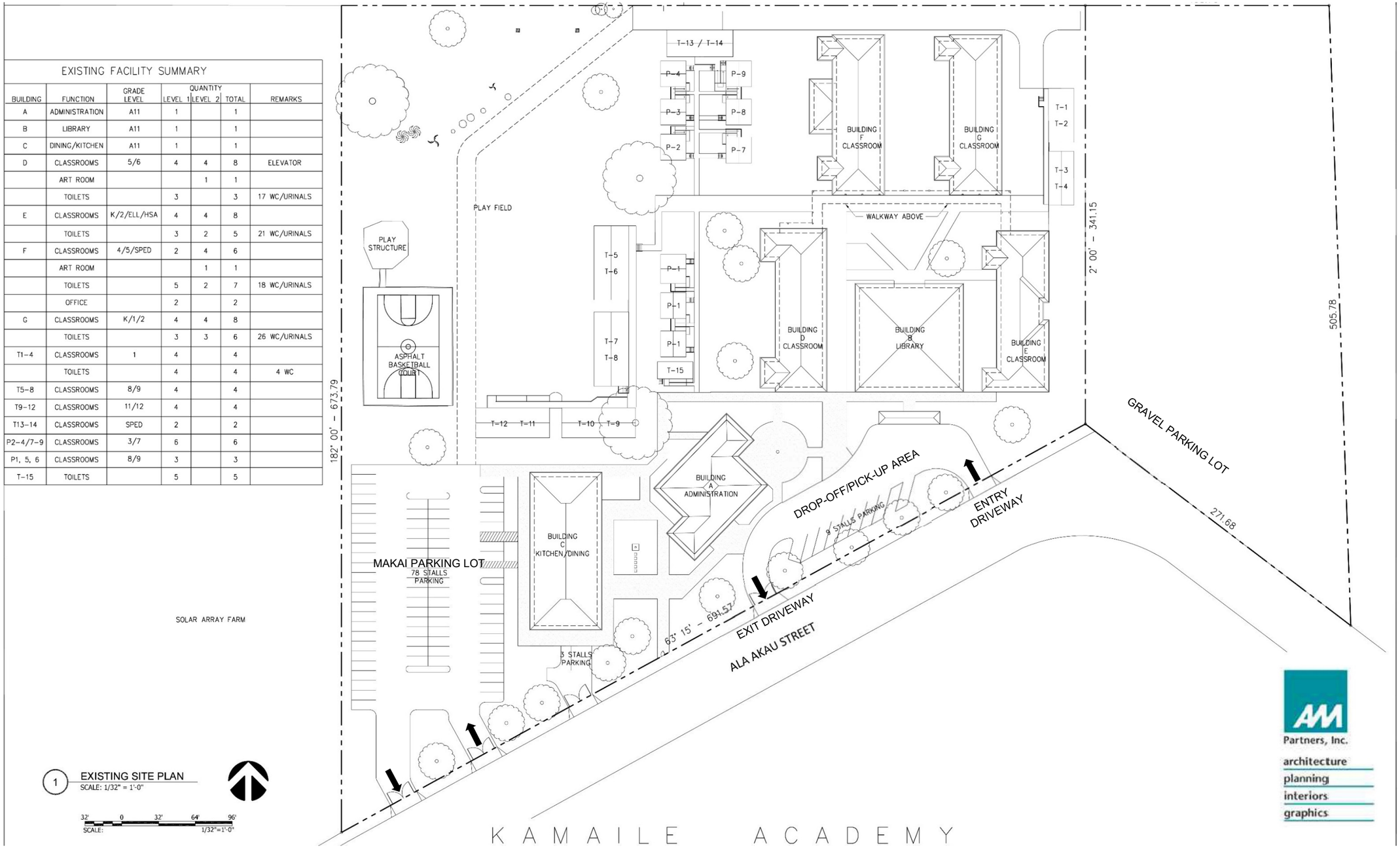


Figure 2. Existing Kamaile Academy Site Plan

FACILITY SUMMARY - LEVEL 1

BLDG	FUNCTION	GRADE LEVEL	QUANTITY	REMARKS
A	ADMINISTRATION OFFICE	K-12	1	
	TOILET	STAFF	2	2 WC , 2 LAV
B	LIBRARY	K-12	1	
	TOILET	STAFF	2	2 WC , 2 LAV
C	DINING / MULTI-PURPOSE HALL	K-12	1	
		ALL	4	5 WC , 1 URI, 2 LAV
	KITCHEN	STAFF	1	
	STORAGE	STAFF	1	
D	SPED	ALL	3	
	ELL	ALL	1	
	TOILET	ALL	1	3 URI, 12 WC, 4 LAV
	TEACHER WORK ROOM	STAFF	1	
E	CLASSROOM	K	4	
	TOILET	ALL	3	2 URI, 8 WC, 5 LAV
	TEACHER WORK ROOM	STAFF	1	
F	CLASSROOM	6	2	
	SPED	ALL	1	
	TOILET	ALL	1	3 URI, 14 WC, 5 LAV
	TEACHER WORK ROOM	STAFF	1	
	CRAFT	5/6	1	
G	CLASSROOM	1	4	
	TOILET	ALL	3	3 URI, 8 WC, 5 LAV
	TEACHER WORK ROOM	STAFF	1	
H	CLASSROOM	9/10	3	
	SCIENCE GENERAL	9/12	1	
	TOILET	ALL	1	3 URI, 14 WC, 6 LAV
	TEACHER WORK ROOM	STAFF	1	
	ART	9/12	1	
	PE STORAGE	9/12	1	
	STORAGE	STAFF	1	
I	CLASSROOM	1	4	
	MUSIC	K-6	1	
	TOILET	ALL	3	3 URI, 14 WC, 6 LAV
	TEACHER WORK ROOM	STAFF	1	
J	CLASSROOM	9/12	1	
	MUSIC	7-12	1	
	HWN LANGUAGE	K-12	1	
	SPED	ALL	1	
	TOILET	ALL	3	3 URI, 14 WC, 6 LAV
	BLEACHER	ALL	1	
K	CLASSROOM	PRE-K	4	
	TOILET	PRE-K	6	6 WC / 6 LAV
	UTILTY ROOM + TOILET	STAFF	1	1 WC / 1 LAV
L	CLASSROOM	PRE-K	4	
	TOILET	PRE-K	6	6 WC / 6 LAV
	UTILTY ROOM + TOILET	STAFF	1	1 WC / 1 LAV
M	EXTENDED ADMIN.	ALL	1	
	OFFICE	STAFF	3	
	STORAGE	ALL	2	
	TOILET	ALL	2	2 WC / 2 LAV
	HEALTH ROOM	STAFF	1	

KAMAILE CAMPUS:

PARKING CALCULATIONS: 1/500 sf
LIBRARY = 15 STALLS
ADMIN OFFICES = 15 STALLS
CAFETERIA = 22 STALLS
CLASSROOMS = 180 STALLS
PARKING STALLS REQUIRED = 234
PARKING STALLS PROVIDED = 177

PRE-K PROGRAM:

PRE-K CLASSROOMS = 14 STALLS
PRE-K ADMIN/MULTI = 7 STALLS
PARKING STALLS REQUIRED = 21
PARKING PROVIDED = 30

TOTAL STALLS REQUIRED = 255
TOTAL STALLS PROVIDED = 207

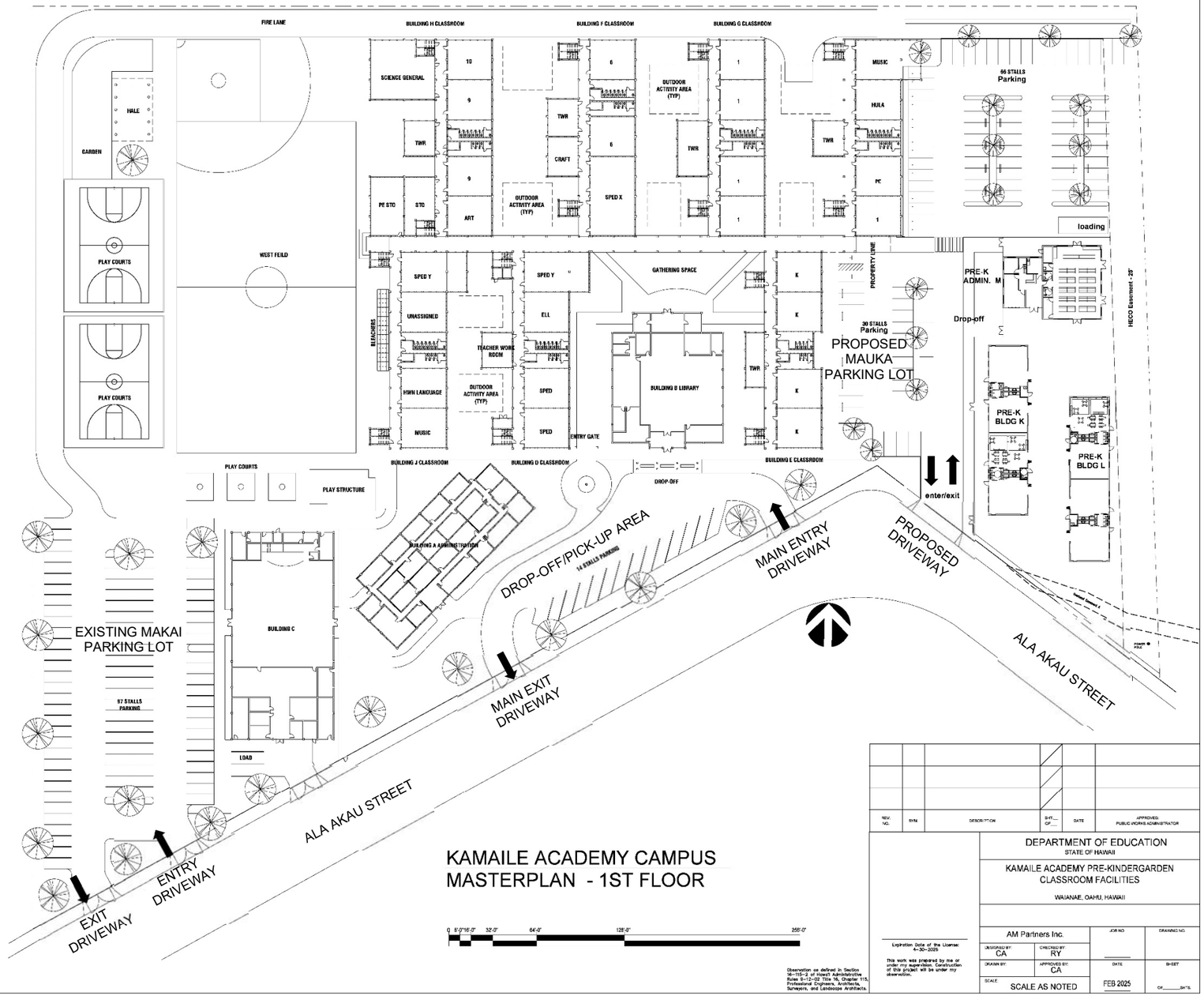


Figure 3. Proposed Kamaile Academy Site Plan

Intersection LOS is primarily based upon the average delay (d) in seconds per vehicle (sec/veh). The LOS delays at unsignalized intersections, which include stop-controlled intersections and roundabouts, are generally shorter than signalized intersections, due to the drivers' expectation and acceptance of longer delays at higher-volume signalized intersections.

LOS's "A", "B", and "C" are generally considered to be satisfactory Levels of Service. LOS "D" is generally considered to be the minimum acceptable operating Level of Service. LOS's "E" and "F" are undesirable conditions. Table 2 summarizes the HCM LOS criteria.

Table 2. Intersection Level of Service Criteria (HCM)

LOS	Signalized Control	Unsignalized Control	Description
	Delay d (sec/veh)		
A	d≤10	d≤10	Control delay is minimal.
B	10<d ≤20	10<d≤15	Control delay is not significant.
C	20<d≤35	15<d≤25	Stable operation. Queuing begins to occur.
D	35<d≤55	25<d≤35	Less stable condition. Increase in delays, decrease in travel speeds.
E	55<d≤80	35<d≤50	Unstable operation, significant delays.
F	d>80	d>50	High delays, extensive queuing.

Synchro is a traffic analysis software that was developed by Trafficware. Synchro is an intersection analysis program that is based upon the HCM methodology. Synchro was used to calculate the Levels of Service for the intersections in the study area. Worksheets for the capacity analysis, performed throughout this report, are compiled in the Appendix.

2. Trip Generation Methodology

The trip generation methodology is based upon generally accepted techniques that were developed by the Institute of Transportation Engineers (ITE) and published in Trip Generation, 12th Edition. The ITE trip rates were developed by correlating the total vehicle trip generation data with various activity/land use characteristics, such as the vehicle trips per hour (vph) per student. The ITE fitted curve equations were used to estimate the trip generation. The average trip rates were used when a fitted curve equation was not developed.

3. Queuing Analysis Methodology

The queuing analysis for the drop-off/pick-up area is based upon the following equation, presented in Transportation and Land Development (Stover and Koepke).

$$M = \frac{\text{Ln } P_{x>m} - \text{Ln } (Q_M)}{\text{Ln } (\rho)} - 1$$

M = number of vehicles in the queue

$P_{x>m}$ = probability that the queue will exceed M = 95 percent

s = dwell time (minutes)

Q = 60/s = service rate per position (vph)

q = traffic demand (vph)

N = number of loading/unloading spaces(vehicles)

$\rho = q/(NQ)$

Q_M = Table 8-11 (Transportation and Land Development)

The dwell time is the times spent loading/unloading children. M is the expected 95-percentile ($P_{x>m}$) queue, i.e., the vehicle queue that is expected to be exceeded five (5) percent of the time.

4. Bicycle Level of Traffic Stress

The bicycle Level of Traffic Stress (LTS) assesses the comfort level of the bicyclist on a roadway. The LTS score is calculated by using the Bicycle LTS Cross Section Rating Tool. A low LTS score indicates that the roadway is suitable for most bicyclists, while a high LTS score indicates that the roadway is suitable for only more experienced bicyclists. The LTS score is based upon street characteristics, such as the number and widths of the traffic lanes, speed limit, average daily traffic, and the presence and widths of the bicycle lanes/paths. Table 3 summarizes the description of the LTS scores.

Table 3. Bicycle Level of Traffic Stress

LTS Score	Description
LTS 1	Suitable for bicyclists of all ages and abilities
LTS 2	Comfortable for the average adult bicyclist
LTS 3	Tolerable for experienced and confident bicyclists
LTS 4	Highly stressful

II. Existing Conditions

A. Kamaile Academy Transportation Operations

The Kamaile Academy classes are from 7:45 AM to 2:00 PM, Monday through Friday. The morning drop-off occurs from 6:00 AM to 7:45 AM, primarily in the main drop-off/ pick-up area and the Makai Parking Lot. Pre-K students are picked up after 1:30 PM in the drop-off/pick-up area. Parents/guardians must walk their Pre-K children to/from their vehicles. Kamaile Academy staff are posted in the drop-off/pick-up area to facilitate the Pre-K student drop-off/pick-up. Kindergarten (K) students are picked up in the Makai Parking Lot from 2:00 PM. Grades 1 through 12 students are picked up at the drop-off/pick-up area, the Makai Parking Lot, and along Ala Akau Street after 2:00 PM. Kamaile Academy provides its own school bus transportation, which carries about 130 students to and from school.

Table 4 summarizes the student attendances during the field investigation, the current enrollments, and the existing design enrollments, as reported by the Kamaile Academy administration.

Table 4. Kamaile Academy Student Population

Grades	Attendances			Enrollment	
	Tuesday 4/16/24	Wednesday 4/17/24	Thursday 4/18/24	Current	Design
Pre-K	54	50	54	62	70
K	75	72	73	89	100
1st	91	105	101	117	130
2nd – 12th	555	563	558	682	760
Total	**775**	**790**	**786**	**950**	**1,060**

B. Roadways

Farrington Highway is a two-way, four-lane arterial highway, which provides access along the Waianae Coast. An exclusive left-turn lane is provided on southbound Farrington Highway to Ala Akau Street. Bicycle lanes are provided in both directions on Farrington Highway in the vicinity of Ala Akau Street. Paved sidewalks are also provided on both sides of Farrington Highway in the vicinity of Ala Akau Street. The posted speed on Farrington Highway is 25 miles per hour (mph). Farrington Highway carried about 22,500 vehicles per day (vpd), total for both directions. The existing Bicycle Level of Stress on Farrington Highway is LTS 2.

Ala Akau Street is a two-way, two-lane local street. Ala Akau Street intersects Farrington Highway at a signalized Tee-intersection. Passing is not permitted along the entire length of Ala Akau Street. Parking is permitted on both sides of Ala Akau Street. A paved sidewalk is provided only on the south side of Ala Akau Street. A midblock

crosswalk is located on Ala Akau Street, fronting Kamaile Academy, between the Makai Parking Lot and the drop-off/pick-up area. A crossing guard is posted at the midblock crosswalk before and after school hours. Wheelchair ramps are not provided at the midblock crosswalk on Ala Akau Street. Ala Akau Street carried about 3,800 vpd, total for both directions. The posted speed on Ala Akau Street is 20 mph. The existing Bicycle Level of Stress on Ala Akau Street is LTS 3.

C. Public Transit

TheBus stops are located on both sides of Farrington Highway near Ala Akau Street.

D. Existing Peak Hour Traffic Volumes and Operating Conditions

1. Field Investigation and Data Collection

Turning movement traffic count surveys were conducted on Tuesday, April 16, 2024 through Thursday, April 18, 2024, during the weekday AM and PM peak periods of traffic, at the following intersections:

- Farrington Highway and Ala Akau Street
- Ala Akau Street and the Makai Parking Lot driveways
- Ala Akau Street and the Entry and Exit Driveways

The traffic count surveys included pedestrian traffic, crossing the roadways and driveways, and bicycle traffic. The traffic signal timing and phasing were based upon the existing conditions, which were observed during the field investigation. The traffic count data are presented in the Appendix.

2. Existing AM Peak Hour Traffic

The AM peak hour of traffic occurred between 7:00 AM and 8:00 AM. Farrington Highway carried about 2,000 vehicles per hour (vph), total for both directions at Ala Akau Street. Ala Akau Street carried about 600 vph, total for both directions. Two (2) bicycles entered the intersection of Farrington Highway and Ala Akau Street, during the AM peak hour of traffic. Three (3) bicycles were observed on Ala Akau Street in the vicinity of Kamaile Academy, during the AM peak hour of traffic. During the existing AM peak hour of traffic, Kamaile Academy generated a total of 445 vph, entering and exiting the school driveways. About 250 pedestrians were observed entering and exiting Kamaile Academy. By comparison, ITE estimates about 60 walk trips for Kamaile Academy, during the AM peak hour of generator.

The intersection of Farrington Highway and Ala Akau Street operated at LOS “B”, during the existing AM peak hour of traffic. The left-turn movement from southbound Farrington Highway onto Ala Akau Street operated at LOS “E”. The left-turn movement from Ala Akau Street onto southbound Farrington Highway operated at

LOS "D". The Kamaile Academy driveways on Ala Akau Street operated at LOS "B" or better, during the existing AM peak hour of traffic.

A dwell time survey was conducted at the drop-off/pick-up area, during the existing AM peak hour of traffic. The average drop-off time was about 70 seconds, ranging from 40 seconds up to 120 seconds. The queuing analysis estimated a 95-percentile queue of about nine (9) vehicles, which was confirmed during the field investigation. From 7:15 AM to 7:45 AM, vehicles queued on mauka bound Ala Akau Street from the drop-off/pick-up area Entry Driveway up to the Exit Driveway on Ala Akau Street. Figure 4 depicts the existing AM peak hour traffic volumes.

3. Existing PM Peak Hour Traffic

The PM peak hour of traffic, which occurred between 1:45 PM and 2:45 PM, was selected based upon the midafternoon peak hour of Kamaile Academy traffic. Farrington Highway carried 1,800 vph, total for both directions. Three (3) bicycles entered the intersection of Farrington Highway and Ala Akau Street. Ala Akau Street carried about 400 vph. The existing Kamaile Academy PM peak hour traffic volumes were lower than during the existing AM peak hour traffic. However, the peak traffic occurred during a 30-minute period.

Five (5) bicycles were observed on Ala Akau Street, during the PM peak hour of traffic. Kamaile Academy generated a total of 245 vph, entering and exiting the school driveways, during the existing PM peak hour of traffic. About 350 pedestrians were observed entering and exiting Kamaile Academy. ITE estimates about 120 walk trips for Kamaile Academy, during the PM peak hour of generator.

During the existing PM peak hour of traffic, the intersection of Farrington Highway and Ala Akau Street operated at LOS "B". The left-turn movements from southbound Farrington Highway onto Ala Akau Street and from Ala Akau Street onto southbound Farrington Highway operated at LOS "E" and LOS "D", respectively. The Kamaile Academy driveways on Ala Akau Street operated at LOS "B" or better, during the existing PM peak hour of traffic. The existing PM peak hour traffic volumes are depicted in Figure 5.

A dwell time survey was conducted at the drop-off/pick-up area, during the existing PM peak hour of traffic. The average pick-up time was about 4 minutes, 20 seconds, ranging from 60 seconds up to 10 minutes. The queuing analysis estimated a 95-percentile queue of about 13 vehicles, which was exceeded during the field investigation due to through traffic on Ala Akau Street. From 1:45 PM to 2:15 PM, vehicles queued on mauka bound Ala Akau Street from the drop-off/pick-up area Entry Driveway up to the Makai Parking Lot. Mauka bound through vehicles on Ala Akau Street were observed to pass the queue in the makai bound lane. Students were observed being picked up within the travel lanes, as well as curbside on both sides of Ala Akau Street.

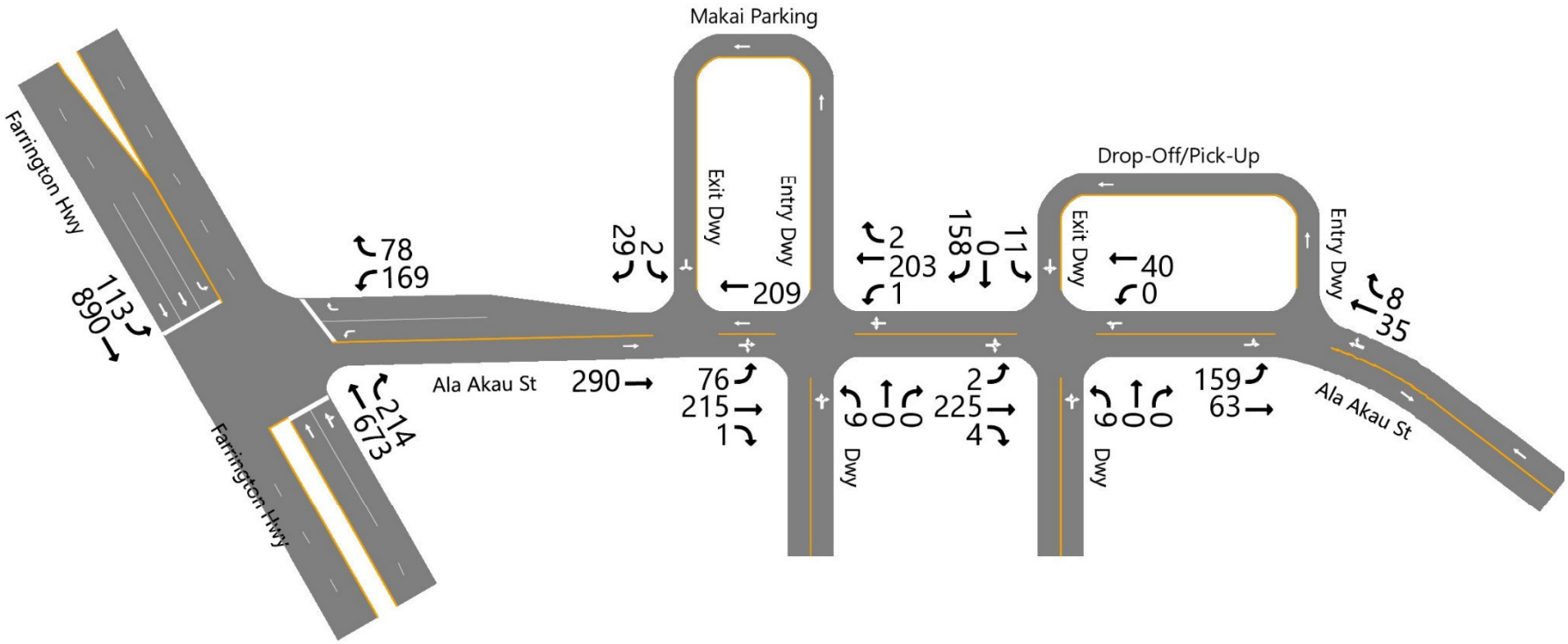


Figure 4. Existing AM Peak Hour Traffic

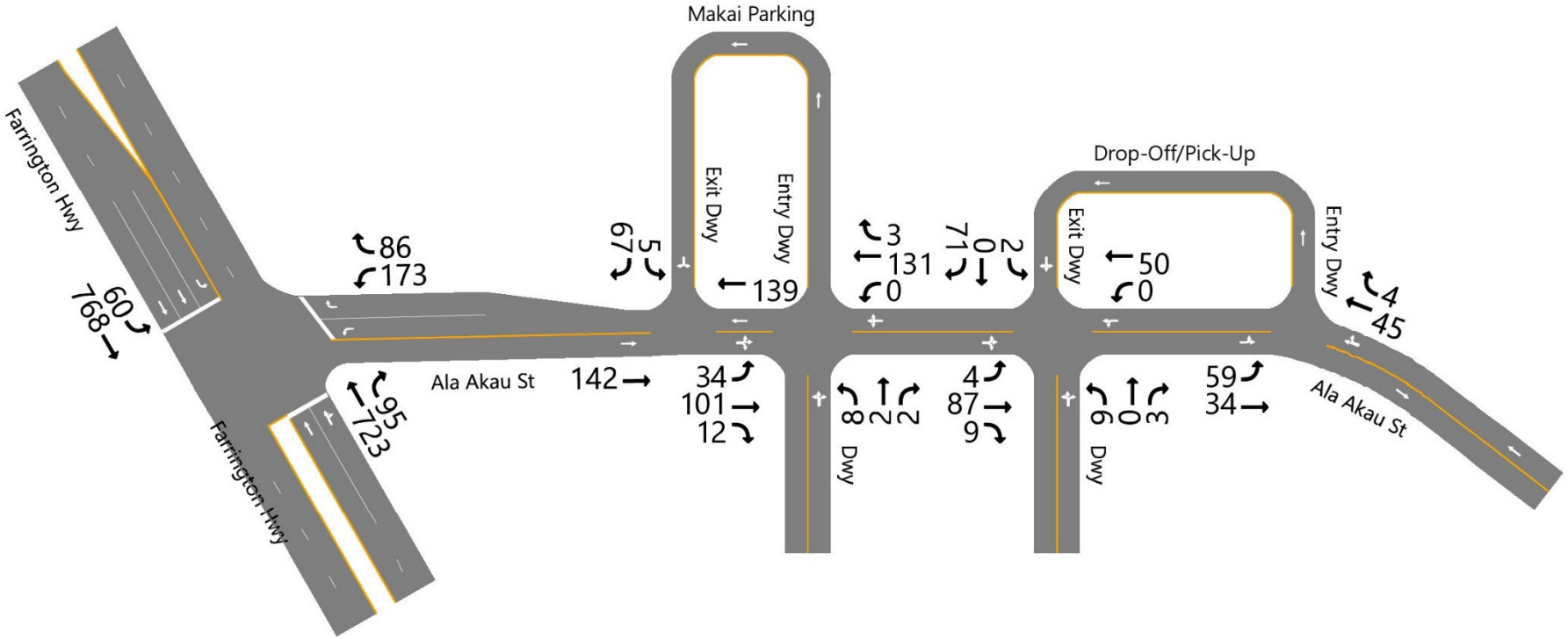


Figure 5. Existing PM Peak Hour Traffic

III. Future Transportation Conditions

A. Background Growth in Traffic

The population and number of households forecasts for Oahu were published in the Oahu Regional Transportation Plan, by the Oahu Metropolitan Planning Organization. The population and number of households on the Waianae Coast are expected to increase by 0.55 percent and 0.8 percent per year, respectively. For the purpose of this transportation assessment, an annual growth rate of 0.8 percent was applied to the existing (2024) traffic demands to estimate the Year 2027 traffic demands without the proposed project.

B. Current Design Enrollment and Attendance Adjustments

The trip generation characteristics for the existing Kamaile Academy Pre-K and K-12th grade were based upon the ITE trip rates for a Daycare Center (ITE Land Use Code 565) and a K-12th Grade Charter School (ITE Land Use Code 538), respectively. The existing ITE and observed trip generation characteristics for the Kamaile Academy Pre-K and K-12th grades are compared in Table 5.

Table 5. Existing Vehicle Trip Generation Characteristics

Peak Hour	Direction	ITE Pre-K	ITE K-12	ITE Total	Observed	Observed/ ITE Total
AM Peak Hour	Enter	24	301	325	247	76%
	Exit	22	267	289	200	69%
	Total	46	568	614	447	73%
PM Peak Hour	Enter	22	185	207	106	51%
	Exit	25	185	210	143	68%
	Total	47	370	417	249	60%

The existing (2024) traffic demands were adjusted from the attendance of 780 students to the current design enrollment of 1,060 students. Table 6 summarizes the trip generation characteristics at the design enrollment, adjusted for the observed conditions.

Table 6. Current Design Enrollment Vehicle Trip Generation Characteristics

Peak Hour	Direction	ITE Pre-K	ITE K-12	ITE Total	Adjusted Trips
AM Peak Hour	Enter	30	352	382	290
	Exit	27	312	339	235
	Total	57	664	721	525
PM Peak Hour	Enter	27	299	326	167
	Exit	30	337	367	250
	Total	57	636	693	414

C. Year 2027 Traffic Analysis Without Project

1. AM Peak Hour Traffic Analysis Without Project

During the Year 2027 AM peak hour of traffic without the proposed project, the intersection of Farrington Highway and Ala Akau Street is expected to operate at LOS "C". The left-turn movements from southbound Farrington Highway and mauka bound Ala Akau Street are expected to continue to operate at LOS "E" and LOS "D", respectively. The other traffic movements at the intersection are expected to operate at satisfactory Levels of Service, i.e., LOS "C" or better.

The other intersections in the study area are expected to operate at satisfactory Levels of Service, during the Year 2027 AM peak hour of traffic without the proposed project. Figure 6 depicts the Year 2027 AM peak hour traffic volumes without the proposed project.

2. PM Peak Hour Traffic Analysis Without Project

The intersection of Farrington Highway and Ala Akau Street is expected to continue to operate at LOS "B", during the Year 2027 PM peak hour of traffic without the proposed project. The left-turn movements from southbound Farrington Highway onto Ala Akau Street and from Ala Akau Street onto southbound Farrington Highway are expected to continue to operate at LOS "E" and LOS "D", respectively.

During the Year 2027 PM peak hour of traffic without the proposed project, the other study intersections are expected to continue to operate at satisfactory Levels of Service. The Year 2027 PM peak hour traffic volumes without the proposed project are depicted on Figure 7.

IV. Transportation Impact Analysis With Project

A. Trip Generation Characteristics

The trip generation characteristics for the Kamaile Academy Pre-K and K-12th grade expansion were based upon the ITE trip rates for a daycare center and a K-12th grade charter school, respectively. The ITE vehicle trip generation rates were higher than the observed conditions, due to the large number of walk trips and the Kamaile Academy bus trips. The trip generation characteristics for the Kamaile Academy Pre-Kindergarten and K-12th grade, adjusted for the observed conditions, are summarized in Tables 7 and 8, respectively.

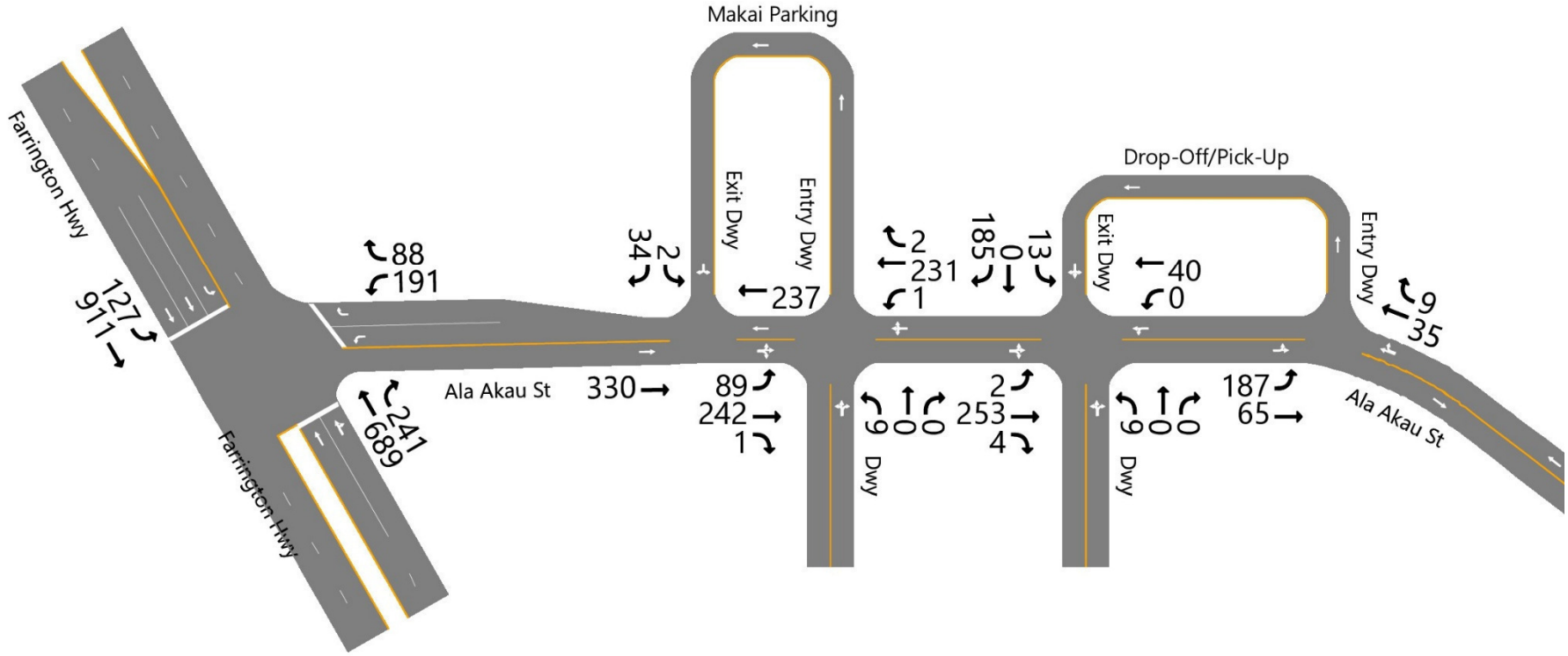


Figure 6. Year 2027 AM Peak Hour Traffic Without Project

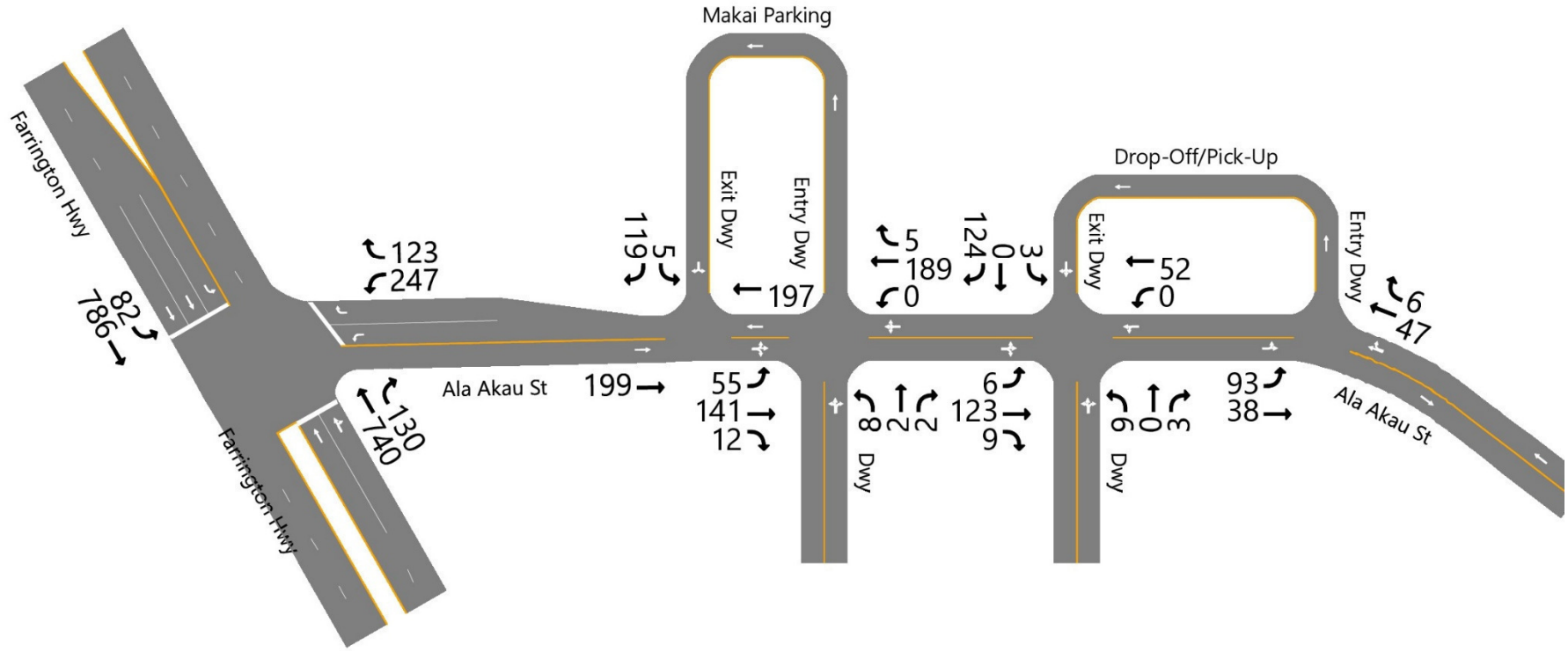


Figure 7. Year 2027 PM Peak Hour Traffic Without Project

Table 7. Pre-Kindergarten Trip Generation Characteristics				
Peak Hour	**Direction**	**Current Design Enrollment**	**Expansion Total**	**Increase**
AM Peak Hour	**Enter**	23	50	27
	Exit	19	40	21
	Total	42	90	48
PM Peak Hour	**Enter**	14	29	15
	Exit	20	43	23
	Total	34	72	38

Table 8. K-12th Grade Trip Generation Characteristics				
Peak Hour	**Direction**	**Current Design Enrollment**	**Expansion Total**	**Increase**
AM Peak Hour	**Enter**	268	286	18
	Exit	216	231	15
	Total	484	517	33
PM Peak Hour	**Enter**	153	164	11
	Exit	229	246	17
	Total	384	410	28

The proposed Kamaile Academy expansion is expected to generate totals of 82 vph and 66 vph, during the AM and PM peak hours, respectively.

B. Transportation Impact Analysis With Project

1. Trip Distribution

The traffic assignments are based upon the modified traffic circulation patterns, where Pre-K children are dropped off and picked up in the proposed Mauka Parking Lot. The traffic circulation has been further modified where the left-turn movement from mauka bound Ala Akau Street into the Entry Driveway would be restricted. Motorists would be directed to turn around in the proposed Mauka Parking Lot and turn right into the Entry Driveway from makai bound Ala Akau Street. Figures 8 and 9 depict the AM and PM peak hour site-generated traffic, respectively.

2. AM Peak Hour Transportation Impact Analysis With Project

During the Year 2027 AM peak hour of traffic with the proposed project, the intersection of Farrington Highway and Ala Akau Street is expected to operate at an overall LOS “C”, during the Year 2027 AM peak hour of traffic with the proposed project. The left-turn movements on southbound Farrington Highway and makai bound Ala Akau Street are expected to continue operate at LOS “E” and LOS “D”, respectively.

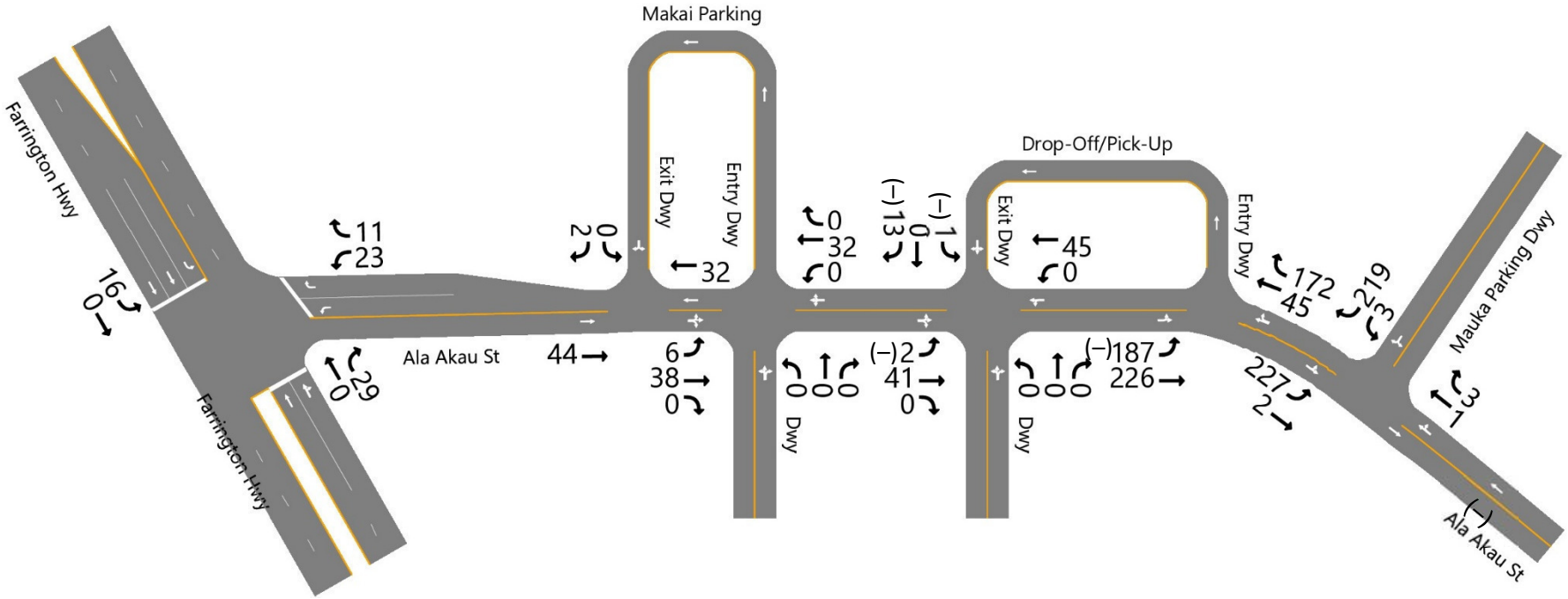


Figure 8. AM Peak Hour Site Traffic Assignment

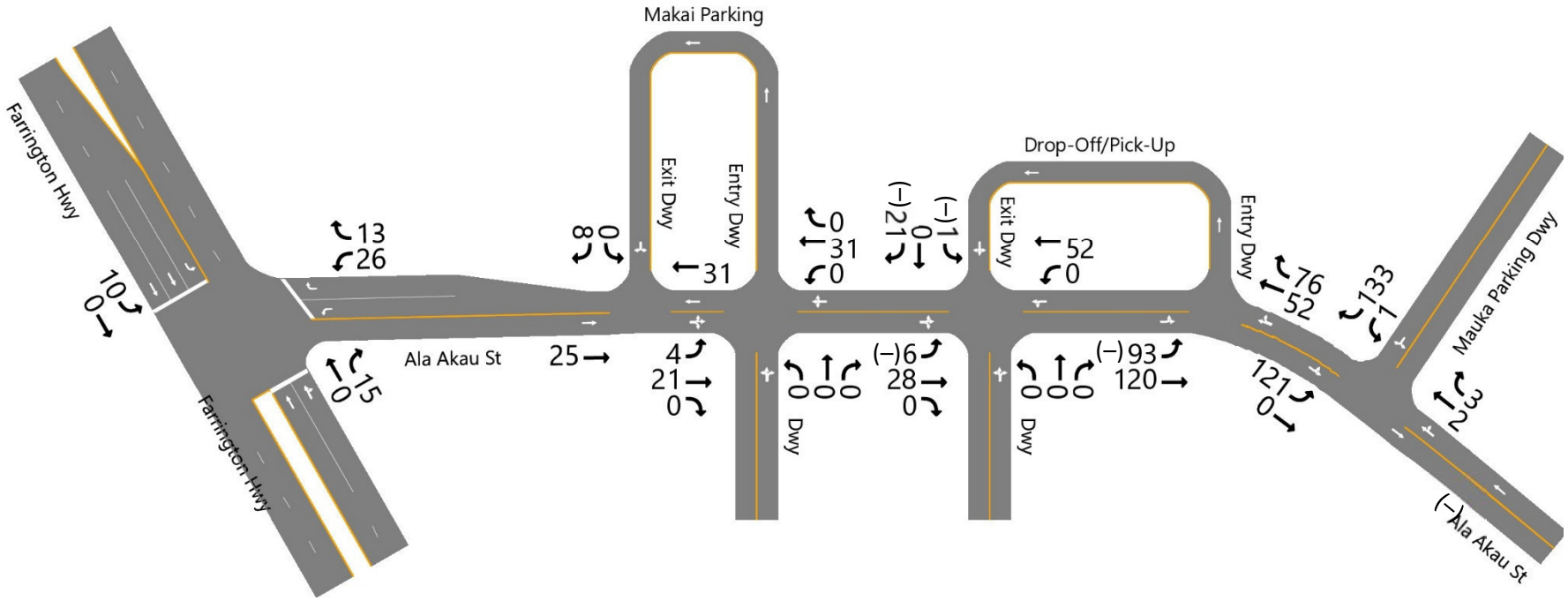


Figure 9. PM Peak Hour Site Traffic Assignment

The other intersections in the study area are expected to operate at satisfactory Levels of Service, during the Year 2027 AM peak hour of traffic with the proposed project. Figure 10 depicts the Year 2027 AM peak hour traffic volumes with the proposed project.

The AM peak hour queuing analysis indicates that the eight (8) curbside spaces in the proposed Mauka Parking Lot should be adequate for the Pre-K drop-off operations during the AM peak hour of traffic.

3. PM Peak Hour Transportation Impact Analysis With Project

The intersection of Farrington Highway and Ala Akau Street is expected to continue to operate at LOS "C", during the Year 2027 PM peak hour of traffic with the proposed project. The left-turn movements from southbound Farrington Highway onto Ala Akau Street and from Ala Akau Street onto southbound Farrington Highway are expected to continue to operate at LOS "E" and LOS "D", respectively.

During the Year 2027 PM peak hour of traffic with the proposed project, the other study intersections are expected to continue to operate at satisfactory Levels of Service. The Year 2027 PM peak hour traffic volumes with the proposed project are depicted in Figure 11.

The PM peak hour queuing analysis indicates that a minimum of ten (10) parking spaces in addition to the eight (8) curbside loading spaces in the proposed Mauka Parking Lot will be required for picking up the Pre-K children after school.

V. Recommendations and Conclusions

A. Recommendations

1. The left-turn movement from mauka bound Ala Akau Street at the Entry Driveway should be prohibited before and after school hours. Mauka bound school traffic should be directed to turn around within the proposed Mauka Parking Lot and queue in the curb lane on mauka bound Ala Akau Street and turn right into the Entry Driveway.

2. A convenient and safe vehicle turnaround pattern should be provided for mauka bound motorists on Ala Akau Street to enter and exit the proposed Mauka Parking Lot and return to the main drop-off/pick-up area. The turnaround area should be separated from the Pre-K loading/unloading area.

3. In addition to the eight (8) curbside pick-up spaces, a minimum of ten (10) parking spaces should be provided in the proposed Mauka Parking Lot for parents/guardians picking up Pre-K children after school.

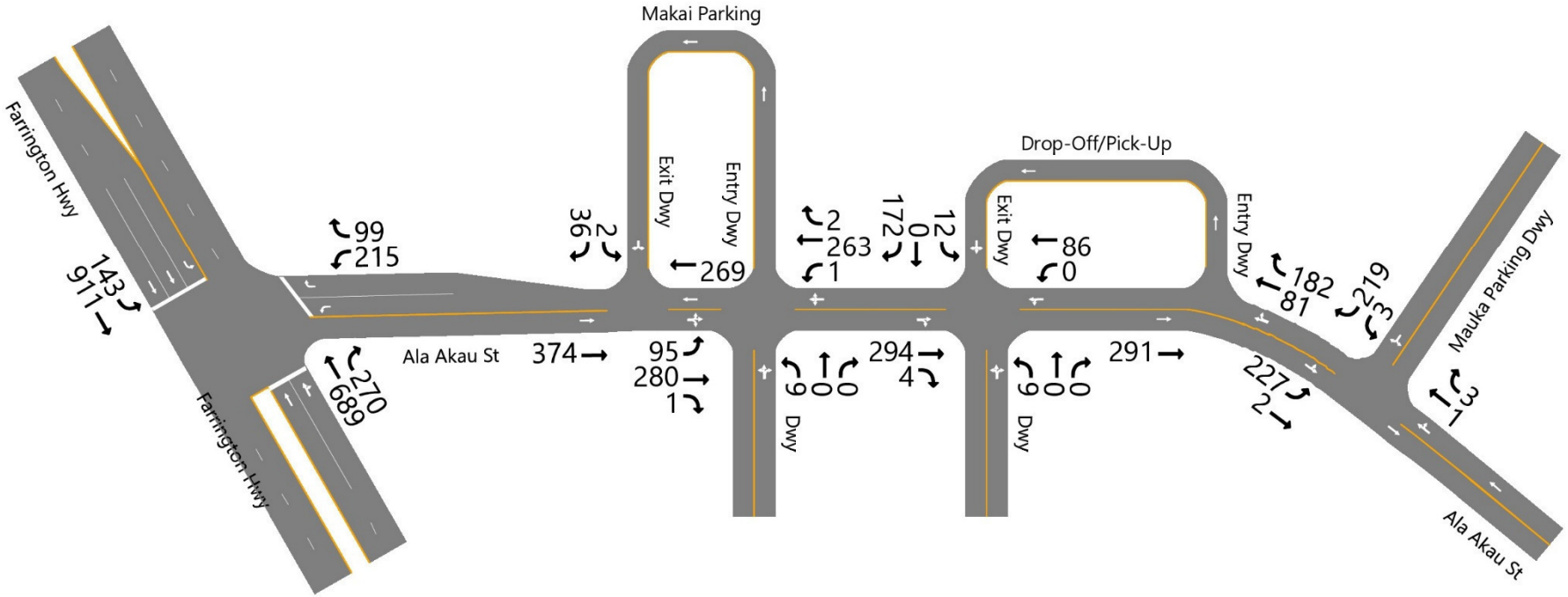


Figure 10. Year 2027 AM Peak Hour Traffic With Project

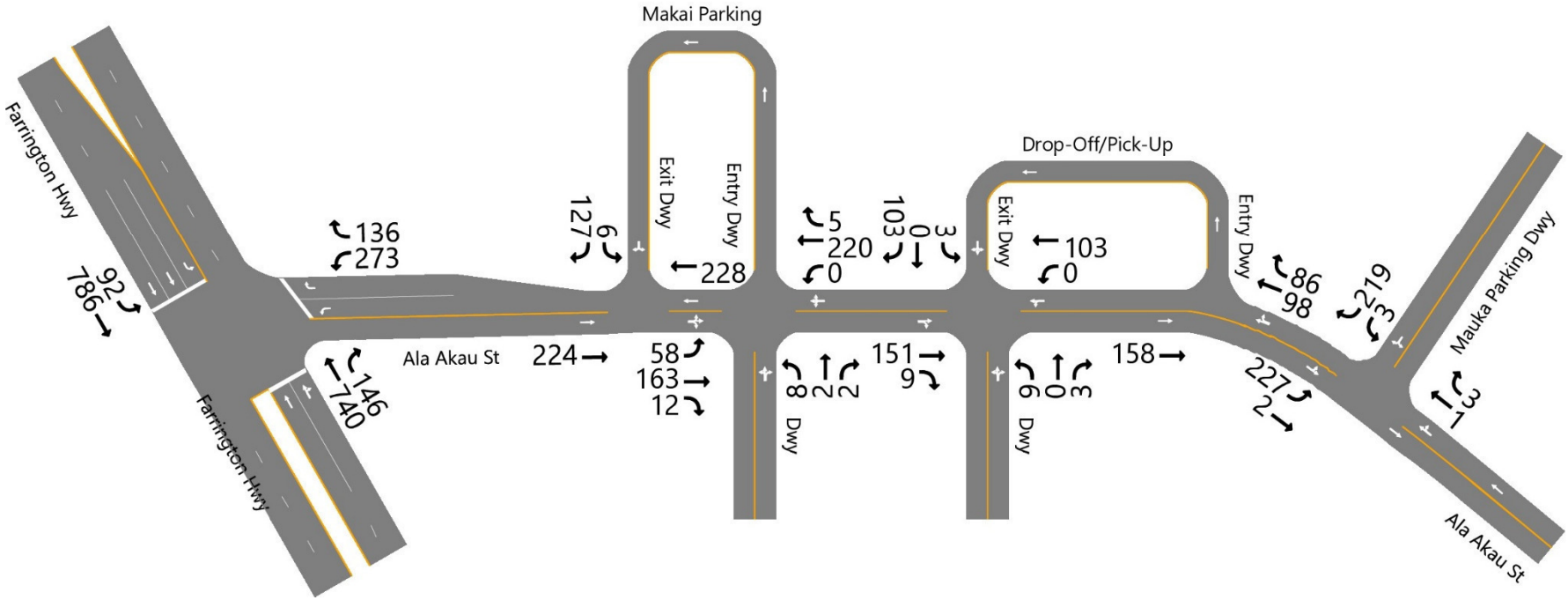


Figure 11. Year 2027 PM Peak Hour Traffic With Project

4. Active Kamaile Academy staff-assisted curbside loading of Pre-K children should be considered to minimize children walking through the Mauka Parking Lot.

5. Parking along the Kamaile Academy frontage on the north side of Ala Akau Street should be restricted before/after school to provide safe drop-off/pick-up operations.

6. Concrete sidewalks should be constructed along the Kamaile Academy frontage on Ala Akau Street, in accordance with the City and County of Honolulu Complete Street standards.

7. American Disability Act (ADA) compliant pedestrian ramps should be constructed at the existing midblock crosswalk on Ala Akau Street at Kamaile Academy, in accordance with the City and County of Honolulu Complete Street standards.

B. Conclusions

The intersection of Farrington Highway and Ala Akau Street is not expected to be significantly impacted by the proposed expansion of Kamaile Academy. The existing AM peak hour and PM peak hour traffic operations were affected by the queuing on mauka bound Ala Akau Street from the Entry Driveway at the drop-off/pick-up area. Full enrollment/attendance and the proposed expansion of Kamaile Academy are expected to further increase the queuing on mauka bound Ala Akau Street.

The proposed "No Left-Turn" restriction from mauka bound Ala Akau Street into the Entry Driveway will minimize the queuing on mauka bound Ala Akau Street. The proposed parking restrictions along Ala Akau Street, fronting the main drop-off/pick-up area, are expected to provide safer and more convenient curbside drop-off and pick-up operations along Ala Akau Street. Relocating the Pre-K drop-off/pick-up to the proposed Mauka Parking Lot is expected to reduce the traffic demands at the main drop-off/pick-up area.

TRANSPORTATION ASSESSMENT REPORT

FOR THE PROPOSED

KAMAILE ACADEMY EXPANSION

WAIANAE, OAHU, HAWAI`I

TAX MAP KEY: 8-5-002: 037 & 053

APPENDIX A

EXISTING TRAFFIC COUNT DATA

arrington Hwy Ala Akau St 4-16 17-24 - TMC

ue Apr 16, 2024
Full Length (1 PM-5:30 PM, 6:30 AM-9 AM)
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1176776, Location: 21.454777, -158.197858, Site Code: Kamaile Academy

Provided by: The Traffic Management Consultant
1188 Bishop Street, Suite 1907,
Honolulu, HI, 96813, US

Leg Direction	Ala Akau St Westbound					Farrington Hwy Northbound					Farrington Hwy Southbound					
ime	R	L	U	**App**	Ped*	R		U	**App**	Ped*		L	U	**App**	Ped*	**Int**
2024-04-16 1:00PM	1	10	0	**11**	0	17	138	0	**155**	0	132	4	0	**136**	0	**302**
1:15PM	2	21	0	**23**	1	19	170	0	**189**	0	109	5	0	**114**	0	**326**
1:30PM	6	13	0	**19**	6	35	191	0	**226**	0	135	7	0	**142**	3	**387**
1:45PM	6	25	0	**31**	0	27	203	0	**230**	0	253	18	0	**271**	15	**532**
Hourly Total	15	69	0	**84**	7	98	702	0	**800**	0	629	34	0	**663**	18	**1547**
2:00PM	41	63	0	**104**	1	25	165	0	**190**	0	185	20	0	**205**	7	**499**
2:15PM	32	55	0	**87**	0	32	192	0	**224**	0	169	11	0	**180**	1	**491**
2:30PM	7	30	0	**37**	4	11	163	0	**174**	0	161	11	0	**172**	0	**383**
2:45PM	5	23	0	**28**	7	10	175	0	**185**	0	151	4	0	**155**	3	**368**
Hourly Total	85	171	0	**256**	12	78	695	0	**773**	0	666	46	0	**712**	11	**1741**
3:00PM	6	22	0	**28**	2	9	160	0	**169**	0	148	3	0	**151**	1	**348**
3:15PM	8	22	0	**30**	1	14	206	0	**220**	0	148	2	0	**150**	0	**400**
3:30PM	1	11	0	**12**	3	14	165	0	**179**	0	164	1	0	**165**	2	**356**
3:45PM	3	20	0	**23**	2	12	195	0	**207**	0	155	8	0	**163**	0	**393**
Hourly Total	18	75	0	**93**	8	49	726	0	**775**	0	615	14	0	**629**	3	**1497**
4:00PM	7	14	0	**21**	1	15	200	0	**215**	0	138	3	0	**141**	1	**377**
4:15PM	8	16	0	**24**	0	17	169	0	**186**	0	126	9	0	**135**	1	**345**
4:30PM	15	26	0	**41**	5	21	182	0	**203**	0	147	7	0	**154**	4	**398**
4:45PM	7	25	0	**32**	6	17	182	0	**199**	0	145	1	0	**146**	0	**377**
Hourly Total	37	81	0	**118**	12	70	733	0	**803**	0	556	20	0	**576**	6	**1497**
5:00PM	8	6	0	**14**	1	14	187	0	**201**	0	137	2	0	**139**	1	**354**
5:15PM	3	12	0	**15**	2	19	172	0	**191**	0	123	2	0	**125**	0	**331**
Hourly Total	11	18	0	**29**	3	33	359	0	**392**	0	260	4	0	**264**	1	**685**
2024-04-17 6:30AM	8	22	0	**30**	1	22	76	0	**98**	0	126	13	0	**139**	2	**267**
6:45AM	6	20	0	**26**	5	26	90	0	**116**	0	200	19	0	**219**	1	**361**
Hourly Total	14	42	0	**56**	6	48	166	0	**214**	0	326	32	0	**358**	3	**628**
7:00AM	18	31	0	**49**	2	63	122	0	**185**	0	172	19	0	**191**	2	**425**
7:15AM	18	38	0	**56**	2	56	150	0	**206**	0	220	36	0	**256**	6	**518**
7:30AM	15	71	0	**86**	7	61	191	0	**252**	0	219	33	0	**252**	4	**590**
7:45AM	19	41	0	**60**	7	37	194	0	**231**	0	264	16	0	**280**	6	**571**
Hourly Total	70	181	0	**251**	18	217	657	0	**874**	0	875	104	0	**979**	18	**2104**
8:00AM	11	28	0	**39**	1	33	207	0	**240**	0	200	9	0	**209**	0	**488**
8:15AM	6	20	0	**26**	2	22	133	0	**155**	0	145	7	0	**152**	4	**333**
8:30AM	12	16	0	**28**	3	10	126	0	**136**	0	139	10	0	**149**	0	**313**
8:45AM	3	8	0	**11**	5	10	104	0	**114**	0	110	0	0	**110**	2	**235**
Hourly Total	32	72	0	**104**	11	75	570	0	**645**	0	594	26	0	**620**	6	**1369**
1:00PM	4	6	0	**10**	1	17	130	0	**147**	0	159	4	0	**163**	0	**320**

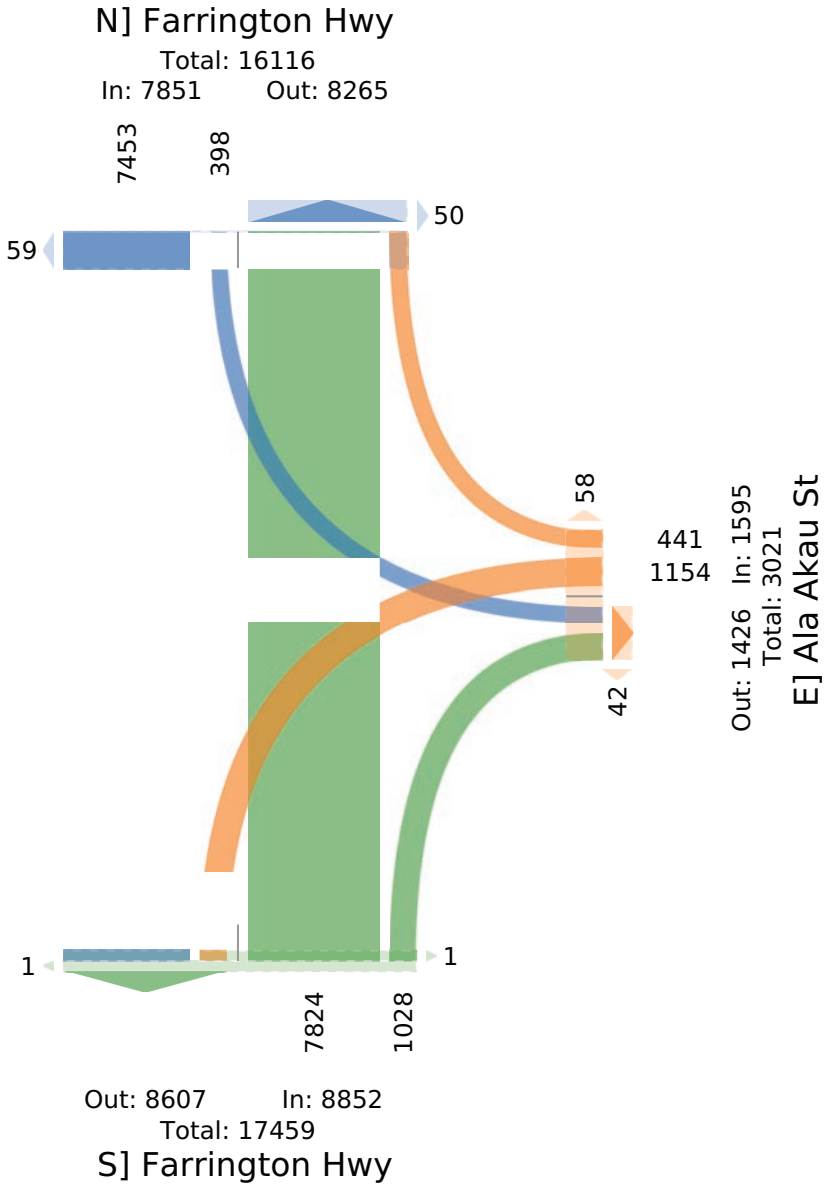
Leg Direction	Ala Akau St Westbound					Farrington Hwy Northbound					Farrington Hwy Southbound					
ime	R	L	U	**App**	Ped*	R		U	**App**	Ped*		L	U	**App**	Ped*	**Int**
1:15PM	1	26	0	**27**	0	24	142	0	**166**	0	151	11	0	**162**	1	**355**
1:30PM	9	15	0	**24**	2	32	153	0	**185**	0	145	8	0	**153**	0	**362**
1:45PM	4	12	0	**16**	0	44	173	0	**217**	0	163	14	0	**177**	1	**410**
Hourly Total	18	59	0	**77**	3	117	598	0	**715**	0	618	37	0	**655**	2	**1447**
2:00PM	30	74	0	**104**	0	26	161	0	**187**	0	153	14	0	**167**	14	**458**
2:15PM	26	49	0	**75**	2	25	237	0	**262**	0	247	10	0	**257**	14	**594**
2:30PM	9	22	0	**31**	0	12	213	0	**225**	0	221	12	0	**233**	3	**489**
2:45PM	8	19	0	**27**	3	13	189	0	**202**	0	156	7	0	**163**	1	**392**
Hourly Total	73	164	0	**237**	5	76	800	0	**876**	0	777	43	0	**820**	32	**1933**
3:00PM	6	16	0	**22**	1	20	160	0	**180**	1	147	4	0	**151**	2	**353**
3:15PM	9	23	0	**32**	4	22	199	0	**221**	0	161	2	0	**163**	0	**416**
3:30PM	12	22	0	**34**	3	16	196	0	**212**	0	178	8	0	**186**	0	**432**
3:45PM	11	42	0	**53**	1	17	180	0	**197**	0	169	7	0	**176**	0	**426**
Hourly Total	38	103	0	**141**	9	75	735	0	**810**	1	655	21	0	**676**	2	**1627**
4:00PM	7	27	0	**34**	3	21	190	0	**211**	0	174	6	0	**180**	2	**425**
4:15PM	6	23	0	**29**	0	12	178	0	**190**	0	144	2	0	**146**	2	**365**
4:30PM	5	29	0	**34**	0	15	184	0	**199**	0	144	3	0	**147**	2	**380**
4:45PM	6	12	0	**18**	3	14	176	0	**190**	1	130	3	0	**133**	1	**341**
Hourly Total	24	91	0	**115**	6	62	728	0	**790**	1	592	14	0	**606**	7	**1511**
5:00PM	1	18	0	**19**	0	17	204	0	**221**	0	145	2	0	**147**	0	**387**
5:15PM	5	10	0	**15**	0	13	151	0	**164**	0	145	1	0	**146**	0	**325**
Hourly Total	6	28	0	**34**	0	30	355	0	**385**	0	290	3	0	**293**	0	**712**
otal	441	1154	0	**1595**	100	1028	7824	0	**8852**	2	7453	398	0	**7851**	109	**18298**
% Approach	27.6%	72.4%	0%	**-**	-	11.6%	88.4%	0%	**-**	-	94.9%	5.1%	0%	**-**	-	-
% Total	2.4%	6.3%	0%	**8.7%**	-	5.6%	42.8%	0%	**48.4%**	-	40.7%	2.2%	0%	**42.9%**	-	-
Motorcycles	5	3	0	**8**	-	5	66	0	**71**	-	43	4	0	**47**	-	126
% Motorcycles	1.1%	0.3%	0%	**0.5%**	-	0.5%	0.8%	0%	**0.8%**	-	0.6%	1.0%	0%	**0.6%**	-	0.7%
Lights	403	1138	0	**1541**	-	1007	7552	0	**8559**	-	7247	373	0	**7620**	-	17720
% Lights	91.4%	98.6%	0%	**96.6%**	-	98.0%	96.5%	0%	**96.7%**	-	97.2%	93.7%	0%	**97.1%**	-	96.8%
Single-Unit Trucks	5	6	0	**11**	-	7	73	0	**80**	-	46	4	0	**50**	-	141
% Single-Unit Trucks	1.1%	0.5%	0%	**0.7%**	-	0.7%	0.9%	0%	**0.9%**	-	0.6%	1.0%	0%	**0.6%**	-	0.8%
Articulated Trucks	0	0	0	**0**	-	0	4	0	**4**	-	6	0	0	**6**	-	10
% Articulated Trucks	0%	0%	0%	**0%**	-	0%	0.1%	0%	**0%**	-	0.1%	0%	0%	**0.1%**	-	0.1%
Buses	17	7	0	**24**	-	7	125	0	**132**	-	103	15	0	**118**	-	274
% Buses	3.9%	0.6%	0%	**1.5%**	-	0.7%	1.6%	0%	**1.5%**	-	1.4%	3.8%	0%	**1.5%**	-	1.5%
Bicycles on Road	11	0	0	**11**	-	2	4	0	**6**	-	8	2	0	**10**	-	27
% Bicycles on Road	2.5%	0%	0%	**0.7%**	-	0.2%	0.1%	0%	**0.1%**	-	0.1%	0.5%	0%	**0.1%**	-	0.1%
Pedestrians	-	-	-	-	72	-	-	-	-	2	-	-	-	-	106	
% Pedestrians	-	-	-	-	72.0%	-	-	-	-	100%	-	-	-	-	97.2%	-
Bicycles on Crosswalk	-	-	-	-	28	-	-	-	-	0	-	-	-	-	3	
% Bicycles on Crosswalk	-	-	-	-	28.0%	-	-	-	-	0%	-	-	-	-	2.8%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U- urn

arrington Hwy Ala Akau St 4-16 17-24 - TMC

ue Apr 16, 2024
Full Length (1 PM-5:30 PM, 6:30 AM-9 AM)
All Classes (Motorcycles, Lights, Single-Unit rucks, Articulated rucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1176776, Location: 21.454777, -158.197858, Site Code: Kamaile Academy

Provided by: he raffic Management Consultant
1188 Bishop Street, Suite 1907,
Honolulu, HI, 96813, US



arrington Hwy Ala Akau St 4-16 17-24 - TMC

ue Apr 16, 2024

Midday Peak (Apr 16 2024 1PM - 2 PM)

All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1176776, Location: 21.454777, -158.197858, Site Code: Kamaile Academy

Provided by: The Traffic Management Consultant
1188 Bishop Street, Suite 1907,
Honolulu, HI, 96813, US

Leg Direction	Ala Akau St Westbound					Farrington Hwy Northbound					Farrington Hwy Southbound					
ime	R	L	U	**App**	Ped*	R		U	**App**	Ped*		L	U	**App**	Ped*	**Int**
2024-04-16 1:00PM	1	10	0	**11**	0	17	138	0	**155**	0	132	4	0	**136**	0	**302**
1:15PM	2	21	0	**23**	1	19	170	0	**189**	0	109	5	0	**114**	0	**326**
1:30PM	6	13	0	**19**	6	35	191	0	**226**	0	135	7	0	**142**	3	**387**
1:45PM	6	25	0	**31**	0	27	203	0	**230**	0	253	18	0	**271**	15	**532**
otal	15	69	0	**84**	7	98	702	0	**800**	0	629	34	0	**663**	18	**1547**
% Approach	17.9%	82.1%	0%	**-**	-	12.3%	87.8%	0%	**-**	-	94.9%	5.1%	0%	**-**	-	-
% Total	1.0%	4.5%	0%	**5.4%**	-	6.3%	45.4%	0%	**51.7%**	-	40.7%	2.2%	0%	**42.9%**	-	-
PHF	0.583	0.690	-	**0.669**	-	0.700	0.865	-	**0.870**	-	0.622	0.472	-	**0.612**	-	0.727
Motorcycles	0	0	0	**0**	-	0	5	0	**5**	-	4	0	0	**4**	-	9
% Motorcycles	0%	0%	0%	**0%**	-	0%	0.7%	0%	**0.6%**	-	0.6%	0%	0%	**0.6%**	-	0.6%
Lights	13	68	0	**81**	-	95	669	0	**764**	-	602	33	0	**635**	-	1480
% Lights	86.7%	98.6%	0%	**96.4%**	-	96.9%	95.3%	0%	**95.5%**	-	95.7%	97.1%	0%	**95.8%**	-	95.7%
Single-Unit Trucks	0	0	0	**0**	-	1	11	0	**12**	-	5	0	0	**5**	-	17
% Single-Unit Trucks	0%	0%	0%	**0%**	-	1.0%	1.6%	0%	**1.5%**	-	0.8%	0%	0%	**0.8%**	-	1.1%
Articulated Trucks	0	0	0	**0**	-	0	2	0	**2**	-	3	0	0	**3**	-	5
% Articulated Trucks	0%	0%	0%	**0%**	-	0%	0.3%	0%	**0.3%**	-	0.5%	0%	0%	**0.5%**	-	0.3%
Buses	1	1	0	**2**	-	2	15	0	**17**	-	15	1	0	**16**	-	35
% Buses	6.7%	1.4%	0%	**2.4%**	-	2.0%	2.1%	0%	**2.1%**	-	2.4%	2.9%	0%	**2.4%**	-	2.3%
Bicycles on Road	1	0	0	**1**	-	0	0	0	**0**	-	0	0	0	**0**	-	1
% Bicycles on Road	6.7%	0%	0%	**1.2%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0.1%
Pedestrians	-	-	-	-	6	-	-	-	-	0	-	-	-	-	18	
% Pedestrians	-	-	-	-	85.7%	-	-	-	-	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	0	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	14.3%	-	-	-	-	-	-	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U- urn

arrington Hwy Ala Akau St 4-16 17-24 - TMC

ue Apr 16, 2024

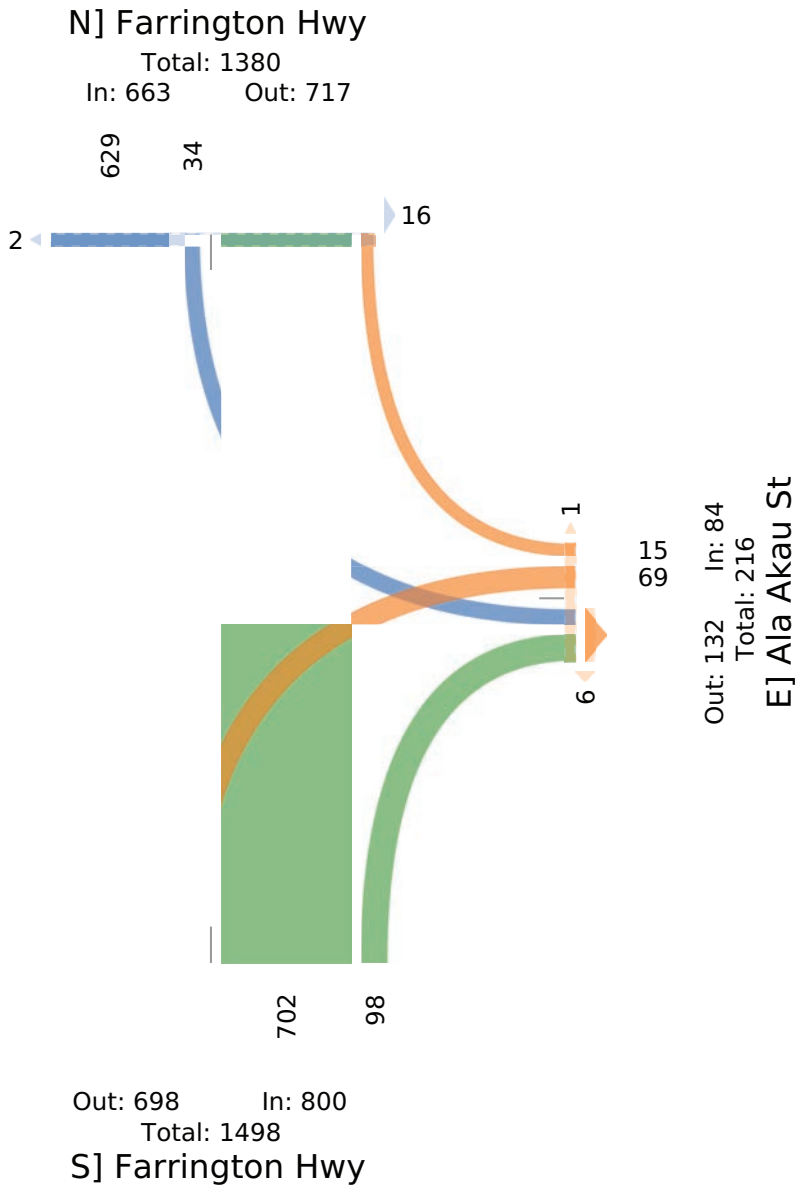
Midday Peak (Apr 16 2024 1PM - 2 PM)

All Classes (Motorcycles, Lights, Single-Unit rucks, Articulated rucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1176776, Location: 21.454777, -158.197858, Site Code: Kamaile Academy

Provided by: he raffic Management Consultant
1188 Bishop Street, Suite 1907,
Honolulu, HI, 96813, US



arrington Hwy Ala Akau St 4-16 17-24 - TMC

ed Apr 17, 2024

AM Peak (Apr 17 2024 7:15AM - 8:15 AM) - Overall Peak Hour

All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1176776, Location: 21.454777, -158.197858, Site Code: Kamaile Academy

Provided by: The Traffic Management Consultant
1188 Bishop Street, Suite 1907,
Honolulu, HI, 96813, US

Leg Direction	Ala Akau St estbound					Farrington Hwy Northbound					Farrington Hwy Southbound					
Time	R	L	U	**App**	Ped*	R	T	U	**App**	Ped*	T	L	U	**App**	Ped*	**Int**
2024-04-17 7:15AM	18	38	0	**56**	2	56	150	0	**206**	0	220	36	0	**256**	6	**518**
7:30AM	15	71	0	**86**	7	61	191	0	**252**	0	219	33	0	**252**	4	**590**
7:45AM	19	41	0	**60**	7	37	194	0	**231**	0	264	16	0	**280**	6	**571**
8:00AM	11	28	0	**39**	1	33	207	0	**240**	0	200	9	0	**209**	0	**488**
Total	63	178	0	**241**	17	187	742	0	**929**	0	903	94	0	**997**	16	**2167**
% Approach	26.1%	73.9%	0%	**-**	-	20.1%	79.9%	0%	**-**	-	90.6%	9.4%	0%	**-**	-	-
% Total	2.9%	8.2%	0%	**11.1%**	-	8.6%	34.2%	0%	**42.9%**	-	41.7%	4.3%	0%	**46.0%**	-	-
PHF	0.816	0.627	-	**0.698**	-	0.766	0.896	-	**0.922**	-	0.855	0.653	-	**0.890**	-	0.918
Motorcycles	0	0	0	**0**	-	0	1	0	**1**	-	2	0	0	**2**	-	3
% Motorcycles	0%	0%	0%	**0%**	-	0%	0.1%	0%	**0.1%**	-	0.2%	0%	0%	**0.2%**	-	0.1%
Lights	61	174	0	**235**	-	184	713	0	**897**	-	878	91	0	**969**	-	2101
% Lights	96.8%	97.8%	0%	**97.5%**	-	98.4%	96.1%	0%	**96.6%**	-	97.2%	96.8%	0%	**97.2%**	-	97.0%
Single-Unit Trucks	0	3	0	**3**	-	2	16	0	**18**	-	8	1	0	**9**	-	30
% Single-Unit Trucks	0%	1.7%	0%	**1.2%**	-	1.1%	2.2%	0%	**1.9%**	-	0.9%	1.1%	0%	**0.9%**	-	1.4%
Articulated Trucks	0	0	0	**0**	-	0	1	0	**1**	-	0	0	0	**0**	-	1
% Articulated Trucks	0%	0%	0%	**0%**	-	0%	0.1%	0%	**0.1%**	-	0%	0%	0%	**0%**	-	0%
Buses	1	1	0	**2**	-	1	11	0	**12**	-	15	2	0	**17**	-	31
% Buses	1.6%	0.6%	0%	**0.8%**	-	0.5%	1.5%	0%	**1.3%**	-	1.7%	2.1%	0%	**1.7%**	-	1.4%
Bicycles on Road	1	0	0	**1**	-	0	0	0	**0**	-	0	0	0	**0**	-	1
% Bicycles on Road	1.6%	0%	0%	**0.4%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%
Pedestrians	-	-	-	-	16	-	-	-	-	0	-	-	-	-	16	
% Pedestrians	-	-	-	-	94.1%	-	-	-	-	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	0	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	5.9%	-	-	-	-	-	-	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

arrington Hwy Ala Akau St 4-16 17-24 - TMC

ed Apr 17, 2024

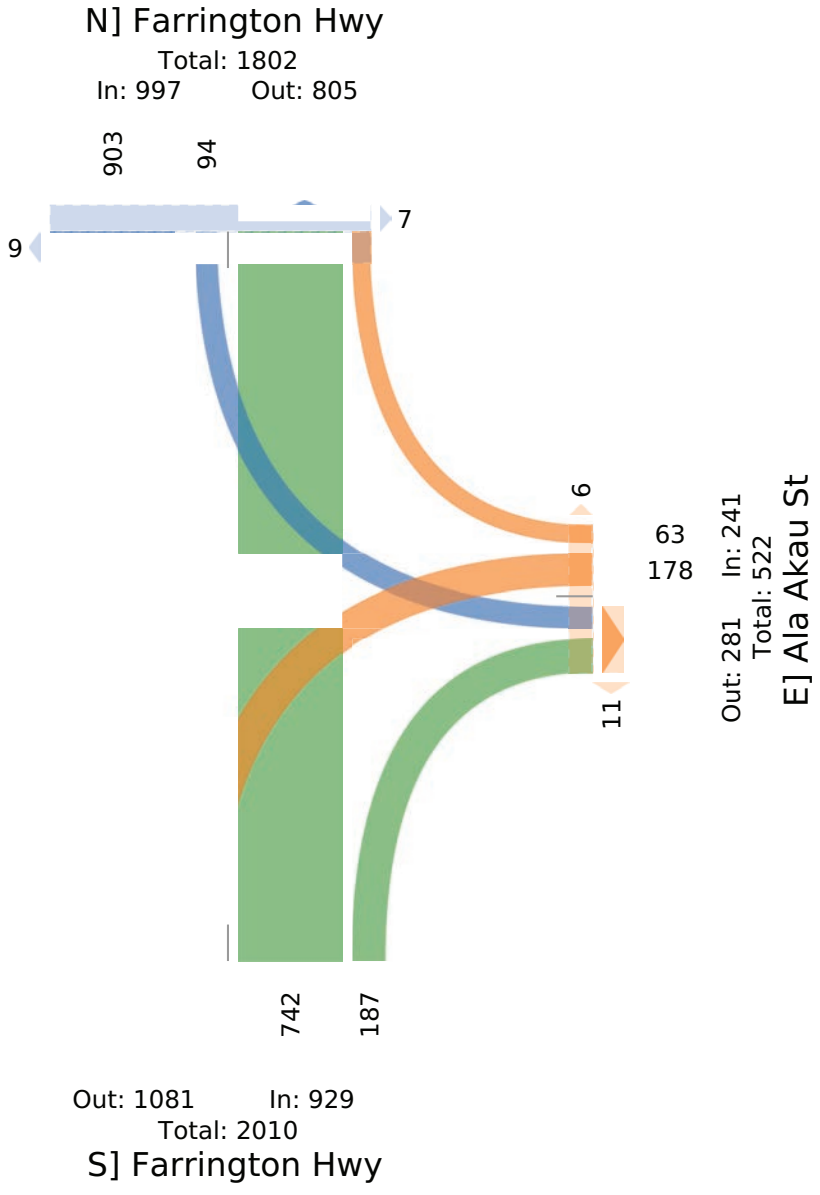
AM Peak (Apr 17 2024 7:15AM - 8:15 AM) - Overall Peak Hour

All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1176776, Location: 21.454777, -158.197858, Site Code: Kamaile Academy

Provided by: The Traffic Management Consultant
1188 Bishop Street, Suite 1907,
Honolulu, HI, 96813, US



arrington Hwy Ala Akau St 4-16 17-24 - TMC

ed Apr 17, 2024

PM Peak (Apr 17 2024 1:45PM - 2:45 PM)

All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1176776, Location: 21.454777, -158.197858, Site Code: Kamaile Academy

Provided by: The Traffic Management Consultant
1188 Bishop Street, Suite 1907,
Honolulu, HI, 96813, US

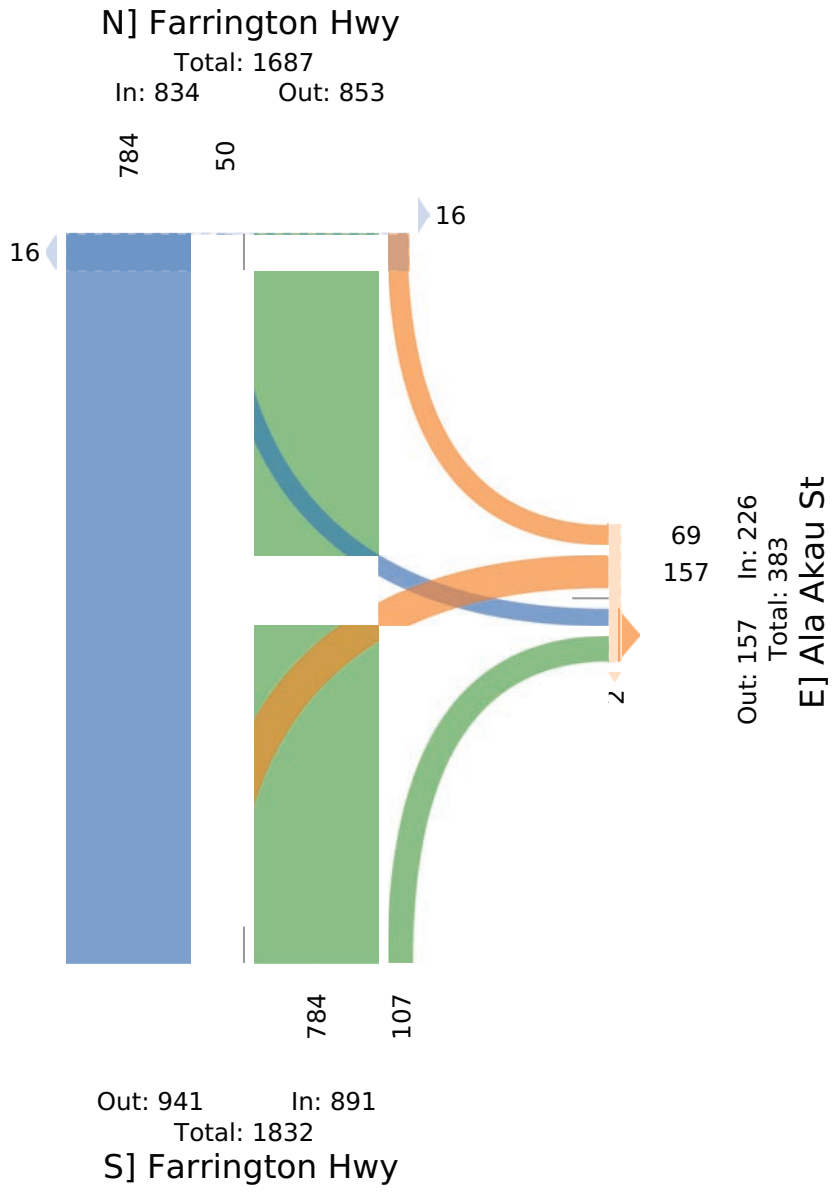
Leg Direction	Ala Akau St estbound					Farrington Hwy Northbound					Farrington Hwy Southbound					
Time	R	L	U	**App**	Ped*	R	T	U	**App**	Ped*	T	L	U	**App**	Ped*	**Int**
2024-04-17 1:45PM	4	12	0	**16**	0	44	173	0	**217**	0	163	14	0	**177**	1	**410**
2:00PM	30	74	0	**104**	0	26	161	0	**187**	0	153	14	0	**167**	14	**458**
2:15PM	26	49	0	**75**	2	25	237	0	**262**	0	247	10	0	**257**	14	**594**
2:30PM	9	22	0	**31**	0	12	213	0	**225**	0	221	12	0	**233**	3	**489**
Total	69	157	0	**226**	2	107	784	0	**891**	0	784	50	0	**834**	32	**1951**
% Approach	30.5%	69.5%	0%	**-**	-	12.0%	88.0%	0%	**-**	-	94.0%	6.0%	0%	**-**	-	-
% Total	3.5%	8.0%	0%	**11.6%**	-	5.5%	40.2%	0%	**45.7%**	-	40.2%	2.6%	0%	**42.7%**	-	-
PHF	0.575	0.530	-	**0.543**	-	0.608	0.827	-	**0.850**	-	0.795	0.893	-	**0.813**	-	0.822
Motorcycles	0	0	0	**0**	-	0	12	0	**12**	-	5	0	0	**5**	-	17
% Motorcycles	0%	0%	0%	**0%**	-	0%	1.5%	0%	**1.3%**	-	0.6%	0%	0%	**0.6%**	-	0.9%
Lights	62	156	0	**218**	-	107	755	0	**862**	-	758	44	0	**802**	-	1882
% Lights	89.9%	99.4%	0%	**96.5%**	-	100%	96.3%	0%	**96.7%**	-	96.7%	88.0%	0%	**96.2%**	-	96.5%
Single-Unit Trucks	2	0	0	**2**	-	0	4	0	**4**	-	6	1	0	**7**	-	13
% Single-Unit Trucks	2.9%	0%	0%	**0.9%**	-	0%	0.5%	0%	**0.4%**	-	0.8%	2.0%	0%	**0.8%**	-	0.7%
Articulated Trucks	0	0	0	**0**	-	0	0	0	**0**	-	0	0	0	**0**	-	0
% Articulated Trucks	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%
Buses	5	1	0	**6**	-	0	13	0	**13**	-	13	5	0	**18**	-	37
% Buses	7.2%	0.6%	0%	**2.7%**	-	0%	1.7%	0%	**1.5%**	-	1.7%	10.0%	0%	**2.2%**	-	1.9%
Bicycles on Road	0	0	0	**0**	-	0	0	0	**0**	-	2	0	0	**2**	-	2
% Bicycles on Road	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0.3%	0%	0%	**0.2%**	-	0.1%
Pedestrians	-	-	-	-	2	-	-	-	-	0	-	-	-	-	32	
% Pedestrians	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	0%	-	-	-	-	-	-	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

arrington Hwy Ala Akau St 4-16 17-24 - TMC

ed Apr 17, 2024
PM Peak (Apr 17 2024 1:45PM - 2:45 PM)
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1176776, Location: 21.454777, -158.197858, Site Code: Kamaile Academy

Provided by: The Traffic Management Consultant
1188 Bishop Street, Suite 1907,
Honolulu, HI, 96813, US



la kau St West Dwys - TMC

ue Apr 16, 2024
Full Length (1 PM-5:30 PM, 6:30 AM-9 AM)
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1176778, Location: 21.455992, -158.196024, Site Code: Kamaile Academy

Provided by: The Traffic Management Consultant
1188 Bishop Street, Suite 1907,
Honolulu, HI, 96813, US

Leg / Direction	Ala Akau St Eastbound						Ala Akau St Westbound						Driveway Northbound						West Exit Dwy Southbound						West Entry Dwy Southwestbound		
ime	R		BL	U	**App**	Ped*	HR		L	U	**App**	Ped*	R	BR	L	U	**App**	Ped*	R		L	HL	**App**	Ped*	**App**	Ped*	**Int**
2024-04-16 1:00PM	2	12	3	2	**19**	1	0	7	0	1	**8**	0	0	0	3	0	**3**	2	1	0	0	0	**1**	0	**0**	1	**31**
1:15PM	1	15	6	0	**22**	0	0	18	1	1	**20**	0	0	0	1	0	**1**	0	2	0	0	0	**2**	0	**0**	1	**45**
1:30PM	2	23	8	0	**33**	1	0	12	0	0	**12**	2	0	0	2	0	**2**	8	2	0	0	0	**2**	1	**0**	0	**49**
1:45PM	3	24	9	1	**37**	1	0	6	0	0	**6**	0	0	0	0	0	**0**	35	8	0	0	2	**10**	7	**0**	4	**53**
Hourly Total	8	74	26	3	**111**	3	0	43	1	2	**46**	2	0	0	6	0	**6**	45	13	0	0	2	**15**	8	**0**	6	**178**
2:00PM	3	29	13	0	**45**	0	1	58	0	0	**59**	1	0	2	5	0	**7**	77	30	0	0	0	**30**	34	**0**	33	**141**
2:15PM	3	32	5	0	**40**	0	1	50	0	0	**51**	0	0	0	3	0	**3**	11	17	0	1	0	**18**	4	**0**	0	**112**
2:30PM	3	13	4	0	**20**	0	1	17	0	0	**18**	0	2	0	0	0	**2**	2	12	0	2	0	**14**	0	**0**	0	**54**
2:45PM	0	10	1	0	**11**	0	1	19	0	0	**20**	0	0	0	1	0	**1**	4	8	0	0	0	**8**	0	**0**	0	**40**
Hourly Total	9	84	23	0	**116**	0	4	144	0	0	**148**	1	2	2	9	0	**13**	94	67	0	3	0	**70**	38	**0**	33	**347**
3:00PM	0	4	4	0	**8**	0	0	14	0	0	**14**	3	0	0	2	0	**2**	0	6	0	0	0	**6**	0	**0**	0	**30**
3:15PM	1	9	2	0	**12**	0	0	15	0	0	**15**	2	0	0	1	0	**1**	1	11	0	0	0	**11**	2	**0**	2	**39**
3:30PM	1	14	0	0	**15**	0	1	8	0	0	**9**	0	0	0	0	0	**0**	0	4	0	0	0	**4**	0	**0**	0	**28**
3:45PM	2	8	2	0	**12**	0	0	14	0	0	**14**	0	0	0	2	0	**2**	0	5	0	1	0	**6**	0	**0**	0	**34**
Hourly Total	4	35	8	0	**47**	0	1	51	0	0	**52**	5	0	0	5	0	**5**	1	26	0	1	0	**27**	2	**0**	2	**131**
4:00PM	1	9	3	1	**14**	1	0	13	0	0	**13**	0	0	0	0	0	**0**	1	1	0	2	0	**3**	2	**0**	0	**30**
4:15PM	1	17	3	0	**21**	0	0	13	0	0	**13**	1	0	0	1	0	**1**	3	5	0	0	0	**5**	0	**0**	0	**40**
4:30PM	2	18	5	0	**25**	0	0	26	0	0	**26**	4	0	0	2	0	**2**	8	10	0	0	0	**10**	5	**0**	0	**63**
4:45PM	0	8	3	1	**12**	0	0	10	0	0	**10**	5	1	0	1	0	**2**	1	11	0	0	0	**11**	0	**0**	0	**35**
Hourly Total	4	52	14	2	**72**	1	0	62	0	0	**62**	10	1	0	4	0	**5**	13	27	0	2	0	**29**	7	**0**	0	**168**
5:00PM	2	12	0	0	**14**	0	0	8	0	0	**8**	4	0	1	4	0	**5**	1	2	0	1	0	**3**	0	**0**	0	**30**
5:15PM	4	15	0	0	**19**	0	0	7	1	0	**8**	4	0	0	1	0	**1**	1	1	0	0	0	**1**	0	**0**	0	**29**
Hourly Total	6	27	0	0	**33**	0	0	15	1	0	**16**	8	0	1	5	0	**6**	2	3	0	1	0	**4**	0	**0**	0	**59**
2024-04-17 6:30AM	1	17	15	0	**33**	0	1	16	0	0	**17**	0	0	0	3	0	**3**	4	2	0	1	0	**3**	1	**0**	1	**56**
6:45AM	0	23	16	0	**39**	0	1	15	0	0	**16**	0	0	0	1	0	**1**	2	5	0	0	0	**5**	0	**0**	1	**61**
Hourly Total	1	40	31	0	**72**	0	2	31	0	0	**33**	0	0	0	4	0	**4**	6	7	0	1	0	**8**	1	**0**	2	**117**
7:00AM	2	53	25	0	**80**	0	0	38	0	0	**38**	0	0	0	0	0	**0**	6	6	0	0	0	**6**	8	**0**	11	**124**
7:15AM	1	62	21	0	**84**	0	0	44	0	0	**44**	0	0	0	0	0	**0**	10	4	0	0	0	**4**	13	**0**	18	**132**
7:30AM	0	66	17	0	**83**	0	0	67	0	0	**67**	1	0	0	2	0	**2**	10	8	0	0	0	**8**	5	**0**	11	**160**
7:45AM	0	45	2	0	**47**	0	0	46	2	0	**48**	1	1	0	2	0	**3**	11	5	0	0	0	**5**	7	**0**	8	**103**
Hourly Total	3	226	65	0	**294**	0	0	195	2	0	**197**	2	1	0	4	0	**5**	37	23	0	0	0	**23**	33	**0**	48	**519**
8:00AM	0	29	4	0	**33**	0	0	29	0	0	**29**	1	1	0	1	0	**2**	12	2	0	0	0	**2**	7	**0**	7	**66**
8:15AM	0	26	1	0	**27**	0	0	20	0	0	**20**	0	0	0	2	0	**2**	4	0	0	0	0	**0**	0	**0**	0	**49**
8:30AM	4	12	0	0	**16**	0	0	21	0	0	**21**	0	0	0	1	0	**1**	1	0	0	0	0	**0**	1	**0**	1	**38**
8:45AM	2	5	0	0	**7**	0	0	10	0	0	**10**	0	1	0	0	0	**1**	0	1	0	0	0	**1**	1	**0**	1	**19**
Hourly Total	6	72	5	0	**83**	0	0	80	0	0	**80**	1	2	0	4	0	**6**	17	3	0	0	0	**3**	9	**0**	9	**172**
1:00PM	4	7	2	1	**14**	0	0	6	0	0	**6**	1	0	0	2	0	**2**	2	2	0	0	0	**2**	0	**0**	0	**24**

Leg	Ala Akau St						Ala Akau St						Driveway						West Exit Dwy						West Entry Dwy		
Direction	Eastbound						Westbound						Northbound						Southbound						Southwestbound		
ime	R		BL	U	App	Ped*	HR		L	U	App	Ped*	R	BR	L	U	App	Ped*	R		L	HL	App	Ped*	App	Ped*	Int
1:15PM	2	25	7	0	**34**	0	2	21	1	0	**24**	1	0	0	2	0	**2**	2	4	0	0	0	**4**	0	**0**	0	**64**
1:30PM	2	21	12	0	**35**	0	0	11	0	0	**11**	1	0	0	1	0	**1**	9	4	0	0	0	**4**	0	**0**	0	**51**
1:45PM	3	30	5	3	**41**	1	0	6	0	0	**6**	0	0	0	2	0	**2**	4	7	0	0	0	**7**	1	**0**	1	**56**
Hourly Total	11	83	26	4	**124**	1	2	44	1	0	**47**	3	0	0	7	0	**7**	17	17	0	0	0	**17**	1	**0**	1	**195**
2:00PM	2	28	10	0	**40**	0	0	70	0	0	**70**	42	0	0	4	0	**4**	88	25	0	0	0	**25**	47	**0**	47	**139**
2:15PM	0	29	5	0	**34**	1	1	33	1	0	**35**	18	0	0	1	0	**1**	31	15	0	0	0	**15**	3	**0**	3	**85**
2:30PM	4	14	3	0	**21**	2	0	18	0	0	**18**	4	1	0	3	0	**4**	4	4	0	0	0	**4**	5	**0**	4	**47**
2:45PM	0	13	3	0	**16**	0	0	18	0	0	**18**	2	0	0	2	0	**2**	4	0	0	0	0	**0**	0	**0**	0	**36**
Hourly Total	6	84	21	0	**111**	3	1	139	1	0	**141**	66	1	0	10	0	**11**	127	44	0	0	0	**44**	55	**0**	54	**307**
3:00PM	1	15	3	0	**19**	0	1	10	0	0	**11**	7	0	0	0	0	**0**	9	4	0	2	0	**6**	1	**0**	1	**36**
3:15PM	5	12	3	0	**20**	0	0	18	0	0	**18**	1	0	0	1	0	**1**	1	9	0	0	0	**9**	0	**0**	0	**48**
3:30PM	1	16	3	1	**21**	0	1	16	0	0	**17**	3	0	0	5	0	**5**	1	5	0	0	0	**5**	0	**0**	0	**48**
3:45PM	0	10	3	0	**13**	0	1	16	0	0	**17**	0	0	0	1	0	**1**	1	23	0	0	0	**23**	0	**0**	0	**54**
Hourly Total	7	53	12	1	**73**	0	3	60	0	0	**63**	11	0	0	7	0	**7**	12	41	0	2	0	**43**	1	**0**	1	**186**
4:00PM	2	15	5	2	**24**	0	0	12	0	0	**12**	4	0	0	1	0	**1**	0	12	0	1	0	**13**	3	**0**	3	**50**
4:15PM	0	6	2	0	**8**	0	1	12	0	0	**13**	2	1	0	1	0	**2**	3	8	0	0	0	**8**	0	**0**	0	**31**
4:30PM	0	11	4	0	**15**	0	0	19	0	0	**19**	6	0	0	0	0	**0**	0	6	0	0	0	**6**	1	**0**	1	**40**
4:45PM	2	7	2	2	**13**	0	0	8	0	0	**8**	4	0	1	0	0	**1**	7	5	0	1	0	**6**	0	**0**	0	**28**
Hourly Total	4	39	13	4	**60**	0	1	51	0	0	**52**	16	1	1	2	0	**4**	10	31	0	2	0	**33**	4	**0**	4	**149**
5:00PM	0	10	0	0	**10**	0	0	6	0	0	**6**	1	1	0	2	0	**3**	0	3	0	0	0	**3**	0	**0**	0	**22**
5:15PM	0	10	0	0	**10**	0	0	10	2	0	**12**	0	0	0	1	0	**1**	2	1	0	0	0	**1**	2	**0**	0	**24**
Hourly Total	0	20	0	0	**20**	0	0	16	2	0	**18**	1	1	0	3	0	**4**	2	4	0	0	0	**4**	2	**0**	0	**46**
2024-04-18 6:30AM	0	22	11	0	**33**	0	2	27	1	0	**30**	0	0	0	0	0	**0**	5	3	0	0	0	**3**	0	**0**	0	**66**
6:45AM	0	29	14	0	**43**	0	0	22	0	0	**22**	0	0	0	0	0	**0**	1	4	0	0	0	**4**	2	**0**	2	**69**
Hourly Total	0	51	25	0	**76**	0	2	49	1	0	**52**	0	0	0	0	0	**0**	6	7	0	0	0	**7**	2	**0**	2	**135**
7:00AM	0	48	24	0	**72**	0	1	42	0	0	**43**	0	0	0	1	0	**1**	13	7	0	0	0	**7**	7	**0**	9	**123**
7:15AM	1	55	24	0	**80**	0	0	47	0	0	**47**	1	0	0	1	0	**1**	10	6	0	0	0	**6**	9	**0**	11	**134**
7:30AM	0	68	19	0	**87**	1	1	60	1	0	**62**	0	0	0	2	0	**2**	8	8	0	2	0	**10**	9	**0**	9	**161**
7:45AM	0	42	9	0	**51**	0	0	54	0	0	**54**	1	0	0	2	0	**2**	9	8	0	0	0	**8**	8	**0**	8	**115**
Hourly Total	1	213	76	0	**290**	1	2	203	1	0	**206**	2	0	0	6	0	**6**	40	29	0	2	0	**31**	33	**0**	37	**533**
8:00AM	0	24	1	0	**25**	0	0	22	0	0	**22**	0	0	0	1	0	**1**	5	0	0	0	0	**0**	4	**0**	4	**48**
8:15AM	1	11	1	0	**13**	0	0	12	0	0	**12**	0	1	0	0	0	**1**	6	0	0	0	0	**0**	0	**0**	0	**26**
8:30AM	2	14	1	0	**17**	0	2	10	0	0	**12**	2	0	0	2	0	**2**	0	1	0	2	0	**3**	0	**0**	0	**34**
8:45AM	0	10	0	0	**10**	0	0	17	0	0	**17**	0	0	0	0	0	**0**	1	1	0	0	0	**1**	0	**0**	0	**28**
Hourly Total	3	59	3	0	**65**	0	2	61	0	0	**63**	2	1	0	3	0	**4**	12	2	0	2	0	**4**	4	**0**	4	**136**
otal	73	1212	348	14	**1647**	9	20	1244	10	2	**1276**	130	10	4	79	0	**93**	441	344	0	16	2	**362**	200	**0**	203	**3378**
% Approach	4.4%	73.6%	21.1%	0.9%	**-**	-	1.6%	97.5%	0.8%	0.2%	**-**	-	10.8%	4.3%	84.9%	0%	**-**	-	95.0%	0%	4.4%	0.6%	**-**	-	**-**	-	-
% Total	2.2%	35.9%	10.3%	0.4%	**48.8%**	-	0.6%	36.8%	0.3%	0.1%	**37.8%**	-	0.3%	0.1%	2.3%	0%	**2.8%**	-	10.2%	0%	0.5%	0.1%	**10.7%**	-	**0%**	-	-
Motorcycles	2	4	1	0	**7**	-	0	7	0	0	**7**	-	1	0	0	0	**1**	-	0	0	0	0	**0**	-	**0**	-	15
% Motorcycles	2.7%	0.3%	0.3%	0%	**0.4%**	-	0%	0.6%	0%	0%	**0.5%**	-	10.0%	0%	0%	0%	**1.1%**	-	0%	0%	0%	0%	**0%**	-	**-**	-	0.4%
Lights	65	1167	334	14	**1580**	-	20	1206	9	2	**1237**	-	5	4	72	0	**81**	-	330	0	16	2	**348**	-	**0**	-	3246
% Lights	89.0%	96.3%	96.0%	100%	**95.9%**	-	100%	96.9%	90.0%	100%	**96.9%**	-	50.0%	100%	91.1%	0%	**87.1%**	-	95.9%	0%	100%	100%	**96.1%**	-	**-**	-	96.1%
Single-Unit Trucks	3	7	1	0	**11**	-	0	6	1	0	**7**	-	2	0	2	0	**4**	-	2	0	0	0	**2**	-	**0**	-	24
% Single-Unit Trucks	4.1%	0.6%	0.3%	0%	**0.7%**	-	0%	0.5%	10.0%	0%	**0.5%**	-	20.0%	0%	2.5%	0%	**4.3%**	-	0.6%	0%	0%	0%	**0.6%**	-	**-**	-	0.7%
Articulated Trucks	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	**0**	-	0

Leg	Ala Akau St						Ala Akau St						Driveway						West Exit Dwy						West Entry Dwy		
Direction	Eastbound						Westbound						Northbound						Southbound						Southwestbound		
ime	R		BL	U	**App**	Ped*	HR		L	U	**App**	Ped*	R	BR	L	U	**App**	Ped*	R		L	HL	**App**	Ped*	**App**	Ped*	**Int**
% Articulated Trucks	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	**-**	-	0%
Buses	2	30	12	0	**44**	-	0	19	0	0	**19**	-	0	0	5	0	**5**	-	11	0	0	0	**11**	-	**0**	-	79
% Buses	2.7%	2.5%	3.4%	0%	**2.7%**	-	0%	1.5%	0%	0%	**1.5%**	-	0%	0%	6.3%	0%	**5.4%**	-	3.2%	0%	0%	0%	**3.0%**	-	**-**	-	2.3%
Bicycles on Road	1	4	0	0	**5**	-	0	6	0	0	**6**	-	2	0	0	0	**2**	-	1	0	0	0	**1**	-	**0**	-	14
% Bicycles on Road	1.4%	0.3%	0%	0%	**0.3%**	-	0%	0.5%	0%	0%	**0.5%**	-	20.0%	0%	0%	0%	**2.2%**	-	0.3%	0%	0%	0%	**0.3%**	-	**-**	-	0.4%
Pedestrians	-	-	-	-	-	9	-	-	-	-	-	130	-	-	-	-	-	429	-	-	-	-	-	198	-	202	
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	100%	-	-	-	-	-	97.3%	-	-	-	-	-	99.0%	-	99.5%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	12	-	-	-	-	-	2	-	1	
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	2.7%	-	-	-	-	-	1.0%	-	0.5%	-

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

la kau St West Dwys - TMC

ue Apr 16, 2024

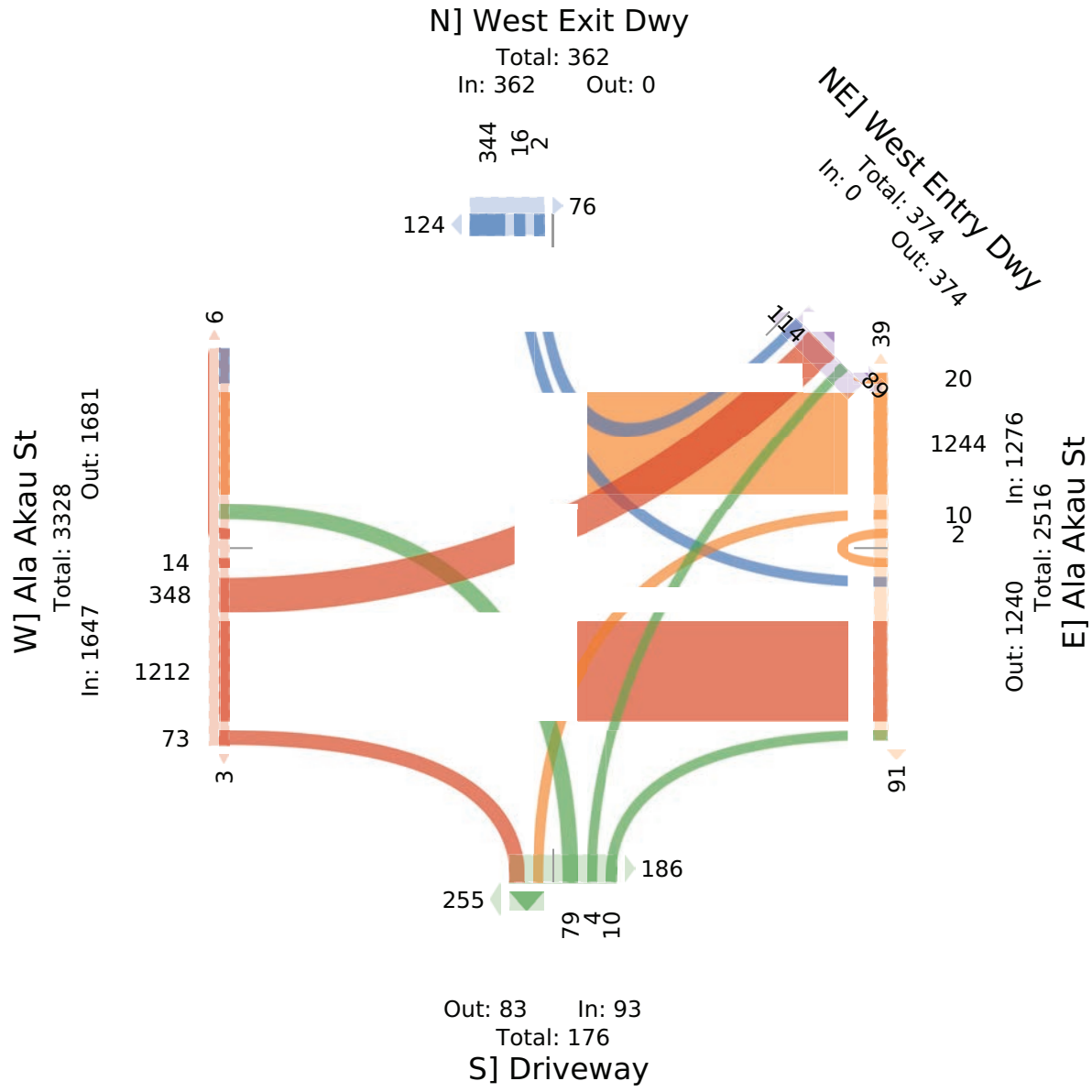
Full Length (1 PM-5:30 PM, 6:30 AM-9 AM)

All Classes (Motorcycles, Lights, Single-Unit rucks, Articulated rucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1176778, Location: 21.455992, -158.196024, Site Code: Kamaile Academy

Provided by: he raffic Management Consultant
1188 Bishop Street, Suite 1907,
Honolulu, HI, 96813, US



la kau St West Dwys - TMC

ue Apr 16, 2024

PM Peak (Apr 16 2024 1:45PM - 2:45 PM)

All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1176778, Location: 21.455992, -158.196024, Site Code: Kamaile Academy

Provided by: The Traffic Management Consultant
1188 Bishop Street, Suite 1907,
Honolulu, HI, 96813, US

Leg Direction	Ala Akau St Eastbound						Ala Akau St Westbound						Driveway Northbound						West Exit Dwy Southbound						West Entry Dwy Southwestbound		
ime	R		BL	U	**App**	Ped*	HR		L	U	**App**	Ped*	R	BR	L	U	**App**	Ped*	R		L	HL	**App**	Ped*	**App**	Ped*	**Int**
2024-04-16 1:45PM	3	24	9	1	**37**	1	0	6	0	0	**6**	0	0	0	0	0	**0**	35	8	0	0	2	**10**	7	**0**	4	**53**
2:00PM	3	29	13	0	**45**	0	1	58	0	0	**59**	1	0	2	5	0	**7**	77	30	0	0	0	**30**	34	**0**	33	**141**
2:15PM	3	32	5	0	**40**	0	1	50	0	0	**51**	0	0	0	3	0	**3**	11	17	0	1	0	**18**	4	**0**	0	**112**
2:30PM	3	13	4	0	**20**	0	1	17	0	0	**18**	0	2	0	0	0	**2**	2	12	0	2	0	**14**	0	**0**	0	**54**
otal	12	98	31	1	**142**	1	3	131	0	0	**134**	1	2	2	8	0	**12**	125	67	0	3	2	**72**	45	**0**	37	**360**
% Approach	8.5%	69.0%	21.8%	0.7%	**-**	-	2.2%	97.8%	0%	0%	**-**	-	16.7%	16.7%	66.7%	0%	**-**	-	93.1%	0%	4.2%	2.8%	**-**	-	**-**	-	-
% Total	3.3%	27.2%	8.6%	0.3%	**39.4%**	-	0.8%	36.4%	0%	0%	**37.2%**	-	0.6%	0.6%	2.2%	0%	**3.3%**	-	18.6%	0%	0.8%	0.6%	**20.0%**	-	**0%**	-	-
PHF	0.917	0.782	0.596	0.250	**0.795**	-	0.750	0.560	-	-	**0.564**	-	0.250	0.250	0.400	-	**0.429**	-	0.550	-	0.375	0.250	**0.592**	-	**-**	-	0.636
Motorcycles	0	1	0	0	**1**	-	0	2	0	0	**2**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	**0**	-	3
% Motorcycles	0%	1.0%	0%	0%	**0.7%**	-	0%	1.5%	0%	0%	**1.5%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	**-**	-	0.8%
Lights	10	86	29	1	**126**	-	3	124	0	0	**127**	-	1	2	8	0	**11**	-	64	0	3	2	**69**	-	**0**	-	333
% Lights	83.3%	87.8%	93.5%	100%	**88.7%**	-	100%	94.7%	0%	0%	**94.8%**	-	50.0%	100%	100%	0%	**91.7%**	-	95.5%	0%	100%	100%	**95.8%**	-	**-**	-	92.5%
Single-Unit Trucks	1	0	0	0	**1**	-	0	0	0	0	**0**	-	1	0	0	0	**1**	-	0	0	0	0	**0**	-	**0**	-	2
% Single-Unit Trucks	8.3%	0%	0%	0%	**0.7%**	-	0%	0%	0%	0%	**0%**	-	50.0%	0%	0%	0%	**8.3%**	-	0%	0%	0%	0%	**0%**	-	**-**	-	0.6%
Articulated Trucks	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	**0**	-	0
% Articulated Trucks	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	**-**	-	0%
Buses	0	10	2	0	**12**	-	0	4	0	0	**4**	-	0	0	0	0	**0**	-	2	0	0	0	**2**	-	**0**	-	18
% Buses	0%	10.2%	6.5%	0%	**8.5%**	-	0%	3.1%	0%	0%	**3.0%**	-	0%	0%	0%	0%	**0%**	-	3.0%	0%	0%	0%	**2.8%**	-	**-**	-	5.0%
Bicycles on Road	1	1	0	0	**2**	-	0	1	0	0	**1**	-	0	0	0	0	**0**	-	1	0	0	0	**1**	-	**0**	-	4
% Bicycles on Road	8.3%	1.0%	0%	0%	**1.4%**	-	0%	0.8%	0%	0%	**0.7%**	-	0%	0%	0%	0%	**0%**	-	1.5%	0%	0%	0%	**1.4%**	-	**-**	-	1.1%
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	124	-	-	-	-	-	45	-	37	
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	100%	-	-	-	-	-	99.2%	-	-	-	-	-	100%	-	100%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0.8%	-	-	-	-	-	0%	-	0%	-

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

la kau St West Dwys - TMC

ue Apr 16, 2024

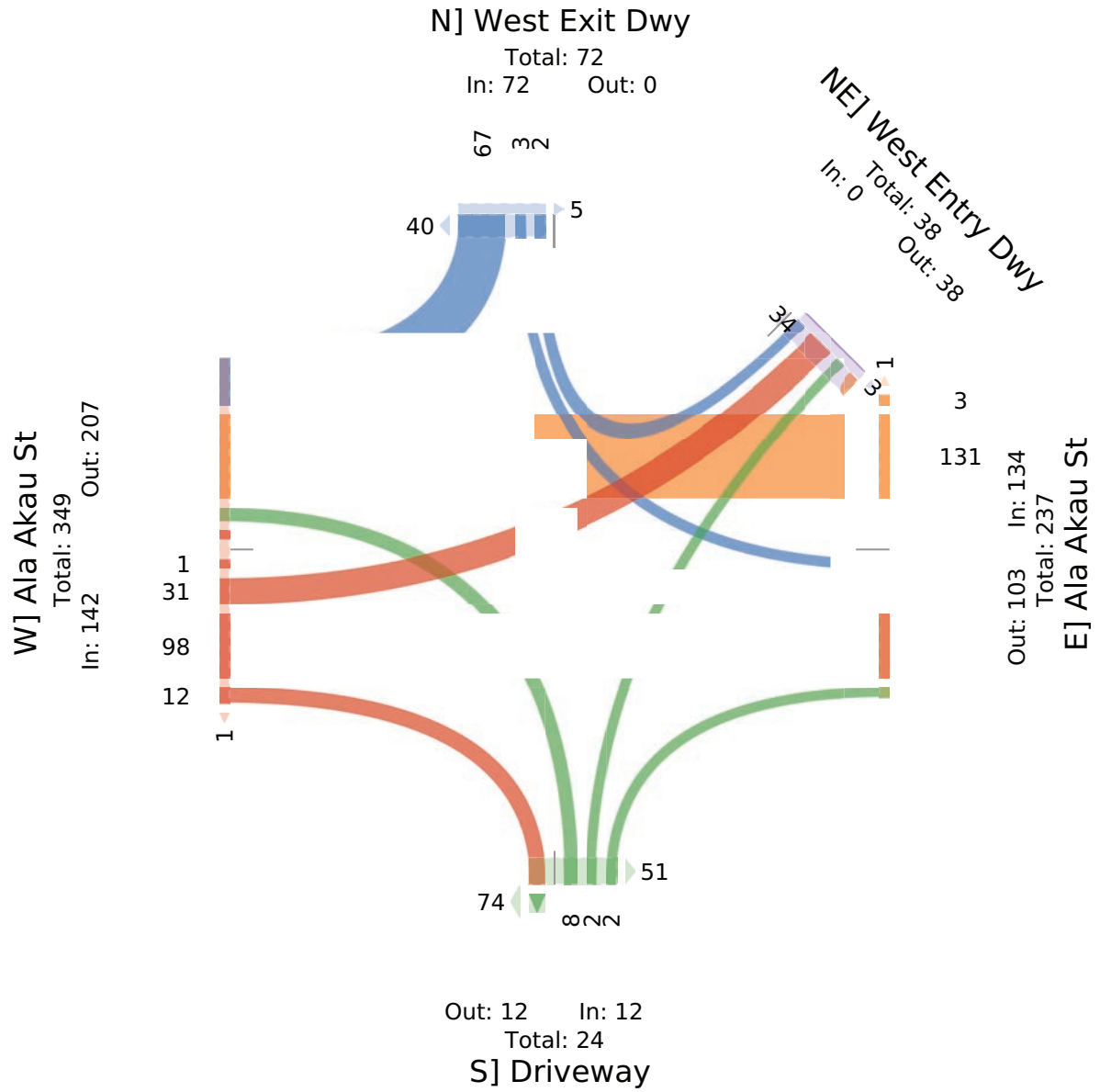
PM Peak (Apr 16 2024 1:45PM - 2:45 PM)

All Classes (Motorcycles, Lights, Single-Unit rucks, Articulated rucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1176778, Location: 21.455992, -158.196024, Site Code: Kamaile Academy

Provided by: he raffic Management Consultant
1188 Bishop Street, Suite 1907,
Honolulu, HI, 96813, US



la kau St West Dwys - TMC

ed Apr 17, 2024

Midday Peak (Apr 17 2024 1PM - 2 PM)

All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1176778, Location: 21.455992, -158.196024, Site Code: Kamaile Academy

Provided by: The Traffic Management Consultant
1188 Bishop Street, Suite 1907,
Honolulu, HI, 96813, US

Leg	Ala Akau St						Ala Akau St						Driveway						est Exit Dwy						est Entry Dwy		
Direction	Eastbound						estbound						Northbound						Southbound						Southwestbound		
Time	R	T	BL	U	**App**	Ped*	HR	T	L	U	**App**	Ped*	R	BR	L	U	**App**	Ped*	R	T	L	HL	**App**	Ped*	**App**	Ped*	**Int**
2024-04-17 1:00PM	4	7	2	1	**14**	0	0	6	0	0	**6**	1	0	0	2	0	**2**	2	2	0	0	0	**2**	0	**0**	0	**24**
1:15PM	2	25	7	0	**34**	0	2	21	1	0	**24**	1	0	0	2	0	**2**	2	4	0	0	0	**4**	0	**0**	0	**64**
1:30PM	2	21	12	0	**35**	0	0	11	0	0	**11**	1	0	0	1	0	**1**	9	4	0	0	0	**4**	0	**0**	0	**51**
1:45PM	3	30	5	3	**41**	1	0	6	0	0	**6**	0	0	0	2	0	**2**	4	7	0	0	0	**7**	1	**0**	1	**56**
Total	11	83	26	4	**124**	1	2	44	1	0	**47**	3	0	0	7	0	**7**	17	17	0	0	0	**17**	1	**0**	1	**195**
% Approach	8.9%	66.9%	21.0%	3.2%	**-**	-	4.3%	93.6%	2.1%	0%	**-**	-	0%	0%	100%	0%	**-**	-	100%	0%	0%	0%	**-**	-	**-**	-	-
% Total	5.6%	42.6%	13.3%	2.1%	**63.6%**	-	1.0%	22.6%	0.5%	0%	**24.1%**	-	0%	0%	3.6%	0%	**3.6%**	-	8.7%	0%	0%	0%	**8.7%**	-	**0%**	-	-
PHF	0.688	0.692	0.542	0.333	**0.756**	-	0.250	0.538	0.250	-	**0.500**	-	-	-	0.875	-	**0.875**	-	0.607	-	-	-	**0.607**	-	**-**	-	0.770
Motorcycles	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	**0**	-	0
% Motorcycles	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	**-**	-	0%
Lights	11	83	23	4	**121**	-	2	43	1	0	**46**	-	0	0	7	0	**7**	-	15	0	0	0	**15**	-	**0**	-	189
% Lights	100%	100%	88.5%	100%	**97.6%**	-	100%	97.7%	100%	0%	**97.9%**	-	0%	0%	100%	0%	**100%**	-	88.2%	0%	0%	0%	**88.2%**	-	**-**	-	96.9%
Single-Unit Trucks	0	0	1	0	**1**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	1	0	0	0	**1**	-	**0**	-	2
% Single-Unit Trucks	0%	0%	3.8%	0%	**0.8%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	5.9%	0%	0%	0%	**5.9%**	-	**-**	-	1.0%
Articulated Trucks	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	**0**	-	0
% Articulated Trucks	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	**-**	-	0%
Buses	0	0	2	0	**2**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	1	0	0	0	**1**	-	**0**	-	3
% Buses	0%	0%	7.7%	0%	**1.6%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	5.9%	0%	0%	0%	**5.9%**	-	**-**	-	1.5%
Bicycles on Road	0	0	0	0	**0**	-	0	1	0	0	**1**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	**0**	-	1
% Bicycles on Road	0%	0%	0%	0%	**0%**	-	0%	2.3%	0%	0%	**2.1%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	**-**	-	0.5%
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	3	-	-	-	-	-	17	-	-	-	-	-	1	-	1	
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	100%	-	-	-	-	-	100%	-	-	-	-	-	100%	-	100%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	0%	-

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

la kau St West Dwys - TMC

ed Apr 17, 2024

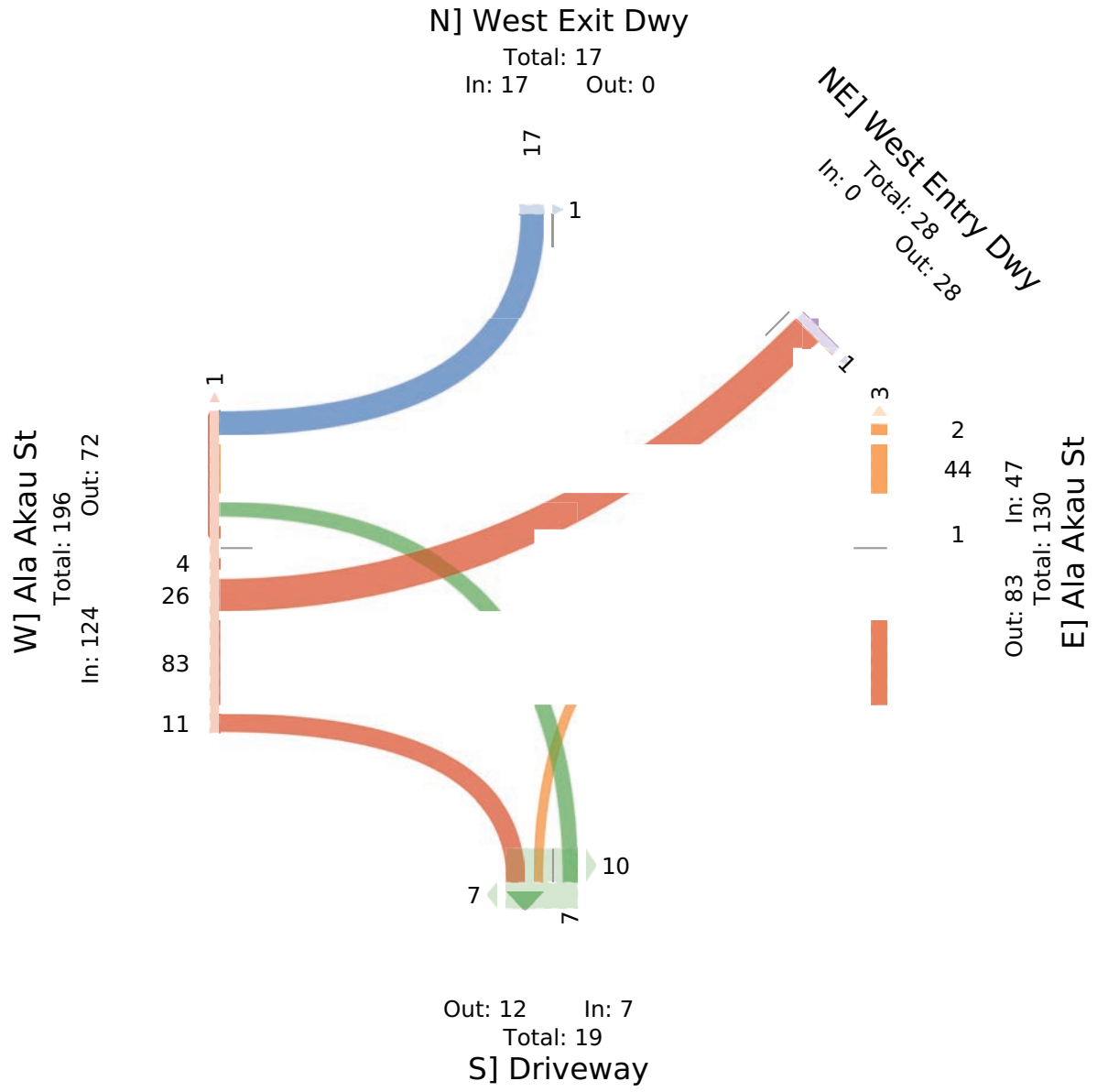
Midday Peak (Apr 17 2024 1PM - 2 PM)

All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1176778, Location: 21.455992, -158.196024, Site Code: Kamaile Academy

Provided by: The Traffic Management Consultant
1188 Bishop Street, Suite 1907,
Honolulu, HI, 96813, US



la kau St West Dwys - TMC

hu Apr 18, 2024

AM Peak (Apr 18 2024 7AM - 8 AM) - Overall Peak Hour

All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1176778, Location: 21.455992, -158.196024, Site Code: Kamaile Academy

Provided by: The Traffic Management Consultant
1188 Bishop Street, Suite 1907,
Honolulu, HI, 96813, US

Leg / Direction	Ala Akau St Eastbound						Ala Akau St Westbound						Driveway Northbound						West Exit Dwy Southbound						West Entry Dwy Southwestbound		
ime	R		BL	U	**App**	Ped*	HR		L	U	**App**	Ped*	R	BR	L	U	**App**	Ped*	R		L	HL	**App**	Ped*	**App**	Ped*	**Int**
2024-04-18 7:00AM	0	48	24	0	**72**	0	1	42	0	0	**43**	0	0	0	1	0	**1**	13	7	0	0	0	**7**	7	**0**	9	**123**
7:15AM	1	55	24	0	**80**	0	0	47	0	0	**47**	1	0	0	1	0	**1**	10	6	0	0	0	**6**	9	**0**	11	**134**
7:30AM	0	68	19	0	**87**	1	1	60	1	0	**62**	0	0	0	2	0	**2**	8	8	0	2	0	**10**	9	**0**	9	**161**
7:45AM	0	42	9	0	**51**	0	0	54	0	0	**54**	1	0	0	2	0	**2**	9	8	0	0	0	**8**	8	**0**	8	**115**
otal	1	213	76	0	**290**	1	2	203	1	0	**206**	2	0	0	6	0	**6**	40	29	0	2	0	**31**	33	**0**	37	**533**
% Approach	0.3%	73.4%	26.2%	0%	**-**	-	1.0%	98.5%	0.5%	0%	**-**	-	0%	0%	100%	0%	**-**	-	93.5%	0%	6.5%	0%	**-**	-	**-**	-	-
% Total	0.2%	40.0%	14.3%	0%	**54.4%**	-	0.4%	38.1%	0.2%	0%	**38.6%**	-	0%	0%	1.1%	0%	**1.1%**	-	5.4%	0%	0.4%	0%	**5.8%**	-	**0%**	-	-
PHF	0.250	0.783	0.792	-	**0.833**	-	0.500	0.846	0.250	-	**0.831**	-	-	-	0.750	-	**0.750**	-	0.906	-	0.250	-	**0.775**	-	**-**	-	0.828
Motorcycles	0	1	1	0	**2**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	**0**	-	2
% Motorcycles	0%	0.5%	1.3%	0%	**0.7%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	**-**	-	0.4%
Lights	1	209	72	0	**282**	-	2	201	1	0	**204**	-	0	0	6	0	**6**	-	26	0	2	0	**28**	-	**0**	-	520
% Lights	100%	98.1%	94.7%	0%	**97.2%**	-	100%	99.0%	100%	0%	**99.0%**	-	0%	0%	100%	0%	**100%**	-	89.7%	0%	100%	0%	**90.3%**	-	**-**	-	97.6%
Single-Unit Trucks	0	1	0	0	**1**	-	0	1	0	0	**1**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	**0**	-	2
% Single-Unit Trucks	0%	0.5%	0%	0%	**0.3%**	-	0%	0.5%	0%	0%	**0.5%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	**-**	-	0.4%
Articulated Trucks	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	**0**	-	0
% Articulated Trucks	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	**-**	-	0%
Buses	0	2	3	0	**5**	-	0	1	0	0	**1**	-	0	0	0	0	**0**	-	3	0	0	0	**3**	-	**0**	-	9
% Buses	0%	0.9%	3.9%	0%	**1.7%**	-	0%	0.5%	0%	0%	**0.5%**	-	0%	0%	0%	0%	**0%**	-	10.3%	0%	0%	0%	**9.7%**	-	**-**	-	1.7%
Bicycles on Road	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	**0**	-	0
% Bicycles on Road	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	**-**	-	0%
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	37	-	-	-	-	-	33	-	37	
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	100%	-	-	-	-	-	92.5%	-	-	-	-	-	100%	-	100%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	0	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	7.5%	-	-	-	-	-	0%	-	0%	-

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

la kau St West Dwys - TMC

hu Apr 18, 2024

AM Peak (Apr 18 2024 7AM - 8 AM) - Overall Peak Hour

All Classes (Motorcycles, Lights, Single-Unit rucks, Articulated rucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1176778, Location: 21.455992, -158.196024, Site Code: Kamaile Academy

Provided by: he raffic Management Consultant
1188 Bishop Street, Suite 1907,
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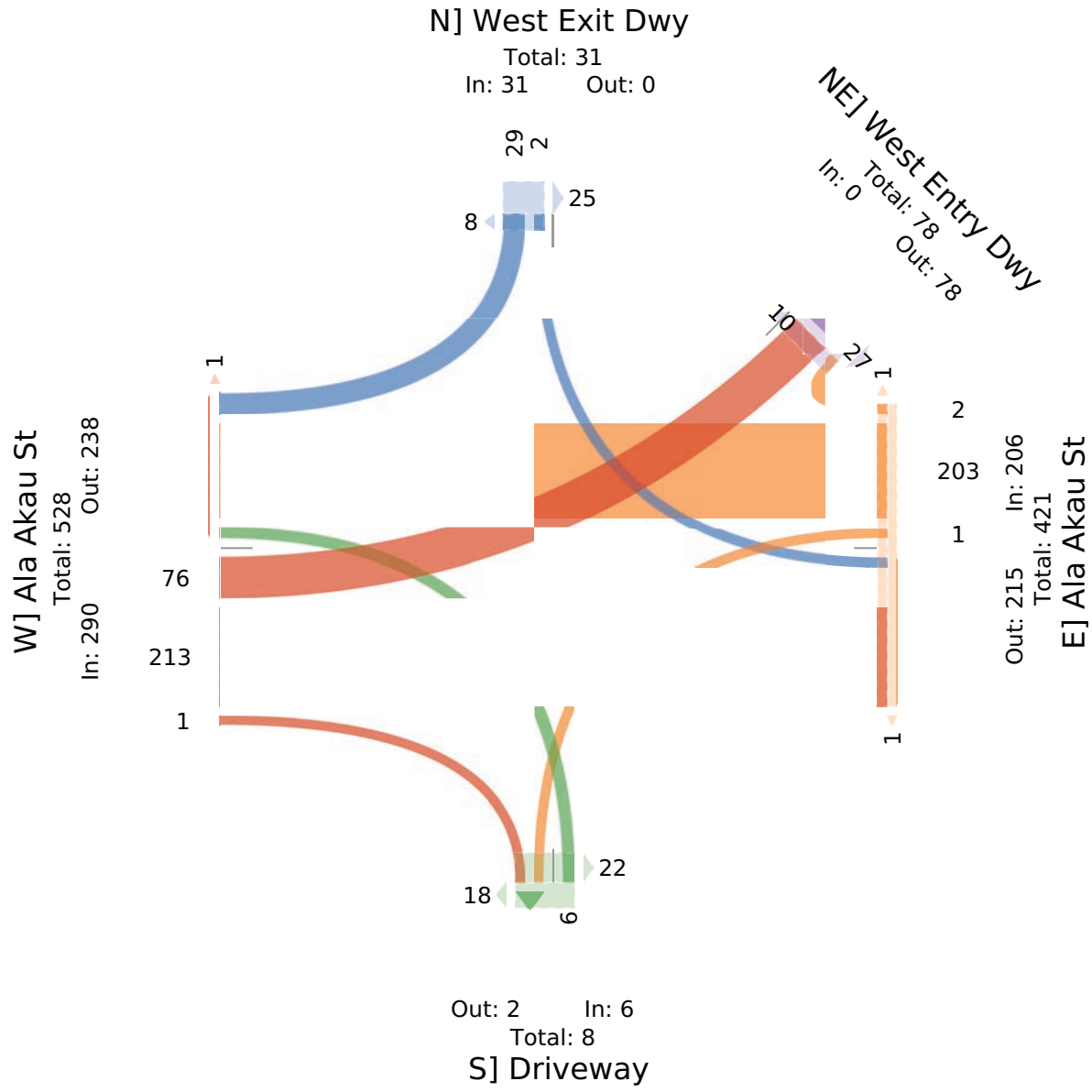


xit Dwy Ala Akau St - TMC

ue Apr 16, 2024
Full Length (6:30 AM-9 AM, 1 PM-5:30 PM)
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1176780, Location: 21.456379, -158.195199, Site Code: Kamaile Academy

Provided by: The Traffic Management Consultant
1188 Bishop Street, Suite 1907,
Honolulu, HI, 96813, US

Leg Direction	Ala Akau St Eastbound					Ala Akau St Westbound					Driveway Northbound					Exit Dwy Southbound					
ime	R		U	**App**	Ped*		L	U	**App**	Ped*	R	L	U	**App**	Ped*	R		L	**App**	Ped*	**Int**
2024-04-16 1:00PM	1	10	0	**11**	1	6	0	0	**6**	3	0	0	0	**0**	2	2	0	0	**2**	2	**19**
1:15PM	1	15	0	**16**	0	8	1	0	**9**	6	0	3	0	**3**	0	6	0	3	**9**	2	**37**
1:30PM	6	15	2	**23**	0	7	0	0	**7**	0	0	3	0	**3**	1	1	0	0	**1**	1	**34**
1:45PM	0	16	0	**16**	1	5	0	0	**5**	4	0	1	0	**1**	13	1	0	0	**1**	0	**23**
Hourly Total	8	56	2	**66**	2	26	1	0	**27**	13	0	7	0	**7**	16	10	0	3	**13**	5	**113**
2:00PM	5	27	1	**33**	3	23	0	0	**23**	0	1	6	0	**7**	33	27	0	1	**28**	1	**91**
2:15PM	2	32	3	**37**	3	15	0	0	**15**	2	0	2	0	**2**	5	33	0	0	**33**	3	**87**
2:30PM	2	12	0	**14**	7	7	0	0	**7**	0	2	0	0	**2**	0	10	0	1	**11**	1	**34**
2:45PM	0	10	0	**10**	7	16	0	0	**16**	0	0	0	0	**0**	1	4	0	0	**4**	0	**30**
Hourly Total	9	81	4	**94**	20	61	0	0	**61**	2	3	8	0	**11**	39	74	0	2	**76**	5	**242**
3:00PM	1	3	0	**4**	0	10	0	0	**10**	0	0	1	0	**1**	0	3	0	0	**3**	0	**18**
3:15PM	0	9	0	**9**	1	9	0	0	**9**	3	0	1	0	**1**	0	4	0	0	**4**	0	**23**
3:30PM	3	11	0	**14**	0	6	0	0	**6**	2	0	0	0	**0**	4	2	0	0	**2**	0	**22**
3:45PM	1	8	0	**9**	0	7	0	0	**7**	0	0	4	0	**4**	0	3	0	0	**3**	1	**23**
Hourly Total	5	31	0	**36**	1	32	0	0	**32**	5	0	6	0	**6**	4	12	0	0	**12**	1	**86**
4:00PM	0	9	1	**10**	3	8	0	0	**8**	0	0	1	0	**1**	0	4	0	0	**4**	0	**23**
4:15PM	1	16	0	**17**	0	9	0	0	**9**	2	0	0	0	**0**	0	3	0	0	**3**	0	**29**
4:30PM	2	14	1	**17**	5	9	0	0	**9**	0	0	1	0	**1**	1	13	0	0	**13**	0	**40**
4:45PM	0	7	0	**7**	0	8	0	0	**8**	0	0	0	0	**0**	1	1	0	0	**1**	0	**16**
Hourly Total	3	46	2	**51**	8	34	0	0	**34**	2	0	2	0	**2**	2	21	0	0	**21**	0	**108**
5:00PM	2	11	0	**13**	4	6	0	0	**6**	0	0	0	0	**0**	0	2	0	0	**2**	0	**21**
5:15PM	1	13	0	**14**	1	6	0	0	**6**	0	0	0	0	**0**	1	0	0	0	**0**	0	**20**
Hourly Total	3	24	0	**27**	5	12	0	0	**12**	0	0	0	0	**0**	1	2	0	0	**2**	0	**41**
2024-04-17 6:30AM	1	17	0	**18**	0	7	0	0	**7**	0	0	1	0	**1**	1	11	0	0	**11**	0	**37**
6:45AM	0	18	0	**18**	0	4	0	0	**4**	0	0	0	0	**0**	1	12	0	0	**12**	0	**34**
Hourly Total	1	35	0	**36**	0	11	0	0	**11**	0	0	1	0	**1**	2	23	0	0	**23**	0	**71**
7:00AM	0	55	0	**55**	0	8	0	0	**8**	1	0	1	0	**1**	0	34	0	0	**34**	0	**98**
7:15AM	2	54	1	**57**	2	6	0	0	**6**	0	0	3	0	**3**	13	39	0	1	**40**	0	**106**
7:30AM	1	70	0	**71**	0	11	1	0	**12**	0	0	2	0	**2**	3	53	0	2	**55**	0	**140**
7:45AM	0	44	0	**44**	4	9	0	0	**9**	2	0	2	0	**2**	5	36	1	1	**38**	0	**93**
Hourly Total	3	223	1	**227**	6	34	1	0	**35**	3	0	8	0	**8**	21	162	1	4	**167**	0	**437**
8:00AM	1	30	0	**31**	5	5	0	0	**5**	1	0	2	0	**2**	1	22	0	0	**22**	0	**60**
8:15AM	1	25	0	**26**	0	4	0	0	**4**	0	0	1	0	**1**	4	14	0	1	**15**	0	**46**
8:30AM	0	12	0	**12**	0	13	0	0	**13**	0	0	3	0	**3**	0	5	0	0	**5**	0	**33**
8:45AM	1	5	0	**6**	0	8	0	1	**9**	0	0	0	0	**0**	0	3	0	0	**3**	0	**18**
Hourly Total	3	72	0	**75**	5	30	0	1	**31**	1	0	6	0	**6**	5	44	0	1	**45**	0	**157**
1:00PM	0	6	0	**6**	2	4	0	0	**4**	1	0	0	0	**0**	1	1	0	1	**2**	1	**12**

Leg Direction	Ala Akau St Eastbound					Ala Akau St Westbound					Driveway Northbound					Exit Dwy Southbound					
ime	R		U	App	Ped*		L	U	App	Ped*	R	L	U	App	Ped*	R		L	App	Ped*	Int
1:15PM	1	23	0	**24**	0	13	0	1	**14**	1	0	4	0	**4**	0	7	0	1	**8**	3	**50**
1:30PM	1	19	0	**20**	0	4	0	0	**4**	1	0	1	0	**1**	0	2	0	0	**2**	1	**27**
1:45PM	5	17	1	**23**	0	5	0	0	**5**	8	0	2	0	**2**	1	0	0	0	**0**	0	**30**
Hourly Total	7	65	1	**73**	2	26	0	1	**27**	11	0	7	0	**7**	2	10	0	2	**12**	5	**119**
2:00PM	5	27	2	**34**	3	28	0	0	**28**	1	0	7	0	**7**	28	31	0	0	**31**	0	**100**
2:15PM	2	26	1	**29**	5	7	0	0	**7**	0	0	3	0	**3**	10	23	0	1	**24**	2	**63**
2:30PM	1	12	0	**13**	3	7	0	0	**7**	2	1	0	0	**1**	2	9	0	0	**9**	0	**30**
2:45PM	0	12	0	**12**	1	9	0	0	**9**	0	0	0	0	**0**	2	8	0	0	**8**	0	**29**
Hourly Total	8	77	3	**88**	12	51	0	0	**51**	3	1	10	0	**11**	42	71	0	1	**72**	2	**222**
3:00PM	2	13	1	**16**	3	6	0	0	**6**	0	0	0	0	**0**	4	6	0	0	**6**	0	**28**
3:15PM	0	11	0	**11**	0	9	0	0	**9**	3	0	1	0	**1**	1	7	0	0	**7**	0	**28**
3:30PM	0	12	0	**12**	3	10	0	0	**10**	2	0	1	0	**1**	6	4	0	0	**4**	0	**27**
3:45PM	2	7	0	**9**	1	14	0	0	**14**	1	0	2	0	**2**	3	1	0	0	**1**	0	**26**
Hourly Total	4	43	1	**48**	7	39	0	0	**39**	6	0	4	0	**4**	14	18	0	0	**18**	0	**109**
4:00PM	2	14	0	**16**	0	11	0	0	**11**	0	0	1	0	**1**	0	4	0	0	**4**	0	**32**
4:15PM	1	6	0	**7**	5	7	0	0	**7**	0	0	1	0	**1**	1	5	0	0	**5**	1	**20**
4:30PM	3	7	0	**10**	0	17	0	0	**17**	0	0	2	0	**2**	0	1	0	1	**2**	0	**31**
4:45PM	1	5	1	**7**	5	5	0	0	**5**	0	0	0	0	**0**	5	1	0	0	**1**	0	**13**
Hourly Total	7	32	1	**40**	10	40	0	0	**40**	0	0	4	0	**4**	6	11	0	1	**12**	1	**96**
5:00PM	0	11	0	**11**	0	4	0	0	**4**	1	0	0	0	**0**	0	0	0	0	**0**	0	**15**
5:15PM	1	9	0	**10**	0	9	0	0	**9**	0	0	1	0	**1**	0	1	0	0	**1**	0	**21**
Hourly Total	1	20	0	**21**	0	13	0	0	**13**	1	0	1	0	**1**	0	1	0	0	**1**	0	**36**
2024-04-18 6:30AM	1	14	2	**17**	1	16	0	0	**16**	0	0	5	0	**5**	0	9	0	0	**9**	0	**47**
6:45AM	1	28	1	**30**	0	2	0	0	**2**	0	0	0	0	**0**	0	18	0	2	**20**	0	**52**
Hourly Total	2	42	3	**47**	1	18	0	0	**18**	0	0	5	0	**5**	0	27	0	2	**29**	0	**99**
7:00AM	1	49	0	**50**	0	8	0	0	**8**	0	0	2	0	**2**	4	34	0	2	**36**	0	**96**
7:15AM	2	60	1	**63**	2	3	0	0	**3**	0	0	1	1	**2**	9	41	0	3	**44**	2	**112**
7:30AM	1	73	1	**75**	2	16	0	0	**16**	2	0	2	0	**2**	5	44	0	5	**49**	1	**142**
7:45AM	0	43	0	**43**	2	13	0	0	**13**	3	0	0	0	**0**	3	39	0	1	**40**	0	**96**
Hourly Total	4	225	2	**231**	6	40	0	0	**40**	5	0	5	1	**6**	21	158	0	11	**169**	3	**446**
8:00AM	1	22	0	**23**	2	4	0	0	**4**	1	0	1	0	**1**	3	18	0	0	**18**	0	**46**
8:15AM	0	13	1	**14**	3	3	0	0	**3**	2	0	0	0	**0**	1	7	0	0	**7**	2	**24**
8:30AM	0	15	0	**15**	0	6	0	1	**7**	0	0	0	0	**0**	2	6	0	1	**7**	0	**29**
8:45AM	0	10	0	**10**	1	10	0	0	**10**	3	0	0	0	**0**	0	7	0	1	**8**	0	**28**
Hourly Total	1	60	1	**62**	6	23	0	1	**24**	6	0	1	0	**1**	6	38	0	2	**40**	2	**127**
otal	69	1132	21	**1222**	91	490	2	3	**495**	58	4	75	1	**80**	181	682	1	29	**712**	24	**2509**
% Approach	5.6%	92.6%	1.7%	**-**	-	99.0%	0.4%	0.6%	**-**	-	5.0%	93.8%	1.3%	**-**	-	95.8%	0.1%	4.1%	**-**	-	-
% Total	2.8%	45.1%	0.8%	**48.7%**	-	19.5%	0.1%	0.1%	**19.7%**	-	0.2%	3.0%	0%	**3.2%**	-	27.2%	0%	1.2%	**28.4%**	-	-
Motorcycles	0	2	0	**2**	-	2	0	0	**2**	-	0	0	0	**0**	-	1	0	0	**1**	-	5
% Motorcycles	0%	0.2%	0%	**0.2%**	-	0.4%	0%	0%	**0.4%**	-	0%	0%	0%	**0%**	-	0.1%	0%	0%	**0.1%**	-	0.2%
Lights	64	1106	21	**1191**	-	478	1	3	**482**	-	2	74	1	**77**	-	661	1	26	**688**	-	2438
% Lights	92.8%	97.7%	100%	**97.5%**	-	97.6%	50.0%	100%	**97.4%**	-	50.0%	98.7%	100%	**96.3%**	-	96.9%	100%	89.7%	**96.6%**	-	97.2%
Single-Unit Trucks	2	6	0	**8**	-	4	1	0	**5**	-	2	1	0	**3**	-	3	0	0	**3**	-	19
% Single-Unit Trucks	2.9%	0.5%	0%	**0.7%**	-	0.8%	50.0%	0%	**1.0%**	-	50.0%	1.3%	0%	**3.8%**	-	0.4%	0%	0%	**0.4%**	-	0.8%
Articulated Trucks	0	0	0	**0**	-	0	0	0	**0**	-	0	0	0	**0**	-	0	0	0	**0**	-	0

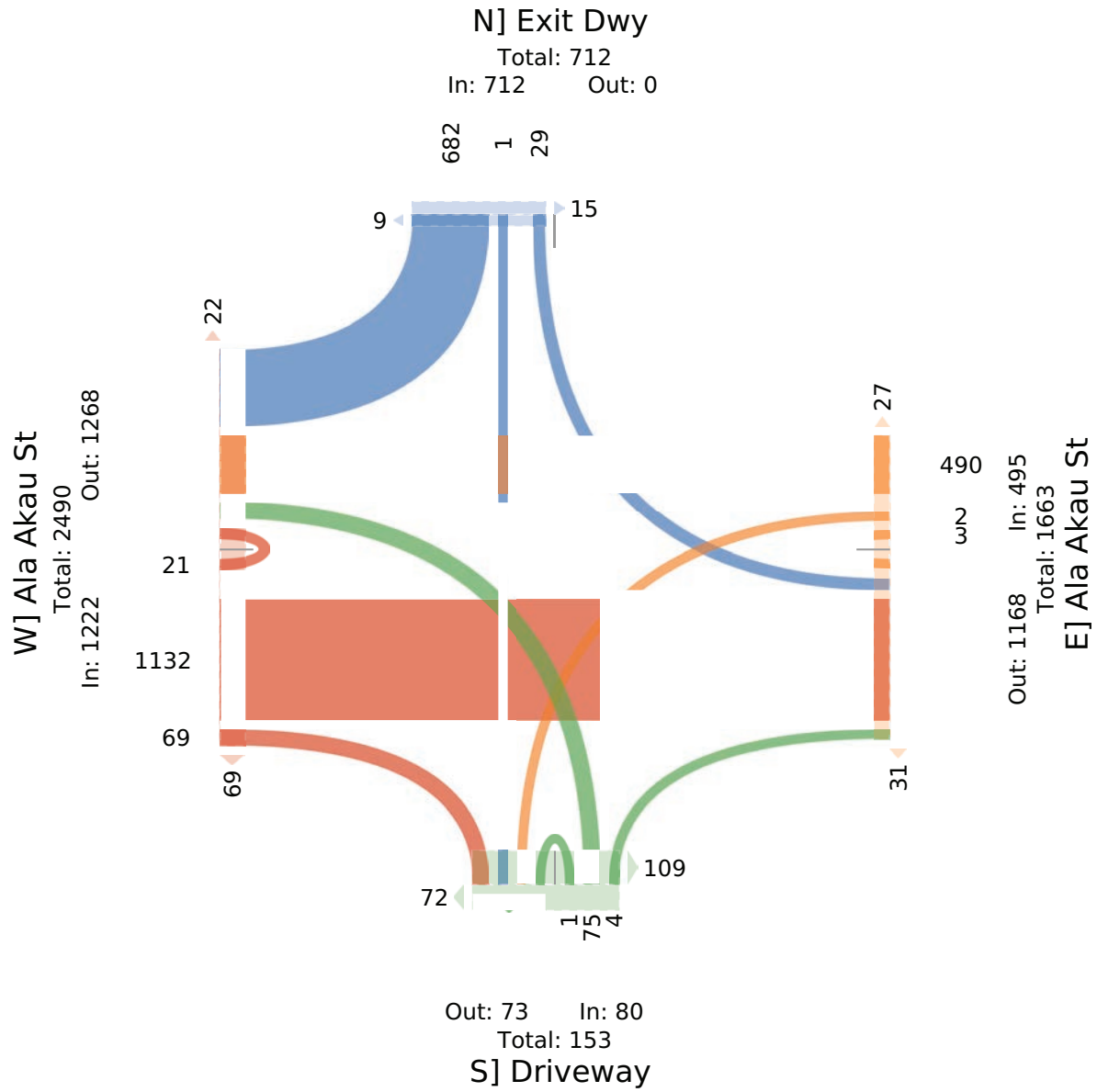
Leg Direction	Ala Akau St Eastbound					Ala Akau St Westbound					Driveway Northbound					Exit Dwy Southbound					
ime	R		U	**App**	Ped*		L	U	**App**	Ped*	R	L	U	**App**	Ped*	R		L	**App**	Ped*	**Int**
% Articulated Trucks	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%
Buses	0	13	0	**13**	-	3	0	0	**3**	-	0	0	0	**0**	-	13	0	3	**16**	-	32
% Buses	0%	1.1%	0%	**1.1%**	-	0.6%	0%	0%	**0.6%**	-	0%	0%	0%	**0%**	-	1.9%	0%	10.3%	**2.2%**	-	1.3%
Bicycles on Road	3	5	0	**8**	-	3	0	0	**3**	-	0	0	0	**0**	-	4	0	0	**4**	-	15
% Bicycles on Road	4.3%	0.4%	0%	**0.7%**	-	0.6%	0%	0%	**0.6%**	-	0%	0%	0%	**0%**	-	0.6%	0%	0%	**0.6%**	-	0.6%
Pedestrians	-	-	-	-	91	-	-	-	-	58	-	-	-	-	176	-	-	-	-	24	
% Pedestrians	-	-	-	-	100%	-	-	-	-	100%	-	-	-	-	97.2%	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	5	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	2.8%	-	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U- urn

xit Dwy Ala Akau St - TMC

ue Apr 16, 2024
Full Length (6:30 AM-9 AM, 1 PM-5:30 PM)
All Classes (Motorcycles, Lights, Single-Unit rucks, Articulated rucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1176780, Location: 21.456379, -158.195199, Site Code: Kamaile Academy

Provided by: he raffic Management Consultant
1188 Bishop Street, Suite 1907,
Honolulu, HI, 96813, US



xit Dwy Ala Akau St - TMC

ue Apr 16, 2024

PM Peak (Apr 16 2024 2PM - 3 PM)

All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1176780, Location: 21.456379, -158.195199, Site Code: Kamaile Academy

Provided by: The Traffic Management Consultant
1188 Bishop Street, Suite 1907,
Honolulu, HI, 96813, US

Leg Direction	Ala Akau St Eastbound					Ala Akau St Westbound					Driveway Northbound					Exit Dwy Southbound					
ime	R		U	**App**	Ped*		L	U	**App**	Ped*	R	L	U	**App**	Ped*	R		L	**App**	Ped*	**Int**
2024-04-16 2:00PM	5	27	1	**33**	3	23	0	0	**23**	0	1	6	0	**7**	33	27	0	1	**28**	1	**91**
2:15PM	2	32	3	**37**	3	15	0	0	**15**	2	0	2	0	**2**	5	33	0	0	**33**	3	**87**
2:30PM	2	12	0	**14**	7	7	0	0	**7**	0	2	0	0	**2**	0	10	0	1	**11**	1	**34**
2:45PM	0	10	0	**10**	7	16	0	0	**16**	0	0	0	0	**0**	1	4	0	0	**4**	0	**30**
otal	9	81	4	**94**	20	61	0	0	**61**	2	3	8	0	**11**	39	74	0	2	**76**	5	**242**
% Approach	9.6%	86.2%	4.3%	**-**	-	100%	0%	0%	**-**	-	27.3%	72.7%	0%	**-**	-	97.4%	0%	2.6%	**-**	-	-
% Total	3.7%	33.5%	1.7%	**38.8%**	-	25.2%	0%	0%	**25.2%**	-	1.2%	3.3%	0%	**4.5%**	-	30.6%	0%	0.8%	**31.4%**	-	-
PHF	0.450	0.625	0.333	**0.628**	-	0.652	-	-	**0.652**	-	0.375	0.333	-	**0.393**	-	0.545	-	0.500	**0.561**	-	0.676
Motorcycles	0	0	0	**0**	-	0	0	0	**0**	-	0	0	0	**0**	-	0	0	0	**0**	-	0
% Motorcycles	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%
Lights	8	78	4	**90**	-	60	0	0	**60**	-	2	8	0	**10**	-	67	0	2	**69**	-	229
% Lights	88.9%	96.3%	100%	**95.7%**	-	98.4%	0%	0%	**98.4%**	-	66.7%	100%	0%	**90.9%**	-	90.5%	0%	100%	**90.8%**	-	94.6%
Single-Unit Trucks	1	0	0	**1**	-	0	0	0	**0**	-	1	0	0	**1**	-	1	0	0	**1**	-	3
% Single-Unit Trucks	11.1%	0%	0%	**1.1%**	-	0%	0%	0%	**0%**	-	33.3%	0%	0%	**9.1%**	-	1.4%	0%	0%	**1.3%**	-	1.2%
Articulated Trucks	0	0	0	**0**	-	0	0	0	**0**	-	0	0	0	**0**	-	0	0	0	**0**	-	0
% Articulated Trucks	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%
Buses	0	2	0	**2**	-	0	0	0	**0**	-	0	0	0	**0**	-	4	0	0	**4**	-	6
% Buses	0%	2.5%	0%	**2.1%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	5.4%	0%	0%	**5.3%**	-	2.5%
Bicycles on Road	0	1	0	**1**	-	1	0	0	**1**	-	0	0	0	**0**	-	2	0	0	**2**	-	4
% Bicycles on Road	0%	1.2%	0%	**1.1%**	-	1.6%	0%	0%	**1.6%**	-	0%	0%	0%	**0%**	-	2.7%	0%	0%	**2.6%**	-	1.7%
Pedestrians	-	-	-	-	20	-	-	-	-	2	-	-	-	-	39	-	-	-	-	5	
% Pedestrians	-	-	-	-	100%	-	-	-	-	100%	-	-	-	-	100%	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U- urn

Provided by: he raffic Management Consultant
1188 Bishop Street, Suite 1907,
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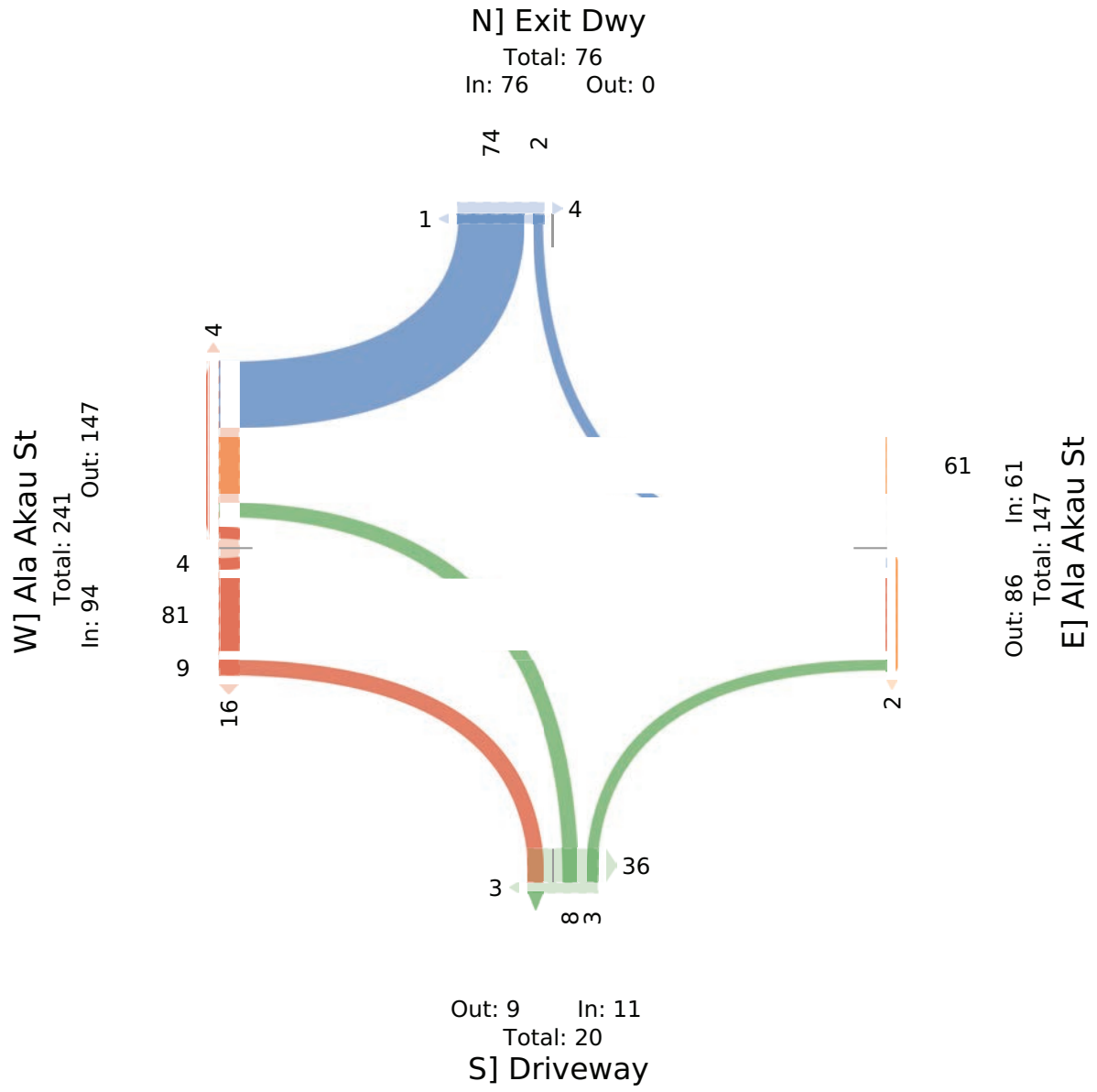

xit Dwy Ala Akau St - TMC

ed Apr 17, 2024

Midday Peak (Apr 17 2024 1PM - 2 PM)

All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1176780, Location: 21.456379, -158.195199, Site Code: Kamaile Academy

Provided by: The Traffic Management Consultant
1188 Bishop Street, Suite 1907,
Honolulu, HI, 96813, US

Leg Direction	Ala Akau St Eastbound					Ala Akau St estbound					Driveway Northbound					Exit Dwy Southbound					
Time	R	T	U	**App**	Ped*	T	L	U	**App**	Ped*	R	L	U	**App**	Ped*	R	T	L	**App**	Ped*	**Int**
2024-04-17 1:00PM	0	6	0	**6**	2	4	0	0	**4**	1	0	0	0	**0**	1	1	0	1	**2**	1	**12**
1:15PM	1	23	0	**24**	0	13	0	1	**14**	1	0	4	0	**4**	0	7	0	1	**8**	3	**50**
1:30PM	1	19	0	**20**	0	4	0	0	**4**	1	0	1	0	**1**	0	2	0	0	**2**	1	**27**
1:45PM	5	17	1	**23**	0	5	0	0	**5**	8	0	2	0	**2**	1	0	0	0	**0**	0	**30**
Total	7	65	1	**73**	2	26	0	1	**27**	11	0	7	0	**7**	2	10	0	2	**12**	5	**119**
% Approach	9.6%	89.0%	1.4%	**-**	-	96.3%	0%	3.7%	**-**	-	0%	100%	0%	**-**	-	83.3%	0%	16.7%	**-**	-	-
% Total	5.9%	54.6%	0.8%	**61.3%**	-	21.8%	0%	0.8%	**22.7%**	-	0%	5.9%	0%	**5.9%**	-	8.4%	0%	1.7%	**10.1%**	-	-
PHF	0.350	0.707	0.250	**0.760**	-	0.500	-	0.250	**0.482**	-	-	0.438	-	**0.438**	-	0.357	-	0.500	**0.375**	-	0.595
Motorcycles	0	0	0	**0**	-	0	0	0	**0**	-	0	0	0	**0**	-	0	0	0	**0**	-	0
% Motorcycles	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%
Lights	7	65	1	**73**	-	26	0	1	**27**	-	0	7	0	**7**	-	10	0	2	**12**	-	119
% Lights	100%	100%	100%	**100%**	-	100%	0%	100%	**100%**	-	0%	100%	0%	**100%**	-	100%	0%	100%	**100%**	-	100%
Single-Unit Trucks	0	0	0	**0**	-	0	0	0	**0**	-	0	0	0	**0**	-	0	0	0	**0**	-	0
% Single-Unit Trucks	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%
Articulated Trucks	0	0	0	**0**	-	0	0	0	**0**	-	0	0	0	**0**	-	0	0	0	**0**	-	0
% Articulated Trucks	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%
Buses	0	0	0	**0**	-	0	0	0	**0**	-	0	0	0	**0**	-	0	0	0	**0**	-	0
% Buses	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%
Bicycles on Road	0	0	0	**0**	-	0	0	0	**0**	-	0	0	0	**0**	-	0	0	0	**0**	-	0
% Bicycles on Road	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%
Pedestrians	-	-	-	-	2	-	-	-	-	11	-	-	-	-	2	-	-	-	-	5	
% Pedestrians	-	-	-	-	100%	-	-	-	-	100%	-	-	-	-	100%	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

xit Dwy Ala Akau St - TMC
ed Apr 17, 2024
Midday Peak (Apr 17 2024 1PM - 2 PM)
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1176780, Location: 21.456379, -158.195199, Site Code: Kamaile Academy

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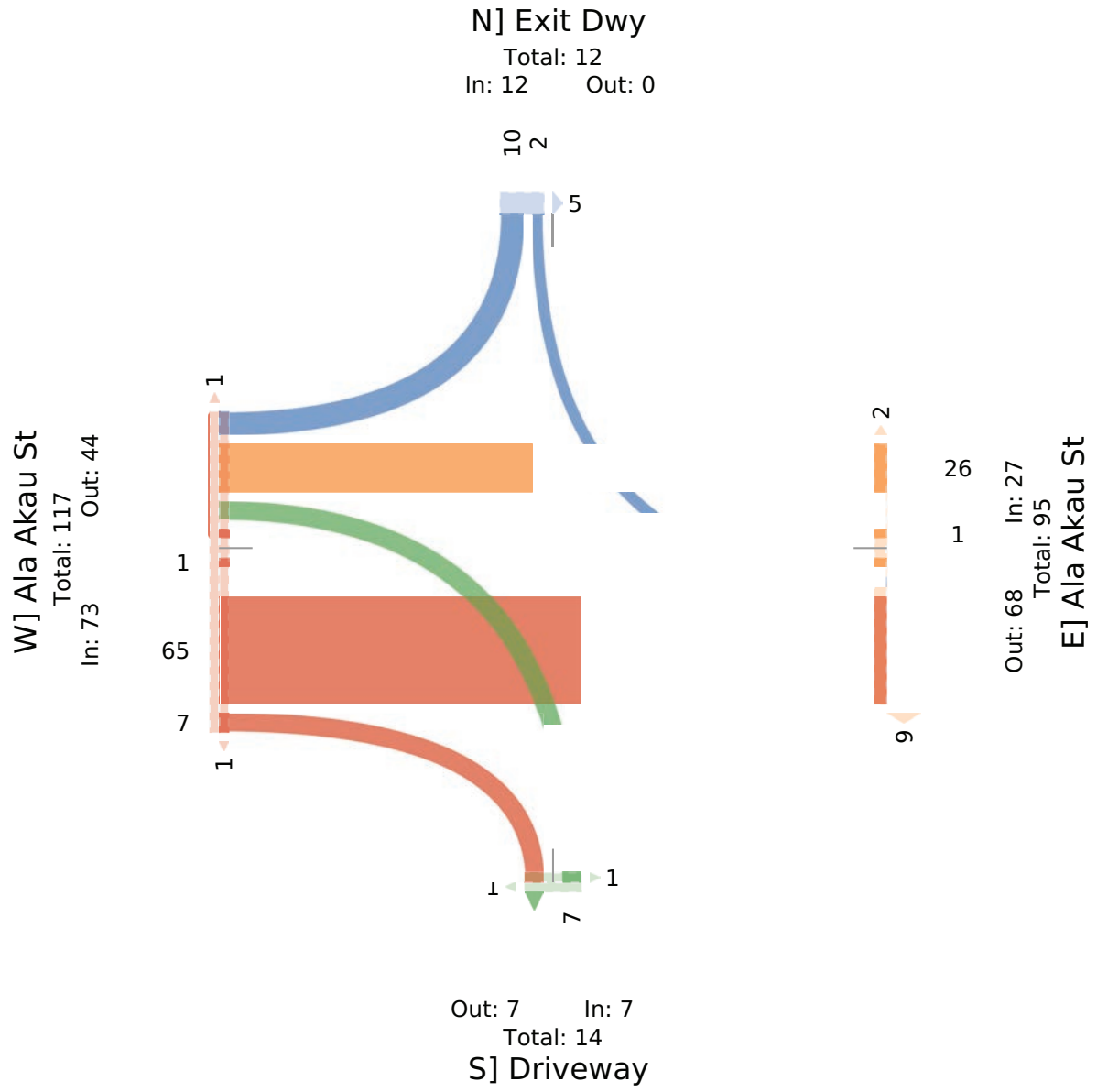
1188 Bishop Street, Suite 1907,
Honolulu, HI, 96813, US



xit Dwy Ala Akau St - TMC

hu Apr 18, 2024

AM Peak (Apr 18 2024 7AM - 8 AM) - Overall Peak Hour

All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1176780, Location: 21.456379, -158.195199, Site Code: Kamaile Academy

Provided by: The Traffic Management Consultant
1188 Bishop Street, Suite 1907,
Honolulu, HI, 96813, US

Leg Direction	Ala Akau St Eastbound					Ala Akau St Westbound					Driveway Northbound					Exit Dwy Southbound					
ime	R		U	**App**	Ped*		L	U	**App**	Ped*	R	L	U	**App**	Ped*	R		L	**App**	Ped*	**Int**
2024-04-18 7:00AM	1	49	0	**50**	0	8	0	0	**8**	0	0	2	0	**2**	4	34	0	2	**36**	0	**96**
7:15AM	2	60	1	**63**	2	3	0	0	**3**	0	0	1	1	**2**	9	41	0	3	**44**	2	**112**
7:30AM	1	73	1	**75**	2	16	0	0	**16**	2	0	2	0	**2**	5	44	0	5	**49**	1	**142**
7:45AM	0	43	0	**43**	2	13	0	0	**13**	3	0	0	0	**0**	3	39	0	1	**40**	0	**96**
otal	4	225	2	**231**	6	40	0	0	**40**	5	0	5	1	**6**	21	158	0	11	**169**	3	**446**
% Approach	1.7%	97.4%	0.9%	**-**	-	100%	0%	0%	**-**	-	0%	83.3%	16.7%	**-**	-	93.5%	0%	6.5%	**-**	-	-
% Total	0.9%	50.4%	0.4%	**51.8%**	-	9.0%	0%	0%	**9.0%**	-	0%	1.1%	0.2%	**1.3%**	-	35.4%	0%	2.5%	**37.9%**	-	-
PHF	0.375	0.771	0.500	**0.777**	-	0.625	-	-	**0.625**	-	-	0.625	0.250	**0.750**	-	0.898	-	0.550	**0.862**	-	0.789
Motorcycles	0	0	0	**0**	-	0	0	0	**0**	-	0	0	0	**0**	-	0	0	0	**0**	-	0
% Motorcycles	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%
Lights	3	221	2	**226**	-	39	0	0	**39**	-	0	5	1	**6**	-	157	0	9	**166**	-	437
% Lights	75.0%	98.2%	100%	**97.8%**	-	97.5%	0%	0%	**97.5%**	-	0%	100%	100%	**100%**	-	99.4%	0%	81.8%	**98.2%**	-	98.0%
Single-Unit Trucks	0	1	0	**1**	-	1	0	0	**1**	-	0	0	0	**0**	-	0	0	0	**0**	-	2
% Single-Unit Trucks	0%	0.4%	0%	**0.4%**	-	2.5%	0%	0%	**2.5%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0.4%
Articulated Trucks	0	0	0	**0**	-	0	0	0	**0**	-	0	0	0	**0**	-	0	0	0	**0**	-	0
% Articulated Trucks	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%
Buses	0	3	0	**3**	-	0	0	0	**0**	-	0	0	0	**0**	-	1	0	2	**3**	-	6
% Buses	0%	1.3%	0%	**1.3%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0.6%	0%	18.2%	**1.8%**	-	1.3%
Bicycles on Road	1	0	0	**1**	-	0	0	0	**0**	-	0	0	0	**0**	-	0	0	0	**0**	-	1
% Bicycles on Road	25.0%	0%	0%	**0.4%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0.2%
Pedestrians	-	-	-	-	6	-	-	-	-	5	-	-	-	-	21	-	-	-	-	3	
% Pedestrians	-	-	-	-	100%	-	-	-	-	100%	-	-	-	-	100%	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U- urn

xit Dwy Ala Akau St - TMC

hu Apr 18, 2024

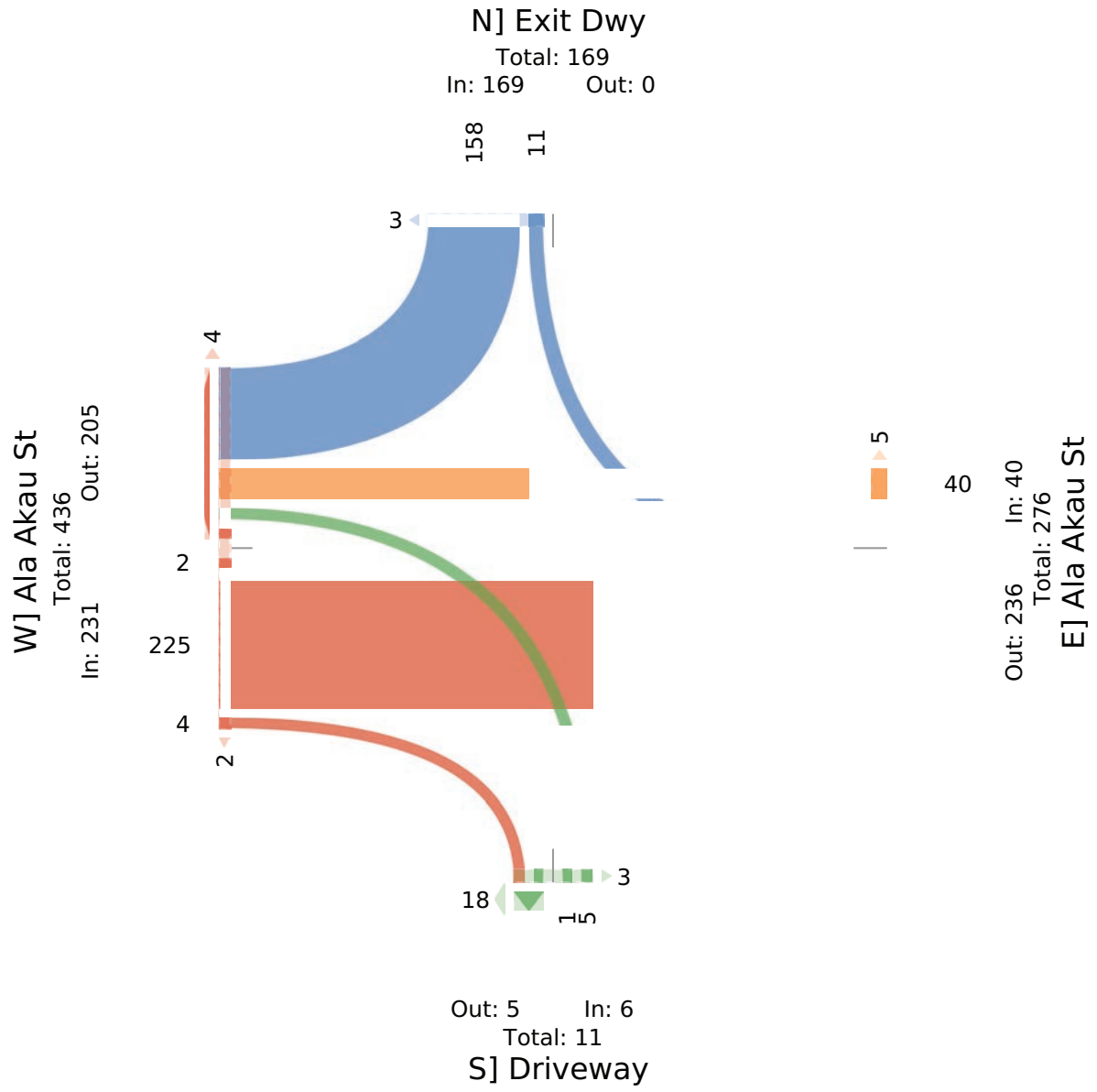
AM Peak (Apr 18 2024 7AM - 8 AM) - Overall Peak Hour

All Classes (Motorcycles, Lights, Single-Unit rucks, Articulated rucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1176780, Location: 21.456379, -158.195199, Site Code: Kamaile Academy

Provided by: he raffic Management Consultant
1188 Bishop Street, Suite 1907,
Honolulu, HI, 96813, US



ntry Dwy Ala Akau St - TMC

ue Apr 16, 2024
Full Length (1 PM-5:30 PM, 6:30 AM-9 AM)
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1176781, Location: 21.456612, -158.194657, Site Code: Kamaile Academy

Provided by: The Traffic Management Consultant
1188 Bishop Street, Suite 1907,
Honolulu, HI, 96813, US

Leg Direction	Ala Akau St Eastbound					Ala Akau St Westbound					Entry Dwy Southbound		
ime		L	U	**App**	Ped*	R		U	**App**	Ped*	**App**	Ped*	**Int**
2024-04-16 1:00PM	6	4	0	**10**	0	0	5	0	**5**	1	**0**	3	**15**
1:15PM	8	10	0	**18**	0	1	9	0	**10**	0	**0**	0	**28**
1:30PM	6	2	1	**9**	0	0	3	0	**3**	0	**0**	4	**12**
1:45PM	9	2	0	**11**	0	1	4	0	**5**	0	**0**	2	**16**
Hourly Total	29	18	1	**48**	0	2	21	0	**23**	1	**0**	9	**71**
2:00PM	10	21	0	**31**	0	2	21	0	**23**	34	**0**	1	**54**
2:15PM	9	26	0	**35**	0	1	13	0	**14**	5	**0**	1	**49**
2:30PM	6	10	0	**16**	0	0	7	0	**7**	1	**0**	0	**23**
2:45PM	9	2	0	**11**	0	0	15	0	**15**	1	**0**	0	**26**
Hourly Total	34	59	0	**93**	0	3	56	0	**59**	41	**0**	2	**152**
3:00PM	2	1	0	**3**	0	0	9	0	**9**	0	**0**	1	**12**
3:15PM	7	2	0	**9**	0	0	9	0	**9**	0	**0**	0	**18**
3:30PM	6	3	0	**9**	0	2	6	0	**8**	2	**0**	2	**17**
3:45PM	5	4	0	**9**	0	0	6	0	**6**	0	**0**	0	**15**
Hourly Total	20	10	0	**30**	0	2	30	0	**32**	2	**0**	3	**62**
4:00PM	4	5	0	**9**	0	0	6	0	**6**	0	**0**	1	**15**
4:15PM	10	3	0	**13**	0	0	10	0	**10**	0	**0**	0	**23**
4:30PM	6	7	0	**13**	0	1	6	0	**7**	2	**0**	0	**20**
4:45PM	7	0	0	**7**	0	0	7	0	**7**	0	**0**	0	**14**
Hourly Total	27	15	0	**42**	0	1	29	0	**30**	2	**0**	1	**72**
5:00PM	11	0	0	**11**	0	0	7	0	**7**	0	**0**	0	**18**
5:15PM	14	0	0	**14**	0	0	6	0	**6**	0	**0**	4	**20**
Hourly Total	25	0	0	**25**	0	0	13	0	**13**	0	**0**	4	**38**
2024-04-17 6:30AM	6	11	0	**17**	0	0	8	0	**8**	0	**0**	0	**25**
6:45AM	3	15	0	**18**	0	0	4	0	**4**	2	**0**	0	**22**
Hourly Total	9	26	0	**35**	0	0	12	0	**12**	2	**0**	0	**47**
7:00AM	14	37	0	**51**	0	0	7	0	**7**	6	**0**	0	**58**
7:15AM	8	43	0	**51**	0	2	6	0	**8**	3	**0**	1	**59**
7:30AM	25	50	0	**75**	0	2	11	0	**13**	6	**0**	0	**88**
7:45AM	9	34	1	**44**	0	1	8	0	**9**	9	**0**	0	**53**
Hourly Total	56	164	1	**221**	0	5	32	0	**37**	24	**0**	1	**258**
8:00AM	7	22	0	**29**	0	4	4	0	**8**	4	**0**	0	**37**
8:15AM	17	10	0	**27**	0	1	6	0	**7**	0	**0**	0	**34**
8:30AM	6	4	0	**10**	0	0	11	0	**11**	1	**0**	2	**21**
8:45AM	5	2	0	**7**	0	0	10	1	**11**	0	**0**	0	**18**
Hourly Total	35	38	0	**73**	0	5	31	1	**37**	5	**0**	2	**110**
1:00PM	2	5	0	**7**	0	0	4	0	**4**	0	**0**	2	**11**

Leg Direction	Ala Akau St Eastbound					Ala Akau St Westbound					Entry Dwy Southbound		
ime		L	U	**App**	Ped*	R		U	**App**	Ped*	**App**	Ped*	**Int**
1:15PM	17	7	2	**26**	0	1	10	0	**11**	0	**0**	0	**37**
1:30PM	13	3	0	**16**	0	1	3	0	**4**	0	**0**	4	**20**
1:45PM	11	0	0	**11**	0	0	5	0	**5**	0	**0**	2	**16**
Hourly Total	43	15	2	**60**	0	2	22	0	**24**	0	**0**	8	**84**
2:00PM	7	24	0	**31**	0	1	25	0	**26**	19	**0**	0	**57**
2:15PM	9	20	0	**29**	0	1	8	0	**9**	10	**0**	0	**38**
2:30PM	5	9	0	**14**	1	0	6	0	**6**	7	**0**	1	**20**
2:45PM	8	4	0	**12**	0	0	8	0	**8**	0	**0**	1	**20**
Hourly Total	29	57	0	**86**	1	2	47	0	**49**	36	**0**	2	**135**
3:00PM	5	8	0	**13**	0	0	7	0	**7**	0	**0**	1	**20**
3:15PM	7	3	0	**10**	0	0	9	0	**9**	0	**0**	2	**19**
3:30PM	8	4	0	**12**	0	0	10	0	**10**	0	**0**	1	**22**
3:45PM	5	0	0	**5**	0	1	12	0	**13**	0	**0**	4	**18**
Hourly Total	25	15	0	**40**	0	1	38	0	**39**	0	**0**	8	**79**
4:00PM	11	2	0	**13**	0	0	9	0	**9**	0	**0**	0	**22**
4:15PM	5	1	0	**6**	0	0	7	0	**7**	0	**0**	0	**13**
4:30PM	8	0	0	**8**	0	0	16	0	**16**	0	**0**	4	**24**
4:45PM	5	0	0	**5**	0	0	6	0	**6**	0	**0**	3	**11**
Hourly Total	29	3	0	**32**	0	0	38	0	**38**	0	**0**	7	**70**
5:00PM	12	0	0	**12**	0	0	4	0	**4**	0	**0**	1	**16**
5:15PM	9	0	0	**9**	0	0	9	0	**9**	0	**0**	0	**18**
Hourly Total	21	0	0	**21**	0	0	13	0	**13**	0	**0**	1	**34**
2024-04-18 6:30AM	3	13	0	**16**	0	0	12	0	**12**	0	**0**	0	**28**
6:45AM	8	20	0	**28**	0	0	3	0	**3**	0	**0**	3	**31**
Hourly Total	11	33	0	**44**	0	0	15	0	**15**	0	**0**	3	**59**
7:00AM	8	42	0	**50**	0	0	4	0	**4**	7	**0**	0	**54**
7:15AM	15	36	0	**51**	0	0	3	0	**3**	4	**0**	0	**54**
7:30AM	27	48	0	**75**	0	5	16	0	**21**	6	**0**	0	**96**
7:45AM	13	32	1	**46**	0	3	12	0	**15**	5	**0**	1	**61**
Hourly Total	63	158	1	**222**	0	8	35	0	**43**	22	**0**	1	**265**
8:00AM	4	18	0	**22**	0	1	4	0	**5**	0	**0**	0	**27**
8:15AM	6	7	0	**13**	0	0	4	0	**4**	7	**0**	6	**17**
8:30AM	11	6	0	**17**	0	1	6	0	**7**	0	**0**	3	**24**
8:45AM	4	7	0	**11**	0	1	10	0	**11**	0	**0**	2	**22**
Hourly Total	25	38	0	**63**	0	3	24	0	**27**	7	**0**	11	**90**
otal	481	649	5	**1135**	1	34	456	1	**491**	142	**0**	63	**1626**
% Approach	42.4%	57.2%	0.4%	**-**	-	6.9%	92.9%	0.2%	**-**	-	**-**	-	-
% Total	29.6%	39.9%	0.3%	**69.8%**	-	2.1%	28.0%	0.1%	**30.2%**	-	**0%**	-	-
Motorcycles	3	0	0	**3**	-	0	2	0	**2**	-	**0**	-	5
% Motorcycles	0.6%	0%	0%	**0.3%**	-	0%	0.4%	0%	**0.4%**	-	**-**	-	0.3%
Lights	472	629	5	**1106**	-	33	445	1	**479**	-	**0**	-	1585
% Lights	98.1%	96.9%	100%	**97.4%**	-	97.1%	97.6%	100%	**97.6%**	-	**-**	-	97.5%
Single-Unit Trucks	4	3	0	**7**	-	0	4	0	**4**	-	**0**	-	11
% Single-Unit Trucks	0.8%	0.5%	0%	**0.6%**	-	0%	0.9%	0%	**0.8%**	-	**-**	-	0.7%
Articulated Trucks	0	0	0	**0**	-	0	0	0	**0**	-	**0**	-	0

Leg	Ala Akau St					Ala Akau St					Entry Dwy		
Direction	Eastbound					Westbound					Southbound		
ime		L	U	**App**	Ped*	R		U	**App**	Ped*	**App**	Ped*	**Int**
% Articulated Trucks	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	**-**	-	0%
Buses	1	15	0	**16**	-	0	1	0	**1**	-	**0**	-	17
% Buses	0.2%	2.3%	0%	**1.4%**	-	0%	0.2%	0%	**0.2%**	-	**-**	-	1.0%
Bicycles on Road	1	2	0	**3**	-	1	4	0	**5**	-	**0**	-	8
% Bicycles on Road	0.2%	0.3%	0%	**0.3%**	-	2.9%	0.9%	0%	**1.0%**	-	**-**	-	0.5%
Pedestrians	-	-	-	-	1	-	-	-	-	142	-	63	
% Pedestrians	-	-	-	-	100%	-	-	-	-	100%	-	100%	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	0	
% Bicycles on Crosswalk	-	-	-	-	0%	-	-	-	-	0%	-	0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U- urn

ntry Dwy Ala Akau St - TMC

ue Apr 16, 2024
Full Length (1 PM-5:30 PM, 6:30 AM-9 AM)
All Classes (Motorcycles, Lights, Single-Unit rucks, Articulated rucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1176781, Location: 21.456612, -158.194657, Site Code: Kamaile Academy

Provided by: he raffic Management Consultant
1188 Bishop Street, Suite 1907,
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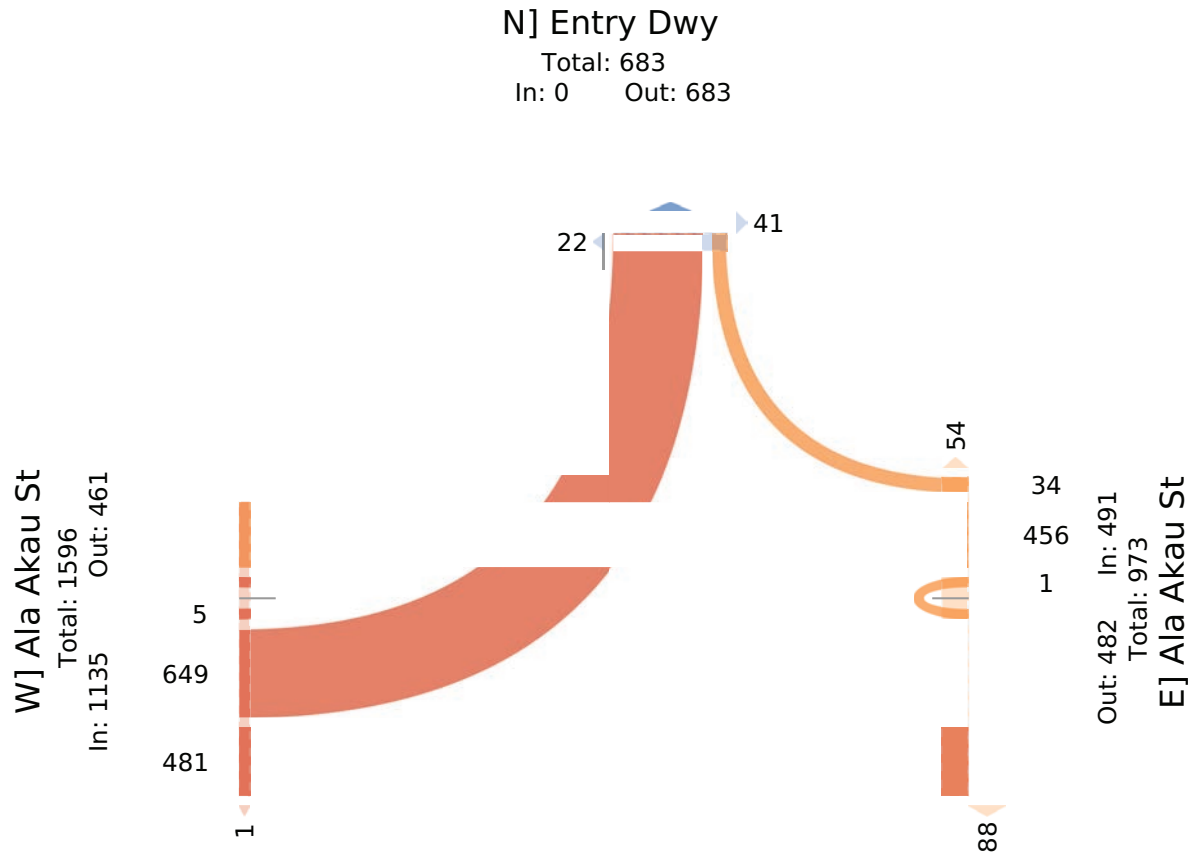


ntry Dwy Ala Akau St - TMC

ue Apr 16, 2024
PM Peak (Apr 16 2024 2PM - 3 PM)
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1176781, Location: 21.456612, -158.194657, Site Code: Kamaile Academy

Provided by: The Traffic Management Consultant
1188 Bishop Street, Suite 1907,
Honolulu, HI, 96813, US

Leg Direction	Ala Akau St Eastbound					Ala Akau St Westbound					Entry Dwy Southbound		
ime		L	U	**App**	Ped*	R		U	**App**	Ped*	**App**	Ped*	**Int**
2024-04-16 2:00PM	10	21	0	**31**	0	2	21	0	**23**	34	**0**	1	**54**
2:15PM	9	26	0	**35**	0	1	13	0	**14**	5	**0**	1	**49**
2:30PM	6	10	0	**16**	0	0	7	0	**7**	1	**0**	0	**23**
2:45PM	9	2	0	**11**	0	0	15	0	**15**	1	**0**	0	**26**
otal	34	59	0	**93**	0	3	56	0	**59**	41	**0**	2	**152**
% Approach	36.6%	63.4%	0%	**-**	-	5.1%	94.9%	0%	**-**	-	**-**	-	-
% Total	22.4%	38.8%	0%	**61.2%**	-	2.0%	36.8%	0%	**38.8%**	-	**0%**	-	-
PHF	0.917	0.567	-	**0.657**	-	0.375	0.655	-	**0.630**	-	**-**	-	0.708
Motorcycles	0	0	0	**0**	-	0	0	0	**0**	-	**0**	-	0
% Motorcycles	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	**-**	-	0%
Lights	33	56	0	**89**	-	3	55	0	**58**	-	**0**	-	147
% Lights	97.1%	94.9%	0%	**95.7%**	-	100%	98.2%	0%	**98.3%**	-	**-**	-	96.7%
Single-Unit Trucks	0	1	0	**1**	-	0	0	0	**0**	-	**0**	-	1
% Single-Unit Trucks	0%	1.7%	0%	**1.1%**	-	0%	0%	0%	**0%**	-	**-**	-	0.7%
Articulated Trucks	0	0	0	**0**	-	0	0	0	**0**	-	**0**	-	0
% Articulated Trucks	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	**-**	-	0%
Buses	0	2	0	**2**	-	0	0	0	**0**	-	**0**	-	2
% Buses	0%	3.4%	0%	**2.2%**	-	0%	0%	0%	**0%**	-	**-**	-	1.3%
Bicycles on Road	1	0	0	**1**	-	0	1	0	**1**	-	**0**	-	2
% Bicycles on Road	2.9%	0%	0%	**1.1%**	-	0%	1.8%	0%	**1.7%**	-	**-**	-	1.3%
Pedestrians	-	-	-	-	0	-	-	-	-	41	-	2	
% Pedestrians	-	-	-	-	-	-	-	-	-	100%	-	100%	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	0%	-	0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U- urn

ntry Dwy Ala Akau St - TMC

ue Apr 16, 2024

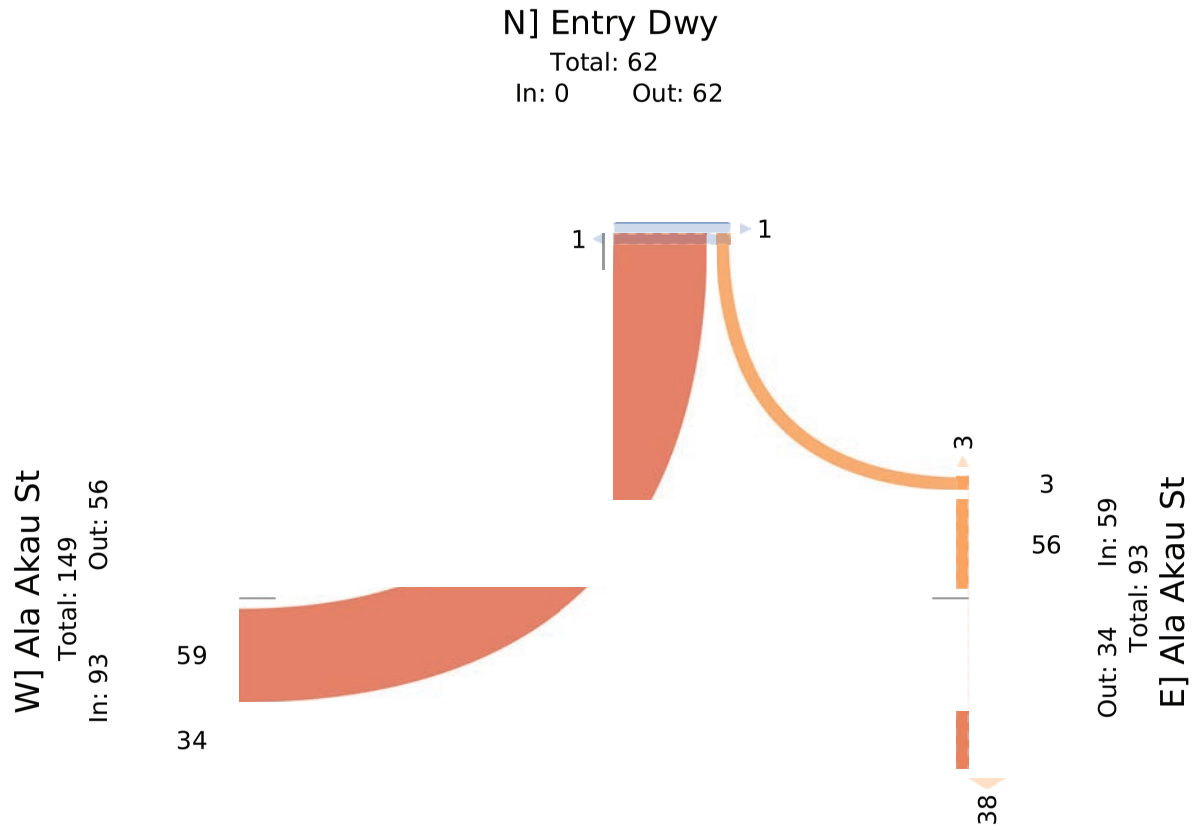
PM Peak (Apr 16 2024 2PM - 3 PM)

All Classes (Motorcycles, Lights, Single-Unit rucks, Articulated rucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1176781, Location: 21.456612, -158.194657, Site Code: Kamaile Academy

Provided by: he raffic Management Consultant
1188 Bishop Street, Suite 1907,
Honolulu, HI, 96813, US



ntry Dwy Ala Akau St - TMC

ed Apr 17, 2024

Midday Peak (Apr 17 2024 1PM - 2 PM)

All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1176781, Location: 21.456612, -158.194657, Site Code: Kamaile Academy

Provided by: The Traffic Management Consultant
1188 Bishop Street, Suite 1907,
Honolulu, HI, 96813, US

Leg Direction	Ala Akau St Eastbound					Ala Akau St estbound					Entry Dwy Southbound		
Time	T	L	U	**App**	Ped*	R	T	U	**App**	Ped*	**App**	Ped*	**Int**
2024-04-17 1:00PM	2	5	0	**7**	0	0	4	0	**4**	0	**0**	2	**11**
1:15PM	17	7	2	**26**	0	1	10	0	**11**	0	**0**	0	**37**
1:30PM	13	3	0	**16**	0	1	3	0	**4**	0	**0**	4	**20**
1:45PM	11	0	0	**11**	0	0	5	0	**5**	0	**0**	2	**16**
Total	43	15	2	**60**	0	2	22	0	**24**	0	**0**	8	**84**
% Approach	71.7%	25.0%	3.3%	**-**	-	8.3%	91.7%	0%	**-**	-	**-**	-	-
% Total	51.2%	17.9%	2.4%	**71.4%**	-	2.4%	26.2%	0%	**28.6%**	-	**0%**	-	-
PHF	0.632	0.536	0.250	**0.577**	-	0.500	0.550	-	**0.545**	-	**-**	-	0.568
Motorcycles	0	0	0	**0**	-	0	0	0	**0**	-	**0**	-	0
% Motorcycles	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	**-**	-	0%
Lights	43	15	2	**60**	-	2	22	0	**24**	-	**0**	-	84
% Lights	100%	100%	100%	**100%**	-	100%	100%	0%	**100%**	-	**-**	-	100%
Single-Unit Trucks	0	0	0	**0**	-	0	0	0	**0**	-	**0**	-	0
% Single-Unit Trucks	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	**-**	-	0%
Articulated Trucks	0	0	0	**0**	-	0	0	0	**0**	-	**0**	-	0
% Articulated Trucks	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	**-**	-	0%
Buses	0	0	0	**0**	-	0	0	0	**0**	-	**0**	-	0
% Buses	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	**-**	-	0%
Bicycles on Road	0	0	0	**0**	-	0	0	0	**0**	-	**0**	-	0
% Bicycles on Road	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	**-**	-	0%
Pedestrians	-	-	-	-	0	-	-	-	-	0	-	8	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

ntry Dwy Ala Akau St - TMC

ed Apr 17, 2024

Midday Peak (Apr 17 2024 1PM - 2 PM)

All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

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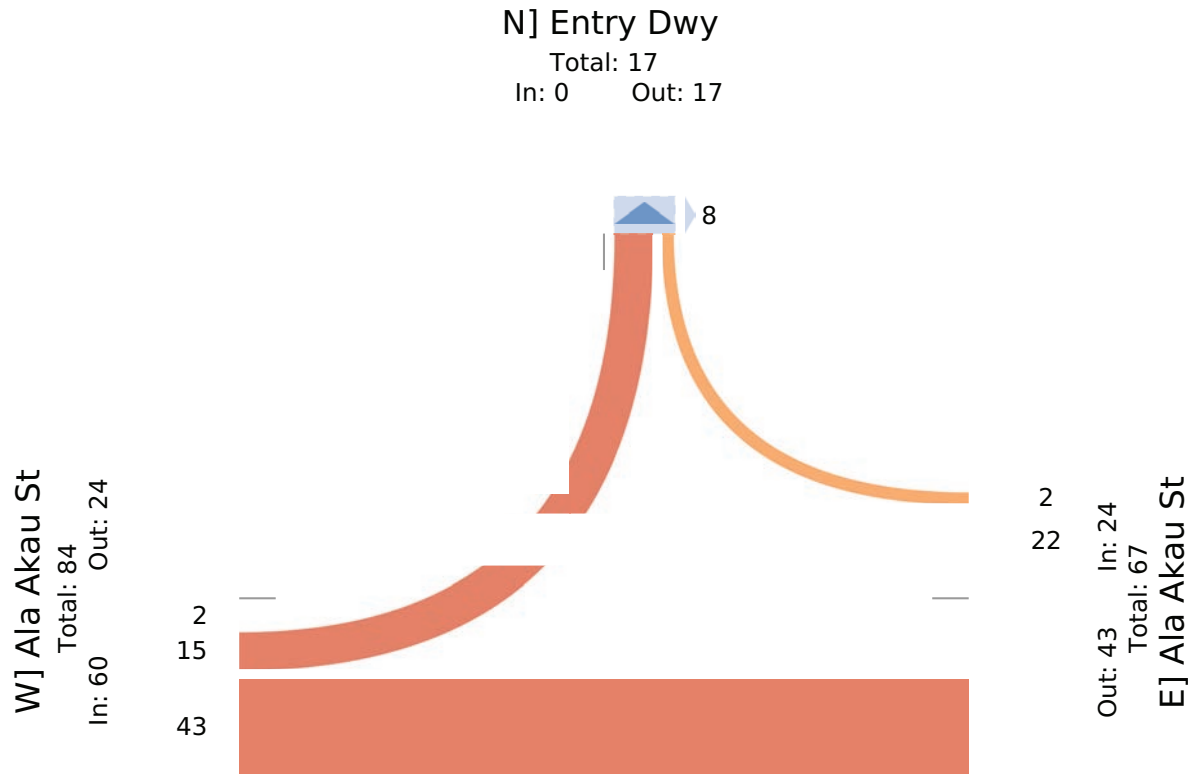

ntry Dwy Ala Akau St - TMC

hu Apr 18, 2024

AM Peak (Apr 18 2024 7AM - 8 AM) - Overall Peak Hour

All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1176781, Location: 21.456612, -158.194657, Site Code: Kamaile Academy

Provided by: The Traffic Management Consultant
1188 Bishop Street, Suite 1907,
Honolulu, HI, 96813, US

Leg Direction	Ala Akau St Eastbound					Ala Akau St Westbound					Entry Dwy Southbound		
ime		L	U	**App**	Ped*	R		U	**App**	Ped*	**App**	Ped*	**Int**
2024-04-18 7:00AM	8	42	0	**50**	0	0	4	0	**4**	7	**0**	0	**54**
7:15AM	15	36	0	**51**	0	0	3	0	**3**	4	**0**	0	**54**
7:30AM	27	48	0	**75**	0	5	16	0	**21**	6	**0**	0	**96**
7:45AM	13	32	1	**46**	0	3	12	0	**15**	5	**0**	1	**61**
otal	63	158	1	**222**	0	8	35	0	**43**	22	**0**	1	**265**
% Approach	28.4%	71.2%	0.5%	**-**	-	18.6%	81.4%	0%	**-**	-	**-**	-	-
% Total	23.8%	59.6%	0.4%	**83.8%**	-	3.0%	13.2%	0%	**16.2%**	-	**0%**	-	-
PHF	0.583	0.823	0.250	**0.740**	-	0.400	0.547	-	**0.512**	-	**-**	-	0.690
Motorcycles	0	0	0	**0**	-	0	0	0	**0**	-	**0**	-	0
% Motorcycles	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	**-**	-	0%
Lights	62	153	1	**216**	-	8	34	0	**42**	-	**0**	-	258
% Lights	98.4%	96.8%	100%	**97.3%**	-	100%	97.1%	0%	**97.7%**	-	**-**	-	97.4%
Single-Unit Trucks	1	0	0	**1**	-	0	1	0	**1**	-	**0**	-	2
% Single-Unit Trucks	1.6%	0%	0%	**0.5%**	-	0%	2.9%	0%	**2.3%**	-	**-**	-	0.8%
Articulated Trucks	0	0	0	**0**	-	0	0	0	**0**	-	**0**	-	0
% Articulated Trucks	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	**-**	-	0%
Buses	0	5	0	**5**	-	0	0	0	**0**	-	**0**	-	5
% Buses	0%	3.2%	0%	**2.3%**	-	0%	0%	0%	**0%**	-	**-**	-	1.9%
Bicycles on Road	0	0	0	**0**	-	0	0	0	**0**	-	**0**	-	0
% Bicycles on Road	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	**-**	-	0%
Pedestrians	-	-	-	-	0	-	-	-	-	22	-	1	
% Pedestrians	-	-	-	-	-	-	-	-	-	100%	-	100%	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	0%	-	0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U- urn

ntry Dwy Ala Akau St - TMC

hu Apr 18, 2024

AM Peak (Apr 18 2024 7AM - 8 AM) - Overall Peak Hour

All Classes (Motorcycles, Lights, Single-Unit rucks, Articulated rucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 1176781, Location: 21.456612, -158.194657, Site Code: Kamaile Academy

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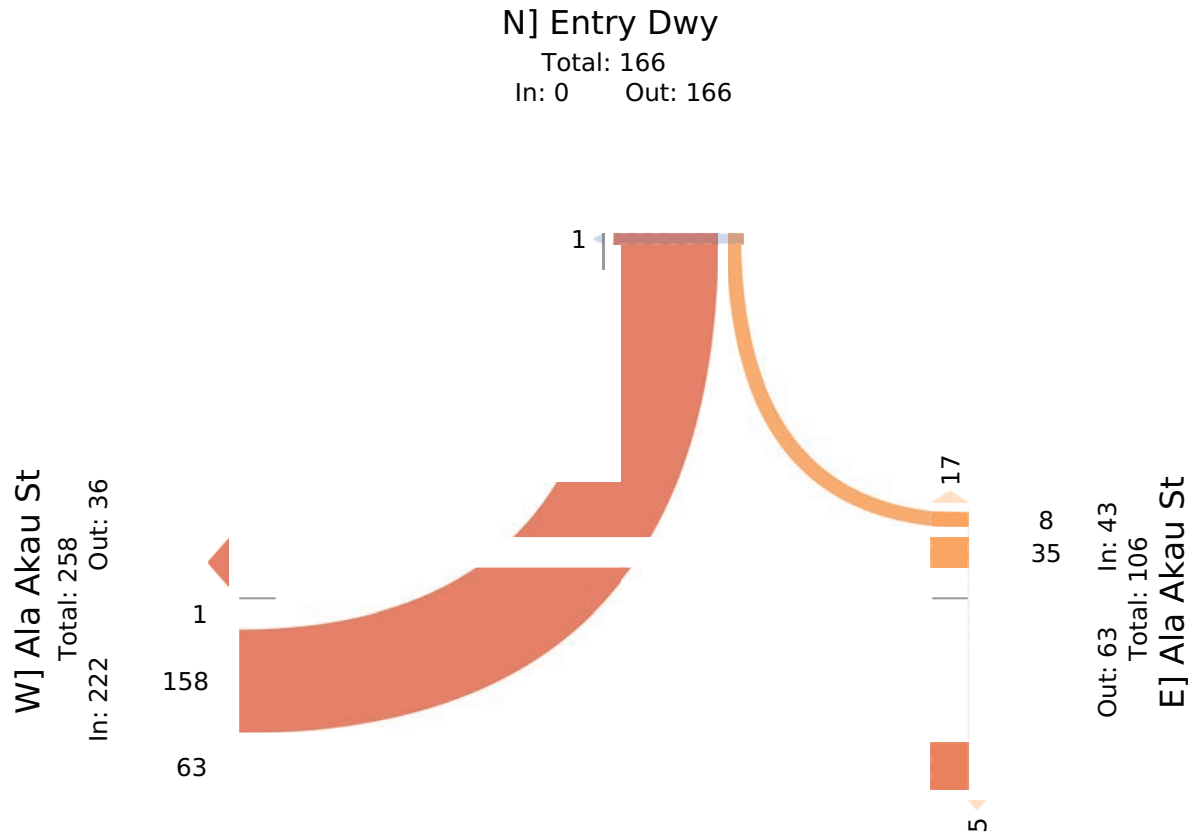


TRANSPORTATION ASSESSMENT REPORT

FOR THE PROPOSED

KAMAILE ACADEMY EXPANSION

WAIANAE, OAHU, HAWAI`I

TAX MAP KEY: 8-5-002: 037 & 053

APPENDIX B

CAPACITY ANALYSIS WORKSHEETS

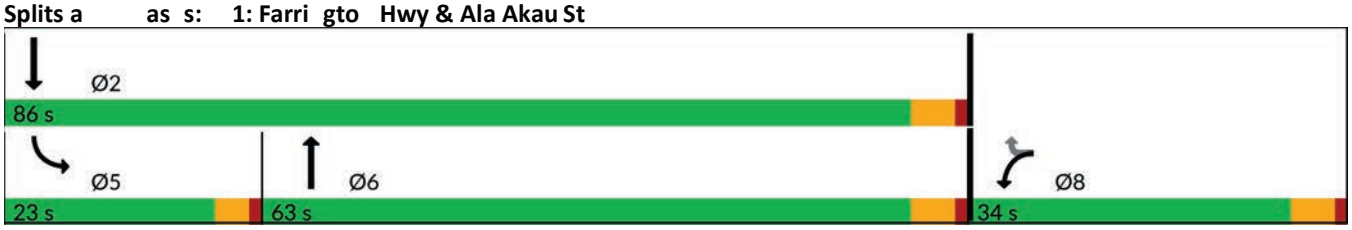
EXISTING TRAFFIC CONDITIONS

axe Coxfiguratioxsx						
Traffix Volume (vph)x	169x	78x	673x	214x	113x	890x
Future Volume (vph)x	169x	78x	673x	214x	113x	890x
Ixeal Flow (vphpl)x	1900x	1900x	1900x	1900x	1900x	1900x
axe Wixth (ft)x	10x	10x	10x	10x	10x	10x
Storage xexgth (ft)x	0x	100x		0x	160x	
Storage xaxesx	1x	1x		0x	1x	
Taper xexgth (ft)x	100x				100x	
Satx. Flow (prot)x	1652x	1463x	3133x	0x	1620x	3303x
Flt Permittex	0.950x				0.950x	
Satx. Flow (perm)x	1652x	1402x	3133x	0x	1613x	3303x
Right Turx ox Rex		Yesx		Yesx		
Satx. Flow (RTOR)x		90x	49x			
ixk Speex (mph)x	25x		25x			25x
ixk Distax e (ft)x	740x		268x			344x
Travel Time (s)x	20.2x		7.3x			9.4x
Coxfl. Pexs. (#/hr)x		23x		9x	9x	
Coxfl. Bikes (#/hr)x				1x		
Peak Hour Faxtorx	0.87x	0.87x	0.87x	0.87x	0.87x	0.87x
Heavx Vehixles (%)x	2%x	3%x	3%x	2%x	4%x	2%x
Sharex xaxe Traffix (%)x						
axe Group Flow (vph)x	194x	90x	1020x	0x	130x	1023x
Turx Txpex	Protx	Permx	NAx		Protx	NAx
Protextex Phasesx	8x		6x		5x	2x
Permittex Phasesx		8x				
Detextor Phasex	8x	8x	6x		5x	2x
Switxh Phasex						
Mixximum Ixitial (s)x	7.0x	7.0x	7.0x		3.0x	7.0x
Mixximum Split (s)x	32.0x	32.0x	38.0x		7.0x	12.0x
Total Split (s)x	34.0x	34.0x	63.0x		23.0x	86.0x
Total Split (%)x	28.3%x	28.3%x	52.5%x		19.2%x	71.7%x
Yellow Time (s)x	4.0x	4.0x	4.0x		3.0x	4.0x
All-Rex Time (s)x	1.0x	1.0x	1.0x		1.0x	1.0x
ost Time Axjust (s)x	0.0x	0.0x	0.0x		0.0x	0.0x
Total xost Time (s)x	5.0x	5.0x	5.0x		4.0x	5.0x
eax/xagx			agx		eax	
eax-xag Optimize?x			Yesx		Yesx	
Rexall Moxex	Noxex	Noxex	Max		Noxex	Max
Axt Effxt Greex (s)x	21.1x	21.1x	63.3x		14.0x	81.3x
Axtuatex g/C Ratiox	0.19x	0.19x	0.56x		0.12x	0.72x
v/x Ratiox	0.63x	0.27x	0.57x		0.65x	0.43x
Coxtrol Delax (s/veh)x	50.9x	9.8x	18.3x		62.4x	7.6x
Queue Delax	0.0x	0.0x	0.0x		0.0x	0.0x
Total Delax (s/veh)x	50.9x	9.8x	18.3x		62.4x	7.6x
OSx	Dx	Ax	Bx		Ex	Ax
Approaxh Delax (s/veh)x	37.9x		18.3x			13.8x
Approaxh xOSx	Dx		Bx			Bx
Queue xexgth 50th (ft)x	132x	0x	265x		99x	170x
Queue xexgth 95th (ft)x	201x	40x	345x		156x	201x

axe Groupx	WBx	WBR	NBTx	NBR	SBx	SBTx
Ixterxal xixk Dist (ft)x	660x		188x			264x
Turx Bax xexgth (ft)x		100x			160x	
Base Capaxitx (vph)x	427x	429x	1785x		274x	2388x
Starvatiox Cap Rexuxtx	0x	0x	0x		0x	0x
Spillbaxk Cap Rexuxtx	0x	0x	0x		0x	0x
Storage Cap Rexuxtx	0x	0x	0x		0x	0x
Rexuxex v/x Ratiox	0.45x	0.21x	0.57x		0.47x	0.43x

Ixtersextiox Summarx			
Area Txpe:x	Otherx		
Cx le xexgth: 120x			
Axtuatex Cx le xexgth: 112.5x			
Natural Cx le: 80x			
Coxtrol Txpe: Semi Axt-Ux oorx			
Maximum v/x Ratio: 0.65x			
Ixtersextiox Sigxal Delax (s/veh): 18.5x		Ixtersextiox xOS: Bx	
Ixtersextiox Capaxitx Utilizatiox 61.8%x		ICU xevel of Servixe Bx	
Axalxsis Periox (mix) 15x			

Splits a as s: 1: Farri gto Hwy & Ala Akau St



Intersention						
Int Delan, s/vehn	0.6n					

Movementn	EBLn	EBTn	WBTn	WBRn	SBLn	SBRn
Lane nonfigurationsn		↑	↑		↱	
Traffin Vol, veh/hn	0	290	209n	0	2n	29n
Future Vol, veh/hn	0	290	209n	0	2n	29n
onflinting Pens, #/hrn	0	0	0	0	0	0
Sign nontrol n	Freen	Freen	Freen	Freen	Stopn	Stopn
RT nhan elizen	-n	Nonen	-n	Nonen	-n	Nonen
Storage Lengthn	-n	-n	-n	-n	0	-n
Veh in Menian Storage, #n	-n	0	0	-n	0	-n
Grane, %n	-n	0	0	-n	0	-n
Peak nour Fantorn	100	100	100	100	100	100
eavn Vehinles, %n	2n	2n	1n	0	0	10
Mvmt Flown	0	290	209n	0	2n	29n

Major/Minorn	Major1n		Major2n		Minor2n	
onflinting Flow Alln	-n	0	-n	0	499n	209n
Stage 1n	-n	-n	-n	-n	209n	-n
Stage 2n	-n	-n	-n	-n	290	-n
ritinal n wn	-n	-n	-n	-n	6.4n	6.3n
ritinal n wn Stg 1n	-n	-n	-n	-n	5.4n	-n
ritinal n wn Stg 2n	-n	-n	-n	-n	5.4n	-n
Follow-up n wn	-n	-n	-n	-n	3.5n	3.39n
Pot nap-1 Maneuvern	0	-n	-n	0	535n	812n
Stage 1n	0	-n	-n	0	831n	-n
Stage 2n	0	-n	-n	0	764n	-n
Platoon blonken, %n		-n	-n			
Mov nap-1 Maneuvern	-n	-n	-n	-n	535n	812n
Mov nap-2 Maneuvern	-n	-n	-n	-n	535n	-n
Stage 1n	-n	-n	-n	-n	831n	-n
Stage 2n	-n	-n	-n	-n	764n	-n

Approanhn	EBn	WBn	SBn
M ntrl Dln, s/vn	0	0	9.77n
M LOSn			An

Minor Lane/Major Mvmtn	EBTn	WBTn	SBLn1n
apanitn (veh/h)n	-n	-n	785n
M Lane V/n Ration	-n	-n	0.039n
M ntrl Dln (s/v)n	-n	-n	9.8n
M Lane LOSn	-n	-n	An
M 95th %tile Q(veh)n	-n	-n	0.1n

Intersention	
Int Delan, s/vehn	1.4n

Movementn	EBLn	EBTn	EBRn	WBLn	WBTn	WBRn	NBLn	NBTn	NBRn	SBLn	SBTn	SBRn
Lane nonfigurationsn												
Traffin Vol, veh/hn	76n	213n	1n	1n	203n	2n	6n	0	0	0	0	0
Future Vol, veh/hn	76n	213n	1n	1n	203n	2n	6n	0	0	0	0	0
onflinting Pens, #/hrn	48n	0	37n	37n	0	48n	0	0	2n	2n	0	0
Sign nontrol n	Freen	Freen	Freen	Freen	Freen	Freen	Stopn	Stopn	Stopn	Stopn	Stopn	Stopn
RT nhan elizen	-n	-n	Nonen	-n	-n	Nonen	-n	-n	Nonen	-n	-n	Nonen
Storage Lengthn	-n	-n	-n	-n	-n	-n	-n	-n	-n	-n	-n	-n
Veh in Menian Storage, #n	-n	0	-n	-n	0	-n	-n	0	-n	-n	0	-n
Grane, %n	-n	0	-n	-n	0	-n	-n	0	-n	-n	0	-n
Peak nour Fantorn	100	100	100	100	100	100	100	100	100	100	100	100
eavn Vehinles, %n	4n	1n	0	0	1n	0	0	0	0	0	0	0
Mvmt Flown	76n	213n	1n	1n	203n	2n	6n	0	0	0	0	0

Major/Minorn	Major1n			Major2n			Minor1n		
onflinting Flow Alln	253n	0	0	251n	0	0	608n	658n	253n
Stage 1n	-n	-n	-n	-n	-n	-n	403n	403n	-n
Stage 2n	-n	-n	-n	-n	-n	-n	205n	255n	-n
ritinal n wn	4.14n	-n	-n	4.1n	-n	-n	6.4n	6.5n	6.2n
ritinal n wn Stg 1n	-n	-n	-n	-n	-n	-n	5.4n	5.5n	-n
ritinal n wn Stg 2n	-n	-n	-n	-n	-n	-n	5.4n	5.5n	-n
Follow-up n wn	2.236n	-n	-n	2.2n	-n	-n	3.5n	4n	3.3n
Pot nap-1 Maneuvern	1301n	-n	-n	1326n	-n	-n	463n	387n	791n
Stage 1n	-n	-n	-n	-n	-n	-n	680	604n	-n
Stage 2n	-n	-n	-n	-n	-n	-n	834n	700	-n
Platoon blonken, %n		-n	-n		-n	-n			
Mov nap-1 Maneuvern	1301n	-n	-n	1279n	-n	-n	416n	0	762n
Mov nap-2 Maneuvern	-n	-n	-n	-n	-n	-n	416n	0	-n
Stage 1n	-n	-n	-n	-n	-n	-n	612n	0	-n
Stage 2n	-n	-n	-n	-n	-n	-n	833n	0	-n

Approanhn	EBn	WBn	NBn
M ntrl Dln, s/vn	2.08n	0.04n	13.77n
M LOSn			Bn

Minor Lane/Major Mvmtn	NBLn1n	EBLn	EBTn	EBRn	WBLn	WBTn	WBRn
apanitn (veh/h)n	416n	471n	-n	-n	9n	-n	-n
M Lane V/n Ration	0.014n	0.058n	-n	-n	0.001n	-n	-n
M ntrl Dln (s/v)n	13.8n	7.9n	0	-n	7.8n	0	-n
M Lane LOSn	Bn	An	An	-n	An	An	-n
M 95th %tile Q(veh)n	0	0.2n	-n	-n	0	-n	-n

Intersention	
Int Delan, s/vehn	3.8n

Movementn	EBLn	EBTn	EBRn	WBLn	WBTn	WBRn	NBLn	NBTn	NBRn	SBLn	SBTn	SBRn
Lane nonfigurationsn												
Traffin Vol, veh/hn	2n	225n	4n	0	40	0	6n	0	0	11n	0	158n
Future Vol, veh/hn	2n	225n	4n	0	40	0	6n	0	0	11n	0	158n
onflinting Pens, #/hrn	0	0	21n	21n	0	0	6n	0	3n	3n	0	0
Sign nontrol n	Freen	Freen	Freen	Freen	Freen	Freen	Stopn	Stopn	Stopn	Stopn	Stopn	Stopn
RT nhan elizen	-n	-n	Nonen	-n	-n	Nonen	-n	-n	Nonen	-n	-n	Nonen
Storage Lengthn	-n	-n	-n	-n	-n	-n	-n	-n	-n	-n	-n	-n
Veh in Menian Storage, #n	-n	0	-n	-n	0	-n	-n	0	-n	-n	0	-n
Grane, %n	-n	0	-n	-n	0	-n	-n	0	-n	-n	0	-n
Peak nour Fantorn	100	100	100	100	100	100	100	100	100	100	100	100
eavn Vehinles, %n	0	2n	0	0	3n	0	0	0	0	18n	0	1n
Mvmt Flown	2n	225n	4n	0	40	0	6n	0	0	11n	0	158n

Major/Minorn	Major1n			Major2n			Minor1n			Minor2n		
onflinting Flow Alln	40	0	0	250	0	0	298n	292n	251n	272n	294n	46n
Stage 1n	-n	-n	-n	-n	-n	-n	252n	252n	-n	40	40	-n
Stage 2n	-n	-n	-n	-n	-n	-n	46n	40	-n	232n	254n	-n
ritinal n wn	4.1n	-n	-n	4.1n	-n	-n	7.1n	6.5n	6.2n	7.28n	6.5n	6.21n
ritinal n wn Stg 1n	-n	-n	-n	-n	-n	-n	6.1n	5.5n	-n	6.28n	5.5n	-n
ritinal n wn Stg 2n	-n	-n	-n	-n	-n	-n	6.1n	5.5n	-n	6.28n	5.5n	-n
Follow-up n wn	2.2n	-n	-n	2.2n	-n	-n	3.5n	4n	3.3n	3.662n	4n	3.309n
Pot nap-1 Maneuvern	1583n	-n	-n	1327n	-n	0	658n	622n	793n	649n	620	1026n
Stage 1n	-n	-n	-n	-n	-n	0	757n	702n	-n	936n	866n	-n
Stage 2n	-n	-n	-n	-n	-n	0	973n	866n	-n	736n	701n	-n
Platoon blonken, %n		-n	-n		-n							
Mov nap-1 Maneuvern	1583n	-n	-n	1301n	-n	-n	541n	609n	775n	646n	607n	1020
Mov nap-2 Maneuvern	-n	-n	-n	-n	-n	-n	541n	609n	-n	646n	607n	-n
Stage 1n	-n	-n	-n	-n	-n	-n	740	687n	-n	936n	866n	-n
Stage 2n	-n	-n	-n	-n	-n	-n	818n	866n	-n	733n	686n	-n

Approanhn	EBn	WBn	NBn	SBn
M ntrl Dln, s/vn	0.06n	0	11.73n	9.42n
M LOSn			Bn	An

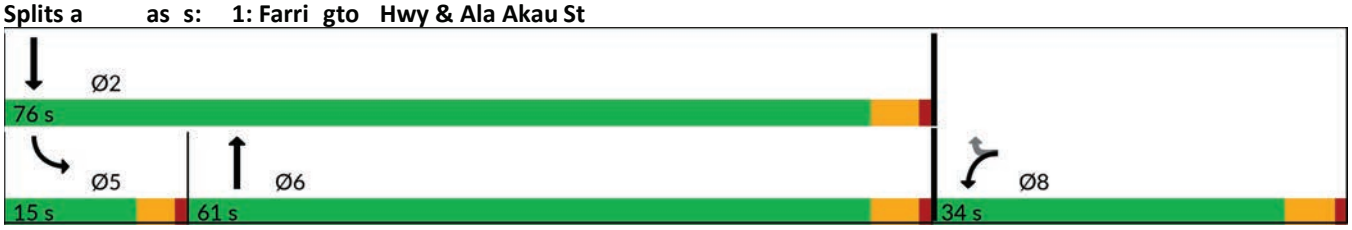
Minor Lane/Major Mvmtn	NBLn1n	EBLn	EBTn	EBRn	WBLn	WBTn	SBLn1n
apanitn (veh/h)n	541n	1583n	-n	-n	1301n	-n	983n
M Lane V/n Ration	0.011n	0.001n	-n	-n	-n	-n	0.172n
M ntrl Dln (s/v)n	11.7n	7.3n	-n	-n	0	-n	9.4n
M Lane LOSn	Bn	An	-n	-n	An	-n	An
M 95th %tile Q(veh)n	0	0	-n	-n	0	-n	0.6n

axe Coxfiguratioxsx						
Traffix Volume (vph)x	173x	86x	723x	95x	60x	768x
Future Volume (vph)x	173x	86x	723x	95x	60x	768x
Ixeal Flow (vphpl)x	1900x	1900x	1900x	1900x	1900x	1900x
axe Wixth (ft)x	10x	10x	10x	10x	10x	10x
Storage xexgth (ft)x	0x	100x		0x	160x	
Storage xaxesx	1x	1x		0x	1x	
Taper xexgth (ft)x	100x				100x	
Satx. Flow (prot)x	1668x	1422x	3240x	0x	1504x	3271x
Flt Permittex	0.950x				0.950x	
Satx. Flow (perm)x	1668x	1366x	3240x	0x	1501x	3271x
Right Turx ox Rex		Yesx		Yesx		
Satx. Flow (RTOR)x		105x	19x			
ixk Speex (mph)x	25x		25x			25x
ixk Distax e (ft)x	740x		268x			344x
Travel Time (s)x	20.2x		7.3x			9.4x
Coxfl. Pexs. (#/hr)x		23x		5x	5x	
Peak Hour Faxtorx	0.82x	0.82x	0.82x	0.82x	0.82x	0.82x
Heavx Vehixles (%)x	1%x	6%x	2%x	1%x	12%x	3%x
Sharex xaxe Traffix (%)x						
axe Group Flow (vph)x	211x	105x	998x	0x	73x	937x
Turx Txpex	Protx	Permx	NAx		Protx	NAx
Protextex Phasesx	8x		6x		5x	2x
Permittex Phasesx		8x				
Detextor Phasex	8x	8x	6x		5x	2x
Switxh Phasex						
Miximum Ixitial (s)x	7.0x	7.0x	7.0x		3.0x	7.0x
Miximum Split (s)x	32.0x	32.0x	38.0x		7.0x	12.0x
Total Split (s)x	34.0x	34.0x	61.0x		15.0x	76.0x
Total Split (%)x	30.9%x	30.9%x	55.5%x		13.6%x	69.1%x
Yellow Time (s)x	4.0x	4.0x	4.0x		3.0x	4.0x
All-Rex Time (s)x	1.0x	1.0x	1.0x		1.0x	1.0x
ost Time Axjust (s)x	0.0x	0.0x	0.0x		0.0x	0.0x
Total xost Time (s)x	5.0x	5.0x	5.0x		4.0x	5.0x
eax/xagx			agx		eax	
eax-xag Optimize?x			Yesx		Yesx	
Rexall Moxex	Noxex	Noxex	Max		Noxex	Max
Axt Effxt Greex (s)x	20.9x	20.9x	60.3x		9.3x	71.3x
Axtuatex g/C Ratiox	0.20x	0.20x	0.59x		0.09x	0.70x
v/x Ratiox	0.62x	0.29x	0.52x		0.54x	0.41x
Coxtrol Delax (s/veh)x	44.8x	8.6x	15.6x		60.6x	8.1x
Queue Delax	0.0x	0.0x	0.0x		0.0x	0.0x
Total Delax (s/veh)x	44.8x	8.6x	15.6x		60.6x	8.1x
OSx	Dx	Ax	Bx		Ex	Ax
Approaxh Delax (s/veh)x	32.8x		15.6x			11.9x
Approaxh xOSx	Cx		Bx			Bx
Queue xexgth 50th (ft)x	127x	0x	238x		53x	152x
Queue xexgth 95th (ft)x	181x	35x	265x		95x	168x
Ixterxal xixk Dist (ft)x	660x		188x			264x

axe Groupx	WBx	WBR	NBTx	NBR	SBx	SBTx
Turx Bax xexgth (ft)x		100x			160x	
Base Capaxitx (vph)x	474x	464x	1916x		162x	2280x
Starvatiox Cap Rexuxtx	0x	0x	0x		0x	0x
Spillbaxk Cap Rexuxtx	0x	0x	0x		0x	0x
Storage Cap Rexuxtx	0x	0x	0x		0x	0x
Rexuxex v/x Ratiox	0.45x	0.23x	0.52x		0.45x	0.41x

Ixtersextiox Summarx			
Area Txpe:x	Otherx		
Cx le xexgth: 110x			
Axtuatex Cx le xexgth: 102.3x			
Natural Cx le: 80x			
Coxtrol Txpe: Semi Axt-Ux oorx			
Maximum v/x Ratio: 0.62x			
Ixtersextiox Sigxal Delax (s/veh): 16.3x		Ixtersextiox xOS: Bx	
Ixtersextiox Capaxitx Utilizatiox 59.0%x		ICU xevel of Servixe Bx	
Axalxsis Periox (mix) 15x			

Splits a as s: 1: Farri gto Hwy & Ala Akau St



Intersention	
Int Delan, s/vehn	1.9n

Movementn	EBLn	EBTn	WBTn	WBRn	SBLn	SBRn
Lane nonfigurationsn		↑	↑		⋎	
Traffin Vol, veh/hn	0n	142n	139n	0n	5n	67n
Future Vol, veh/hn	0n	142n	139n	0n	5n	67n
onflinting Pens, #/hrn	0n	0n	0n	0n	0n	1
Sign nontrol n	Freen	Freen	Freen	Freen	Stopn	Stopn
RT nhan elizen	-n	Nonen	-n	Nonen	-n	Nonen
Storage Lengthn	-n	-n	-n	-n	0n	-n
Veh in Menian Storage, #n	-n	0n	0n	-n	0n	-n
Grane, %n	-n	0n	0n	-n	0n	-n
Peak nour Fantorn	100n	100n	100n	100n	100n	100n
eavn Vehinles, %n	2n	10n	3n	0n	0n	3n
Mvmt Flown	0n	142n	139n	0n	5n	67n

Major/Minorn	Major1		Major2n		Minor2n	
onflinting Flow Alln	-n	0n	-n	0n	281	140n
Stage 1	-n	-n	-n	-n	139n	-n
Stage 2n	-n	-n	-n	-n	142n	-n
ritinal n wn	-n	-n	-n	-n	6.4n	6.23n
ritinal n wn Stg 1	-n	-n	-n	-n	5.4n	-n
ritinal n wn Stg 2n	-n	-n	-n	-n	5.4n	-n
Follow-up n wn	-n	-n	-n	-n	3.5n	3.327n
Pot nap-1 Maneuvern	0n	-n	-n	0n	713n	905n
Stage 1	0n	-n	-n	0n	893n	-n
Stage 2n	0n	-n	-n	0n	890n	-n
Platoon blonken, %n		-n	-n			
Mov nap-1 Maneuvern	-n	-n	-n	-n	713n	904n
Mov nap-2 Maneuvern	-n	-n	-n	-n	713n	-n
Stage 1	-n	-n	-n	-n	893n	-n
Stage 2n	-n	-n	-n	-n	890n	-n

Approanhn	EBn	WBn	SBn
M ntrl Dln, s/vn	0n	0n	9.41
M LOSn			An

Minor Lane/Major Mvmtn	EBTn	WBTn	SBLn1
apanitn (veh/h)n	-n	-n	888n
M Lane V/n Ration	-n	-n	0.081
M ntrl Dln (s/v)n	-n	-n	9.4n
M Lane LOSn	-n	-n	An
M 95th %tile Q(veh)n	-n	-n	0.3n

Intersention	
Int Delan, s/vehn	0.9n

Movementn	EBLn	EBTn	EBRn	WBLn	WBTn	WBRn	NBLn	NBTn	NBRn	SBLn	SBTn	SBRn
Lane nonfigurationsn												
Traffin Vol, veh/hn	34n	101	12n	0n	131	3n	8n	2n	2n	0n	0n	0n
Future Vol, veh/hn	34n	101	12n	0n	131	3n	8n	2n	2n	0n	0n	0n
onflinting Pens, #/hrn	37n	0n	125n	125n	0n	37n	1	0n	1	0n	0n	0n
Sign nontrol n	Freen	Freen	Freen	Freen	Freen	Freen	Stopn	Stopn	Stopn	Stopn	Stopn	Stopn
RT nhan elizen	-n	-n	Nonen	-n	-n	Nonen	-n	-n	Nonen	-n	-n	Nonen
Storage Lengthn	-n	-n	-n	-n	-n	-n	-n	-n	-n	-n	-n	-n
Veh in Menian Storage, #n	-n	0n	-n	-n	0n	-n	-n	0n	-n	-n	0n	-n
Grane, %n	-n	0n	-n	-n	0n	-n	-n	0n	-n	-n	0n	-n
Peak nour Fantorn	100n	100n	100n	100n	100n	100n	100n	100n	100n	100n	100n	100n
eavn Vehinles, %n	6n	10n	8n	0n	3n	0n	0n	0n	50n	0n	0n	0n
Mvmt Flown	34n	101	12n	0n	131	3n	8n	2n	2n	0n	0n	0n

Major/Minorn	Major1			Major2n			Minor1		
onflinting Flow Alln	171	0n	0n	238n	0n	0n	432n	471	233n
Stage 1	-n	-n	-n	-n	-n	-n	300n	300n	-n
Stage 2n	-n	-n	-n	-n	-n	-n	132n	171	-n
ritinal n wn	4.16n	-n	-n	4.1	-n	-n	6.4n	6.5n	6.7n
ritinal n wn Stg 1	-n	-n	-n	-n	-n	-n	5.4n	5.5n	-n
ritinal n wn Stg 2n	-n	-n	-n	-n	-n	-n	5.4n	5.5n	-n
Follow-up n wn	2.254n	-n	-n	2.2n	-n	-n	3.5n	4n	3.75n
Pot nap-1 Maneuvern	1382n	-n	-n	1341	-n	-n	584n	494n	701
Stage 1	-n	-n	-n	-n	-n	-n	756n	669n	-n
Stage 2n	-n	-n	-n	-n	-n	-n	899n	761	-n
Platoon blonken, %n		-n	-n		-n	-n			
Mov nap-1 Maneuvern	1382n	-n	-n	1181	-n	-n	501	0n	617n
Mov nap-2 Maneuvern	-n	-n	-n	-n	-n	-n	501	0n	-n
Stage 1	-n	-n	-n	-n	-n	-n	649n	0n	-n
Stage 2n	-n	-n	-n	-n	-n	-n	898n	0n	-n

Approanhn	EBn	WBn	NBn
M ntrl Dln, s/vn	1.77n	0n	
M LOSn			-n

Minor Lane/Major Mvmtn	NBLn1	EBLn	EBTn	EBRn	WBLn	WBTn	WBRn
apanitn (veh/h)n	-n	408n	-n	-n	1181	-n	-n
M Lane V/n Ration	-n	0.025n	-n	-n	-n	-n	-n
M ntrl Dln (s/v)n	-n	7.7n	0n	-n	0n	-n	-n
M Lane LOSn	-n	An	An	-n	An	-n	-n
M 95th %tile Q(veh)n	-n	0.1	-n	-n	0n	-n	-n

Intersention	
Int Delan, s/vehn	3.5n

Movementn	EBLn	EBTn	EBRn	WBLn	WBTn	WBRn	NBLn	NBTn	NBRn	SBLn	SBTn	SBRn
Lane nonfigurationsn												
Traffin Vol, veh/hn	4n	87n	9n	0n	50n	0n	9n	0n	3n	2n	0n	71
Future Vol, veh/hn	4n	87n	9n	0n	50n	0n	9n	0n	3n	2n	0n	71
onflinting Pens, #/hrn	5n	0n	51	51	0n	0n	14n	0n	6n	6n	0n	14n
Sign nontrol n	Freen	Freen	Freen	Freen	Freen	Freen	Stopn	Stopn	Stopn	Stopn	Stopn	Stopn
RT nhan elizen	-n	-n	Nonen	-n	-n	Nonen	-n	-n	Nonen	-n	-n	Nonen
Storage Lengthn	-n	-n	-n	-n	-n	-n	0n	-n	-n	-n	-n	-n
Veh in Menian Storage, #n	-n	0n	-n	-n	0n	-n	-n	0n	-n	-n	0n	-n
Grane, %n	-n	0n	-n	-n	0n	-n	-n	0n	-n	-n	0n	-n
Peak nour Fantorn	100n	100n	100n	100n	100n	100n	100n	100n	100n	100n	100n	100n
eavn Vehinles, %n	0n	4n	0n	0n	0n	0n	0n	0n	33n	0n	0n	2n
Mvmt Flown	4n	87n	9n	0n	50n	0n	9n	0n	3n	2n	0n	71

Major/Minorn	Major1			Major2n			Minor1			Minor2n		
onflinting Flow Alln	55n	0n	0n	147n	0n	0n	215n	-n	149n	156n	210n	69n
Stage 1	-n	-n	-n	-n	-n	-n	151	-n	-n	55n	55n	-n
Stage 2n	-n	-n	-n	-n	-n	-n	64n	-n	-n	101	155n	-n
ritinal n wn	4.1	-n	-n	4.1	-n	-n	7.1	-n	6.53n	7.1	6.5n	6.22n
ritinal n wn Stg 1	-n	-n	-n	-n	-n	-n	6.1	-n	-n	6.1	5.5n	-n
ritinal n wn Stg 2n	-n	-n	-n	-n	-n	-n	6.1	-n	-n	6.1	5.5n	-n
Follow-up n wn	2.2n	-n	-n	2.2n	-n	-n	3.5n	-n	3.597n	3.5n	4n	3.318n
Pot nap-1 Maneuvern	1563n	-n	-n	1447n	-n	0n	746n	0n	823n	815n	691	994n
Stage 1	-n	-n	-n	-n	-n	0n	857n	0n	-n	962n	853n	-n
Stage 2n	-n	-n	-n	-n	-n	0n	952n	0n	-n	910n	773n	-n
Platoon blonken, %n		-n	-n		-n							
Mov nap-1 Maneuvern	1556n	-n	-n	1377n	-n	-n	648n	-n	778n	801	652n	976n
Mov nap-2 Maneuvern	-n	-n	-n	-n	-n	-n	648n	-n	-n	801	652n	-n
Stage 1	-n	-n	-n	-n	-n	-n	813n	-n	-n	958n	849n	-n
Stage 2n	-n	-n	-n	-n	-n	-n	871	-n	-n	899n	734n	-n

Approanhn	EBn	WBn	NBn	SBn
M ntrl Dln, s/vn	0.29n	0n	10.42n	9.01
M LOSn			Bn	An

Minor Lane/Major Mvmtn	NBLn1	EBLn	EBTn	EBRn	WBLn	WBTn	SBLn1
apanitn (veh/h)n	676n	1556n	-n	-n	1377n	-n	970n
M Lane V/n Ration	0.018n	0.003n	-n	-n	-n	-n	0.075n
M ntrl Dln (s/v)n	10.4n	7.3n	-n	-n	0n	-n	9n
M Lane LOSn	Bn	An	-n	-n	An	-n	An
M 95th %tile Q(veh)n	0.1	0n	-n	-n	0n	-n	0.2n

TRANSPORTATION ASSESSMENT REPORT

FOR THE PROPOSED

KAMAILE ACADEMY EXPANSION

WAIANAE, OAHU, HAWAI`I

TAX MAP KEY: 8-5-002: 037 & 053

APPENDIX C

CAPACITY ANALYSIS WORKSHEETS

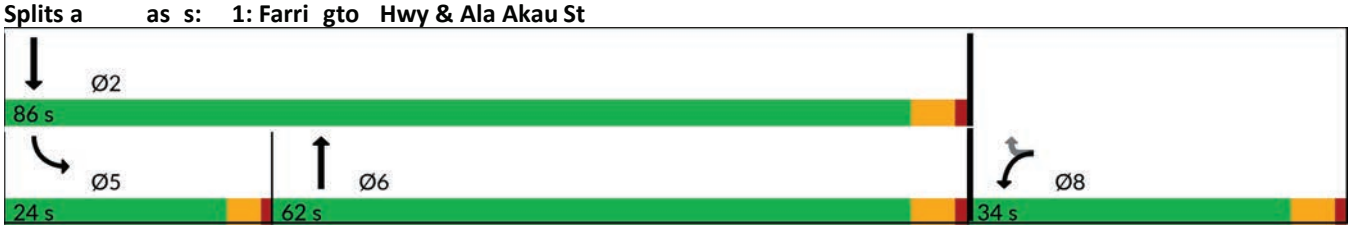
PEAK HOUR TRAFFIC CONDITIONS WITHOUT PROJECT

a0e Co0figuratio0s0						
Traffi0 Volume (vph)0	1910	880	6890	2410	1270	9110
Future Volume (vph)0	1910	880	6890	2410	1270	9110
I0eal Flow (vphpl)0	190	190	190	190	190	190
a0e Wi0th (ft)0	10	10	10	10	10	10
Storage 0e0gth (ft)0		10			160	
Storage 0a0es0	10	10			10	
Taper 0e0gth (ft)0	10				10	
Sat0. Flow (prot)0	16520	14630	31210		1620	33030
Flt Permitte0	.950				.950	
Sat0. Flow (perm)0	16520	14020	31210		16140	33030
Right Tur0 o0 Re0		Yes0		Yes0		
Sat0. Flow (RTOR)0		910	550			
i0k Spee0 (mph)0	250		250			250
i0k Dista0 e (ft)0	740		2680			3440
Travel Time (s)0	20.20		7.30			9.40
Co0fl. Pe0s. (#/hr)0		230		90	90	
Co0fl. Bikes (#/hr)0				10		
Peak Hour Fa0tor0	.870	.870	.870	.870	.870	.870
Heav0 Vehi0les (%)0	2%0	3%0	3%0	2%0	4%0	2%0
Share0 0a0e Traffi0 (%)0						
a0e Group Flow (vph)0	220	1010	10690		1460	10470
Tur0 T0pe0	Prot0	Perm0	NA0		Prot0	NA0
Prote0te0 Phases0	80		60		50	20
Permitte0 Phases0		80				
Dete0tor Phase0	80	80	60		50	20
Swit0h Phase0						
Mi0imum I0itial (s)0	7.0	7.0	7.0		3.0	7.0
Mi0imum Split (s)0	32.0	32.0	38.0		7.0	12.0
Total Split (s)0	34.0	34.0	62.0		24.0	86.0
Total Split (%)0	28.3%0	28.3%0	51.7%0		20.0%0	71.7%0
Yellow Time (s)0	4.0	4.0	4.0		3.0	4.0
All-Re0 Time (s)0	1.0	1.0	1.0		1.0	1.0
ost Time A0just (s)0	.0	.0	.0		.0	.0
Total 0ost Time (s)0	5.0	5.0	5.0		4.0	5.0
ea0/0ag0			ag0		ea0	
ea0-0ag Optimize?0			Yes0		Yes0	
Re0all Mo0e0	No0e0	No0e0	Max0		No0e0	Max0
A0t Eff0t Gree0 (s)0	22.0	22.0	62.20		15.0	81.30
A0tuate0 g/C Ratio0	.190	.190	.550		.130	.720
v/0 Ratio0	.690	.290	.610		.680	.440
Co0trol Dela0 (s/veh)0	53.60	11.70	20.10		63.50	8.0
Queue Dela0	.0	.0	.0		.0	.0
Total Dela0 (s/veh)0	53.60	11.70	20.10		63.50	8.0
OS0	D0	B0	C0		E0	A0
Approa0h Dela0 (s/veh)0	40.40		20.10			14.80
Approa0h 0OS0	D0		C0			B0
Queue 0e0gth 50th (ft)0	1520	60	2910		1110	1760
Queue 0e0gth 95th (ft)0	2270	490	3830		1720	2160

a0e Group0	WB0	WBR	NBT0	NBR	SB0	SBT0
I0ter0al 0i0k Dist (ft)0	660		1880			2640
Tur0 Ba0 0e0gth (ft)0		10			160	
Base Capa0it0 (vph)0	4240	4270	17390		2860	23690
Starvatio0 Cap Re0u0t0						
Spillba0k Cap Re0u0t0						
Storage Cap Re0u0t0						
Re0u0e0 v/0 Ratio0	.520	.240	.610		.510	.440

I0terse0tio0 Summar0			
Area T0pe:0	Other0		
C0 le 0e0gth: 120			
A0tuate0 C0 le 0e0gth: 113.30			
Natural C0 le: 80			
Co0trol T0pe: Semi A0t-U0 oor0			
Maximum v/0 Ratio: 0.690			
I0terse0tio0 Sig0al Dela0 (s/veh): 20.20		I0terse0tio0 0OS: C0	
I0terse0tio0 Capa0it0 Utilizatio0 63.2%0		ICU 0evel of Servi0e B0	
A0al0sis Perio0 (mi0) 150			

Splits a as s: 1: Farri gto Hwy & Ala Akau St



IntersePtionP						
Int DelaP, s/vehP	0.6P					
Lane PonfigurationsP		↑	↑		Y	
TraffiP Vol, veh/hP	0P	330P	237P	0P	2P	34P
Future Vol, veh/hP	0P	330P	237P	0P	2P	34P
onfliPting PePs, #/hrP	0P	0P	0P	0P	2P	1P
Sign Pontrol P	FreeP	FreeP	FreeP	FreeP	StopP	StopP
RT PhannelizeP	-P	NoneP	-P	NoneP	-P	NoneP
Storage LengthP	-P	-P	-P	-P	0P	-P
Veh in MePian Storage, #P	-P	0P	0P	-P	0P	-P
GraPe, %P	-P	0P	0P	-P	0P	-P
eak P our FaPtorP	100P	100P	100P	100P	100P	100P
eav VehiPles, %P	2P	2P	1P	0P	0P	10P
Mvmt FlowP	0P	330P	237P	0P	2P	34P

Major/MinorP	Major1P		Major2P		Minor2P	
onfliPting Flow AllP	-P	0P	-P	0P	569P	238P
Stage 1P	-P	-P	-P	-P	237P	-P
Stage 2P	-P	-P	-P	-P	332P	-P
ritiPal P wP	-P	-P	-P	-P	6.4P	6.3P
ritiPal P wP Stg 1P	-P	-P	-P	-P	5.4P	-P
ritiPal P wP Stg 2P	-P	-P	-P	-P	5.4P	-P
Follow-up P wP	-P	-P	-P	-P	3.5P	3.39P
ot Pap-1 ManeuverP	0P	-P	-P	0P	487P	782P
Stage 1P	0P	-P	-P	0P	807P	-P
Stage 2P	0P	-P	-P	0P	731P	-P
latoon bloPkeP, %P		-P	-P			
Mov Pap-1 ManeuverP	-P	-P	-P	-P	486P	781P
Mov Pap-2 ManeuverP	-P	-P	-P	-P	486P	-P
Stage 1P	-P	-P	-P	-P	807P	-P
Stage 2P	-P	-P	-P	-P	730P	-P

ApproaPhP	EBP	WBP	SBP
M Ptrl DlP, s/v	0P	0P	10P
M LOSP			BP

Minor Lane/Major MvmtP	EBTP	WBTP	SBLn1P
apaPitP (veh/h)P	-P	-P	755P
M Lane V/P RatioP	-P	-P	0.048P
M Ptrl DlP (s/v)P	-P	-P	10P
M Lane LOSP	-P	-P	BP
M 95th %tile Q(veh)P	-P	-P	0.1P

IntersePtionP	
Int DelaP, s/vehP	1.4P

MovementP	EBLP	EBTP	EBRP	WBLP	WBTP	WBRP	NBLP	NBTP	NBRP	SBLP	SBTP	SBRP
Lane PonfigurationsP												
TraffiP Vol, veh/hP	89P	242P	1P	1P	231P	2P	6P	0P	0P	0P	0P	0P
Future Vol, veh/hP	89P	242P	1P	1P	231P	2P	6P	0P	0P	0P	0P	0P
onfliPting PePs, #/hrP	37P	0P	40P	40P	0P	37P	1P	0P	2P	2P	0P	1P
Sign Pontrol P	FreeP	FreeP	FreeP	FreeP	FreeP	FreeP	StopP	StopP	StopP	StopP	StopP	StopP
RT PhannelizeP	-P	-P	NoneP	-P	-P	NoneP	-P	-P	NoneP	-P	-P	NoneP
Storage LengthP	-P	-P	-P	-P	-P	-P	-P	-P	-P	-P	-P	-P
Veh in MePian Storage, #P	-P	0P	-P	-P	0P	-P	-P	0P	-P	-P	0P	-P
GraPe, %P	-P	0P	-P	-P	0P	-P	-P	0P	-P	-P	0P	-P
eak P our FaPtorP	100P	100P	100P	100P	100P	100P	100P	100P	100P	100P	100P	100P
eav VehiPles, %P	4P	1P	0P	0P	1P	0P	0P	0P	0P	0P	0P	0P
Mvmt FlowP	89P	242P	1P	1P	231P	2P	6P	0P	0P	0P	0P	0P

Major/MinorP	Major1P			Major2P			Minor1P		
onfliPting Flow AllP	270P	0P	0P	283P	0P	0P	695P	733P	285P
Stage 1P	-P	-P	-P	-P	-P	-P	461P	461P	-P
Stage 2P	-P	-P	-P	-P	-P	-P	234P	272P	-P
ritiPal P wP	4.14P	-P	-P	4.1P	-P	-P	6.4P	6.5P	6.2P
ritiPal P wP Stg 1P	-P	-P	-P	-P	-P	-P	5.4P	5.5P	-P
ritiPal P wP Stg 2P	-P	-P	-P	-P	-P	-P	5.4P	5.5P	-P
Follow-up P wP	2.236P	-P	-P	2.2P	-P	-P	3.5P	4P	3.3P
ot Pap-1 ManeuverP	1282P	-P	-P	1291P	-P	-P	412P	350P	759P
Stage 1P	-P	-P	-P	-P	-P	-P	640P	569P	-P
Stage 2P	-P	-P	-P	-P	-P	-P	810P	688P	-P
latoon bloPkeP, %P		-P	-P		-P	-P			
Mov Pap-1 ManeuverP	1282P	-P	-P	1242P	-P	-P	363P	0P	729P
Mov Pap-2 ManeuverP	-P	-P	-P	-P	-P	-P	363P	0P	-P
Stage 1P	-P	-P	-P	-P	-P	-P	566P	0P	-P
Stage 2P	-P	-P	-P	-P	-P	-P	808P	0P	-P

ApproaPhP	EBP	WBP	NBP
M Ptrl DlP, s/v	2.15P	0.03P	15.07P
M LOSP			

Minor Lane/Major MvmtP	NBLn1P	EBLP	EBTP	EBRP	WBLP	WBTP	WBRP
apaPitP (veh/h)P	363P	482P	-P	-P	8P	-P	-P
M Lane V/P RatioP	0.017P	0.069P	-P	-P	0.001P	-P	-P
M Ptrl DlP (s/v)P	15.1P	8P	0P	-P	7.9P	0P	-P
M Lane LOSP		AP	AP	-P	AP	AP	-P
M 95th %tile Q(veh)P	0.1P	0.2P	-P	-P	0P	-P	-P

IntersePtionP	
Int DelaP, s/vehP	6.6P

MovementP	EBLP	EBTP	EBRP	WBLP	WBTP	WBRP	NBLP	NBTP	NBRP	SBLP	SBTP	SBRP
Lane PonfigurationsP												
TraffiP Vol, veh/hP	2P	253P	4P	0P	40P	0P	6P	0P	0P	13P	0P	185P
Future Vol, veh/hP	2P	253P	4P	0P	40P	0P	6P	0P	0P	13P	0P	185P
onfliPting PePs, #/hrP	268P	0P	21P	21P	0P	3P	6P	0P	5P	5P	0P	6P
Sign Pontrol P	FreeP	FreeP	FreeP	FreeP	FreeP	FreeP	StopP	StopP	StopP	StopP	StopP	StopP
RT PhannelizeP	-P	-P	NoneP	-P	-P	NoneP	-P	-P	NoneP	-P	-P	NoneP
Storage LengthP	-P	-P	-P	-P	-P	-P	-P	-P	-P	-P	-P	-P
Veh in MePian Storage, #P	-P	0P	-P	-P	0P	-P	-P	0P	-P	-P	0P	-P
GraPe, %P	-P	0P	-P	-P	0P	-P	-P	0P	-P	-P	0P	-P
eak P our FaPtorP	100P	100P	100P	100P	100P	100P	100P	100P	100P	100P	100P	100P
eav VehiPles, %P	0P	2P	0P	0P	3P	0P	0P	0P	0P	18P	0P	1P
Mvmt FlowP	2P	253P	4P	0P	40P	0P	6P	0P	0P	13P	0P	185P

Major/MinorP	Major1P			Major2P			Minor1P			Minor2P		
onfliPting Flow AllP	308P	0P	0P	278P	0P	0P	326P	588P	281P	570P	590P	314P
Stage 1P	-P	-P	-P	-P	-P	-P	280P	280P	-P	308P	308P	-P
Stage 2P	-P	-P	-P	-P	-P	-P	46P	308P	-P	262P	282P	-P
ritiPal P wP	4.1P	-P	-P	4.1P	-P	-P	7.1P	6.5P	6.2P	7.28P	6.5P	6.21P
ritiPal P wP Stg 1P	-P	-P	-P	-P	-P	-P	6.1P	5.5P	-P	6.28P	5.5P	-P
ritiPal P wP Stg 2P	-P	-P	-P	-P	-P	-P	6.1P	5.5P	-P	6.28P	5.5P	-P
Follow-up P wP	2.2P	-P	-P	2.2P	-P	-P	3.5P	4P	3.3P	3.662P	4P	3.309P
ot Pap-1 ManeuverP	1264P	-P	-P	1296P	-P	0P	631P	424P	763P	409P	423P	729P
Stage 1P	-P	-P	-P	-P	-P	0P	731P	683P	-P	669P	664P	-P
Stage 2P	-P	-P	-P	-P	-P	0P	973P	664P	-P	709P	681P	-P
latoon bloPkeP, %P		-P	-P		-P							
Mov Pap-1 ManeuverP	941P	-P	-P	1270P	-P	-P	403P	309P	744P	302P	308P	540P
Mov Pap-2 ManeuverP	-P	-P	-P	-P	-P	-P	403P	309P	-P	302P	308P	-P
Stage 1P	-P	-P	-P	-P	-P	-P	715P	667P	-P	498P	494P	-P
Stage 2P	-P	-P	-P	-P	-P	-P	636P	494P	-P	704P	666P	-P

ApproaPhP	EBP	WBP	NBP	SBP
M Ptrl DlP, s/v	0.07P	0P	14.07P	16.35P
M LOSP			BP	

Minor Lane/Major MvmtP	NBLn1P	EBLP	EBTP	EBRP	WBLP	WBTP	SBLn1P
apaPitP (veh/h)P	403P	941P	-P	-P	1270P	-P	513P
M Lane V/P RatioP	0.015P	0.002P	-P	-P	-P	-P	0.386P
M Ptrl DlP (s/v)P	14.1P	8.8P	-P	-P	0P	-P	16.4P
M Lane LOSP	BP	AP	-P	-P	AP	-P	
M 95th %tile Q(veh)P	0P	0P	-P	-P	0P	-P	1.8P

IntersePtionP	
Int DelaP, s/vehP	4.8P

Lane PonfigurationsP						
TraffiP Vol, veh/hP	187P	65P	35P	9P	0P	0P
Future Vol, veh/hP	187P	65P	35P	9P	0P	0P
onfliPting PePs, #/hrP	1P	0P	0P	1P	0P	0P
Sign Pontrol P	FreeP	FreeP	FreeP	FreeP	StopP	StopP
RT PhannelizeP	-P	NoneP	-P	NoneP	-P	NoneP
Storage LengthP	-P	-P	-P	-P	-P	0P
Veh in MePian Storage, #P	-P	0P	0P	-P	0P	-P
GraPe, %P	-P	0P	0P	-P	0P	-P
eak P our FaPtorP	100P	100P	100P	100P	100P	100P
eav VehiPles, %P	3P	2P	3P	0P	0P	0P
Mvmt FlowP	187P	65P	35P	9P	0P	0P

Major/MinorP	Major1P		Major2P		Minor2P	
onfliPting Flow AllP	45P	0P	-P	0P	-P	41P
Stage 1P	-P	-P	-P	-P	-P	-P
Stage 2P	-P	-P	-P	-P	-P	-P
ritiPal P wP	4.13P	-P	-P	-P	-P	6.2P
ritiPal P wP Stg 1P	-P	-P	-P	-P	-P	-P
ritiPal P wP Stg 2P	-P	-P	-P	-P	-P	-P
Follow-up P wP	2.227P	-P	-P	-P	-P	3.3P
ot Pap-1 ManeuverP	1557P	-P	-P	-P	0P	1036P
Stage 1P	-P	-P	-P	-P	0P	-P
Stage 2P	-P	-P	-P	-P	0P	-P
latoon bloPkeP, %P		-P	-P	-P		
Mov Pap-1 ManeuverP	1555P	-P	-P	-P	-P	1035P
Mov Pap-2 ManeuverP	-P	-P	-P	-P	-P	-P
Stage 1P	-P	-P	-P	-P	-P	-P
Stage 2P	-P	-P	-P	-P	-P	-P

ApproaPhP	EBP	WBP	SBP
M Ptrl DlP, s/v	5.66P	0P	0P
M LOSP			AP

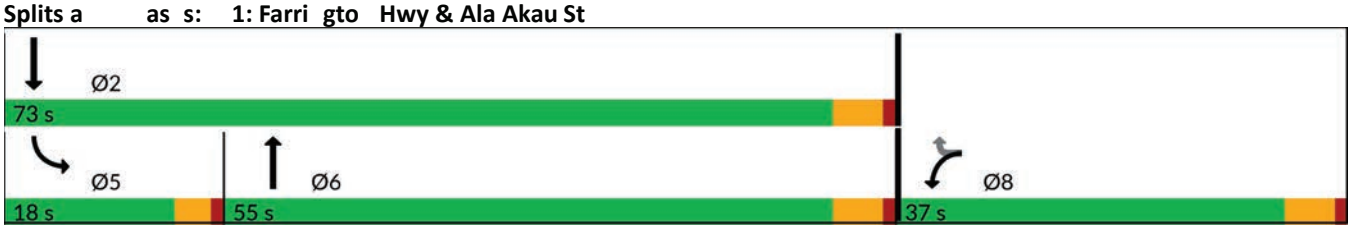
Minor Lane/Major MvmtP	EBLP	EBTP	WBTP	WBRPSBLn1P	
apaPitP (veh/h)P	1336P	-P	-P	-P	-P
M Lane V/P RatioP	0.12P	-P	-P	-P	-P
M Ptrl DlP (s/v)P	7.6P	0P	-P	-P	0P
M Lane LOSP	AP	AP	-P	-P	AP
M 95th %tile Q(veh)P	0.4P	-P	-P	-P	-P

a0e Co0figuratio0s0						
Traffi0 Volume (vph)0	2470	1230	740	130	820	7860
Future Volume (vph)0	2470	1230	740	130	820	7860
I0eal Flow (vphpl)0	190	190	190	190	190	190
a0e Wi0th (ft)0	10	10	10	10	10	10
Storage 0e0gth (ft)0		10			160	
Storage 0a0es0	10	10			10	
Taper 0e0gth (ft)0	10				10	
Sat0. Flow (prot)0	16680	14220	32220		15040	32710
Flt Permitte0	.950				.950	
Sat0. Flow (perm)0	16680	13660	32220		15010	32710
Right Tur0 o0 Re0		Yes0		Yes0		
Sat0. Flow (RTOR)0		1150	240			
i0k Spee0 (mph)0	250		250			250
i0k Dista0 e (ft)0	740		2680			3440
Travel Time (s)0	20.20		7.30			9.40
Co0fl. Pe0s. (#/hr)0		230		50	50	
Peak Hour Fa0tor0	.820	.820	.820	.820	.820	.820
Heav0 Vehi0les (%)0	1%0	6%0	2%0	1%0	12%0	3%0
Share0 0a0e Traffi0 (%)0						
a0e Group Flow (vph)0	3010	150	10610		10	9590
Tur0 T0pe0	Prot0	Perm0	NA0		Prot0	NA0
Prote0te0 Phases0	80		60		50	20
Permitte0 Phases0		80				
Dete0tor Phase0	80	80	60		50	20
Swit0h Phase0						
Mi0imum I0itial (s)0	7.0	7.0	7.0		3.0	7.0
Mi0imum Split (s)0	32.0	32.0	38.0		7.0	12.0
Total Split (s)0	37.0	37.0	55.0		18.0	73.0
Total Split (%)0	33.6%0	33.6%0	50.0%0		16.4%0	66.4%0
Yellow Time (s)0	4.0	4.0	4.0		3.0	4.0
All-Re0 Time (s)0	1.0	1.0	1.0		1.0	1.0
ost Time A0just (s)0	.0	.0	.0		.0	.0
Total 0ost Time (s)0	5.0	5.0	5.0		4.0	5.0
ea0/0ag0			ag0		ea0	
ea0-0ag Optimize?0			Yes0		Yes0	
Re0all Mo0e0	No0e0	No0e0	Max0		No0e0	Max0
A0t Eff0t Gree0 (s)0	23.80	23.80	55.40		11.30	68.20
A0tuate0 g/C Ratio0	.230	.230	.540		.110	.670
v/0 Ratio0	.770	.370	.60		.60	.440
Co0trol Dela0 (s/veh)0	50.50	12.20	19.90		59.50	9.50
Queue Dela0	.0	.0	.0		.0	.0
Total Dela0 (s/veh)0	50.50	12.20	19.90		59.50	9.50
OS0	D0	B0	B0		E0	A0
Approa0h Dela0 (s/veh)0	37.70		19.90			14.20
Approa0h 0OS0	D0		B0			B0
Queue 0e0gth 50th (ft)0	1850	190	270		710	1570
Queue 0e0gth 95th (ft)0	2480	580	3360		1220	2010
I0ter0al 0i0k Dist (ft)0	660		1880			2640

a0e Group0	WB	WBR0	NBT0	NBR0	SB	SBT0
Tur0 Ba0 0e0gth (ft)0		10			160	
Base Capa0it0 (vph)0	5240	5080	17580		2060	21860
Starvatio0 Cap Re0u0t0						
Spillba0k Cap Re0u0t0						
Storage Cap Re0u0t0						
Re0u0e0 v/0 Ratio0	.570	.30	.60		.490	.440

I0terse0tio0 Summar0			
Area T0pe:0	Other0		
C0 le 0e0gth: 110			
A0tuate0 C0 le 0e0gth: 102.10			
Natural C0 le: 80			
Co0trol T0pe: Semi A0t-U0 oor0			
Maximum v/0 Ratio: 0.770			
I0terse0tio0 Sig0al Dela0 (s/veh): 20.70		I0terse0tio0 0OS: C0	
I0terse0tio0 Capa0it0 Utilizatio0 62.1%0		ICU 0evel of Servi0e B	
A0al0sis Perio0 (mi0) 150			

Splits a as s: 1: Farri gto Hwy & Ala Akau St



IntersePtionP						
Int DelaP, s/vehP	2.4P					
Lane PonfigurationsP		↑	↑		Y	
TraffiP Vol, veh/hP	0P	199P	197P	0P	5P	119P
Future Vol, veh/hP	0P	199P	197P	0P	5P	119P
onfliPting PePs, #/hrP	0P	0P	0P	0P	0P	1P
Sign Pontrol P	FreeP	FreeP	FreeP	FreeP	StopP	StopP
RT PhannelizeP	-P	NoneP	-P	NoneP	-P	NoneP
Storage LengthP	-P	-P	-P	-P	0P	-P
Veh in MePian Storage, #P	-P	0P	0P	-P	0P	-P
GraPe, %P	-P	0P	0P	-P	0P	-P
eak P our FaPtorP	100P	100P	100P	100P	100P	100P
eav VehiPles, %P	2P	10P	3P	0P	0P	3P
Mvmt FlowP	0P	199P	197P	0P	5P	119P

Major/MinorP	Major1P		Major2P		Minor2P	
onfliPting Flow AllP	-P	0P	-P	0P	396P	198P
Stage 1P	-P	-P	-P	-P	197P	-P
Stage 2P	-P	-P	-P	-P	199P	-P
ritiPal P wP	-P	-P	-P	-P	6.4P	6.23P
ritiPal P wP Stg 1P	-P	-P	-P	-P	5.4P	-P
ritiPal P wP Stg 2P	-P	-P	-P	-P	5.4P	-P
Follow-up P wP	-P	-P	-P	-P	3.5P	3.327P
ot Pap-1 ManeuverP	0P	-P	-P	0P	613P	841P
Stage 1P	0P	-P	-P	0P	841P	-P
Stage 2P	0P	-P	-P	0P	839P	-P
latoon bloPkeP, %P		-P	-P			
Mov Pap-1 ManeuverP	-P	-P	-P	-P	613P	840P
Mov Pap-2 ManeuverP	-P	-P	-P	-P	613P	-P
Stage 1P	-P	-P	-P	-P	841P	-P
Stage 2P	-P	-P	-P	-P	839P	-P

ApproaPhP	EBP	WBP	SBP
M Ptrl DlP, s/v	0P	0P	10.12P
M LOSP			BP

Minor Lane/Major MvmtP	EBTP	WBTP	SBLn1P
apaPitP (veh/h)P	-P	-P	827P
M Lane V/P RatioP	-P	-P	0.15P
M Ptrl DlP (s/v)P	-P	-P	10.1P
M Lane LOSP	-P	-P	BP
M 95th %tile Q(veh)P	-P	-P	0.5P

IntersePtionP	
Int DelaP, s/vehP	1P

MovementP	EBLP	EBTP	EBRP	WBLP	WBTP	WBRP	NBLP	NBTP	NBRP	SBLP	SBTP	SBRP
Lane PonfigurationsP												
TraffiP Vol, veh/hP	55P	141P	12P	0P	189P	5P	8P	2P	2P	0P	0P	0P
Future Vol, veh/hP	55P	141P	12P	0P	189P	5P	8P	2P	2P	0P	0P	0P
onfliPting PePs, #/hrP	37P	0P	125P	125P	0P	37P	1P	0P	1P	0P	0P	0P
Sign Pontrol P	FreeP	FreeP	FreeP	FreeP	FreeP	FreeP	StopP	StopP	StopP	StopP	StopP	StopP
RT PhannelizeP	-P	-P	NoneP	-P	-P	NoneP	-P	-P	NoneP	-P	-P	NoneP
Storage LengthP	-P	-P	-P	-P	-P	-P	-P	-P	-P	-P	-P	-P
Veh in MePian Storage, #P	-P	0P	-P	-P	0P	-P	-P	0P	-P	-P	0P	-P
GraPe, %P	-P	0P	-P	-P	0P	-P	-P	0P	-P	-P	0P	-P
eak P our FaPtorP	100P	100P	100P	100P	100P	100P	100P	100P	100P	100P	100P	100P
eav VehiPles, %P	6P	10P	8P	0P	3P	0P	0P	0P	50P	0P	0P	0P
Mvmt FlowP	55P	141P	12P	0P	189P	5P	8P	2P	2P	0P	0P	0P

Major/MinorP	Major1P			Major2P			Minor1P		
onfliPting Flow AllP	231P	0P	0P	278P	0P	0P	572P	613P	273P
Stage 1P	-P	-P	-P	-P	-P	-P	382P	382P	-P
Stage 2P	-P	-P	-P	-P	-P	-P	190P	231P	-P
ritiPal P wP	4.16P	-P	-P	4.1P	-P	-P	6.4P	6.5P	6.7P
ritiPal P wP Stg 1P	-P	-P	-P	-P	-P	-P	5.4P	5.5P	-P
ritiPal P wP Stg 2P	-P	-P	-P	-P	-P	-P	5.4P	5.5P	-P
Follow-up P wP	2.254P	-P	-P	2.2P	-P	-P	3.5P	4P	3.75P
ot Pap-1 ManeuverP	1314P	-P	-P	1296P	-P	-P	485P	410P	664P
Stage 1P	-P	-P	-P	-P	-P	-P	694P	616P	-P
Stage 2P	-P	-P	-P	-P	-P	-P	847P	717P	-P
latoon bloPkeP, %P		-P	-P		-P	-P			
Mov Pap-1 ManeuverP	1314P	-P	-P	1142P	-P	-P	407P	0P	584P
Mov Pap-2 ManeuverP	-P	-P	-P	-P	-P	-P	407P	0P	-P
Stage 1P	-P	-P	-P	-P	-P	-P	584P	0P	-P
Stage 2P	-P	-P	-P	-P	-P	-P	846P	0P	-P

ApproaPhP	EBP	WBP	NBP
M Ptrl DlP, s/v	2.08P	0P	
M LOSP			-P

Minor Lane/Major MvmtP	NBLn1P	EBLP	EBTP	EBRP	WBLP	WBTP	WBRP
apaPitP (veh/h)P	-P	469P	-P	-P	1142P	-P	-P
M Lane V/P RatioP	-P	0.042P	-P	-P	-P	-P	-P
M Ptrl DlP (s/v)P	-P	7.9P	0P	-P	0P	-P	-P
M Lane LOSP	-P	AP	AP	-P	AP	-P	-P
M 95th %tile Q(veh)P	-P	0.1P	-P	-P	0P	-P	-P

IntersePtionP	
Int DelaP, s/vehP	4.1P

MovementP	EBLP	EBTP	EBRP	WBLP	WBTP	WBRP	NBLP	NBTP	NBRP	SBLP	SBTP	SBRP
Lane PonfigurationsP												
TraffiP Vol, veh/hP	6P	123P	9P	0P	52P	0P	9P	0P	3P	3P	0P	124P
Future Vol, veh/hP	6P	123P	9P	0P	52P	0P	9P	0P	3P	3P	0P	124P
onfliPting PePs, #/hrP	5P	0P	51P	51P	0P	0P	14P	0P	6P	6P	0P	14P
Sign Pontrol P	FreeP	FreeP	FreeP	FreeP	FreeP	FreeP	StopP	StopP	StopP	StopP	StopP	StopP
RT PhannelizeP	-P	-P	NoneP	-P	-P	NoneP	-P	-P	NoneP	-P	-P	NoneP
Storage LengthP	-P	-P	-P	-P	-P	-P	0P	-P	-P	-P	-P	-P
Veh in MePian Storage, #P	-P	0P	-P	-P	0P	-P	-P	0P	-P	-P	0P	-P
GraPe, %P	-P	0P	-P	-P	0P	-P	-P	0P	-P	-P	0P	-P
eak P our FaPtorP	100P	100P	100P	100P	100P	100P	100P	100P	100P	100P	100P	100P
eav VehiPles, %P	0P	4P	0P	0P	0P	0P	0P	0P	33P	0P	0P	2P
Mvmt FlowP	6P	123P	9P	0P	52P	0P	9P	0P	3P	3P	0P	124P

Major/MinorP	Major1P			Major2P			Minor1P			Minor2P		
onfliPting Flow AllP	57P	0P	0P	183P	0P	0P	257P	-P	185P	198P	252P	71P
Stage 1P	-P	-P	-P	-P	-P	-P	191P	-P	-P	57P	57P	-P
Stage 2P	-P	-P	-P	-P	-P	-P	66P	-P	-P	141P	195P	-P
ritiPal P wP	4.1P	-P	-P	4.1P	-P	-P	7.1P	-P	6.53P	7.1P	6.5P	6.22P
ritiPal P wP Stg 1P	-P	-P	-P	-P	-P	-P	6.1P	-P	-P	6.1P	5.5P	-P
ritiPal P wP Stg 2P	-P	-P	-P	-P	-P	-P	6.1P	-P	-P	6.1P	5.5P	-P
Follow-up P wP	2.2P	-P	-P	2.2P	-P	-P	3.5P	-P	3.597P	3.5P	4P	3.318P
ot Pap-1 ManeuverP	1560P	-P	-P	1404P	-P	0P	701P	0P	784P	765P	655P	991P
Stage 1P	-P	-P	-P	-P	-P	0P	816P	0P	-P	960P	851P	-P
Stage 2P	-P	-P	-P	-P	-P	0P	950P	0P	-P	867P	743P	-P
latoon bloPkeP, %P		-P	-P		-P							
Mov Pap-1 ManeuverP	1553P	-P	-P	1336P	-P	-P	572P	-P	742P	751P	617P	974P
Mov Pap-2 ManeuverP	-P	-P	-P	-P	-P	-P	572P	-P	-P	751P	617P	-P
Stage 1P	-P	-P	-P	-P	-P	-P	773P	-P	-P	955P	847P	-P
Stage 2P	-P	-P	-P	-P	-P	-P	818P	-P	-P	855P	704P	-P

ApproaPhP	EBP	WBP	NBP	SBP
M Ptrl DlP, s/v	0.32P	0P	11.06P	9.29P
M LOSP			BP	AP

Minor Lane/Major MvmtP	NBLn1P	EBLP	EBTP	EBRP	WBLP	WBTP	SBLn1P
apaPitP (veh/h)P	606P	1553P	-P	-P	1336P	-P	967P
M Lane V/P RatioP	0.02P	0.004P	-P	-P	-P	-P	0.131P
M Ptrl DlP (s/v)P	11.1P	7.3P	-P	-P	0P	-P	9.3P
M Lane LOSP	BP	AP	-P	-P	AP	-P	AP
M 95th %tile Q(veh)P	0.1P	0P	-P	-P	0P	-P	0.5P

IntersePtionP	
Int DelaP, s/vehP	3.8P

Lane PonfigurationsP						
TraffiP Vol, veh/hP	93P	38P	47P	6P	0P	0P
Future Vol, veh/hP	93P	38P	47P	6P	0P	0P
onfliPting PePs, #/hrP	4P	0P	0P	0P	0P	4P
Sign Pontrol P	FreeP	FreeP	FreeP	FreeP	StopP	StopP
RT PhannelizeP	-P	NoneP	-P	NoneP	-P	NoneP
Storage LengthP	-P	-P	-P	-P	-P	0P
Veh in MePian Storage, #P	-P	0P	0P	-P	0P	-P
GraPe, %P	-P	0P	0P	-P	0P	-P
eak P our FaPtorP	100P	100P	100P	100P	100P	100P
eav VehiPles, %P	5P	1P	1P	1P	0P	0P
Mvmt FlowP	93P	38P	47P	6P	0P	0P

Major/MinorP	Major1P		Major2P		Minor2P	
onfliPting Flow AllP	57P	0P	-P	0P	-P	58P
Stage 1P	-P	-P	-P	-P	-P	-P
Stage 2P	-P	-P	-P	-P	-P	-P
ritiPal P wP	4.15P	-P	-P	-P	-P	6.2P
ritiPal P wP Stg 1P	-P	-P	-P	-P	-P	-P
ritiPal P wP Stg 2P	-P	-P	-P	-P	-P	-P
Follow-up P wP	2.245P	-P	-P	-P	-P	3.3P
ot Pap-1 ManeuverP	1528P	-P	-P	-P	0P	1014P
Stage 1P	-P	-P	-P	-P	0P	-P
Stage 2P	-P	-P	-P	-P	0P	-P
latoon bloPkeP, %P		-P	-P	-P		
Mov Pap-1 ManeuverP	1523P	-P	-P	-P	-P	1006P
Mov Pap-2 ManeuverP	-P	-P	-P	-P	-P	-P
Stage 1P	-P	-P	-P	-P	-P	-P
Stage 2P	-P	-P	-P	-P	-P	-P

ApproaPhP	EBP	WBP	SBP
M Ptrl DlP, s/v	5.34P	0P	0P
M LOSP			AP

Minor Lane/Major MvmtP	EBLP	EBTP	WBTP	WBRPSBLn1P	
apaPitP (veh/h)P	1278P	-P	-P	-P	-P
M Lane V/P RatioP	0.061P	-P	-P	-P	-P
M Ptrl DlP (s/v)P	7.5P	0P	-P	-P	0P
M Lane LOSP	AP	AP	-P	-P	AP
M 95th %tile Q(veh)P	0.2P	-P	-P	-P	-P

TRANSPORTATION ASS&SS& NT R&PORT&

OR T& PROPOS&D&

KA&AIL& ACAD& Y& XPANSION&

WAIANA&, OA&U,& AWAI`I&

TAX& AP K&Y: 8-5-002: 037& 053&

APP&NDIX D&

CAPACITY ANALYSIS WORKS& TS&

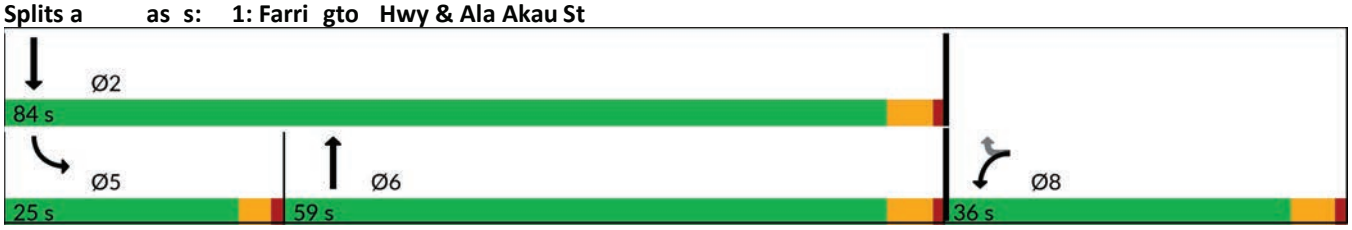
P&AK& OUR TRA& IC CONDITIONS WIT& PROJ&CT&

a0e Co0figuratio0s0						
Traffi0 Volume (vph)0	2150	990	6890	270	1430	9110
Future Volume (vph)0	2150	990	6890	270	1430	9110
I0eal Flow (vphpl)0	190	190	190	190	190	190
a0e Wi0th (ft)0	10	10	10	10	10	10
Storage 0e0gth (ft)0		10			160	
Storage 0a0es0	10	10			10	
Taper 0e0gth (ft)0	10				10	
Sat0. Flow (prot)0	16520	14630	3110		1620	33030
Flt Permitte0	.950				.950	
Sat0. Flow (perm)0	16520	14020	3110		16140	33030
Right Tur0 o0 Re0		Yes0		Yes0		
Sat0. Flow (RTOR)0		930	630			
i0k Spee0 (mph)0	250		250			250
i0k Dista0 e (ft)0	740		2680			3440
Travel Time (s)0	20.20		7.30			9.40
Co0fl. Pe0s. (#/hr)0		230		90	90	
Co0fl. Bikes (#/hr)0				10		
Peak Hour Fa0tor0	.870	.870	.870	.870	.870	.870
Heav0 Vehi0les (%)0	2%0	3%0	3%0	2%0	4%0	2%0
Share0 0a0e Traffi0 (%)0						
a0e Group Flow (vph)0	2470	1140	11020		1640	10470
Tur0 T0pe0	Prot0	Perm0	NA0		Prot0	NA0
Prote0te0 Phases0	80		60		50	20
Permitte0 Phases0		80				
Dete0tor Phase0	80	80	60		50	20
Swit0h Phase0						
Mi0imum I0itial (s)0	7.0	7.0	7.0		3.0	7.0
Mi0imum Split (s)0	32.0	32.0	38.0		7.0	12.0
Total Split (s)0	36.0	36.0	59.0		25.0	84.0
Total Split (%)0	30.0%0	30.0%0	49.2%0		20.8%0	70.0%0
Yellow Time (s)0	4.0	4.0	4.0		3.0	4.0
All-Re0 Time (s)0	1.0	1.0	1.0		1.0	1.0
ost Time A0just (s)0	.0	.0	.0		.0	.0
Total 0ost Time (s)0	5.0	5.0	5.0		4.0	5.0
ea0/0ag0			ag0		ea0	
ea0-0ag Optimize?0			Yes0		Yes0	
Re0all Mo0e0	No0e0	No0e0	Max0		No0e0	Max0
A0t Eff0t Gree0 (s)0	23.0	23.0	59.20		16.0	79.20
A0tuate0 g/C Ratio0	.20	.20	.530		.140	.710
v/0 Ratio0	.730	.320	.660		.710	.450
Co0trol Dela0 (s/veh)0	54.50	12.90	22.30		63.50	8.60
Queue Dela0	.0	.0	.0		.0	.0
Total Dela0 (s/veh)0	54.50	12.90	22.30		63.50	8.60
OS0	D0	B	C0		E0	A0
Approa0h Dela0 (s/veh)0	41.40		22.30			16.0
Approa0h 0OS0	D0		C0			B
Queue 0e0gth 50th (ft)0	170	130	310		1220	1760
Queue 0e0gth 95th (ft)0	2490	570	4220		1910	2320

a0e Group0	WB	WBR0	NBT0	NBR0	SB	SBT0
I0ter0al 0i0k Dist (ft)0	660		1880			2640
Tur0 Ba0 0e0gth (ft)0		10			160	
Base Capa0it0 (vph)0	4570	4550	1670		3040	2330
Starvatio0 Cap Re0u0t0						
Spillba0k Cap Re0u0t0						
Storage Cap Re0u0t0						
Re0u0e0 v/0 Ratio0	.540	.250	.660		.540	.450

I0terse0tio0 Summar0			
Area T0pe:0	Other0		
C0 le 0e0gth: 120			
A0tuate0 C0 le 0e0gth: 112.30			
Natural C0 le: 80			
Co0trol T0pe: Semi A0t-U0 oor0			
Maximum v/0 Ratio: 0.730			
I0terse0tio0 Sig0al Dela0 (s/veh): 22.0		I0terse0tio0 0OS: C0	
I0terse0tio0 Capa0it0 Utilizatio0 65.1%0		ICU 0evel of Servi0e C0	
A0al0sis Perio0 (mi0) 150			

Splits a as s: 1: Farri gto Hwy & Ala Akau St



IntersePtionP	
Int DelaP, s/vehP	0.6P

MovementP	EBLP	EBTP	WBTP	WBRP	SBLP	SBRP
Lane PonfigurationsP		↑	↑		Y	
TraffiP Vol, veh/hP	0P	374P	269P	0P	2P	36P
Future Vol, veh/hP	0P	374P	269P	0P	2P	36P
onfliPting PePs, #/hrP	0P	0P	0P	0P	2P	1P
Sign Pontrol P	FreeP	FreeP	FreeP	FreeP	StopP	StopP
RT PhannelizeP	-P	NoneP	-P	NoneP	-P	NoneP
Storage LengthP	-P	-P	-P	-P	0P	-P
Veh in MePian Storage, #P	-P	0P	0P	-P	0P	-P
GraPe, %P	-P	0P	0P	-P	0P	-P
eak P our FaPtorP	100P	100P	100P	100P	100P	100P
eavP VehiPles, %P	2P	2P	1P	0P	0P	10P
Mvmt FlowP	0P	374P	269P	0P	2P	36P

Major/MinorP	Major1P		Major2P		Minor2P	
onfliPting Flow AllP	-P	0P	-P	0P	645P	270P
Stage 1P	-P	-P	-P	-P	269P	-P
Stage 2P	-P	-P	-P	-P	376P	-P
ritiPal P wP	-P	-P	-P	-P	6.4P	6.3P
ritiPal P wP Stg 1P	-P	-P	-P	-P	5.4P	-P
ritiPal P wP Stg 2P	-P	-P	-P	-P	5.4P	-P
Follow-up P wP	-P	-P	-P	-P	3.5P	3.39P
ot Pap-1 ManeuverP	0P	-P	-P	0P	440P	750P
Stage 1P	0P	-P	-P	0P	781P	-P
Stage 2P	0P	-P	-P	0P	699P	-P
latoon bloPkeP, %P		-P	-P			
Mov Pap-1 ManeuverP	-P	-P	-P	-P	439P	749P
Mov Pap-2 ManeuverP	-P	-P	-P	-P	439P	-P
Stage 1P	-P	-P	-P	-P	781P	-P
Stage 2P	-P	-P	-P	-P	697P	-P

ApproaPhP	EBP	WBP	SBP
M Ptrl DlP, s/vP	0P	0P	10.26P
M LOSP			BP

Minor Lane/Major MvmtP	EBTP	WBTP	SBLn1P
apaPitP (veh/h)P	-P	-P	722P
M Lane V/P RatioP	-P	-P	0.053P
M Ptrl DlP (s/v)P	-P	-P	10.3P
M Lane LOSP	-P	-P	BP
M 95th %tile Q(veh)P	-P	-P	0.2P

IntersePtionP	
Int DelaP, s/vehP	1.4P

MovementP	EBLP	EBTP	EBRP	WBLP	WBTP	WBRP	NBLP	NBTP	NBRP	SBLP	SBTP	SBRP
Lane PonfigurationsP												
TraffiP Vol, veh/hP	95P	280P	1P	1P	263P	2P	6P	0P	0P	0P	0P	0P
Future Vol, veh/hP	95P	280P	1P	1P	263P	2P	6P	0P	0P	0P	0P	0P
onfliPting PePs, #/hrP	37P	0P	40P	40P	0P	37P	1P	0P	2P	2P	0P	1P
Sign Pontrol P	FreeP	FreeP	FreeP	FreeP	FreeP	FreeP	StopP	StopP	StopP	StopP	StopP	StopP
RT PhannelizeP	-P	-P	NoneP	-P	-P	NoneP	-P	-P	NoneP	-P	-P	NoneP
Storage LengthP	-P	-P	-P	-P	-P	-P	-P	-P	-P	-P	-P	-P
Veh in MePian Storage, #P	-P	0P	-P	-P	0P	-P	-P	0P	-P	-P	0P	-P
GraPe, %P	-P	0P	-P	-P	0P	-P	-P	0P	-P	-P	0P	-P
eak P our FaPtorP	100P	100P	100P	100P	100P	100P	100P	100P	100P	100P	100P	100P
eavP VehiPles, %P	4P	1P	0P	0P	1P	0P	0P	0P	0P	0P	0P	0P
Mvmt FlowP	95P	280P	1P	1P	263P	2P	6P	0P	0P	0P	0P	0P

Major/MinorP	Major1P			Major2P			Minor1P		
onfliPting Flow AllP	302P	0P	0P	321P	0P	0P	777P	815P	323P
Stage 1P	-P	-P	-P	-P	-P	-P	511P	511P	-P
Stage 2P	-P	-P	-P	-P	-P	-P	266P	304P	-P
ritiPal P wP	4.14P	-P	-P	4.1P	-P	-P	6.4P	6.5P	6.2P
ritiPal P wP Stg 1P	-P	-P	-P	-P	-P	-P	5.4P	5.5P	-P
ritiPal P wP Stg 2P	-P	-P	-P	-P	-P	-P	5.4P	5.5P	-P
Follow-up P wP	2.236P	-P	-P	2.2P	-P	-P	3.5P	4P	3.3P
ot Pap-1 ManeuverP	1248P	-P	-P	1250P	-P	-P	368P	314P	723P
Stage 1P	-P	-P	-P	-P	-P	-P	607P	541P	-P
Stage 2P	-P	-P	-P	-P	-P	-P	783P	667P	-P
latoon bloPkeP, %P		-P	-P		-P	-P			
Mov Pap-1 ManeuverP	1248P	-P	-P	1203P	-P	-P	322P	0P	694P
Mov Pap-2 ManeuverP	-P	-P	-P	-P	-P	-P	322P	0P	-P
Stage 1P	-P	-P	-P	-P	-P	-P	531P	0P	-P
Stage 2P	-P	-P	-P	-P	-P	-P	782P	0P	-P

ApproaPhP	EBP	WBP	NBP
M Ptrl DlP, s/vP	2.05P	0.03P	16.4P
M LOSP			

Minor Lane/Major MvmtP	NBLn1P	EBLP	EBTP	EBRP	WBLP	WBTP	WBRP
apaPitP (veh/h)P	322P	454P	-P	-P	7P	-P	-P
M Lane V/P RatioP	0.019P	0.076P	-P	-P	0.001P	-P	-P
M Ptrl DlP (s/v)P	16.4P	8.1P	0P	-P	8P	0P	-P
M Lane LOSP		AP	AP	-P	AP	AP	-P
M 95th %tile Q(veh)P	0.1P	0.2P	-P	-P	0P	-P	-P

IntersePtionP												
Int DelaP, s/vehP	3.3P											

MovementP	EBLP	EBTP	EBRP	WBLP	WBTP	WBRP	NBLP	NBTP	NBRP	SBLP	SBTP	SBRP
Lane PonfigurationsP												
TraffiP Vol, veh/hP	0P	294P	4P	0P	86P	0P	6P	0P	0P	12P	0P	172P
Future Vol, veh/hP	0P	294P	4P	0P	86P	0P	6P	0P	0P	12P	0P	172P
onfliPting PePs, #/hrP	268P	0P	21P	21P	0P	3P	6P	0P	5P	5P	0P	6P
Sign Pontrol P	FreeP	FreeP	FreeP	FreeP	FreeP	FreeP	StopP	StopP	StopP	StopP	StopP	StopP
RT PhannelizeP	-P	-P	NoneP	-P	-P	NoneP	-P	-P	NoneP	-P	-P	NoneP
Storage LengthP	-P	-P	-P	-P	-P	-P	-P	-P	-P	-P	-P	-P
Veh in MePian Storage, #P	-P	0P	-P	-P	0P	-P	-P	0P	-P	-P	0P	-P
GraPe, %P	-P	0P	-P	-P	0P	-P	-P	0P	-P	-P	0P	-P
eak P our FaPtorP	100P	100P	100P	100P	100P	100P	100P	100P	100P	100P	100P	100P
eavP VehiPles, %P	0P	2P	0P	0P	3P	0P	0P	0P	0P	18P	0P	1P
Mvmt FlowP	0P	294P	4P	0P	86P	0P	6P	0P	0P	12P	0P	172P

Major/MinorP	Major1P			Major2P			Minor1P			Minor2P		
onfliPting Flow AllP	-P	0P	0P	319P	0P	0P	409P	403P	322P	385P	405P	92P
Stage 1P	-P	-P	-P	-P	-P	-P	317P	317P	-P	86P	86P	-P
Stage 2P	-P	-P	-P	-P	-P	-P	92P	86P	-P	299P	319P	-P
ritiPal P wP	-P	-P	-P	4.1P	-P	-P	7.1P	6.5P	6.2P	7.28P	6.5P	6.21P
ritiPal P wP Stg 1P	-P	-P	-P	-P	-P	-P	6.1P	5.5P	-P	6.28P	5.5P	-P
ritiPal P wP Stg 2P	-P	-P	-P	-P	-P	-P	6.1P	5.5P	-P	6.28P	5.5P	-P
Follow-up P wP	-P	-P	-P	2.2P	-P	-P	3.5P	4P	3.3P	3.662P	4P	3.309P
ot Pap-1 ManeuverP	0P	-P	-P	1252P	-P	0P	556P	539P	724P	545P	538P	968P
Stage 1P	0P	-P	-P	-P	-P	0P	698P	658P	-P	884P	827P	-P
Stage 2P	0P	-P	-P	-P	-P	0P	920P	827P	-P	677P	657P	-P
latoon bloPkeP, %P		-P	-P		-P							
Mov Pap-1 ManeuverP	-P	-P	-P	1227P	-P	-P	445P	529P	706P	543P	527P	963P
Mov Pap-2 ManeuverP	-P	-P	-P	-P	-P	-P	445P	529P	-P	543P	527P	-P
Stage 1P	-P	-P	-P	-P	-P	-P	685P	645P	-P	884P	827P	-P
Stage 2P	-P	-P	-P	-P	-P	-P	751P	827P	-P	674P	643P	-P

ApproaPhP	EBP	WBP	NBP	SBP
M Ptrl DlP, s/vP	0P	0P	13.19P	9.91P
M LOSP			BP	AP

Minor Lane/Major MvmtP	NBLn1P	EBTP	EBRP	WBLP	WBTP	SBLn1P
apaPitP (veh/h)P	445P	-P	-P	1227P	-P	916P
M Lane V/P RatioP	0.013P	-P	-P	-P	-P	0.201P
M Ptrl DlP (s/v)P	13.2P	-P	-P	0P	-P	9.9P
M Lane LOSP	BP	-P	-P	AP	-P	AP
M 95th %tile Q(veh)P	0P	-P	-P	0P	-P	0.7P

IntersePtionP	
Int DelaP, s/vehP	0P

MovementP	EBLP	EBTP	WBTP	WBRP	SBLP	SBRP
Lane PonfigurationsP						
TraffiP Vol, veh/hP	0P	291P	81P	182P	0P	0P
Future Vol, veh/hP	0P	291P	81P	182P	0P	0P
onfliPting PePs, #/hrP	1P	0P	0P	1P	0P	0P
Sign Pontrol P	FreeP	FreeP	FreeP	FreeP	StopP	StopP
RT PhannelizeP	-P	NoneP	-P	NoneP	-P	NoneP
Storage LengthP	-P	-P	-P	-P	-P	0P
Veh in MePian Storage, #P	-P	0P	0P	-P	0P	-P
GraPe, %P	-P	0P	0P	-P	0P	-P
eak P our FaPtorP	100P	100P	100P	100P	100P	100P
eavP VehiPles, %P	3P	2P	3P	0P	0P	0P
Mvmt FlowP	0P	291P	81P	182P	0P	0P

Major/MinorP	Major1P		Major2P		Minor2P	
onfliPting Flow AllP	264P	0P	-P	0P	-P	173P
Stage 1P	-P	-P	-P	-P	-P	-P
Stage 2P	-P	-P	-P	-P	-P	-P
ritiPal P wP	4.13P	-P	-P	-P	-P	6.2P
ritiPal P wP Stg 1P	-P	-P	-P	-P	-P	-P
ritiPal P wP Stg 2P	-P	-P	-P	-P	-P	-P
Follow-up P wP	2.227P	-P	-P	-P	-P	3.3P
ot Pap-1 ManeuverP	1294P	-P	-P	-P	0P	876P
Stage 1P	-P	-P	-P	-P	0P	-P
Stage 2P	-P	-P	-P	-P	0P	-P
latoon bloPkeP, %P		-P	-P	-P		
Mov Pap-1 ManeuverP	1293P	-P	-P	-P	-P	875P
Mov Pap-2 ManeuverP	-P	-P	-P	-P	-P	-P
Stage 1P	-P	-P	-P	-P	-P	-P
Stage 2P	-P	-P	-P	-P	-P	-P

ApproaPhP	EBP	WBP	SBP
M Ptrl DlP, s/vP	0P	0P	0P
M LOSP			AP

Minor Lane/Major MvmtP	EBLP	EBTP	WBTP	WBRP	SBLn1P
apaPitP (veh/h)P	1293P	-P	-P	-P	-P
M Lane V/P RatioP	-P	-P	-P	-P	-P
M Ptrl DlP (s/v)P	0P	-P	-P	-P	0P
M Lane LOSP	AP	-P	-P	-P	AP
M 95th %tile Q(veh)P	0P	-P	-P	-P	-P

Interseti onti						
Int Delati, s/vehti	6.9ti					

Movementti	SEL	SETti	NWTti	NWRti	SWL	SWRti
Lane tionfigurationsti						
Traffiti Vol, veh/hti	227ti	64ti	43ti	3ti	3ti	219ti
Future Vol, veh/hti	227ti	64ti	43ti	3ti	3ti	219ti
onfliti ng Petis, #/hrti	0ti	0ti	0ti	0ti	0ti	0ti
Sign tiontrol ti	Freeti	Freeti	Freeti	Freeti	Stopti	Stopti
RT tihannelizeti	-ti	Noneti	-ti	Noneti	-ti	Noneti
Storage Lengthti	-ti	-ti	-ti	-ti	0ti	-ti
Veh in Metiian Storage, #ti	-ti	0ti	0ti	-ti	0ti	-ti
Gratie, %ti	-	0	0ti	-	0ti	-ti
Peak tiour Fattorti	100ti	100ti	100ti	100ti	100ti	100ti
eavti Vehitiles, %ti	2ti	2ti	2ti	2ti	2ti	2ti
Mvmt Flowti	227ti	64ti	43ti	3ti	3ti	219ti

Major/Minorti	Major1ti		Major2ti		Minor2ti	
onfliti ng Flow Allti	46ti	0ti	-ti	0ti	563ti	45ti
Stage 1ti	-	-	-	-	45ti	-ti
Stage 2ti	-ti	-ti	-ti	-	518ti	-ti
riti al ti wti	4.12ti	-ti	-ti	-	6.42ti	6.22ti
riti al ti w Stg 1ti	-ti	-ti	-ti	-	5.42ti	-ti
riti al ti w Stg 2ti	-ti	-ti	-ti	-	5.42ti	-ti
Follow-up ti wti	2.218ti	-ti	-ti	-ti	3.518ti	3.318ti
Pot tiap-1 Maneuverti	1562ti	-ti	-ti	-ti	488ti	1025ti
Stage 1ti	-ti	-ti	-ti	-	978ti	-ti
Stage 2ti	-ti	-ti	-ti	-	598ti	-ti
Platoon blotiketi, %ti		-ti	-ti	-ti		
Mov tiap-1 Maneuverti	1562ti	-ti	-ti	-ti	414ti	1025ti
Mov tiap-2 Maneuverti	-ti	-ti	-ti	-ti	414ti	-ti
Stage 1ti	-ti	-ti	-ti	-	831ti	-ti
Stage 2ti	-ti	-ti	-ti	-	598ti	-ti

Approatihti	SEti	NWti	SWti
M titrl Dlti, s/vti	6ti	0ti	9.59ti
M LOSti			Ati

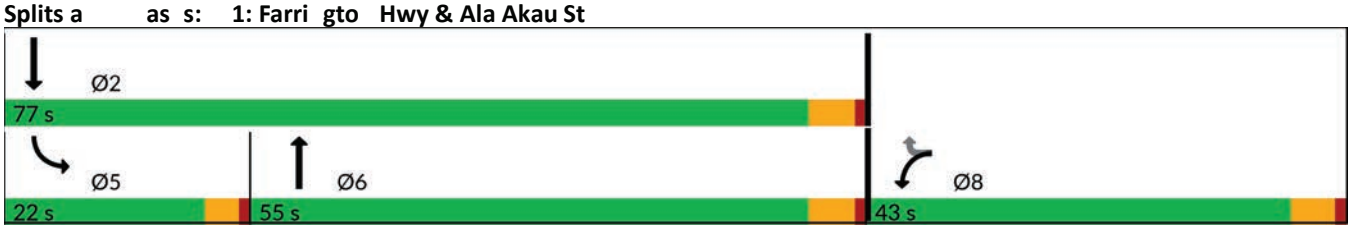
Minor Lane/Major Mvmtti	NWTti	NWRti	SEL	SET	SWLn1ti
apatitti (veh/h)ti	-ti	-ti	1404ti	-ti	1005ti
M Lane V/ti Ratioti	-ti	-ti	0.145ti	-ti	0.221ti
M titrl Dlti (s/v)ti	-ti	-ti	7.7ti	0ti	9.6ti
M Lane LOSti	-ti	-ti	Ati	Ati	Ati
M 95th %tile Q(veh)ti	-ti	-ti	0.5ti	-ti	0.8ti

a0e Co0figuratio0s0						
Traffi0 Volume (vph)0	2730	1360	740	1460	920	7860
Future Volume (vph)0	2730	1360	740	1460	920	7860
I0eal Flow (vphpl)0	190	190	190	190	190	190
a0e Wi0th (ft)0	10	10	10	10	10	10
Storage 0e0gth (ft)0		10			160	
Storage 0a0es0	10	10			10	
Taper 0e0gth (ft)0	10				10	
Sat0. Flow (prot)0	16680	14220	3210		15040	32710
Flt Permitte0	.950				.950	
Sat0. Flow (perm)0	16680	13620	3210		15010	32710
Right Tur0 o0 Re0		Yes0		Yes0		
Sat0. Flow (RTOR)0		1090	230			
i0k Spee0 (mph)0	250		250			250
i0k Dista0 e (ft)0	740		2680			3440
Travel Time (s)0	20.20		7.30			9.40
Co0fl. Pe0s. (#/hr)0		230		50	50	
Co0fl. Bikes (#/hr)0				10		
Peak Hour Fa0tor0	.820	.820	.820	.820	.820	.820
Heav0 Vehi0les (%)0	1%0	6%0	2%0	1%0	12%0	3%0
Share0 0a0e Traffi0 (%)0						
a0e Group Flow (vph)0	3330	1660	1080		1120	9590
Tur0 T0pe0	Prot0	Perm0	NA0		Prot0	NA0
Prote0te0 Phases0	80		60		50	20
Permitte0 Phases0		80				
Dete0tor Phase0	80	80	60		50	20
Swit0h Phase0						
Mi0imum I0itial (s)0	7.0	7.0	7.0		3.0	7.0
Mi0imum Split (s)0	32.0	32.0	38.0		7.0	12.0
Total Split (s)0	43.0	43.0	55.0		22.0	77.0
Total Split (%)0	35.8%0	35.8%0	45.8%0		18.3%0	64.2%0
Yellow Time (s)0	4.0	4.0	4.0		3.0	4.0
All-Re0 Time (s)0	1.0	1.0	1.0		1.0	1.0
ost Time A0just (s)0	.0	.0	.0		.0	.0
Total 0ost Time (s)0	5.0	5.0	5.0		4.0	5.0
ea0/0ag0			ag0		ea0	
ea0-0ag Optimize?0			Yes0		Yes0	
Re0all Mo0e0	No0e0	No0e0	Max0		No0e0	Max0
A0t Eff0t Gree0 (s)0	26.80	26.80	55.20		13.0	72.30
A0tuate0 g/C Ratio0	.250	.250	.510		.120	.660
v/0 Ratio0	.810	.40	.660		.630	.440
Co0trol Dela0 (s/veh)0	54.70	15.20	24.10		62.0	10.50
Queue Dela0	.0	.0	.0		.0	.0
Total Dela0 (s/veh)0	54.70	15.20	24.10		62.0	10.50
OS0	D0	B0	C0		E0	B0
Approa0h Dela0 (s/veh)0	41.60		24.10			15.90
Approa0h 0OS0	D0		C0			B0
Queue 0e0gth 50th (ft)0	2210	330	2850		830	1570
Queue 0e0gth 95th (ft)0	2870	760	4040		140	2310

a0e Group	WB0	WBR0	NBT0	NBR0	SB0	SBT0
I0ter0al 0i0k Dist (ft)0	660		1880			2640
Tur0 Ba0 0e0gth (ft)0		10			160	
Base Capa0it0 (vph)0	5830	5470	16360		2490	21660
Starvatio0 Cap Re0u0t0						
Spillba0k Cap Re0u0t0						
Storage Cap Re0u0t0						
Re0u0e0 v/0 Ratio0	.570	.30	.660		.450	.440

I0terse0tio0 Summar0			
Area T0pe:0	Other0		
C0 le 0e0gth: 120			
A0tuate0 C0 le 0e0gth: 109.10			
Natural C0 le: 80			
Co0trol T0pe: Semi A0t-U0 oor0			
Maximum v/0 Ratio: 0.810			
I0terse0tio0 Signal Dela0 (s/veh): 24.10		I0terse0tio0 0OS: C0	
I0terse0tio0 Capa0it0 Utilizatio0 63.3%0		ICU 0evel of Servi0e B0	
A0al0sis Perio0 (mi0) 150			

Splits a as s: 1: Farri gto Hwy & Ala Akau St



IntersePtionP	
Int DelaP, s/vehP	2.4P

MovementP	EBLP	EBTP	WBTP	WBRP	SBLP	SBRP
Lane PonfigurationsP		↑	↑		Y	
TraffiP Vol, veh/hP	0P	224P	228P	0P	6P	127P
Future Vol, veh/hP	0P	224P	228P	0P	6P	127P
onfliPting PePs, #/hrP	0P	0P	0P	0P	0P	1P
Sign Pontrol P	FreeP	FreeP	FreeP	FreeP	StopP	StopP
RT PhannelizeP	-P	NoneP	-P	NoneP	-P	NoneP
Storage LengthP	-P	-P	-P	-P	0P	-P
Veh in MePian Storage, #P	-P	0P	0P	-P	0P	-P
GraPe, %P	-P	0P	0P	-P	0P	-P
eak P our FaPtorP	100P	100P	100P	100P	100P	100P
eavP VehiPles, %P	2P	10P	3P	0P	0P	3P
Mvmt FlowP	0P	224P	228P	0P	6P	127P

Major/MinorP	Major1P		Major2P		Minor2P	
onfliPting Flow AllP	-P	0P	-P	0P	452P	229P
Stage 1P	-P	-P	-P	-P	228P	-P
Stage 2P	-P	-P	-P	-P	224P	-P
ritiPal P wP	-P	-P	-P	-P	6.4P	6.23P
ritiPal P wP Stg 1P	-P	-P	-P	-P	5.4P	-P
ritiPal P wP Stg 2P	-P	-P	-P	-P	5.4P	-P
Follow-up P wP	-P	-P	-P	-P	3.5P	3.327P
ot Pap-1 ManeuverP	0P	-P	-P	0P	569P	808P
Stage 1P	0P	-P	-P	0P	815P	-P
Stage 2P	0P	-P	-P	0P	818P	-P
latoon bloPkeP, %P		-P	-P			
Mov Pap-1 ManeuverP	-P	-P	-P	-P	569P	807P
Mov Pap-2 ManeuverP	-P	-P	-P	-P	569P	-P
Stage 1P	-P	-P	-P	-P	815P	-P
Stage 2P	-P	-P	-P	-P	818P	-P

ApproaPhP	EBP	WBP	SBP
M Ptrl DlP, s/vP	0P	0P	10.46P
M LOSP			BP

Minor Lane/Major MvmtP	EBTP	WBTP	SBLn1P
apaPitP (veh/h)P	-P	-P	792P
M Lane V/P RatioP	-P	-P	0.168P
M Ptrl DlP (s/v)P	-P	-P	10.5P
M Lane LOSP	-P	-P	BP
M 95th %tile Q(veh)P	-P	-P	0.6P

IntersePtionP	
Int DelaP, s/vehP	1P

MovementP	EBLP	EBTP	EBRP	WBLP	WBTP	WBRP	NBLP	NBTP	NBRP	SBLP	SBTP	SBRP
Lane PonfigurationsP												
TraffiP Vol, veh/hP	58P	163P	12P	0P	220P	5P	8P	2P	2P	0P	0P	0P
Future Vol, veh/hP	58P	163P	12P	0P	220P	5P	8P	2P	2P	0P	0P	0P
onfliPting PePs, #/hrP	37P	0P	125P	125P	0P	37P	1P	0P	1P	0P	0P	0P
Sign Pontrol P	FreeP	FreeP	FreeP	FreeP	FreeP	FreeP	StopP	StopP	StopP	StopP	StopP	StopP
RT PhannelizeP	-P	-P	NoneP	-P	-P	NoneP	-P	-P	NoneP	-P	-P	NoneP
Storage LengthP	-P	-P	-P	-P	-P	-P	-P	-P	-P	-P	-P	-P
Veh in MePian Storage, #P	-P	0P	-P	-P	0P	-P	-P	0P	-P	-P	0P	-P
GraPe, %P	-P	0P	-P	-P	0P	-P	-P	0P	-P	-P	0P	-P
eak P our FaPtorP	100P	100P	100P	100P	100P	100P	100P	100P	100P	100P	100P	100P
eavP VehiPles, %P	6P	10P	8P	0P	3P	0P	0P	0P	50P	0P	0P	0P
Mvmt FlowP	58P	163P	12P	0P	220P	5P	8P	2P	2P	0P	0P	0P

Major/MinorP	Major1P			Major2P			Minor1P		
onfliPting Flow AllP	262P	0P	0P	300P	0P	0P	631P	672P	295P
Stage 1P	-P	-P	-P	-P	-P	-P	410P	410P	-P
Stage 2P	-P	-P	-P	-P	-P	-P	221P	262P	-P
ritiPal P wP	4.16P	-P	-P	4.1P	-P	-P	6.4P	6.5P	6.7P
ritiPal P wP Stg 1P	-P	-P	-P	-P	-P	-P	5.4P	5.5P	-P
ritiPal P wP Stg 2P	-P	-P	-P	-P	-P	-P	5.4P	5.5P	-P
Follow-up P wP	2.254P	-P	-P	2.2P	-P	-P	3.5P	4P	3.75P
ot Pap-1 ManeuverP	1279P	-P	-P	1273P	-P	-P	448P	380P	644P
Stage 1P	-P	-P	-P	-P	-P	-P	674P	599P	-P
Stage 2P	-P	-P	-P	-P	-P	-P	821P	695P	-P
latoon bloPkeP, %P		-P	-P		-P	-P			
Mov Pap-1 ManeuverP	1279P	-P	-P	1121P	-P	-P	375P	0P	567P
Mov Pap-2 ManeuverP	-P	-P	-P	-P	-P	-P	375P	0P	-P
Stage 1P	-P	-P	-P	-P	-P	-P	564P	0P	-P
Stage 2P	-P	-P	-P	-P	-P	-P	820P	0P	-P

ApproaPhP	EBP	WBP	NBP
M Ptrl DlP, s/vP	1.98P	0P	
M LOSP			-P

Minor Lane/Major MvmtP	NBLn1P	EBLP	EBTP	EBRP	WBLP	WBTP	WBRP
apaPitP (veh/h)P	-P	442P	-P	-P	1121P	-P	-P
M Lane V/P RatioP	-P	0.045P	-P	-P	-P	-P	-P
M Ptrl DlP (s/v)P	-P	7.9P	0P	-P	0P	-P	-P
M Lane LOSP	-P	AP	AP	-P	AP	-P	-P
M 95th %tile Q(veh)P	-P	0.1P	-P	-P	0P	-P	-P

IntersePtionP	
Int DelaP, s/vehP	3P

MovementP	EBLP	EBTP	EBRP	WBLP	WBTP	WBRP	NBLP	NBTP	NBRP	SBLP	SBTP	SBRP
Lane PonfigurationsP												
TraffiP Vol, veh/hP	0P	151P	9P	0P	103P	0P	9P	0P	3P	3P	0P	103P
Future Vol, veh/hP	0P	151P	9P	0P	103P	0P	9P	0P	3P	3P	0P	103P
onfliPting PePs, #/hrP	5P	0P	51P	51P	0P	0P	14P	0P	6P	6P	0P	14P
Sign Pontrol P	FreeP	FreeP	FreeP	FreeP	FreeP	FreeP	StopP	StopP	StopP	StopP	StopP	StopP
RT PhannelizeP	-P	-P	NoneP	-P	-P	NoneP	-P	-P	NoneP	-P	-P	NoneP
Storage LengthP	-P	-P	-P	-P	-P	-P	-P	-P	-P	-P	-P	-P
Veh in MePian Storage, #P	-P	0P	-P	-P	0P	-P	-P	0P	-P	-P	0P	-P
GraPe, %P	-P	0P	-P	-P	0P	-P	-P	0P	-P	-P	0P	-P
eak P our FaPtorP	100P	100P	100P	100P	100P	100P	100P	100P	100P	100P	100P	100P
eavP VehiPles, %P	0P	4P	0P	0P	0P	0P	0P	0P	33P	0P	0P	2P
Mvmt FlowP	0P	151P	9P	0P	103P	0P	9P	0P	3P	3P	0P	103P

Major/MinorP	Major1P			Major2P			Minor1P			Minor2P		
onfliPting Flow AllP	-P	0P	0P	211P	0P	0P	324P	310P	213P	260P	314P	117P
Stage 1P	-P	-P	-P	-P	-P	-P	207P	207P	-P	103P	103P	-P
Stage 2P	-P	-P	-P	-P	-P	-P	117P	103P	-P	157P	211P	-P
ritiPal P wP	-P	-P	-P	4.1P	-P	-P	7.1P	6.5P	6.53P	7.1P	6.5P	6.22P
ritiPal P wP Stg 1P	-P	-P	-P	-P	-P	-P	6.1P	5.5P	-P	6.1P	5.5P	-P
ritiPal P wP Stg 2P	-P	-P	-P	-P	-P	-P	6.1P	5.5P	-P	6.1P	5.5P	-P
Follow-up P wP	-P	-P	-P	2.2P	-P	-P	3.5P	4P	3.597P	3.5P	4P	3.318P
ot Pap-1 ManeuverP	0P	-P	-P	1372P	-P	0P	633P	608P	756P	697P	605P	935P
Stage 1P	0P	-P	-P	-P	-P	0P	800P	735P	-P	908P	814P	-P
Stage 2P	0P	-P	-P	-P	-P	0P	892P	814P	-P	850P	731P	-P
latoon bloPkeP, %P		-P	-P		-P							
Mov Pap-1 ManeuverP	-P	-P	-P	1305P	-P	-P	528P	579P	715P	690P	575P	923P
Mov Pap-2 ManeuverP	-P	-P	-P	-P	-P	-P	528P	579P	-P	690P	575P	-P
Stage 1P	-P	-P	-P	-P	-P	-P	761P	699P	-P	908P	814P	-P
Stage 2P	-P	-P	-P	-P	-P	-P	782P	814P	-P	842P	696P	-P

ApproaPhP	EBP	WBP	NBP	SBP
M Ptrl DlP, s/vP	0P	0P	11.51P	9.46P
M LOSP			BP	AP

Minor Lane/Major MvmtP	NBLn1P	EBTP	EBRP	WBLP	WBTP	SBLn1P
apaPitP (veh/h)P	565P	-P	-P	1305P	-P	914P
M Lane V/P RatioP	0.021P	-P	-P	-P	-P	0.116P
M Ptrl DlP (s/v)P	11.5P	-P	-P	0P	-P	9.5P
M Lane LOSP	BP	-P	-P	AP	-P	AP
M 95th %tile Q(veh)P	0.1P	-P	-P	0P	-P	0.4P

IntersePtionP						
Int DelaP, s/vehP	0P					

MovementP	EBLP	EBTP	WBTP	WBRP	SBLP	SBRP
Lane PonfigurationsP						
TraffiP Vol, veh/hP	0P	158P	98P	86P	0P	0P
Future Vol, veh/hP	0P	158P	98P	86P	0P	0P
onfliPting PePs, #/hrP	4P	0P	0P	0P	0P	4P
Sign Pontrol P	FreeP	FreeP	FreeP	FreeP	StopP	StopP
RT PhannelizeP	-P	NoneP	-P	NoneP	-P	NoneP
Storage LengthP	-P	-P	-P	-P	0P	-P
Veh in MePian Storage, #P	-P	0P	0P	-P	0P	-P
GraPe, %P	-P	0P	0P	-P	0P	-P
eak P our FaPtorP	100P	100P	100P	100P	100P	100P
eavP VehiPles, %P	5P	1P	1P	1P	0P	0P
Mvmt FlowP	0P	158P	98P	86P	0P	0P

Major/MinorP	Major1P		Major2P		Minor2P	
onfliPting Flow AllP	188P	0P	-P	0P	303P	149P
Stage 1P	-P	-P	-P	-P	145P	-P
Stage 2P	-P	-P	-P	-P	158P	-P
ritiPal P wP	4.15P	-P	-P	-P	6.4P	6.2P
ritiPal P wP Stg 1P	-P	-P	-P	-P	5.4P	-P
ritiPal P wP Stg 2P	-P	-P	-P	-P	5.4P	-P
Follow-up P wP	2.245P	-P	-P	-P	3.5P	3.3P
ot Pap-1 ManeuverP	1368P	-P	-P	-P	693P	903P
Stage 1P	-P	-P	-P	-P	887P	-P
Stage 2P	-P	-P	-P	-P	875P	-P
latoon bloPkeP, %P		-P	-P	-P		
Mov Pap-1 ManeuverP	1363P	-P	-P	-P	690P	896P
Mov Pap-2 ManeuverP	-P	-P	-P	-P	690P	-P
Stage 1P	-P	-P	-P	-P	884P	-P
Stage 2P	-P	-P	-P	-P	875P	-P

ApproaPhP	EBP	WBP	SBP
M Ptrl DlP, s/vP	0P	0P	0P
M LOSP			AP

Minor Lane/Major MvmtP	EBLP	EBTP	WBTP	WBRP	SBLn1P
apaPitP (veh/h)P	1363P	-P	-P	-P	-P
M Lane V/P RatioP	-P	-P	-P	-P	-P
M Ptrl DlP (s/v)P	0P	-P	-P	-P	0P
M Lane LOSP	AP	-P	-P	-P	AP
M 95th %tile Q(veh)P	0P	-P	-P	-P	-P

Interseti onti						
Int Delati, s/vehti	6.2ti					

Movementti	SELti	SETti	NWTti	NWRti	SWLti	SWRti
Lane tionfigurationsti						
Traffiti Vol, veh/hti	121ti	37ti	51ti	3ti	1ti	133ti
Future Vol, veh/hti	121ti	37ti	51ti	3ti	1ti	133ti
onfliti ng Petis, #/hrti	0ti	0ti	0ti	0ti	0ti	0ti
Sign tiontrol ti	Freeti	Freeti	Freeti	Freeti	Stopti	Stopti
RT tihannelizeti	-ti	Noneti	-ti	Noneti	-ti	Noneti
Storage Lengthti	-ti	-ti	-ti	-ti	0ti	-ti
Veh in Metiian Storage, #ti	-ti	0ti	0ti	-ti	0ti	-ti
Gratie, %ti	-ti	0ti	0ti	-ti	0ti	-ti
Peak tiour Fatitorti	100ti	100ti	100ti	100ti	100ti	100ti
eavti Vehitiles, %ti	2ti	2ti	2ti	2ti	2ti	2ti
Mvmt Flowti	121ti	37ti	51ti	3ti	1ti	133ti

Major/Minorti	Major1ti		Major2ti		Minor2ti	
onfliti ng Flow Allti	54ti	0ti	-ti	0ti	332ti	53ti
Stage 1ti	-ti	-ti	-ti	-ti	53ti	-ti
Stage 2ti	-ti	-ti	-ti	-ti	279ti	-ti
riti al ti wti	4.12ti	-ti	-ti	-ti	6.42ti	6.22ti
riti al ti wti Stg 1ti	-ti	-ti	-ti	-ti	5.42ti	-ti
riti al ti wti Stg 2ti	-ti	-ti	-ti	-ti	5.42ti	-ti
Follow-up ti wti	2.218ti	-ti	-ti	-ti	3.518ti	3.318ti
Pot tiap-1 Maneuverti	1551ti	-ti	-ti	-ti	663ti	1015ti
Stage 1ti	-ti	-ti	-ti	-ti	970ti	-ti
Stage 2ti	-ti	-ti	-ti	-ti	768ti	-ti
Platoon blotiketi, %ti		-ti	-ti	-ti		
Mov tiap-1 Maneuverti	1551ti	-ti	-ti	-ti	610ti	1015ti
Mov tiap-2 Maneuverti	-ti	-ti	-ti	-ti	610ti	-ti
Stage 1ti	-ti	-ti	-ti	-ti	893ti	-ti
Stage 2ti	-ti	-ti	-ti	-ti	768ti	-ti

Approatihti	SE	NWti	SWti
M titrl Dlti, s/vti	5.76ti	0ti	9.11ti
M LOSti			Ati

Minor Lane/Major Mvmtti	NWTti	NWRti	SELti	SET	SWLn1ti
apatitti (veh/h)ti	-ti	-ti	1378ti	-ti	1010ti
M Lane V/ti Ratioti	-ti	-ti	0.078ti	-ti	0.133ti
M titrl Dlti (s/v)ti	-ti	-ti	7.5ti	0ti	9.1ti
M Lane LOSti	-ti	-ti	Ati	Ati	Ati
M 95th %tile Q(veh)ti	-ti	-ti	0.3ti	-ti	0.5ti

APPENDIX C

Archaeological Literature Review and Field Inspection Report for Waianae High School Cultural Surveys Hawaii

Draft
Archaeological Literature Review and Field Inspection Report for the Wai‘anae High School Connection of Buildings SP and T Project, Wai‘anae Ahupua‘a, Wai‘anae District, O‘ahu TMKs: [1] 8-5-002:018 (por.) and 8-5-015:001 (por.)

Prepared for
Gerald Park Urban Planner

Prepared by
Si-Si Hensley, M.A.,
Constance R. O’Hare, B.A.,
and
Matt McDermott, M.A.

Cultural Surveys Hawai‘i, Inc.
Kailua, Hawai‘i
(Job Code: WAIANAE 13

February 2017

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Management Summary

Reference	Archaeological Literature Review and Field Inspection Report for the Wai‘anae High School Connection of Buildings SP and T Project, Wai‘anae Ahupua‘a, Wai‘anae District, O‘ahu, TMKs: [1] 8-5-002:018 (por.) and 8-5-015:001 (por.) (Hensley et al. 2017)
Date	February 2017
Project Number(s)	Cultural Surveys Hawai‘i, Inc. (CSH) Job Code: WAIANAE 13
Investigation Permit Number	The fieldwork for this study was completed under CSH’s annual archaeological fieldwork permit number 16-26, issued by the Hawai‘i State Historic Preservation Division (SHPD) per Hawai‘i Administrative Rules (HAR) §13-282.
Agencies	SHPD, State of Hawai‘i Department of Education (DOE)
Land Jurisdiction	City and County of Honolulu; State of Hawai‘i
Project Proponent	Gerald Park Urban Planner
Project Funding	DOE
Project Location	The project area is located southwest of Farrington Highway within the Wai‘anae High School (WHS) campus. The project area is depicted on a portion of the 1998 Waianae U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle.
Project Description	Plans include the demolition and filling of the existing above-ground swimming pool, the construction of a new parking area on the lower third portion of the former pool area, widening the fire line from 15 ft to 20 ft, the addition of a turnaround to the fire lane, and the construction of a new, two-story building, connecting the existing Building SP and Building T.
Project Acreage	The entire WHS campus area is approximately 37.86 acres (15.32 hectares). The project area is a 1.8 acre (0.73 hectares) subset of the WHS campus.
Area of Potential Effect (APE)	The APE is considered to be the entire 1.8 acres (0.73 hectare) project area.
Historic Preservation Regulatory Context and Document Purpose	This proposed project is subject to Hawai‘i State historic preservation review legislation, specifically Hawai‘i Revised Statutes (HRS) §6E-8 and HAR §13-275. This document serves to facilitate the proposed project’s planning and to support consultation with the SHPD regarding the project’s necessary historic preservation review steps pursuant to HAR §13-275, by assessing whether there are archaeological concerns within the project area, and to develop data on the general nature, density, and distribution of archaeological resources. It is intended to support SHPD’s determination on whether or not a project inventory survey is needed pursuant to HAR §13-275-5(b)(5).

Fieldwork Effort	Fieldwork was accomplished on 13 December 2016 by principal investigator Matt McDermott, M.A., requiring approximately 0.5 person-days to complete.
Results Summary	Background research indicated that the O‘ahu Railway and Land Company (OR&L) railroad extended through the project area from the late 1800s into the 1940s. Also, that prior archaeological investigations in the vicinity of the project area have documented coastal Native Hawaiian burial sites in Jaucas sand deposits—particularly immediately northwest of the current project area. During the field inspection, the entire project area was inspected and photographed. Particular attention was paid to identifying any surface remnants of the OR&L and indications of Jaucas sand deposits that are more likely to contain Native Hawaiian skeletal remains. No potential historic properties were identified during the field inspection. Where the OR&L once crossed the project area has been disturbed by subsequent construction, particularly a subsurface drainage/filtration system for the adjacent above ground swimming pool. The project area is located atop an emerged coral karstic outcrop that has been filled with approximately 70 cm of fill consisting of crushed coral and terrigenous soil. Based on surface observations, there are unlikely to be significant Jaucas sand deposits in the project area
Recommendations	Based on the results of the pedestrian inspection and background research, it is unlikely that significant historic properties will be affected by the proposed project. Coral karstic outcrops are known to contain pre- and post-Contact archaeological deposits and human burials; however, based on the minimal ground disturbance proposed and the general thickness of the fill deposits overlying the coral outcrop, it is unlikely the coral outcrop, and any archaeological deposits therein, will be encountered or affected. Therefore, no further archaeological historic preservation work is recommended for the proposed project. However, if significant finds are encountered, including human burials, all work in the immediate vicinity will cease and the SHPD will be promptly notified.

Table of Contents

List of Figures

List of Tables

Section 1 Introduction

1.1 Project Background

At the request of Gerald Park Urban Planner, Cultural Surveys Hawai‘i, Inc. (CSH) has prepared this literature review and field inspection report (LRFI) for Wai‘anae High School (WHS) Connection of Buildings SP and T Project, Wai‘anae Ahupua‘a, Wai‘anae District, O‘ahu, TMKs: [1] 8-5-002:018 and 015:001. The campus is bound on the north, *mauka* (inland) side by Farrington Highway, on the east by undeveloped land, on the south, *makai* (seaward) side by the Pacific Ocean, and to the west by the Makaha Surfside housing development. The entire WHS campus area is approximately 37.86 acres (15.32 hectares), while the current project area measures approximately 1.8 acres (0.73 hectare). The project area is depicted on a portion of the 1998 Waianae U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle (Figure 1), a tax map plat (Figure 2 and Figure 3), and a 2013 aerial photograph (Figure 4). The Department of Education, State of Hawai‘i, proposes to construct building improvements at Wai‘anae High School. The project area is within two TMK parcels. The larger 23.8 acre lot (TMK 8-5-002:081) is owned by the State of Hawai‘i, and the smaller 14.06 acre lot (TMK 8-5-015:001) is owned by the City and County of Honolulu. The proposed project area is on the west side of the campus, bound by the Gym to the north, the swimming pool to the south, Buildings SP and T on the west, and the Makaha Surfside development on the west (Figure 5). The building project will provide additional classrooms and shop space for the school’s art curriculum.

Plans include the demolition and of the existing above-ground swimming pool, the construction of a new parking area on the lower third portion of the former pool area, widening the fire line that connects to Farringdon Highway from 15 ft to 20 ft, the addition of a turnaround to the fire lane, and the construction of a new, two-story building, connecting the existing Building SP and Building T (Figure 5 and Figure 6). The new building will be approximately 28 ft in height with a ground-level floor space of 4,075 sq ft. A triangular-shaped open courtyard will be created by the joining of Buildings SP, T, and the new building (refer to Figure 6).

1.2 Historic Preservation Regulatory Context and Document Purpose

As a project funded by the State of Hawai‘i Department of Education (DOE), on lands falling under the jurisdiction of the DOE, this proposed project is subject to Hawai‘i State historic preservation review legislation, specifically Hawai‘i Revised Statutes (HRS) §6E-8 and Hawai‘i Administrative Rules (HAR) §13-275.

This LRFI serves to facilitate the proposed project’s planning and to support consultation with the State Historic Preservation Division (SHPD) regarding the project’s necessary historic preservation review steps pursuant to HAR §13-275, by assessing whether there are archaeological concerns within the project area, and to develop data on the general nature, density, and distribution of archaeological resources. It is intended to support SHPD’s determination on whether or not a project inventory survey is needed pursuant to HAR §13-275-5(b)(5).

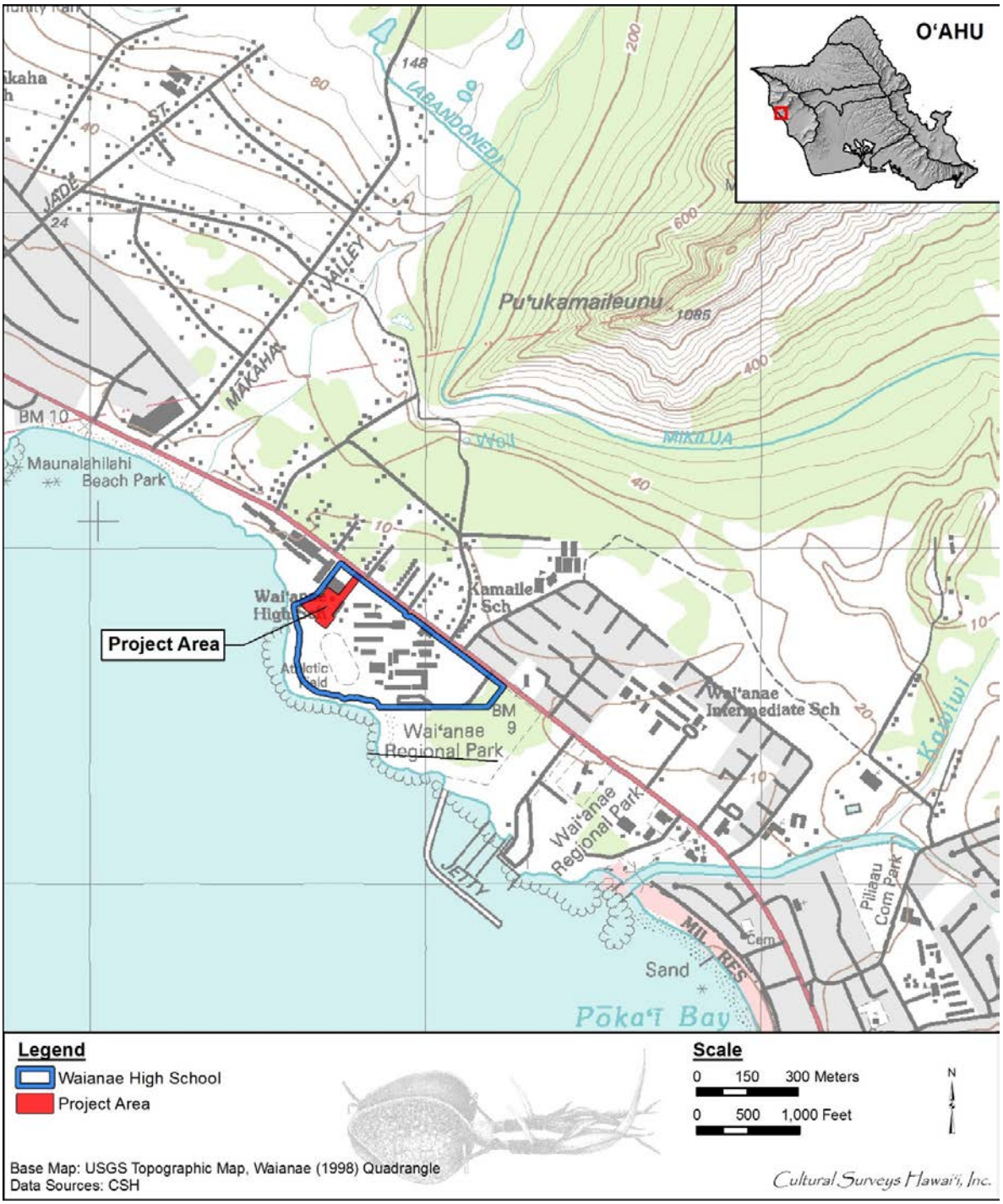

Figure 1. Portion of the 1998 Waianae USGS 7.5-minute topographic quadrangle showing the location of the project area within the WHS campus

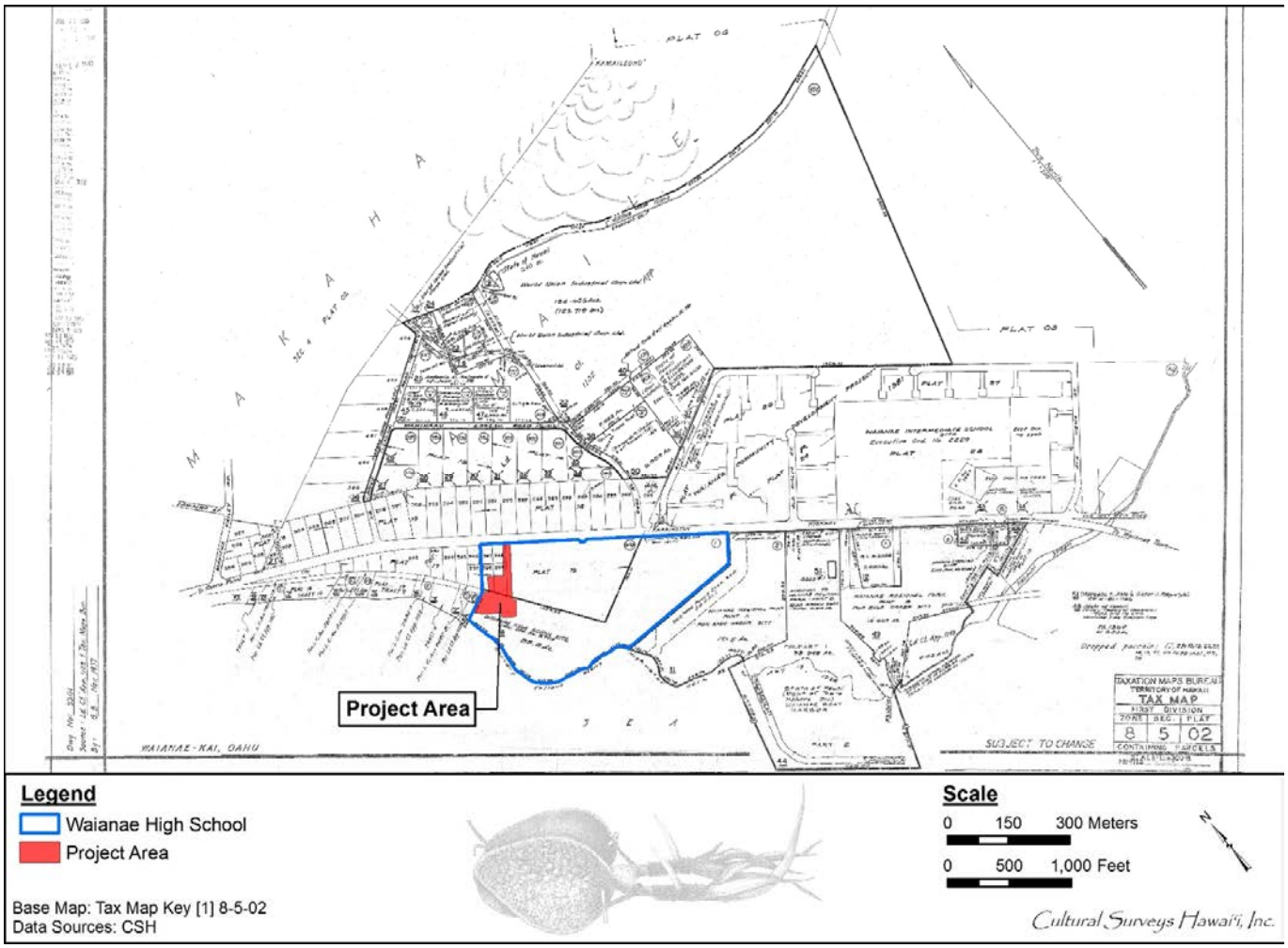

Figure 2. Tax Map Key [1] 8-5-002, showing the project area (Hawai‘i TMK 2014)

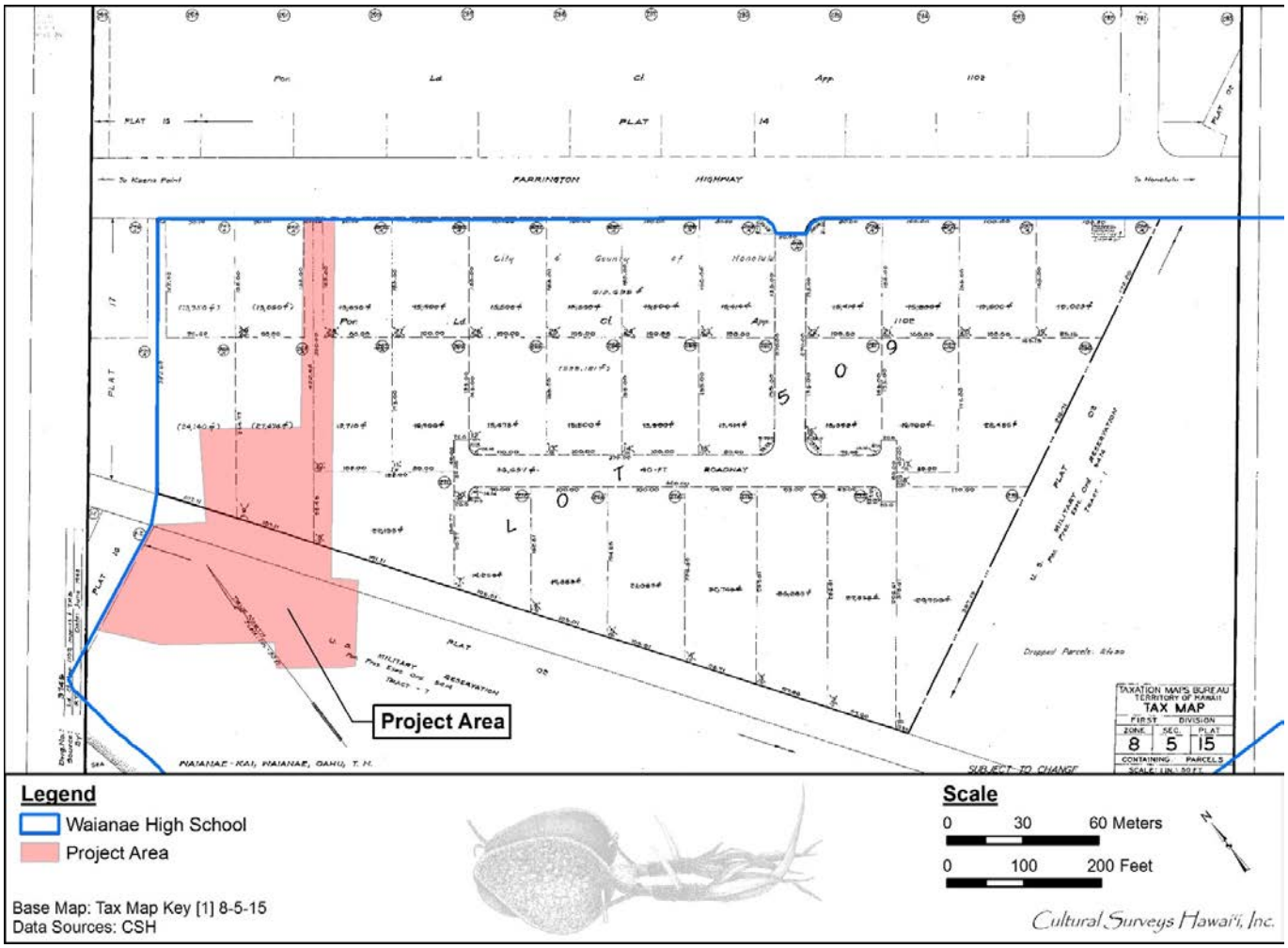

Figure 3. Tax Map Key [1] 8-5-015, showing the project area (Hawai‘i TMK 2014)

Figure 4. Aerial photograph showing the location of the project area (Google Earth 2013)

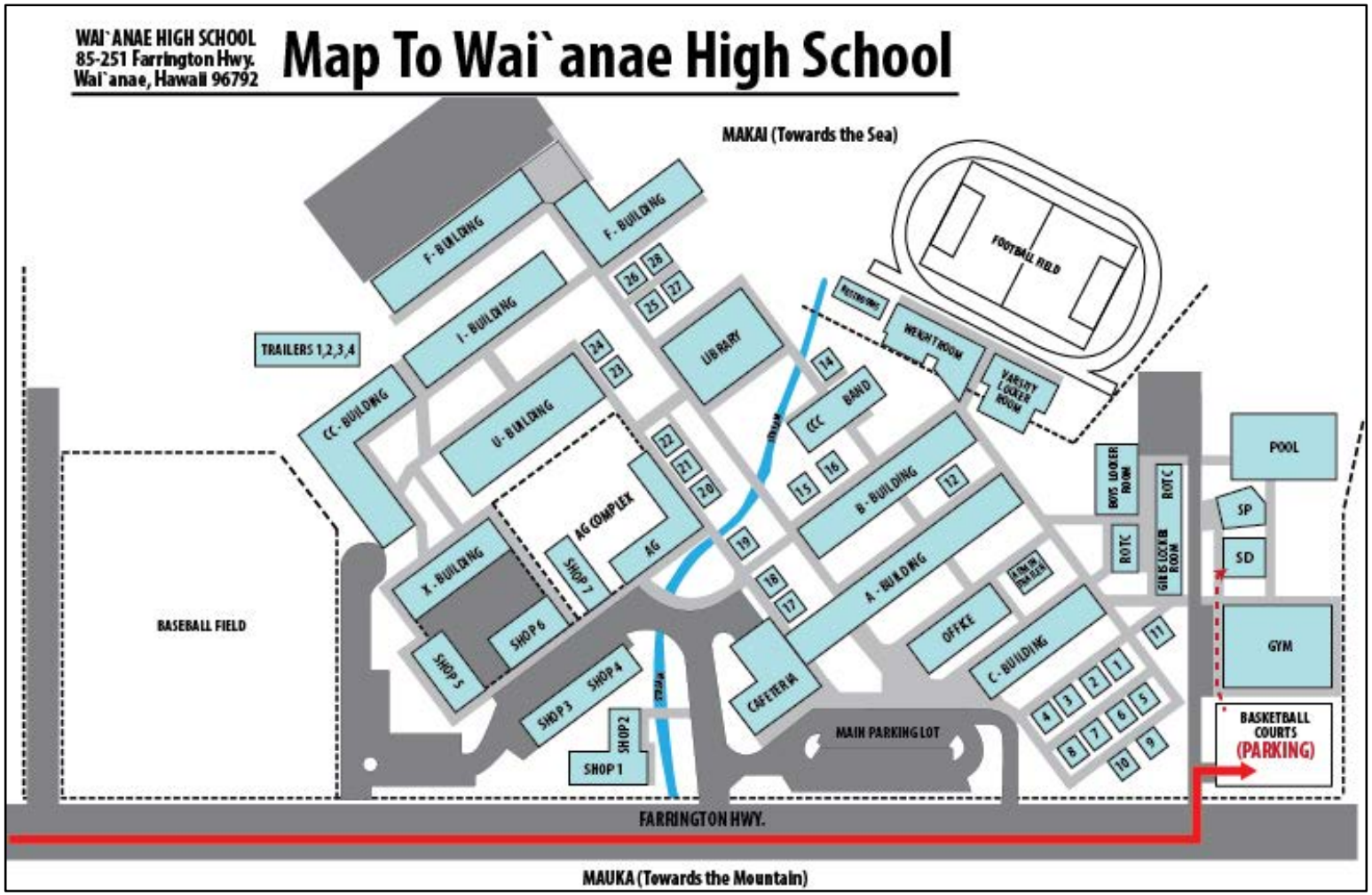

Figure 5. Campus map of Waianae High School with building names and locations (from Waianae High School website), the project area is to the right in the vicinity of the buildings labeled Pool and Gym; note that Building labeled SD is now called Building T

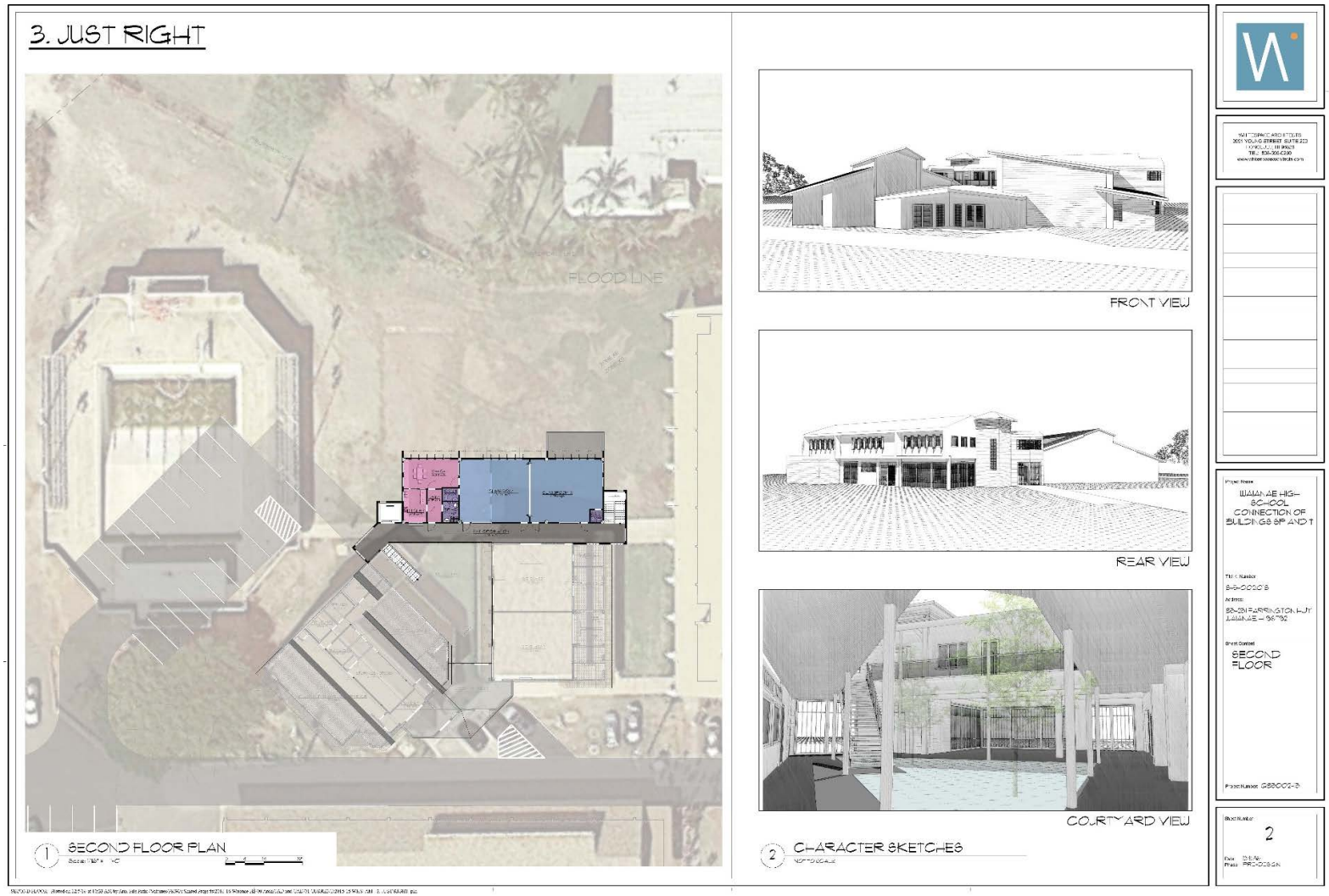

Figure 6. Plan view on a current aerial photograph (for reference the above ground pool is on the left and the *makai* edge of the gym is on the right) and perspective elevations of the proposed project (from Just Right)

1.3 Environmental Setting

1.3.1 Natural Environment

The project area is located within the traditional Hawaiian land division (*ahupua‘a*) of Wai‘anae (Wai‘anae Kai) in the district (*moku*) of Wai‘anae on the leeward coast of O‘ahu. The project area lies in central coastal Wai‘anae Town on the karstic flats of an emerged limestone reef (Stearns 1940:36). The emerged reef formation is relatively flat with frequent sinkholes, depressions and cobble concentrations. The project area is between 40 and 160 m inland of the coast and the project area is relatively flat and approximately 1 m above mean sea level. Rainfall in the project area ranges between 550 and 560 millimeters (21.7-22 inches) annually (Giambelluca et al. 2013). No streams are located in the project area, however, a man-made drainage canal extends through the WHS campus southeast of the project area. ‘Eku Stream is located approximately 500 m to the northwest of the project area and Kawiwi Stream is located 1,000 m to the southeast.

According to the U.S. Department of Agriculture (USDA) soil survey for O‘ahu, the project area is located within the coral outcrop (CR) and Mokuleia clay (Mtb) soil types (Foote et al. 1972) (Figure 7). Coral Outcrop (CR) is described as:

> …coral or cemented calcareous sand on the island of Oahu. The coral reefs formed in shallow ocean water during the time the ocean stand was at a higher level. Small areas of coral outcrop are exposed on the ocean shore, on the coastal plains, and at the foot of the uplands. Elevations range from sea level to approximately 100 feet. The annual rainfall amounts to 18 to 40 inches. Coral outcrop is geographically associated with Jaucas, Keaau, and Mokuleia soils.
>
> Coral outcrop makes up about 80 to 90 percent of the acreage. The remaining 10 to 20 percent consists of a thin layer of friable, red soil material in cracks, crevices, and depressions within the coral outcrop. This soil material is simiilar to that of the Mamala series. This land type is used for military installations quarries, and urban development. Vegetation is sparse. It consists of kiawe, *koa haole*, and fingergrass. [Foote et al. 1972:29]

Mokuleia clay (Mtb) is described as: “well drained soils that formed in recent alluvium deposited over coral sand [or coral outcrop]. Mokuleia soils are on coastal plains and have slopes of 0 to 2 percent. The mean annual rainfall is about 40 inches and the mean annual temperature is about 74 degrees F” (Foot et al. 1972).

The project area is bound by the Pacific Ocean on the south side. This coastal area is not beach sand, but is a “low sea cliff of sharp coral rocks with a six-to ten-foot drop into the ocean” (Clark 1977:89).

1.3.2 Built Environment

The project area is located on the west side of the WHS campus, between an existing above-ground swimming pool to the north and the gymnasium to the south. Just outside the project area, there are a number of school and athletic buildings that are adjacent to the road and adjacent to the other buildings within the project area.

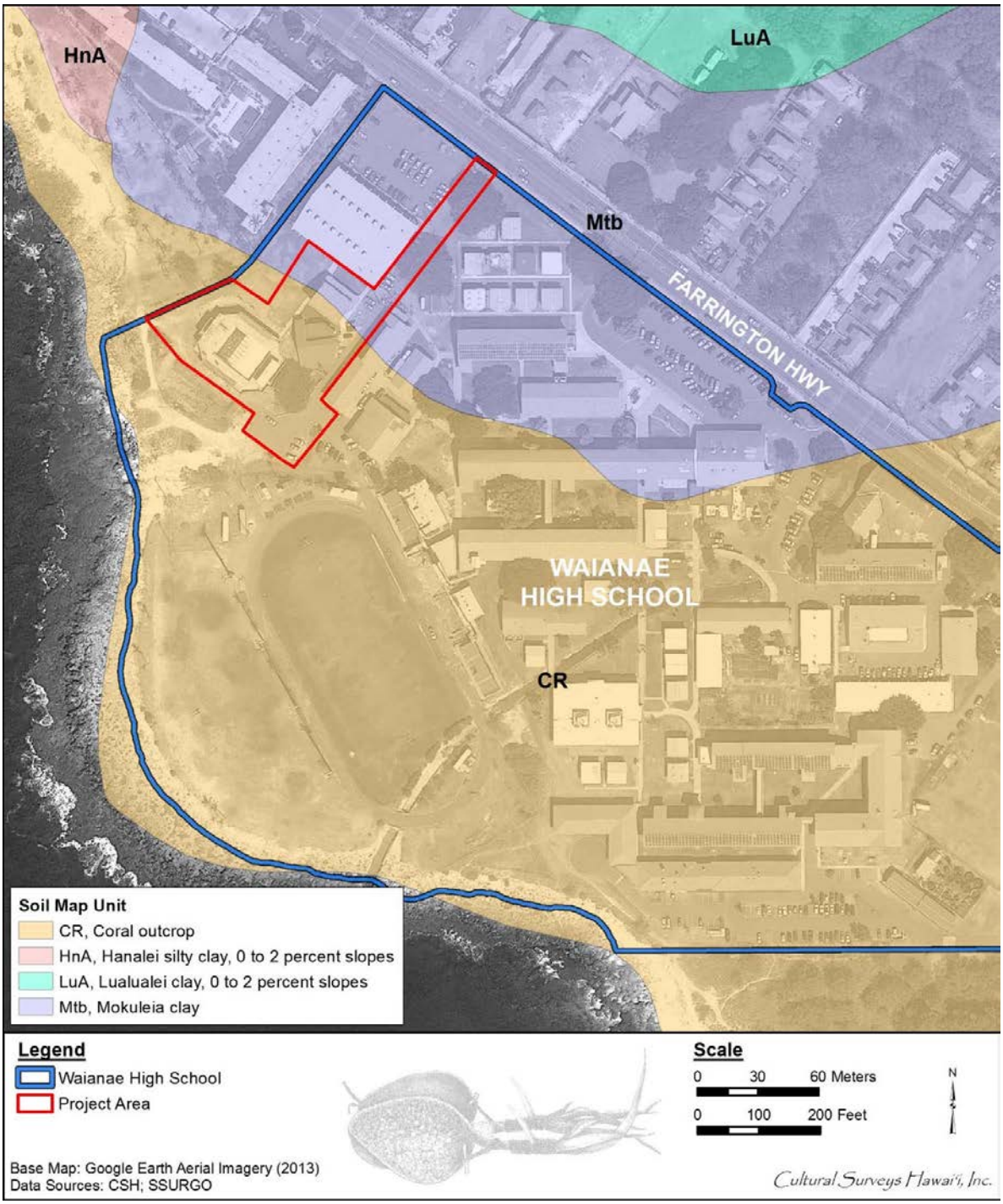

Figure 7. Overlay of *Soil Survey of the State of Hawaii* (Foote et al. 1972), indicating soil types within and surrounding the project area (U.S. Department of Agriculture Soils Survey Geographic Database [SSURGO] 2001)

Section 2 Methods

2.1 Field Methods

CSH completed the fieldwork component of this study under archaeological permit number 16-26, issued by the SHPD pursuant to HAR §13-13-282. Fieldwork was conducted on 13 December 2016 by Matt McDermott, M.A. This work required approximately 0.5 person-days to complete.

In general, fieldwork included 100% pedestrian inspection of the project area and photographing current conditions. Additionally, the wave-cut soil bank along the shoreline just *makai* of the project area was inspected to evaluate the likely thickness of fill deposits within the project area.

2.2 Research Methods

Background research included a review of previous archaeological studies on file at the SHPD; review of documents at Hamilton Library at the University of Hawai‘i at Mānoa, the Hawai‘i State Archives, the Hawaiian Mission Children’s Society Library, the Hawai‘i Public Library, and the archives of the Bishop Museum; study of historic photographs at the Hawai‘i State Archives and the archives of the Bishop Museum; and study of historic maps at the Survey Office of the Department of Land and Natural Resources. Historic maps and photographs from the CSH library were also consulted. In addition, Māhele records were examined from the Waihona ‘Aina (2017) and the AvaKonohiki (2017) online databases.

This research provided the environmental, cultural, historic, and archaeological background for the project area. The sources studied were used to formulate a predictive model regarding the expected types and locations of historic properties in the project area.

Section 3 Background Research

3.1 Traditional Background

Wai‘anae Kai Ahupua‘a occupies the central portion of Wai‘anae District on the leeward coast of O‘ahu. The district originally owed its fame to its multitude of fish, especially the opportunities for deep-sea fishing from the calm lee side of Ka‘ena Point, where the ocean currents meet. The term Wai‘anae refers to “mullet water” and the meaning implies an abundance of fish with the word “‘*anae*” referring to full-grown mullet (Pukui et al. 1974:220). Handy and Handy (1972:468) attribute the naming of Wai‘anae to a large freshwater pond for mullet called Pueha [*sic*] (Puehu) located just inland of Pōka‘ī Bay. Today, Wai‘anae maintains its reputation as one of the best fishing locales on O‘ahu.

Another age-old characteristic of the Wai‘anae District has been the independent lifestyle and attitudes of many of the residents. There were many political struggles in the pre-Contact and early historic period, with the district varying from battlefield to refuge for dissident and/or contentious factions. This independent spirit owes its origins to generations of inhabitants conditioned to cope with a marginal physical environment. Human survival depended on consistent availability of water for cultivation and consumption along with offshore marine resources.

In January 1778, Captain James Cook sighted Wai‘anae from a distance but chose to continue his journey, landing instead first near Waimea on Kaua‘i. Fifteen years later, Captain George Vancouver approached the coast of Wai‘anae from Pu‘uloa and wrote in his log:

> The few inhabitants who visited us [in canoes] from the village earnestly entreated our anchoring . . . And [they] told us that, if we would stay until morning, their chief would be on board with a number of hogs and a great quantity of vegetables; but that he would not visit us then because the day was taboo poory [a *kapu* day]. The face of the country did not however, promise an abundant supply [of water]; the situation was exposed. [Vancouver 1798:218]

Unimpressed with his limited view of the Wai‘anae coastline, Vancouver described it as “one barren, rocky, waste nearly destitute of verdure, cultivation or inhabitants” (Vancouver 1798:217). Despite the dismal forecast presented by the arid coast, the ocean hosted an abundant supply of fish, the lowlands produced *‘uala* (sweet potato; *Ipomoea batatas*) and *niu* (coconut; *Cocos nucifera*), and the inland valley boasted *kalo* (taro; *Colocasia esculenta*) and *wauke* (paper mulberry; *Broussonetia papyrifera*). The upland forest regions sustained various trees whose wood could be worked into weapons and canoes.

3.1.1 Mythological and Traditional Accounts

The district is a focus in the mythological cycles of the demigod Māui, the pig demigod Kamapua‘a, and the shark god and older brother of Pele, Kamohoali‘i.

The demigod Māui and his brothers were said to have been born in Wai‘anae, and it was here that Māui learned the secret of making fire for mankind. Samuel Kamakau (in Sterling and Summers 1978:65–66) enumerates, among the famous locales in Wai‘anae, the cave in which Hina, the moon goddess and mother of Māui, made her *tapa,* the fishhook Manaia Kalani (with

which Māui attempted to unite the Hawaiian Islands), the snare for catching the sun (which Māui used to his advantage on Haleakalā), and the place where Māui's adze was made.

The pig demigod, Kamapua‘a, battled with the giant man-dog Kū-‘īlio-loa (after whom the *heiau* in Wai‘anae is named) and razed the taro patches of Wai‘anae Valley. The people caught him, tied him up, and were preparing to sacrifice him when his many supernatural bodies swept over the plains, devouring the men of Wai‘anae and sending them fleeing in terror (Pooloa 1930:4, translated in Sterling and Summers 1978:72).

The older and favorite brother of Pele, Kamohoali‘i the shark god, became enamored with a maiden of the Wai‘anae coast and begot a half-man/half-shark child who devoured many people before being captured and killed (Stearns 1939 in Sterling and Summers 1978:83).

3.1.2 Place Names

Wai‘anae extends from the seashore on the *makai* (seaward) side to the top of the Ko‘olau mountain range on the *mauka* (inland) side (Figure 8). The mountain range separates Wai‘anae on the leeward side of O‘ahu from the Waialua District on the north shore of O‘ahu and Wai‘anae Uka District in central O‘ahu. The center of the coastal promontory called Mauna Lahilahi ("thin mountain") is the coastal boundary point dividing Wai‘anae and Makaha Ahupua‘a. This boundary continues upward along Kamaile‘unu ("the striped *maile* vine") Ridge to central O‘ahu. At the *makai* base of this ridge was a spring called Keke‘o (Chamberlain 1826 in McAllister 1933:114), or Ka‘aipueo, and a coconut grove; in historic times this was called the village of Kamaile ("the *maile* vine").

Along the ridge separating Wai‘anae and Makaha are several named *pu‘u*, or peaks: Pu‘u Kepauala; a peak at 3,220 feet (ft), which may be a boundary point called Pu‘u Kūmaipō ("Kū from the night") mentioned in Boundary Commission Testimony (see Soehren 2009); and Pu‘u Kawiwi. The northern point of Wai‘anae is at Ka‘ala (possibly "laughter" or "the path") at 4,020 ft amsl, the highest mountain on O‘ahu. The northeastern boundary of Wai‘anae is separated from the Wai‘anae Uka District by the Wai‘anae mountain range, with the peaks Pu‘u Kalena ("the lazy one") and Pu‘u Kūmakali‘i. For the division between Wai‘anae and Lualualei Ahupua‘a to the south, the boundary line follows a ridge called Pāhe‘ehe‘e ("slippery"). On this ridge are the peaks Kaua‘ōpu‘u (possibly "swelling battle," Thrum 1922:646), Mauna Kūwale ("mountain standing alone") and Pu‘u Pāhe‘ehe‘e ("slippery hill") at the *makai* end of the ridge of the same name. The ridge may have been named this for an ancient *hōlua* slide that once extended from the *makai* end of the ridge toward the shore. The eastern edge of the coastal promontory called Kāne‘īlio (dog Kāne) is the coastal point on the boundary of Wai‘anae / Lualualei.

In the *mauka* interior Wai‘anae section, there is a peak called Pu‘u Kōleali‘ili‘i, which means "small plover." The Pacific golden plover (*Pluvialis dominica*) is a migratory bird that nests in inland areas of the island; the Hawaiians were fond of the meat of this bird and travelled into the uplands to catch the nesting birds. The name of this hill may indicate this is an area where plovers were trapped. Below this hill was a *pali* (cliff, called Ka‘oniapuhi ["the writhing eel"]), with wavy scars that reminded the Hawaiians of the movement of a *puhi*, or eel. Near the coast was a hill on the plain called Pu‘u Kāhea ("calling hill"); three *heiau* (pre-Christian place of worship) were built on top or at the base of this hill

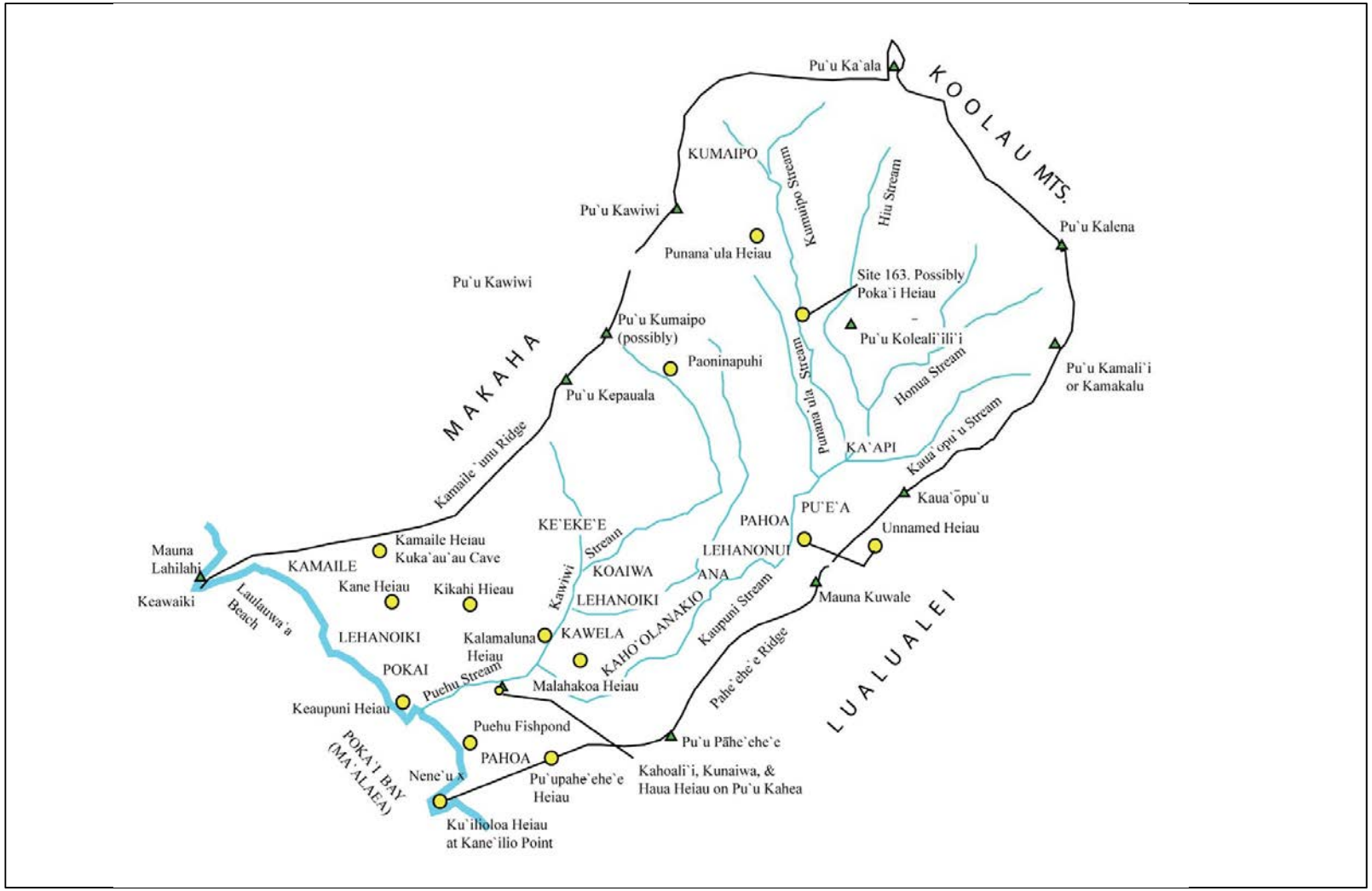

Figure 8. Place Names of Wai‘anae (base map U.S. Army War Department 1919 Fire Control map, Waianae Quadrangle); ‘Ili names all upper case; the project area is in the *‘ili* of Kamaile (southwest corner of Wai‘anae Ahuua‘a)

The boundary line between Wai‘anae and Makaha runs along a center line that splits Mauna Lahilahi promontory from a coastal point called Keawaiki (“the small bay”). On the south side of the promontory was a shoreline area called Laulauwa‘a (“the canoe paddle blade,” Clark 1977:89). At the eastern end of the *ahupua‘a* is a bay, traditionally called Mā‘alaea. Stretching along the shoreline of the bay was a large coconut (*niu*) grove called Ka Ulu Niu of Pōka‘ī. In historic times, the name Pōka‘ī (“night [of] the supreme one”) began to be used for the bay itself, and the original name, Mā‘alaea, was abandoned. The bay ends at Kāne‘īlio Point; at the *mauka* end of the point was an ancient fishing village called Nene‘u, a shortened version of the word, *nenelu*, meaning “marshy, swampy” (Pukui and Elbert 1986:265). In historic times, this expanded and grew into the modern town of Wai‘anae.

The *ahupua‘a* is watered by one large drainage system, now called the Wai‘anae River. In ancient times, each section and tributary was given its own name, only a few of which can be found on historic and modern maps. Two tributary streams in the northeastern sections are called Kānewai (“water of Kāne) and Kūkahi (“standing along” possibly, Thrum 1922:653); these merge to form the Honua Stream. In the northeastern uplands, the streams called Pūnana‘ula, Kūmuipō (“Kū from the night”), Hiu (“throw violently”), Honua (“land”), and Kaua‘ōpu‘u (possibly “swelling battle,” Thrum 1922:646), all flow and join to form the Kaupuni Stream (“place around”) at a point west of the peak Kaua‘ōpu‘u. Kawiwi Stream drains the western section of the *ahupua‘a* and joins with Kaupuni Stream near the coast. Traditionally the stream section near the coast was called Puehu (“scattered”), which emptied into the sea at an inlet also called Puehu. Other names for this stream were Keaupuni (“the government or nation”; Pukui and Elbert 1986) and Kānepūniu (Clark 1977:87). There was once one small watercourse, usually dry, at the eastern end of Laulauwa‘a, now called Mauna Lahilahi Beach Park, called ‘Eku, which means “to root, as does a pig” (Clark 1977:90).

3.1.3 Pre-Contact Period

The earliest permanent habitation of the district most likely was in Wai‘anae Kai Ahupua‘a along Kaupuni Stream. In an archaeological study of Mākaha, the *ahupua‘a* immediately north of Wai‘anae, Green (1980) proposed the following scenario:

> The first settlement of the district was probably, as tradition tends to suggest, on the coast around the stream at the mouth of the Wai‘anae-kai Valley where the foreign chief from Kahiki planted the first coconut of the famous grove. That area, with its well-watered valley behind, would have been the most favored locality in the district . . . [Green 1980:72]

Archaeological investigations at Pōka‘ī Bay have processed dates for occupation of the area well within the prehistoric period. During monitoring of 943 m of sewer and water line trenching at the Wai‘anae Army Recreation Center (WARC), five articulated human burials were recovered and a charcoal sample from the prehistoric cultural layer (Layer V) yielded a radiocarbon age of AD 1376 +/-50 (C13 adjusted) (Riford 1984). Further study at the Wai‘anae Army Recreation Center (Hammatt et al. 1985) encountered additional burials. Testing of a sample from a pit feature yielded a radiocarbon date of AD 1340 +/- 70. Hammatt et al. (1985) noted the following:

> The archaeological assemblage points to the heavy use of the site as a communal area for fishing preparation, canoe landing and return. The site was the focus of

> beach access for the inhabitants of Wai‘anae-Kai as well as occasional informal sand burial from at least 1300 A.D. onwards. [Hammatt et al. 1985:i]

Inland of Pōka‘ī Bay, three trenches were excavated in a complex of possible taro *lo‘i* (agricultural field pond) that dated to AD 1170-1430, 1270-1480, and 1299-1510 (Shapiro and Rosendahl 1988:32). This suggests permanent habitation of Wai‘anae Ahupua‘a by the late 1100s.

Evidence of elaborate and expanded settlement throughout the *ahupua‘a* during the pre-Contact period has also presented itself in the number and variety of sites recorded during the first investigation of Wai‘anae during the 1930s. McAllister (1933:112–114) noted 16 sites within the *ahupua‘a,* including ten *heiau* (sacred temples) (seven of which had been destroyed), the Puehu fishpond, the Kawiwi place of refuge, and several house sites (see Figure 8). The sites extend well inland adjacent to streams at the head of Wai‘anae Valley.

The number of *heiau* recorded within Wai‘anae (Kai) Ahupua‘a alludes to its political centrality within the district and its association with the *ali‘i* (royalty) during the pre-Contact period. Samuel Kamakau, the pioneering nineteenth-century Hawaiian historian, recorded oral traditions that associated some of the Wai‘anae *heiau* with prominent *ali‘i* as in the following two accounts:

> At Wai‘anae [Kahahana, late eighteenth-century O‘ahu ruling chief] restored the heiau of Ka-moho-ali‘i . . . [Kamakau 1992:134]

> Take the story of Ka-welo when he sailed for Kaua‘i to make war. He set a tabu over the heiau at Puehu at Wai‘anae, and at the end of the sacrifice ordered that the wood of the paehumu, both the fence and the images themselves, be used for firewood for the expedition to Kaua‘i. [Kamakau 1992:203]

There was a coastal pre-Contact/early historic trail that connected the leeward coast with Waialua and Honolulu (Figure 9). The nineteenth-century Hawaiian historian John Papa ‘Ī‘ī (1959:97) describes

> . . . three trails to Waianae, one by way of Puu O Kapolei, another by way of Pohakea, and the third by way of Kolekole.
>
> From Kunia the trail went to the plain of Keahumoa, on to Maunauna, and along Paupauwela, which met with the trails from Wahiawa and Waialua. The trail continued to the west of Mahu, to Malamanui, and up to Kolekole, from where one can look down to Pokai and Waianaeuka. There was a long cliff trail called Elou from Kalena and Haleauau on the east side of Kaala coming down to Waianae. There was also a trail called Kumaipo which went up and then down Makahauka.
>
> Below Kumaipo trail in the olden days was a stronghold named Kawiwi. At the time of a battle, a boy was posted there as a guard every night. He was often hungry, for the lord of the stronghold did not supply him with food. This caused him to change his allegiance and give the place over to the rebels. This he did by calling out ‘Hake. Come up the ladder. Let two come, let the second stay back, let one come along. Hake, hake. Come up the ladder. Let three come up, leave the third, and let two continue up.’ The boy kept up the cry until the stronghold was filled with men, and its lords were taken captive by the rebels. O friends, if it is true that

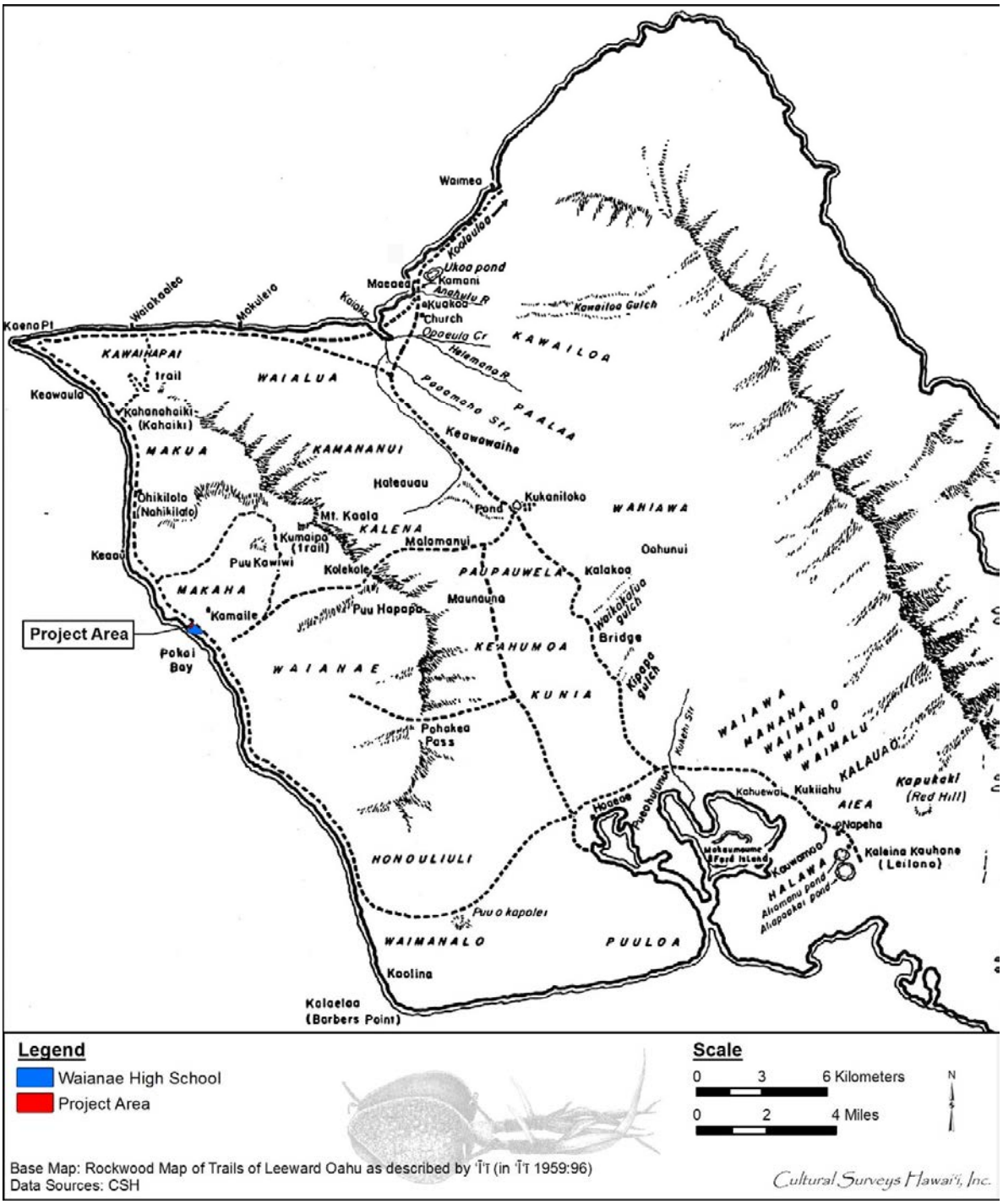

Figure 9. Portion of the Paul Rockwood map of traditional trails of Leeward Oʻahu as described by John Papa ʻĪʻī, indicating the project area (ʻĪʻī 1959:96)

> the boy did this, it proves what the Holy Scriptures have pointed out (Luke 10:7) that ‘the laborer is worthy of his hire (E pono ke uku ‘ia mai ka pa‘ahana).’
>
> The stronghold of Kawiwi was part of a mountain ridge lying between Waianae and Makaha and overlooking Kamaile. The trail, Kumaipo, went down to the farms of Makaha and the homes of that land. A branch trail which led up Mount Kaala and looked down on Waialua and Mokuleia could be used to go down to those level lands. It was customary to have dwelling places along the mountain trails that led downward from here into Kamaile, as well as along the beach trail of Makaha. There were many houses at Makaha, where a fine circle of sand provided a landingplace for fleets of fishing canoes. The trail which passed by this sandy bar was the one from Puu O Kapolei, which had joined the beach trail from Puuloa and from Waimanalo. It then went along the shore all around this island. [‘Ī‘ī 1959:97]

3.2 Historical Background

3.2.1 Early Post-Contact Period

The latter eighteenth century also saw the involvement of Wai‘anae Ahupua‘a and its population in the political changes impelled by the struggle of *ali‘i* from other islands for political control and conquest of O‘ahu. The Maui Island king Kahekili invaded O‘ahu ca. 1783, vanquishing the O‘ahu chiefs in a series of battles that culminated in Wai‘anae:

> Pupuka [an O‘ahu chief] rallied the retainers of the chiefs of Kona, ‘Ewa, Wai‘anae, Waialua, and Ko‘olau at Kawiwi, a stronghold between Wai‘anae and Mākaha, where many died of starvation or were flung over the precipice because of famine, and many perished. [Kamakau 1992:139–140]

In 1794, Ka‘eokūlani recruited the “warriors of Waialua and Wai‘anae” to make war on his nephew Kalanikūpule, then ruler of O‘ahu (Kamakau 1992:168). By December 1794, Ka‘eo had been killed and his forces were defeated. Kalanikūpule was himself deposed the following year when the invading Hawai‘i Island forces of Kamehameha prevailed at the Battle of Nu‘uanu in April 1795 (Cordy 2002a:44). Wai‘anae itself did not host any major conflicts associated with the conquest of O‘ahu by Kamehameha, but traditional records designated it as a refuge for large numbers of O‘ahu residents who resettled after fleeing from the Hawai‘i Island invaders (McGrath et al. 1973:14).

In 1796, Kamehameha went to Wai‘anae where his fleet of 80 double canoes stopped on their way to invade Kaua‘i. “The fleet went on to Wai‘anae and the war god [Kū-ka‘ili-moku] was carried ashore that evening” (Kamakau 1992:173). Kamakau records that the fleet departed Wai‘anae before midnight but Wai‘anae tradition maintains that Kamehameha remained on the coast long enough to rededicate two *heiau* to his war god and that his presumption so angered the Wai‘anae gods that they sent the storm which caused the disastrous end of his Kaua‘i expedition.

3.2.2 Early 1800s

The Hawaiian Kingdom began exporting sandalwood to Asia shortly after 1800 and the commerce flourished until the supply dwindled in the mid-1830s. Trade in sandalwood was the strict monopoly of the *ali‘i*, beginning with the first Hawaiian monarch, Kamehameha I. At the

height of the sandalwood boom, Kamehameha was buying foreign ships, including six vessels between 1816 and 1818, to transport his own wood to Asia (Kuykendall 1938:87).

After Kamehameha's death in 1819, Liholiho (Kamehameha II) allowed his chiefs to share in the sandalwood trade, which resulted in an unrestrained demand on the stocks of the wood and upon the commoners who did the harvesting. By the middle of 1828, the stands of sandalwood above the Wai‘anae coast may have already been been depleted. This happened significantly, perhaps, when Boki Kamauleule, the chief of Wai‘anae appointed by Kamehameha to also serve as governor of O‘ahu, supervised "collecting Sandalwood to pay [his] debts" (Kuykendall 1938:234).

In October 1819, two whale ships anchored in the Hawaiian Islands. In the following decades, the number of whale ships increased greatly and the Islands became a victualing center and layover base in the mid-Pacific. Supplies of both fresh and salted beef were in high demand and a trade in hide and tallow developed. Following the collapse of the sandalwood trade, the Hawaiian economy depended primarily on supplying whale ships during their long layovers in the Islands. The trade sustained the Islands until the collapse of the whaling industry in the mid-1860s (Kuykendall 1938:70, 310).

During the same decades that commercial ventures were forcing changes upon the Hawaiian landscape, western missionary interests were establishing their foothold in the Islands. The first company of Christian missionaries came to the Hawaiian Islands in 1820 and, within a year, had established close ties with the *ali‘i* (McGrath et al. 1973:20).

Beginning in 1831, Protestant missionaries throughout the Hawaiian Islands took a census of the native population, thus providing the first documentation of its size after the first decades of Western Contact. In 1831–1832, the first census of *ahupua‘a* within the Wai‘anae District totaled 1,868 people comprised of 757 adult males, 695 adult females, and 416 children (Schmitt 1973:19). Four years later, in the 1835–1836 census, the total district population had dropped to 1,654 (Schmitt 1973:9).

3.2.3 The Māhele and Land Commission Awards

The Organic Acts of 1845 and 1846 initiated the process of the Māhele, the division of Hawaiian lands, which introduced the concept of private property to Hawaiian society. In 1848, the crown and the *ali‘i* (royalty) received their land titles. *Kuleana* Land Commission Awards (LCAs) for individual parcels within *ahupua‘a* subsequently were granted beginning in 1850. These awards were presented to tenants, i.e., Native Hawaiians, naturalized foreigners, non-Hawaiians born in the Islands, or long-term resident foreigners who could prove occupancy on the parcels prior to 1845 (Chinen 1958:8).

The *ali‘i* Mataio Kekūanao‘a was awarded the *ahupua‘a* of Wai‘anae in the Māhele, but he returned it to pay the commutation fee for the lands he retained. Wai‘anae then became one of the Crown Lands, lands set aside for the use of the Hawaiian monarchy (Soehren 2017). As such, the land was under the control of the king, and much of it was leased to high chiefs and foreigners for use in ranching (McGrath et al. 1973:32). Traditional life was greatly altered as there were many instances where commoners were denied access to the land and upland agriculture ended.

Wai‘anae Kai was divided into three areas, Kamaile on the northwest, Pōka‘i in the central section, and Pāhoa on the southeast. The distribution of LCA *‘āpana* (lots) in Wai‘anae Kai

Ahupua‘a indicate two major foci of residence, one at Kamaile, and the other on the opposite side of Kaupuni Stream in Pāhoa (Green 1980:10–11). Numerous LCAs are located north (*mauka*) of the project area, in the *‘ili* (small land division) known as Kamaile. LCA parcels near the coastline or within the immediate vicinity of the project area are listed in Table 1 and shown on Figure 10 and Figure 11.

Table 1. LCAs Located near the Coast or in the Immediate Vicinity of the Project Area

Land Claim #	**Claimant**	***Ahupua‘a***	***‘Ili***
8189-D	Nakoalele	Kamaile	Kamaile 1
9479	Kahinu	Wai‘anae	Kamaile
9480	Ohule	Kamaile	Kuaimoa
9481	Kaluoku	Wai‘anae	Kamaile
9482	Kawaamole	Wai‘anae	Kamaile
9483	Kahue	Wai‘anae	Kamaile
9484	Hema	Wai‘anae	Kamaile, Kaulupuuawa
9485	Lae	Wai‘anae	Kamaile
9486	Kaipu	Wai‘anae	Kamaile
9486-C	Kuheleloa 2	Wai‘anae	Kamaile
9489-B	Holi	Wai‘anae	Kamaile 1
9490	Kamuno	Wai‘anae	Kamaile 1
9491	Kaneele	Wai‘anae	Kamaile
9492	Paaluhi	Wai‘anae	Kamaile
9493	Kuheleloa	Wai‘anae	Kamaile 2
10356	Nuhi, wahine	Kamaile 2	Kaulupunawai

No LCAs are located within the WHS campus or the current project area, although a portion of LCA 9489B is directly adjacent to the west side of the campus and near the project area. LCA 9489B, with two *‘āpana* (lots), was awarded to a man named Holi who claimed a *pahale* (houselot) in one lot (Āpana 1) on the coast *makai* of the main trail (later Farrington Highway) and taro land (‘Āpana 2) located *mauka* of the trail. The project area is near the *pahale* award, which was in the *mo‘o* (garden or strip of land) of Pōhakulapalapa. The taro land, located further inland, was in the *mo‘o* of Kumuma‘oma‘o. Pōhakulapalapa probably translates to “many-ridged stone” (Soehren 2017). Kumuma‘oma‘o is possibly named after a calm (*mao*) easterly wind associated with Kamaile, It is mentioned as the name of the wind of Kamaile within the Hawaiian story of the Wind Gourd of La‘amaomao (Nakuina 1990:51). The word *kumuma‘oma‘o* (“the source for green”) is also used to describe any kind of green stone, especially those stones used for the *maika* (bowling) game (Pukui and Elbert 1986:182).

It is important to note that while only five award lots are shown on historic maps (see Figure 10) along this section of the coast, the testimony for these awards also mention other houselots for native Hawaiians who did not make claims for their land during the Māhele. In LCA 9489B, Holi

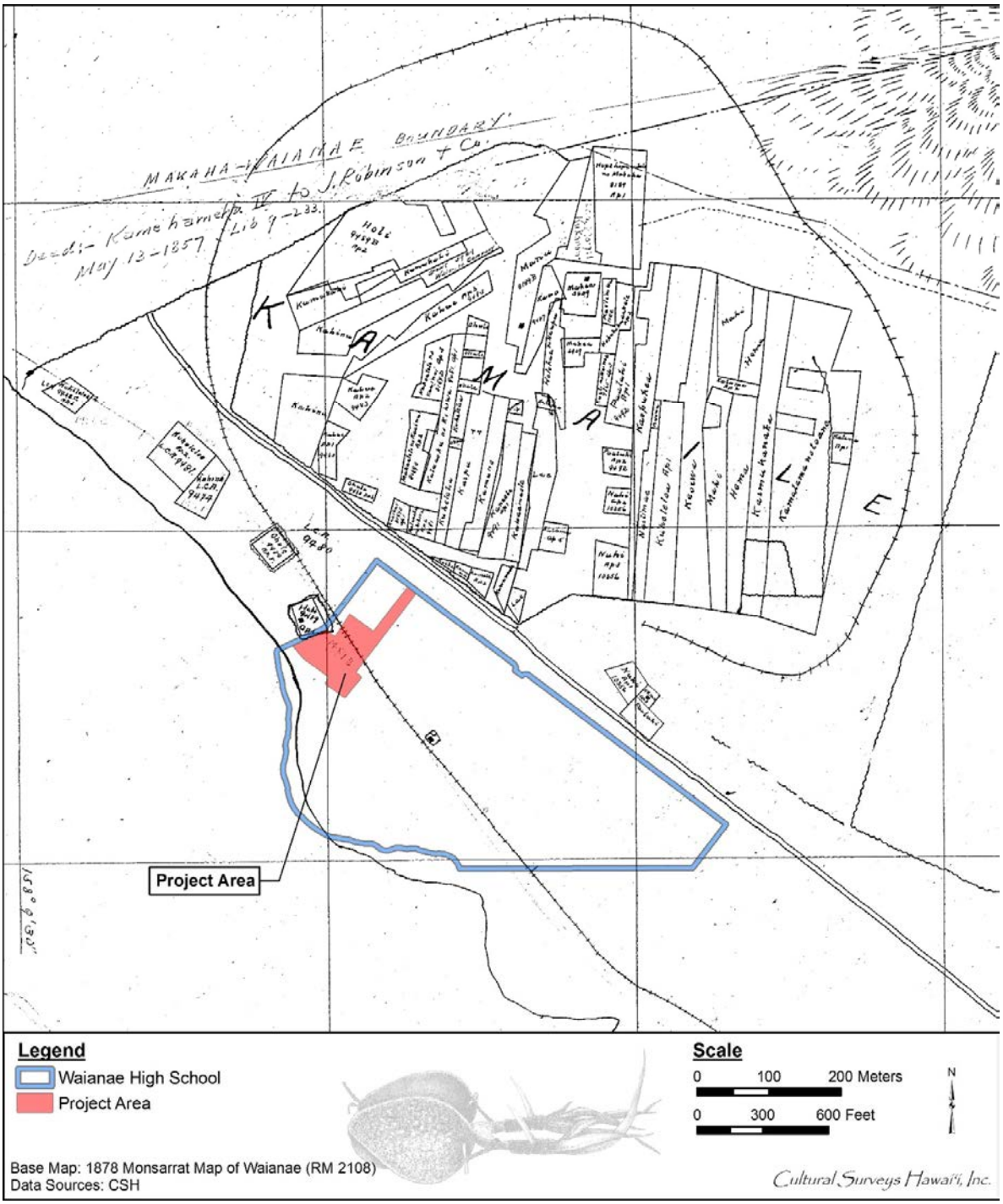

Figure 10. Portion of 1878 Monsarrat map of Wai‘anae showing LCA lots in the Kamaile area, and location of OR&L railroad track through the project area (Monsarrat 1878; Reg. Map No. 2108)

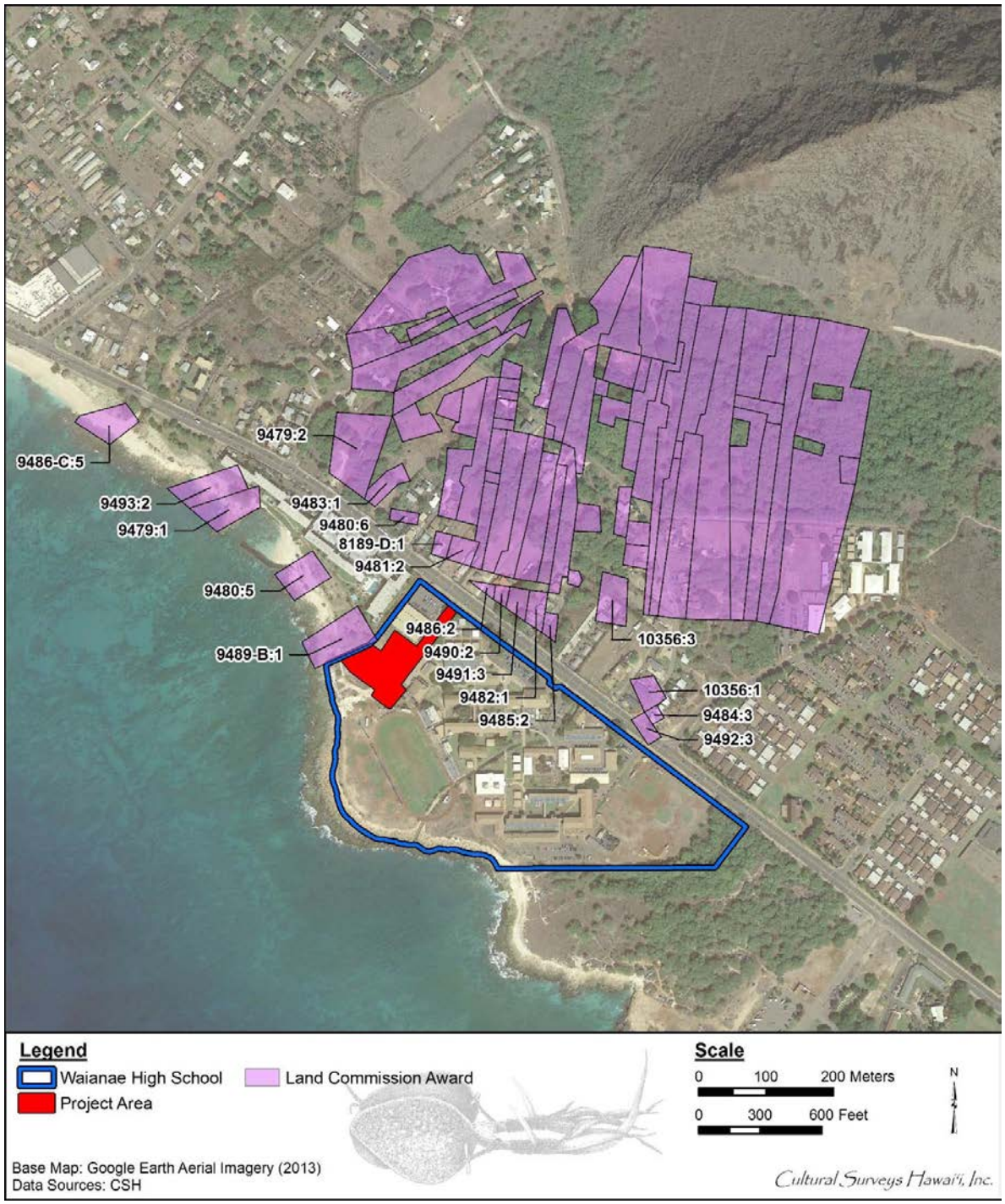

Figure 11. 2013 aerial photograph showing the locations of LCAs near the coastline and near the project area (Google Earth)

claims that his houselot is west of three neighbors, the houselots of Piiapoo, Holokau, and Keohokapu (Cordy 2001:Figure 11). The exact location of these houselots is unknown. While there are no LCA awards in the WHS project area, there were mid-nineteenth century houselots to the east of LCA 9489B to Holi, and thus one or more of these houselots could have been located in the campus area. The Land Commission claim, testimony, and award for LCA 9489B are presented in full in Appendix A

3.2.4 Mid- to Late 1800s

In 1851, Paul F. Manini, son of Don Francisco de Paula Marin, leased 17,000 acres in Lualualei Valley for grazing livestock. By 1863, a missionary reported that "most of the land in the Wai‘anae District was devoted to grazing and had already been divided ‘into six or seven divisions; and secured to as many parties or individuals on long lease or fee simple titles'" (McGrath et al. 1973:31). The experience of the *maka‘āinana* (commoners) in Wai‘anae likely mirrored that of the remaining Hawaiians in Waialua:

> . . . the depredations of the foreigners' cattle had virtually reduced agriculture to the cultivation of wetland taro. For destruction of sweet potato fields and gardens of melons, bananas, maize, and other crops was causing the people to take these out of cultivation, and in some cases to take themselves out of Waialua. [Kirch and Sahlins 1992:149]

A missionary account in 1863 reported only 100 acres were in taro in Wai‘anae Valley and that the only items for sale were fish and fungus. Censuses taken during the second half of the nineteenth century recorded a diminishing population for the Wai‘anae District. In 1853 a combined total of 2,451 persons were recorded in the ‘Ewa and Wai‘anae districts; 19 years later, in 1872, the population total had dropped to 1,671. By 1890, when the districts were recorded separately, the population of Wai‘anae was recorded at 903 individuals (Schmitt 1977:12–13). A large part of the population in 1890 would have been workers at the Waianae Sugar Company Plantation.

The first large-scale industry for Wai‘anae was ranching. James Isaac Dowsett began a ranch in Waianae Uka around 1870 and by the 1880s a relative leased 17,200 acres of Crown Lands in the Wai‘anae Valley for a cattle ranch (McGrath et al. 1973:32). When the Oahu Land and Railway Company (OR&L) railroad was extended to Wai‘anae in 1895, the district became much more accessible. Sometime before 1895, Dowsett built a small hotel on Keaupuni Point in an area later sold as Land Grant 4200, located at present-day Wai‘anae District Park. In 1907, Dowsett sold the remaining 1,231 acres of land in Wai‘anae Kai to the Waianae Sugar Company (Hawaii Office of the Commissioner of Public Lands 1916, Hawaii Office of the Government Survey 1907).

The livestock industry in the Islands reached its peak in the 1870s. At Wai‘anae, a new venture arose to supplant ranching. In 1878, Hermann A. Widemann, a retired Hawaii Supreme Court justice, started the Waianae Sugar Company on land formerly owned by James Dowsett in the *ahupua‘a* of Mākaha, Wai‘anae, and Lualualei (Dorrance and Morgan 2000:43). Widemann leased most of Wai‘anae Kai for 25 years, beginning in 1879:

> Between 1878 and 1884 the economy and community of Wai‘anae underwent a major change, in which the former Hawaiian landscape virtually disappeared. The reason was the production of sugar. The results were the conversion beginning in

> 1878 of coastal and central valley garden plots and irrigation systems to large fields of sugarcane, the construction in 1880 of a plantation railway to haul the cane to the mill, and the building, in the former Hawaiian village, not only of the mill itself, but the creation of a whole town to support the processing of cane. [Green 1980:12]

Widemann hired 20 Hawaiians and brought in 15 technicians and almost 60 Chinese laborers. He built 24 new houses in Wai‘anae Valley and a plantation manager’s mansion on the site of Haua Heiau. He built a water reservoir and installed a flume system to bring water from the reservoir to the mill. A tramway was built from the mill site to the coast where a jetty was constructed. Seven miles of track were laid to haul harvested cane to the mill. In 1880, a Chinese firm planted 122 acres of cane in Wai‘anae and employed about 30 men (McGrath et al. 1973:38-41).

By 1884 Waianae Sugar Company had 475 acres under cultivation, 9 miles of railroad, and 175 men employed. Although no sugarcane was planted directly on the coast, the Waianae Sugar Company did acquire several coastal lots, probably for offices or warehouses. In 1890, Waianae Sugar Company had 600 acres in cultivation (McGrath et al. 1972:42, 48). On 4 July 1895, a rail line of the OR&L extended from Ewa Mill and reached the Waianae Sugar Company track (McGrath et al. 1973:62). The 1884 Jackson map shows the OR&L track traversing near the northwest portion of the project area. (Figure 12). In 1898, the OR&L railway was extended around Ka‘ena Point, linking Wai‘anae with Waialua on O‘ahu’s north shore (McGrath et al. 1973:72). The plantation was purchased by Amfac, Inc. in 1947, and then closed down (Dorrance and Morgan 2000:44).

3.2.5 1900s to Present

Several maps, and aerial photographs show the land use and general development in the vicinity of the project area (Figure 13 through Figure 22). According to Schilz (1994:23), a business directory of 1900 identified 23 taro planters in the Wai‘anae District, but by the 1924 edition of the directory, only one taro planter was listed. Other Hawaiian traditions remained in practice in Wai‘anae into the first decades of the twentieth century; a *kama‘āina* (local inhabitant) reported: “. . . between 1910 and 1912 there lived in the Wai‘anae area about 25 *kahunas* known [only] to the Hawaiians” (McGrath et al. 1973:84). However, the sugar plantation continued to dominate the landscape. A 1906 Donn map shows the area northwest of the project area planted in sugar and the railway still extant through the high school campus (see Figure 13).

U.S. Army War Department Fire Control maps from 1919 and 1936 show a line of the OR&L railway extending through the high school campus and within the current project area (see Figure 14 and Figure 15). A 1928 aerial photograph shows the project area divided by the OR&L railway, with the area *mauka* of the railway under commercial agriculture (most likely sugarcane) and the area *makai* of the railway undeveloped and relatively undisturbed (see Figure 16).

On 2 July 1918, the U.S. Army established the Waianae Kai Military Reservation by presidential executive order 2900 (Flood et al. 1994:42). During World War II, Wai‘anae became the site of massive amphibious training operations with more than 200,000 men training at the Waianae Kai Reservation and surrounding lands. A 1943 U.S. Army War Department map shows the structures and roadways near the project area, which is northwest of the Military Reservation (see Figure 17).

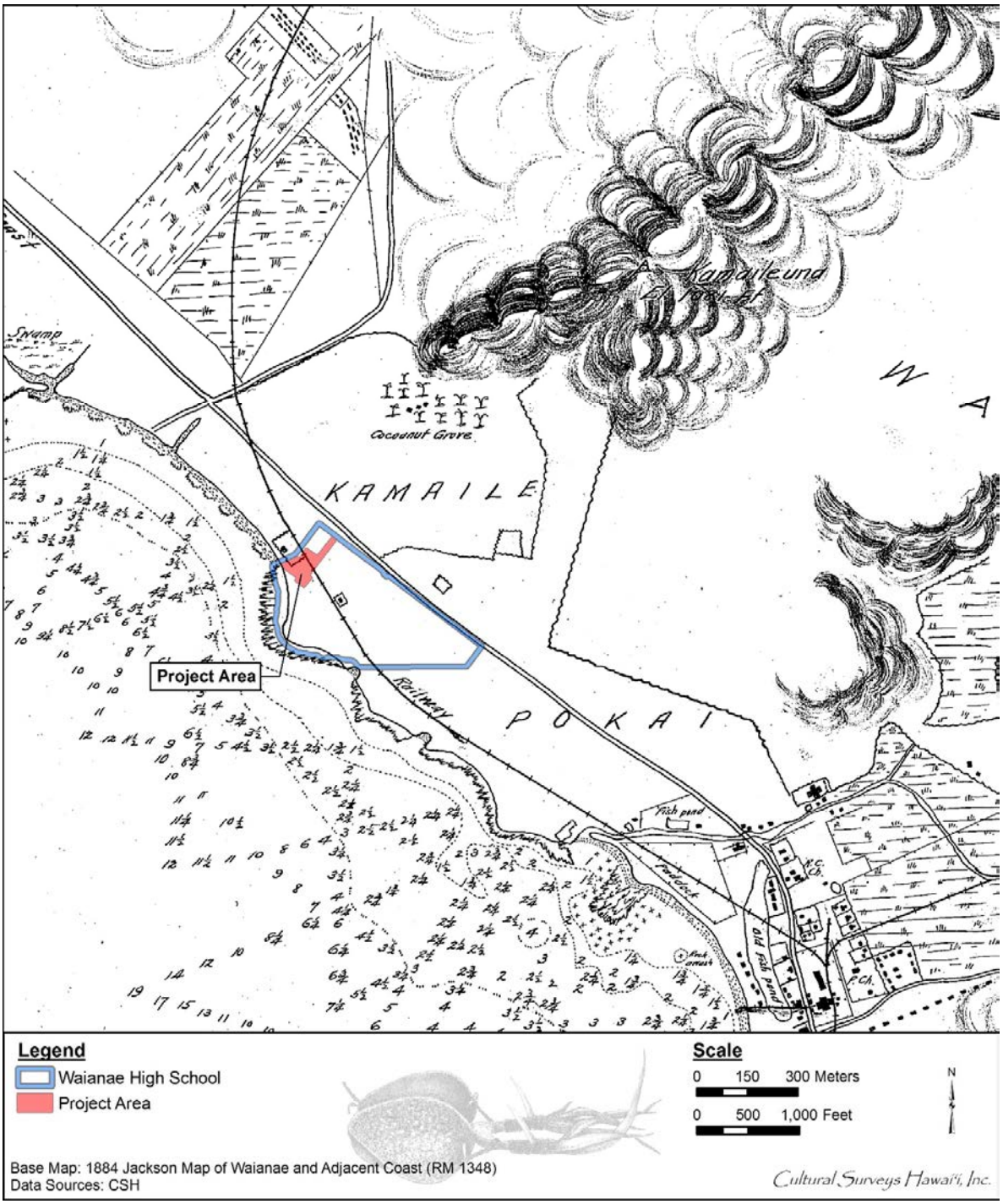

Figure 12. Portion of 1884 Jackson map (Reg. Map No. 1328) of Waianae and adjacent coast, showing the OR&L Railway extending through the WHS Campus

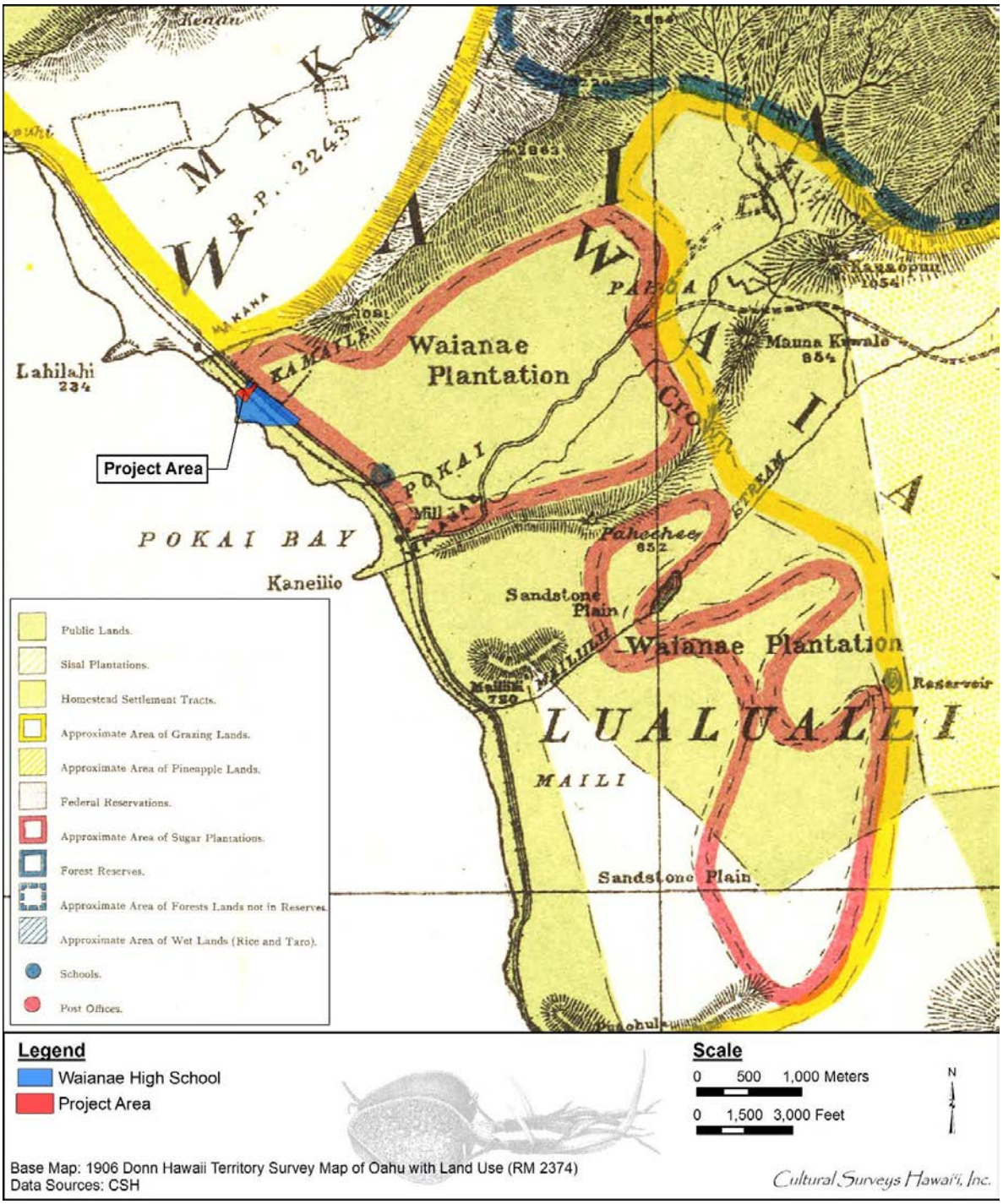

Figure 13. Portion of 1906 Donn (Reg. Map No. 2374) Hawaii Territory Survey map of O‘ahu showing the various land uses in the vicinity of the project area and the railway extending through the WHS campus

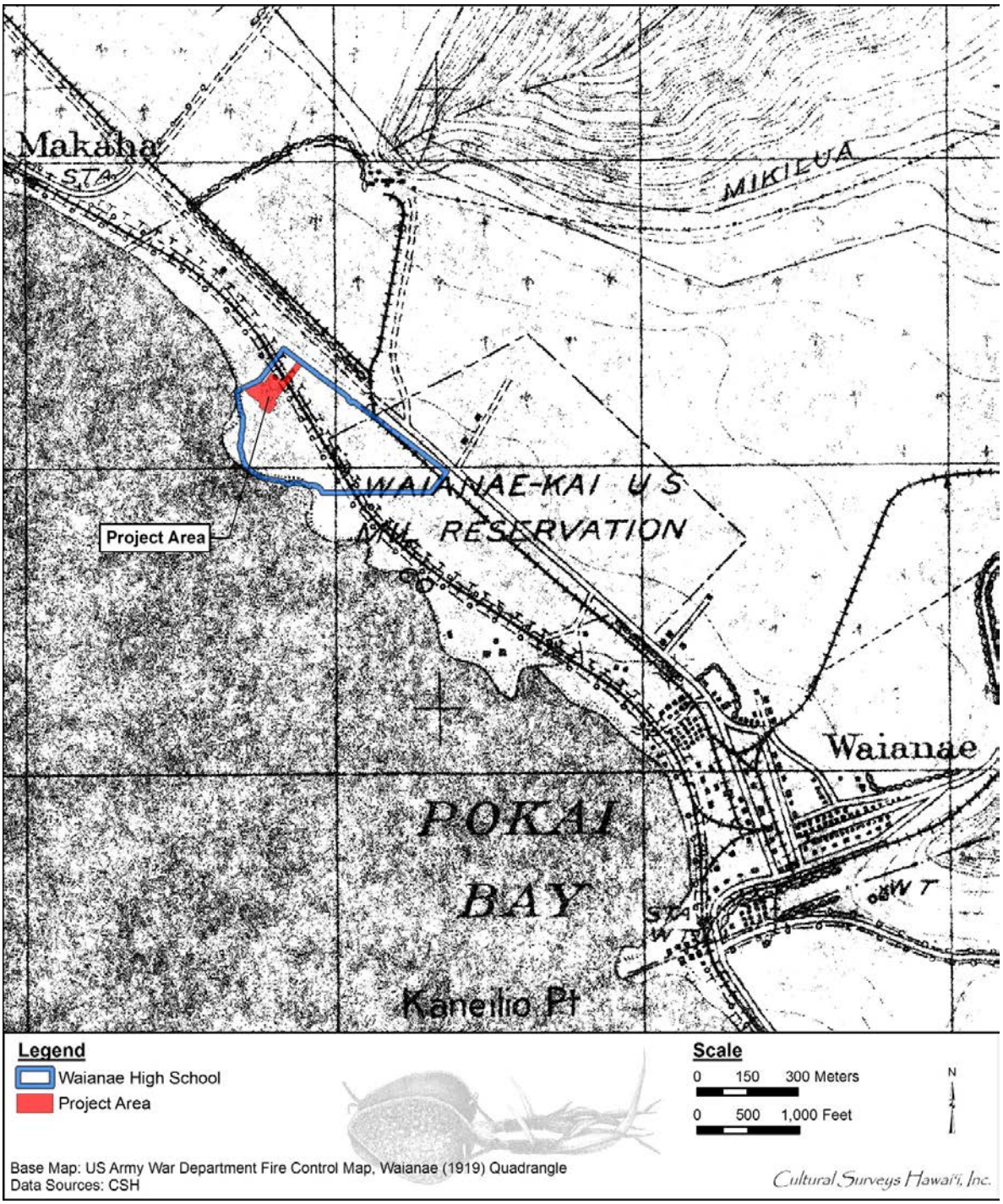

Figure 14. Portion of 1919 U.S. Army War Department Fire Control map, Waianae Quadrangle showing the location of the project area

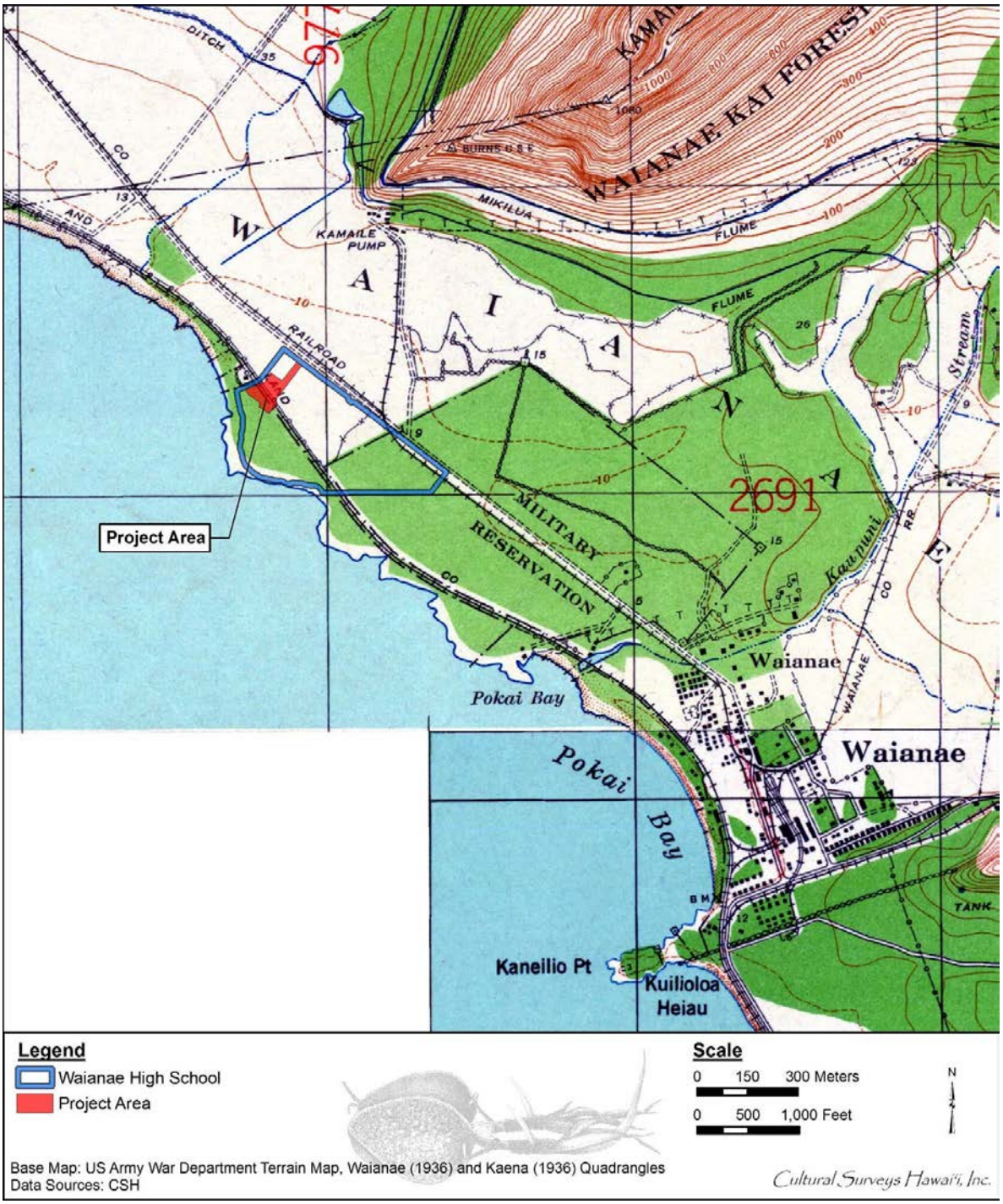

Figure 15. Portion of the 1936 U.S. Army War Department Terrain map, Waianae and Kaena Quadrangles, showing the location of the project area

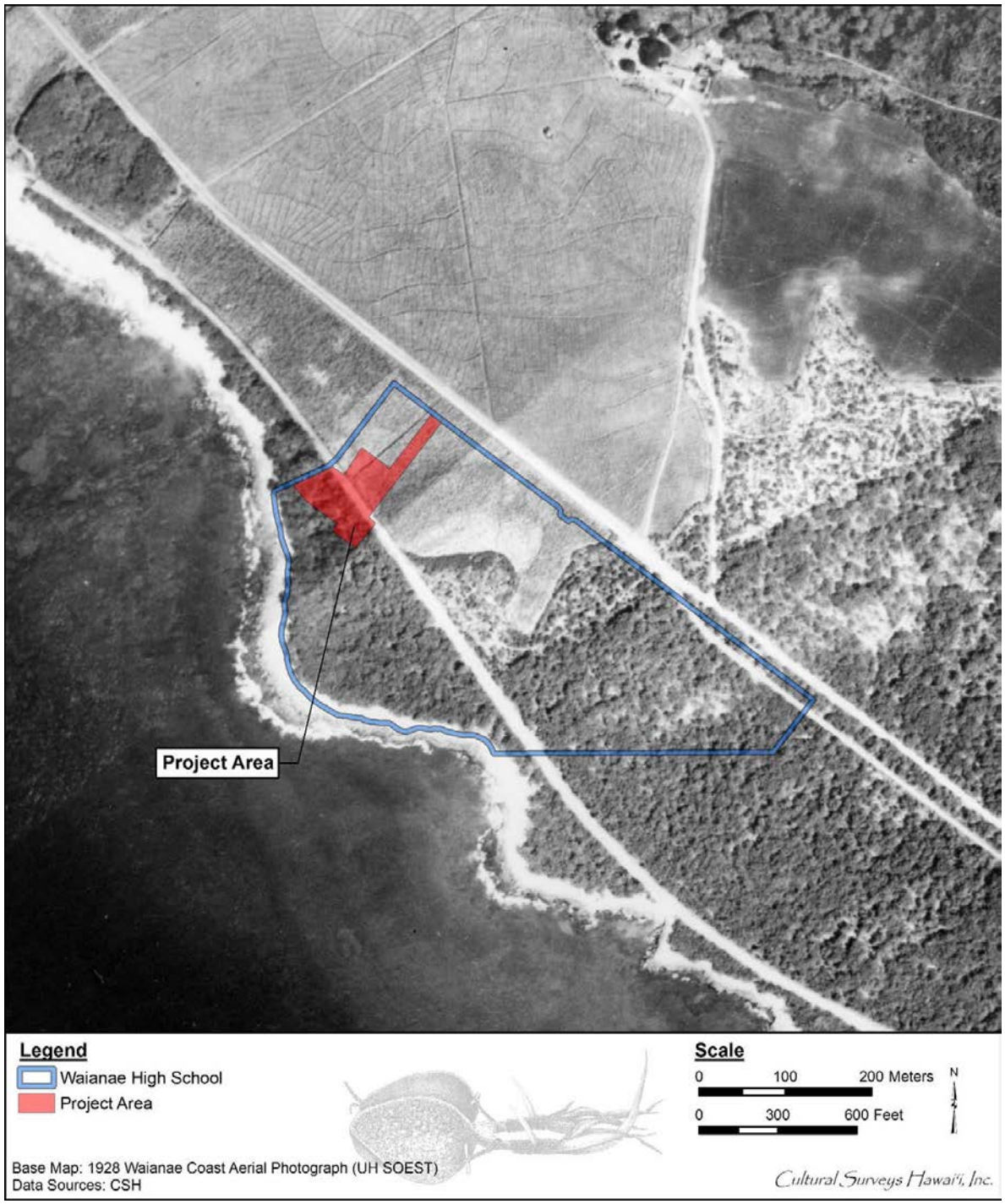

Figure 16. 1928 UH SOEST Waianae Coast aerial photograph showing the lack of development within the project area

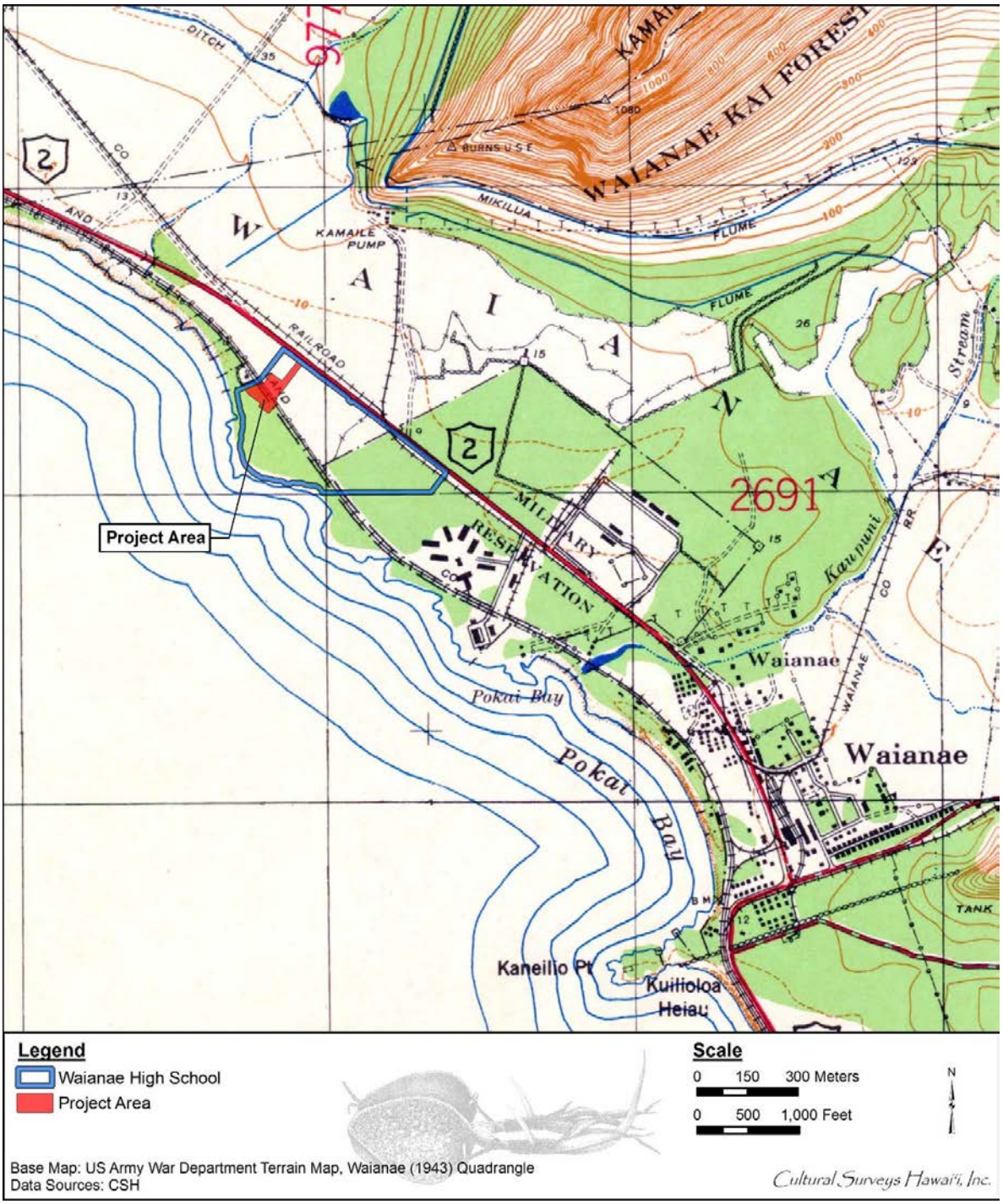

Figure 17. Portion of 1943 U.S. Army War Department Terrain map, Waianae Quadrangle, showing the location of the project area

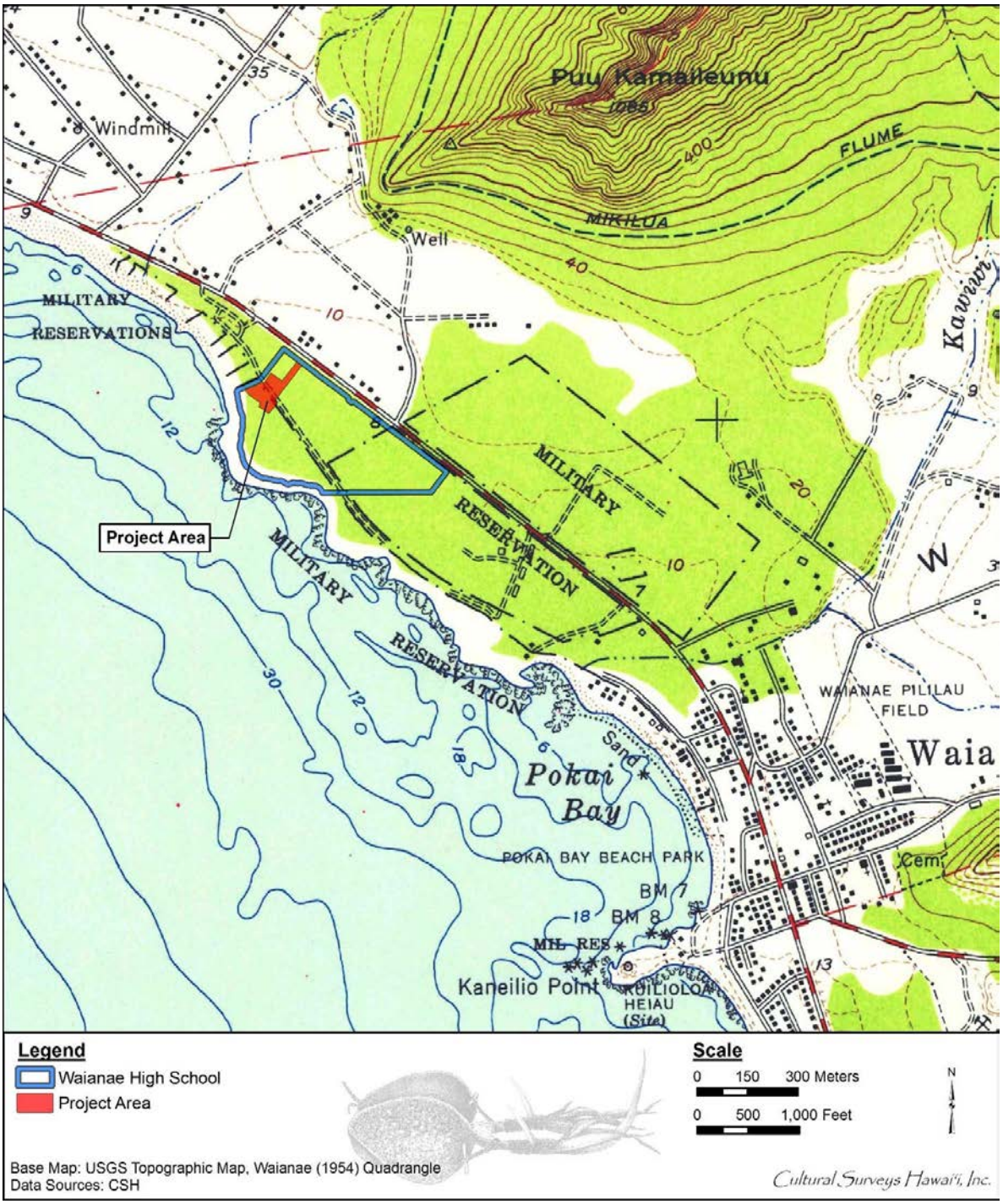

Figure 18. Portion of the 1954 Waianae USGS topographic quadrangle showing the location of the project area

Figure 19. 1960 UH SOEST Waianae Coast aerial photograph showing the development of Waianae High School within the project area

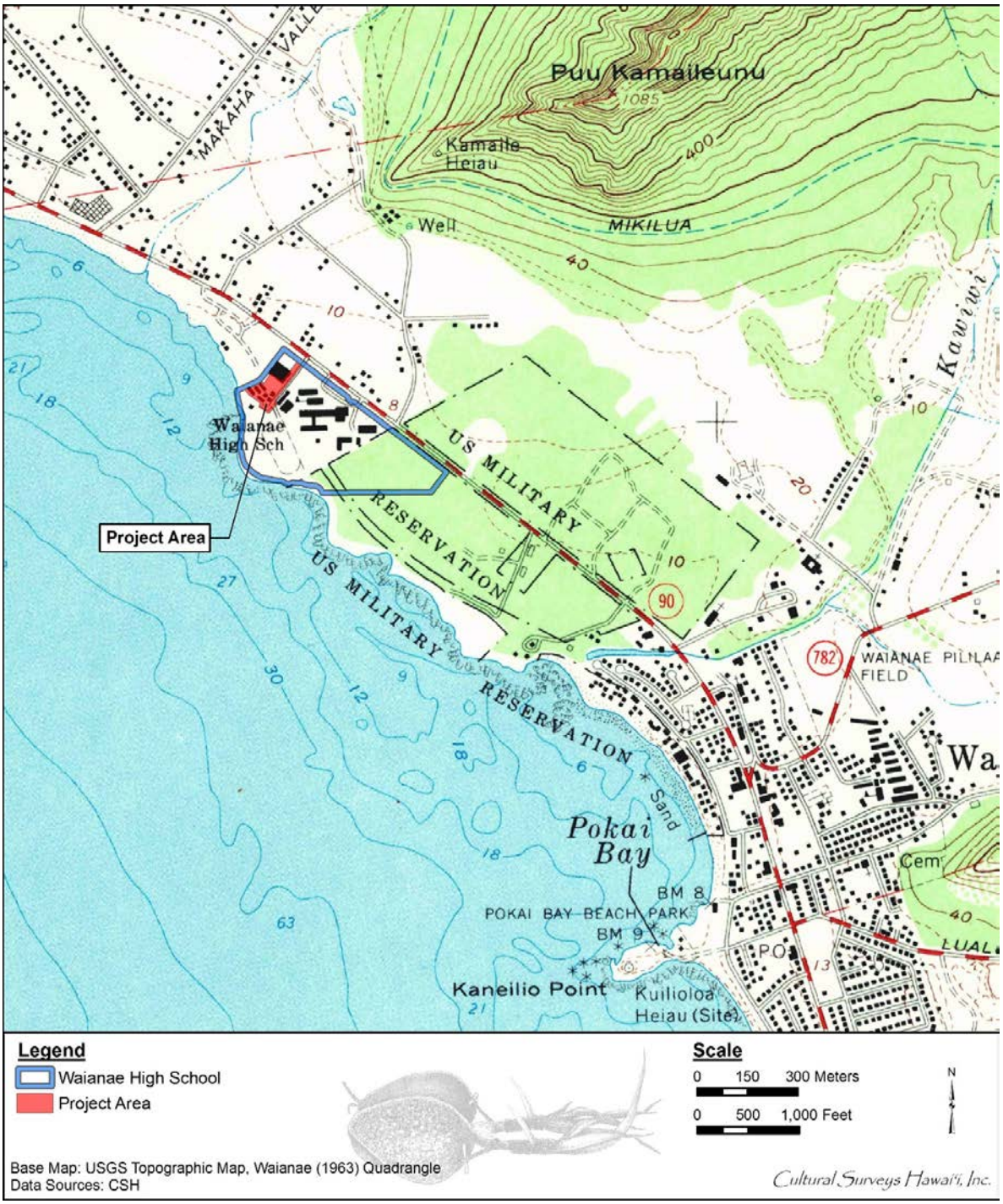

Figure 20. Portion of the 1963 Waianae USGS topographic quadrangle showing the location of the project area

Figure 21. 1971 UH SOEST Waianae Coast aerial photograph showing the project area within the WHS athletic field

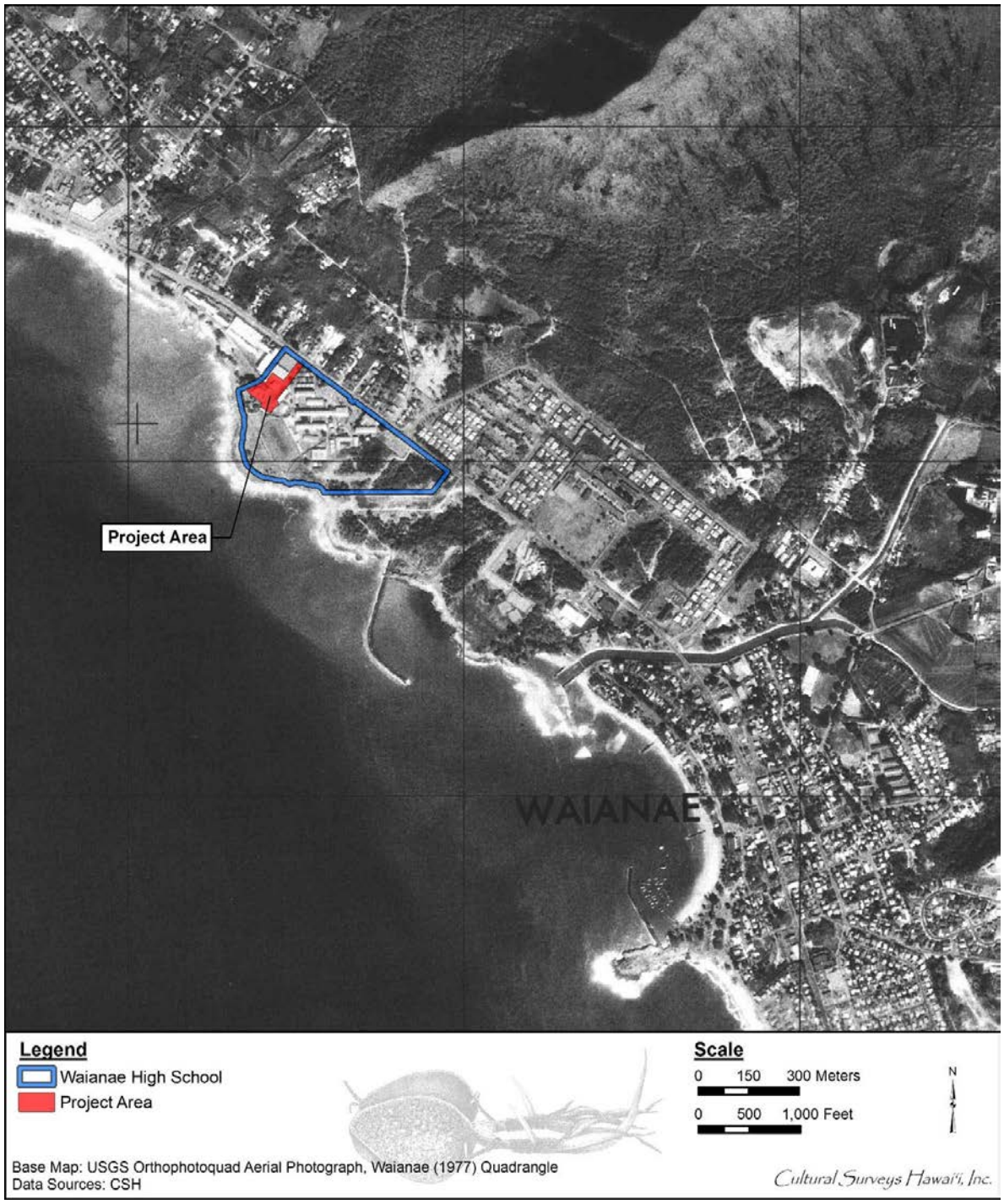

Figure 22. 1977 UH SOEST Waianae Coast aerial photograph showing the project area within the WHS athletic field

The sugar plantation never recovered after the war. American Factors Ltd. had bought the plantation in 1931. On 17 October 1946, the stockholders voted to liquidate the plantation eliminating the economic mainstay of the Wai‘anae Coast. Chinn Ho, head of Capital Investment Company, bought the nearly 10,000-acre plantation parcel for $1.25 million in 1947. During the late 1940s, Chinn Ho promoted the establishment of new ventures in Wai‘anae:

> By 1949, [Chinn Ho] was trying to interest dairy operators in farm lots. The manager of a large dairy company in San Francisco turned down an offer of about 450,000 acres of prime sugar land in Wai‘anae Valley because ‘land in Hawaii is going to be much cheaper in the future.’ The wife of a local dairy operator was concerned about the schools in Wai‘anae, but her husband bought the farm anyway. [McGrath et al. 1973:151]

A 1954 U.S. Army Map Service topographic map depicts the project area near military reservations and the railway appears to have been converted to a roadway (see Figure 18). UH SOEST aerial orthophotos from 1960, 1971 and 1977 and a 1963 USGS map show increased development of Wai‘anae, including the creation of WHS (see Figure 19 through Figure 22), shown first on the 1960 map, with only a few buildings *makai* of the highway. The gymnasium is first shown on the 1963 USGS maps, and the pool is first shown on the 1977 aerial photograph.

3.2.6 Contemporary Land Use

Today, Wai‘anae Kai Ahupua‘a is covered by homes, farms, and gardens. Wai‘anae Valley and its people are engaged in many new projects that perpetuate Hawaiian traditions and culture. These projects range from archaeological field trips to restoring ancient *lo‘i* terraces near Mount Ka‘ala. Ka‘ala Farm was developed in 1996 as a learning center for children and the community with a *hale* (a house), working *lo‘i*, and access to numerous archaeological sites including *heiau*, terrace systems, and house sites (Cordy 2013). Construction of Wai‘anae High School began in 1956 (*Honolulu Star Bulletin* 11 March, 1956) with continued construction of new buildings to the present.

Section 4 Previous Archaeological Research

No previous archaeological studies have been conducted within the project area, and only one known study (Belluomini and Hammatt 2016) within the larger WHS campus. However, numerous studies have been conducted within the vicinity of the project area. These studies and their results are summarized in Table 2 and discussed chronologically in the following paragraphs. The locations of previously conducted archaeological studies and previously documented historic properties within the vicinity of the project area are depicted on Figure 23 and Figure 24.

Table 2. Previous Archaeological Studies in the Vicinity of the Project Area

Reference	Type of Study	Location	Results (SIHP # 50-80-07-****)
McAllister 1933	Reconnaissance survey	Island-wide	Described Site 154 (Puehu Fishpond), Site 155 (Keaupuni Heiau), Site 156 (Kahoalii Heiau), Site 159 (Kalamaluna Heiau), Site 160 (Kane Heiau) and Site 161 (Kamaile Heiau) within the vicinity of the project area
Sinoto 1975	Reconnaissance survey	Wai‘anae Light-Draft Harbor, Wai‘anae Regional Park	Documented five historic properties: SIHP #s -4822 (enclosure), -4823 (enclosure/L-shaped wall), -4824 (wall), -4825 (enclosure), and -4826 (L-shaped wall)
Douglas 1991a	Burial report	Makaha Surfside Apartments, Wai‘anae	Recovered and documented sub-adult burial eroding out of Mauna Lahilahi Beach Park (SIHP # -4064)
Douglas 1991b	Burial report	Makaha Surfside Apartments, Wai‘anae	Artifact memorandum and skeletal analysis from two individuals recovered by SHPD in 1979 (SIHP # -4064)
Kawachi 1991a	Burial report	Makaha Surfside Apartments, Wai‘anae	Recovered and documented sub-adult burial eroding out of Mauna Lahilahi Beach Park (SIHP # -4064)
Kawachi 1991b	Burial report	Makaha Surfside Apartments, Wai‘anae	Artifact memorandum and skeletal analysis from two individuals recovered by SHPD in 1979 (SIHP # -4064)
Denham et al. 1992	Archaeological inventory survey	Wai‘anae Regional Park	No historic properties identified
Kawachi 1992	Burial study	Wai‘anae Regional Park	Human remains of one individual identified and designated as part of SIHP # -3967 (Wai‘anae Regional Park)

Reference	Type of Study	Location	Results (SIHP # 50-80-07-****)
Flood et al. 1994	Archaeological inventory survey	Wai‘anae Intermediate School	SIHP # -2474 (pre- and post-Contact complex) identified; 24 features, including 18 sinkholes documented along with lure point artifact made of human long bone
Jourdane 1995	Burial report	Mauna Lahilahi Beach Park	Reported discovery of two burials eroding out of Mauna Lahilahi Beach Park (SIHP # -4064)
Borthwick and Hammatt 1997	Inadvertent discovery of human skeletal remains report	Church of Jesus Christ of Latter Day Saints, Wai‘anae	Documented six burials exposed after area graded ; located in a cluster at southwestern edge of property (no SIHP # assigned)
Magnuson 2000	Archaeological reconnaissance survey	Southern base of Pu‘u Kamaile‘unu in Wai‘anae	No historic properties identified
Elmore and Kennedy 2001	Archaeological inventory survey	Wai‘anae coast emergency access road	Documented SIHP # -5949 (traditional Hawaiian habitation site and burial) and SIHP # -5950 (sugar plantation camp and pumping station remnants)
Cordy 2002b	Archaeological investigation	Makaha Surfside Apartments, Mauna Lahilahi Beach Park	Documented 15 features: two burial pits, four fire pits, five indeterminate pits, two paving stone foundations, and two twentieth century trash pits along coastal habitation site (SIHP # -4064)
Jones and Hammatt 2003	Archaeological monitoring	Mauna Lahilahi Beach Park	No historic properties identified
Kailihiwa and Cleghorn 2003	Archaeological monitoring	Board of Water Supply water improvement project; on ten streets including Valley and Ma‘i‘u‘u roads, and Lahaina, Hanalei, Jade, Orange, Fricke, Moua, Lahilahi, Widemann, and Upena streets	Documented three historic properties: SIHP #s -3325 (portion of a concrete flume), -6521 (pit feature), and -6522 (two fire pits); a possible trench and charcoal deposit also identified but no SIHP # assigned; SIHP #s -6521 and -6522 not located in the vicinity of the project area

Reference	Type of Study	Location	Results (SIHP # 50-80-07-****)
Clark et al. 2004	Archaeological inventory survey	Wai‘anae Regional Park	Located sites documented by Sinoto (1975) and redesignated the three extant historic properties (SIHP #s -4822, -4825, and 4826) as Features 2 through 4 of SIHP # -3967, respectively; also redesignated the burial identified by Kawachi (1992) as Feature 1 of SIHP # -3967 and documented four newly identified features (Features 5 through 8) consisting of four sinkholes
Perzinski and Hammatt 2004	Archaeological inventory survey	Mauna Lahilahi Beach Park	Documented two new historic properties: SIHP #s -6634 (intact cultural layer) and -6635 (historic basalt alignment); also documented components of previously documented historic properties: SIHP # -4064, human burials, and SIHP # 50-80-12-9714 (OR&L Railroad Right of Way)
Tulchin and Hammatt 2004	Archaeological monitoring	Farrington Hwy from Jade St to Kaulawaha Rd	No historic properties identified
Hammatt and Shideler 2006	Archaeological inventory survey	Wai‘anae Civic Center	Identified a single human burial (SIHP # -6860)
Shefcheck and Spear 2007	Archaeological assessment	2.5-acre property north of Wai‘anae Intermediate School	No historic properties identified
Tulchin and Hammatt 2007	Archaeological inventory survey	Spotkaeff House project, east of Mai‘u‘u Rd and Mahina‘au Rd	Documented SIHP # -6858 (remnant historic L-shaped basalt and mortar foundation); related to former sugar cane plantation in area
Desilets 2008	Archaeological assessment	Hawai‘i Department of Transportation Wai‘anae baseyard	No historic properties identified
Hazlett et al. 2008	Archaeological monitoring	Wai‘anae Civic Center	No historic properties identified
McElroy 2008	Archaeological monitoring	Farrington Hwy, in Lualualei, Mākaha, and Wai‘anae Ahupua‘a	No historic properties identified

Reference	Type of Study	Location	Results (SIHP # 50-80-07-****)
Shefcheck and Spear 2008	Archaeological assessment	Wai‘anae Regional Park	No historic properties identified
Hammatt 2009	Memorandum	Seawind Apartment project	Located and conducted GPS data collection for a portion of the site complex SIHP # -2474, previously documented by Flood et al. (1994)
Jones and Hammatt 2009	Archaeological monitoring	Mauna Lahilahi Beach Park	Identified two human burials, SIHP #s -6704 (intact historic coffin burial) and -6705 (previously disturbed human remains)
Shefcheck and Spear 2009	Archaeological monitoring	2.5-acre property north of Wai‘anae Intermediate School	No historic properties identified
Liebhardt and Kennedy 2010	Archaeological inventory survey	Mākaha Valley Road and Farrington Hwy	No historic properties identified
Mooney et al. 2013	Archaeological assessment	Proposed Wai‘anae Solar Power Farm	Identified 16 potential historic properties designated T-001 through T-016; no SIHP #s assigned
Yucha et al. 2014	Archaeological inventory survey	Kamaile Plantation Wells and Production Wells site	Documented five historic properties: SIHP #s -1185 (Kuka‘au‘au Complex), -1190 (C-shaped enclosure), -1191 (Wai‘anae “Kamaile” Complex), -5949 (traditional Hawaiian habitation site and burial) and -5950 (sugar plantation camp and pumping station remnants)
Yucha et al. 2015	Archaeological monitoring	Wai‘anae Regional Park	No historic properties identified
Belluomini and Hammatt 2016	Literature review and field inspection	WHS Athletic Field	No historic properties identified and no further archaeological historic preservation work recommended
Hawai‘i Register	N/A	Former Waianae Plantation	Waianae Plantation, designated SIHP # -9993, listed on the Hawai‘i Register of Historic Places

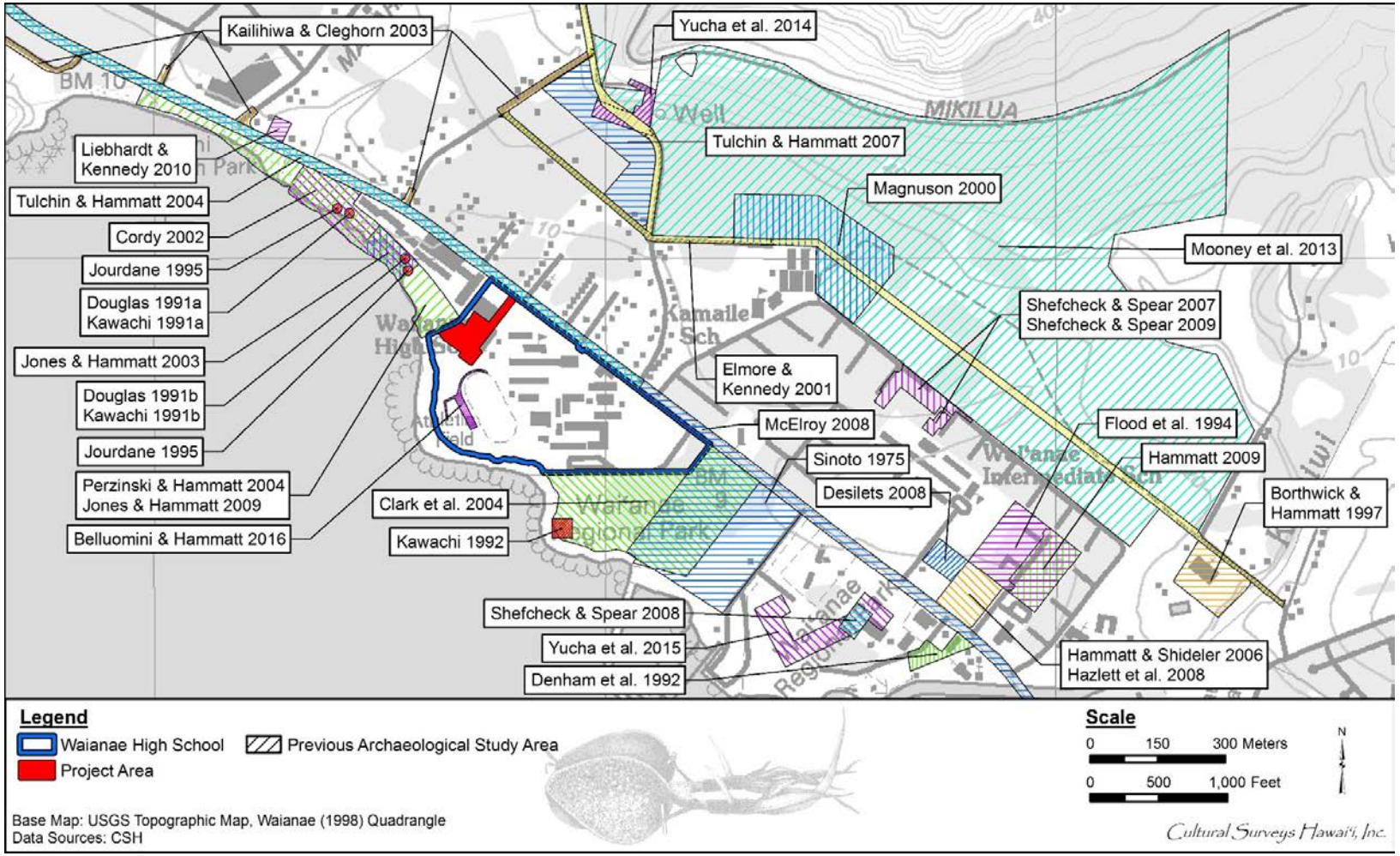

Figure 23. Portion of 1998 Waianae USGS 7.5-minute topographic quadrangle showing the locations of previously conducted archaeological studies within the vicinity of the project area

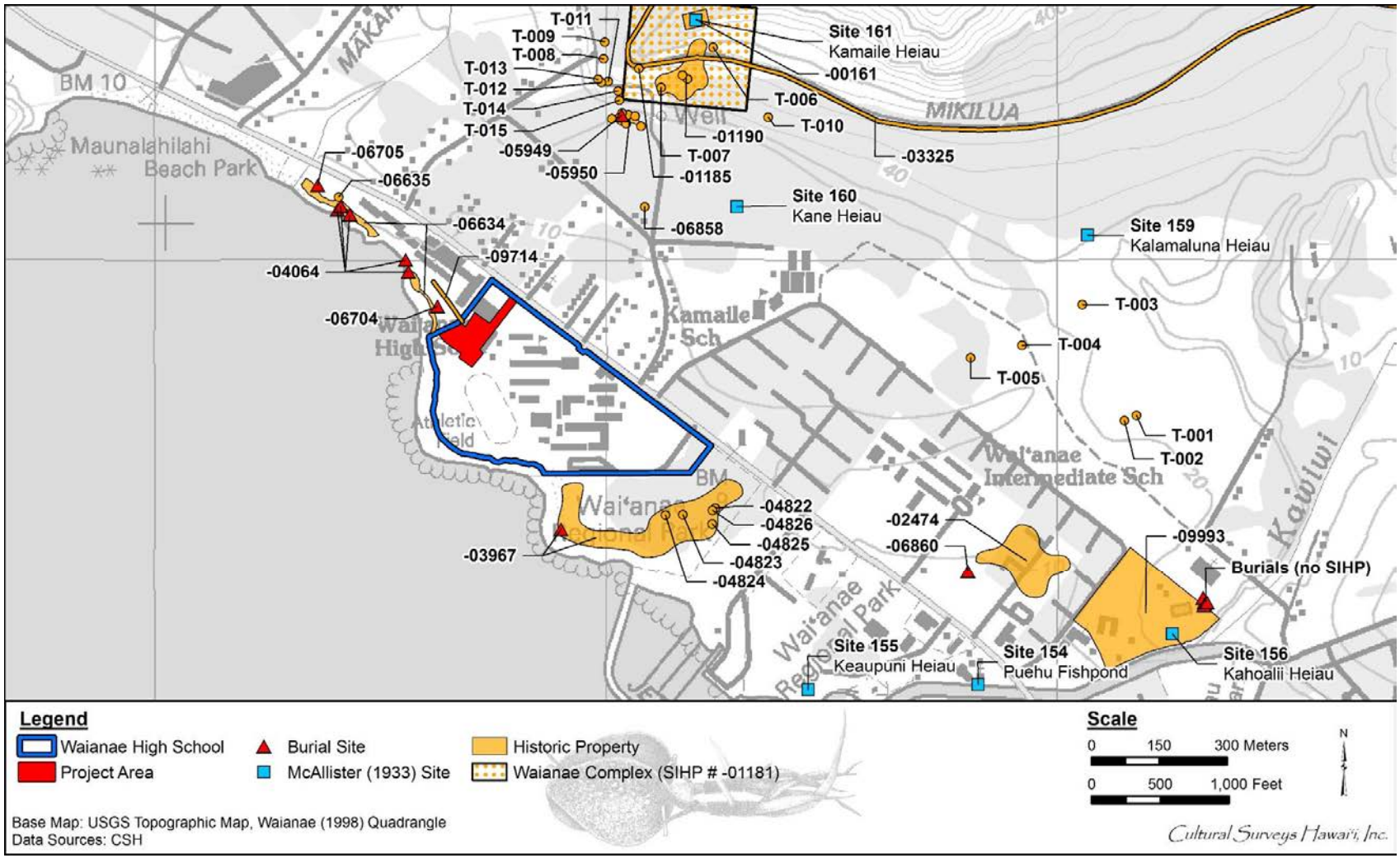

Figure 24. Portion of 1998 Waianae USGS 7.5-minute topographic quadrangle showing the locations of previously documented historic properties within the vicinity of the project area

4.1 Heiau of Wai‘anae

In 1930, McAllister (1933) conducted an island-wide survey of sites on O‘ahu. These sites were designated with site numbers and described. Six sites were documented in the vicinity of the project area (see Figure 24):

> **Site 154**. Puehu Fishpond, Waianae.
>
> Located on the west side of the foot of the Waianae stream, Puehu pond is said to have once been of great importance. Due to neglect it is greatly overgrown and its extent not clearly defined. Its original area was probably 300 by 75 feet, and it seems to have been dug out of the earth 25 feet from the stream. . This pond is about 500 feet from the beach and is not affected by the tides, though the end toward the sea may at one time have been connected with ·the stream. The water now standing in the pond is from 1 to 2 feet deep. [McAllister 1933:113]
>
> **Site 155**. Keaupuni, said to be the name of a heiau which was once located on the small point on the Makaha side of Pokai Bay where the J.M. Dowsett home is now located. Nothing remains of the old temple. [McAllister 1933:114]
>
> **Site 156**. Kahoalii heiau, on Puu Kahea. The present site of Mr. Brecht’s barn was pointed out by Harry Poe and William Smithers as the old heiau site. Nothing now remains except an elevation of land and the knowledge among the natives. Thrum [1907] has the following information:
>
> Size 120 by 80 feet; entirely destroyed even to its foundations. Stones taken in 1870 for fence building. This is said to have been the place of Kahahana’s residence, and the scene of some of Kamapuaa’s escapades. . . . This heiau destroyed by J.L. Richardson, and its stones used to enclose the manager's premises. [McAllister 1933:114]
>
> **Site 159**. Kalamaluna heiau at Kuaiwa, the approximate site of which was pointed out in the cane field, but of which nothing else is known or remembered. [McAllister 1933:114]
>
> **Site 160**. Kane heiau, Kamaile.
>
> The approximate location in the cane field was pointed out, but all the stones have been moved. The full name is said to be Kane-i-ka-pua-Iena. This is the heiau at which Kawelo is said to have stopped and offered sacrifices when on his way to Kauai to wage war on Aikanaka (85, p. 183). Some legends say that Kawelo stopped at the Makaha heiau known as Kaneaki (Site 170). [McAllister 1933:114]
>
> **Site 161**. Kamaile heiau, on Kamaile ridge between Waianae and Makaha valleys, an elevation about 400 feet, just above pumping station…
>
> The heiau is a single terrace, built of large, sharp lava rocks. The facings of the terrace are surprisingly even and were carefully fitted. The heiau was formerly paved with small bits of coral, giving it the appearance of fine, white gravel. The amount of such coral is surprising . . . Thrum [1907] offers the following information: ‘A medium sized heiau of platform character and pookanaka class,

> still in fair condition, to be seen from the road on the bluff above the pipe line of the electric pumping station.'
>
> Beneath the heiau, but still above the pump, is a shallow cave shelter known as Kukaauau. The entrance, which faces due south, is concealed by a large kiawe (algaroba), some Cactus, and haole koa. The cave is approximately 40 feet deep and 25 feet wide and 10 feet high at the entrance. It might prove interesting if excavated because it is on the ridge back of what was once a large Hawaiian settlement. The famous Kaimaile spring, known as Kekoo, which watered many acres of taro land (73 just before it was taken over by the plantation) between the ridge and Mauna Lahilahi, was near the base of the shelter. The cave has the appearance of being artificially filled in, for the dust of the floor does not appear to have dropped from the roof. On the floor are many bits of matting, broken gourds, straw, and a few pages from a book printed in Hawaiian which appears to be a portion of a catechism. About one-third of the way in, on the right-hand side facing into the cave, a small hole 6 inches deep was made with a stick and a torn part of 'Ka Hae Hawaii,' dated Mei 14, 1856, was found. These cut pieces are in surprisingly excellent condition; the paper is not even yellow or fragile. The paper has been cut with a scissors or knife. A number of tapa (kapa) fragments were found; one a brick-red color. The floor is covered with grasses, ti leaves, banana stalks, coral, sea shells, a bunch of awa strainers, kukui nuts, coconut shells, charcoal, and a few broken bottles. Near the back of the cave was a hole 2 feet in diameter and about 1 foot deep. Though there is a small plantation camp at the base, the shelter is probably not often frequented now. [McAllister 1993:114–115]

4.2 Previous Archaeological Studies in the Vicinity of the Project Area

4.2.1 Sinoto 1975

In 1975, the Department of Anthropology at the Bernice Pauahi Bishop Museum conducted a reconnaissance survey for the Wai‘anae Light-Draft Harbor project near the western boundary of the Wai‘anae Regional Park (Sinoto 1975). The project area is located adjacent to the boundary of the Wai‘anae Regional Park and was previously disturbed, most likely due to military activities and more modern bulldozing. During the survey, five archaeological sites were identified, although all had been destroyed beyond the point required for any research of interpretative potential. The sites include two enclosures (SIHP #s -4822 and -4825), an enclosure with adjoining L-shaped wall (SIHP # -4823), and two walls, one L-shaped (SIHP # -4826) and one linear (SIHP # -4824). Due to the stark contrast in the environment between this area and the inland areas of nearby Wai‘anae and Mākaha valleys, these sites were thought to be part of fringe settlement, where activities were limited to those related to the sea. Dr. Sinoto concludes that due to the crude construction of these structures, the sites were most likely temporary in nature (Sinoto 1975).

4.2.2 Kawachi 1991a; Douglas 1991a

A memorandum by Kawachi (1991a) from SHPD documents the discovery and disinterment of human skeletal remains from 27 February 1991. The burial was reported as eroding out of the beach at the Ka‘ena corner of the Makaha Surfside Apartments, on City land over 24 m southwest from the property line. A 30-cm-thick cultural layer exhibited dark staining, charcoal, and midden

at 54 cm below surface (cmbs) and was designated SIHP # -4064. A shell fishhook preform also was found in this cultural layer. The burial pit was completely within the cultural layer and the burial was determined to be in a supine flexed position with the head facing toward the ocean and some displacement of elements likely due to wave action (and police investigations during the previous day). Douglas (1991a) conducted an osteological analysis and concluded the partial remains of two individuals were present. One individual was a 7 to 9-year-old child. The second individual was represented by several cranial bones and determined to possibly be a middle-aged male individual. These remains were reinterred with other finds at the designated Lucio Badayos family reinterment site within Mauna Lahilahi Beach Park.

4.2.3 Kawachi 1991b; Douglas 1991b

A memorandum by Kawachi (1991b) and Douglas (1991b) from SHPD includes an artifact and skeletal analysis summary to supplement the disinterment of human skeletal remains from October 1979, designated SIHP # -4064. A burial containing two individuals was found in front of the Makaha Surfside Apartments which border the Mauna Lahilahi Beach Park in Wai‘anae. The artifacts were found during the skeletal analysis and included a rusted nail, wood fragments, a non-human bone fragment, a *kukui* nut shell, and five buttons. The skeletal remains indicated a middle-aged male around 5ft 10 inches tall, and a probable female adult. The ancestry of the individuals was indeterminate due to the incompleteness of the remains, and the time period (pre-Contact versus post-Contact) also was indeterminate. The artifacts were historic but the exact association of the artifacts to the remains is unknown as they may have originated from the surrounding fill material. As part of the skeletal analysis, it was stated that the “place of burial infers that these two were not people of rank” (Kawachi 1991b:6).

4.2.4 Denham et al. 1992

In May 1992, Archaeological Consultants of Hawaii, Inc. conducted an archaeological inventory survey (AIS) on a 2-acre parcel for the proposed extension of Wai‘anae Regional [District] Park (Denham et al. 1992), located directly east of the current project area. The study included ten test excavations in the parcel and six auger holes drilled specifically along the southern boundary to test for the presence of sediment from the former Puehu Fishpond. The lack of carbon in the samples indicated a highly unlikely presence of fishpond sediment in the area (Denham et al. 1992). Artifacts included mostly modern and historic items, as well as a pre-Contact volcanic glass flake and a possible basalt abrader. No significant cultural deposits were observed. The stratigraphy in the area was representative of a marine transgression and emergent reef environment from the lowering of the sea level (Denham et al. 1992:54).

4.2.5 Kawachi 1992

In September 1992, Carol Kawachi from SHPD responded to a find of skeletal remains likely exposed by Hurricane ‘Iniki on the beach fronting Wai‘anae Regional Park, approximately 25 m from the water. Kawachi (1992) identified the remains as a flexed burial likely of an adult female. The burial was left in situ and unmarked. Kawachi (1992) notes that in 1988, Wai‘anae Regional Park was designated SIHP # -3967 because of sites observed by the SHPD. Informants indicated the area was part of a known burial ground of the Kamaile complex and families would bury members in the sinkholes.

4.2.6 Flood et al. 1994

In 1993, Bishop Museum conducted an AIS of a 7-acre parcel near the Wai‘anae Intermediate School approximately 250 m northeast of the current project area. A total of 24 archaeological features were identified and designated as components of SIHP # -2474 (Flood et al. 1994). These features included a core-filled wall, a scatter of historic artifacts, a rubbish mound, an L-shaped boulder slab alignment, a low platform, a small terrace, four modified sinkholes yielding pre-Contact cultural material, and 14 unmodified sinkholes. Excavations conducted on ten of the features yielded pre-Contact cultural material such as lithics, a bone fishhook fragment, midden, an assemblage of extinct avifauna remains and other faunal material, and an assortment of historic artifacts. A probable “human long bone fragment which was apparently part of a finished lure point” (Flood et al. 1994:151) was the only human bone recovered. The extinct avifauna included a true goose (*Branta* sp.), a goose-like *moa-nalo* of the family Anatidae (*Thambetochen xanion*), a small flightless rail (*Porzana ziegleri*), a large crow (*Corvus* sp.), and a Hawaiian petrel (*Pterodroma phaeopygia*) that was extinct on O‘ahu prior to Contact (Flood et al. 1994:147). The study concluded the site (SIHP # -2474) “appears to have been somewhat peripheral to the impact of many of the broader historical events . . . probably due to the relatively impermeable limestone reef deposits which precluded any profitable use of the area except for the hardiest attempts at dry land agriculture . . . ” (Flood et al. 1994:150). They interpreted five basic land use patterns, refuse disposal, agriculture, ranching, habitation, and military. They suggest the site area may also have been utilized as a sugar or railroad camp (Flood et al. 1994:x). The soils in the project area were noted as relatively thin and unlikely to contain burials (Flood et al. 1994:162).

4.2.7 Jourdane 1995

A memorandum by Jourdane (1995) from SHPD describes the discovery of two burials (designated SIHP # -4064) found eroding out of the shoreline fronting the Makaha Surfside Apartments on 21 June 1995. The find was reported by Mr. Alika Silva after walking the beach checking for exposed burials following a period of large surf. Burial 1 was found approximately 40 m west of the apartment complex on the western edge of a small cove. A burial pit was evident on the surface and the face of the encompassing dark sandy layer was about 50 cm thick. Burial 2 was found at the edge of the lawn fronting the second building from the Nānākuli end of the complex. A faint burial pit was visible in the profile and the remains appeared to be those of a juvenile. At the time, both burials were covered with limestone rocks by Mr. Silva in order to protect them from further erosion. SHPD later recommended relocation, and the remains were disinterred in October 1995 in consultation with the Lucio Badayos family. The remains were reinterred in the Badayos reinterment site within the park on 2 January 1996.

4.2.8 Borthwick and Hammattt 1997

In 1997, CSH responded to an inadvertently discovered burial found during grading activities in a parking lot at the Church of Jesus Christ of Latter Day Saints, east of Wai‘anae Intermediate School near Plantation Road and Kaupuni Channel (Borthwick and Hammatt 1997), over 700 m east of the project area. After monitoring further construction activity, five additional human burials were reported. All of the burials were relatively close to the ground surface, which used to be much higher according to historic data, and none of the burials were completely intact. No SIHP # was assigned to the burials.

4.2.9 Magnusson 2000

In May 2000, International Archaeological Research Institute, Inc. (IARII) conducted a reconnaissance survey for the Kamaile Elementary School Expansion project (Magnuson 2000). The survey included a pedestrian field inspection over the parcel. No traditional Hawaiian or historic properties were identified. The ground was composed of remnants from an exposed raised limestone reef. It was noted that the area had been previously bulldozed which may be partly responsible for the lack of archaeological surface sites.

4.2.10 Elmore and Kennedy 2001

From June to July 2001, Archaeological Consultants of the Pacific, Inc. (ACP) conducted an AIS for the Wai‘anae Coast Emergency Access Road (Elmore and Kennedy 2001). The project area consisted of five corridors within the *ahupua‘a* of Mākaha, Wai‘anae Kai, Lualualei, and Nānākuli: 1) Kaulawaha Road Corridor, 2) Maiu‘u/Mahina‘au Road Alternate Corridor, 3) Pakeke Street/Hakimo Road Connector Corridor, 4) Pa‘akea Road Corridor, and 5) Nānākuli Improvements Corridor. Two sites were identified within the Kaulawaha Road Corridor, SIHP # -5949, a traditional Hawaiian subsurface deposit identified within a backhoe trench (Trench 35); and SIHP # -5950, four historic mortar and basalt foundations and a well, identified during the surface survey.

4.2.11 Cordy 2002b

From 1999 to 2001, Dr. Ross Cordy of the SHPD investigated the shoreline exposures of a coastal habitation site (SIHP # -4064) fronting the Makaha Surfside Apartments within Mauna Lahilahi Beach Park in Wai‘anae during yearly visits with advanced archaeology students (Cordy 2002b). The site was determined to extend over 425 m along the shore and about 60 to 70 m inland, based on past burial finds and the exposed deposits. Several representative profiles were documented each year. Overall, the stratigraphy consisted of two layers of modern fill above clear plastic, overlying a cultural layer that was mixed in some areas, then up to three additional layers of non-cultural sand over a brownish basal soil layer (Cordy 2002b:3). A total of 15 features were documented over the three years.

Several features associated with SIHP # -4064 were recorded by Cordy (2002b) in the central north cove area in 1999. Two burial pits (Feature 1 and Feature 3) with partial human remains were exposed in Layer III. Feature 1 had eroded by 2000 and Feature 3 was still exposed in 2001. Feature 4 was identified as a twentieth century trash pit originating from the same layer and containing metal and bottles. Feature 2 and Feature 7 were fire pits found in Layer V. Paving stones (Feature 5 and Feature 6) from a possible house foundation were found in Layer III north of the northern cove, and in the center of the south part of the park. In the south end of the north cove, there were three pit features encountered in Layer III, two were of indeterminate function (Feature 11 and Feature 15) and one was a twentieth century trash pit (Feature 12). In Layer V in this area, there were three additional pit features containing charcoal (Features 8 through 10) and two fire pits (Features 13 and 14).

4.2.12 Jones and Hammatt 2003

In 2003, CSH conducted archaeological monitoring for the Mauna Lahilahi Beach Park Shoreline Protection project. Areas believed to be possibly culturally sensitive were protected with fencing during construction. No historic properties were identified (Jones and Hammatt 2003).

4.2.13 Kalihiwa and Cleghorn 2003

Between September 2001 and October 2002, Pacific Legacy, Inc. conducted archaeological monitoring for a water systems improvements project in Mākaha and Wai‘anae (Kailihiwa and Cleghorn 2003). Monitoring locations for the project involved areas on Lahaina Street, Hanalei Street, Jade Street, Orange Street, Fricke Street, Moua Street, Lahilahi Street, Widemann Street, Upena Street, Mai‘u‘u Road, and Mākaha Valley Road. Three historic properties comprised of five features were identified during the project: SIHP #s -6521, a pit feature not located in the vicinity of the current project area; -3325, a portion of a concrete flume; and -6522, two fire features not located in the vicinity of the current project area, and a charcoal deposit.

No significant finds were encountered at the monitoring location at Mākaha Valley Road. Results of monitoring indicated a fill of rubble used to grade the *makai* section of the road like that of Farrington Highway. A very dark gray likely relating to the previous land use of *lo‘i kalo* (taro paddies) was identified near the intersection of Mai‘u‘u Road and Mahina‘au Street. A concrete flume (SIHP # -3325) was identified along the northwest side of Mai‘u‘u Road and is believed to be associated with the Mikilua Flume, under the same site designation. Kalihiwa and Cleghorn (2003) determined SIHP # -3325 is no longer assessed as being significant.

4.2.14 Clark et al. 2004

Between 2002 and 2003, Pacific Consulting Services, Inc. conducted an AIS at Wai‘anae Regional Park, SIHP # -3967 (Clark et al. 2004). Three of the five sites previously identified by Sinoto (1975) were reevaluated and subsumed under SIHP # -3967 while the other two previously identified sites had been destroyed, and four undocumented sites were recorded. These sites were designated as Features 1 through 8 by Clark et al. (2004:19) and included the burial documented by Kawachi (1992), three sinkholes, one modified sinkhole, two enclosures, and an L-shaped structure.

4.2.15 Perzinski and Hammatt 2004

In August 2003, CSH conducted an AIS consisting of a surface survey, 32 test excavations, four wave-cut bank profiles, and six backhoe trenches for proposed improvements at the Mauna Lahilahi Beach Park (Perzinski and Hammatt 2004). The stratigraphy in the southern half of the project area generally consisted of one to four layers of imported fill or mixed/disturbed sediment (Stratum I), overlying one to three cultural layers (Stratum II), and a culturally sterile layer (Stratum III).

A total of two new sites and two previously documented sites were documented by Perzinski and Hammatt (2004). The new sites consist of SIHP # -6634, an intact cultural layer and SIHP # -6635, an historic basalt alignment. SIHP # -6634, the intact cultural layer, was radiocarbon dated to AD 1430. This date, along with the stratigraphy and artifactual information, indicated continued use and settlement of the shoreline, including a pre-Contact component and an early post-Contact cultural deposit. SIHP # -6635 is a rectangular basalt alignment without a cultural layer and of indeterminate function. The two previously identified sites within the study area are SIHP # -4064, which designates a concentration of human burials, and SIHP # -9714, a portion of the former OR&L railroad berm formerly used to transport sugarcane from Waianae Sugar Company land to the Ewa mill and was still visible within the southeastern area. Findings related to SIHP # -4064 included a human burial eroding out of a wave-cut bank. It was determined this burial was likely

the same as the designated SIHP # -6592:2 burial reported by Ross Cordy (Perzinski and Hammatt 2004;18). It was left in place pending a decision for final disposition. In addition, a probable burial crypt in Test Unit 27 was identified by basalt capstones and a basalt-lined pit. No human remains were encountered within the feature; however, it was identified based on the proximity to the newly identified human burial and a previously identified human burial believed to have eroded out before September 2001 (Perzinski and Hammatt 2004:132).

4.2.16 Tulchin and Hammatt 2004

From April through November 2002, CSH conducted archaeological monitoring of a Board of Water Supply water main project along Farrington Highway from Jade Street to Kaulawaha Road in Wai‘anae (Tulchin and Hammatt 2004). Representative profiles indicated sand deposits only in the western end of the study area, between Jade Street and Lahilahi Street. Charcoal flecking from a sand deposit near Orange Street provided a 2-sigma calibrated date range of AD 1719–1820 (late prehistoric to early historic era). No historic properties were identified.

4.2.17 Hammatt and Shideler 2006; Hazlett et al. 2008

In August 2006, CSH conducted an AIS on 2.817 acres for a Leeward Coast Emergency Homeless Shelter project at the “Wai‘anae Civic Center Location” (Hammatt and Shideler 2006), which has become the current site of the Pai‘olu Kaiaulu Shelter. The parcel is located on the northern corner of Farrington Highway and Kau‘iokalani Place. Testing included the subsurface excavation of 22 trenches, each approximately 8-10 m long. One test excavation in the northern corner of the parcel exposed a small portion of a human burial designated as SIHP # -6860. The burial was estimated to be in a flexed position due to the small size of the depression in the surrounding limestone bedrock. No additional finds were encountered. CSH conducted archaeological monitoring of construction activities from October through November 2006 and no other sites or significant cultural materials were identified, and no historic properties were affected (Hazlett et al. 2008).

4.2.18 Shefcheck and Spear 2007; Shefcheck and Spear 2009

In 2007, Scientific Consultant Services, Inc. conducted an archaeological assessment of approximately 2.5 acres for the development of a housing facility *mauka* (north) of Wai‘anae Intermediate School with no significant findings (Shefcheck and Spear 2007). Archaeological monitoring for the development was conducted from June 2007 to January 2008. The only find consisted of a large grinding stone mortar artifact; no cultural deposits were encountered (Shefcheck and Spear 2009).

4.2.19 Tulchin and Hammatt 2007

In July 2006, CSH (Tulchin and Hammatt 2007) conducted an AIS on an approximately 6.7-acre parcel for the proposed development of a single-story home by the Spotkaeff family. The project area was located directly south of the current project area and east of the intersection of Maiu‘u and Mahinaau roads. Fieldwork consisted of surface inspections and six backhoe test trenches (Tulchin and Hammatt 2007). In general, the stratigraphy observed within the backhoe test trenches consisted of alluvial clay layers, which was expected based on the presence of Keko‘o Spring within the vicinity. The survey identified SIHP # -6858, a remnant historic L-shaped basalt and mortar foundation related to the sugarcane plantation in the area. Due to the deteriorated

condition of the feature, it did not fulfill any of the criteria for recommended eligibility for the Hawai‘i Register of Historic Places.

4.2.20 Desilets 2008

In 2007, Garcia and Associates conducted a subsurface archaeological investigation of a 60 m by 60 m area at the Hawai‘i Department of Transportation Wai‘anae Baseyard, located *mauka* of the current project area on the opposing side of Farrington Highway. The stratigraphy was variable over the area and often consisted of modern fill over limestone substrate with a paleosol in the majority of the excavations (Desilets 2008). No significant cultural material was encountered.

4.2.21 McElroy 2008

In 2007, Garcia and Associates conducted archaeological monitoring for the installation of a fiber optic cable along Farrington Highway (McElroy 2008). Trenching boring pits connected via horizontal drilling was conducted. Stratigraphy included the current road surface and associated base course, and various layers of fill overlying either natural sand or the coral shelf. No historic properties were identified.

4.2.22 Shefcheck and Spear 2008

Shefcheck and Spear (2008) report that Scientific Consultant Services, Inc. conducted an AIS consisting of six test excavations for planned parking lot improvements in the Wai‘anae Regional [District] Park between the Public Library and basketball court, near the recreational complex (no project dates are provided by the authors). The testing revealed shallow soil deposits, primarily of dark reddish brown clay or silty clay, over limestone bedrock. No significant cultural deposits were encountered.

4.2.23 Hammatt 2009

In July 2009, CSH submitted a memorandum concerning archaeological services for the Proposed Seawind Apartment project (Hammatt 2009). The memorandum addressed the documentation of 12 features associated with SIHP # -2474 previously documented by Flood et al. (1994). Nine of the 12 features were reevaluated and located. No new historic properties were identified.

4.2.24 Jones and Hammatt 2009

From November 2003 to June 2004, CSH conducted archaeological monitoring for proposed improvements to beautify Mauna Lahilahi Beach Park (Jones and Hammatt 2009). Project-related ground disturbance included planting 100 coconut trees, installing water lines and fence posts, and grading. Two human burial sites were identified during monitoring. SIHP # -6704 designates an intact historic coffin burial encountered in the southeast portion of the project area within a layer of clay sediment, with no cultural sand layer present. SIHP # -6705 designates human remains that appeared to have been previously disturbed. This burial was located in a layer of sandy clay sediment in the northwestern portion of the project area. The remains were determined to be pre-Contact due to the lack of historic artifacts and proximity to a cultural layer. Both burials were preserved in situ with small boulders/cobbles placed over and around the burials, and a waterworn rock placed on the top for cultural identification prior to backfilling.

4.2.25 Liebhardt and Kennedy 2010

On 6 April 2010, ACP conducted an AIS of a parcel located on the *mauka* side of Farrington Highway near the Mākaha Valley Road intersection. Testing included a pedestrian survey and five backhoe test excavations (2 by 1 m and up to 105 cmbs). Overall, it was found the project area had been greatly impacted by modern activities, and there were no significant archaeological finds (Liebhardt and Kennedy 2010).

4.2.26 Mooney et al. 2013

In 2013, Pacific Legacy conducted an assessment for the proposed Wai‘anae Solar Power Farm (Mooney et al. 2013). Several potential sites were observed (T-001 through T-015). These potential sites were not designated historic properties and primarily consisted of plantation era infrastructure.

4.2.27 Yucha et al. 2014

In November 2013, CSH conducted an AIS for the Kamaile Plantation Wells Sites in Wai‘anae Ahupua‘a (Yucha et al. 2014). Three historic properties were identified. SIHP # -1181, the Wai‘anae (Kamaile) Complex, which includes McAllister Site 161, Kamaile Heiau; SIHP # -1185, the Kuka‘au‘au Cave Shelter; SIHP # -190, a C-shaped enclosure and numerous platforms; and SIHP # -5949, a subsurface platform and previously disturbed burial, were identified as well as SIHP # -5949, a pre-Contact to early post-Contact habitation site, and SIHP # -5950, a plantation-era site complex.

4.2.28 Yucha et al. 2015

In 2014, CSH conducted archaeological monitoring for the Wai‘anae District Park Reconstruction of Wastewater System project (Yucha et al. 2015). The documented stratigraphy consists of various fill layers overlying the coral shelf. No historic properties were identified.

4.2.29 Belluomini and Hammatt 2016

More recently, in 2015 CSH conducted a literature review and field inspection for the replacement of bleachers at the WHS athletic field (Belluomini and Hammatt 2016), to date the only known archaeological study conducted on the WHS campus. The project area consisted of approximately 0.49 acres (0.2 hectares) of the *makai* portion of the WHS campus, east and adjacent to the current project area. Belluomini and Hammatt noted that the project area was located on an emerged coral karstic outcrop, above approximately 70 cm of crushed coral and terrigenous fill. The proposed ground disturbance, consisting of primarily of grading and shallow excavation, was considered minimal. Following a 100% pedestrian inspection and background research, the study concluded that;

> . . . no surface historic properties will be potentially affected by the proposed project. Coral karstic outcrops are known to contain pre- and post-Contact archaeological deposits and human burials; however, based on the minimal ground disturbance proposed and the general thickness of the fill deposits overlying the coral outcrop, it is unlikely the coral outcrop, and any archaeological deposits therein, will be encountered or affected. [Belluomini and Hammatt 2016:57]

Section 5 Results of Fieldwork

CSH completed the fieldwork component of this study under archaeological fieldwork permit number 16-23, issued by the SHPD pursuant to HAR §13-282. Fieldwork was accomplished on 13 December 2016 by principal investigator Matt McDermott, M.A. This work required approximately 0.5 person-days to complete. Photographs taken during the field visit are shown as Figure 25 to Figure 35.

The entire project area was inspected and surveyed. Additionally, the high-surf cut soil bank along the coast immediately *makai* of the project area was inspected to evaluate the likelihood of fill deposits and/or Jaucaus sand deposits in the project area. The project area includes the paved access road from Farrington Highway to the pool, the pool and its surrounding enclosure at the west end (seaward) of the road, the two buildings to the east of the pool, and the grass field that framed by the pool (west) and the two buildings (south). The construction along the access road requires minimal ground disturbing activity which includes repaving of the road, demolition of the pool to pave a new parking lot, and the demolition of the two buildings to rebuild a new structure. The project area also includes various sidewalks that provide access to the buildings and pool area, as well as existing storm drains that would likely be removed and resituated during the construction of the new buildings. In the middle of the field is a column of concrete-covered holes associated with a sewer/drainage line for the above-ground pool.

During the field inspection, the entire project area was inspected and photographed. Particular attention was paid to identifying any surface remnants of the OR&L, which operated in this area from the late 1800s into the 1940s. No surface remains of the OR&L right of way (ROW) were noted. The field archaeologist did note a soil berm approximately seven meters *makai* and parallel to the south edge of the gymnasium (see Figure 26). However, according to historic maps, the OR&L right-of-way would have been *makai* of this soil berm, nearer to the swimming pool, and aligned with the north edge of the athletic field. The relationship of this soil berm to the former OR&L ROW is shown on a 1928 aerial photograph and a modern (2013) aerial photograph (Figure 36 and Figure 37).

The field archaeologist also noted a concrete slab oriented perpendicular to the gymnasium, between the gymnasium and the pool, with eight metal manhole lids. This is the above ground portion of a sewage/drainage system for the swimming pool, which was built in the 1970s. The below-ground portion of the drainage structure is larger, as shown on overlays of the structure on the 1928 and 2013 aerial photographs. This drainage structure and a portion of Building SP are in the former location of the OR&L ROW (see Figure 36 and Figure 37)

The project area is located on an emerged coral karstic outcrop, still visible along the coastline west and south of the current project area documented during a previous study of the WHS athletic fields (Belluomini and Hammatt 2016) (see Figure 34). The project area is within the vicinity of an area previously filled with crushed coral and covered with terrigenous fill (see Figure 35). This fill was documented at the outer flanks of the WHS property as being approximately 70 cm deep. No potential areas of deep undisturbed Jaucas sand were observed during the field inspection.

Figure 25. Wai‘anae High School, Buildings SP and T, view to the east

Figure 26. Gymnasium on left, Building T right, view east; this modern soil berm does not match the location of the old OR&L right-of-way, which would have been located *makai* (to the right) of this berm, closer to the swimming pool

Figure 27. Wai‘anae High School Gymnasium, sewer/drainage slab associated with above-ground swimming pool, view to the north; the old OR&L right-of-way would have crossed diagonally over this slab

Figure 28. Gymnasium in back, Building T to right, view north

Figure 29. View toward the coast, swimming pool to the left, view to the southwest

Figure 30. Makaha Surfside Housing Development to right (white building), view to the northwest from campus

Figure 31. Makaha Surfside Housing Development from the beach, view to the northwest

Figure 32. Building T to left, above-ground pool in back, view to the south

Figure 33. View of Access Road from beach to campus, above-ground pool in center, view to the north

Figure 34. Exposed coral outcrops at coast, Makaha Surfside Housing in back, view northwest

Figure 35. Exposed eroded coastal bank, showing coral/soil fill layers, view northeast

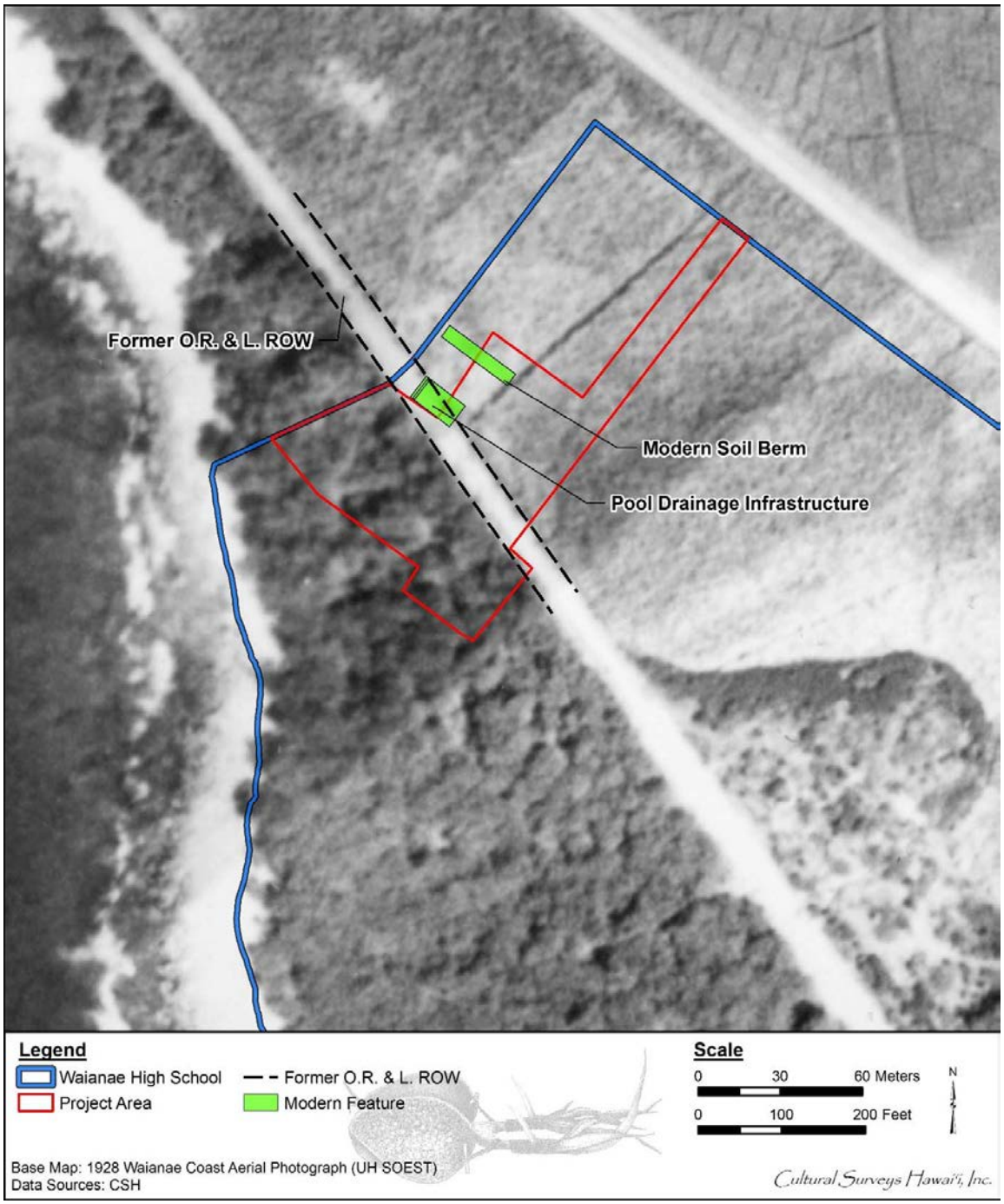

Figure 36. 1928 aerial photograph with overlay of the location of a visible surface soil berm (see (see Figure 26) noted during the field inspection and the location of a below-ground swimming pool drainage structure in relation to the OR& L ROW; note that the above-ground slab with metal manholes for the pool drainage structure is located on the west side of the sructure (see Figure 27)

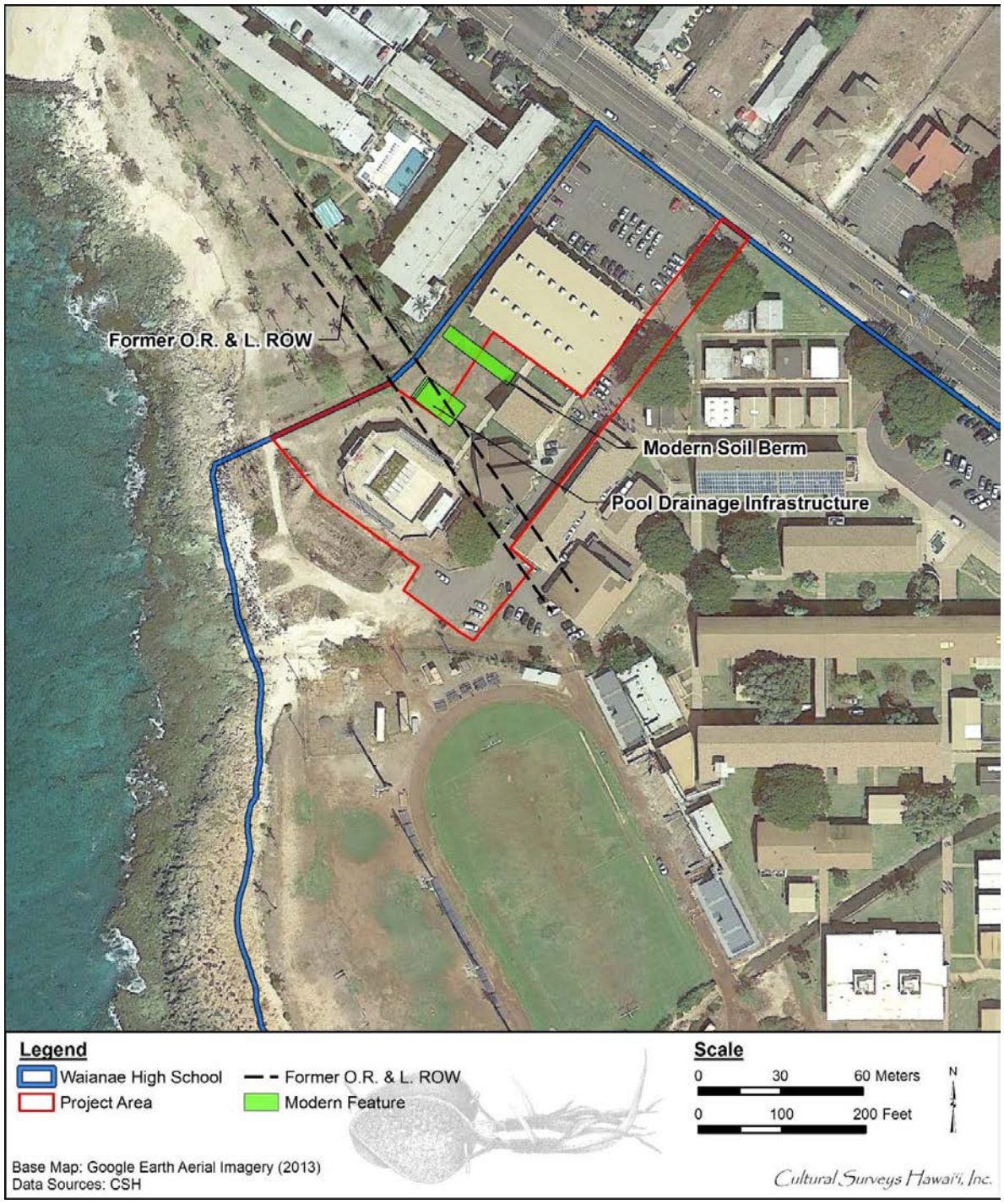

Figure 37. 2013 aerial photograph with overlay of location of modern soil berm noted during the field inspection and location of pool drainage structure and Building SP in relation to the OR&L ROW

Section 6 Summary and Recommendations

At the request of Gerald Park Urban Planner, CSH has prepared this LRFI for the WHS Connection of Buildings SP and T Project, Wai‘anae Ahupua‘a, Wai‘anae District, O‘ahu, TMKs: [1] 8-5-002:018 and 015:001. The project area is located southwest of Farrington Highway within the WHS campus. Possible ground disturbance is considered to be minimal and consists primarily of filling and grading.

This LRFI study was completed for use as a planning document. The proposed project is subject to Hawai‘i State historic preservation review legislation (HRS §6E-8/HAR §13-275). This investigation serves as a document to facilitate the proposed project’s planning and supports historic preservation review compliance by assessing if there are major archaeological concerns within the project area and developing data on the general nature, density, and distribution of archaeological resources.

The seaward portion of Wai‘anae Kai Ahupua‘a was one of the most densely populated areas of O‘ahu between Pearl Harbor and Waialua. This population (as reflected by mid-1800s *kuleana* data) was largely at two major foci of residence, one at Kamaile, within the project area, and the other on the opposite side of Kaupuni Channel in Pāhoa, the central portion of Wai‘anae Ahupua‘a.. Although in the pre-contact period the shoreline probably had only scattered fishermen’s homes, there was a large *heiau* on the Keaupuni Point, east of the project area, which would have been a focus for ritual activity.

No Māhele LCAs are located within the WHS campus or the current project area, although a portion of LCA 9489B is directly adjacent to the west side of the campus and near the project area (see Figure 10). LCA 9489B, with two ‘*āpana* (lots), was awarded to a man named Holi who claimed a *pahale* (houselot) *makai* of the main trail (aligned with the future Farrington Highway). The Māhele documents also mention other houselots near the shoreline to the east of LCA 9489B for native Hawaiians who did not make claims for their land during the Māhele. The exact location of these houselots is unknown. While there are no LCA awards in the WHS project area, there were mid-nineteenth century houselots to the east of LCA 9489B to Holi, and thus one or more of these houselots could have been located in the campus area.

A Jackson 1884 map (Figure 12) shows the OR&L railroad line traversing through the WHS school grounds and through the center of the project area, but no other developments or agricultural land at the location. The 1919 and 1936 US Army War Department Fire Control maps (see Figure 14 and Figure 15) show the OR&L Co. railway crossing the project area and the land as being west of the Waianae-Kai US Military Reservation. A 1943 US Army War Department map and 1954 US Army Map Service Topographic map depicts minimal development within the project area (see Figure 17 and Figure 18).

A number of burial finds have been reported in previous archaeological studies in the vicinity of the project area, especially to the northwest in Jaucas beach sands at Mauna Lahilhai Beach (see Figure 24). These Jaucas sands, however, do not extend east into the current project area. Surface sites and one burial have been documented within the Waianae Regional Park, southeast of the project area. The surface sites consisted of walls and enclosures comprised of stacked basalt; it is unknown, however, if these sites are modern creations. Based on archaeological findings, the coastline contained mostly temporary habitation and activity areas, while the denser and more

permanent areas are located in the more inland portions of Kamaile and Pōka‘i near freshwater springs and rivers.

Fieldwork associated with the study consisted of a 100% pedestrian inspection of the project area. Fieldwork was accomplished on 13 December 2016 by principal investigator Matt McDermott, M.A. No potential historic properties were identified during the LRFI. During the field inspection, the entire project area was inspected and photographed. Particular attention was paid to identifying any surface remnants of the OR&L, which operated in this area from the late 1800s into the 1940s, and indications of Jaucas sand deposits that are more likely to contain Native Hawaiian skeletal remains. No surface remains of the OR&L right of way were noted. The project area is located on top of an emerged coral karstic outcrop that has been filled with approximately 70 cm of fill consisting of crushed coral and terrigenous soil, and thus is unlikely to contain any deep Jaucas sand deposits, such as those at the adjacent Mauna Lahilahi Beach, where several burials have been previously recorded.

Due to the findings of the pedestrian inspection and background research, it is unlikely that significant historic properties will be affected by the proposed project. Coral karstic outcrops are known to contain pre- and post-Contact archaeological deposits and human burials; however, based on the minimal ground disturbance proposed for the construction project and the general thickness of the fill deposits overlying the coral outcrop, it is unlikely the coral outcrop, and any archaeological deposits therein, will be encountered or affected.

Therefore, no further archaeological historic preservation work is recommended for the proposed project. However, if significant finds are encountered, including human burials, all work in the immediate vicinity will cease and the SHPD will be promptly notified.

Section 7 References Cited

AvaKonohiki

2017 Hawai‘i Land Documents. Electronic database at http://www.avakonohiki.org/hawaii-land-documents.html. Accessed 3 December, 2016.

Belluomini, Scott A. and Hallett H. Hammatt

2016 *Archaeological Literature Review and Field Inspection Report for the Wai‘anae High School Athletic Field Bleachers Replacement Project Wai‘anae Ahupua‘a, Wai‘anae District, O‘ahu Island, TMK: [1] 8-5-002:018.* Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

Borthwick, Douglas F. and Hallett H. Hammatt

1997 *Inadvertent Discoveries of Human Skeletal Remains, Church of Jesus Christ of Latter Day Saints (LDS), Pu‘u Kahea, Wai‘anae, O‘ahu Island Hawai‘i, (TMK 8 5 03:25)*. Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

Chamberlain, Levi

1826 *Trip around Oahu by Levi Chamberlain in 1826. (June 21-July 11, 1826)*. Hawaiian Mission Children’s Society, Honolulu.

Chinen, Jon J.

1958 *The Great Mahele. Hawaii‘s Land Division of 1848.* University of Hawaii Press, Honolulu.

Clark, John R.K.

1977 *The Beaches of O‘ahu*. University of Hawai‘i Press, Honolulu.

Clark, Stephan D., Dennis Gosser, and Richard Nees

2004 *Archaeological Inventory Survey for the Proposed Wai‘anae Regional Park, Wai‘anae Kai Ahupua‘a, O‘ahu, Hawai‘i TMK 8-5-02:11.* Pacific Consulting Services, Inc., Honolulu.

Cordy, Ross

2001 Life in 1820-1850 Kamaile ‘Ili, Wai‘anae Ahupua‘a: A Review of the Māhele Records. Historic Preservation Division, Department of Land and Natural Resources, State of Hawai‘i, Honolulu.

2002a *The Rise and Fall of the O‘ahu Kingdom.* Mutual Publishing, Honolulu.

2002b *Archaeological Investigations at a Coastal Habitation Site (Site 4064) in Front of the Makaha Surfside Apartments, Kamaile ‘Ili, Wai‘anae Ahupua‘a (TMK: 8-5-17: 1-7; 8-5-18:1)*. Department of Land and Natural Resources, State Historic Preservation Division, Kapolei, Hawai‘i.

2013 *Ka‘ala Farm. Archaeology: how the land tells it story.* Electronic document, http://kaala.org/2013/04/archaeology-how-the-land-tells-its-story/ (accessed 20 May 2013).

Denham, Tim, Joseph Kennedy, and Laura Reintsema
1992 *Archaeological Inventory Survey with Subsurface Testing Report for a Property Located at TMK: 8 5 02 48, Wai‘anae Ahupua‘a, Wai‘anae District, Island of O‘ahu.* Archaeological Consultants of Hawai‘i, Inc., Hale‘iwa, Hawai‘i.

Desilets, Michael
2008 *Draft Archaeological Assessment and Geophysical Survey of Proposed Dewater Facility Site, Wai‘anae Ahupua‘a, Wai‘anae District, Island of O‘ahu, Hawaii. TMK: (1) 8-5-028:04.* Garcia and Associates, Honolulu.

Donn, John M.
1906 “Oahu. Hawaiian Islands.” Registered Map 2374. Hawai‘i Land Survey Division, Department of Accounting and General Services, Honolulu.

Dorrance, William H. and Francis S. Morgan
2000 *Sugar Islands. The 165-Year Story of Sugar in Hawai‘i.* Mutual Publishing, Honolulu.

Douglas, Michele Toomay
1991a *Report on a Child’s Skeleton Recovered from the Beach at Makaha Surfside Apartments*. University of Hawai‘i at Mānoa, Honolulu.

1991b *Makaha Surfside Burial (1979): Artifacts, Kamaile, Wai‘anae, O‘ahu, TMK: 8-5-17:005, State Site No. 80-07-4064*. Memorandum on file, Department of Land and Natural Resources, State Historic Preservation Division, Honolulu.

Elmore, Michelle and Joseph Kennedy
2001 *An Archaeological Inventory Survey Report for the Wai‘anae Coast Emergency Access Road, Wai‘anae District, Island of O‘ahu*. Archaeological Consultants of the Pacific, Inc., Hale‘iwa, Hawai‘i.

Flood, Krista, Paul Christiaan Klieger, Susan A. Lebo, Boyd Dixon, Stephan D. Clark, and Scot Parry
1994 *An Archaeological Inventory Survey and Mitigation Plan of a Seven Acre Parcel (TMK: 8 5 28:Por. 42) in Wai‘anae Kai Ahupua‘a, Wai‘anae District, O‘ahu Island, Hawai‘i.* Bernice Pauahi Bishop Museum, Honolulu.

Flood, Krista, Paul Christiaan Klieger, Susan A. Lebo, Boyd Dixon, Stephan D. Clark, and Scot Parry
1994 *An Archaeological Inventory Survey and Mitigation Plan of a Seven Acre Parcel (TMK: 8 5 28:Por. 42) in Wai‘anae Kai Ahupua‘a, Wai‘anae District, O‘ahu Island, Hawai‘i.* Bernice Pauahi Bishop Museum, Honolulu.

Foote, Donald E., Elmer L. Hill, Sakuichi Nakamura, and Floyd Stephens
1972 *Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii.* U.S. Department of Agriculture, Soil Conservation Service, in cooperation with the University of Hawai‘i Agricultural Experiment Station. U.S. Government Printing Office, Washington, D.C.

Giambelluca, T.W., Q. Chen, A.G. Frazier, J.P. Price, Y.-L. Chen, P.-S. Chu, J.K. Eischeid, and D.M. Delparte

2013 Online Rainfall Atlas of Hawai‘i. *Bulletin of the American Meteorological Society volume 94, pp. 313-316, doi: 10.1175/BAMS-D-11-00228.1.* Electronic document, http://rainfall.geography.hawaii.edu (accessed 10 April 2014).

Google Earth

2013 Aerial photographs of Hawai‘i. Google Inc., Mountain View, California. Available online at www.google.com/earth.html.

Green, Roger C.

1980 *Makaha Before 1880 A.D.: Makaha Velley Historical Project-Summary Report No. 5.* Pacific Anthropological Records No. 31. Bernice Pauahi Bishop Museum, Honolulu.

Hammatt, Hallett H.

2009 *Memorandum Concerning Archaeological Services for the Proposed Seawind Apartment Project, Wai‘anae Ahupua‘a, Wai‘anae District, O‘ahu Island [TMK (1) 8-5-028:044].* Cultural Surveys Hawai‘i, Inc. Kailua, Hawai‘i.

Hammatt, Hallett H. and David W. Shideler

2006 *Archaeological Inventory Survey for the Leeward Coast Emergency Homeless Shelter Project, Wai‘anae Civic Center Location, Wai‘anae Ahupua‘a, Wai‘anae District, O‘ahu, TMK: [1] 8-5-028:041.* Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

Hammatt, Hallett H., Douglas F. Borthwick, and David W. Shideler

1985 *Archaeological Excavations at the Wai‘anae Army Recreation Center, Pōka‘ī Bay, Wai‘anae, O‘ahu.* Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

Handy, E.S. Craighill and Elizabeth G. Handy

1972 *Native Planters in Old Hawai‘i: Their Life, Lore, and Environment*. Bishop Museum Bulletin 233. Bernice Pauahi Bishop Museum, Honolulu.

Hawaii Office of the Commissioner of Public Lands

1916 *Index of all Grants and Patents Land Sales.* Paradise of the Pacific Print, Honolulu.

Hawaii Office of the Government Survey

1907 C.S.F. [Copy of Survey Furnished] 1773 for Grant 5009 from J.M. Dowsett to the Waianae Company Waianae Makai Lands. Hawai‘i Land Survey Division, Department of Accounting and General Services, Honolulu.

Hawai‘i TMK Service

2014 Tax Map Key [1] 8-5-002. On file at Hawai‘i TMK Service, Honolulu.

Hazlett, Alexander, Hallett H. Hammatt, and David W. Shideler

2008 *Archaeological Monitoring Report for the Leeward Coast Emergency Homeless Shelter Project, Wai‘anae Civic Center Location, Wai‘anae Ahupua‘a, Wai‘anae District, O‘ahu, TMK: [1] 8-5-028:041*. Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

Honolulu Star Bulletin

1956 Waianae High School, Construction Work Underway. *Honolulu Star-Bulletin* 3 March, 1956, page 4.

Ī‘ī, John Papa

1959 *Fragments of Hawaiian History*. Bernice Pauahi Bishop Museum, Honolulu.

Jackson, George Ed Gresley

1884 Waianae and Adjacent Coast [map]. Surveyed and drawn by George Ed Gresley Jackson, April 1884. Tracing of Registered Map 1348 by F.E. Harvey, February 1900. Hawai‘i Land Survey Division, Department of Accounting and General Services, Honolulu.

Jones, C. Kulani and Hallett Hammatt

2003 *Archaeological Monitoring Report for the Mauna Lahilahi Shoreline Protection Project, Wai‘anae Ahupua‘a, Wai‘anae, O‘ahu (TMK: 8-5-017:005)*. Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

2009 *Archaeological Monitoring Report for the Mauna Lahilahi Beach Park Improvements Project, Wai‘anae Ahupua‘a, Wai‘anae District, TMK: [1] 8-04-001: 001; 8-05-017:001-007 & 022, and 8-05-018:001-003*. Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

Jourdane, Elaine Rogers

1995 *Inadvertent Discovery of Human Remains at Makaha Surfside Condominiums, Makaha, Waianae, Oahu*. Department of Land and Natural Resources, State Historic Preservation Division, Kapolei, Hawai‘i.

Kailihiwa, Solomon H., III and Paul L. Cleghorn

2003 *Archaeological Monitoring of Mākaha Water System Improvements Phase II for Ten Streets in the* Ahupua‘a *of Mākaha (TMK: 8-4-03, 05-08, 11, 12, 14, 16) and Waianae (TMK: 8-5-16), Island of O‘ahu*. Pacific Legacy, Inc., Kailua, Hawai‘i.

Kamakau, Samuel Mānaiakalani

1992 *Ruling Chiefs of Hawai‘i*. Revised edition. Kamehameha Schools Press, Honolulu.

Kawachi, Carol T.

1991a *Recovery of Burial Beachside of Makaha Surfside, Waianae-kai, Waianae, O‘ahu, TMK: 8-5-17: 07, State Site No. 80-07-4064*. Memorandum on file, Department of Land and Natural Resources, State Historic Preservation Division, Honolulu.

1991b *Makaha Surfside Burial (1979): Artifacts, Kamaile, Wai‘anae, O‘ahu, TMK: 8-5-17:005, State Site No. 80-07-4064*. Memorandum on file, Department of Land and Natural Resources, State Historic Preservation Division, Honolulu.

1992 *Burial Exposed by Hurricane Iniki, Waianae Regional Park, Waianae, Waianae, Oahu, TMK: 8-5-02:11*. Memorandum on file, Department of Land and Natural Resources, State Historic Preservation Division, Honolulu.

Kirch, Patrick and Marshall Sahlins

1992 *Anahulu: The Anthropology of History in the Kingdom of Hawaii*, Vol. I. University of Chicago Press, Chicago.

Kuykendall, Ralph
19385 *The Hawaiian Kingdom*, *Volume I: 1778-1854*. University of Hawaii Press, Honolulu.

Land Commission, Awards Book
n.d. Awards Book. Hawai‘i Land Commission. Originals at Hawai‘i State Archives, Honolulu. Transcripts at AvaKonohiki, electronic database, http://www.avakonohiki.org/hawaii-land-documents.html. Accessed 2 December 2016.

Liebhardt, Carly and Kennedy, Joseph
2010 *An Archaeological Inventory Survey Report for a Property Located at TMK: (1) 8-5-018: 017, in Makaha Ahupua‘a, Waianae District, Island of O‘ahu*. Archaeological Consultants of the Pacific, Inc. Hale‘iwa, Hawai‘i.

Magnuson, Coral
2000 *Archaeological Reconnaissance for Kamaile Elementary School Expansion, Wai‘anae, O‘ahu*. International Archaeological Research Institute, Inc., Honolulu.

McAllister, J. Gilbert
1933 *Archaeology of Oahu.* Bishop Museum Bulletin 104. Bernice Pauahi Bishop Museum, Honolulu.

McElroy, Windy Keala
2008 *Archaeological Monitoring for Department of Hawaiian Homelands Fiber Optic Cable Installation, Lualualei, Wai‘anae, and Mākaha Ahupua‘a, Wai‘anae District, Island of O‘ahu, Hawai‘i (portions of TMK: 8-7, 8-6, 8-5, 8-4, 8-3, and 8-2)*. Garcia & Associates, Honolulu.

McGrath, Edward J., Kenneth M. Brewer, and Bob Krauss
1973 *Historic Waianae: A Place of Kings.* Island Heritage Limited, Honolulu.

Monsarrat, M.D.
1878 Map of Waianae. Registered Map 2108. Hawai‘i Land Survey Division, Department of Accounting and General Services, Honolulu

Mooney, Kimberly M., James McIntosh, and Paul L. Cleghorn
2013 *Summary of an Archaeological Assessment at the Proposed Wai‘anae Solar Power Farm Wai‘anae, O‘ahu [TMK (1) 8-5-002:022, 023, 124; 8-5-003:030]*. Pacific Legacy, Inc., Kailua, Hawai‘i.

Perzinski, David and Hallett H. Hammatt
2004 *Archaeological Inventory Survey Report for Proposed Improvements at Mauna Lahilahi Beach Park in the Ahupua‘a of Wai‘anae, District of Wai‘anae, Island of O‘ahu, (Portions of TMK 8-4-01:1, 8-5-17:1-7, 8-5-18:1-3)*. Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

Pooloa, George
1930 Anoai o Oahu Nei [Place Names of Oahu]. *Ka Hoku o Hawaii*, 11 February: 4.

Pukui, Mary K. and Samuel H. Elbert
1986 *Hawaiian Dictionary.* Second edition. University of Hawaii Press, Honolulu.

Pukui, Mary K., Samuel H. Elbert, and Esther Mookini
1974 *Place Names of Hawaii.* University of Hawai‘i Press, Honolulu.

Riford, Mary R.
1984 *Report of Archaeological Consulting Services during Repair of Sewer Lines and Replacement of Water Main Lines at Waianae Army Recreation Center, O‘ahu, Hawai‘i*. Department of Anthropology, Bernice Pauahi Bishop Museum, Honolulu.

Schilz, Allan J.
1994 *Subsurface Archaeological Intensive Survey and Data Recovery and Construction Monitoring and Sampling at Waianae Army Recreation Center (WARC), Wai‘anae, O‘ahu Island, Hawai‘i*. Ogden Environmental and Energy Services Company, Inc., Honolulu.

Schmitt, Robert C.
1973 *The Missionary Censuses of Hawaii*. Bernice Pauahi Bishop Museum, Honolulu.

Shapiro, William and Paul H. Rosendahl
1988 *Archaeological Reconnaissance Survey and Limited Subsurface Testing Waianae Kai Property Land of Waianae, Waianae District, Island of Oahu (TMK: 8-5-03:9, 10, 29, 31, 32. 43; 8-5-04:28; 8-5-19:35, 36, 37).* Paul H. Rosendahl, Inc., Hilo, Hawai‘i.

Shefcheck, Donna and Robert Spear
2007 *An Archaeological Assessment Report of Two Adjacent Parcels Measuring Approximately 2.5 Acres in Wai‘anae Ahupua‘a, Wai‘anae Kai, ‘Ili of Lehano Iki, Wai‘anae District, Island of O‘ahu, Hawai‘i [TMK: (1) 8-5-027: 071 and 073]*. Scientific Consultant Services, Inc., Honolulu.

2008 *An Archaeological Assessment of a Portion of the Wai‘anae Regional Park in Preparation for Parking Improvements in Wai‘anae Ahupua‘a, Wai‘anae Kai, Poka‘i‘ili, Wai‘anae District, Island of O‘ahu, Hawai‘i [TMK: (1) 8-5-002:49]*. Scientific Consultant Services, Inc., Honolulu.

2009 *An Archaeological Monitoring Report for Two Adjacent Parcels Measuring Approximately 2.5 Acres in Wai‘anae Ahupua‘a, Wai‘anae Kai, ‘Ili of Lehano Iki, Wai‘anae District, Island of O‘ahu, Hawai‘i [TMK: (1) 8-5-027: 071 and 073]*. Scientific Consultant Services, Inc., Honolulu.

Sinoto, Akihiko
1975 *Archaeological Reconnaissance Survey of the Wai‘anae Light draft Harbor Project Site, Wai‘anae, O‘ahu.* Bernice Pauahi Bishop Museum, Honolulu.

Soehren, Lloyd J.
2017 *A Catalog of Hawaiian Place Names: Compiled from the Records of the Boundary Commission and The Board of Commissioners to Quiet Land Titles of the Kingdom of Hawaii*. Lloyd J. Soehren. Honokaa, Hawai‘i. Available online at http://www.ulukau.org.

Stearns, Norah D.
1939 Kaneana Cave. *Honolulu Star-Bulletin*, 9 September.

Stearns, Harold T.

1940 *Geology and Ground-water Resources of the Island of Oahu, Hawaii.* Bulletin 5, Division of Hydrography, Territory of Hawaii, Honolulu.

Sterling, Elspeth P. and Catherine C. Summers

1978 *Sites of O‘ahu*. Bernice Pauahi Bishop Museum, Honolulu.

Thrum, Thomas G.

1922 Hawaiian Place Names. In *A Dictionary of the Hawaiian Language*. Originally published 1865. Revised by Henry Parker. Board of Commissioners of Public Archives of the Territory of Hawaii, Honolulu.

Tulchin, Jon and Hallett H. Hammatt

2007 *Archaeological Inventory Survey for the Spotkaeff House Project, Wai‘anae Ahupua‘a, Wai‘anae District, Island of O‘ahu: TMK: [1] 8 -5-002:025*. Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

Tulchin, Todd and Hallett H. Hammatt

2004 *Archaeological Monitoring Report for BWS Farrington Highway Part III Project, Jade Street to Kaulawaha Road, Mākaha and Wai‘anae Ahupua‘a, Wai‘anae District, Island of O‘ahu (TMK 8-4-01, 03, 04, 11, 13, 14) (TMK 8-5-02, 14-18)*. Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

U.S. Department of Agriculture

2001 Soil Survey Geographic (SSURGO) database. U.S. Department of Agriculture, Natural Resources Conservation Service. Fort Worth, Texas. http://www.ncgc.nrcs.usda.gov/products/datasets/ssurgo/ (accessed March 2005).

UH SOEST

1928 UH SOEST Waianae coast aerial photograph. University of Hawai‘i at Mānoa School of Ocean and Earth Science and Technology–Coastal Geology Group. Online at http://soest.hawaii.edu/coastal/webftp/Oahu/mosaics/

1960 UH SOEST Waianae coast aerial photograph. University of Hawai‘i at Mānoa School of Ocean and Earth Science and Technology–Coastal Geology Group. Online at http://soest.hawaii.edu/coastal/webftp/Oahu/mosaics/

1971 UH SOEST Waianae coast aerial photograph. University of Hawai‘i at Mānoa School of Ocean and Earth Science and Technology–Coastal Geology Group. Online at http://soest.hawaii.edu/coastal/webftp/Oahu/mosaics/

1977 UH SOEST Waianae coast aerial photograph. University of Hawai‘i at Mānoa School of Ocean and Earth Science and Technology–Coastal Geology Group. Online at http://soest.hawaii.edu/coastal/webftp/Oahu/mosaics/

U.S. Army War Department

1919 U.S. Army War Department Fire Control Map of O‘ahu, Waianae Quadrangle. USGS Information Services, Denver, Colorado.

1936 U.S. Army War Department Terrain Map of O‘ahu, Waianae and Kaena Quadrangles. USGS Information Services, Denver, Colorado.

1943 U.S. Army War Department 7.5-Minute Terrain Map of O‘ahu, Waianae Quadrangle. USGS Information Services, Denver, Colorado.

U.S. Department of Agriculture

2001 Soil Survey Geographic (SSURGO) database. U.S. Department of Agriculture, Natural Resources Conservation Service. Fort Worth, Texas. http://www.ncgc.nrcs.usda.gov/products/datasets/ssurgo/ (accessed March 2005).

USGS (U.S. Geological Survey)

1954 Waianae USGS 7.5 minute topographic quadrangle. USGS Information Services, Denver, Colorado.

1963 Waianae USGS 7.5 minute topographic quadrangle. USGS Information Services, Denver, Colorado.

1998 Waianae USGS 7.5 minute topographic quadrangle. USGS Information Services, Denver, Colorado.

Vancouver, George

1798 A Voyage of Discovery to the North Pacific Ocean and Round the World Performed in the Years 1790-95, Volume II. G.G. and J. Robinson, Paternoster Row, and J. Edwards, Pall-Mall, London, England.

Waihona ‘Aina

2017 *The Māhele Database*. Electronic document, http://waihona.com (accessed 10 December 2016).

Westervelt, William D.

1915 *Hawaiian Legends of Old Honolulu*. G.H. Ellis, Boston.

Yucha, Josephine, Trevor M. Yucha, and Hallett H. Hammatt

2014 *Archaeological Inventory Survey Report for the Kamaile Plantation Wells and Production Wells Sites, Wai‘anae (Kai) Ahupua‘a, Wai‘anae District, O‘ahu TMK: [1] 8-5-002:016*. Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

Yucha, Trevor M., Tara A. Seaver, and Hallett H. Hammatt

2015 *Archaeological Monitoring Report for the Wai‘anae District Park Reconstruction of Wastewater System Project, Wai‘anae Kai Ahupua‘a, Wai‘anae District, O‘ahu TMK: [1] 8-5-002:049 por*. Cultural Surveys Hawai‘i, Inc., Kailua, Hawai‘i.

Appendix A: Māhele Documents

N.R. = Native Register; F.T. – Foreign Testimony; N.T = Native Testimony. Information from Waihona ‘Aina (2017)

LCA 9489B to Holi – Claim and Testimony

[No. 9489B], Holi, Kamaile, Waianae, January 19, 1848

N.R. 470v4

To the Honorable Land Commissioners of the Hawaiian Islands, Greetings: I hereby state my claim for land in Kamaile, Waianae, Island of Oahu. It is bounded on the north by the land of Kaana, on the east by the land of Kahinu, on the south by the land of Kuheleloa and the land of Kalua. on the west by the land of Mahukona.

HOLI

F.T. 298v9

Ohule, sworn says, the land of claimant is a moo aina called Kumumaomao in the ili of Kamaile 1, Waianae, Oahu. It contains 18 lois & a kula in one piece, & is bounded:

Mauka by the koele Kumumaomao
Ewa by the moo aina Hawaiiloa
Makai by the sea shore
Waialua by the kula Kumanomano.

Claimant received his land from Manu in the time of Kekauluohi & has held it in quiet until now.

Kahae, sworn says, his testimony accords with that above & is true.

N.T. 416-417v9

Ohule, sworn, he has seen his land Kumumaomao, a moo land in the ili of Kamaile 1 in Waianae, Oahu - 18 patches and a pasture in 1 section.

Mauka, Kumumaomao koele
Ewa, Hawaiiloa, a moo land
Makai, Beach
Waianae, Kumanomano, a pasture.

Land from Manu at the time of Kekauluohi, no objections.

Kahue, sworn, he has known in the same way as Ohule.

[Award 9489B; R.P. 1047; Pohakulapalapa Kamaile Waianae; 2 ap.; 4.42 Acs; claim index lists award as 9489B; R.P. index lists award as 9489]

LCA 9489B to Holi – Award

Land Commission, Awards Book. Information from AvaKonohiki.com (2017)