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August 21, 2025

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

Dear Mary Evans:

Subject: **Final Environmental Assessment (FEA) Finding of No Significant Impact (FONSI)**
(PL-ENV-2024-000028)
Applicant: **Talon 1 Properties LLC**
Project: **Talon 1 Properties Self Storage Warehouse**
TMK: **(3) 2-2-033:011, South Hilo District, Island of Hawai‘i**

With this letter, the Hawai‘i County Planning Department hereby transmits the Final Environmental Assessment and Finding of No Significant Impact (FEA-FONSI) for the proposed *Talon 1 Properties Self Storage Warehouse* project located on the subject parcel (TMK) in South Hilo on the Island of Hawai‘i for publication in the next available edition of the Environmental Notice.

In addition to this letter, the Planning Department has also submitted an electronic version of the Environmental Review Program Publication Form and a searchable PDF-formatted copy of the Final Environmental Assessment (FEA) for the subject project to the online submission portal.

If you have any questions regarding this letter, please contact Alex J. Roy, M.Sc. of our Planning Department staff at (808) 961-8140 or via email at alex.roy@hawaiicounty.gov.

Sincerely,

Jeffrey W. Darrow
Jeffrey W. Darrow (Aug 21, 2025 09:53:25 HST)
JEFFREY W. DARROW
Planning Director

AJR:rms
P:\wpwin60\alex_roy\ea_eis_review\talon_1_properties_self_storage\pl-env-2024-000028_erp_letter_fonsi.doc

From: dbedt.opsd.erp@hawaii.gov
To: DBEDT OPSD Environmental Review Program
Subject: New online submission for The Environmental Notice
Date: Tuesday, August 26, 2025 2:29:00 PM

Action Name

Talon 1 Properties Self Storage Warehouse

Type of Document/Determination

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

HRS §343-5(a) Trigger(s)

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

Judicial district

South Hilo, Hawai‘i

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

(3) 2-2-033:011

Action type

Applicant

Other required permits and approvals

NPDES, SWPPP, Plan Approval, Grading and Grubbing Permit, Building Permits

Discretionary consent required

Special Management Area Use Permit

Agency jurisdiction

County of Hawai‘i

Approving agency

County of Hawaii Planning Department

Agency contact name

ALEX ROY

Agency contact email (for info about the action)

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Map It

Applicant

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Map It

Is there a consultant for this action?

Yes

Consultant

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Consultant contact name

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Map It

Action summary

The proposed use is a three-floor self-storage warehouse with accompanying restrooms and elevators to serve the tenants. The design includes two porte-cochere on either end, North and South, to allow for large trucks and ADA parking stalls to park under roofed shelter and load/unload to the storage warehouse. The conceptual floor plan includes 88 storage units per floor for a total of 264 storage units within the warehouse. The self-storage warehouse schematic site plan includes 24' wide two-way access driveways at Piilani Street and Mililani Street. The site plan provides for 28 total full size parking stalls including 2 ADA van accessible stalls. The site plan also provides for seven 12x50 foot loading zones for

customer convenience. The schematic design is three floors (12'-0" ground floor, 10'-0" floors 2 and 3 for a total height of 41 '-8" which is compliant with the zoning height limit of 45'-0". The schematic design aesthetic is meant to evoke the 1920's era of Hilo Town.

Reasons supporting determination

The proposed use is consistent with the property class "Industrial" and zoning "ML-20 Limited Industrial District".

Attached documents (signed agency letter & EA/EIS)

- TALON_1_FEA_AUG_2025_unlocked.pdf
- 2025-08-21-LETTER-TO-MARY-ALICE-EVANS-PL-ENV-2024-000028-FEA-FONSI_unlocked.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)."

Shapefile

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

Action location map

- Talon-1-LLC2.zip

Authorized individual

ALEX ROY

Authorized individual email

ALEX.ROY@HAWAIICOUNTY.GOV

Authorized individual phone

(808) 961-8140

Authorization

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

FINAL ENVIRONMENTAL ASSESSMENT

Talon 1 Properties
Self-storage Warehouse

AUGUST 2025

TMK: (3) 2-2-033: 011
Waiākea Houselots, South Hilo, County of Hawai‘i, State of Hawai‘i

APPLICANT:	Talon 1 Properties LLC 347 Andrews Avenue Hilo, Hawai‘i 96720
DETERMINING AGENCY:	County of Hawai‘i Planning Department 101 Pauahi Street Suite 3 Hilo, Hawai‘i 96720
CONSULTANT:	KOA Architects LLC 65-1285C Kawaihae Road Kamuela, HI 96743

This document is prepared pursuant to:
The Hawai‘i Environmental Policy Act,
Chapter 343, Hawai‘i Revised Statutes (HRS), and
Title 11, Chapter 200.1, Hawai‘i Department of Health Administrative Rules (HAR)

ACTION SUMMARY

The proposed use is consistent with the property class "Industrial" and zoning "ML-20 Limited Industrial District" and is a three-floor self-storage warehouse with accompanying restrooms and elevators to serve the tenants. The design includes two porte-cochere on either end, North and South, to allow for large trucks and ADA parking stalls to park under roofed shelter and load/unload to the storage warehouse. The conceptual floor plan includes 88 storage units per floor for a total of 264 storage units within the warehouse.

The self-storage warehouse schematic site plan includes 24' wide two-way access driveways at Piilani Street and Mililani Street. The site plan provides for 28 total full size parking stalls including 2 ADA van accessible stalls. The site plan also provides for seven 12x50 foot loading zones for customer convenience.

The schematic design is three floors (12'-0" ground floor, 10'-0" floors 2 and 3 for a total height of 41'-8" which is compliant with the zoning height limit of 45'-0". The schematic design aesthetic is meant to evoke the 1920's era of Hilo Town.

Significance Criteria

When conducting an **Environmental Assessment (EA)** for a self-storage warehouse project in **Hilo, Hawaii**, there are several significant criteria to consider based on the potential environmental impacts of the development. The purpose of the EA is to determine whether the project will have a significant impact on the environment and if it warrants an Environmental Impact Statement (EIS). Here are the key environmental significance criteria to address:

1. Land Use Compatibility

- **Zoning and Land Use Designation**: Ensure the proposed self-storage facility complies with the zoning regulations of the area. Hilo is governed by specific land use policies that prioritize conservation, agriculture, residential, and commercial uses.
- **Consistency with the Hilo Community Development Plan (CDP)**: The project should align with local plans, policies, and land-use objectives. A deviation from these plans may trigger more intense scrutiny.
- **Urban Growth Boundaries**: Determine if the site is within an urban growth boundary or if the proposed project will extend development into agricultural or conservation lands, which may require special permits.

2. Geology and Soils

- **Soil Quality and Erosion**: Assess soil types on the site to determine susceptibility to erosion, particularly if the site is located near a coastline or has steep topography.
- **Landslide or Volcanic Activity Risks**: In Hilo, there is potential exposure to volcanic hazards (e.g., lava flow, ash fallout). Assess the potential risks and mitigation measures for such hazards.
- **Seismic Activity**: Given Hawaii's vulnerability to earthquakes, it's important to evaluate the seismic risks to ensure proper building design to minimize damage during tremors.

3. Water Resources

- **Surface Water and Groundwater**: Investigate the proximity of the site to streams, rivers, or the ocean, and assess the potential for flooding or impacts on water quality. The presence of wetlands or floodplains could increase the environmental significance.
- **Stormwater Management**: Due to Hawaii's heavy rainfall, effective stormwater management measures must be implemented to avoid flooding and sedimentation into nearby water bodies. Low-impact development strategies may be considered to mitigate runoff.
- **Groundwater Protection**: Evaluate potential contamination risks to groundwater, especially if the site is near a wellhead or in a sensitive aquifer area.

4. Air Quality

- **Dust and Airborne Pollutants**: Assess construction-related dust and vehicle emissions. Long-term operational impacts from traffic-related air pollution, especially on Hilo's main roads, should also be considered.
- **Volcanic Activity**: Volcanic emissions (vog) are a notable concern in Hawaii. While this is a more regional issue, assess how the project may interact with existing air quality conditions.

5. Flora and Fauna

- **Endangered Species**: Hilo is home to several endangered or threatened species of plants and animals. An assessment should be conducted to determine if any listed species are present on or near the site. The U.S. Fish and Wildlife Service or Hawaii Department of Land and Natural Resources (DLNR) can provide guidance.
- **Habitat Disruption**: The project may affect local ecosystems, including coastal habitats, forests, or agricultural lands. Evaluate the potential for habitat destruction or fragmentation.
- **Invasive Species**: Hawaii struggles with invasive species, and new developments can facilitate the spread of these species. Assess the potential for introducing or exacerbating invasive species issues on the site.

6. Cultural and Historic Resources

- **Cultural Significance**: The Hawaiian Islands have a rich cultural heritage. If the site has any connection to historical or cultural practices (e.g., burial sites, sacred lands), an assessment should be made of potential impacts on cultural resources.
- **Archaeological Resources**: An archaeological survey should be conducted to ensure that the site does not contain historic properties or archaeological sites, particularly as Hilo has areas with significant Native Hawaiian history.
- **Traditional Hawaiian Practices**: Consider the potential impact on traditional Hawaiian land use practices and access, such as cultural gatherings or gathering of resources (e.g., taro cultivation, fishing).

7. Traffic and Transportation

- **Traffic Impact**: Assess the traffic impacts on local roads, particularly if the site is near busy areas such as downtown Hilo. The increase in traffic from trucks and customers should be evaluated, including the need for access improvements and potential congestion.
- **Public Transit**: Evaluate the accessibility of the site for public transportation, particularly if the project is near major residential areas or other transportation hubs.
- **Roadway Safety and Design**: Assess any impacts on road safety, such as increased congestion, visibility issues, or the need for traffic control measures (e.g., turning lanes).

8. Noise

- **Construction Noise**: Consider potential noise impacts from construction activities, especially if the project is located near residential or noise-sensitive areas.
- **Operational Noise**: Evaluate noise from vehicle traffic, operational machinery, and security systems (e.g., lighting or cameras) that may affect surrounding properties.

9. Energy and Utilities

- **Energy Consumption**: Consider the energy demand of the self-storage warehouse, including lighting, security, and other operational needs. Evaluate opportunities for energy efficiency measures or renewable energy sources.
- **Water and Sewer Systems**: The project's water and sewage requirements should be reviewed in consultation with local utilities to ensure that there is adequate capacity and to identify any necessary infrastructure upgrades.
- **Waste Management**: Assess waste disposal practices during construction and the facility's operation. Ensure the project adheres to local waste management regulations.

10. Climate Change and Adaptation

- **Sea Level Rise**: Consider the risks of sea level rise on coastal properties. Hilo, while relatively safe from extreme weather events, may still face long-term impacts from rising sea levels.
- **Resilience to Extreme Weather**: Given Hawaii's susceptibility to tropical storms, hurricanes, and heavy rainfall, evaluate the building's resilience to these weather events and ensure adequate flood-proofing, drainage, and structural design.

11. Cumulative Impacts

- **Other Projects**: Evaluate the cumulative impact of this project combined with other developments in the area, including infrastructure improvements and urbanization, to determine if the overall effect is significant.
- **Social and Economic Effects**: Consider the socioeconomic impacts, such as job creation, contribution to the local economy, and how the development might affect the quality of life for nearby residents.

12. Public Participation and Concerns

- **Community Consultation**: Engage with local stakeholders, including residents, businesses, and cultural organizations, to gauge their concerns and incorporate community feedback into the project design and assessment process.

13. Best Management Practices (BMPs) and Mitigation Measures

- Implement BMPs for erosion control, stormwater management, and noise abatement during construction. Identify mitigation measures for any identified impacts to reduce environmental harm, such as buffer zones, habitat restoration, or noise barriers.

Conclusion

The environmental assessment process will help to identify and mitigate potential significant environmental impacts of a self-storage warehouse in Hilo. It is essential to consider local conditions, including cultural, ecological, and infrastructure aspects, in the context of state and federal regulations. If any significant impacts are identified, the EA could lead to a more detailed Environmental Impact Statement (EIS) to ensure comprehensive mitigation and planning.

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Abbreviations

AMSL	Above Mean Sea Level
AWSC	All-Way Stop Controlled
ASTM	American Society for Testing and Materials
AFONSI	Anticipated Finding of No Significant Impact
AIS	Archaeological Inventory Survey
AADT	Average Annual Daily Traffic
B.P.	Before Present
BMP	Best Management Practices
CWA	Clean Water Act
CZM	Coastal Zone Management
CWRM	Commission on Water Resource Management
DOH	Department of Health
DLNR	Department of Land and Natural Resources
DPW	Department of Public Works
DWS	Department of Water Supply
DOFAW	Division of Forestry and Wildlife
DEA	Draft Environmental Assessment
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FEA	Final Environmental Assessment
FONSI	Finding of No Significant Impact
FIRM	Flood Insurance Rate Map
GPD	Gallons Per Day
GPM	Gallons Per Minute
GP	General Plan
GHG	Greenhouse Gases
GDE	Groundwater Dependent Ecosystems
HAR	Hawai‘i Administrative Rules
HCCMAC	Hawai‘i Climate Change Mitigation and Adaptation Commission

HDOT	Hawai‘i Department of Transportation
HEPA	Hawai‘i Environmental Policy Act
HGGRC	Hawai‘i Groundwater & Geothermal Research Center
HRS	Hawai‘i Revised Statutes
HSDP	Hawai‘i Scientific Drilling Project
HELCO	Hawaiian Electric Light Company
HKB	Hawaiian Kingdom Brands
HPMS	Highway Performance Monitoring System
HGRP	Humu‘ula Groundwater Research Project
IPCC	International Panel on Climate Change
ITE	International Transportation of Engineers
JD	Jurisdictional Determination
LUPAG	Land Use Pattern Allocation Guide
LOS	Level of Service
LID	Low Impact Development
MUTCD	Manual on Uniform Traffic Control Devices
MGD	Million Gallons Per Day
NASA	National Aeronautics and Space Administration
NOS	National Ocean Service
NPDES	National Pollutant Discharge Elimination System
OPSD	Office of Planning and Sustainable Development
PIRCA	Pacific Islands Regional Climate Assessment
PTA	Pōhakuloa Training Area
RAM	Robust Analytical Model
SMA	Special Management Area
SHPD	State Historic Preservation Division
SWC	State Water Code
SWPP	Storm Water Pollution Prevention Plan
SY	Sustainable Yield
TMDL	Total Maximum Daily Loads
TWI	Trade Wind Inversion
TWSC	Two-Way Stop Controlled
UV	Ultraviolet
UIC	Underground Injection Control
USDM	United State Drought Monitor
USGS	United States Geological Survey
WMA	Water Management Area
WQS	Water Quality Standard
WRPP	Water Resource Protection Plan
WUDP	Water Use Development Plan

SUMMARY OF PROJECT, ENVIRONMENTAL IMPACTS, AND MITIGATION MEASURES (SUPPLEMENTAL CHANGE OF USE & SIZE)

The use of the project is a minimal resources required self-storage warehouse.

The size and scale of the project is to be a three story, 42' maximum height, self-storage warehouse with two covered porte cocheres (north and south) for sheltered customer loading/unloading.

The proposed new floor area is 31,201 square feet times 3 floors with a total of 93,603 square feet of enclosed storage space.

The covered porte cochere areas are 2,460 square feet each (times 2) for a total of 4,920 square feet of covered loading and unloading. The proposed grand total including interior and covered exterior area is now proposed to be 98,523 square feet.

Per Hawaii County Zoning Code, the project provides seven 12x50 foot loading zones (requirement is six) and 24 full size parking stalls, including one ADA van accessible stall (requirement is three).

Talon 1 Properties LLC is proposing to construct a self-storage warehouse on the subject site located at 525 Pi'ilani Street. The parcel identified as Tax Map Key (TMK) (3) 2-2-033: 011 lies on the northeast corner of Pi'ilani Street and Mililani Street in the Waiākea Houselots (herein referred to as "Property") (**Figure 1-5**). The site is 2.57-acres of land zoned Limited Industrial ML-20 under Ordinance 1992-122. Sole access to the site is off Pi'ilani Street.

The subject Property is within the Special Management Area (SMA), roughly 625 feet east of the Wailoa River/Waiākea Fishpond. The mouth of the Wailoa River, where it enters Hilo Bay, is approximately 2,300 feet north.

On-site infrastructure is expected in the form of driveways, parking, electrical, water supply, storm water management, and wastewater disposal. Electricity will be provided by a Hawaiian Electric Light Company (HELCO) connection and solar panels. County water will be used for onsite potable uses. Estimated County water use calculations will be submitted to DWS for review and approval.

Off-site infrastructure improvements will be required to support traffic and wastewater. A Traffic Impact Analysis Report (TIAR) was completed on July 6, 2022, by SSFM International and is summarized in Section 3.3.1 of this DEA. The proposed project would also require the extension of the County sewer line from its terminus near the intersection of Pi'ilani and Mililani Street. The line is proposed to be extended north from Mililani Street to mitigate impacts to Pi'ilani Street. A detailed discussed on wastewater and measures to mitigate potential impacts to water quality can be found in Section 3.1.4.

Total construction costs are estimated at roughly $5,000,000. Construction is planned to commence upon completion of permitting and design, with full buildout by 2025. Construction activities would produce minor short-term impacts to noise, air quality, and scenic views, which will be mitigated by Best Management Practices (BMPs). Potential impacts to noise, air quality, and scenic resources during operation will be discussed in detail in Section 3.1.6.

A biotic survey conducted on September 14, 2022, confirmed that no endangered or threatened species exist on the Property. The site was recently cleared under SMA minor permit PL-SMM-2022-000012, approved by the Planning Department on January 16, 2022. Typical vegetation that remains on the Property includes non-native trees, vines, and grasses. One native plant known as Kauna'oa kahakai (*Cuscuta sandwichiana)* was also detected, although it was not rooted in the ground.

An Environmental Site Assessment was completed for the subject site in 2018. No current or past evidence of contaminants were found on the Property. A Storm Water Pollution Prevention Plan (SWPPP) was drafted for this Environmental Assessment and is summarized in Section 3.1.4.

An Archaeological Inventory Survey (AIS) determined the presence of one historical site (Site 50-10-35-1481.2). It is a concrete slab interpreted as an historic foundation or walkway, a remnant of previous industrial uses on site, which is significant for yielding information for understanding historic activity in the area. According to the AIS, the mapping, written descriptions, and photography of Site 1481.2 adequately document it. No further work or preservation has been recommended. The survey also found four 'displaced isolated objects' but they are not considered significant historical resources.

It is not known whether the Property has been previously used for traditional and customary rights by native Hawaiians. It is unlikely to be used as such today due to previous development and land use on the Property over the past few decades. In the unlikely event that undocumented archaeological or cultural resources, including shells, bones, midden deposits, lava tubes, or current traditional and customary gathering rights are discovered, all work will cease, and the State Historic Preservation Division will be contacted immediately to determine appropriate action.

The proposed action does not conflict with County or State laws. Discretionary permits required for the proposed action include a Special Management Area Use Permit (SMA-Major) and a Time Extension Request to complete the outstanding conditions of Rezone Ordinance 1992-122. Ordinance 1992-122 changed the district classification of the Property from Resort-Hotel, Safety (V-5-.75) to Limited Industrial (ML-20) in 1992. Other permits and approvals required at the State and County level can be found in Section 3.5. Establishment of the proposed use will not be contrary to the objectives sought to be accomplished by State Land Use Laws and Regulations.

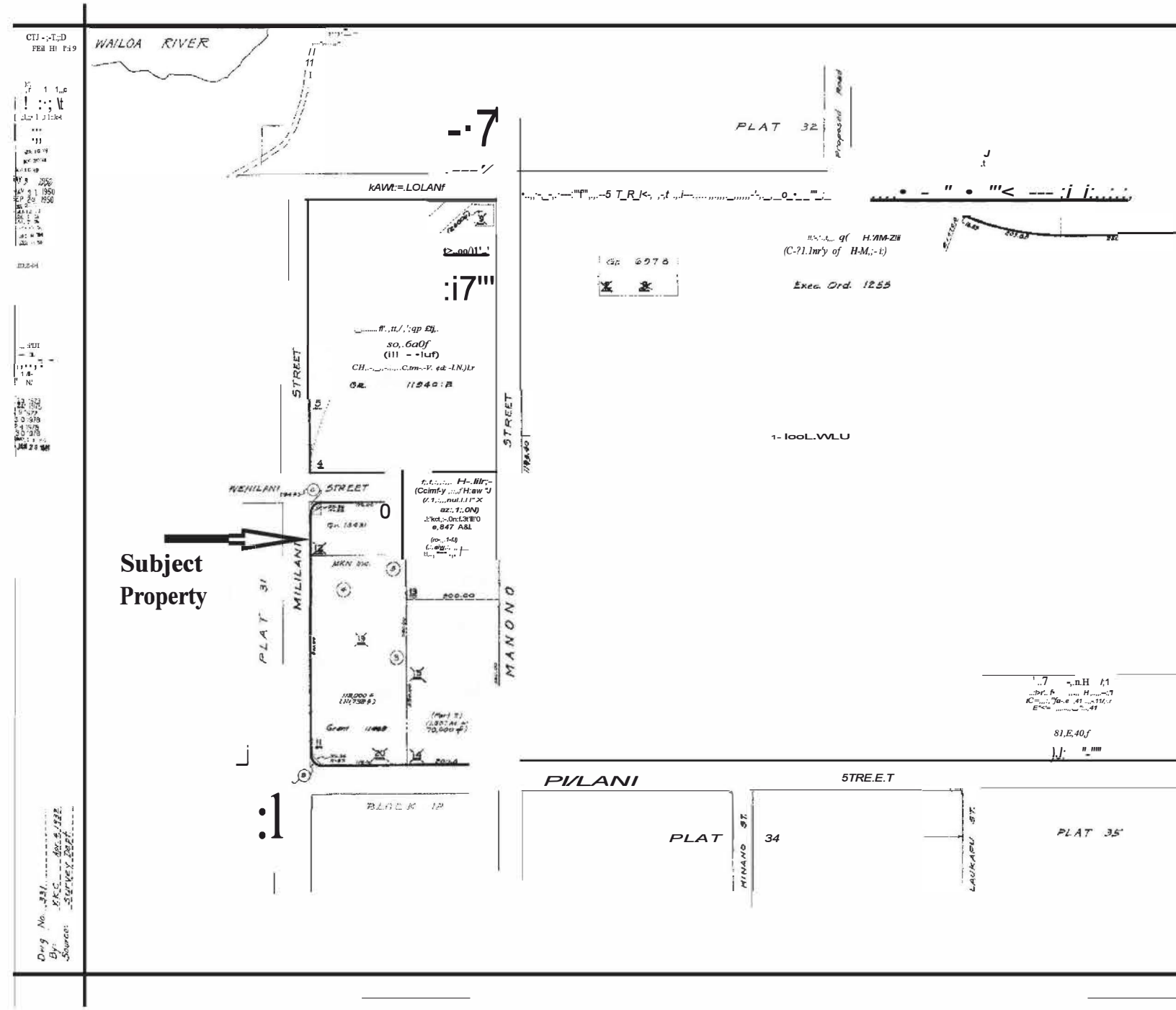

WAILOA RIVER
PLAT 32
STREET
STREET
STREET
MANONO
MILILANI
PLAT 31
PLAT 34
PIILANI
5TREET
Exec. Ord. 1255
Subject Property





Figure 3





Figure 5

PART 1: PROJECT DESCRIPTION AND EA PROCESS

1.1 Project Description and Location

The subject site is located on an undeveloped lot on the northeast corner of Pi‘ilani Street and Mililani Street, roughly 300 feet west of the Pi‘ilani and Manono Street intersection. Mililani Street is undeveloped north of Pi‘ilani Street, therefore current access is solely off Pi‘ilani Street.

The subject Property is roughly 625 feet east of the Wailoa River/Waiākea Fishpond. The mouth of the Wailoa River, where it enters Hilo Bay, is approximately 2,300 feet north. Surrounding land uses include the Hilo marina located roughly 1,300 feet to the north, Ho‘olulu Park located roughly 450 feet to the east, The Manono mini mart convenience store located 130 feet to the south, and Wailoa Plaza and Waiākea Villas roughly 1,000 feet to the southwest (**Figure 6**).



Figure 6: Google Earth Satellite Image of Subject Property and Surrounding Area

According to Planning Department records, the Property has the following permit history:

1. July 24, 1991: the General Plan Amendment Ordinance No. 91 72, changed the Land Use Pattern Allocation Guide (LUPAG) map designation from Medium-Density Urban to Industrial for the subject Property.
2. September 1, 1992: SMA Major Permit (SMA) 334) was approved for a fish processing center but has since been revoked (by the previous landowner) and is no longer valid.
3. November 20, 1992: Effective date of Change of Zone Ordinance No. 92 122, which changed the zoning of TMKs 2-2-033: 011, 012, 019 and 020 totaling 2.5712 acres from the Resort-Hotel-Safety-7,500 square feet (V-S-7.5) district to the Limited Industrial-20,000 square feet (ML-20) zoning district.

4. October 24, 1994: Effective date of final approval for Consolidation 831-Revised, which consolidated TMKs 2-2-033: 011, 012, 019, and 020 into one lot identified by the current TMK: (3) 2-2-033: 011.
5. January 16, 2022, a SMA minor permit (PL-SMM-2022-000012) was granted to the current applicant for land management activities including clearing the Property of overgrown invasive trees and shrubs, and construction of a fence around the Property perimeter.

The proposed action would include both onsite and offsite improvements including buildings, driveways, infrastructure for electrical, water supply, storm water and wastewater management, roadway development, and County sewer line extension.

The size and scale of the project is to be a three story, 42' maximum height, self-storage warehouse with two covered porte cocheres (north and south) for sheltered customer loading/unloading.The proposed floor area is 31,201 square feet times 3 floors with a total of 93,603 square feet of enclosed storage space. The covered porte cochere areas are 2,460 square feet each (times 2) for a total of 4,920 square feet of covered loading and unloading. The proposed grand total including interior and covered exterior area is now proposed to be 98,523 square feet.

Per Hawaii County Zoning Code, the project provides seven 12x50 foot loading zones (requirement is six) and 24 full size parking stalls, including one ADA van accessible stall (requirement is one).

Figures 7-16 show the preliminary site plan, conceptual designs, and factory floor plans. Utility poles are located on the northeast and southeast corners of the parcel. Electricity will be provided via Hawaiian Electric Light Company (HELCO) and solar panels.

The subject Property is located above 'unconfined basal aquifers' recognized by the State of Hawai'i Commission on Water Resource Management (CWRM) as the Hilo Aquifer (80401) and the Onomea Aquifer (80204). These basal aquifers are used as municipal water sources. The change of use self-storage warehouse would NOT propose to drill a well.

(SUPPLEMENTAL CHANGE OF USE – NO WELL PROPOSED) The 'deep confined aquifer' was discovered by the Hawai'i Scientific Drilling Project (HSDP) in 1993. This aquifer is located roughly 1,000 feet below sea level and is 'confined' by a 100-foot- thick soil layer that is identified as the contact surface between Mauna Loa and Mauna Kea lavas. This impermeable soil layer separates the deep confined aquifer from the Hilo and Onomea basal aquifers located above it.

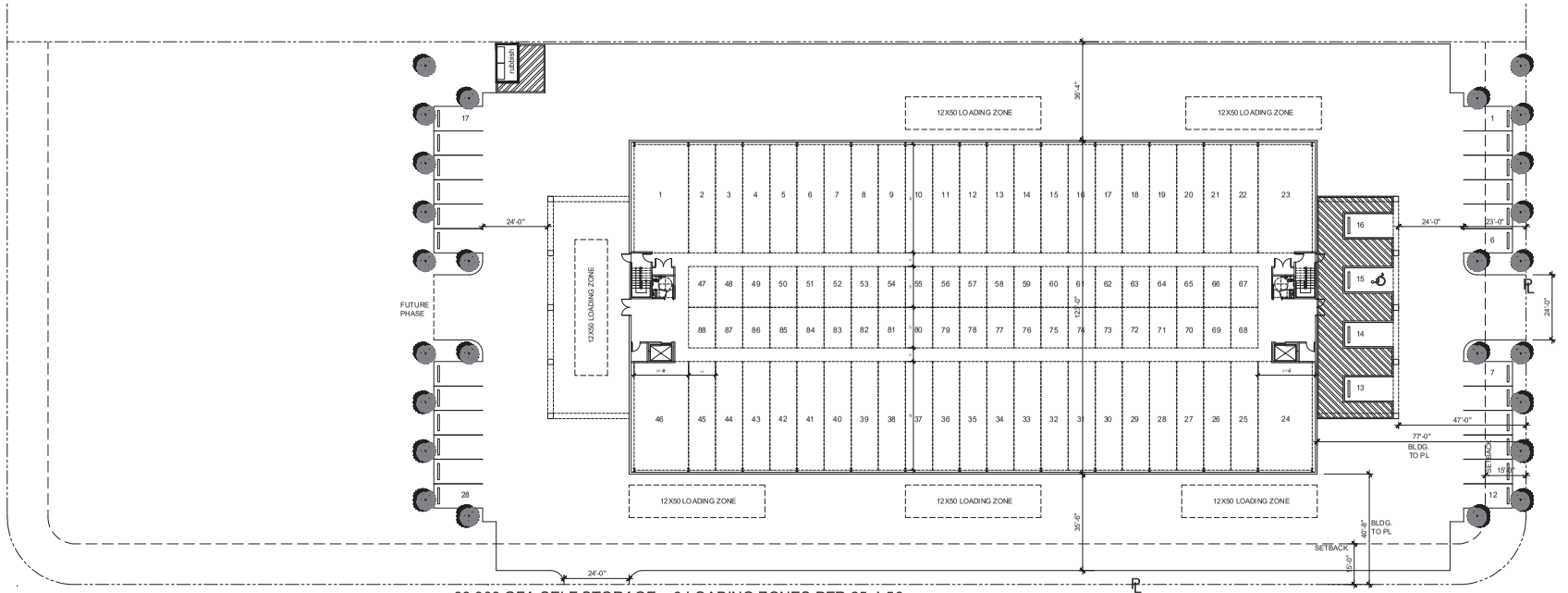
Figure 17 (NOT USED IN SUPPLEMENTAL CHANGE OF USE TO STORAGE)

An Environmental Site Assessment completed in 2018 found no evidence of current or past contamination on the subject site. The complete report can be found in **Appendix A**. A Storm Water Pollution Prevention Plan was developed to outline Best Management Practices during and after construction to prevent storm water from impacting other sites and the Wailoa River/Waiākea Fishpond. The full report can be found in **Appendix B**. An Archaeological Inventory Survey (AIS) determined the presence of one historical site (Site 50-10-35-1481.2). The site is adequately documented, and no further work or preservation is recommended. The full AIS report can be found in **Appendix C**.

Offsite infrastructure improvements are expected in the form of roadway improvements and an extension of the County sewer line. Mililani Street is proposed to be extended north from Pi‘ilani Street along the west side of the parcel to County dedicable standards. The TIAR discusses two (2) potential future road alternatives to mitigate anticipated traffic impacts in 2032 and 2042 at the Pi‘ilani and Manono Street intersection. These will be discussed in Section 3.3.1. The full TIAR report can be found in **Appendix D**.

The County sewer line is proposed to be extended north from its terminus near the intersection of Mililani Street and Pi‘ilani Street. Wastewater from storage warehouse will be minimal.

County water is available to the site via an existing six (6) inch waterline within Pi‘ilani Street fronting the subject Property. The parcel is served by an existing 5/8-inch meter, which allows a maximum daily usage of 600 gallons.



93,603 GFA SELF STORAGE = 6 LOADING ZONES PER 25-4-56
264 STORAGE UNITS = 3 PARKING STALLS REQUIRED WITH 1 ADA STALL (28 PROVIDED)

1 SITE PLAN
SCALE: 1"=20'-0"

0 10' 20' 40'

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SELF-STORAGE WAREHOUSE

TALON1PROPERTIES LLC
525 PIILANI STREET
HILO, HI 96720 TMK (3) 2-2-033:011

DATE	ISSUE
SEP 2024	EA & SMA

REVISIONS

#	DATE	ISSUE

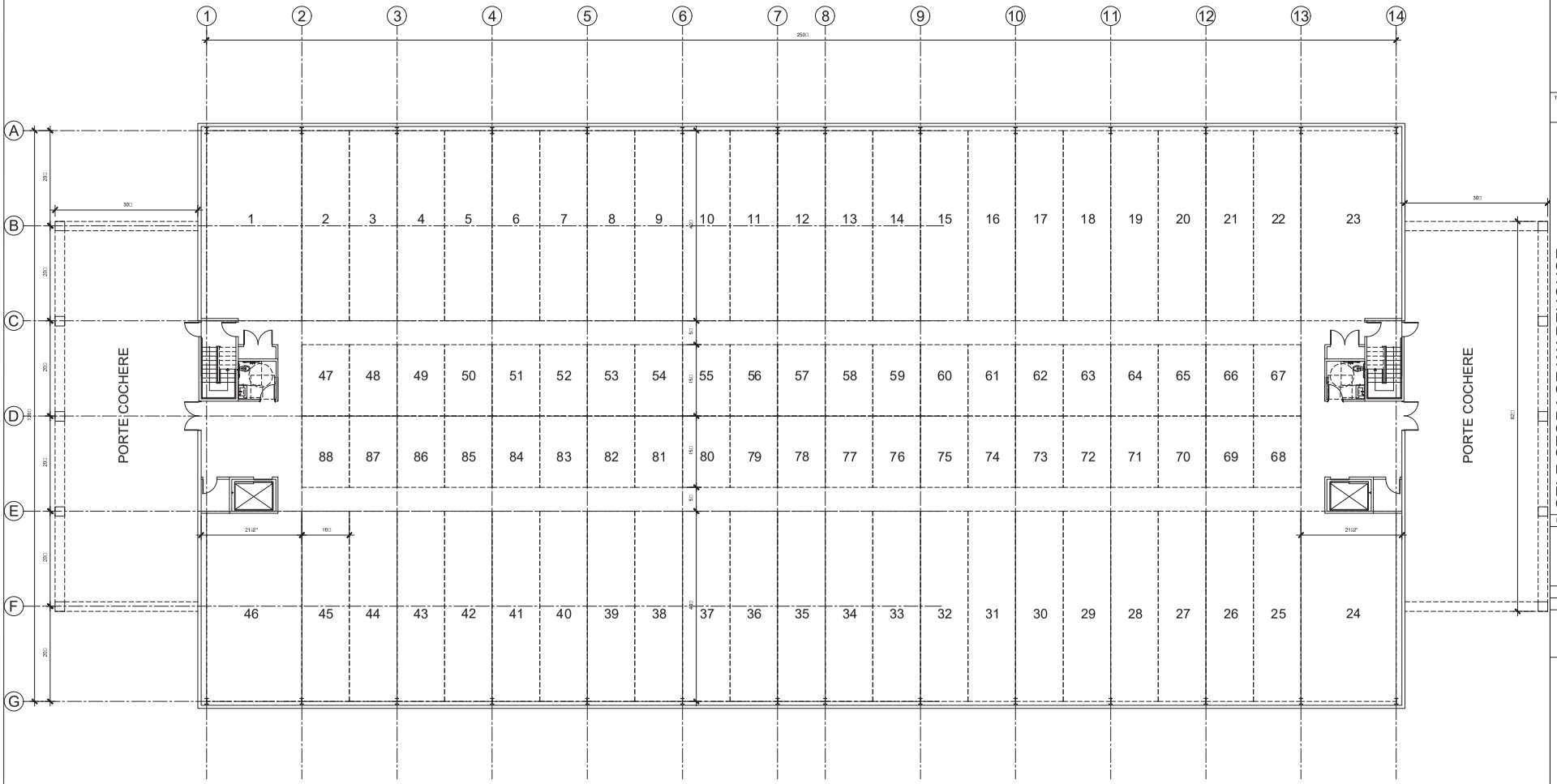
DRAWING TITLE: SITE PLAN

PROJECT # 2307

DRAWN BY: MRK

CHECKED BY: MRK

DRAWING NO: A1



1 FLOOR PLAN

0 5□ 10□ 20□

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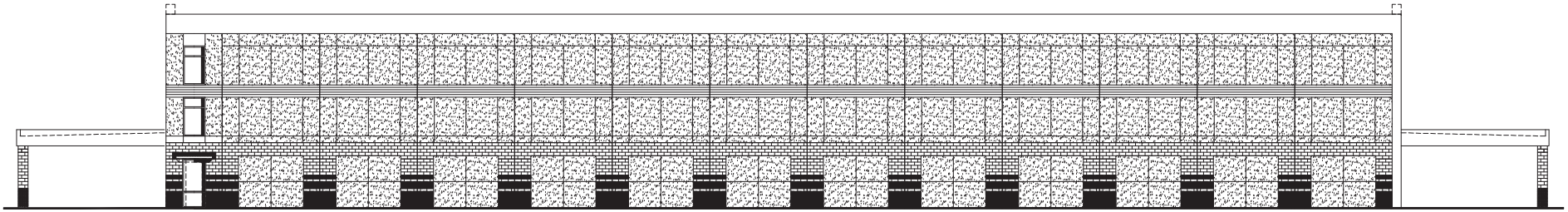
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PROJECT # 2307

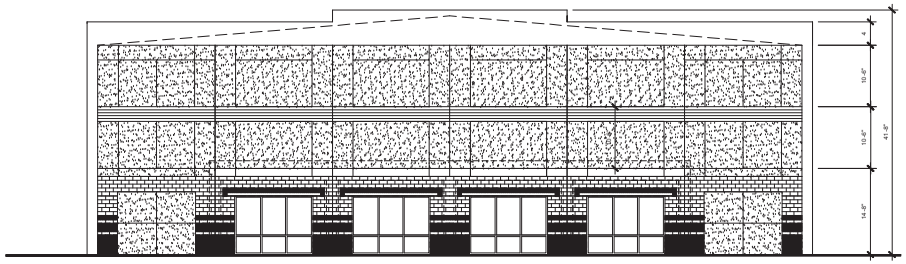
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DRAWING NO: A2



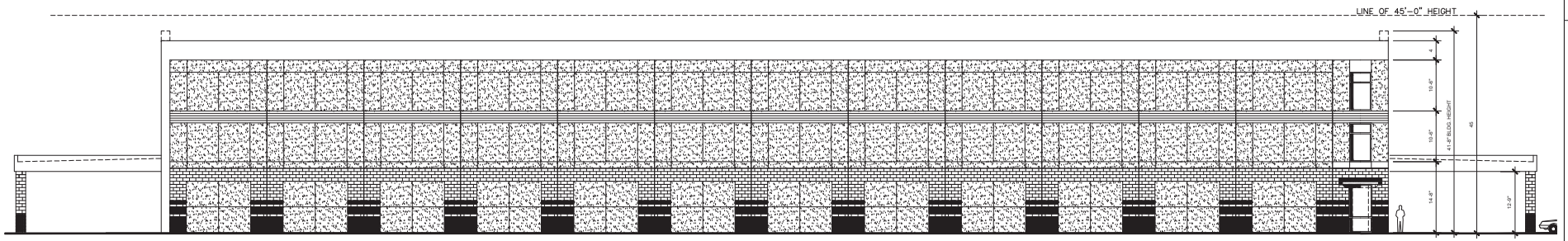
4 EAST ELEVATION
SCALE: 1" 10



3 NORTH ELEVATION
SCALE: 1" 10



2 SOUTH ELEVATION - PIILANI ST.
SCALE: 1" 10



1 WEST ELEVATION - MILILANI ST.
SCALE: 1" 10

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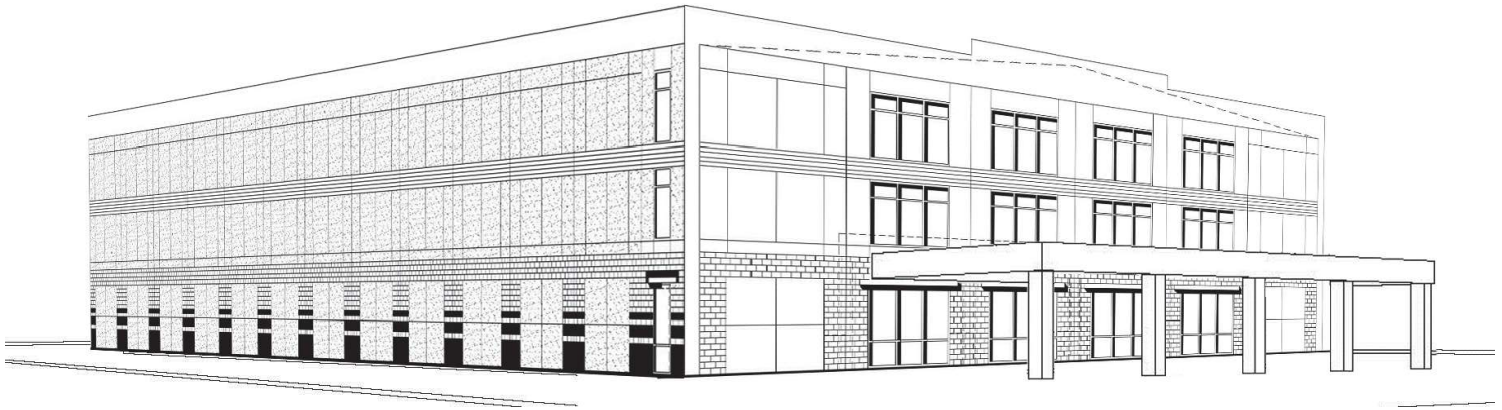
DRAWING TITLE:
EXTERIOR ELEVATIONS

PROJECT # 2307

DRAWN BY: HC

CHECKED BY: MRK

DRAWING NO:
A3



1 — 3D PERSPECTIVE- STREET CORNER
SCALE: not to scale

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DRAWING TITLE:
CORNER PERSPECTIVE

PROJECT # 2307

DRAWN BY:
HC

CHECKED BY:
MRK

DRAWING NO:
A4

1.2 Purpose and Need

The purpose of the proposed project is to provide the community with much needed storage space, employ residents, and give back to the community.

1.3 Cost and Schedule

The proposed action to construct the storage warehouse is expected to cost roughly $5,000,000. Construction is anticipated to begin in 2025. See Section 3.5 for a list of the required County and State permits and approvals that must be obtained before construction can commence.

1.4 Environmental Assessment Process

In 1974 the Hawai‘i State Legislature enacted the Hawai‘i Environmental Policy Act (HEPA), which requires State and County agencies to conduct an environmental impact analysis prior to making decisions on actions that may impact the environment.

This Environmental Assessment (EA) is being conducted in accordance with Chapter 343 of the Hawai‘i Revised Statutes (HRS), along with the implementing regulations, Title 11, Chapter 200.1, of the Hawai‘i Administrative Rules (HAR). This law is the basis for the environmental impact assessment process in the State of Hawai‘i. An EA is necessary for the proposed project as improvement of County land would be required. This includes the extension of the Mililani Street Right-of-Way north to the west side of the subject site, extension of the County sewer line north from its terminus near the intersection of Mililani Street and Pi‘ilani Street, and possible intersection improvements.

According to Chapter 343, an EA is prepared to determine impacts associated with a proposed action, develop mitigation measures for any discovered adverse impacts, and determine whether the impacts are significant (according to the thirteen specific criteria). If a study concludes that no significant impacts would occur from implementation of the proposed action, a Finding of No Significant Impact (FONSI) is prepared. If a study finds that significant impacts are expected to occur because of a proposed action, then an Environmental Impact Statement (EIS) is prepared to allow deeper investigation of impacts and allow more extensive public involvement.

The following EA discusses alternatives to the proposed action, existing environment and impacts associated with the proposed action, the anticipated determination and the findings made by the applicant in consultation with the County of Hawai‘i Planning Department and the expert consultants who prepared supporting studies for this EA.

1.5 Public Involvement and Agency Coordination

Agency coordination and public involvement are crucial components of the environmental assessment process to understand the impacts caused by the proposed action. The agencies, organizations, and individuals below have been consulted as part of the environmental assessment process. Copies of correspondence during the early consultation period can be found in **Appendix E.**

State:

- Department of Land and Natural Resources, Land Division
- Department of Land and Natural Resources, Division of Aquatic Resources
- Department of Land and Natural Resources, Division of Forestry and Wildlife
- Department of Land and Natural Resources, Office of Conservation & Coastal Lands
- Department of Land and Natural Resources, Engineering
- Department of Land and Natural Resources, Historic Preservation
- Hawai'i Department of Transportation
- Office of Hawaiian Affairs
- Sierra Club of Hawai'i
- The Nature Conservancy of Hawai'i
- State Department of Health
- Office of Planning and Sustainable Development
- Commission on Water Resource Management
- U.S. Army Corps of Engineers

County:

- Planning Department
- Fire Department
- Police Department
- Department of Environmental Management
- Department of Public Works
- Department of Water Supply
- Civil Defense
- Aha Moku of Hilo

Private:

- Dr. Donald Thomas, Geochemist, Hawai'i Institute of Geophysics and Planetology (HIGP), School of Ocean and Earth Science and Technology (SOEST), University of Hawai'i at Mānoa
- Surrounding Property Owners within 300 feet of subject parcel
- Tom Nance, Water Resource Engineer
- Hawaiian community members through public outreach meetings

PART 2: ALTERNATIVES

2.1 Proposed Project, Alternative Sites, and Alternative Uses

There are no other action alternatives that could meet the purpose and need of the project. The proposed action requires Industrial zoning and thus has limited site alternatives. No other alternative sites have been identified and are therefore not discussed in this Environmental Assessment.

NOT USED WITH CHANGE OF USE STORAGE WAREHOUSE
Figure 18 shows the Underground Injection Control Line in relation to the subject Property. Areas located *makai* of the line are highlighted in blue.

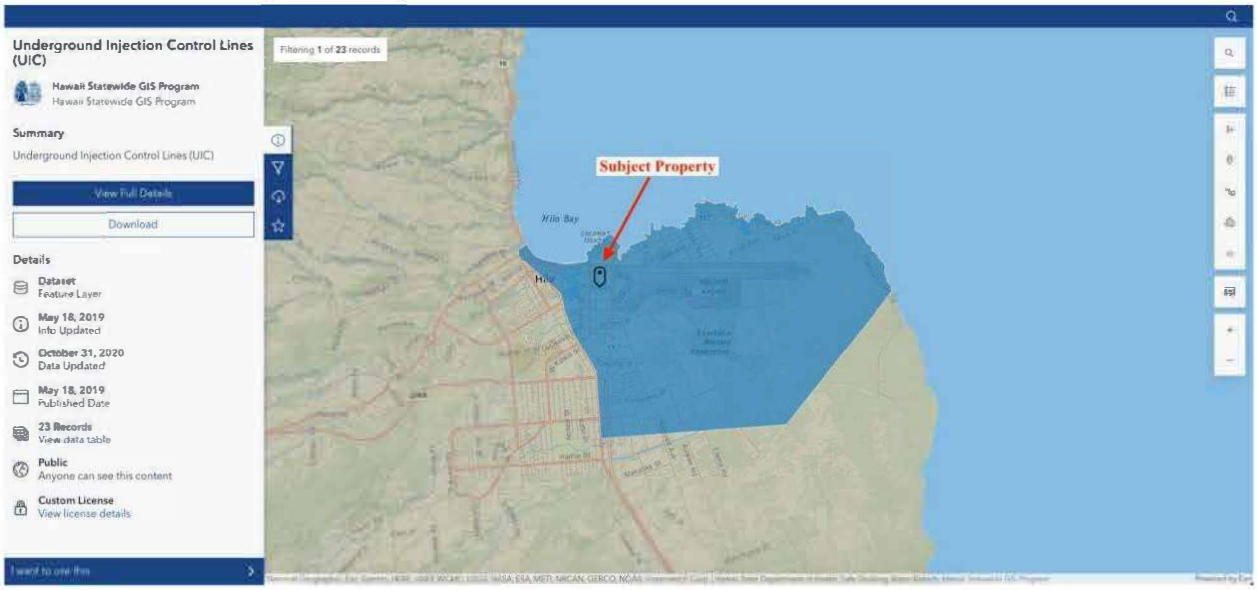


Figure 18: Underground Injection Control Line in Relation to the Subject Property

2.2 No Action

Under a No Action alternative, the storage warehouse would not be built, and no improvements would be made to the land. The lot would remain clear and undeveloped. This EA considers the No Action alternative as the baseline for this project and all environmental effects will be based off this alternative.

PART 3: ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION

3.1 Physical Environment

The subject Property is located roughly 625 feet east of Wailoa River/Waiākea Fishpond, which is contiguous with Hilo Bay and the Pacific Ocean. The mouth of the Wailoa River, where it enters Hilo Bay, is approximately 2,300 feet north. The topography of the subject site is relatively flat with an elevation of approximately 11-16 feet above mean sea level (msl). The topography directs surface flow towards the west.

3.1.1 Geology, Geological Hazards, and Soils

Environmental Setting: Volcanic Activity

The subject Property is located on the northeastern flank of Mauna Loa Volcano. The site is in Lava Zone 3, on a scale ranging from 9 to 1, ranking least hazardous to most. Mauna Loa is the largest active volcano on earth, rising over 13,500 feet above sea level and extending to a depth of 16,400 feet below sea level. The sea floor is depressed another 26,250 feet due to the volcano's enormous mass. Therefore, from the base to the summit, Mauna Loa is more than 56,000 feet high (HVO, 2022).

Since 1843, Mauna Loa has erupted 33 times with an average of one eruption every five years. Exceptions to this pattern occurred during a 25-year hiatus between 1950 and 1975 and a 38-year hiatus from 1984 to 2022. On Sunday November 27, 2022, an eruption began in the summit caldera, Moku'āweoweo. After some hours, new fissures opened along the Northeast Rift Zone. By December 2, the eruption was limited to one fissure, which advanced less than 2 miles from Saddel Road. On December 13, 2022, the eruption ceased.

The most recent lava flow to threaten Hilo occurred in 1984. The flow reached within 4 miles of the city center. **Figure 19** shows a lava flow map depicting the advancement (identified as flow "F"). **Figure 20** is a photo of the lava flow taken from the Hilo Airport on April 4, 1984. The 1984 lava flow remains the first and only Mauna Loa eruption to have been well monitored and documented. Hawaiian Volcano Observatory (HVO) scientists were able to collect detailed observations of activity at vents located on the northeast rift zone and points along the lava channels that were moving towards Hilo. The data collected has developed current flow models that forecast how long a lava flow may extend, and what path it could potentially take, to better evaluate and protect Hilo against future lava flow threats (HVO, 2022).

Despite Mauna Loa's active history, the subject Property has not been inundated by a lava flow for 1,000 to 2,000 years. The Property is located on a Mauna Loa flow identified as the Pana'ewa picrite flow (p2l2), which occurred 1,000 to 2,000 years Before Present (B.P.). The composition of the flow is pāhoehoe with greater than 5 percent olivine and plagioclase (**Figure 21**). 'A'ā lavas associated with this flow are located to the south. Also located to the south is the 'Āinaola Drive picrite flow (p10e1), which occurred 9,000 to 10,000 years B.P. with over 15 percent olivine content. To the west of the Property, on the other side of Waiākea Fishpond, is the Kino'ole Street flow (a9j3). This lava flow is 8,000 to 9,000 years B.P. and has a mixed composition of olivine and plagioclase (Trusdell and Lockwood, 2017).

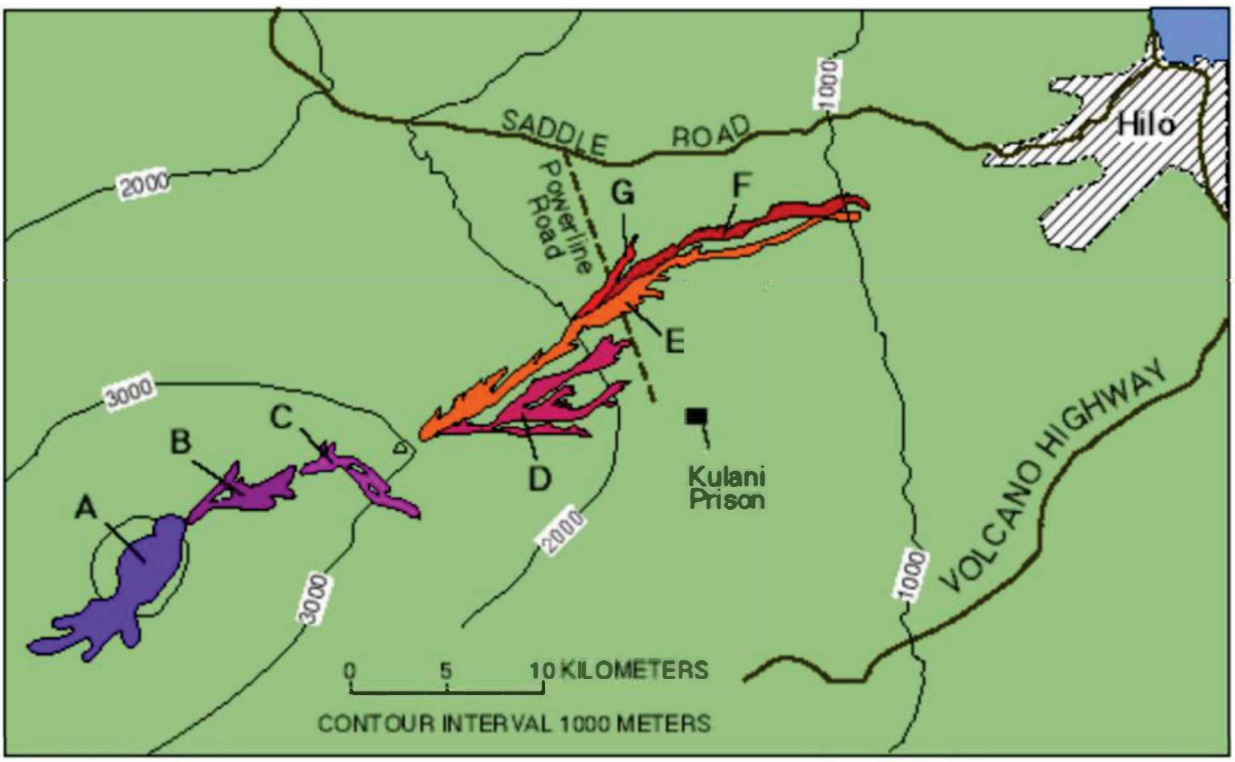


Figure 19: Map of 1984 Mauna Loa Lava Flow Advancing Toward Hilo



Figure 20: Mauna Loa Flow Approaching Hilo; View from Hilo Airport on April 4, 1984

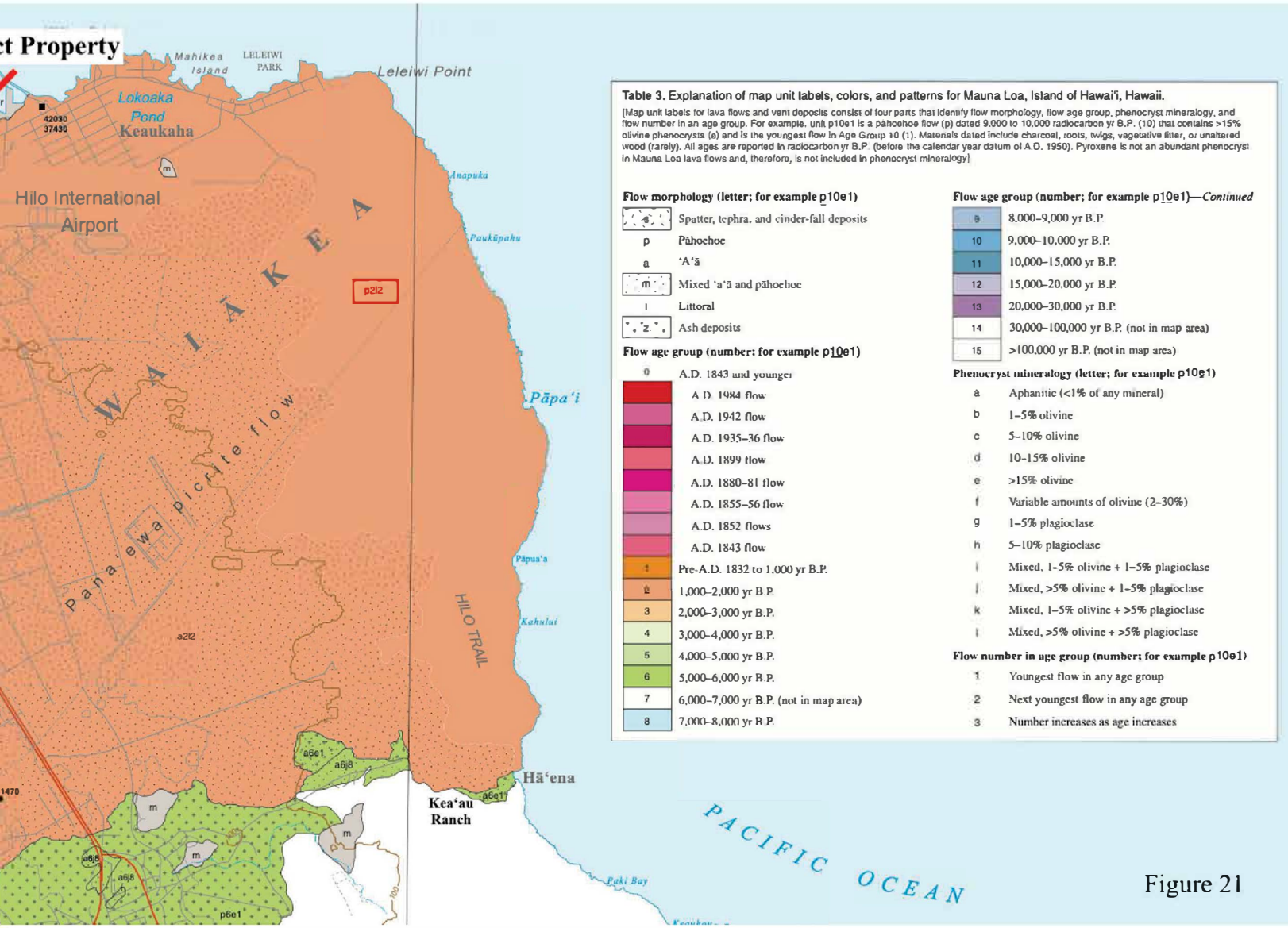


Table 3. Explanation of map unit labels, colors, and patterns for Mauna Loa, Island of Hawai'i, Hawaii.

[Map unit labels for lava flows and vent deposits consist of four parts that identify flow morphology, flow age group, phenocryst mineralogy, and flow number in an age group. For example, unit p10e1 is a pāhoehoe flow (p) dated 9,000 to 10,000 radiocarbon yr B.P. (10) that contains >15% olivine phenocrysts (e) and is the youngest flow in Age Group 10 (1). Materials dated include charcoal, roots, twigs, vegetative litter, or unaltered wood (rarely). All ages are reported in radiocarbon yr B.P. (before the calendar year datum of A.D. 1950). Pyroxene is not an abundant phenocryst in Mauna Loa lava flows and, therefore, is not included in phenocryst mineralogy]

Flow morphology (letter; for example p10e1)

s	Spatter, tephra, and cinder-fall deposits
p	Pāhoehoe
a	'A'ā
m	Mixed 'a'ā and pāhoehoe
l	Littoral
z	Ash deposits

Flow age group (number; for example p10e1)

0	A.D. 1843 and younger
	A.D. 1984 flow
	A.D. 1942 flow
	A.D. 1935–36 flow
	A.D. 1899 flow
	A.D. 1880–81 flow
	A.D. 1855–56 flow
	A.D. 1852 flows
	A.D. 1843 flow
1	Pre-A.D. 1832 to 1,000 yr B.P.
2	1,000–2,000 yr B.P.
3	2,000–3,000 yr B.P.
4	3,000–4,000 yr B.P.
5	4,000–5,000 yr B.P.
6	5,000–6,000 yr B.P.
7	6,000–7,000 yr B.P. (not in map area)
8	7,000–8,000 yr B.P.

Flow age group (number; for example p10e1)—*Continued*

9	8,000–9,000 yr B.P.
10	9,000–10,000 yr B.P.
11	10,000–15,000 yr B.P.
12	15,000–20,000 yr B.P.
13	20,000–30,000 yr B.P.
14	30,000–100,000 yr B.P. (not in map area)
15	>100,000 yr B.P. (not in map area)

Phenocryst mineralogy (letter; for example p10e1)

a	Aphanitic (<1% of any mineral)
b	1–5% olivine
c	5–10% olivine
d	10–15% olivine
e	>15% olivine
f	Variable amounts of olivine (2–30%)
g	1–5% plagioclase
h	5–10% plagioclase
i	Mixed, 1–5% olivine + 1–5% plagioclase
j	Mixed, >5% olivine + 1–5% plagioclase
k	Mixed, 1–5% olivine + >5% plagioclase
l	Mixed, >5% olivine + >5% plagioclase

Flow number in age group (number; for example p10e1)

1	Youngest flow in any age group
2	Next youngest flow in any age group
3	Number increases as age increases

Figure 21

Environmental Setting: Earthquake Activity

The USGS recently came out with a model of earthquake probability for the Hawaiian Islands, which better estimates hazard probability compared to previous models. The ground shaking model indicates that Hawai‘i Island has a greater than 90 percent chance of experiencing an earthquake with slight (or greater) damage during the next 100 years (**Figure 22**).

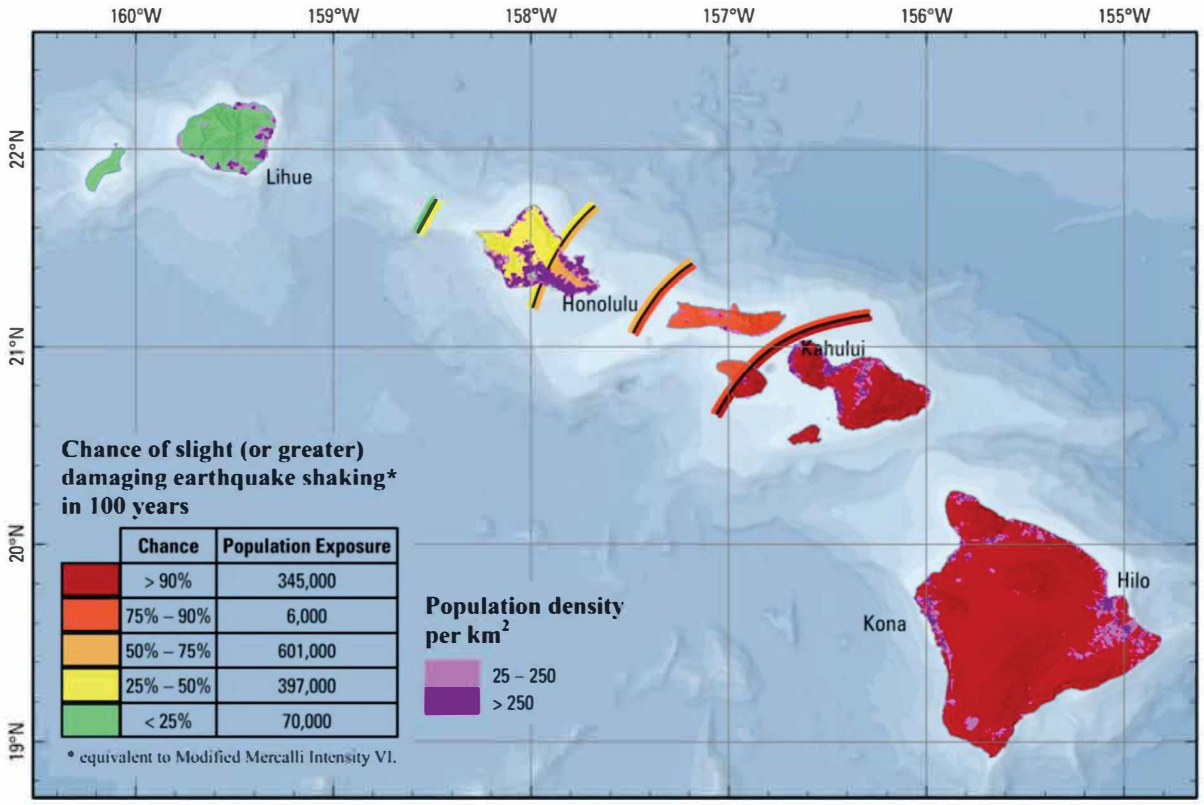


Figure 22: 2021 USGS Model of Earthquake Probability for the Hawaiian Islands

The Hilo area is susceptible to ground shaking from earthquakes originating near Mauna Loa and Kīlauea volcanoes. It is not uncommon to experience frequent slight tremors in Hilo as a result. Larger events, however, occur much less frequently and are more difficult to predict.

Three significant earthquake events to cause structural damage in Hilo occurred in 1973, 1975, and 2018. In 1973, a magnitude-6.2 earthquake struck 29 miles beneath the town of Honomu, just north of Hilo. The depth of the earthquake is what caused such widespread and severe damage. Eleven people were reported injured in Hilo, four of which were hospitalized. An unknown number of injuries were also reported in Waimea. Approximately $5.6 million dollars of structural damage was recorded across the island (~$40 million today). In 1975, a magnitude-7.2 earthquake struck the southern flank of Kīlauea volcano near the town of Kalapana and caused significant shaking throughout the entire island. This earthquake event also caused significant subsidence along southeastern shores of the island. Most recently, the 2018 Kīlauea eruption proved to be historic in many ways, including the magnitude-6.9 earthquake that rattled the entire island. This earthquake caused significant shaking throughout Puna and Hilo. There were even some reports of shaking as far as O‘ahu.

Mauna Loa is not currently erupting but continues to produce small-magnitude (below M3.0) earthquakes below the summit and upper-elevation flanks. During the first week of August 2022, a swarm of over 200 earthquakes below a magnitude-3.0 were recorded in this area. The majority of these earthquakes occurred at shallow depths less than 9 miles below sea level. According to the Hawaiian Volcano Observatory (2022), "This activity is a relatively small increase in volcanic unrest and remains within the range of fluctuations observed over the past several years." Mauna Loa has an Alert Level of "Advisory" and Color Code, "Yellow" because rates of seismicity remain slightly elevated above long-term background levels.

Environmental Setting: Soil

Soils on the subject Property are made up of Opihikao-Urban land complex (*2kll8*) with 2 to 20 percent slopes. These soils are made up of organic material over pāhoehoe lava flows, they are well drained, and have a high runoff class. This Property is not considered to be prime farmland and has a soil classification of D (Web Soil Survey, 2022).

Impacts and Mitigating Measures

The proposed action will not increase the potential of volcanic activity, earthquakes, or adversely impact soil. The proposed site is far from any volcanic rift zone of Mauna Loa or Mauna Kea; therefore, no intrusive rocks, alteration, or high temperature fluids are expected to be encountered.

Best Management Practices for construction activities will be strictly followed to prevent adverse impacts to soil. Hawai'i Administrative Rules Chapter 11-55, Appendix C, under Special Conditions for Land Disturbances, describes the following construction management techniques to protect soil:

Below this impermeable layer, a deep confined freshwater aquifer was encountered at approximately 1,000 feet below sea level. The aquifer is roughly 400 feet thick and has significant artesian pressure, producing a well flow rate of roughly 2,100 gallons per minute (gpm). Although the well flow rate value indicates characteristics of an underground river system, it is not a direct reflection of the rate the aquifer is flowing and discharging. This will be discussed further below.

Thomas, Paillet & Conrad summarize the characteristics of the deep confined subject aquifer in a 1996 article describing the geochemistry and regional flow patterns found during the HSDP:

> *"A deeply buried freshwater aquifer is supplied by high elevation recharge trapped beneath an aquiclude formed by the soil horizon marking the interface between Mauna Kea and overlying Mauna Loa basalts. Water moving through this system is discharged in deep submarine springs in the Puna Canyon and estimates of fluid transport rates suggest that this process has the potential to account for a significant volume of high elevation recharge to Mauna Kea."*

Coincidently, in the 1970's, deep submersible studies conducted off the eastern flank of the island within Hilo Bay, identified freshwater springs at 1,000 feet below sea level. These studies confirm that the deep confined aquifer is an actively flowing system that is discharging into the ocean at depth.

Scientific evidence suggests that the impermeable layer capping the deep confined aquifer (made up of ash and clay) was deposited subaerially, or above sea level, by a young Mauna Kea lava flow. Eventually, subsequent lava flows from Mauna Loa and island subsidence over time, moved the impermeable layer and freshwater aquifer down to 1,000 feet below sea level. The deep confined aquifer is therefore technically part of the Mauna Kea Aquifer System, which further supports evidence that the subject aquifer is being recharged within Mauna Kea. **Figure 27** below is a conceptual model created by the HSDP incorporating the newly discovered deep confined structure of ground water systems.

After the discovery of the deep confined subject aquifer, the HSDP tested the isotopes of the freshwater to determine the water's age and source elevation at which the rainfall originated on the slopes of Mauna Kea. To understand this, the principal isotopes of water must be looked at. These include Oxygen $^{18}O/^{16}O$ and Hydrogen $^{2}H/^{1}H$. Delta Oxygen 18 ($\delta^{18}O$) looks at how much the Oxygen 18 (^{18}O) content of water differs from ocean water. Ocean water is considered the "reference water" because it has a value of zero (0) Delta Oxygen 18 ($\delta^{18}O$). When water is evaporated from the ocean, it loses its heavy oxygen isotope content by up to 13 percent (water vapor in clouds above the ocean have a $\delta^{18}O$ value of -13%). However, as clouds move inland, water vapor condenses and becomes more enriched in ^{18}O. Rainfall over the shoreline has an increased value of $\delta^{18}O$ compared to water vapor in clouds over the ocean by up to 10 percent. The isotopic composition of water vapor continues to change as it moves up slope in elevation. When rain lands on the earth's surface, it maintains its isotopic composition as it percolates into ground water resources. Isotopes of water in aquifers therefore become a way to trace ground water back to its source elevation (Thomas, 2018). **Figure 28 and 29** depicts a figure and graph of the isotopic composition changes of water from ocean to mountain slopes.

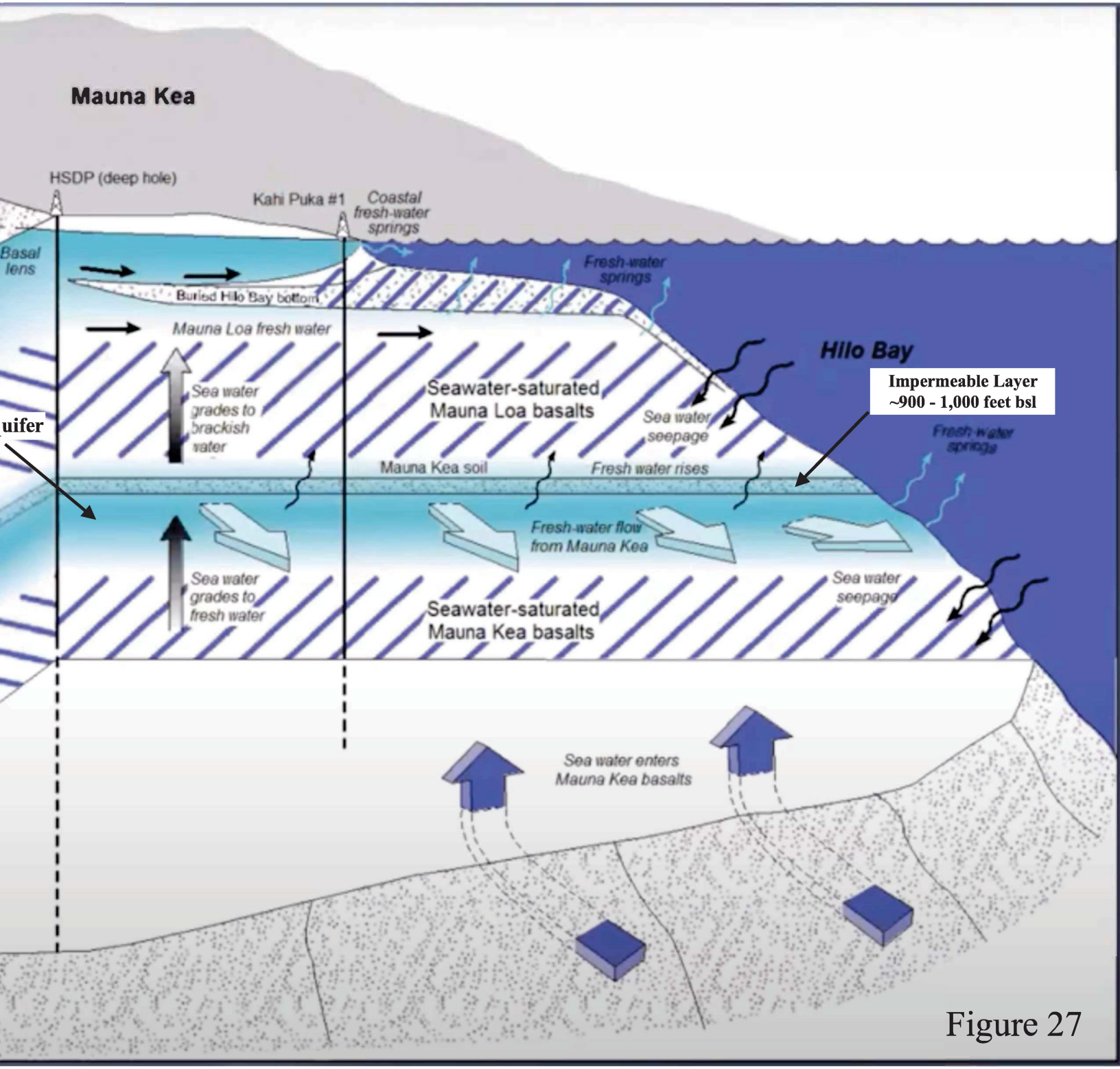

Mauna Kea
HSDP (deep hole)
Kahi Puka #1
Coastal fresh-water springs
Basal lens
Buried Hilo Bay bottom
Fresh-water springs
Mauna Loa fresh water
Hilo Bay
Impermeable Layer ~900 - 1,000 feet bsl
uifer
Sea water grades to brackish water
Seawater-saturated Mauna Loa basalts
Sea water seepage
Fresh-water springs
Mauna Kea soil
Fresh water rises
Fresh-water flow from Mauna Kea
Sea water grades to fresh water
Sea water seepage
Seawater-saturated Mauna Kea basalts
Sea water enters Mauna Kea basalts

Figure 27

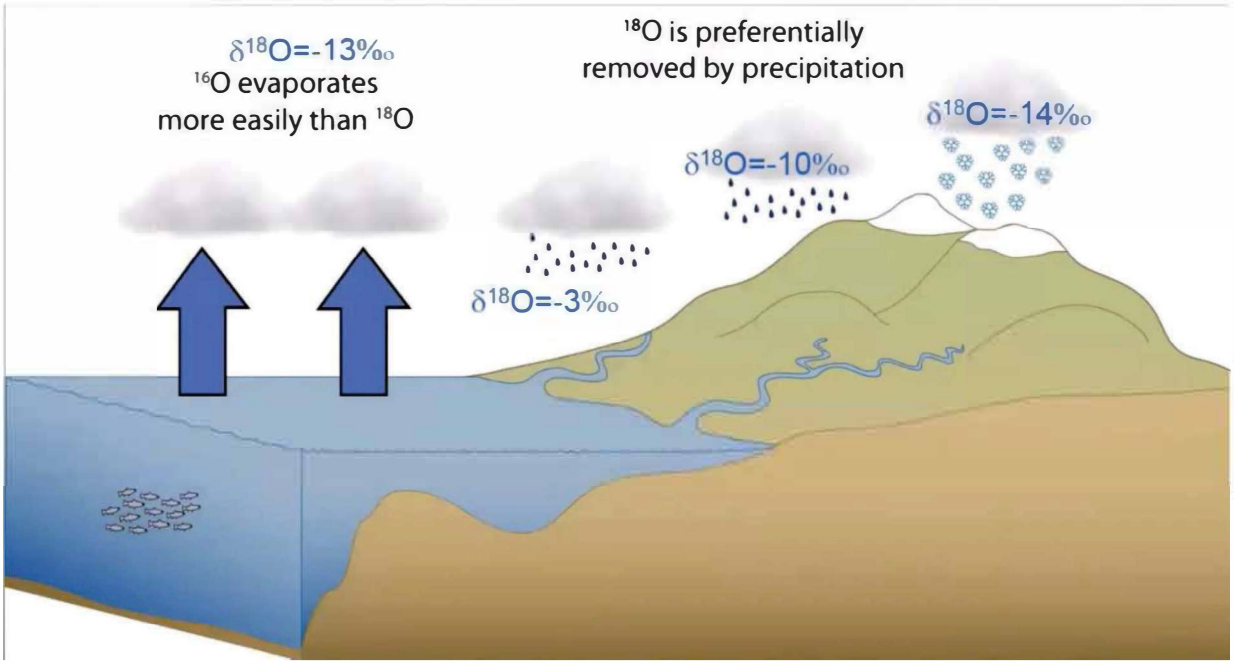


Figure 28: Isotopic Composition Changes of the Hydrological Cycle (Thomas, 2018)

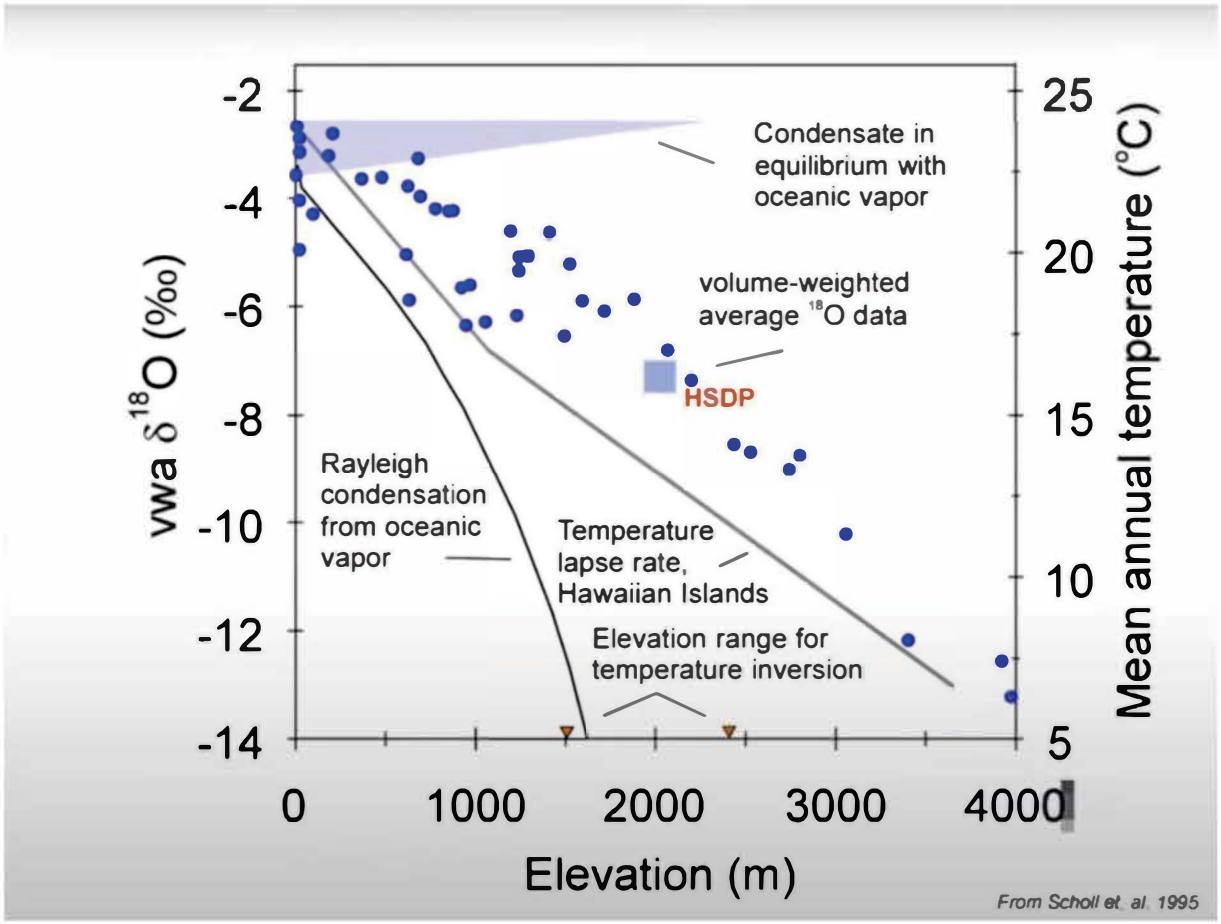


Figure 29: Graph of Isotopic Composition Changes of Water with Elevation (subject aquifer value depicted in the blue square) (Thomas, 2018)

The isotopes measured within the deep confined subject aquifer indicate that the rainfall originated from the mid-elevation slopes of Mauna Kea and is thousands of years old. According to Thomas, Paillet, & Conrad (1996), "Light stable isotope data indicate that the fresh water at 1,000 feet [below sea level] is derived from recharge entering the island at an average elevation of 6,500 feet [above sea level]. Inferred Carbon 14 (^{14}C) activities of the dissolved bicarbonate in the freshwater zone indicate an average calibrated age of 2,200 years B.P. (before present) and an average velocity of at least 14 meters/year (45 feet/year)."

According to Dr. Donald Thomas, a principal geochemist of the Hawai'i Scientific Drilling Project, the age determination of 2,200 years B.P., can be interpreted as the length of time the water took to get from the soil/root zone at an average elevation of 6,500 feet above sea level down to the subject aquifer located 1,000 feet below sea level. Therefore, if recharge at this mid-elevation region of Mauna Kea were to stop today, the last water to enter the soil/root zone would take at least 2,000 years to pass through the system.

Evidence suggests that the rainfall of the deep confined subject aquifer likely originated on the southeast slope of Mauna Kea near and slightly above Saddle Road. **Figure 30** shows a topographic map of Mauna Kea. The contour lines between roughly 1,900 and 2,100 meters (6,200 to 6,800 feet) on the southeast slope is the potential rainfall recharge area.

Figure 31 shows the Rainfall Atlas map of this area of Mauna Kea, which receives an average of 40 inches of rain per year. In comparison, **Figure 32** shows the Rainfall Atlas map of the entire Island of Hawai'i.

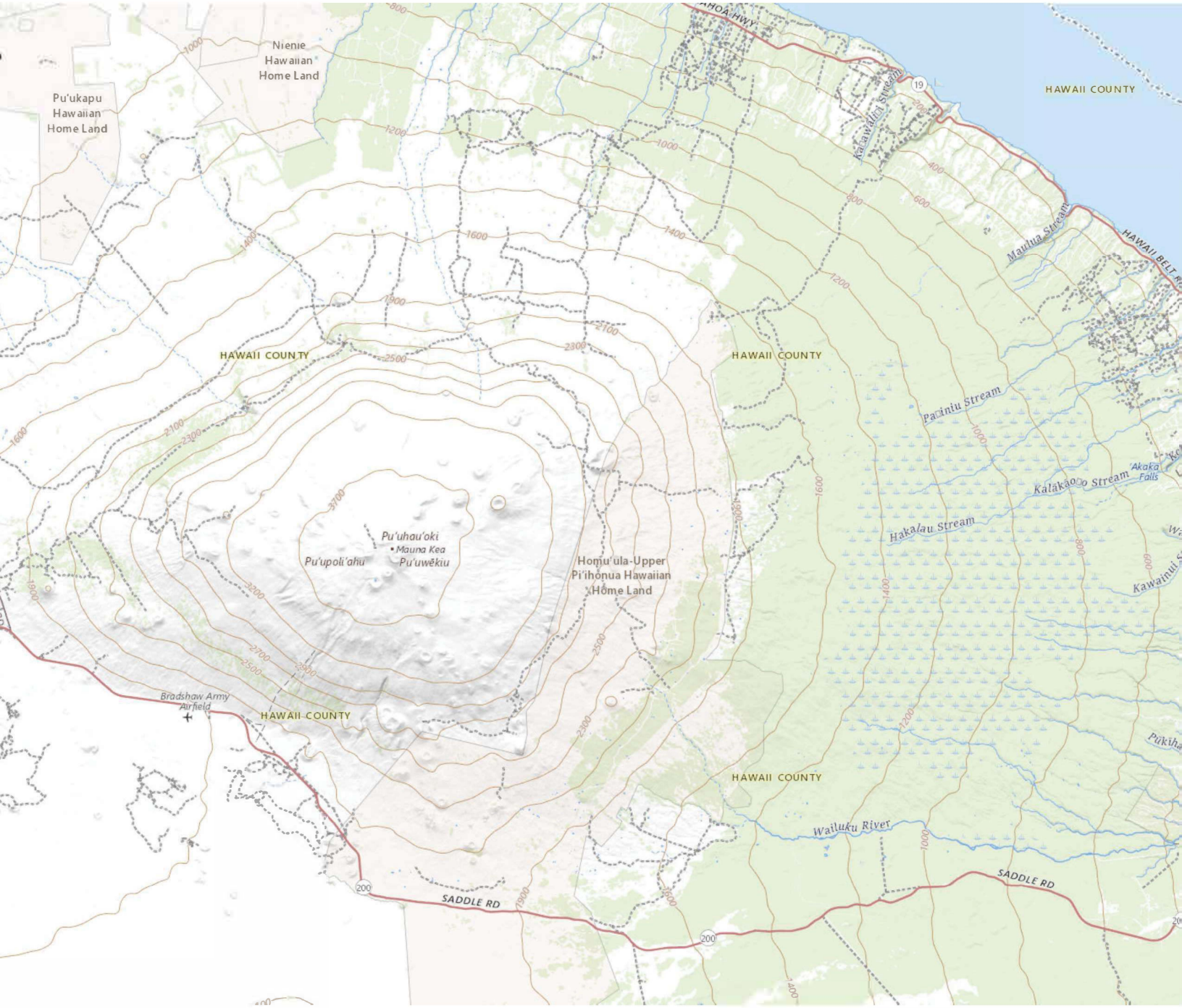

Nienie
Hawaiian
Home Land
Pu'ukapu
Hawaiian
Home Land
HAWAII COUNTY
Kawaihae Stream
Maulua Stream
HAWAII BELT
Pa'iniu Stream
Kalakaoo Stream
Akaka
Falls
Hakalau Stream
Kawainui
Pukiha
Pu'uhau'oki
Mauna Kea
Pu'upoli'ahu
Pu'uwēkiu
Homu'ula-Upper
Pi'ihonua Hawaiian
Home Land
Bradshaw Army
Airfield
Wailuku River
SADDLE RD
19
200

Figure 30

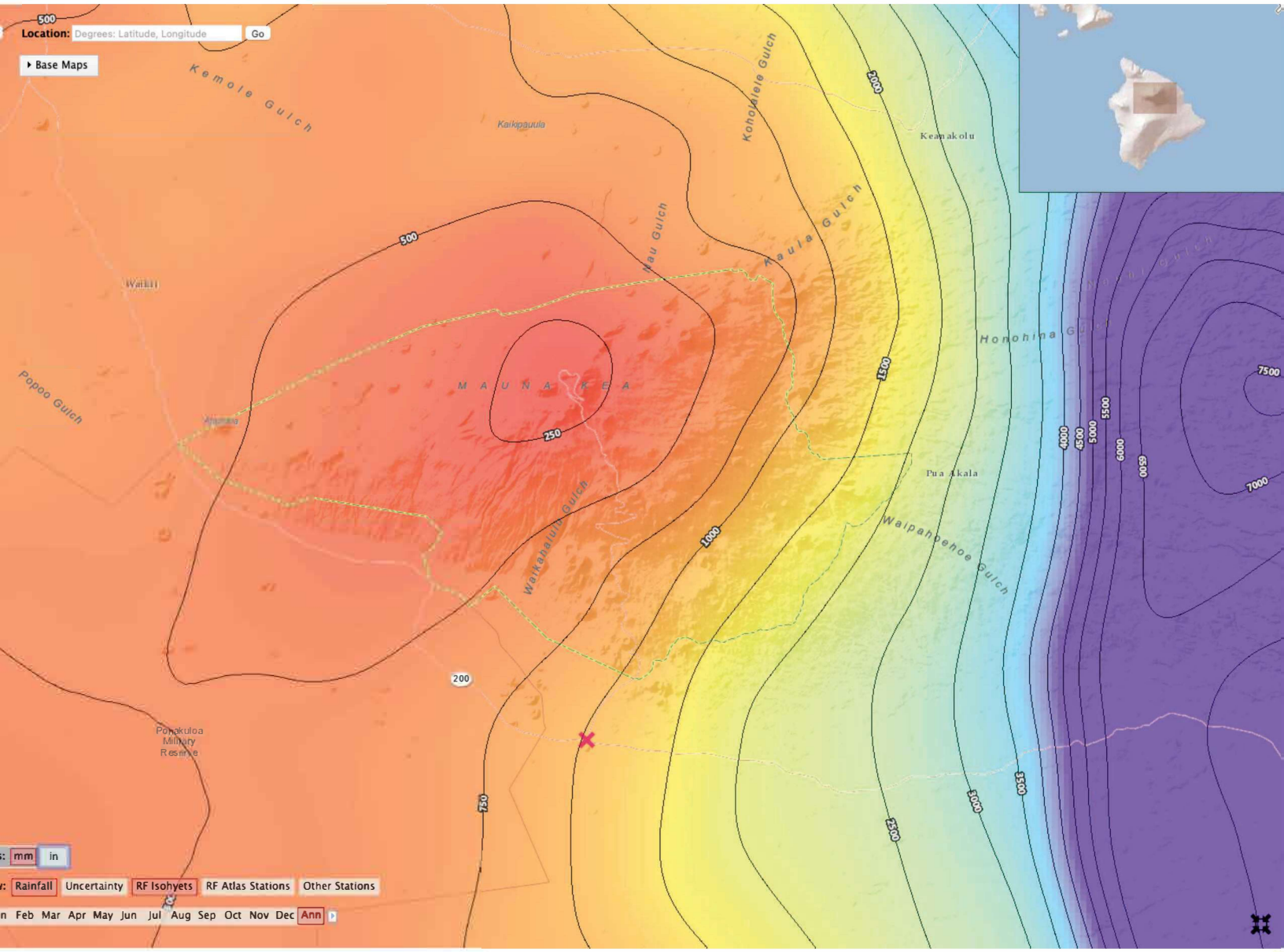

Location: Degrees: Latitude, Longitude
Go
Base Maps
Kemole Gulch
Kaikipauula
Kohoalele Gulch
Keamakolu
Nau Gulch
Kaula Gulch
Honohina Gulch
MAUNA KEA
Poopoo Gulch
Pua Akala
Waikahalulu Gulch
Waipahehoe Gulch
Pohakuloa Military Reserve
500
250
200
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
mm
in
Rainfall
Uncertainty
RF Isohyets
RF Atlas Stations
Other Stations
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Ann

Figure 31

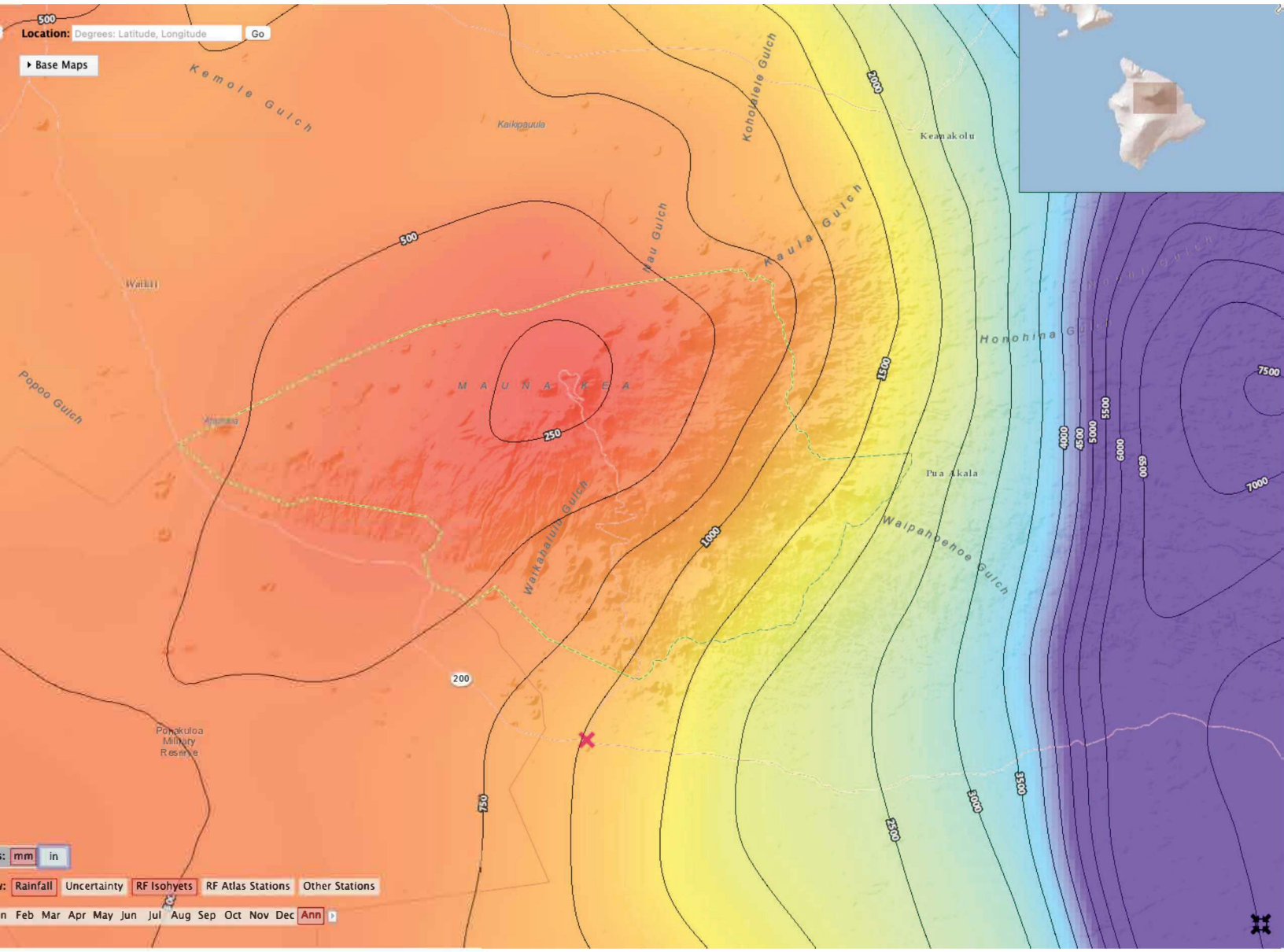

Location: Degrees: Latitude, Longitude
Go
Base Maps
Kemole Gulch
Kaikipauula
Kohoalele Gulch
Keamakolu
Nau Gulch
Kaula Gulch
Honohina Gulch
MAUNA KEA
Poopoo Gulch
Pua Akala
Waikahalulu Gulch
Waipahehoe Gulch
Pohakuloa Military Reserve
500
250
200
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
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mm
in
Rainfall
Uncertainty
RF Isohyets
RF Atlas Stations
Other Stations
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Ann

Figure 31

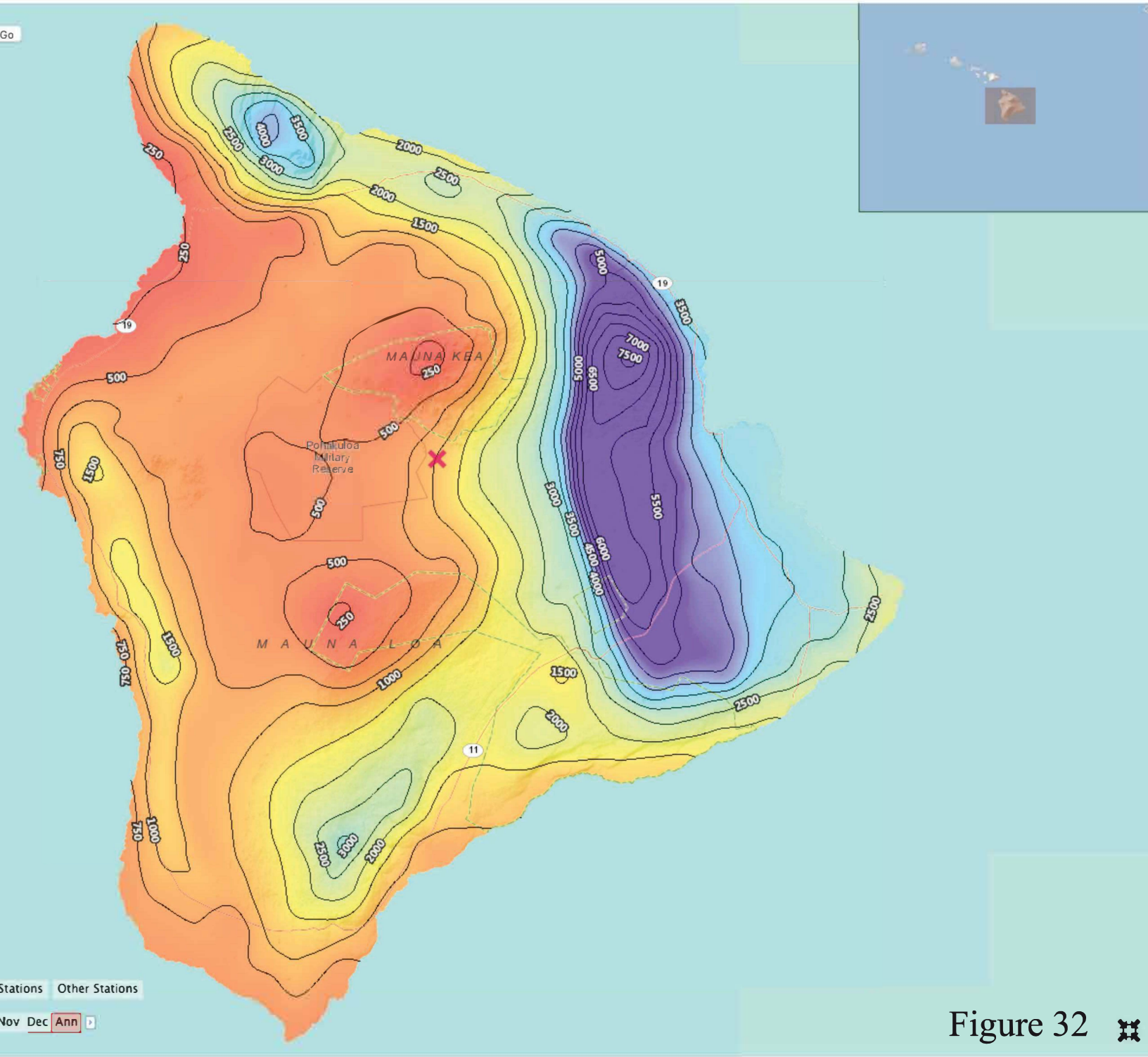

Go
MAUNA KEA
MAUNA LOA
Pohakuloa Military Reserve
19
11
Stations
Other Stations
Nov
Dec
Ann

Figure 32

Another very unexpected discovery of freshwater was made during the HSDP2 drilling at 10,000 feet below sea level within pillow lavas. Geochemists on the project concluded that for water to be present at these vast depths, there would have to be high levels of water under pressure above sea level, within the dike system of Mauna Kea. This is because high amounts of pressure are required to displace sea water that would otherwise infiltrate these pillow lavas at depth. **Figure 33** shows a diagram of this concept.

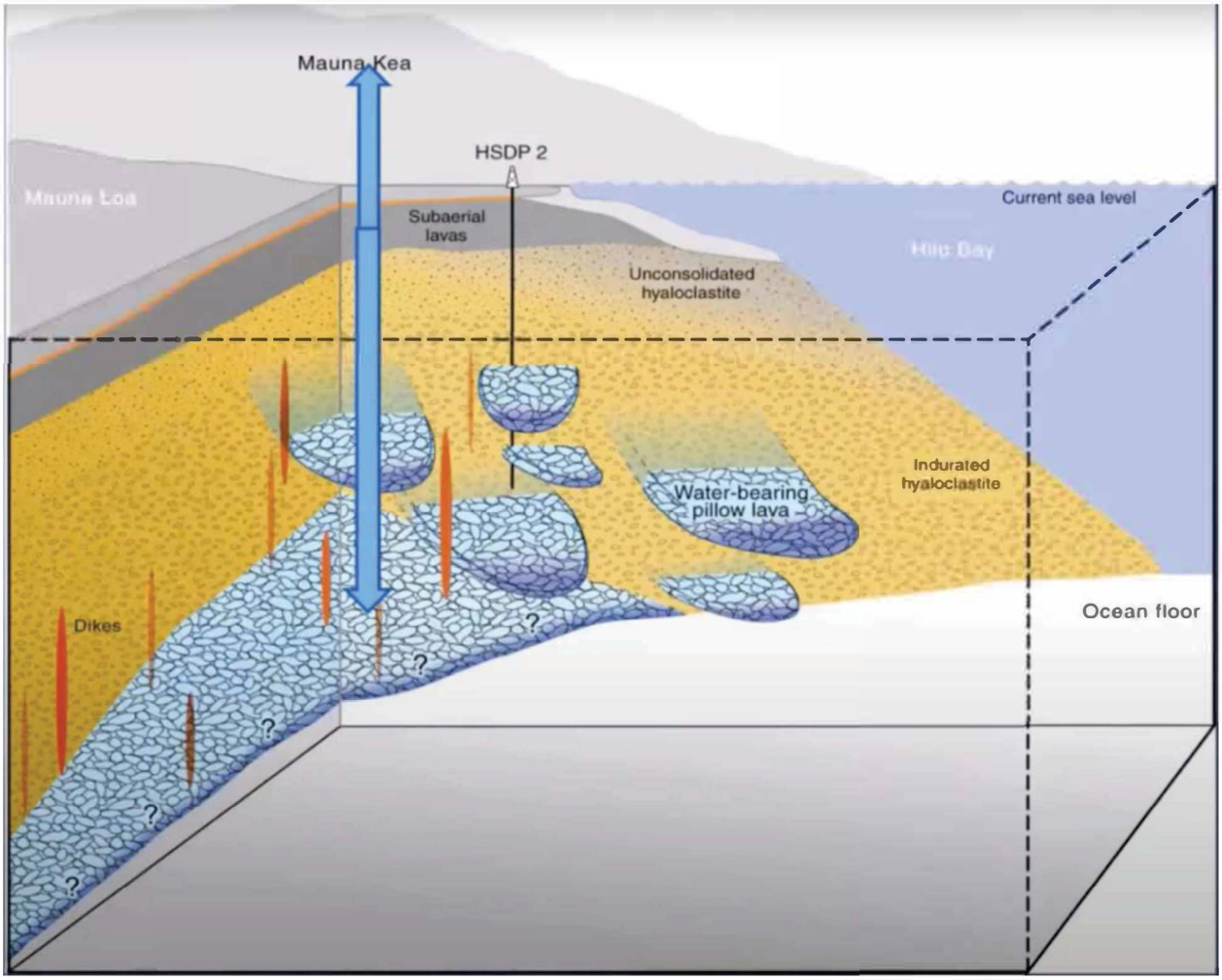


Figure 33: Conceptual Diagram of Water Bearing Pillow Lavas Recharge from Mid-Elevations

To test this theory, the University of Hawai‘i launched the Humu‘ula Ground water Research Project (HGRP), which aimed to research the ground water resources in the Saddle region between Mauna Loa and Mauna Kea. Before this project, very little information was known about this area. Prior models predicted the stable water table to be between 5,000 to 6,000 feet below the Saddle Road region.

The HGRP successfully drilled two test holes within Pōhakuloa Training Area (PTA) beginning at roughly 6,000 feet in elevation. The first test hole called PTA-2 was located on the southern end of the PTA cantonment. According to the Hawai‘i Ground water & Geothermal Resource Center (HGGRC), the following was found from PTA-2 drilling efforts:

- At 700 feet below the ground surface was the initial stable saturated zone.
- 700 feet to 830 feet a perching layer of clay-rich ash was encountered, and water levels began to drop.
- 830 feet to 1,800 feet was dry rock.
- 1,800 feet was a second saturated interval.
- 1,800 feet to 5,780 feet water levels in the borehole remained stable. It is thought that this deeper water is likely the regional water table for this area.

The findings indicate that ground water occurs at much shallower depths than previously thought, and that a dike-impounded aquifer system is present.

The second test hole was drilled roughly 6 miles west of the PTA-2 borehole. In contrast to PTA-2, this borehole encountered a sequence of confined and pressurized aquifers beginning at 980 feet below the ground surface. According to HGGRC (2018), "Layers of soil, ash, or explosive eruptive deposits confined these aquifers as highly pressurized water trapped between impermeable layers. As we drilled into the aquifers, water came spouting from the point of entry to up the drill string from several hundred to several thousand feet."

The HGRP successfully proved that aquifer systems exist between 6,000 feet above sea level and roughly 1,200 feet below sea level, where the deep confined subject aquifer is discharging. Another way to describe this concept would be as a virtual pipeline from mid-elevation on Mauna Kea down to submarine discharge in Hilo Bay. This means that the subject aquifer is continuously being recharged by extensive aquifer systems located at higher elevations above it and that the water is not confined there; it is constantly flowing in the ocean at depth.

Impacts and Mitigating Measures

Contamination of a fresh ground water source can be divided into two (2) main areas of concern regarding the proposed action:

1. Wastewater contamination
2. Storm water runoff

The Property will be connected to the county sewer line to handle wastewater. Construction Best Management Practices and mitigating measures to prevent storm water runoff are outlined in detail in Sections 3.1.1 and 3.1.4.

3.1.3 Flood Zones and Shoreline Setting

Environmental Setting: Floodplain and Tsunamis

The subject property is located within the State Civil Defense Agency, Tsunami Evacuation Zone (**Figure 40**). According to the Federal Emergency Management Agency (FEMA), the Flood Insurance Rate Map (FIRM) classifies the Property as Flood Zone X, which is outside of the 500-year floodplain (**Figure 41**). Wailoa River and Waiākea Fishpond are considered principal flooding sources by FEMA. These water bodies are in Flood Zone VE, which is within the 100-year coastal flood range, or 1% chance of occurring in any given year, with velocity hazard (wave action). The subject Property lies slightly east of this special flood hazard area.

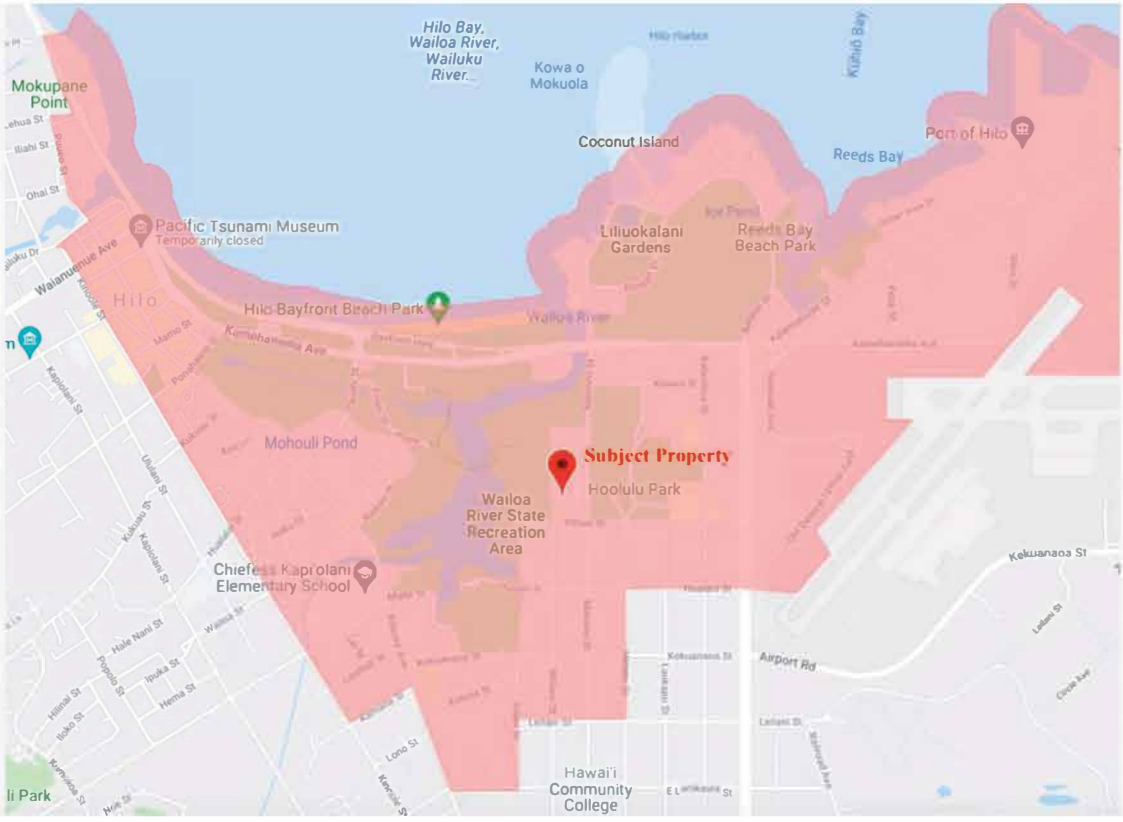
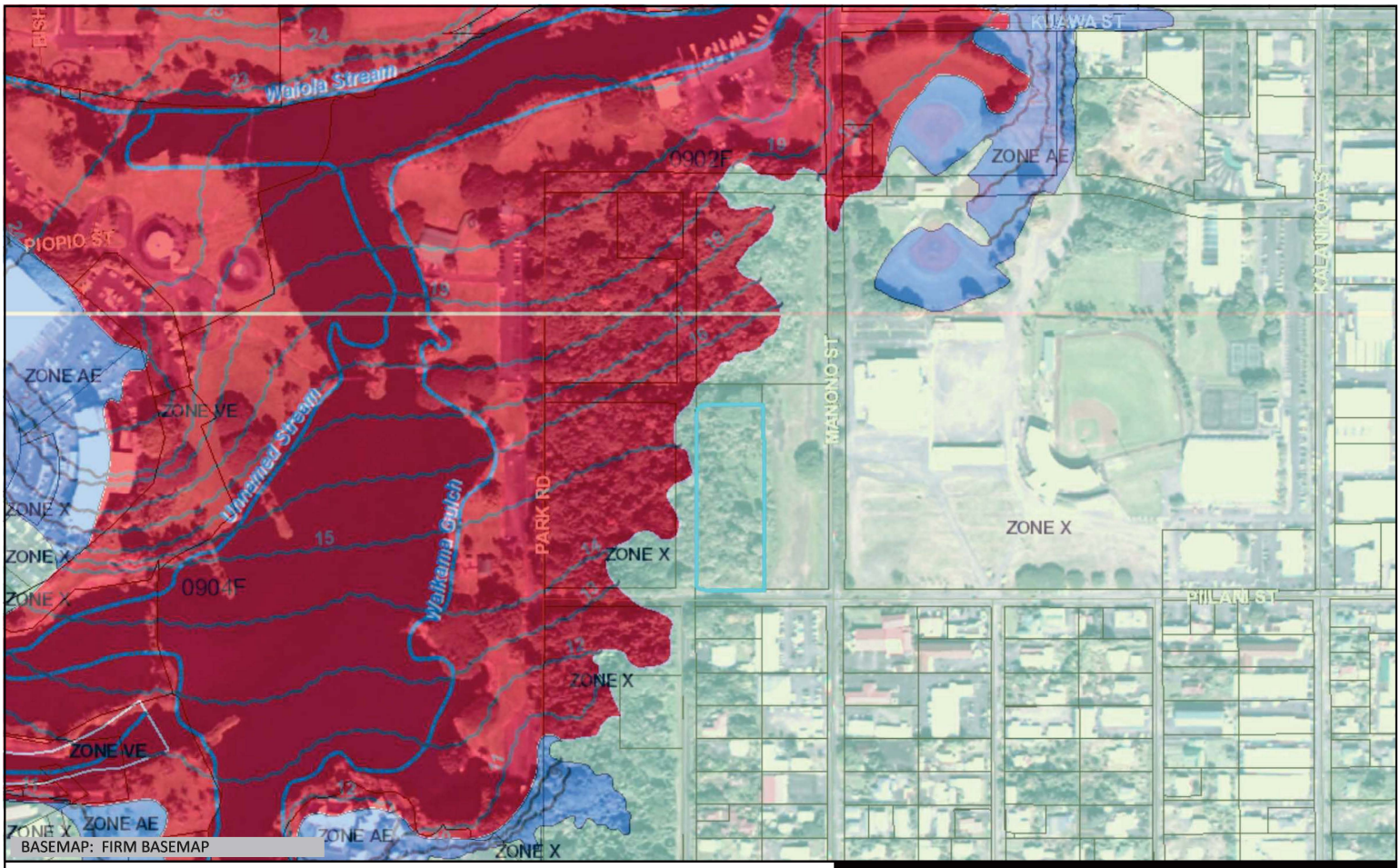


Figure 40: Tsunami Evacuation Zone in Relation to the Subject Property



Flood Hazard Assessment Report

www.hawaiinfip.org

Property Information

COUNTY:	HAWAII
TMK NO:	(3) 2-2-033:011
WATERSHED:	WAILOA
PARCEL ADDRESS:	ADDRESS NOT DETERMINED HILO, HI 96720

Notes:

Flood Hazard Information

FIRM INDEX DATE:	SEPTEMBER 29, 2017
LETTER OF MAP CHANGE(S):	NONE
FEMA FIRM PANEL:	1551660904F
PANEL EFFECTIVE DATE:	SEPTEMBER 29, 2017

THIS PROPERTY IS WITHIN A TSUNAMI EVACUTION ZONE: YES
FOR MORE INFO, VISIT: http://www.scd.hawaii.gov/

THIS PROPERTY IS WITHIN A DAM EVACUATION ZONE: NO
FOR MORE INFO, VISIT: http://dlnreng.hawaii.gov/dam/

0 400 800 ft

Disclaimer: The Hawaii Department of Land and Natural Resources (DLNR) assumes no responsibility arising from the use, accuracy, completeness, and timeliness of any information contained in this report. Viewers/Users are responsible for verifying the accuracy of the information and agree to indemnify the DLNR, its officers, and employees from any liability which may arise from its use of its data or information.

If this map has been identified as 'PRELIMINARY', please note that it is being provided for informational purposes and is not to be used for flood insurance rating. Contact your county floodplain manager for flood zone determinations to be used for compliance with local floodplain management regulations.

FLOOD HAZARD ASSESSMENT TOOL LAYER LEGEND
(*Note: legend does not correspond with NFHL*)

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD - The 1% annual chance flood (100-year), also know as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. SFHAs include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies in these zones:

	Zone A: No BFE determined.
	Zone AE: BFE determined.
	Zone AH: Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined.
	Zone AO: Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined.
	Zone V: Coastal flood zone with velocity hazard (wave action); no BFE determined.
	Zone VE: Coastal flood zone with velocity hazard (wave action); BFE determined.
	Zone AEF: Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE.

NON-SPECIAL FLOOD HAZARD AREA - An area in a low-to-moderate risk flood zone. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

	Zone XS (X shaded): Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
	Zone X: Areas determined to be outside the 0.2% annual chance floodplain.

OTHER FLOOD AREAS

	Zone D: Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase apply, but coverage is available in participating communities.

Figure 41

Tsunamis in Hawai‘i can be generated locally or from a distant source. Local tsunamis have minimal warning and response times. A local tsunami can be generated from an earthquake, surface faulting, liquefaction, and landslides (Tetra Tech, 2020). Distant tsunamis can travel across the Pacific from locations such as Chile, Alaska, and Japan.

Several tsunamis have impacted Hilo Bay since the 1800s, ranging from small to severe. Hilo Bay is well known for its horseshoe shape, which has caused tsunami waves to funnel and increase in height drastically. According to the Pacific Disaster Center, the most devastating tsunamis to hit Hilo occurred in 1946 and 1960. On April 1, 1946, a magnitude-7.1 earthquake originated in the Aleutian Islands of Alaska. This earthquake generated a succession of seven tsunami waves that impacted Hilo Bay and Laupāhoehoe Point with no warning. The maximum wave height reached 55 feet. A total of 170 people were killed in the event. The loss of life prompted the establishment of the Pacific Tsunami Warning System in 1948.

Fourteen years later, in 1960, a magnitude-9.5 earthquake occurred in Chile. It is known as the Valdivia or Great Chilean earthquake, the largest earthquake recorded in the 20th century. Initially, a series of tsunami waves to reach Hilo Bay were just over 3 feet, however, subsequent waves grew to over 35 feet, taking the lives of 61 people. Despite ample warning, some residents refused the evacuate their homes, potentially due in part to two smaller tsunamis, which occurred in 1952 and 1957 that caused minimal damage to the area. Additionally, with the initial waves reaching under 5 feet, some residents who had evacuated returned to their homes before the larger waves hit. Whole city blocks were swept clean of buildings and 580 acres were flooded. **Figure 42** shows approximate tsunami travel time in hours from Alaska and Chile.

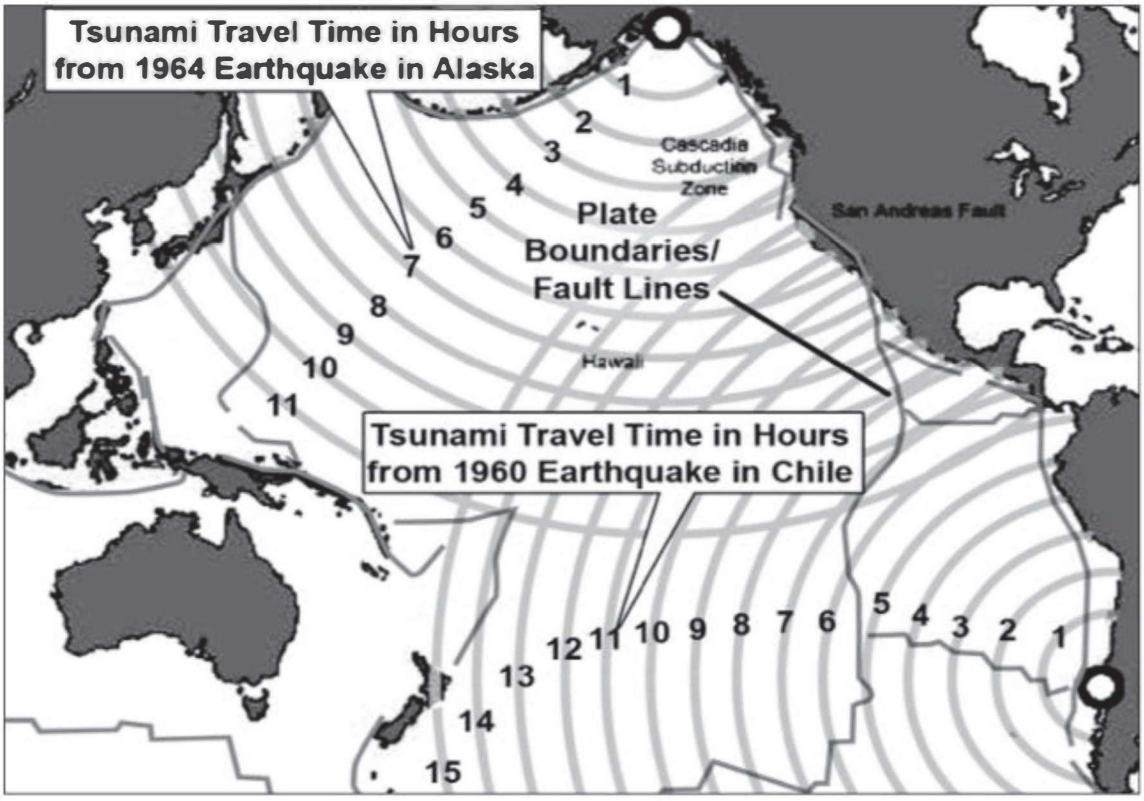


Figure 42: Potential Tsunami Travel Times in the Pacific Ocean

Impacts and Mitigation Measures

According to the Hawai‘i County Hazard Mitigation Plan, potential flooding from storm damage is relatively low in the lower Waiākea area due to the effectiveness of the Wailoa and Waiākea-Uka Flood Control Projects. Since the Property is also outside of the 500-year floodplain, overall flooding risk for the site is low. A topography survey also found no evidence of any drainage issues.

Tsunami warning sirens are situated in the area to alert residents of an evacuation event. Tsunami evacuation route signs are posted within the designated zone to identify the best possible route to follow. The warning sirens are routinely tested and can be clearly heard from the subject site.

Environmental Setting: Sea Level Rise and Storms

It is likely that sea level rise and more frequent and intense storms will affect the Hawaiian Islands due to a rapidly changing climate. The Hawai‘i Climate Change Mitigation and Adaptation Commission (HCCMAC) states that sea level rise is expected due to the increase of anthropogenic Greenhouse Gas emissions into the atmosphere.

> “Sea level rise is an inevitable outcome of global warming that will continue through many centuries even if human-generated global greenhouse gas (GHG) emissions were stopped today. Sea level is rising at increasing rates due to global warming of the atmosphere and oceans and melting of the glaciers and ice sheets. Rising sea level and projections of stronger and more frequent El Niño events and tropical cyclones in waters surrounding Hawai‘i all indicate a growing vulnerability” (HCCMAC, 2017).

Scientists predict that global mean air temperatures will increase by 2.7 °F by the end of the century. Increases in air temperatures will subsequently lead to increased ocean temperatures, which are expected to be the highest in tropical and subtropical areas of the Northern Hemisphere. The IPCC’s “business as usual” scenario predicts that global sea levels will rise by 3.2 feet by the end of the 21st century (IPCC, 2014). There are varying theories regarding when these rising levels will be felt globally. HCCMAC suggests the sea level rise of 3.2 feet can expected by 2100, however, IPCC (2014) and Fletcher (2010), claim this level may be experienced as early as 2060. Hawai‘i Island is expected to be the least vulnerable compared to neighboring islands, but areas such as Kona, Puakō, Kapoho and Hilo Bay may “face serious threats.” **Figure 43** displays a 3.2-foot sea level rise in relation to the subject Property.

The Big Island is also sinking into the Earth’s mantle because of the gravitational weight of its growing volcanoes, which can contribute to perceived sea level rise. Relative sea level rise is a result of the combined eustatic water rise and land subsidence. Tidal records taken in Hilo and Honolulu since 1946 show higher sea level rise on Hawai‘i Island, compared to O‘ahu. Many factors could contribute to this variability; however, the most likely explanation is subsidence. Moore and Fornari (1984) studied drowned reefs off the northwestern coast of Hawai‘i Island. Their studies suggested a regional rate of subsidence between 1.8 and 3 millimeters per year over

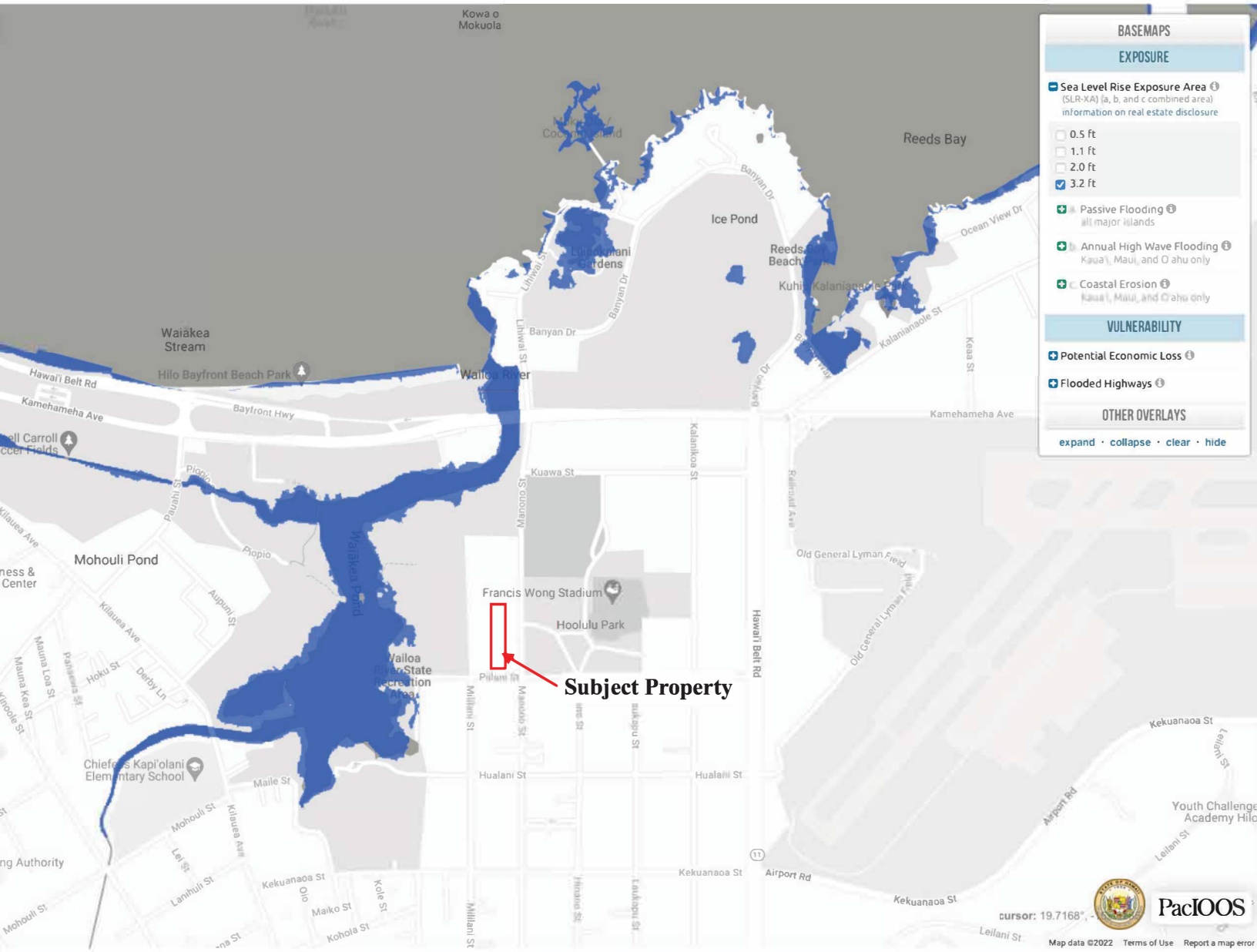

Kowa o Mokuola
Reeds Bay
Ice Pond
Waiakea Stream
Hilo Bayfront Beach Park
Hawai'i Belt Rd
Kamehameha Ave
Bayfront Hwy
Banyan Dr
Lihiwai St
Kuawa St
Kalanikoa St
Manono St
Mohouli Pond
Francis Wong Stadium
Hoolulu Park
Waiakea Pond
Subject Property
Hualani St
Maile St
Kekuanaoa St
Airport Rd
Old General Lyman Field
Hawai'i Belt Rd
Kalanianaole St
Ocean View Dr
Keaa St
Youth Challenge Academy Hilo
BASEMAPS
EXPOSURE
Sea Level Rise Exposure Area
(SLR-XA) (a, b, and c combined area)
information on real estate disclosure
0.5 ft
1.1 ft
2.0 ft
3.2 ft
a. Passive Flooding
all major islands
b. Annual High Wave Flooding
Kaua'i, Maui, and O'ahu only
c. Coastal Erosion
Kaua'i, Maui, and O'ahu only
VULNERABILITY
Potential Economic Loss
Flooded Highways
OTHER OVERLAYS
expand · collapse · clear · hide
PacIOOS
Map data ©2022
Terms of Use
Report a map error

Figure 43

255,000 years. This data was further proven by Ludwig et al. (1991), by dating coral reefs over 475,000 years, which concluded a subsidence rate of 2.6 millimeters per year.

According to Collins et al. (2019), as outlined in an IPCC Special Report on the Ocean and Cryosphere in a Changing Climate, climate change and subsequent sea level rise will likely increase the intensity and frequency of storms.

> "The average intensity of tropical cyclones, the proportion of Category 4 and 5 tropical cyclones, and the associated average precipitation rates are projected to increase for a 2°C global temperature rise above any baseline period (*medium confidence*). Rising mean sea levels will contribute to higher extreme sea levels associated with tropical cyclones (*very high confidence*). Coastal hazards will be exacerbated by an increase in the average intensity, magnitude of storm surge, and precipitation rates of tropical cyclones."

Historically the Island of Hawai'i has been viewed as largely protected from experiencing storms of this magnitude due to the presence of Mauna Loa and Mauna Kea. However, recent years have shown that storms such as Iselle (2014) and Lane (2018) can have very damaging effects to the island.

On August 8, 2014, Hurricane Iselle made landfall in the Puna District of Hawai'i County as a moderate tropical storm with sustained wind speeds of 70mph. Significant damage was felt in the southeastern portions of the Big Island, especially in the Wai'ōpae area, which is a coastal stretch dotted with anchialine ponds and tidepools, known as the Kapoho Tide Pools. Many homes were heavily damaged in this area, which is located over 20 miles southeast from the subject Parcel. Hurricane Lane occurred in late August 2018 and brought significant damage to Hawai'i Island. The hurricane sat just west of the island for several days, bringing torrential rainfall and flash flooding. Parts of the Island of Hawai'i experienced 40 to 56 inches of rain, downed trees, and power lines. Flood waters prompted Bayfront Highway to close. Water rescues occurred in Hilo at Kaiulani Street with water levels as high as 5 feet. A Presidential Disaster Declaration was made for both Hurricane Iselle and Lane.

Impacts and Mitigation Measures

The proposed project will not be impacted by storm surge based on the distance from the coast, Wailoa River and Waiākea Fishpond. Anticipated sea level rise of 3.2 feet will not have a significant impact on the Property. Any changes in water levels within Wailoa River and Waiākea Fishpond are not expected to reach the site. Additional flooding potential due to sea level rise is possible but is not expected to have significant adverse effects to the proposed action.

3.1.4 Water Quality

Environmental Setting

There are three (3) surface water bodies near the subject site: Wailoa River, Waiākea Fishpond, and Hilo Bay. Hilo Bay and Waiākea Fishpond are both listed as impaired water bodies by the Department of Health (DOH). A water body is considered impaired when monitoring data has

shown that the water exceeds the State's water quality standards. The list is updated every two (2) years, most recently in 2022. **Figure 44** shows current impaired water bodies in red.

According to the 2022 State of Hawai'i Water Quality Monitoring and Assessment Report:

> "The Hawai'i State Department of Health (DOH) is obligated by the Clean Water Act (CWA) Sections 303(d) and 305(b) to report on the State's water quality on a two-year cycle…The CWA [Section] 305(d) requires states to submit a list of waters that do not attain applicable water quality standards (WQS), plus a priority ranking of impaired waters for Total Maximum Daily Loads (TMDL) development based on the severity of pollution and the uses of the waters."

The main WQS parameters assessed in this report include fecal indicator bacteria (enterococci), turbidity, chlorophyll *a*, nutrients (total nitrogen, nitrate+nitrite-nitrogen, ammonium-nitrogen, total phosphorus), and where applicable, total dissolved nitrogen and phosphorus, total suspended solids, and orthophosphate.

Water quality issues from algae, murky water, and nitrogen and/or phosphorus buildup are noted for Hilo Bay, and nitrogen and/or phosphorus for Waiākea Fishpond. Waiākea has an additional water quality concern of arsenic found in the sediment at the bottom of the pond, which is the result of pollution from a former canec plant that operated over ¼ mile from the subject Property in the early to mid 1900's. This will be further discussed in Section 3.1.7.

Water quality can be impacted by both point and non-point source pollution such as construction and storm water runoff. Approximately 2.52 acres of land will be disturbed by the proposed construction activities. A National Pollutant Discharge Elimination System (NPDES) permit will therefore be required. A Storm Water Pollution Prevention Plan (SWPPP) has been prepared for the environmental review process and is summarized below. A full copy of the report can be found in **Appendix B**. A drainage study will be completed to establish any additional BMPs and mitigating measures necessary. Offsite road work would also include drainage mitigation which could potentially improve conditions in the area with regards to storm water runoff.

Impacts and Mitigating Measures

The proposed action does not pose a significant adverse risk to water quality, aquatic, or marine habitats. The proposed action is also not expected to have any impact on surface water resources.


Coconut Island
Kuhio Bay
Mokaoku
Banyan Dr
Ocean View Dr
Banyan Dr
Mooheau Park
Bayfront Hwy
Kamehameha Ave
Kamehameha Ave
Kamehameha Ave
Kuawa St
Waiakea River
Hilo
Aala Ln
Aala Ln
Pauahi St
Piopio St
Kukuau St
Kilauea Ave
Hualalai St
Aupuni St
Waiakea River State Park
Mohouli Fishpond
Waiakea Fishpond
Manono St
Operations St
Pilani St
Hualani St
Hualani St
Kaikilani Playground
Kinoole St
Ululani St
Ululani St
Kaplolani St
Alahi St
Airport Rd

Figure 44

Hawaiian Kingdom Brands will ensure all earthwork and construction will be conducted in compliance with the following rules and regulations:

(a) "Storm Drainage Standards," County of Hawai'i, 1970 and as revised
(b) "Flood Control", Chapter 27 of the Hawai'i County Code
(c) Standards and regulations of the Federal Emergency Agency (FEMA)
(d) "Erosion and Sedimentation Control", Chapter 10 of the Hawai'i County Code
(e) Conditions of an NPDES permit and any additional Best Management Practices required by the Board of Land and Natural Resources
(f) Conditions of a Storm Water Pollution Prevention Plan, if required

The proposed action will create impermeable surfaces on the Property, which can increase the volume and rate of storm water runoff. However, as per Hawai'i County Code, Chapter 27, the volume of storm water leaving the site will not increase. A County grading permit, Storm Water Pollution Prevention Plan, and a National Pollution Discharge Elimination System permit are required since the Property will be considered an industrial site.

A Storm Water Pollution Prevention Plan (SWPPP) was prepared for this DEA by Engineering Partners, Inc. according to Hawai'i Administrative Rules, Chapter 11-55 with specific reference to Section 7 of Appendix C. The SWPPP describes the procedures that will be used to prevent non-point source pollution from spreading beyond the project site during construction. A full copy of the report can be found in **Appendix B**.

HAR Chapter 11-55, Appendix C, Section 7.2.1, requires a storm water team to oversee the development, modification, and implementation of the SWPPP. This team will be made up of the Civil Engineer of Record, General Contractor, and Construction Project Manager, who will have the following responsibilities:

A. Civil Engineer of Record: Yen Wen Fang, P.E.
    1. Write the initial draft of the SWPPP and any revisions necessary to obtain approval from the Department of Health, Clean Water Branch.

B. General Contractor (To Be Determined):
    1. Install and maintain storm water runoff controls and Best Management Practices (BMPs) through the duration of the construction.
    2. Conduct weekly inspections of the site to check storm water runoff control measures and BMPs to detect violations of and conditions which may cause violations.
    3. Take immediate corrective action to repair, modify, or replace any storm water control; clean up and properly dispose of spills and releases; remedy a permit violation.
    4. Notify the Construction Project Manager of any violations, and corrective actions taken with regard to the storm water controls, BMPs, the Permit, and the SWPPP.

C. Construction Project Manager (To Be Determined):
    1. Oversee construction of the project and provide construction management services.

2. Submit additional information/documents necessary to complete the NPDES permit to the owner.
3. Submit information/documents for compliance with the NPDES permit conditions to the owner.
4. Conduct periodic site inspections for compliance with permit conditions. Check storm water runoff control measures and BMPs to detect violations of and conditions which may cause violations.
5. Recommend modification of the SWPPP to the owner. Recommendations shall be based on site observations and input by other storm water team members.
6. Maintain records of any modifications to the SWPPP including monthly reports.
7. Ensure members of the storm water team are aware of changes to the SWPPP and ensure changes are implemented by the General Contractor at the construction site.
8. Immediately notify the owner of any violations, and corrective actions taken with regard to the storm water controls, BMPs, the Permit and the SWPPP.
9. Notify the owner of situations or occurrences which may impact use of operation of the facility or its employees and users.

The following three tables (**1-3**) outline the sequence and details of proposed construction activities, potential construction site pollutants and mitigating measures, and descriptions of each control measure.

Table 1: SWPPP Sequence and Details of Construction Activities

Construction Activity	Duration	Details
Install Perimeter BMPs	One (1) Week	Biosocks/silt fences will be placed along the perimeter of the site prior to the start of any other construction work. They will remain in place throughout the duration of the project to act as filters for storm water entering and exiting the project site.
Install Interior BMPs	N/A	Interior BMPs will be installed as applicable based on the progress of the project. For example, impermeable concrete truck washout basins will be utilized but these will not be necessary until concrete work begins.
Rough Grading	Four (4) Weeks	Includes the excavation and embankment within the project site prior to any structural improvements. The initial stockpile/storage area(s) will be created during this phase and sediment trapping wattles will be installed to surround their perimeter.

Retaining Walls (if needed)	N/A	Retaining walls would be constructed throughout the site. Concrete truck washout basins will be installed prior to any concrete trucks arriving onsite for the construction of the retaining walls.
Underground Utilities	Six (6) Weeks	Underground piping for electrical, sewer, water, and other utilities will be installed in this phase.
Building Erection	Eight (8) Weeks	Includes the installation of the building framing and exterior finish. No additional BMPs are required for this work but the stockpile/storage areas may need to be modified.
Finish Site Grading and Paving	Four (4) Weeks	Includes bringing the site up to final grades and the installation of Portland cement concrete pavement.
Site Finish Work and Landscaping	Four (4) Weeks	Includes the installation of planting, painting, and other minor finishing work required.
Removal of Temporary BMPs	One (1) Week	This task may not begin until the project has been accepted as complete by the owner and a maintenance period has elapsed, allowing all finishing to be cured and planting to be established.

Table 2: SWPPP Potential Construction Site Pollutants and Mitigating Measures

Activity	Pollution Issue	Mitigating Measures
Rough and Final Grading	Grading activities leave bare earth exposed to weather, which may result in sediment being transported by storm water, introducing additional turbidity to receiving waters.	Sediment trapping wattles will be installed to intercept storm water runoff as it enters and exits the project site. These wattles will filter the runoff, preventing sediment from being released.

Concrete Pours	Cement and other concrete are pollutants, which may affect turbidity and pH of water. These pollutants may be released while concrete is still in its plastic stage. Once the concrete has reached its initial set, there is no longer potential for these pollutants to be released.	1. Concrete pours will be conducted in dry weather and covered if rain should come after the pour has started. 2. Concrete truck washout will be directed to an impermeable basin where water will be allowed to evaporate, and the remaining sludge will be disposed of offsite. 3. The sediment trapping wattles installed around the perimeter of the site will act as filters if any concrete is contained in the storm water runoff.
AC Pavement	AC paving has the potential to release oils.	Paving will be scheduled for sunny days to allow for maximum cure time prior to rainfall contacting new pavement. 2. The sediment trapping wattles installed around the perimeter of the site will act as filters if any concrete is contained in the storm water runoff.
Fertilization for Landscaping	Fertilizers typically contain high levels of nitrogen, phosphorus, and potassium, which can result in algal blooms or other unwanted vegetative growth if they are released.	Sediment trapping wattles installed around the perimeter of the site will act as filters if any of these nutrients are contained in the storm water runoff.

Table 3: SWPPP Definitions of Storm Water Control Measures

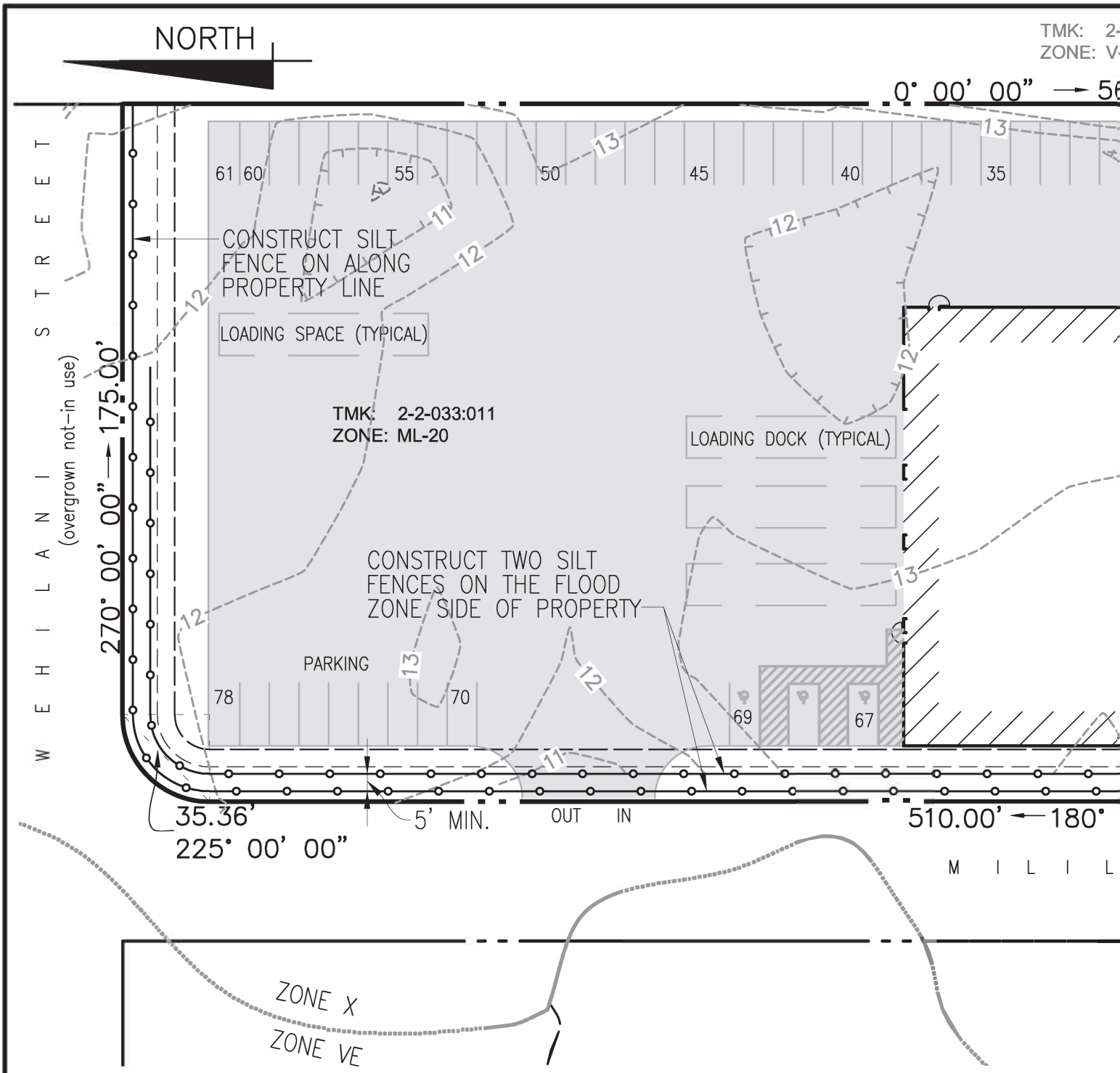
Control Measure	Description
Silt Fence	Sediment barrier composed of permeable geotextile filter fabric attached to support posts will be installed at the perimeter of the project site prior to any ground disturbing activities. Silt fence intercepts the flow of sediment laden runoff, which filters the water and traps the sediment.

Sediment Trapping Wattles (Biosock)	Mulch filled sediment trapping wattles will be installed to surround the stockpiles and storage areas as well as to surround drywell and catch basin inlets.
Stabilized Construction Entrance/Exit	Stabilized construction entrance/exit shall be installed at the beginning of the project to access construction site from paved roads. Shall be a minimum of 12" thick and 3" to 6" aggregate free of fines. This stabilized construction entrance/exit will reduce the amount of sediment tracked off-site by construction vehicles.
Compaction	Fill materials will be compacted as they are installed. This activity is intended to prevent future settlement as traffic loads are placed upon the fill but has the added benefit of making these areas less susceptible to erosion.
Vegetation	Areas of the project site that do not receive pavement (including gravel pavement) will be vegetated after applying topsoil. This activity stabilizes the soil and provides beautification of the area.

Figures 45-47 show the BMP site plan and details. See the full SWPPP report in **Appendix B** for inspection, maintenance, and corrective action; staff training; and compliance with the Safe Drinking Water Act. Each of these procedures will be strictly followed according to HAR Chapter 11-55, Appendix C, Section 7.2.12, 7.2.13, and 7.2.14.

According to the Low Impact Development Guide (LID) Section 3.3.2 General Performance Standards, industrial areas are defined as "hotspots", which are required to use specific structural Best Management Practices (BMPs) and pollution prevention practices. These mitigating measures will be specified during the permitting process following the guidelines outlined in the LID.

Wastewater would be handled by the County sewer system. The County sewer line is proposed to be extended north from its terminus near the Mililani Street and Pi'ilani Street intersection, meeting the approval of the Department of Environmental Management and the Department of Health. Efforts to minimize wastewater from the proposed project will be discussed in Section 3.3.2.



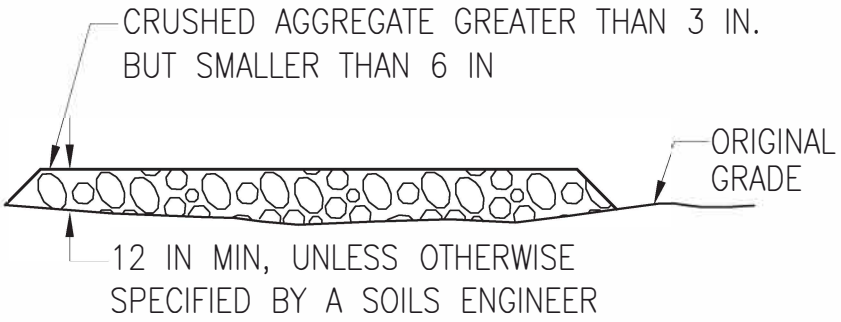
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A BMP SITE PLAN

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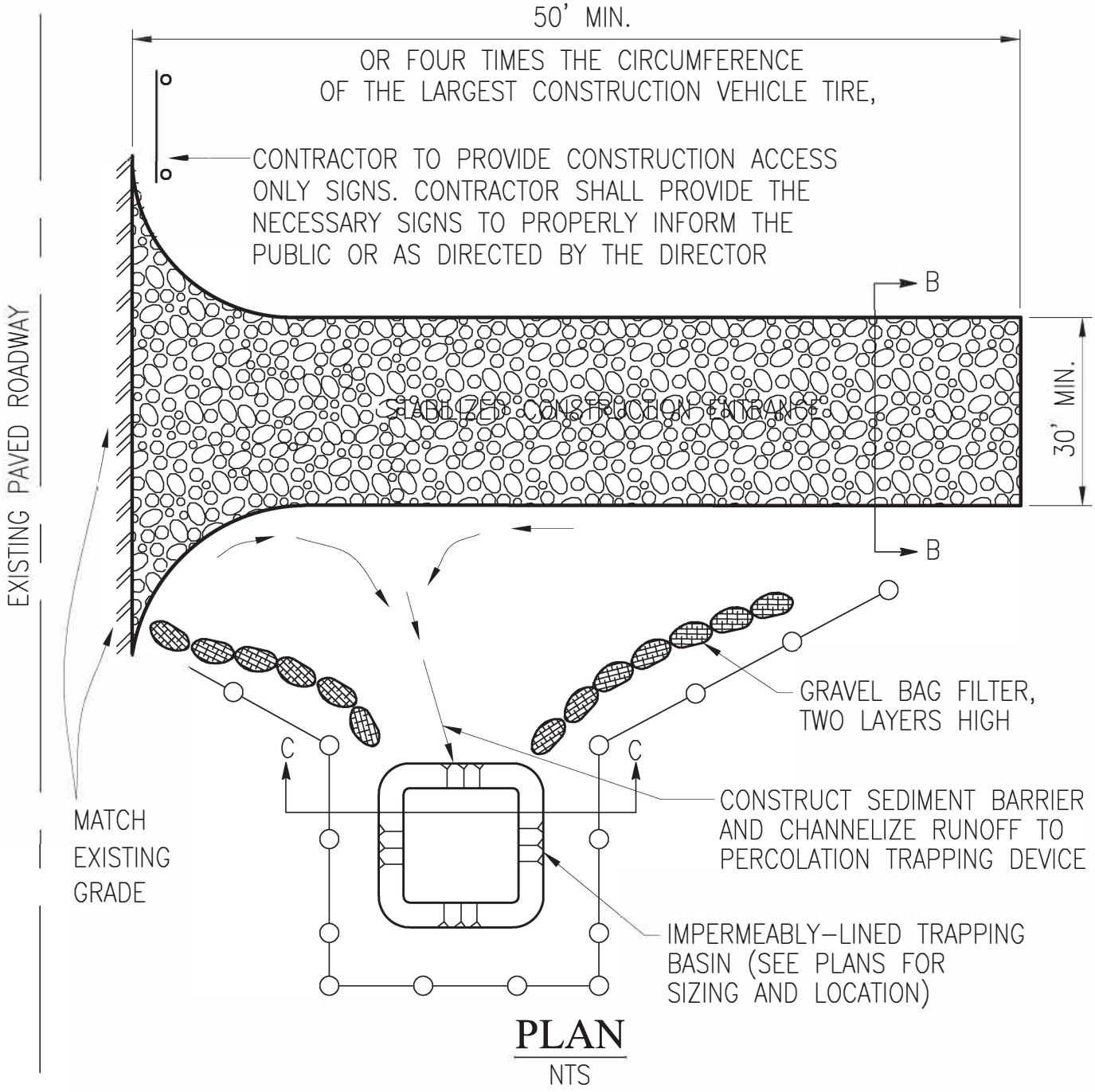
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SECTION B-B

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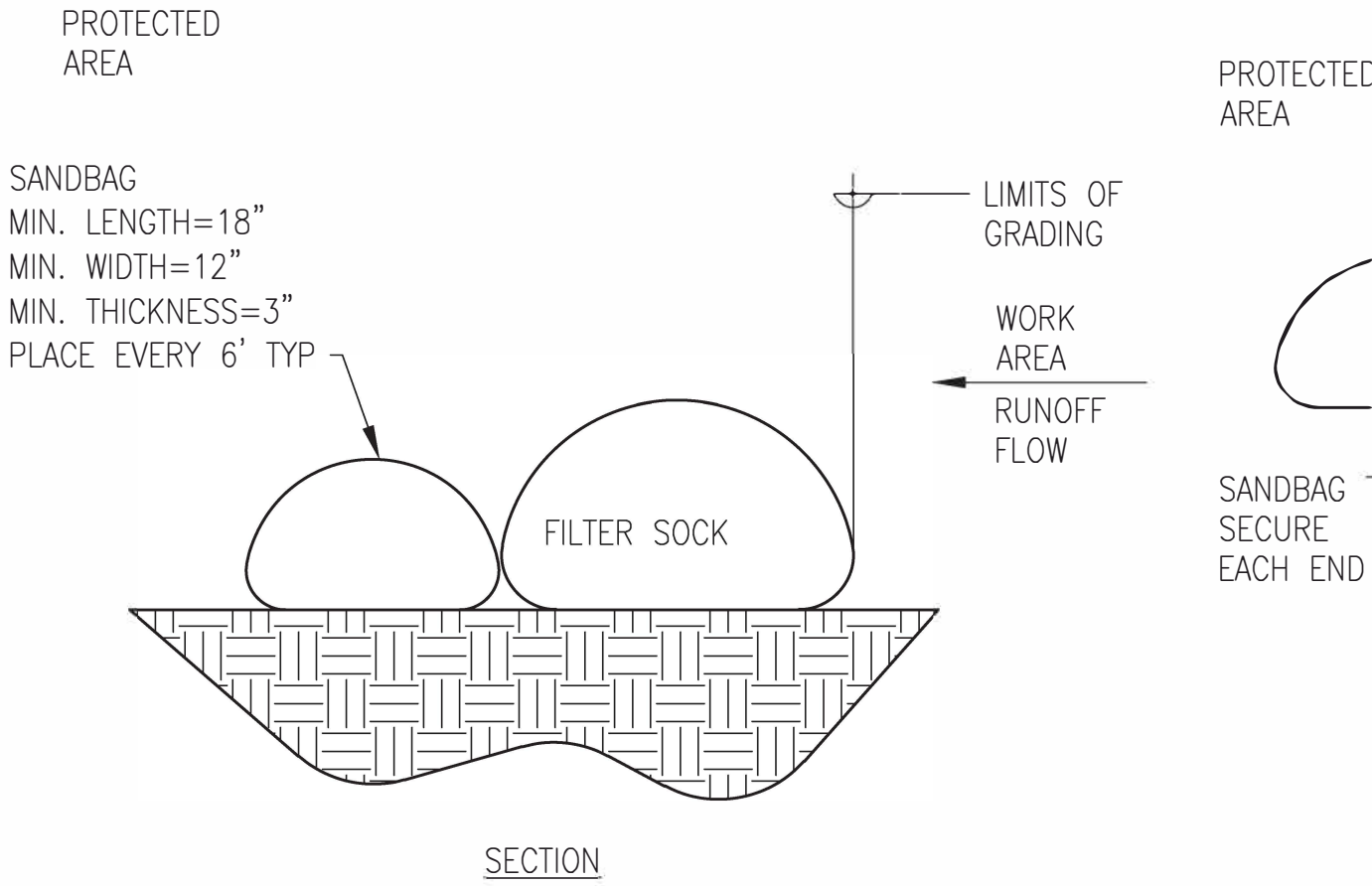
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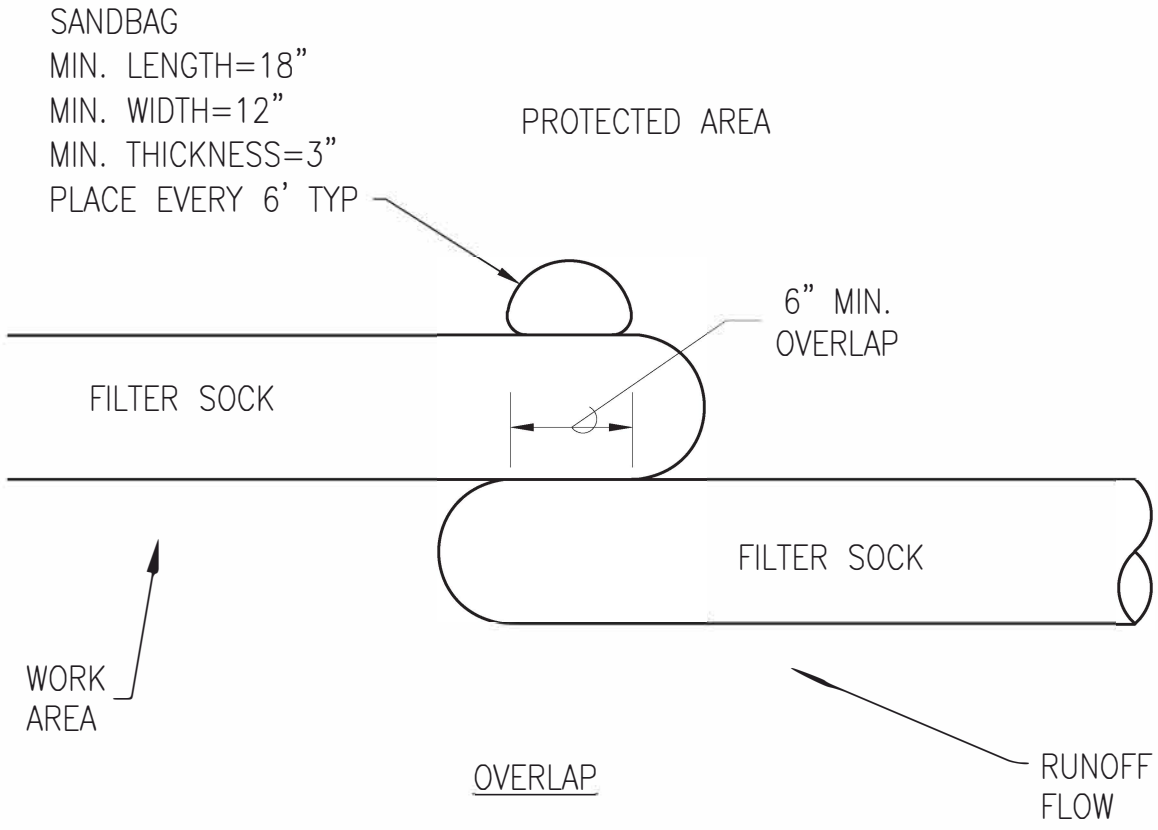
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3.1.5 Flora and Fauna

Environmental Setting: Flora

A biotic survey of the Property conducted on September 14, 2022, found no endangered or threatened species. Previous use of the Property has allowed non-native trees, shrubs, and grasses to populate the site. Typical vegetation found in the area includes Ironwood (*Casuarina equisetifolia*), Kukui (*Aleurites moluccana*), Bingabing (*Macaranga grandifolia*) African tulip (*Spathodea campanulate*), Albizia (*Facaltaria moluccana*), Tropical ash (*Fraxinus uhdei*), Banyan (*Ficus benghalensis*), Areca Palms (*Areca catechu*) and numerous common weedy shrubs, vines, and grasses. One native plant, Kauna'oa kahakai (*Cuscuta sandwichiana)*, was detected on the Property, although it was not rooted in the ground. All the vegetation on the Property is common and not considered rare or endemic. **Table 4** is a full list of flora found during the biotic survey.

Table 4: Flora Found on the Subject Property

Latin Name	**Common Name**	**Family**	**Status**
Falcataria moluccana	Albizia	Fabaceae	A
Commelina diffusa	Honohono grass	Commelinaceae	A
Brachiara mutica	California grass	Poaceae	A
Clusia rosea	Autograph tree	Clusiaceae	A
Polystichum munitum	Sword fern	Dryopteridaceae	A
Macaranga	Bingabing	Euphorbiaceae	A
Mangifera indica	Mango	Anacardiaceae	A
Clidemia hirta	Koster's curse	Melastomataceae	A
Cecropia obtusifolia	Trumpet tree	Moraceae	A
Mimosa pudica	Sensitive Grass	Fabaceae	A
Chamaecrista fasciculata	Partridge Pea	Fabaceae	A
Momordica charantia	Bitter Melon	Cucurbitaceae	A
Passiflora edulis	Lilikoi	Passifloraceae	A
Megathyrsus maximus	Guinea Grass	Poaceae	A
Euphorbia hirta	Hairy Spurge	Euphorbiaceae	A
Dracaena sanderiana	Bamboo	Poaceae	A
Ricinus communis	Castor Bean	Euphorbiaceae	A
Trema orientale	Gunpowder Tree	Cannabaceae	A
Dypsis lutescens	Areca Palm	Arecaceae	A
Epipremnum pinnatum	Pothos Vine	Araceae	A
Momordica charantia	Bitter Melon	Cucurbitaceae	A
Clusia rosea	Autograph Tree	Clusiaceae	A
Cenchrus clandestinus	Kikuyu Grass	Poaceae	A
Crotalaria sp.	Rattlepod	Fabaceae	A

Sphagneticola trilobata	Bay Biscayne	Asteraceae	A
Tibouchina Herbacea	Cane Tibouchina	Melastomataceae	A
Ficus benghalensis	Banyan	Moraceae	A
Paspalum dilatatum	Dallis Grass	Poaceae	A
Paederia foetida	Stinkvine	Rubiaceae	A
Polygala polygama	Racemed milkwort	Polygalaceae	A
Indigofera suffruticosa	Anil de Pasto	Fabaceae	A
Canavalia rosea	Baybean	Fabaceae	A
Vigna luteola	Hairypod Cowpea	Fabaceae	A
Cestrum nocturnum	Night-blooming Jasmine	Solanaceae	A
Fraxinus uhdei	Tropical Ash	Oleaceae	A
Desmodium incanum	Creeping Beggarweed	Fabaceae	A
Justicia betonica	White Shrimp Plant	Acanthaceae	A
Cyperus rotundus	Nutgrass	Cyperaceae	A
Solanum nigrum	Popolo	Solanaceae	I
Cuscuta sandwichiana	Kauna'oa Kahakai	Convolvulaceae	N
Cocos nucifera	Coconut Palm	Arecaceae	PI
Cordyline fruticosa	Ti	Liliaceae	PI
Aleurites moluccana	Kukui Nut Tree	Euphorbiaceae	PI

N: Native PI: Polynesian Introduced A: Alien

Environmental Setting: Fauna

Several common birds were also detected during the survey, including Common Myna (*Acridotheres tristis*), Spotted Dove (*Streptopelia chinensis*), House Finch (*Carpodacus mexicanus*), Saffron Finch (*Sicalis flaveola*), and Japanese White-Eye (*Zosterops japonicus*). A dragonfly species was also seen flying over the Property but was not identified.

Nēnē habitat ranges from sea level to 7,000 feet. Flocks move between high elevation feeding habitats and lowland nesting areas. Wailoa River State Park is a popular nesting ground and habitat for Nēnē. No Nēnē were seen during the biotic survey.

The site is not known to be a habitat for any rare or endangered animal life. However, it would be possible to find the Hawaii Hawk (I'o) (*Buteo solitarius*), the Hawaiian Owl (Pueo) (*Asio flammeus sandwichensis*), and the Hawaiian Hoary Bat or 'Ope'ape'a (*Lasiurus cinereus semotus*) flying over, roosting, or utilizing resources near the Property.

The Indian mongoose (*Herpestes a. auropunctatus*) was detected near the site. It is also possible for feral cats (*Felis catus*) and chickens (*Gallus gallus domesticus*) to also be present at times.

Impacts and Mitigating Measures

Construction and operation activities will have little impact to native biological communities. The Property has been previously cleared, including most recently in April 2022 under a SMA Minor Permit approved by the Planning Department in January of 2021. There was one native plant detected known as Kauna'oa kahakai (*Cuscuta sandwichiana)* although it was not rooted in the ground. *Cuscuta sandwichiana* is a parasitic vine and requires a host plant to survive.

Since the proposed action will involve the use of screening landscaping, and there is potential for native endangered birds to be in the area, mitigating measures must be determined and adopted, if necessary. The State listed Hawaiian Hoary Bat (*Lasiurus cinereus semotus*) has the potential to occur in the vicinity of the project area and may roost in nearby trees. Hoary Bats may be sensitive to disturbance between June 1st and September 15th, throughout which no shrubs or trees taller than 15 feet may be disturbed, removed, or trimmed without consulting the DLNR Division of Forestry and Wildlife (DOFAW). The State listed Hawaiian Hawk, or ʻIo (*Buteo solitarius*) is also known to occur in the project vicinity. If any tree cutting occurs between March and September, DOFAW must be consulted first. A pre-construction hawk nest search by a qualified ornithologist using standard methods must be conducted. If nests are found, no land clearing is permissible until October.

According to DOFAW, artificial lighting can adversely impact seabirds that may pass through the area at night by causing disorientation. The disorientation can result in collision with manmade artifacts or grounding of birds. For nighttime lighting that might be required, DOFAW recommends that all lights be fully shielded to minimize impacts. Nighttime work that requires outdoor lighting should be avoided during the seabird fledging season from September 15th through December 15th. This is the period when young seabirds take their maiden voyage to the open ocean.

The movement of plant or soil material between worksites, such as fill, must be minimized. Soil and plant material may contain invasive fungal pathogens such as Rapid ʻŌhiʻa Death (ROD), vertebrate and invertebrate pests such as Little Fire Ants (*Wasmannia auropunctata*), or invasive plant parts that could harm native species and ecosystems. All equipment, materials, and personnel should be cleaned of excess soil before leaving the site. Gear that may contain soil, such as work boots and vehicles, should be thoroughly cleaned, and sprayed with 70% alcohol solution to prevent the spread of ROD and other harmful fungal pathogens. If any material removed from the site is moved to areas without fire ants or ROD, the material will be inspected and treated. No ʻŌhiʻa trees are present on the Property; therefore, none will be cut down during construction.

3.1.6 Air Quality, Noise, and Scenic Resources

Environmental Setting

The air quality in the vicinity of the Property is generally very good. Heavy vog is not usually a concern for this part of Hilo during past Kīlauea eruptions. Vog is created when sulfur dioxide reacts chemically with sunlight, oxygen, dust particles, and water in the air. During eruptions, the trade winds generally keep the Hilo area free from severe conditions, however, weak winds,

particularly in the winter, may result in worse atmospheric quality. Air quality related to emissions is not an immediate concern since current Kīlauea activity is minimal.

Noise near the subject site is moderate. The area is urban and other businesses are present to the east and south. Manono Street is also located to the east, which generates moderate noise levels from vehicular traffic. The Afook-Chinen Civic Auditorium and the Francis Wong Stadium located to the northeast occasionally hold events and baseball games, which can also generate moderate noise.

Goals and policies to preserve areas of natural beauty are outlined in the County of Hawai'i General Plan. These standards are designed to prevent encroachment on scenic features such as black sand beaches and tidal ponds. The Wailoa River State Park is located 625 feet to the west of the subject Property and is a significant scenic resource in the area.

Impacts and Mitigating Measures

Rules and regulations outlined in Hawai'i Administrative Rules Title 11, Chapter 46 "Community Noise Control," Chapter 59 "Ambient Air Quality," and Chapter 60.1 "Air Pollution," will be followed during all construction and operation activities.

Air pollutants during construction will be limited and temporary. The main sources of short-term air pollutants are construction equipment exhaust and dust. HAR §11-60 on Fugitive Dust prohibits visible emissions of dust from constriction activities. These regulations will be strictly followed to prevent dust impacts to Pi'ilani Street, Mililani Street, and Manono Street. In addition, reasonable measures to control airborne and visible fugitive dust from road areas are outlined by the Department of Health's Clean Air Branch. These measures include, but are not limited to:

- Planning the different phases of construction, focusing on minimizing the amount of airborne, visible fugitive dust-generating materials and activities, centralizing on-site vehicular traffic routes, and locating potential dust-generating equipment in areas of the least impact.
- Providing adequate water sources at the site prior to start-up of construction activities; Landscaping and providing rapid covering of bare areas, including slopes, starting from the initial grading phase.
- Minimizing airborne, visible fugitive dust from shoulders, and access roads.
- Providing reasonable dust control measures during weekends, after hours, and prior to daily start-up of construction activities.
- Controlling airborne, visible fugitive dust from debris being hauled away from the project site.

These mitigating measures will be used during construction to prevent significant impacts from dust to roadways in the area.

During operation, the main source of air pollution will be through regular vehicle trips including the movement of employees and customers.

The TIAR estimates 108 vehicular trips during AM peak hours and 36 vehicular trips during PM peak hours. Idle emissions are not anticipated to produce adverse impacts due to the low number of anticipated trips and nature of building program. With higher EPA standards for vehicular air emissions, plus the need to comply with appropriate Department of Health Air Quality standards, the impact to the ambient air quality should not be significant.

The subject Property is in an area with mixed zoning including Open, Commercial, and Residential. The Property itself is zoned Limited Industrial ML-20. According to Hawai'i Revised Statues Chapter 342F, *Noise Pollution*, Industrial areas allow noise levels to reach 70 decibels for both daytime (7 AM – 10 PM) and nighttime hours (10 PM – 7 AM). Commercial areas allow 60 and 50 decibels for daytime and nighttime hours, respectively, and Residential allows 55 and 45 decibels for daytime and nighttime hours, respectively.

Noise generated by activities on site are not expected to exceed 70 decibels during daytime or nighttime hours. This includes noise generated onsite from the storage facility. The storage facility is proposed to be constructed with steel and insulated with R19 on sidewalls and R30 on the ceiling to abate noise. This will largely mitigate noise emitted to nearby properties and Wailoa River State Park.

Short-term noise impacts may occur during construction from excavation, grading, vehicle and equipment operation, and the construction of new infrastructure. Most of these impacts will be temporary and mitigated through Best Management Practices. It is possible that a noise permit may need to be sought if there is ever a potential for construction noise to exceed the Department of Health's maximum permissible noise levels.

During operation, sources of noise may occur from regular vehicle and truck trips, customers, and warehouse activities. Most of these sources will be limited to typical workday hours.

The storage f acility will operate under standard noise levels compared to similar establishments.

Other mitigating measures can be applied to the proposed project if it is determined that a lower decibel maximum is appropriate for the area (for example, Commercial level standards).

The County of Hawai‘i General Plan outlines regulations to preserve areas of natural scenic beauty. No significant visual impacts would occur to scenic resources in the area. .

Light pollution is another important aspect of maintaining scenic resources, the visibility of the night sky, and the protection of seabirds that may utilize resources near the subject Property. Therefore, the following guidelines to minimize light pollution will be adhered to:

1. Any outdoor lighting must conform to the standards established by the Hawai‘i County Outdoor Lighting Ordinance (Hawai‘i County Code Chapter 14, Article 9: “Outdoor Lighting”).
2. The minimum possible amount of outdoor/exterior lighting should be used and should be turned off when not needed. Motion sensor activated lighting will be used wherever feasible.
3. All exterior lighting should be fully shielded. This means that all lighting fixtures must emit zero light above the horizontal plane.
4. Conformity to the Outdoor Lighting Ordinance also requires the use of blue-deficient exterior lighting. This means that exterior LED lighting must emit less than 2% of its total energy at wavelengths less than 500 nm. The best choice for this is either filtered LED lights, or amber LED lights.
5. White light should be avoided. Any white light used should have Correlated Color Temperature of 2700 K or below.

3.1.7 Hazardous Substances, Toxic Waste, and Hazardous Conditions

Environmental Setting: Historical Use

Waiākea Fishpond has historically been polluted by both point and non-point sources of arsenic pollution. A former canec plant once operated on the southeast corner of Waiākea Fishpond from 1932 to 1963. Canec board was made from pressed sugarcane fiber and widely used for walls and ceilings of buildings. Arsenic was added to canec boards to deter termites and prevent damage. Approximately 500 tons of arsenic compounds were released into Waiākea Fishpond from the former plant’s sewer line over its 30 years of operation. Arsenic based herbicides and

pesticides were also widely used throughout the copious sugarcane fields in the Hilo area. Erosion and runoff of soil from former sugar cane fields in upland areas likely also contributed to arsenic present in the pond sediment today (DOH, 2019).

Arsenic contamination largely remains within sediment found at the bottom of the pond; however, it is possible historical tsunamis spread contaminated sediment to nearby properties. Therefore, an Environmental Site Assessment was conducted in 2018 to determine whether any current or past hazardous substances are present on the site.

A Phase I Environmental Site Assessment (ESA) was conducted on the subject Property in March 2018 by Lehua Environmental Inc. in accordance with the Environmental Protection Agency (EPA) and American Society for Testing and Materials (ASTM) standards. The assessment was conducted to evaluate existing conditions, investigate the environmental history, and identify the presence of Recognized Environmental Conditions (REC's) within and around the site. According to the report, a current REC is defined as:

> "The presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat to a future release to the environment." (ASTM, 2013).

In contrast, a past REC is defined as:

> "A past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted residential use criteria established by a regulatory authority, without subjecting the property to any required controls" (ASTM, 2013).

Research for this study consisted of a review of historical and regulatory records, present conditions, site geology and hydrogeology, Federal, State, and local databases of known or potentially hazardous waste sites, landfills, and sites currently under investigation for environmental violations. According to the report, the assessment revealed no evidence of past or current RECs in connection with the site and thus confirmed that a Phase II study was not necessary. The full ESA report can be found in **Appendix A**.

Impacts and Mitigating Measures

The Environmental Site Assessment found no evidence of past or current RECs, which means any potential contamination from past tsunami events or former land use that impacted the property is no longer detectable.

Environmental Setting: Proposed Use

No hazardous materials will be used throughout the construction process that has the potential to contaminate any surface or ground water resources.

No hazardous waste is anticipated to be produced from the proposed action. The quantity of solid waste that the proposed development will produce is unknown. Services to dispose of waste will be contracted through local waste management companies.

A solid waste management plan will be developed if required by the Department of Environmental Management prior to completion and operation of the project. During operation, petroleum products may be used for onsite machinery and equipment or landscape maintenance.

Impacts and Mitigating Measures

Solid waste generated by the development will require private disposal at the Hilo landfill or other designated landfill sites as required by the County.

Following the guidelines of State and County requirements to minimize the possibility for spills and hazardous materials during construction, the applicant proposes the following:

- Construction activities with the potential to produce polluted runoff will be limited to periods of low rainfall
- During construction, emergency spill treatment, storage, and disposal of all hazardous materials, will be explicitly required to meet all State and County requirements, and the contractor will adhere to "Good Housekeeping" for all appropriate substances, with the following instructions:
    - Onsite storage to minimum practical quantity of hazardous materials necessary to complete the job;
    - Fuel storage and use will be conducted to prevent leaks, spills or fires;
    - Products will be kept in their original containers unless un-resealable, and original labels and safety data will be retained
    - Disposal of surplus will follow manufacturer's recommendation and all regulations;
    - Manufacturers' instructions for proper use and disposal will be strictly followed;
    - Regular inspection by contractor to ensure proper use and disposal;
    - Onsite vehicles and machinery will be monitored for leaks and receive regular maintenance;
    - Construction materials, petroleum products, wastes, debris, and landscaping substances (herbicides, pesticides and fertilizers) will be prevented from blowing, falling, flowing, washing or leaching into the ocean; and

    - All spills will be cleaned up and properly disposed of immediately after discovery.
- Unused materials and excess fill (if any) will be properly disposed of at an authorized waste disposal site.

Petroleum products can be considered hazardous if not handled or stored properly. All petroleum products will be stored and will be managed by qualified personnel. Personnel who have completed the proper education and training will be the only qualified individuals to handle such products, which will only be used according to the original label on the container. Material Safety Data Sheets (MSDS) must be made readily available and visible within the maintenance building. Personal Protective Equipment (PPE) will be used at all times and checked regularly.

If at any time, hazardous substances or waste are discovered on the Property during construction, all work will cease, and appropriate authorities will be contacted. A remediation specialist can be contacted to supervise the appropriate disposal and management of substances, if deemed necessary. Hawaiian Kingdom Brands will require all users and occupants of the proposed facilities to follow all government regulations pertaining to hazardous and toxic substances.

3.2 Socioeconomic and Cultural

3.2.1 Land Use, Socioeconomic Characteristics, and Recreation

Environmental Setting

The subject property is zoned Limited Industrial ML-20. The parcel is bordered by Pi‘ilani Street to the south and by vacant land to the north, east, and west. Properties further to the north, east and west are Resort-Hotel 750 square feet (V.75), and properties located further south are zoned General Commercial 7,500 square feet (CG 7.5).

Open zoning is present on the east side of Manono street where the Afook-Chinen Civic Center lies. Other surrounding land uses vary and include:

- The Hilo marina is located roughly 1,300 feet to the north
- Ho‘olulu Park is located to the northeast/east, which hosts the Walter Victor Baseball Complex, Francis Wong Stadium, and the Afook-Chinen Civic Center (roughly 800, 950 and 450 feet from the subject Property)
- The Manono mini mart convenience store and Luquin’s restaurant are located approximately 130 feet to the south
- Hooganji Buddhist mission is roughly 450 feet to the south
- Wailoa Plaza and Waiākea Villas residential complex are located roughly 1,000 feet to the southwest

The nearest point of the Wailoa River/Waiākea Fishpond is approximately 625 feet to the west. The mouth of the Wailoa River where it enters Hilo Bay is approximately 2,300 feet to the north.

Impacts and Mitigation Measures

No significant impacts are anticipated to land use, socioeconomic characteristics, or recreation. Recreation in Wailoa River State Park will not be impacted during construction or operation. The proposed project will be a convenient resource for local residents.

3.2.2 Cultural and Historic Resources

Environmental Setting: Cultural Background

Hawai'i is believed to be first inhabited by voyagers from the Marquesas around 1,000 A.D, however, recent studies have shown that initial Polynesian colonization of Hawai'i Island occurred between 1220 and 1261 A.D.

Early Hawaiian settlements incorporated new strategies and structures to adapt to their new environment. Traditional Polynesian philosophies and ideals were used to form new societal standards and structures including the principle of genealogical seniority, observance of gods such as *Kāne, Ku, and Lono*, the *kapu* system of law and order, *ahupua'a* land systems, and various beliefs and values that determined day-to-day protocol and lifestyle such as *mana* and the *'aumakua*.

It is believed that Hilo is likely one of the first settlements on Hawai'i Island. Hilo is known to have rich marine resources accessed at Hilo Bay and additional abundant resources from the forests that descend from Mauna Loa and Mauna Kea. Ancient Hawaiians understood the critical importance of fresh water. Fresh water streams and springs were believed to be created by the gods Kāne and Kanaloa, which established a spiritual connection between people and water. In accordance with the native Hawaiians respect for water, land management units were organized around freshwater supplies in a traditional system known as the *ahupua'a* resource-management system (CWRM, 2019). According to the Water Resource Protection Plan, "water was viewed as such a critical resource to the health and well-bring of the people of ancient Hawai'i, that the concept of private ownership did not exist" (CWRM, 2019).

The *ahupua'a* system, divided near the end of the 16th century, or early 17th century, was designed to provide all the necessary resources to live including agricultural resources inland and ocean resources at the coast. These *ahupua'a* in the Hilo region include Pu'u'eo, Pi'ihonua, Punahoa, Pōnahawai Kūkūau and Waiākea (where the property is located). Waiākea *ahupua'a* is one of the largest in the district, covering over 95,000 acres and provided resources stretching from the sea up to 6,000 feet along the slopes of Mauna Kea (Kelly, 1981). Waiākea translates to "broad waters" and includes the Wailoa River/Waiākea Fishpond, Reeds Bay, Kūhiō Bay and Puhi Bay (Pukui et al. 1976).

Hawaiian traditional accounts attest to the longstanding importance of Waiākea. Marine subsistence was a significant part of traditional culture and social organization. Fishponds were

developed in the vicinity of Hilo Bay, including royal fishponds, which were spring-fed inland ponds reserved for the highest *ali'i* and religious rituals. According to Haun & Associates (2018), "The chief of the Hilo region, Kulukulu'a, who resided in Waiākea, was the first conquest of 'Umi-a-Liloa in his campaign to unify the districts of Hawai'i Island."

The largest known royal fishpond is the Waiākea Fishpond located roughly 625 feet east of the subject Property. A dedicated fishing ground or *ko'a* known as Maka-o-kū was located near present day Coconut Island, roughly 0.75 miles northeast of the subject site. Strict *kapu* were enforced throughout the Waiākea region, which dictated when and where certain varieties of fish could be caught (Kelly et al. 1981). Farming was also essential to the residents of Waiākea through the cultivation of wet and dry taro (Maly 1996; Handy and Handy 1972).

Today, there has been a resurgence in traditional uses of water resources, which often rely on surface water sources and coastal springs for traditional and customary practices and subsistence activities (CWRM, 2019).

Environmental Setting: Historical Background

The earliest documentation of Hilo is found in 'Umi-a-Liloa's conquest of Hawai'i Island in the sixteenth century, which established Hilo as a royal center for the island. In the account, 'Umi-a-Liloa began his conquest of the Island of Hawai'i by defeating chief Kulukulu'ā, who lived in Waiākea, and the other chiefs of Hilo. 'Umi-a-Liloa's son Keawe-nui-a-'Umi ruled Hāmākua, Hilo and Puna. After the death of Keawe-nui-a-'Umi, the ruling kingdom was divided into three parts and was established under warring chiefs (Kamakau, 1992).

In 1738 Kamehameha I was born. Chief Kalani'opu'u was the high chief during Cook's arrival in 1778. After the chief's death in 1782, his son Kiwala'o, and his nephew, Kamehameha I began to compete for control of the west side of Hawai'i Island. Kamehameha won the battle of Moku'ohai against Kiwala'o in Kona, officially controlling the western half of the island. In 1791, Kamehameha, having gained control of Hilo, fought, and won a battle against his cousin Keoua at Kawaihae for control of the entire Island of Hawai'i. At this time, fur traders and other seamen began to come to the islands. By 1791, the exploitation of sandalwood began and Hilo's reputation as a significant port emerged. A few years later, in 1795, Kamehameha conquered Maui, Moloka'i, Lana'i and O'ahu. He also received Kaua'i by cession in 1810 (Kamakau, 1992). Kamehameha's son Liholiho was born in Hilo in November 1797. Waiākea was inherited by Lihiliho after Kamehameha's death. The *'ili kūpono* of Pi'opi'o and its royal fishpond were given to his favorite wife, Ka'ahumanu.

At the end of the sandalwood era, Christian missionaries led by William Ellis, arrived at the islands. In 1824, a missionary station was established at the mouth of Wailoa River in Waiākea. By 1837, two-thirds of the population relocated to Hilo from villages outside of the area. The mission eventually moved to the top of Haili Street from Waiākea, which established the present location of Hilo.

In 1839, King Kamehameha III signed the Bill of Rights, which sought to ensure that the people's land would not be taken from them. In 1840, the first Constitution of Hawai'i was enacted. In 1845, the Land Commission was created by Kamehameha III to award land claims,

although this could not be done under the current feudal system of land tenure as individuals did not hold title to the land. In 1848 The Great Māhele (Land Division) established a system of private land ownership, which divided all Hawai'i's land into three classifications: Crown Lands, Government Lands and Konohiki Lands. Crown, Government and Konohiki lands remained subject to the rights of the *kanaka* who were in possession and cultivated the lands. As land sales between the Crown, Government and Konohiki continued, the rights of the kanaka became an issue. In 1850, the Land Commission moved to award title of land to kanaka who remained in physical possession, cultivated, or improved any portion of Konohiki Lands. These became Kuleana Lands.

By 1875 the sugar cane industry was firmly established. New sugar mills were being built, laborers were arriving from Asia and Europe, and Hilo became a thriving economic center. In 1893, the Hawaiian Monarchy was over-thrown, and Queen Lili'uokalani was imprisoned. The remaining Crown Lands were confiscated by the government and made a part of the public domain (Chinen, 1961). Hilo began to significantly change in the 1900's through the increased presence of foreign vessels, expansion and growth of tourism, the establishment of missions, private land ownership legalization, the presence of the whaling, cattle, and sugar industries, and the construction of Government roads and railroad lines (Kelly et al. 1981).

Environmental Setting: Archaeological Inventory Survey

An Archaeological Inventory Survey (AIS) was conducted by Haun & Associates between April 13th and April 18th, 2018. The survey identified one site of historical significance on the Property known as Site 50-10-35-1481.2. It is a concrete slab interpreted as a historic foundation or walkway, a remnant of previous industrial uses on site, which is significant for yielding information for understanding historic activity in the area. The mapping, written descriptions, and photography of Site 1481.2 adequately document it and no further work or preservation has been recommended.

Four 'displaced isolated objects' were also found during the survey and consist of a metal gear, a concrete post, and two concrete platforms. It is thought that the gear and concrete post were likely associated with historical use of the area. The concrete platforms are known to have been placed on the Property in the 1990s to support cooling towers. **Figures 48 and 49** show aerial views of Hilo and the subject Property from 1965 and 1977.

Impacts and Mitigation Measures

The proposed development is not expected to impact historical resources on site. Site 1481.2 identified during the AIS was adequately documented and no further work or preservation was recommended. The Hawai'i State Supreme Court's PASH and Ka Pa'akai O Ka 'Aina decisions require decision-makers to consider a project's impact to native Hawaiian practices and resources. Specifically, prior to making a decision, State and County agencies must identify the cultural, historical, and natural resources and associated traditional and customary practices of the site, the impacts of the proposed project to those resources and practices, and the feasible action (i.e., mitigation measures), if any, to protect such resources and practices. Past land use makes it unlikely any cultural practices or traditional and customary rights would be impacted by the proposed action. However, in the event any cultural, historical, or natural resource associated

with traditional and customary rights is discovered on the site, work will cease immediately, and the State Historic Preservation Division will be contacted for appropriate action.



Figure 48: 1965 USDA Aerial Photo of the Subject Property



Figure 49: 1977 USDA Aerial Photo of the Subject Property

3.3 Public Roads, Services, and Utilities

3.3.1 Roads and Access

Environmental Setting

The subject site is located on an undeveloped lot on the northeast corner of Pi'ilani Street and Mililani Street intersection. Mililani street is undeveloped north of the Pi'ilani Street, therefore current access is solely off Pi'ilani Street.

A Traffic Impact Analysis Report (TIAR) was completed on July 6, 2022, by SSFM International to evaluate potential traffic impacts from the proposed project. The TIAR analyzed five (5) main characteristics of potential traffic outcomes with and without the project, based on existing conditions (2022) and future year projections in five (5), ten (10) and twenty (20) year intervals. These include:

- Existing operating conditions with AM and PM peak traffic hours.
- Traffic projections for Future Without Project in 2027, 2032, and 2042.
- Estimated vehicular trips that will be generated by the project.
- Traffic projections for Future With Project in 2027, 2032 and 2042.
- Recommendations for roadway improvements or other mitigating measures, as appropriate, to reduce or eliminate any adverse impacts resulting from traffic generated by the project.

The Highway Capacity Manual (HCM), 6th Edition, was used for calculating Levels of Service (LOS), volume-to-capacity (v/c) ratios, and delays using the traffic analysis software "Synchro." According to the report, Levels of Service is a quantitative measure used to describe the conditions of traffic flow at intersections, with values ranging from free-flow conditions at LOS A, with little to no delays, to congested conditions at LOS F, where extreme delays exist.

Traffic operations and impacts were analyzed during AM and PM peak hours at five (5) intersections within the subject area (**Figure 50)**:

1. Hawai'i Route 19 and Manono Street/Lihiwai Street
2. Manono Street and Pi'ilani Street
3. Hawai'i Route 11 and Pi'ilani Street
4. Manono Street and Kekūanaō'a Street
5. Mililani Street and Kekūanaō'a Street

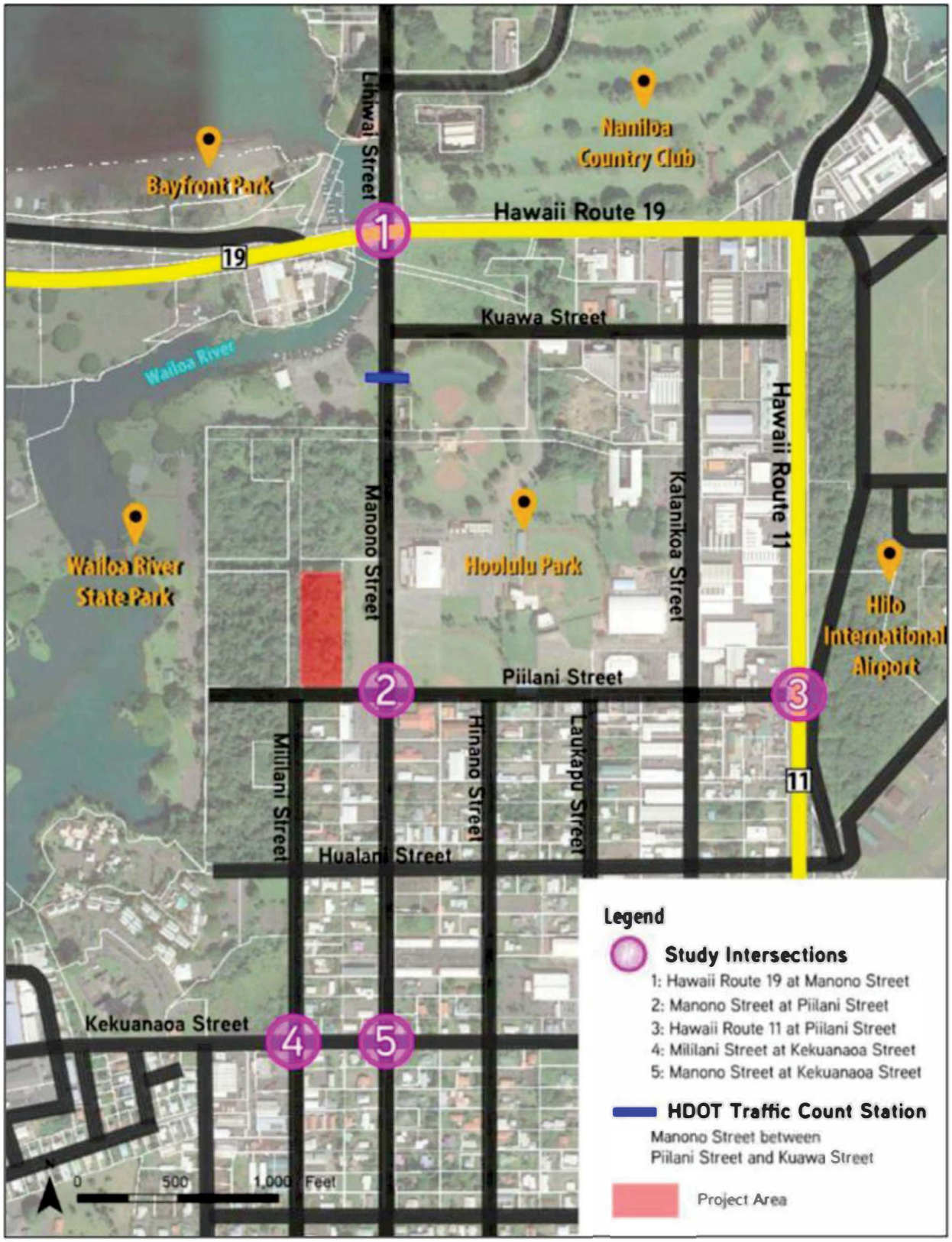


Figure 50: TIAR Study Intersections

Hawai'i Route 19 and 11 are State-owned highways. Manono Street, Pi'ilani Street, Kekūanaō'a Street, and Mililani Street are all County-owned roadways. These intersections were chosen by identifying significant intersections, which may be impacted by project related trips, which would add 3 percent or greater traffic to their forecasted volumes, per the Hawai'i Department of Transportation (HDOT) standard practices.

Vehicle turning movement counts were taken at the five study intersections on Wednesday, April 6, 2022, from 6:30-9:30 AM, and 3:00-6:00 PM. The AM and PM peak traffic hours occurred between 7:30-8:30 AM and 3:45-4:45 PM. Pedestrian and bicycle crossings were also studied at each intersection during the same AM and PM peak hours. Manono Street/Lihiwai Street has the highest amount of pedestrian activity, with up to six (6) peak hour pedestrian crossings during the PM hours. Hawai'i Route 11 and Pi'ilani Street had the highest bicycle activity, with six (6) peak hour bicycle movements during the PM hours (**Table 5**).

Table 5: Peak Hour Pedestrian and Bicycle Volumes

Intersection	Pedestrian		Bicyle	
	AM Peak	PM Peak	AM Peak	PM Peak
Hawaii Route 19 & Manono Street/Lihiwai Street	2	6	1	1
Hawaii Route 11 & Piilani Street	2	0	1	6
Manono Street & Piilani Street	1	4	2	0
Manono Street & Kekuanaoa Street	1	6	0	0
Mililani Street & Kekuanaoa Street	5	3	0	0

Existing Intersection LOS Analysis

1. Hawai'i Route 19 and Manono Street/Lihiwai Street
    - This signalized intersection has an appropriate LOS D or better and v/c of <1.0 during AM and PM peak hours.
2. Hawai'i Route 11 and Pi'ilani Street
    - All movements at this unsignalized Two-Way Stop Controlled (TWSC) intersection resulted in appropriate LOS C or better and v/c <1.0 during AM and PM peak hours.
3. Manono Street and Pi'ilani Street
    - All movements at this unsignalized TWSC intersection resulted in appropriate LOS C or better and v/c <1.0 during AM and PM peak hours.
4. Manono Street and Kekūanaō'a Street
    - All movements at this signalized intersection resulted in appropriate LOS C or better and v/c <1.0 during AM and PM peak hours.
5. Mililani Street and Kekūanaō'a Street
    - All movements at this unsignalized TWSC intersection resulted in appropriate LOS C or better and v/c <1.0 during AM and PM peak hours.

Table 6 below shows the existing vehicular delay and LOS at each intersection (2022).

Table 6: Existing (2022) Level of Service

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Hawaii Route 19 & Manono Street/Lihiwai Street	19.4	-	B	23.2	-	C
Hawaii Route 19 EB Left	12.5	0.27	B	15.1	0.27	B
Hawaii Route 19 EB Through	15.1	0.35	B	19.5	0.44	B
Hawaii Route 19 EB Right	18.0	0.48	B	26.7	0.68	C
Hawaii Route 19 WB Left	11.6	0.16	B	14.8	0.22	B
Hawaii Route 19 WB Through	17.6	0.52	B	20.3	0.48	C
Hawaii Route 19 WB Right	12.8	0.02	B	15.8	0.02	B
Manono Street NB Left	26.0	0.60	C	27.0	0.71	C
Manono Street NB Through-Right	25.5	0.37	C	22.3	0.23	C
Lihiwai Street SB Left	26.0	0.08	C	27.7	0.08	C
Lihiwai Street SB Through-Right	35.0	0.74	D	37.5	0.76	D
Hawaii Route 11 & Piilani Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Hawaii Route 11 NB Left	19.3	0.50	C	19.9	0.37	C
Hawaii Route 11 NB Through	-	-	-	-	-	-
Hawaii Route 11 SB Through-Right	-	-	-	-	-	-
Piilani Street EB Left-Right	20.2	0.23	C	20.8	0.39	C
Manono Street & Piilani Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Manono Street NB Left-Through-Right	8.1	0.01	A	8.2	0.01	A
Manono Street SB Left-Through-Right	8.1	0.05	A	8.2	0.07	A
Piilani Street EB Left-Through-Right	21.6	0.16	C	22.6	0.20	C
Piilani Street WB Left-Through-Right	17.2	0.35	C	20.9	0.41	C
Manono Street & Kekuanaoa Street	29.2	-	C	29.0	-	C
Manono Street NB Left	21.8	0.25	C	21.0	0.16	C
Manono Street NB Through-Right	32.3	0.64	C	28.6	0.51	C
Manono Street SB Left	22.7	0.28	C	21.5	0.26	C
Manono Street SB Through-Right	30.0	0.56	C	32.5	0.65	C
Kekuanaoa Street EB Left	22.6	0.35	C	20.5	0.31	C
Kekuanaoa Street EB Through-Right	25.8	0.52	C	32.0	0.72	C
Kekuanaoa Street WB Left	17.2	0.07	B	22.3	0.33	C
Kekuanaoa Street WB Through-Right	33.4	0.75	C	29.2	0.63	C
Mililani Street & Kekuanaoa Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Mililani Street NB Left-Through-Right	22.1	0.13	C	16.0	0.08	C
Mililani Street SB Left-Through-Right	17.3	0.15	C	12.8	0.12	B
Kekuanaoa Street EB Left-Through-Right	8.8	0.02	A	8.4	0.02	A
Kekuanaoa Street WB Left-Through-Right	8.3	0.01	A	8.6	0.00	A

Future Without Project Conditions

A. Upcoming Planned Projects

Island Naturals Properties, LLC was granted a Special Management Area (SMA) Use Permit (No. 21-000079) to construct a 67,685 square foot retail and office complex on the Northwest corner of Mililani Street and Kekūanaō'a Street, roughly 0.25 miles south of the subject site. This development is expected to include a one-stop commercial retail and office center, including relocating the current Island Naturals grocery store. Full buildout is expected by 2026.

No TIAR was conducted for the SMA application. However, the background report estimates that the development will generate at least 50 vehicular trips during peak hours. The background report also discusses implementing two (2) full movement access driveways, one off Mililani Street, and one off Hualani Street, with the belief that dividing left-turn movements between these side-streets will help reduce congestion. In addition, the developer is suggesting the inclusion of two right-in, right-out driveways off Kekūanaōʻa Street to minimize or eliminate the backup of traffic on Kekūanaōʻa Street. In response, the County of Hawaiʻi Department of Public Works has recommended a left-turn lane in the eastbound direction be installed at the intersection of Kekūanaōʻa Street and Mililani Street; however, it is unclear if this will be implemented.

According to SSFM, the proposed land uses outlined in the Island Naturals SMA application are estimated to generate 282 additional AM peak hour trips and 486 additional PM peak hour trips, as shown in **Table 7**. The SMA application estimates the total number of peak hour trips to be much lower due to unspecified trip reduction factors. It is worth noting that the current location of the grocery store already generates many of these trips in the surrounding road network, so the overall trip generation from the development may be limited to the other planned developments in the proposed complex. Even without the trips from the grocery store, the total number of AM and PM peak hour trips is expected to be 208 and 226 vehicles, respectively. It is important to note that the anticipated trip generation for the Hawaiian Kingdom Brands proposed action is projected to be significantly lower than the unadjusted trip generation for the Island Naturals development.

Table 7: Estimated Vehicular Trips to be Generated by the Island Naturals Complex

Phase/Land Use	Area (1000 SF)	ITE Land Use	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Phase 1								
Island Naturals Store	26.0	850 - Supermarket	44	30	74	130	130	260
Office Space	8.9	710 - General Office Building	18	3	21	4	18	22
Total:			**62**	**33**	**95**	**134**	**148**	**282**
Phase 2								
Drive-Through Restaurant	3.0	934 - Fast Food Restaurant with Drive-Through	68	66	134	52	47	99
Total:			**68**	**66**	**134**	**52**	**47**	**99**
Phase 3								
Retail Space	10.3	822 - Strip Retail Plaza (<40k)	18	11	29	40	40	80
Office Space	10.3	710 - General Office Building	21	3	24	4	21	25
Total:			**39**	**14**	**53**	**44**	**61**	**105**
Total of All Phases:			169	113	282	230	256	486

B. Background Growth

The Statewide Federal-Aid Highways 2035 Transportation Plan for the State of Hawaiʻi forecasts an annual increase in traffic volume of 1.28 percent between 2007 and 2035 in South Hilo. Historical HDOT traffic volumes along Manono Street varied between 2013-2022. Recorded traffic counts in 2013 along Manono Street were 10,723. Compared to pre-pandemic volumes in 2019, which were slightly lower at 10,320. **Figure 51** below shows a 1.28 percent growth rate applied to high-volume regional traffic movements (identified with red arrows).

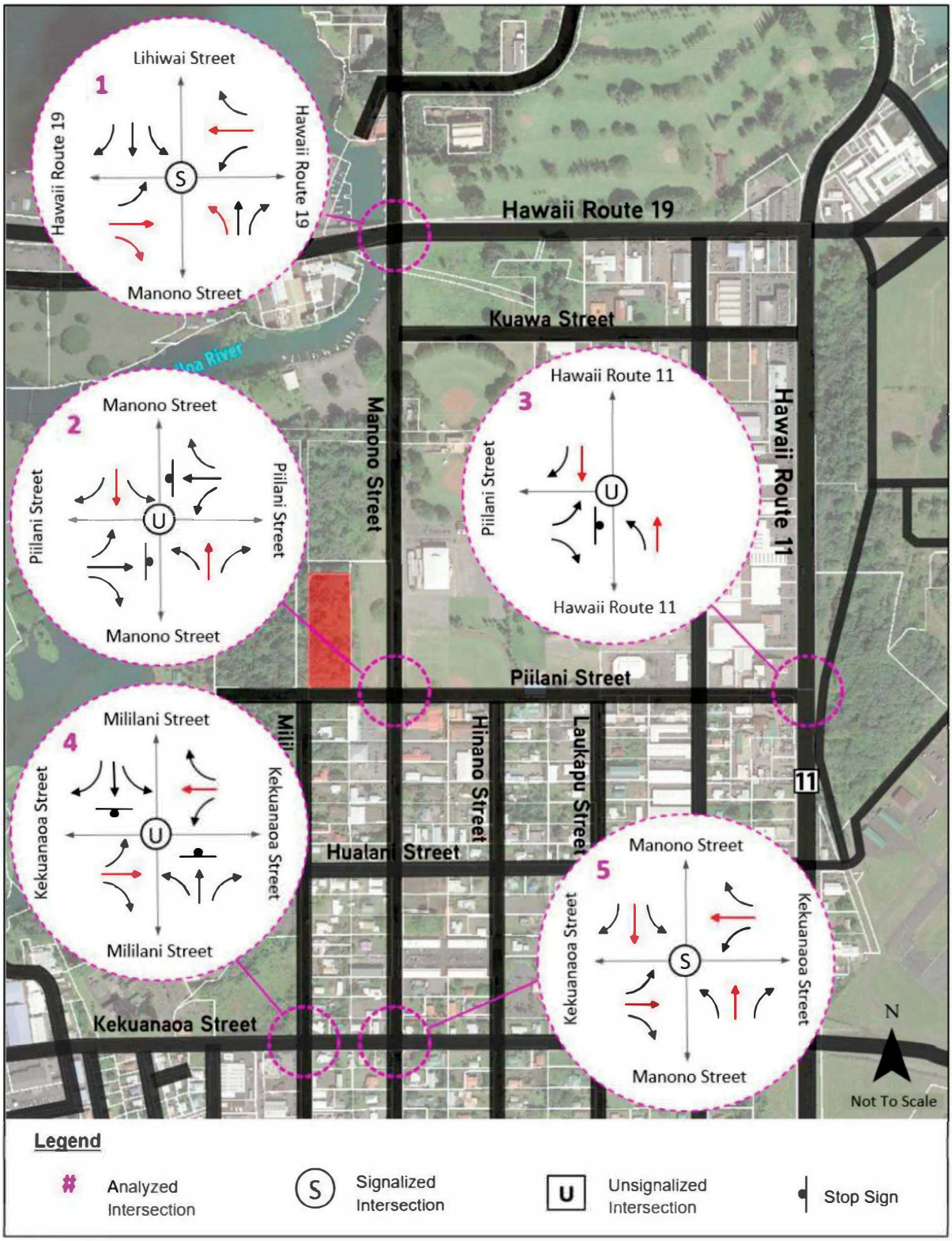


Figure 51: Study Intersection Regional Traffic Volume Movements

C. Future 2027, 2032 and 2042 Without Project Peak Hour Conditions and LOS at Each Study Intersection (**Figures 52-54 and Tables 8-10**)

1. Hawai‘i Route 19 and Manono Street/Lihiwai Street

   All movements at the signalized intersection resulted in appropriate LOS D or better and v/c <1.0 during AM and PM peak hours in 2027, 2032 and 2042.

2. Hawai‘i Route 11 and Pi‘ilani Street

   All movements at the unsignalized intersection resulted in appropriate LOS C or better and v/c <1.0 during the AM and PM peak hours in 2027 and 2032.

   In 2042, all movements resulted in LOS D and v/c <1.0 during the AM and PM peak hours.

3. Manono Street and Pi‘ilani Street

   All movements at the unsignalized intersection resulted in appropriate LOS C or better and v/c <1.0 during the AM and PM peak hours in 2027, and LOS D and v/c <1.0 during the AM and PM peak hours in 2032 and 2042.

4. Manono Street and Kekūanaō‘a Street

   All movements at the signalized intersection resulted in appropriate LOS D or better and v/c <1.0 during AM and PM peak hours in 2027 and 2032.

   In 2042, the Eastbound through-right land resulted in poor LOS E conditions during PM peak hours with a v/c ratio of 0.97. All other movements at the intersection resulted in LOS D or better and v/c <1.0 during AM and PM peak hours.

5. Mililani Street and Kekūanaō‘a Street

   All movements at the unsignalized intersection resulted in appropriate LOS C or better and v/c <1.0 during the AM and PM peak hours and LOS D or better and v/c <1.0 in 2032 and 2042.

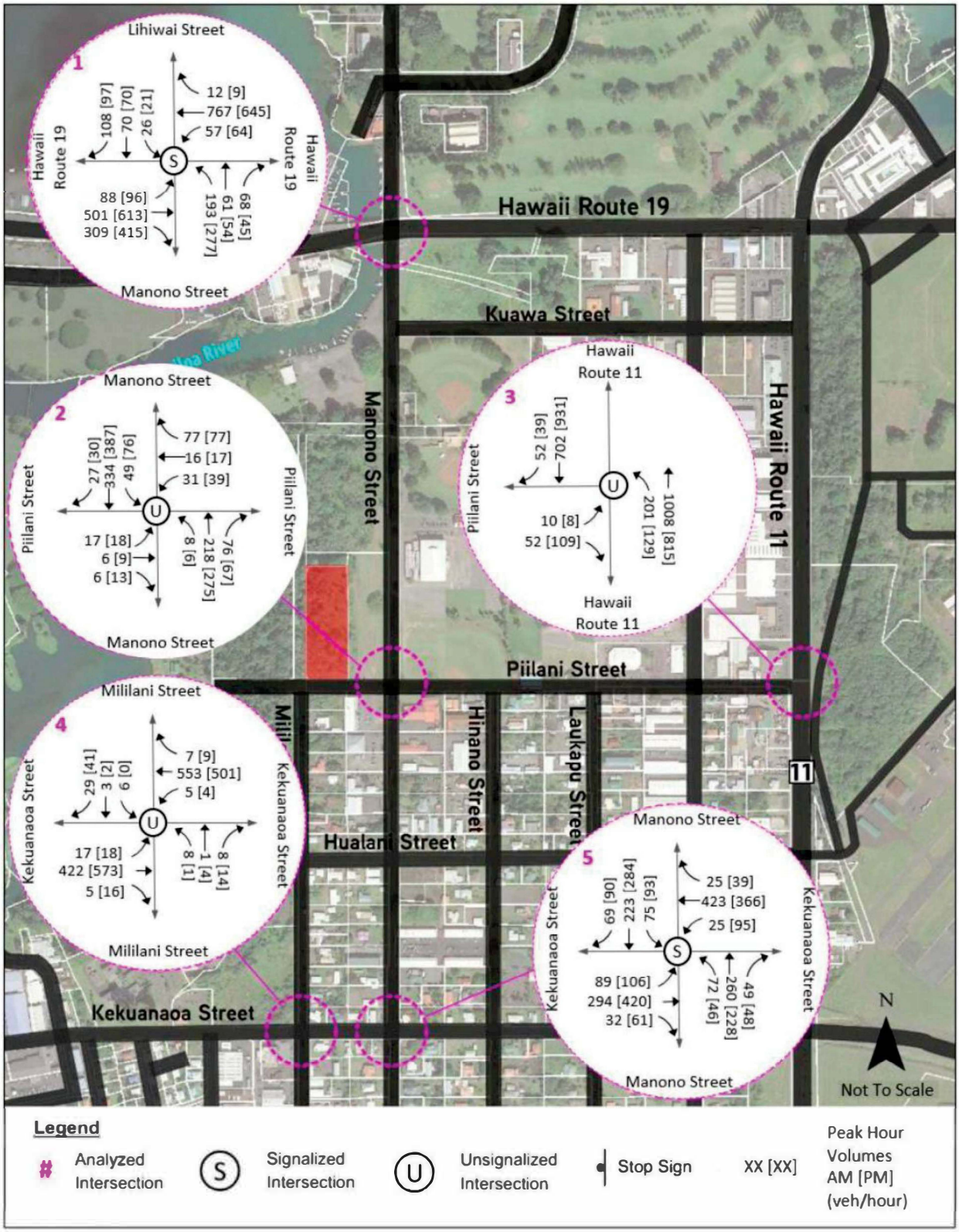


Figure 52: 2027 Future Without Project Peak Hour Volumes

Table 8: 2027 Future LOS Conditions Without Project

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Hawaii Route 19 & Manono Street/Lihiwai Street	20.2	-	C	24.0	-	C
Hawaii Route 19 EB Left	13.2	0.28	B	15.5	0.29	B
Hawaii Route 19 EB Through	15.8	0.38	B	20.2	0.47	C
Hawaii Route 19 EB Right	19.1	0.52	B	29.0	0.72	C
Hawaii Route 19 WB Left	12.1	0.17	B	15.2	0.23	B
Hawaii Route 19 WB Through	18.7	0.56	B	21.1	0.51	C
Hawaii Route 19 WB Right	13.2	0.02	B	16.0	0.02	B
Manono Street NB Left	26.6	0.62	C	27.8	0.73	C
Manono Street NB Through-Right	25.4	0.36	C	22.2	0.22	C
Lihiwai Street SB Left	26.8	0.08	C	27.9	0.08	C
Lihiwai Street SB Through-Right	36.0	0.74	D	37.8	0.77	D
Hawaii Route 11 & Piilani Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Hawaii Route 11 NB Left	20.8	0.52	C	21.7	0.40	C
Hawaii Route 11 NB Through	-	-	-	-	-	-
Hawaii Route 11 SB Through-Right	-	-	-	-	-	-
Piilani Street EB Left-Right	21.7	0.25	C	22.6	0.42	C
Manono Street & Piilani Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Manono Street NB Left-Through-Right	8.1	0.01	A	8.2	0.01	A
Manono Street SB Left-Through-Right	8.1	0.05	A	8.2	0.07	A
Piilani Street EB Left-Through-Right	22.8	0.16	C	24.0	0.22	C
Piilani Street WB Left-Through-Right	18.1	0.37	C	22.3	0.43	C
Manono Street & Kekuanaoa Street	31.1	-	C	31.3	-	C
Manono Street NB Left	21.3	0.25	C	19.8	0.15	B
Manono Street NB Through-Right	31.8	0.65	C	26.9	0.50	C
Manono Street SB Left	22.1	0.28	C	20.1	0.25	C
Manono Street SB Through-Right	29.6	0.58	C	30.8	0.65	C
Kekuanaoa Street EB Left	25.1	0.39	C	23.1	0.36	C
Kekuanaoa Street EB Through-Right	28.0	0.58	C	40.1	0.83	D
Kekuanaoa Street WB Left	18.1	0.08	B	25.8	0.40	C
Kekuanaoa Street WB Through-Right	38.7	0.83	D	31.9	0.68	C
Mililani Street & Kekuanaoa Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Mililani Street NB Left-Through-Right	24.0	0.15	C	16.9	0.08	C
Mililani Street SB Left-Through-Right	18.3	0.16	C	13.1	0.12	B
Kekuanaoa Street EB Left-Through-Right	8.9	0.02	A	8.5	0.02	A
Kekuanaoa Street WB Left-Through-Right	8.3	0.01	A	8.7	0.00	A

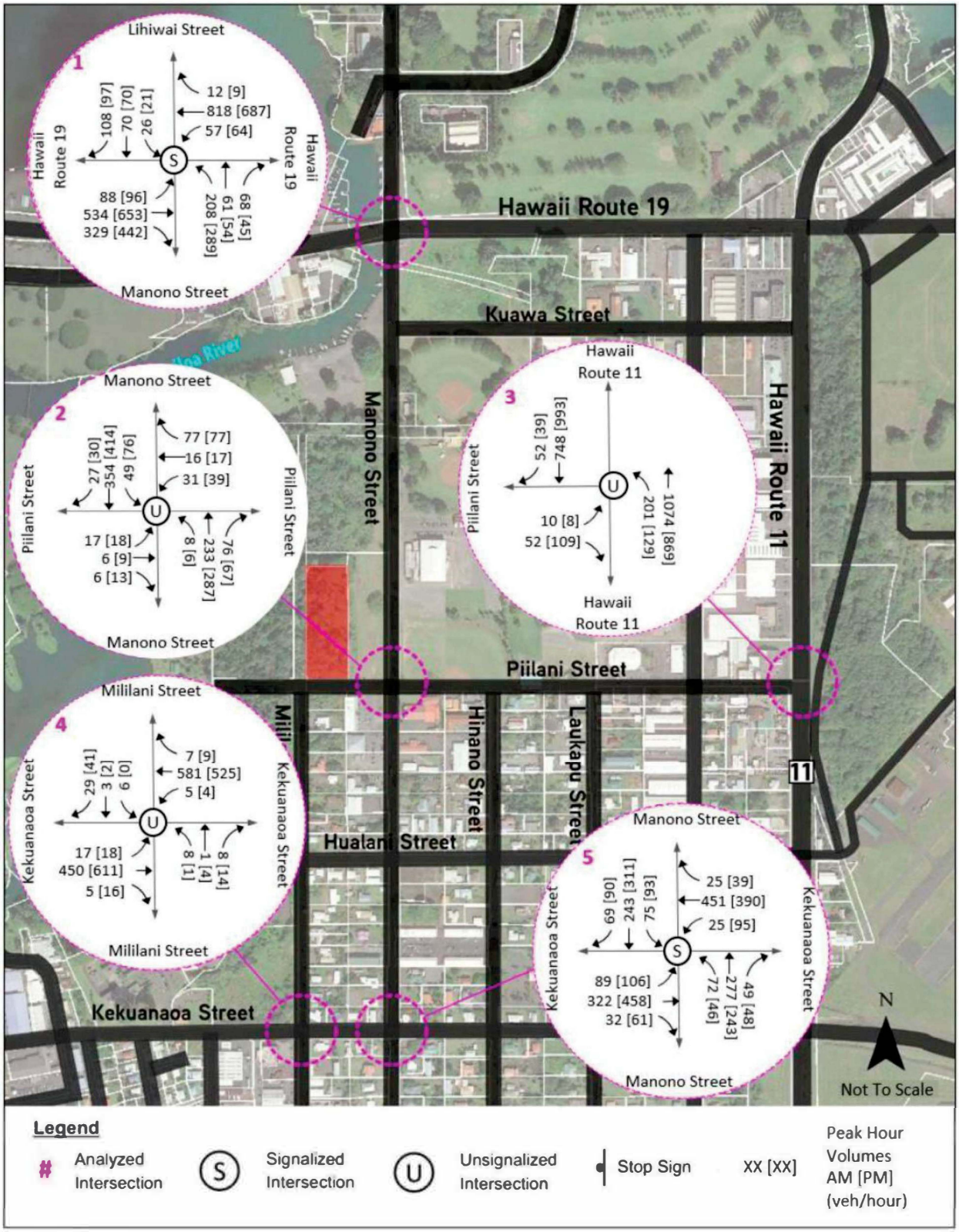


Figure 53: 2032 Future Without Project Peak Hour Volumes

Table 9: 2032 Future LOS Conditions Without Project

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Hawaii Route 19 & Manono Street/Lihiwai Street	20.6	-	C	25.2	-	C
Hawaii Route 19 EB Left	13.6	0.30	B	16.2	0.30	B
Hawaii Route 19 EB Through	16.1	0.40	B	21.1	0.51	C
Hawaii Route 19 EB Right	19.9	0.55	B	32.4	0.78	C
Hawaii Route 19 WB Left	12.2	0.18	B	15.9	0.24	B
Hawaii Route 19 WB Through	19.3	0.60	B	22.1	0.55	C
Hawaii Route 19 WB Right	13.2	0.02	B	16.4	0.02	B
Manono Street NB Left	28.3	0.67	C	27.6	0.74	C
Manono Street NB Through-Right	25.4	0.36	C	21.9	0.22	C
Lihiwai Street SB Left	26.8	0.08	C	28.3	0.08	C
Lihiwai Street SB Through-Right	36.0	0.74	D	38.3	0.77	D
Hawaii Route 11 & Piilani Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Hawaii Route 11 NB Left	22.6	0.55	C	24.0	0.43	C
Hawaii Route 11 NB Through	-	-	-	-	-	-
Hawaii Route 11 SB Through-Right	-	-	-	-	-	-
Piilani Street EB Left-Right	23.8	0.27	C	24.9	0.45	C
Manono Street & Piilani Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Manono Street NB Left-Through-Right	8.2	0.01	A	8.3	0.01	A
Manono Street SB Left-Through-Right	8.2	0.05	A	8.2	0.07	A
Piilani Street EB Left-Through-Right	24.3	0.18	C	25.6	0.23	D
Piilani Street WB Left-Through-Right	19.1	0.38	C	24.0	0.46	C
Manono Street & Kekuanaoa Street	33.2	-	C	33.0	-	C
Manono Street NB Left	21.7	0.27	C	21.1	0.17	C
Manono Street NB Through-Right	33.1	0.69	C	28.6	0.54	C
Manono Street SB Left	22.6	0.29	C	21.2	0.26	C
Manono Street SB Through-Right	30.7	0.62	C	34.2	0.72	C
Kekuanaoa Street EB Left	26.9	0.43	C	22.8	0.36	C
Kekuanaoa Street EB Through-Right	29.3	0.63	C	42.2	0.86	D
Kekuanaoa Street WB Left	18.5	0.09	B	26.5	0.42	C
Kekuanaoa Street WB Through-Right	43.1	0.87	D	31.7	0.70	C
Mililani Street & Kekuanaoa Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Mililani Street NB Left-Through-Right	26.0	0.16	D	17.9	0.09	C
Mililani Street SB Left-Through-Right	19.4	0.17	C	13.5	0.12	B
Kekuanaoa Street EB Left-Through-Right	9.0	0.02	A	8.6	0.02	A
Kekuanaoa Street WB Left-Through-Right	8.4	0.01	A	8.8	0.00	A

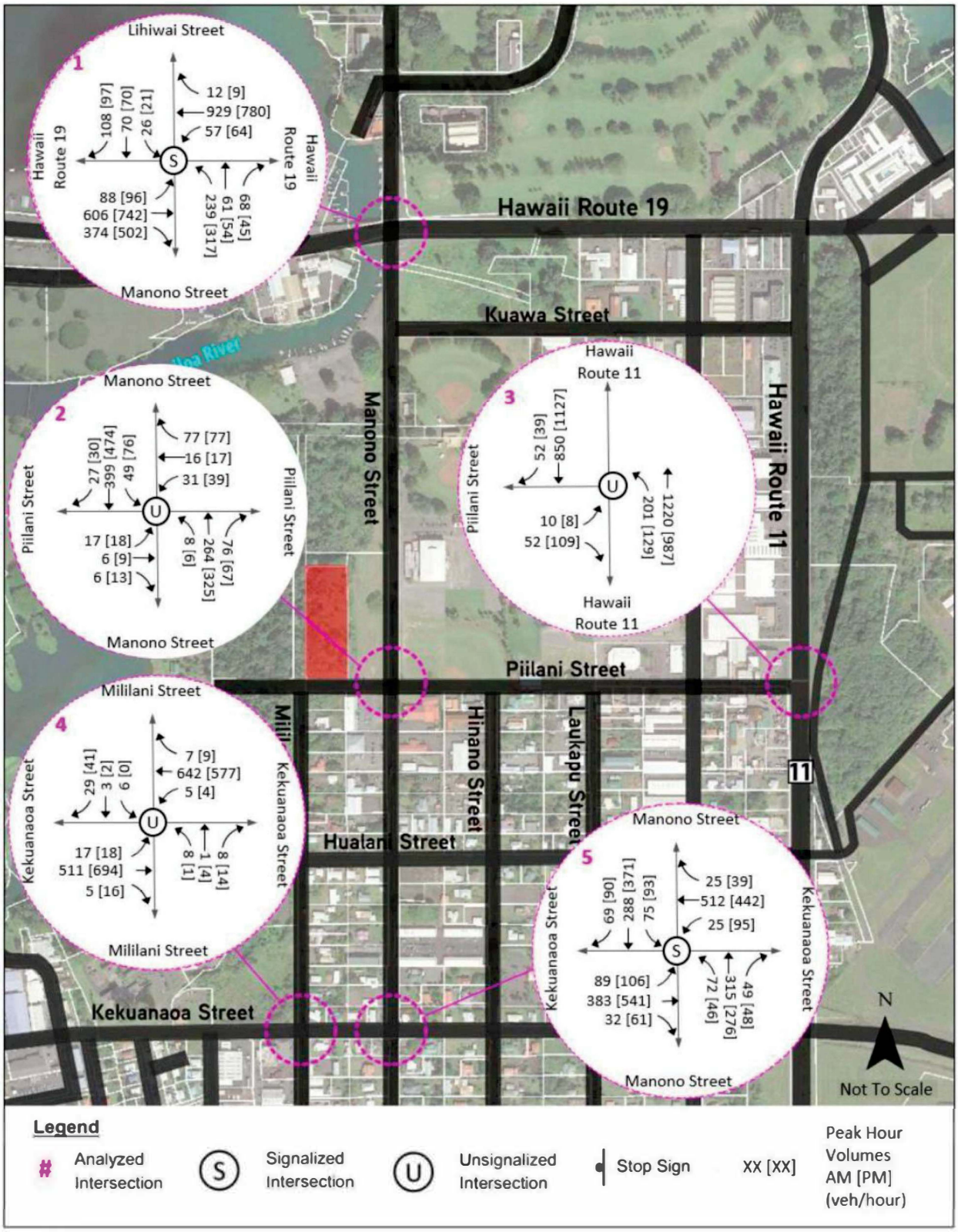


Figure 54: 2042 Future Without Project Peak Hour Volumes

Table 10: 2042 Future LOS Conditions Without Project

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Hawaii Route 19 & Manono Street/Lihiwai Street	23.3	-	C	28.7	-	C
Hawaii Route 19 EB Left	16.2	0.36	B	17.7	0.35	B
Hawaii Route 19 EB Through	18.6	0.47	B	23.2	0.58	C
Hawaii Route 19 EB Right	24.3	0.65	C	43.5	0.89	D
Hawaii Route 19 WB Left	13.9	0.20	B	17.2	0.28	B
Hawaii Route 19 WB Through	23.2	0.71	C	24.5	0.63	C
Hawaii Route 19 WB Right	14.6	0.02	B	17.2	0.02	B
Manono Street NB Left	27.7	0.68	C	29.6	0.78	C
Manono Street NB Through-Right	24.4	0.32	C	21.9	0.21	C
Lihiwai Street SB Left	28.1	0.09	C	29.5	0.08	C
Lihiwai Street SB Through-Right	37.8	0.75	D	40.1	0.78	D
Hawaii Route 11 & Piilani Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Hawaii Route 11 NB Left	28.3	0.63	D	30.8	0.51	D
Hawaii Route 11 NB Through	-	-	-	-	-	-
Hawaii Route 11 SB Through-Right	-	-	-	-	-	-
Piilani Street EB Left-Right	30.7	0.34	D	32.7	0.54	D
Manono Street & Piilani Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Manono Street NB Left-Through-Right	8.4	0.01	A	8.5	0.01	A
Manono Street SB Left-Through-Right	8.3	0.05	A	8.4	0.07	A
Piilani Street EB Left-Through-Right	28.1	0.20	D	30.9	0.27	D
Piilani Street WB Left-Through-Right	21.9	0.43	C	29.7	0.53	D
Manono Street & Kekuanaoa Street	39.3	-	D	40.4	-	D
Manono Street NB Left	23.9	0.31	C	23.4	0.21	C
Manono Street NB Through-Right	39.1	0.79	D	31.5	0.62	C
Manono Street SB Left	25.1	0.34	C	22.7	0.30	C
Manono Street SB Through-Right	35.7	0.73	D	43.6	0.85	D
Kekuanaoa Street EB Left	30.7	0.50	C	23.6	0.39	C
Kekuanaoa Street EB Through-Right	31.3	0.71	C	56.7	0.97	E
Kekuanaoa Street WB Left	18.7	0.10	B	31.6	0.52	C
Kekuanaoa Street WB Through-Right	53.9	0.96	D	33.6	0.76	C
Mililani Street & Kekuanaoa Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Mililani Street NB Left-Through-Right	32.2	0.20	D	20.4	0.11	C
Mililani Street SB Left-Through-Right	22.5	0.20	C	14.5	0.14	B
Kekuanaoa Street EB Left-Through-Right	9.3	0.02	A	8.7	0.02	A
Kekuanaoa Street WB Left-Through-Right	8.6	0.01	A	9.1	0.01	A

Future With Project Conditions

A. Project Related Volumes

The number of trips generated for the proposed project was determined using trip generation, trip distribution, modal choice, and route assignment.

B. Trip Generation and Distribution

Trip generation was calculated using rates from *Trip Generation, 11th Edition* (International Transportation of Engineers, 2021) appropriate for manufacturing and fast-food restaurants with a drive through window. **Table 11** outlines the projected trips generated from the proposed project.

Table 11: Project Related Development Phasing and Trips Generated

Phase (Analysis Year)	Agency or Building Description	Land Use Code	Units	Independent Variable	AM Peak Hour			PM Peak Hour		
					In	Out	Total	In	Out	Total
2024	Manufacturing	140	30	1000 Sq. Ft. GFA	21	7	28	3	6	9
2024	Fast-Food Restaurant with Drive-Through Window	934	1.8	1000 Sq. Ft. GFA	*41*	*39*	*80*	*30*	*29*	*59*
Trip Reduction (Fast-Food Restaurant with Drive-Through Window)					-	-	-	-16	-16	-32
Totals					***62***	***46***	***108***	***17***	***19***	***36***

Total vehicular trips expected to be generated during AM and PM peak hours are 108 and 36, respectively. Additionally, the project related trips were distributed along the four (4) primary roadways in the surrounding area, including Hawai'i Route 19 and 11, Kekūanaō'a Street, and Manono Street. This distribution was based on data from the 2018 Highway Performance Monitoring System (HPMS) for Hawai'i Roads (**Table 12**). This data was chosen to reflect pre-Covid traffic patterns.

Table 12: 2018 HPMS Surrounding Roadway Volumes

HPMS 2018 GIS		
Hawaii Route 19 (at Manono)	16,800	**25%**
Hawaii Route 11 (at Piilani)	24,900	**38%**
Kekuanaoa Street (at Mililani and Kekuanaoa)	13,700	**21%**
Manono Street (at Kekuanaoa)	10,300	**16%**
Total	65,700	**100%**
*Source: 2018 Highway Performance Monitoring System Roads for Hawaii GIS Database		

C. Future 2027, 2032 and 2042 With Project Peak Hour Conditions and LOS at Each Study Intersection (**Figures 55-57 and Tables 13-15**)

1. Hawai‘i Route 19 and Manono Street/Lihiwai Street

   All movements at the unsignalized intersection resulted in appropriate LOS D or better and v/c <1.0 during the AM and PM peak hours in 2027, 2032 and 2042.

2. Hawai‘i Route 11 and Pi‘ilani Street

   All movements at the unsignalized intersection resulted in appropriate LOS D or better and v/c <1.0 during the AM and PM peak hours in 2027 and 2032.

   In 2042, the Eastbound left-right lane will operate poorly at LOS E during the AM peak hour (v/c ratio of 0.51). All other movements at this intersection resulted in appropriate LOS D or better and v/c <1.0 during the AM and PM peak hours in 2042.

3. Manono Street and Pi‘ilani Street

   All movements at the unsignalized intersection resulted in appropriate LOS D or better and v/c <1.0 during the AM and PM peak hours in 2027.

   In 2032, the Eastbound left-through-right lane will operate poorly at LOS E during the AM peak hour (v/c ratio of 0.46). All other movements at this intersection resulted in appropriate LOS D or better and v/c <1.0 during the AM and PM peak hours in 2042.

4. Manono Street and Kekūanaō‘a Street

   All movements at the unsignalized intersection resulted in appropriate LOS D or better and v/c <1.0 during the AM and PM peak hours in 2027 and 2032.

   In 2042, the Southbound left-through-right lane will operate poorly at LOS E during the AM and PM peak hours (v/c ratio of 0.89 and 0.94, respectively). All other movements at this intersection resulted in appropriate LOS C or better and v/c <1.0 during the AM and PM peak hours in 2042.

5. Mililani Street and Kekūanaō‘a Street

   All movements at the unsignalized intersection resulted in appropriate LOS D or better and v/c <1.0 during the AM and PM peak hours in 2027, 2032, and 2042.

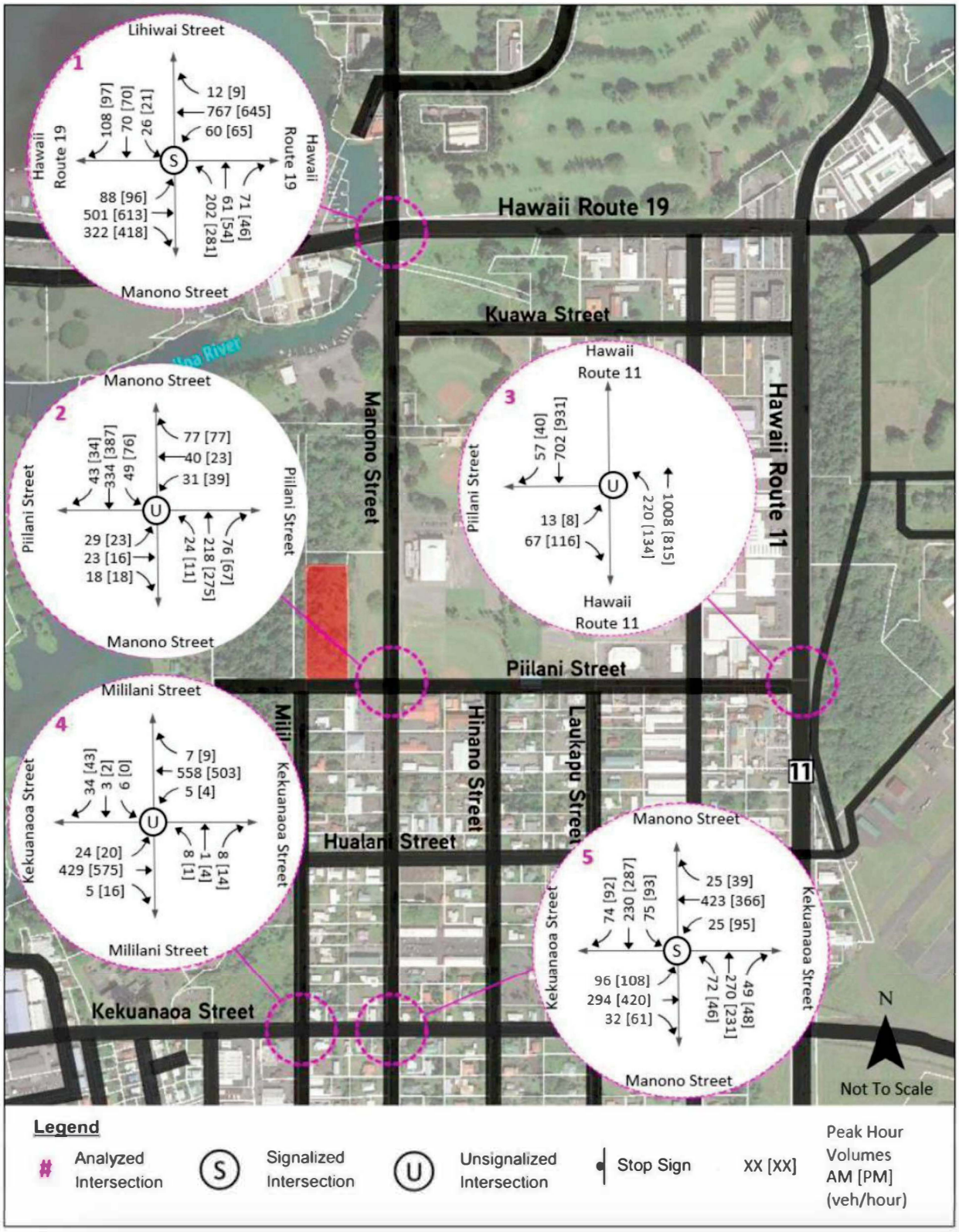


Figure 55: 2027 Future with Project Peak Hour Volumes

Table 13: 2027 Future LOS Conditions With Project

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Hawaii Route 19 & Manono Street/Lihiwai Street	20.4	-	C	24.3	-	C
Hawaii Route 19 EB Left	13.2	0.28	B	15.7	0.29	B
Hawaii Route 19 EB Through	15.9	0.38	B	20.5	0.47	C
Hawaii Route 19 EB Right	19.7	0.54	B	29.8	0.74	C
Hawaii Route 19 WB Left	12.1	0.18	B	15.5	0.23	B
Hawaii Route 19 WB Through	18.7	0.56	B	21.4	0.51	C
Hawaii Route 19 WB Right	13.2	0.02	B	16.2	0.02	B
Manono Street NB Left	27.6	0.65	C	27.1	0.73	C
Manono Street NB Through-Right	25.5	0.37	C	22.1	0.22	C
Lihiwai Street SB Left	26.8	0.08	C	28.1	0.08	C
Lihiwai Street SB Through-Right	36.0	0.74	D	38.1	0.77	D
Hawaii Route 11 & Piilani Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Hawaii Route 11 NB Left	22.6	0.57	C	22.2	0.41	C
Hawaii Route 11 NB Through	-	-	-	-	-	-
Hawaii Route 11 SB Through-Right	-	-	-	-	-	-
Piilani Street EB Left-Right	25.3	0.34	D	23.4	0.44	C
Manono Street & Piilani Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Manono Street NB Left-Through-Right	8.3	0.03	A	8.3	0.01	A
Manono Street SB Left-Through-Right	8.1	0.05	A	8.2	0.07	A
Piilani Street EB Left-Through-Right	32.6	0.42	D	27.6	0.32	D
Piilani Street WB Left-Through-Right	26.5	0.53	D	25.5	0.49	D
Manono Street & Kekuanaoa Street	32.0	-	C	31.4	-	C
Manono Street NB Left	20.7	0.25	C	19.9	0.15	B
Manono Street NB Through-Right	30.9	0.65	C	27.0	0.50	C
Manono Street SB Left	21.5	0.27	C	20.1	0.25	C
Manono Street SB Through-Right	29.0	0.58	C	31.1	0.66	C
Kekuanaoa Street EB Left	27.5	0.44	C	23.2	0.37	C
Kekuanaoa Street EB Through-Right	29.3	0.60	C	40.1	0.83	D
Kekuanaoa Street WB Left	18.8	0.08	B	25.8	0.40	C
Kekuanaoa Street WB Through-Right	42.0	0.85	D	31.9	0.68	C
Mililani Street & Kekuanaoa Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Mililani Street NB Left-Through-Right	25.4	0.15	D	17.0	0.09	C
Mililani Street SB Left-Through-Right	18.5	0.18	C	13.2	0.13	B
Kekuanaoa Street EB Left-Through-Right	9.0	0.03	A	8.5	0.02	A
Kekuanaoa Street WB Left-Through-Right	8.4	0.01	A	8.7	0.00	A

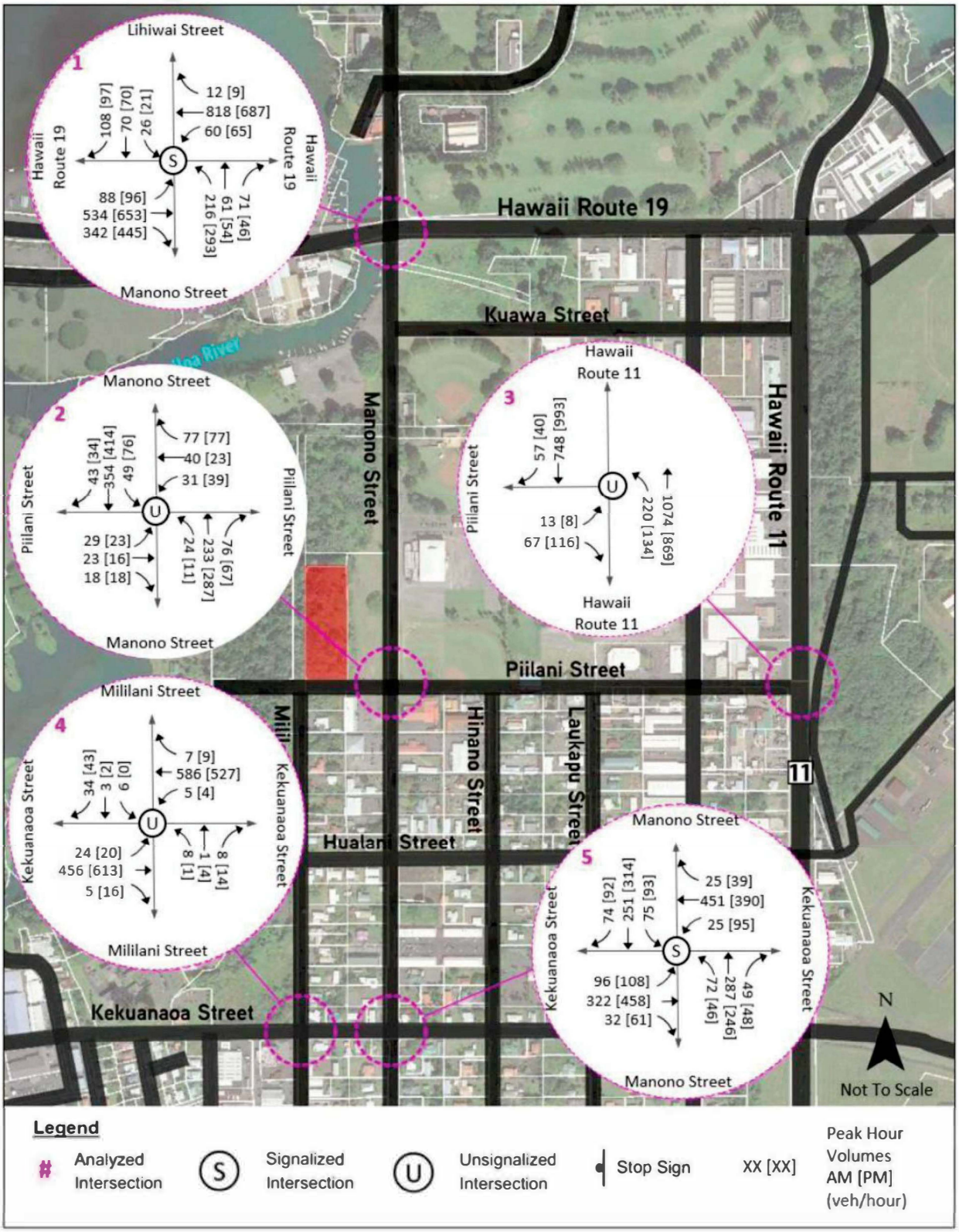


Figure 56: 2032 Future With Project Peak Hour Volumes

Table 14: 2032 Future LOS Conditions With Project

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Hawaii Route 19 & Manono Street/Lihiwai Street	21.3	-	C	25.4	-	C
Hawaii Route 19 EB Left	14.1	0.31	B	16.4	0.31	B
Hawaii Route 19 EB Through	16.8	0.41	B	21.4	0.51	C
Hawaii Route 19 EB Right	21.2	0.58	C	33.3	0.79	C
Hawaii Route 19 WB Left	12.7	0.19	B	16.0	0.25	B
Hawaii Route 19 WB Through	20.0	0.61	B	22.3	0.55	C
Hawaii Route 19 WB Right	13.7	0.02	B	16.6	0.02	B
Manono Street NB Left	27.8	0.66	C	27.5	0.75	C
Manono Street NB Through-Right	25.1	0.35	C	21.9	0.22	C
Lihiwai Street SB Left	27.3	0.08	C	28.4	0.08	C
Lihiwai Street SB Through-Right	36.6	0.75	D	38.6	0.77	D
Hawaii Route 11 & Piilani Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Hawaii Route 11 NB Left	25.0	0.61	D	24.6	0.45	C
Hawaii Route 11 NB Through	-	-	-	-	-	-
Hawaii Route 11 SB Through-Right	-	-	-	-	-	-
Piilani Street EB Left-Right	30.2	0.40	D	25.9	0.48	D
Manono Street & Piilani Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Manono Street NB Left-Through-Right	8.3	0.03	A	8.3	0.01	A
Manono Street SB Left-Through-Right	8.2	0.05	A	8.2	0.07	A
Piilani Street EB Left-Through-Right	36.3	0.46	E	29.8	0.34	D
Piilani Street WB Left-Through-Right	29.3	0.57	D	27.7	0.51	D
Manono Street & Kekuanaoa Street	33.7	-	C	33.2	-	C
Manono Street NB Left	22.1	0.27	C	21.2	0.17	C
Manono Street NB Through-Right	33.9	0.71	C	28.7	0.55	C
Manono Street SB Left	23.0	0.30	C	21.2	0.27	C
Manono Street SB Through-Right	31.6	0.65	C	34.7	0.73	C
Kekuanaoa Street EB Left	28.0	0.46	C	22.9	0.37	C
Kekuanaoa Street EB Through-Right	29.3	0.63	C	42.4	0.87	D
Kekuanaoa Street WB Left	18.5	0.09	B	26.5	0.42	C
Kekuanaoa Street WB Through-Right	43.4	0.88	D	31.8	0.70	C
Mililani Street & Kekuanaoa Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Mililani Street NB Left-Through-Right	27.9	0.17	D	18.0	0.09	C
Mililani Street SB Left-Through-Right	19.7	0.19	C	13.6	0.13	B
Kekuanaoa Street EB Left-Through-Right	9.1	0.03	A	8.6	0.02	A
Kekuanaoa Street WB Left-Through-Right	8.5	0.01	A	8.9	0.00	A

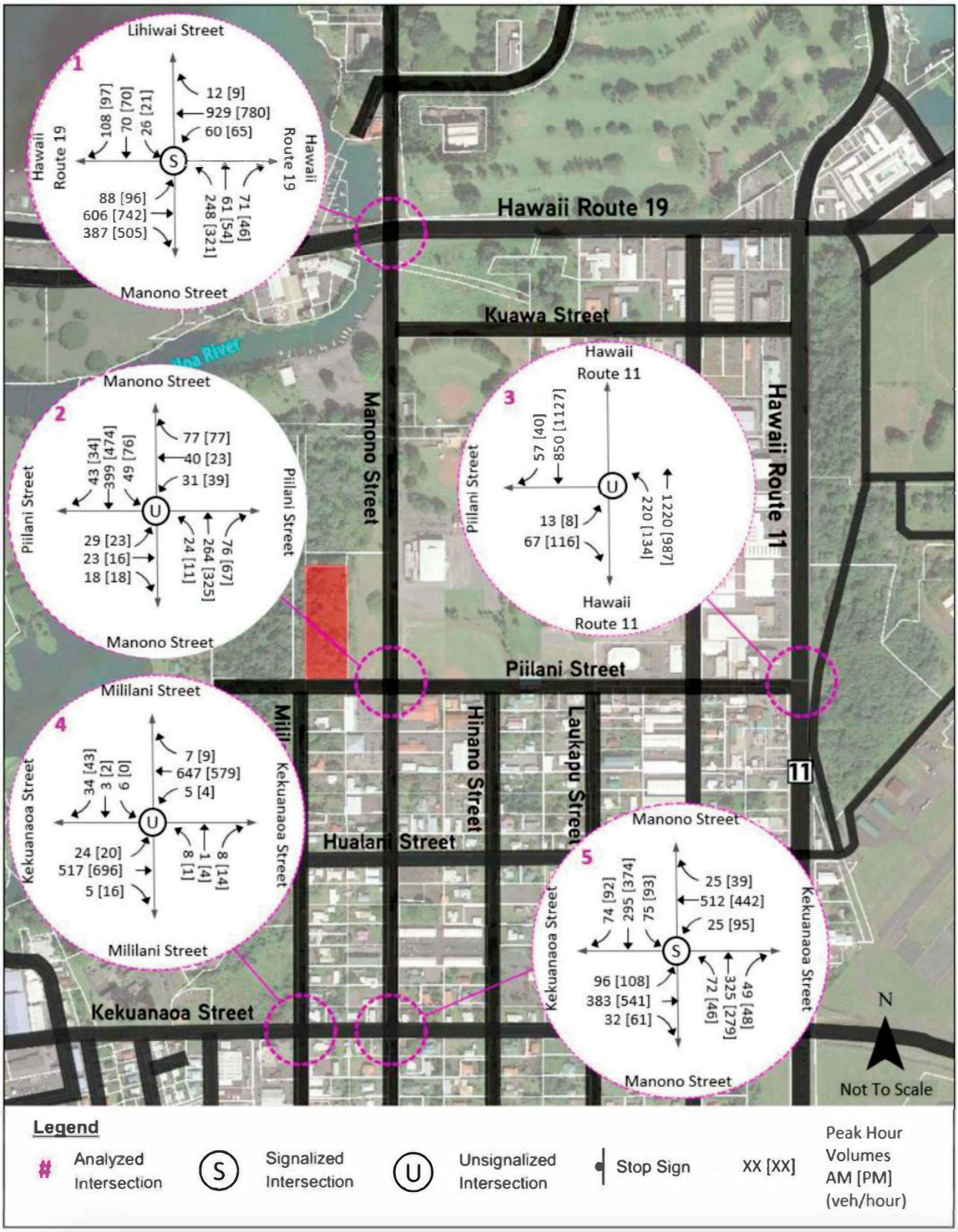


Figure 57: 2042 Future With Project Peak Hour Volumes

Table 15: 2042 Future LOS Conditions With Project

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Hawaii Route 19 & Manono Street/Lihiwai Street	23.6	-	C	29.1	-	C
Hawaii Route 19 EB Left	16.3	0.36	B	17.9	0.35	B
Hawaii Route 19 EB Through	18.7	0.48	B	23.5	0.58	C
Hawaii Route 19 EB Right	25.3	0.68	C	45.1	0.90	D
Hawaii Route 19 WB Left	14.0	0.21	B	17.4	0.28	B
Hawaii Route 19 WB Through	23.3	0.71	C	24.7	0.63	C
Hawaii Route 19 WB Right	14.7	0.02	B	17.4	0.02	B
Manono Street NB Left	28.7	0.70	C	29.4	0.78	C
Manono Street NB Through-Right	24.4	0.33	C	21.9	0.21	C
Lihiwai Street SB Left	28.1	0.09	C	29.7	0.08	C
Lihiwai Street SB Through-Right	37.8	0.75	D	40.3	0.78	D
Hawaii Route 11 & Piilani Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Hawaii Route 11 NB Left	32.3	0.69	D	31.7	0.53	D
Hawaii Route 11 NB Through	-	-	-	-		
Hawaii Route 11 SB Through-Right	-	-	-	-	-	-
Piilani Street EB Left-Right	44.2	0.51	E	34.7	0.57	D
Manono Street & Piilani Street	Unsignalized (AWSC)			Unsignalized (AWSC)		
Manono Street NB Left-Through-Right	20.8	0.69	C	19.5	0.67	C
Manono Street SB Left-Through-Right	39.8	0.89	E	43.6	0.94	E
Piilani Street EB Left-Through-Right	12.3	0.20	B	11.4	0.15	B
Piilani Street WB Left-Through-Right	13.6	0.36	B	12.5	0.30	B
Manono Street & Kekuanaoa Street	36.6	-	D	34.4	-	C
Manono Street NB Left	24.4	0.32	C	23.6	0.21	C
Manono Street NB Through-Right	40.9	0.81	D	31.7	0.63	C
Manono Street SB Left	25.7	0.35	C	22.8	0.30	C
Manono Street SB Through-Right	37.0	0.75	D	44.8	0.86	D
Kekuanaoa Street EB Left	29.1	0.49	C	22.2	0.37	C
Kekuanaoa Street EB Through	29.1	0.65	C	40.2	0.86	D
Kekuanaoa Street EB Right	19.3	0.06	B	19.9	0.11	B
Kekuanaoa Street WB Left	18.1	0.09	B	25.9	0.42	C
Kekuanaoa Street WB Through	45.7	0.91	D	30.4	0.69	C
Kekuanaoa Street WB Right	19.2	0.05	B	19.4	0.07	B
Mililani Street & Kekuanaoa Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Mililani Street NB Left-Through-Right	34.7	0.21	D	20.6	0.11	C
Mililani Street SB Left-Through-Right	22.9	0.22	C	14.5	0.14	B
Kekuanaoa Street EB Left-Through-Right	9.4	0.03	A	8.8	0.02	A
Kekuanaoa Street WB Left-Through-Right	8.7	0.01	A	9.1	0.01	A

Impacts and Mitigating Measures

The TIAR has three (3) main recommendations to mitigate traffic in the future with the proposed project based on projected traffic increases in 2032 and 2042.

Future 2032 With Project conditions suggest that the eastbound left-through-right lane at Manono Street and Pi'ilani Street will operate at LOS E during the AM peak hour, with a v/c ratio of 0.46. A traffic signal was analyzed at this intersection but did not pass the minimum volume thresholds outlined in the Manual on Uniform Traffic Control Devices (MUTCD). Alternatively, an All-Way Stop Control would result in acceptable LOS for all intersection movements during AM and PM peak hours. It is therefore recommended that an AWSC be constructed at the intersection of Manono Street and Pi'ilani Street by 2032.

Future 2042 With Project conditions suggest that southbound left-through-right lane at Manono Street and Pi'ilani Street will operate at LOS E during the AM and PM peak hours, with a v/c ratio of 0.89 and 0.94, respectively. This projection is likely even if an AWSC is constructed in 2032. A traffic signal alternative was analyzed but did not pass the minimum MUTCD volume thresholds. Alternatively, a mini-roundabout could be considered at this intersection. A mini-round about would have similar features to a standard roundabout in terms of efficiency, safety, and traffic calming, but could be implemented at a smaller intersection such as this one. However, peak hour volumes at this intersection in Future 2042 With Project conditions fall well below the FHWA capacity to merit a mini-roundabout. It is therefore recommended that this intersection is monitored in the future to determine the appropriate mitigating measures.

Future 2042 With Project conditions suggest that the eastbound left-right at Hawai'i Route 11 and Pi'ilani Street will operate at LOS E during the AM peak hour, with a v/c ratio of 0.51. However, the TIAR notes that all mainline movements along Hawai'i Route 11 will operate at appropriate LOS. Since the eastbound volume at the intersection is low, and the eastbound-left-right is not currently approaching capacity, no mitigation is recommended at this time.

3.3.2 Public Utilities and Services

Environmental Setting: Water

County water is available to the site via an existing six (6) inch waterline within Pi'ilani Street fronting the subject Property. The parcel is served by an existing 5/8-inch meter, which allows a maximum daily usage of 600 gallons. According to the Department of Water Supply (DWS), the existing six (6) inch waterline fronting Pi'ilani Street, and the existing eight (8) inch waterline within Manono Street are both inadequate to provide the required 2,000 gallons per minute flow for fire protection, as per DWS standards. Estimated maximum daily water usage calculations, prepared by a professional engineer, licensed in the State of Hawai'i, will be submitted to DWS for review and approval. These calculations will include estimated peak flow in gallons per minute and the total estimated maximum daily water usage in gallons per day, including

irrigation use. Based on the water demand calculations, the Department will determine the appropriate service lateral and meter size required to satisfy all water needs including fire suppression requirements.

The proposed zoning will require the installation of a reduced pressure type backflow prevention assembly, by a licensed contractor, within five (5) feet of the meter on the Property. If a larger or additional meter is required, a backflow prevention assembly will be installed for that meter. The installation of the backflow prevention assembly will be inspected and approved by DWS before commencement of water service. In the event other agencies require construction improvements within the road right-of-way fronting the Property, Hawaiian Kingdom Brands will be responsible for the relocation and adjustment of affected DWS water system facilities, should they be necessary.

Impacts and Mitigating Measures

Water efficient fixtures and practices will be installed and implemented throughout all proposed buildings and activities to reduce the demand on water resources. These include low flow systems and timed shut off for appropriate devices in all bathrooms which will also reduce wastewater.

The Commission on Water Resource Management also recommends implementing appropriate landscaping irrigation conservation Best Management Practices endorsed by the Landscape Industry Council of Hawai‘i. These include installation and maintenance BMPs.

Installation Best Management Practices:

1. Irrigation system plans and specifications should include post-construction documentation, including drawing of record (as-built drawings), maintenance recommendations, design precipitation rates and manufacturer's operational guide.
2. Design irrigation system with sprinklers spaced with head-to-head coverage or better.
3. Irrigate with a precipitation rate not exceeding soil infiltration rate.
4. Design systems to irrigate similar hydrozones such as slope, sun exposure, soil conditions, and plant materials with similar water use.
5. Use smart controllers.
6. Encourage the use of drip irrigation for individual specimen plants, shrubs, and trees during establishment period.
7. Use flow sensors with smart controllers to detect leaks or drastic changes in water use.
8. Use an irrigation submeter that measures water use on large sites.
9. Use water conservation irrigation components, such as rotary nozzles, pressure regulated spray heads and valves, rain switches, and high efficiency nozzles.
10. Sprinklers in low-lying areas and slopes should be equipped with check valves.

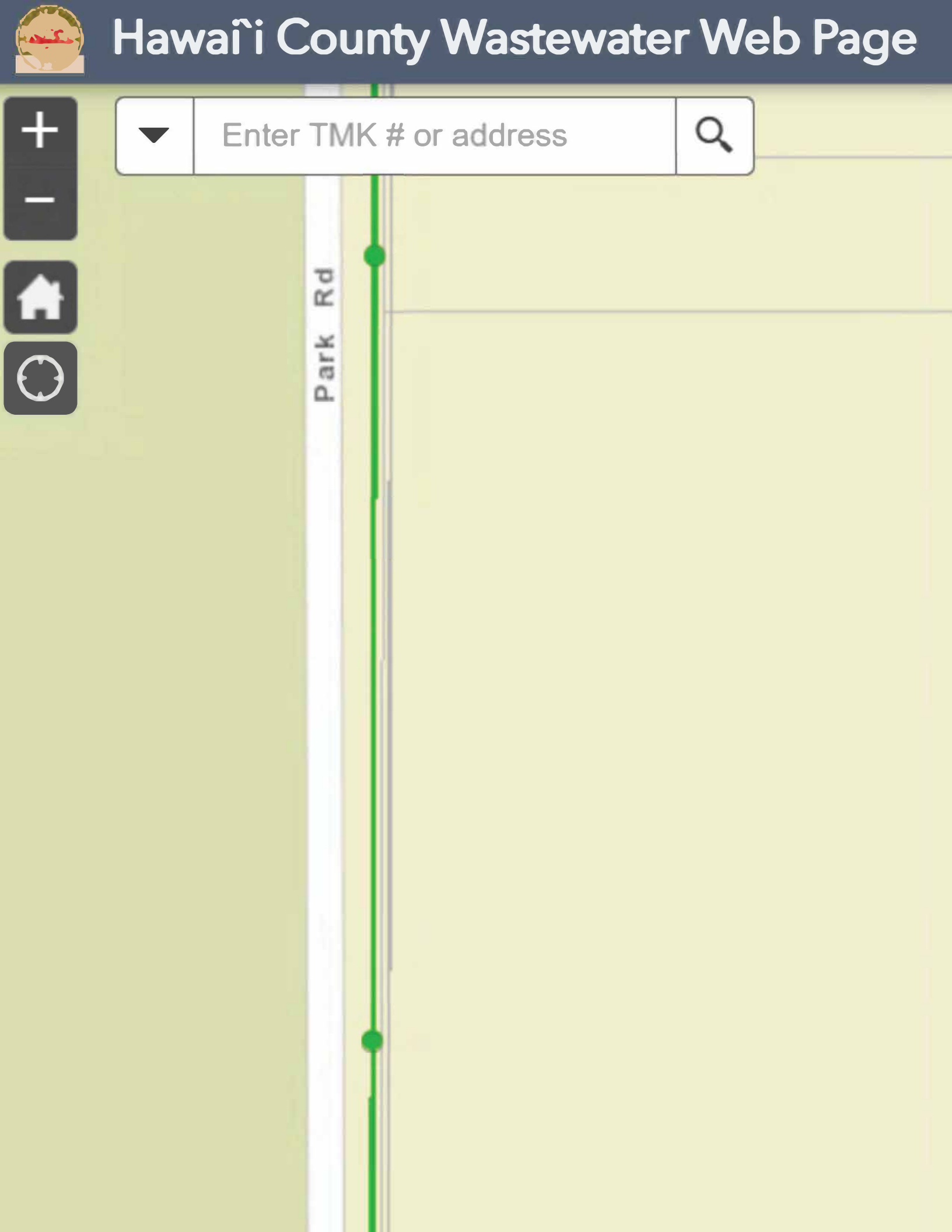
11. Incorporate Low Impact Development (LID) storm water design methods, including rain gardens, infiltration beds, rain barrels, swales, and basins, that allow water to collect and soak into the ground on site.
12. Preserve existing native trees and non-invasive vegetation where feasible during development and do not install irrigation in these areas.
13. Incorporate compost into soils at planting.
14. Encourage xeriscaping practices to include native and non-invasive ornamental plants.
15. Encourage the use of non-potable water for irrigation.
16. Use a qualified irrigation designer, irrigation supplier, landscape architect and installation contractor.

Maintenance Best Management Practices:

1. If not using a climate-based controller, manually manage controller run times and days to water according to soil conditions and seasonal weather conditions.
2. Program irrigation controller to encourage deep watering by using longer, less frequent watering times to improve deep rooting and increase drought resistance.
3. To reduce the amount of water evaporating from the soil surface, schedule night or early morning (5 p.m. to 9 a.m.) start times for established plantings. In areas where ponding, compaction, or runoff occurs, set 2-3 short run time cycles.
4. Mulch with wood chips around base of trees and shrub beds and refresh as necessary to maintain a minimum of two inches.
5. Allow grass to grow taller in summer months to conserve water and encourage deep rooting.
6. Aerate lawns when compaction occurs.
7. At a minimum, conduct a monthly inspection to verify system operation and correct deficiencies.
8. Conduct a practical water audit once every 2 to 5 years by a qualified irrigation professional.
9. Attend water conservation seminars and webinars including Board of Warer Supply, Landscape Architects, University of Hawai‘i, EPA Water Sense, and the Irrigation Association.
10. Use a licensed maintenance contractor with water conservation expertise.

Environmental Setting: Wastewater

The proposed project would require the extension of the County sewer line from its terminus near the intersection of Pi‘ilani and Mililani Street. The line is proposed to be extended north from its terminus near Mililani Street and Pi‘ilani Street to mitigate impacts to Pi‘ilani Street (**Figure 58**). This extension would require a Sewer Extension Application and approval.


Hawai`i County Wastewater Web Page
Enter TMK # or address
Park Rd

The Department of Environmental Management (DEM) may require a sewer line study prior to connection to the County sewer system, which may advise sewer line or other facility improvements for mitigation of impacts of the proposed project. Hawai‘i County Code Section 21-8 prohibits the discharge of unpolluted water into County sewers.

Impacts and Mitigating Measures

The Hilo Wastewater Treatment Plant facility needs significant repairs to maintain long term functional operations. The proposed development would be a modest addition to the sewer from the proposed use. Efforts to minimize wastewater are reflected in the design of the project.

Environmental Setting: Electricity, Schools, Police, Fire, and Hospitals

Electricity will be provided by a Hawaiian Electric Light Company (HELCO) connection as well as solar panels.

The Hilo police and fire stations are just over 1.5 miles west of the subject site. The closest school is the Chiefess Kapi‘olani Elementary School located roughly 1 mile west, on the other side of the Wailoa River/Waiākea Fishpond. The Hilo hospital, known as Hilo Medical Center, is located roughly 4 miles to the northwest.

Impacts and Mitigating Measures

There are no anticipated significant impacts to any public utilities or services. No adverse effect to medical, government, social service, or recreational services would occur. The Property is in proximity to the Hilo city center and nearby public services and utilities.

3.4 Secondary and Cumulative Impacts

Secondary Impacts

1. Wastewater

   The estimated wastewater produced from all proposed actions will be moderate and are not expected to cause significant impacts to the county sewer line or the Hilo Wastewater Treatment Plant. Efforts to minimize wastewater will be enforced at all times and revisited as operations develop.

PREVIOUS ENVIRONMENTAL ASSESSMENT PAGE 120 OMITTED.

SUBJECT NOT APPLICABLE.

Cumulative Impacts

Cumulative impacts occur when the implementation of several projects, which have individually limited impacts, combine to produce more severe impacts. Draft Environmental Assessments published in the Environmental Notice between 2017 to present and Special Management Area permits were reviewed to assess potential cumulative impacts from other proposed developments in the area. One (1) planned development within 1 mile of the subject site was found to have potential cumulative impacts to the proposed action.

It is necessary to consider the potential cumulative impacts the Island Naturals retail and office complex development may have on the proposed action, particularly to traffic. However, the limited information available regarding the planned commercial complex makes it very difficult to predict or assess potential traffic impacts to the Hawaiian Kingdom Brands proposed action. SSFM states, "without a TIAR detailing more specific trip generation and distribution, future traffic volumes for this development cannot be accurately forecast and distributed as part of this report." See **Appendix D, Pages 22-23** for SSFM's full assessment.

3.5 Required Permits and Approvals

The following permits and approvals are required for the proposed construction of a storage facility in the County of Hawai'i Special Management Area:

County of Hawai'i:

- Special Management Area Use Permit
- Plan Approval
- Grading and Grubbing Permit
- Building Permits
- Time Extension for Rezone Ordinance 1992-122
- Sewer Extension Application

State of Hawai'i:

- National Pollutant Discharge Elimination System (NPDES) Permit for construction related activities
- Storm Water Pollution Prevention Plan (SWPPP) Permit
- Possible Community Noise Permit for construction related activities

3.6 Consistency with Government Plans and Policies

3.6.1 Hawai‘i County General Plan

The Hawai‘i County General Plan serves as a guiding document for decision-making and the implementation of goals for Hawai‘i Island. The plan was adopted in 1989 by ordinance and most recently revised in 2005. The General Plan uses the Land Use Pattern Allocation Guide (LUPAG) Map to designate land on Hawai‘i Island for future developments. The LUPAG is a broad, flexible design tool to guide the direction and quality of future developments in a coordinated and manner. It indicates the general location of various land uses in relation to each other. The designation for the subject Property is Industrial. Due to the importance of the General Plan in determining the suitability of land-use projects and developments, the following goals, policies, and standards that align with the proposed action are discussed below:

ECONOMIC GOALS

a. Provide residents with opportunities to improve their quality of life through economic development that enhances the County's natural and social environments.
b. Economic development and improvement shall be in balance with the physical, social, and cultural environments of the island of Hawai‘i.
d. Provide an economic environment that allows new, expanded, or improved economic opportunities that are compatible with the County's cultural, natural, and social environment.
e. Strive for an economic climate that provides its residents an opportunity for choice of occupation.
f. Strive for diversification of the economy by strengthening existing industries and attracting new endeavors.
g. Strive for full employment.
h. Promote and develop the island of Hawai‘i into a unique scientific and cultural model, where economic gains are in balance with social and physical amenities. Development should be reviewed on the basis of total impact on the residents of the County, not only in terms of immediate short run economic benefits.

ENVIRONMENTAL QUALITY GOALS

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

ENVIRONMENTAL QUALITY POLICIES

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

ENVIRONMENTAL QUALITY STANDARDS

a. Pollution shall be prevented, abated, and controlled at levels that will protect and preserve the public health and well-being, through the enforcement of appropriate Federal, State and County standards.
b. Incorporate environmental quality controls either as standards in appropriate ordinances or as conditions of approval.
c. Federal and State environmental regulations shall be adhered to.

Discussion: The proposed action will not have a significant adverse impact to environmental quality or ecological systems. Any effect that may result will be minimized to the extent practicable and is clearly outweighed by public health, safety, welfare, and other compelling public interests, such as job creation. Regulations relating to site development and operation will safeguard the public health and well-being and ensure all potential environmental impacts are mitigated to the greatest extent possible.

FLOOD CONTROL AND DRAINAGE GOALS

a. Protect human life.
b. Prevent damage to man-made improvements.
c. Control pollution.
d. Prevent damage from inundation.
e. Reduce surface water and sediment runoff.
f. Maximize soil and water conservation.

FLOOD CONTROL AND DRAINAGE POLICIES

a. Enact restrictive land use and building structure regulations in areas vulnerable to severe damage due to the impact of wave action. Only uses that cannot be located elsewhere due to public necessity and character, such as maritime activities and the necessary public facilities and utilities, shall be allowed in these areas.
d. Any development within the Federal Emergency Management Agency designated floodplain must be in compliance with Chapter 27.

g. Development-generated runoff shall be disposed of in a manner acceptable to the Department of Public Works and in compliance with all State and Federal laws.

FLOOD CONTROL AND DRAINAGE STANDARDS

a. "Storm Drainage Standards," County of Hawai'i, October 1970, and as revised.
b. Applicable standards and regulations of Chapter 27, "Flood Control," of the Hawai'i County Code.
c. Applicable standards and regulations of the Federal Emergency Management Agency (FEMA).
d. Applicable standards and regulations of Chapter 10, "Erosion and Sedimentation Control," of the Hawai'i County Code.
e. Applicable standards and regulations of the Natural Resources Conservation Service and the Soil and Water Conservation Districts.

Discussion: The Property is in Flood Zone X, or outside the 500-year floodplain and is not expected to impact or be impacted by significant flooding or coastal hazards. Anticipated sea level rise of 3.2 feet, expected to occur as soon as 2060 by some experts, will have no impact on the subject Property.

HISTORIC SITES GOALS

a. Protect, restore, and enhance the sites, buildings, and objects of significant historical and cultural importance to Hawai'i.
b. Appropriate access to significant historic sites, buildings, and objects of public interest should be made available.

HISTORIC SITES POLICIES

a. Agencies and organizations, either public or private, pursuing knowledge about historic sites should keep the public apprised of projects.
b. Amend appropriate ordinances to incorporate the stewardship and protection of historic sites, buildings, and objects.
c. Require both public and private developers of land to provide historical and archaeological surveys and cultural assessments, where appropriate, prior to the clearing or development of land when there are indications that the land under consideration has historical significance.
d. Public access to significant historic sites and objects shall be acquired, where appropriate.

Discussion: An Archeological Inventory Survey (AIS) conducted in 2018 determined the presence of one historical site on the subject Property. This site is identified as Site 50-10-35-1481.2. It is a concrete slab interpreted as a historic foundation or walkway, a remnant of

Operation activities on site are not expected to exceed 70 decibels during daytime or nighttime hours. This includes noise generated onsite from the storage facility. Onsite noise is not expected to impact nearby properties or Wailoa River State Park. If it is determined that a lower decibel maximum is appropriate for the area (for example, Commercial level standards), then further mitigating measures will be applied.

The Storm Water Pollution Prevention Plan will mitigate any potential impacts to water quality from construction activities on site.

11. *The proposed project will not have a substantial adverse effect on or be likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, sea level rise exposure area, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.*

The Property is in Lava Zone 3 and has the same volcanic/seismic activity risk as much of Hilo. All buildings, would be designed according to State and County code to withstand acceptable levels of seismic activity.

The Property is in Flood Zone X, or outside the 500-year floodplain and is not expected to impact or be impacted by significant flooding or coastal hazards. Anticipated sea level rise of 3.2 feet will have no impact on the subject Property. The proposed action would comply with all required codes and regulations regarding drainage and runoff mitigation.

There are no anticipated impacts to estuarine habitats, the local non-commercial fishery, nor intermittent anchialine pools that may support endemic species. The proposed action does not involve any activities that would alter existing stream channels, wetlands, or other surface water bodies. Contamination is not a risk for any surface or ground water resource from the proposed action.

12. *The proposed project will not have a substantial adverse effect on scenic vistas and view planes, during day or night, identified in County or State plans or studies.*

The proposed development will have limited impacts on scenic resources. The proposed construction will not impose on views to or from any listed resource in the General Plan,

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FINAL ENVIRONMENTAL ASSESSMENT

PI'ILANI SELF STORAGE WAREHOUSE

Appendix A
Environmental Site Assessment

PHASE I
ENVIRONMENTAL SITE ASSESSMENT

525 Piilani Streeet
Hilo, Hawaii 96720
Tax Map Key Parcel (3) 2-2-033:011

March 2018

Prepared by:
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P.O. Box 1018
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Prepared for: Columbus
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2571 Lemon Road
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List of Acronyms

%	percent
ASTM	American Society for Testing and Materials
AUL	activity and use limitation
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFC	chlorofluorocarbon
CFR	Code of Federal Regulations
CORRACTS	Corrective action report
DLNR	State of Hawai'i Department of Land and Natural Resources
DOH	State of Hawai'i Department of Health
DOT	Department of Transportation
EDR	Environmental Data Resources, Inc.
EPA	United States Environmental Protection Agency
ERNS	Emergency Response Notification System
ESA	Environmental Site Assessment
ft	feet
HCC	Hawaii County Code
HEER	Hazard Evaluation and Emergency Response
LEI	Lehua Environmental Inc.
LUST	leaking underground storage tank
Ma	millions of years ago
mi	miles
mg/L	milligrams per liter
msl	mean sea level
N/A	Not available
NFA	no further action
NFRAP	No Further Remedial Action Planned
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
NRCS	Natural Resource Conservation Service
PCB	polychlorinated biphenyl
RCRA	Resource Conservation and Recovery Act
REC	recognized environmental condition
SHWS	State Hazardous Waste Site
TMK	tax map key
TSD	treatment, storage, and disposal
UIC	underground injection control
USGS	United States Geological Survey
U.S.	United States
UST	underground storage tank

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Executive Summary

This report presents the results of the Phase I Environmental Site Assessment (ESA) performed by Lehua Environmental Inc. (LEI) for the Tax Map Key (TMK) Parcel located at 525 Piilani Street Hilo, Hawaii 96720: (3) 2-2-033: 011 (hereinafter referred to as the Site). The Site is currently unused undeveloped vacant land. The Site occupies approximately 2.57 acres of land located in Hilo, Hawai'i on the island of Hawaii.

This assessment and report have been performed in general accordance with the United States Environmental Protection Agency (EPA) "All Appropriate Inquiry" (40 Code of Federal Regulations (CFR) Part 312), as well as the American Society for Testing and Materials (ASTM) "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process" (ASTM, 2013).

This assessment was conducted to evaluate existing conditions, investigate the environmental history, and identify the presence of recognized environmental conditions (RECs) within and around the Site. A REC is defined as *"the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment."* (ASTM, 2013).

Research consisted of a review of historical and regulatory records, present conditions, site geology and hydrogeology.

This assessment has not revealed evidence of a current REC and has not revealed evidence of any historical RECs in connection with the Site. A historical REC is defined as *"a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted residential use criteria established by a regulatory authority, without subjecting the property to any required controls"* (ASTM, 2013).

This assessment has not revealed evidence of a historical or current REC in connection with the Site.

De Minimis Items of Concern

- Abandoned tires and trash was observed at the Site. These materials should be properly disposed.

Data Gaps

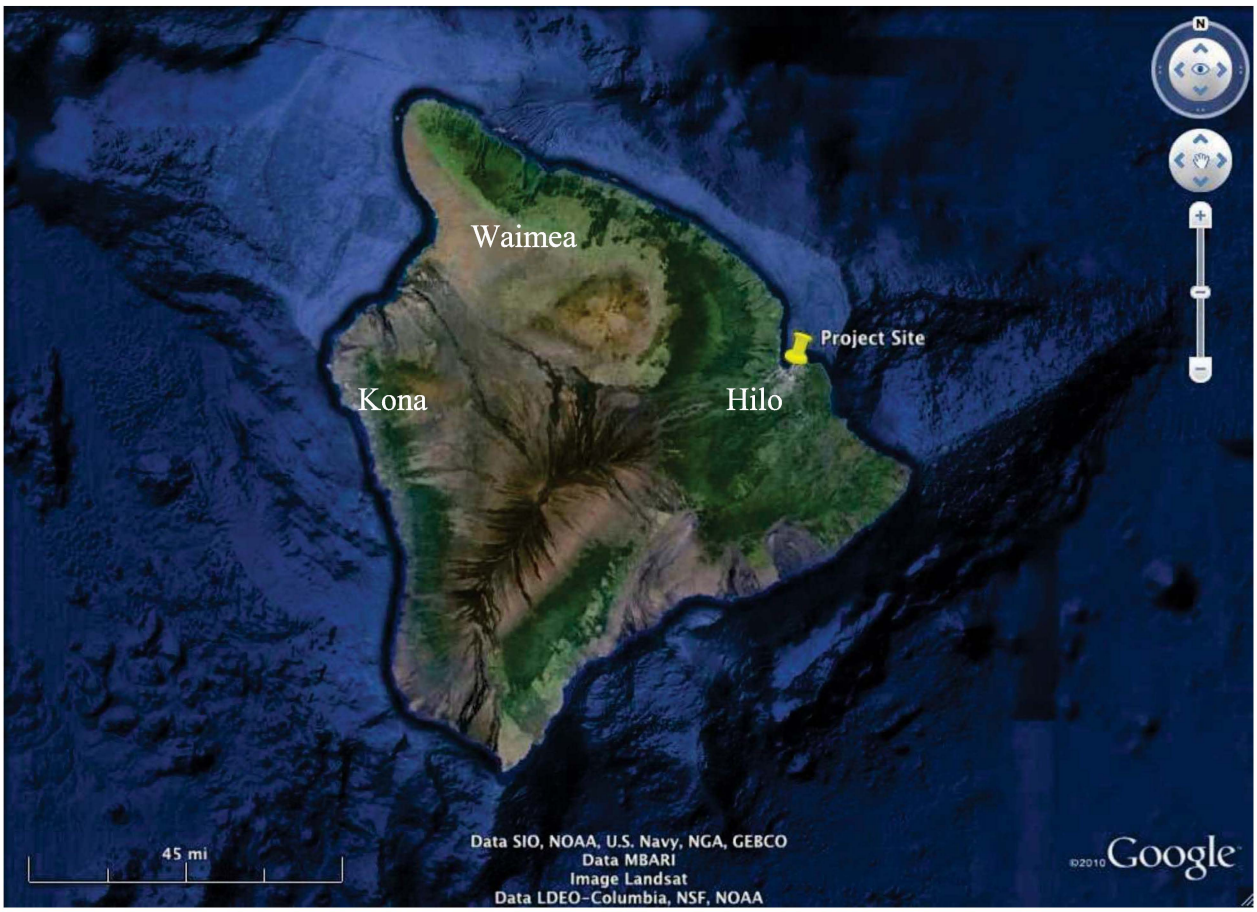
- In performing this Phase I ESA, no data gaps were identified.

Section 1 Introduction

This report presents the results of the Phase I ESA of the Site located in Hilo, Hawai'i on the eastern side of the island of Hawaii (Figure 1). The property is denoted by TMK: (3) 2-2-033: 011.

The purpose of this assessment was to evaluate the presence of RECs at and surrounding the Site. The assessment of the Site has been performed by qualified environmental professionals as defined by, and in general accordance, with the EPA "All Appropriate Inquiry" (40 CFR Part 312), as well as the ASTM E 1527-013. This Phase I ESA includes a review of relevant geology and hydrogeology, federal, state, and local databases of known or potential hazardous waste sites, landfills, and sites currently under investigation for environmental violations within the ASTM recommended search distance of the Site. It also includes a site inspection and interviews with applicable persons that have knowledge of the site to check for evidence of RECs.

Figure 1: Location Map



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Section 2 Site Description

The Site is currently unused vacant land (Figure 2). The Site is bordered to the north, east and west by undeveloped land, and is bordered by residential and commercial properties to the south. According to Chapter 25 of the Hawaii County Code (HCC), the Site is zoned for Industrial use (HCC, 2005).

Topography and Surface Water Flow

The topography of the Site is flat at an elevation of approximately 11-13 feet above msl. The topography directs surface flow towards the west. The Site is approximately 590 feet east of Waiakea Pond, which is contiguous with Hilo Bay and the Pacific Ocean.

Geology

Published geologic and hydrogeologic reports and maps were reviewed to obtain available information regarding subsurface conditions in the general area of the Site.

The Island of Hawaii comprises five coalesced shield volcanoes: Kohala, Mauna Kea, Hualalai, Mauna Loa, and Kilauea. The Site is located near the east coast below Mauna Kea Volcano.

The Mauna Kea Volcano has passed through the primitive shield-building stage into the late stage and produced a cap of differentiated lavas that almost completely buried the original shield above sea level. The rocks have been divided into an older Hamakua Volcanic Series and a younger Laupahoehoe Volcanic Series with the former becoming further divided into upper and lower members. The top of Mauna Kea consists almost wholly of flows of the Laupahoehoe Series. Rocks of the Hamakua Series are exposed only in Waikahaluu and Pohakuloa gulches on the south flank of the mountain and in another, smaller gulch three kilometers farther west. These volcanic series are covered by a layer of Pahala ash in some areas that reach a thickness of seven and one-half meters along the Wailuku River above Hilo, but gradually thin northward to about two meters towards Paauilo (Macdonald et al., 1983).

Soil

Soils in the Site area include Keaukaha muck, characterized as Class D soil, with very slow infiltration rates. These soils are clayey, have a high water table, or are shallow to an impervious layer (Environmental Data Resources, Inc. (EDR), 2018).

Figure 2: Project Site Layout Map



Groundwater

According to Mink and Lau (1990), the entire Site is located above one aquifer, status code 80401111(11111). This type of aquifer is basal (fresh water in contact with salt water), unconfined (where the water table is the upper surface of saturated aquifer), and composed of horizontally extensive (i.e. flank type) geological units (Mink and Lau, 1990). This aquifer is currently used as a drinking water source, is fresh (< 250 milligrams per liter (mg/L) chloride), irreplaceable, and is highly vulnerable to contamination (Mink and Lau, 1990).

Groundwater resources in the area are listed as being in the Northeast Mauna Loa aquifer system of the Hilo aquifer sector. The groundwater gradient in the vicinity of the Site is likely to the northwest towards Waiakea Pond. Annual average rainfall for the Site area is approximately 160 inches (Giambelluca et al., 2013).

2.1.1 Wells and Drinking Water Sources

The Site is located approximately 0.45 miles seaward (*makai*) of the underground injection control (UIC) line. The UIC line was established by the State of Hawai'i Department of Health (DOH) to protect groundwater resources. Groundwater *mauka* of the UIC line is considered a potential drinking water source. Groundwater seaward (*makai*) of the UIC line is considered as non-potable and saline. Injection wells are prohibited *mauka* of the UIC line.

Results of the EDR report indicated no wells directly on the Site. The EDR also retrieved records for 15 wells within a distance of 1.0 mi to the nearest Site boundary. The wells are used for geothermal power exploration and aquifer research (USGS).

2.2 Historic Land Use

The County of Hawaii Planning Department website was examined for review of building permits for the Site and adjacent properties. Permit records are examined in order to identify any associated RECs. Permit records for the Site indicated that a warehouse was demolished at the Site in 1993 and previous tenants of the warehouse included a wood crafts company and Hawaiian Sun Inc. No building permits found represent a REC for the Site (COH, 2017).

Aerial Photographs and Topographic Maps

Past land use was evaluated by reviewing historical topographic maps and photos. Representative documents were selected to show the evolution of the Site and the surrounding area.

The years available with aerial photographs of the Site are 1954, 1975, 1977, 1985, 1988, 1992, and 2000. The earliest available aerial photograph, from 1954, shows one large warehouse and one small warehouse at the Site. The area surrounding the Site was lightly developed with residential, commercial/industrial uses to the south and northeast. Hoolulu Park was located to the east. The 1975-1992 photos depict further density of commercial/industrial use in the surrounding area. The 2000 photo shows the disappearance of the two warehouses previously located at the Site that were demolished in 1993 (EDR, 2018).

Topographic maps of the Site available were published during the years 1914, 1917, 1932, 1963, 1980, 1981,1995 and 2013. The 1914 topographic map depicts concentrated development south of the Site, as well as the presence of a railroad track along the current alignment of the Mamalahoa Highway to the east of the Site. The Waiakea Sugar Mill is located approximately 0.4 miles southwest of the Site. The presence of a former sugar mill may suggest the former use of pesticides and other hazardous materials. However, given the distance from the former mill to the Site, and since the mill site has been redeveloped, it is not likely to have impacted the Site. A 1932 topographic map depicts increased development around the Site, as well as the Hilo Airport to the east of the Site. The 1963 topographic map shows increased development. The 1981 and 1995 topographic maps depict increased density development in Hilo town around the Site (EDR, 2018).

2.2.1 Sanborn Fire Insurance Maps

Past land use for the Site was also evaluated using Sanborn Maps for the following years: 1921, 1957, 1974, 1978, 1987 and 1991 (Appendix B). The Site is just off the mapped areas in all Sanborn Maps found. The 1921-1991 maps show increased residential and light commercial development south of the Site (EDR, 2018).

2.2.2 Tax Records

Records from the County of Hawaii Real Property Tax Department were reviewed for the Site to assess the chain of title to determine historical uses that may indicate RECs. Tax records show that the Site was used as a commercial goods storage and distribution warehouse since at least 1948, and that the former large warehouse was built and used by the US military in 1942. No information found in the tax records researched reveals a REC for the Site.

2.3 Previous Environmental Reports

No previous environmental reports were found for the Site.

Section 3 User Provided Information

ASTM E1527-13 outlines the responsibilities of the user (i.e., the user of this Phase I ESA report, in context of completing a Phase I ESA). A user is defined as *the party seeking to use the Phase I ESA to complete an ESA of a property. A user may include a potential purchaser of property, a potential tenant of property, an owner of property, a lender, or a property manager* (ASTM, 2013). In line with this definition, the user is the person/organization requesting this Phase I ESA. As part of completing a Phase I ESA, the user has the following duties:

- Communicate in advance of the Site reconnaissance, any specialized knowledge or experience of the user that is material to RECs.
- Communicate in advance of the Site reconnaissance, any actual knowledge or any environmental lien or AULs encumbering the property or in connection with the property.
- Consider the relationship of the purchase price of the property to the fair market value of the property if the property was not affected by hazardous substances or petroleum products.
- Communicate in advance of the Site reconnaissance, any commonly known or reasonably ascertainable information within the local community about the property that is material to RECs in connection with the property.
- Make known the reason why the user wants to have the Phase I ESA performed.

Ms. Fumiyo Okuda, Manager for Columbus East LLC. was interviewed as the Site user. Ms. Okuda has been familiar with the Site for less than one year. Ms. Okuda satisfied User responsibilities under ASTM E1527-13. None of the information obtained from Ms. Okuda represents a REC for the Site.

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Section 4 Records Review

According to the ASTM (2013), "The purpose of the records review is to obtain and review records that will help identify recognized environmental conditions in connection with the property." The following records and lists were reviewed for sites equal to or greater than the ASTM specified minimum search distance from the Site.

Sites Within One Mile of the Site

- EPA National Priority List (NPL)
- EPA Resource Conservation and Recovery Act (RCRA) Corrective Action Site (CORRACTS) List
- DOH State Hazardous Waste Site (SHWS)
- EPA National Pollutant Discharge Elimination System (NPDES)

Sites Within 0.5 Mile of the Site

- EPA Delisted NPL
- Federal Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) List
- CERCLIS No Further Remedial Action Planned (NFRAP) List
- EPA RCRA Treatment, Storage, and/or Disposal (TSD) Facilities List
- DOH Landfill and/or Solid Waste Disposal Site Lists
- DOH leaking underground storage tanks (LUSTs) List

On the Site and Adjoining Properties

- DOH Registered underground storage tank (UST) List
- RCRA Generators List

On the Site

- Federal Emergency Response Notification System (ERNS) List
- EPA Institutional Controls and Engineering Controls Lists
- DOH Institutional Control and Engineering Control Lists
- DOH Voluntary Response Program List
- DOH Brownfields List

Explanations of each federal record or list are provided in EDR's report (Appendix B). DOH records that may not be included in the EDR are included in this report.

4.1 Federal NPL Site List

The Federal NPL includes those sites listed and proposed to be listed on the NPL (Superfund), as well those which have had a Superfund Liens notice filed. The NPL is a subset of the CERCLIS, and identifies over 1,200 sites for priority cleanup under the Superfund Program.

There are no NPL sites listed on or within one mile of the Site (EDR, 2018), and the Site is not listed (EDR, 2018).

4.2 Federal Delisted NPL Site List

There are no delisted NPL sites listed on or within one mile of the Site (EDR, 2018), and the Site is not listed (EDR, 2018).

4.3 Federal CERCLIS List

CERCLIS contains data on potentially hazardous waste sites that are either proposed to or on the NPL, as well as sites which are in the screening and assessment phase for possible inclusion on the NPL. Additionally, all EPA Federal Facilities Restoration and Reuse Office involved in cleanup activities are listed in this database.

There is one CERCLA SEMS site listed; the former Waiakea Pond Products Plant is located approximately 2,200 feet from the Site. Sediment and soil has shown high levels of arsenic and other heavy metals from former use as a sugar mill/canec board treatment plant. There is no concern for the Site from this listing since there is no likely pathway for contamination from the SEMS site. Federal CERCLIS sites listed on or within one mile of the Site; there are no EPA Federal Facilities Restoration and Reuse Office involved in cleanup activities within one mile of the site; and the Site is not listed (EDR, 2018).

4.4 Federal CERCLIS NFRAP Site List

There are no CERCLIS-NFRAP sites listed within one-mile of the Site, and the Site is not listed. (EDR, 2018).

4.5 Federal RCRA CORRACTS Facilities List

Hazardous waste handlers with RCRA CORRACTS activity are listed in this database.

There are no RCRA CORRACTS facilities located within a mile of the Site, and the Site is not listed (EDR, 2018).

4.6 Federal RCRA non-CORRACTS TSD Facilities List

Information on RCRA defined hazardous waste TSD activities are listed in this database.

There is one RCRA non-CORRACTS TSD facility listed within one-half mile of the Site, and the Site is not listed. There are no listed violations for the listed site that could impact the Site (EDR, 2018).

4.7 Federal RCRA Generators List

The Federal RCRA generators list includes large, small and conditionally exempt small quantity hazardous waste generators.

There are no RCRA generators listed within one-quarter mile of the Site, and the Site is not listed (EDR, 2018).

4.8 Federal Institutional Controls/Engineering Controls Registries

This database includes a listing of engineering and institutional controls in place in order to create pathway elimination for regulated substances to enter environmental media or effect human health.

There are no federal institutional controls or engineering controls listed within one-quarter mile of the Site, and the Site is not listed (EDR, 2018).

4.9 Federal ERNS List

The Federal ERNS List records and stores information on reported releases of oil and hazardous substances.

There are no federal ERNS events reported on the Site (EDR, 2018).

4.10 DOH SHWS

The SHWS records are the state's equivalent to CERCLIS. These sites may or may not be listed on the federal CERCLIS list. The SHWS list contains information on sites identified by the State of Hawai'i as abandoned, inactive, or uncontrolled hazardous waste sites that may require cleanup.

There were no SHWS within one-quarter of a mile from the Site, and 22 SHWS listed within one mile from the Site (EDR, 2018).

- The 22 SHWS reported within one mile of the Site do not represent a REC for the Site due to their cleanup status with DOH and/or distance/elevation/gradient relative to the Site (EDR, 2018).

4.11 State Landfill and/or Solid Waste Disposal Site Lists

Records in this database typically contain an inventory of solid waste disposal facilities or landfills in a particular state.

There are no state or tribal landfill and/or solid waste disposal sites listed within one-half mile of the Site, and the Site is not listed (EDR, 2018).

4.12 State Leaking Underground Storage Tank Lists

This database includes an inventory of reported LUSTs.

There were 10 state LUSTs listed within one-half mile of the Site, and the Site is not listed (DOH, 2004; EDR, 2018).

Given the status of the LUST sites (NFA), they are not considered a concern for the Site (EDR, 2018).

4.13 State Registered Underground Storage Tank Lists

This database includes an inventory of reported USTs.

There are no state USTs listed within one-quarter mile of the Site and the Site is not listed. (DOH, EDR, 2018).

None of the UST listings represent a concern for the Site (EDR, 2018).

4.14 State Institutional Control/Engineering Control Registries

This database includes a listing of sites with engineering and/or institutional controls in place.

There were no state engineering and/or institutional controls registered within one-half mile of the Site, and the Site is not registered (EDR, 2018).

4.15 State Voluntary Cleanup Sites

This database includes a listing of voluntary cleanup priority sites.

There are no state or tribal voluntary cleanup priority sites recorded within one-half mile of the Site, and the Site is not listed (EDR, 2018).

4.16 State Brownfields Sites

This database includes an inventory of state and tribal "Brownfield sites" which are defined as: any real property where the expansion, redevelopment or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant (EDR, 2018).

There were no state or tribal Brownfield site within one-half mile of the Site, and the Site is not listed (EDR, 2018).

4.17 State Land Records

These records include the CERCLA Lien Information, which indicate where the EPA has spent Superfund monies to investigate releases and threatened releases of contamination. Additionally, records of land use control information pertaining to former Navy Base Realignment and Closure properties, is included.

There are no CERCLA Liens filed at the Site, and there are no records of land use control information within one-half mile of the Site (EDR, 2018).

4.18 Records of Emergency Release Reports

This database includes the Hazardous Materials Incident Report System, which incorporates spills reported to the DOT.

There are no records of Emergency Release Reports on the Site (EDR, 2018).

4.19 Other Ascertainable Records

These records include inventories from a variety of select environmental databases; the full list of which is available in the EDR (EDR, 2018).

There were no Other Ascertainable Records found for sites within one-quarter mile of the Site (EDR, 2018).

4.20 EDR Proprietary Records

The EDR Proprietary Manufactured Gas Plant Database includes an inventory of coal gas plants compiled by EDR researchers.

There are no Manufactured Gas Plants found within a mile of the Site (EDR, 2018).

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Section 5 Current/Historical Use

Mr. Harvey Taira, Properties Manager for the previous owner, Suisan Company, Ltd. was interviewed as the Site contact. Mr. Taira has been familiar with the Site for at least 20 years, during which time it was used as a fruit warehouse and Quonset hut prior to being demolished in the early 1990s. Mr. Taira satisfied site contact responsibilities under ASTM E1527-13. None of the information obtained from Mr. Taira represents a REC for the Site.

No information disclosed by current or historical owners/occupants represents a REC for the Site.

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Section 6 Site Reconnaissance

The Site visit was conducted on Monday, March 26, 2018 by LEI personnel. All observations were based on the Site's conditions at the time of LEI's reconnaissance. Photographs taken during the site visit are included in Appendix A. The Site has been unused and includes natural foliage and small amounts of abandoned tires and garbage.

6.1.1 USTs, Aboveground Storage Tanks (ASTs), Oil/Water Separators, Pipelines

No USTs, ASTs, oil/water separators or pipelines were observed at the Site.

6.1.2 Drains

No drains, pits, ponds, pools were observed at the Site.

6.1.3 Indication of Polychlorinated Biphenyl (PCB) Containing Materials

No potentially PCB containing materials were observed at the Site.

6.1.4 Mercury

There was no indication of mercury-containing materials at the Site during the time of the Site reconnaissance.

6.1.5 Chlorofluorocarbons (CFCs)

No potential CFC-containing materials were observed at the Site.

6.1.6 Stains and Chemical Odors

No staining or chemical odors were observed at the Site.

6.1.7 Adjacent Properties

Adjacent property uses include open land and Waiakea Pond to the west, open land to the east and residential and commercial uses to the south. There was no evidence of runoff or other potential contamination observed during the site reconnaissance.

Section 7 Data Gaps

A data gap is a lack of or inability to obtain information required by ASTM E 1527-13 despite good faith efforts by the environmental professional to gather such information. Data gaps may result from incompleteness in any of the activities required by this practice (ASTM, 2013). In performing this Phase I ESA, no data gaps were identified.

Section 8 Conclusions and Opinions

This Phase I ESA has been performed in conformance with the scope and limitations of ASTM E 1527-13 for the Site. Any exceptions to, or deletions from this practice are described in Section 9 of this report.

This assessment has not revealed evidence of a historical or current REC in connection with the Site.

De Minimis Items of Concern

- Abandoned tires and trash was observed at the Site. These materials should be properly disposed.

Data Gaps

- In performing this Phase I ESA, no data gaps were identified.

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Section 9 Limitations

The conclusions and recommendations of this ESA have been based on interpretation of the available historical and regulatory information, and a visual Site reconnaissance. No guarantee or warrant is made that the Site is free of contamination. This Phase I ESA was performed with the usual competence and thoroughness of the consulting profession, in accordance with the standard operating procedures of this time. LEI does not provide any other guarantee or warranty.

This Phase I ESA is not a comprehensive site characterization and should not be construed as such. The opinions presented in this report are based on findings derived from a site reconnaissance and a review of specified regulatory records and historical sources. This Phase I ESA did not include any investigation with respect to lead, asbestos, arsenic, radon, methane, regulatory compliance, cultural and historical resources, industrial hygiene, health and safety, ecological resources, endangered species, indoor air quality, or site geotechnical concerns. All information on UST and LUST sites are based on information reported to the DOH Solid and Hazardous Waste Branch. All information on DOH Hazard Evaluation and Emergency Response (HEER) listed sites and release sites are based on information reported to the DOH HEER Office.

There are no exceptions or deletions to ASTM practice in this Phase I ESA.

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Section 10 References

ASTM, 2013. Standard Practice for ESAs: Phase I ESA Process. ASTM, E 1527-13.

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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. Bull. Amer. Meteor. Soc. 94, 313-316, doi: 10.1175/BAMS-D-11-00228.

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HCC, 2005. Hawai‘i County Code 1983 (2005 Edition, as amended).

Macdonald, G.; Abbott, A.; and Peterson, F., 1983. Volcanoes in the Sea, University of Hawai‘i Press, Honolulu, Hawai‘i.

Mink, J. F. and Lau, S., 1990. Aquifer Identification and Classification for *Hawaii*: Groundwater Protection Strategy for Hawai‘i. Water Resources Research Center, University of Hawai‘i, Technical Report 179. February.

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Appendix A: Photographs



North side of property



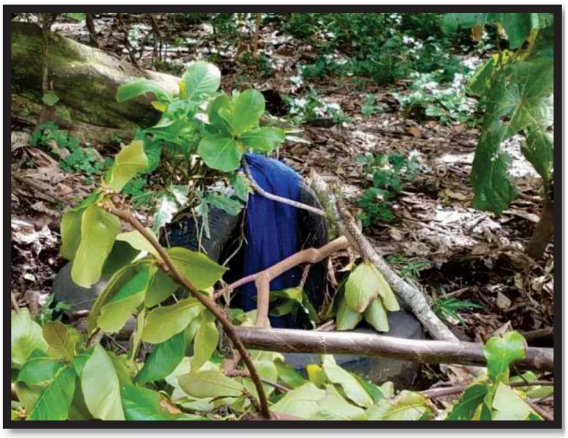
East side of property



South side of property



Tires found on northeast corner



Tires found on northeast corner



Tires found on north east corner



TV found on north east corner



Rubbish can found on north east corner



North west corner marker



South east corner marker



South west corner marker



South west vegetation



North side vegetation



East side vegetation



South side vegetation

Appendix B: EDR Database Search

525 Piilani Street
525 Piilani Street
Hilo, HI 96720

Inquiry Number: 5207731.2s
March 05, 2018

The EDR Radius Map™ Report with GeoCheck®

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

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Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13), the ASTM Standard Practice for Environmental Site Assessments for Forestland or Rural Property (E 2247-16), the ASTM Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process (E 1528-14) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

525 PIILANI STREET
HILO, HI 96720

COORDINATES

Latitude (North):	19.7172100 - 19° 43' 1.95"
Longitude (West):	155.0709960 - 155° 4' 15.58"
Universal Tranverse Mercator:	Zone 5
UTM X (Meters):	282938.7
UTM Y (Meters):	2181382.2
Elevation:	12 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	5949390 HILO, HI
Version Date:	2013

MAPPED SITES SUMMARY

Target Property Address:
525 PIILANI STREET
HILO, HI 96720

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
1	KUAWA STREET SOCCER	KAMEHAMEHA HWY AND M	SHWS	Lower	1689, 0.320, North
A2	WAIAKEA UPLAND ARSEN	CORNER OF MILILANI A	SHWS	Higher	1698, 0.322, South
A3	EXEMPT UST CLOSURE A	458 KEKUANAOA ST	SHWS, SPILLS	Higher	1771, 0.335, South
A4	EXCELSIOR DAIRY	458 KEKAUANAOA ST	LUST, UST	Higher	1771, 0.335, South
5	S.K. ODA, LTD.	180 KALANIKOA ST	LUST, UST	Higher	1787, 0.338, ENE
6	PHILLIPS U DRIVE INC	920 PIILANI ST	LUST, UST	Higher	1841, 0.349, East
7	JACK'S TOURS	226 KANOELEHUA AVE	LUST, UST	Lower	2188, 0.414, ENE
8	SHIPMAN GENERATING S	20 BANYAN DRIVE	RCRA-TSDF, RCRA-SQG	Lower	2225, 0.421, NNE
B9	WAIAKEA POND/HAWAIIA	HILO	SEMS	Higher	2296, 0.435, West
B10	LARRY'S CHEVRON	835 KILAUEA AVE	SHWS, LUST, UST, Financial Assurance	Higher	2361, 0.447, West
11	HELCO PIPELINE RELEA	KANOELEHUA AVE & HUA	SHWS	Higher	2385, 0.452, ESE
12	UST EXCAVATED BISHOP	BISHOP ST AND KAMEHA	SHWS	Lower	2406, 0.456, NW
C13	TESORO GAS EXPRESS 8	1672 KAMEHAMEHA AVE	LUST, UST, Financial Assurance	Lower	2449, 0.464, NE
C14	HARPER CAR & TRUCK R	1690 KAMEHAMEHA AVE	LUST, UST	Lower	2460, 0.466, NE
D15	DUKE'S SHELL	1104 KILAUEA AVE.	LUST, UST, Financial Assurance	Higher	2508, 0.475, SW
D16	PACIFIC RENT-ALL, IN	1080 KILAUEA AVE	LUST, UST	Higher	2523, 0.478, SW
17	AIM HILO	761 KEKUANAOA ST	LUST, UST, Financial Assurance	Higher	2629, 0.498, SE
18	HILO SHOPPING CENTER	1255 KILAUEA AVE	SHWS, SPILLS	Higher	2766, 0.524, SW
19	KHI INC. DBA BAYSIDE	774 KAMEHAMEHA AVE	SHWS, LUST, UST, INST CONTROL, SPILLS, Financial...	Lower	2786, 0.528, NW
20	STATIONERS CORPORATI	708 KANOELEHUA AVE	SHWS, SPILLS	Higher	3356, 0.636, SE
21	HELCO PIPELINE ANOMA	126 BANYAN WY	SHWS, SPILLS	Lower	3459, 0.655, NE
22	SUN SUN LAU CHOP SUE	1055 KINOOLE ST	SHWS, SPILLS	Higher	3604, 0.683, WSW
E23	HILO QUALITY WASHERE	210 HOKU ST	SHWS, INST CONTROL, SPILLS	Higher	3788, 0.717, West
E24	HILO QUALITY CLEANER	865 KINOOLE ST	RCRA-CESQG, SHWS, SPILLS, FINDS, ECHO, AIRS	Higher	4011, 0.760, West
25	HILO SODA WORKS	270 E KAWILI ST	SHWS, LUST, UST	Higher	4086, 0.774, South
26	HATADA BAKERY (FORME	55 KUKUAU ST	SHWS, INST CONTROL, SPILLS	Higher	4407, 0.835, WNW
27	HILO MACARONI FACTOR	639 KINOOLE ST	SHWS, SPILLS	Higher	4558, 0.863, West
28	WOOD PROTECTION COMP	150 KEAA ST	SHWS, SPILLS	Higher	4575, 0.866, ENE
29	HILO MECHANICAL, INC	50 HOLOMUA ST	SHWS	Higher	4651, 0.881, SSE
30	HILO GAS COMPANY LTD	51-53 PONAHAWAI ST	EDR MGP	Lower	4708, 0.892, WNW
31	USDA FOREST SERVICE	1643 KILAUEA AVE	SHWS	Higher	4712, 0.892, South
32	HAWAII PEST CONTROL	56 WIWOOLE ST	SHWS	Higher	4887, 0.926, SSE
33	KANOELEHUA INDUSTRIA	20 POOKELA ST	SHWS, BROWNFIELDS	Higher	4946, 0.937, SSE
34	HILO ARSENIC	33B LILIUOKALANI LN	SHWS, ENG CONTROLS, INST CONTROL, SPILLS	Higher	5037, 0.954, WNW

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL ---------- National Priority List
Proposed NPL ---------- Proposed National Priority List Sites
NPL LIENS ---------- Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL ---------- National Priority List Deletions

Federal CERCLIS list

FEDERAL FACILITY ---------- Federal Facility Site Information listing

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE ---------- Superfund Enterprise Management System Archive

Federal RCRA CORRACTS facilities list

CORRACTS ---------- Corrective Action Report

Federal RCRA generators list

RCRA-LQG ---------- RCRA - Large Quantity Generators
RCRA-SQG ---------- RCRA - Small Quantity Generators
RCRA-CESQG ---------- RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

LUCIS ---------- Land Use Control Information System
US ENG CONTROLS ---------- Engineering Controls Sites List
US INST CONTROL ---------- Sites with Institutional Controls

Federal ERNS list

ERNS ---------- Emergency Response Notification System

State and tribal landfill and/or solid waste disposal site lists

SWF/LF ---------- Permitted Landfills in the State of Hawaii

State and tribal leaking storage tank lists

INDIAN LUST ---------- Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

FEMA UST ---------- Underground Storage Tank Listing
UST ---------- Underground Storage Tank Database
INDIAN UST ---------- Underground Storage Tanks on Indian Land

State and tribal institutional control / engineering control registries

ENG CONTROLS ---------- Engineering Control Sites
INST CONTROL ---------- Sites with Institutional Controls

State and tribal voluntary cleanup sites

VCP ---------- Voluntary Response Program Sites
INDIAN VCP ---------- Voluntary Cleanup Priority Listing

State and tribal Brownfields sites

BROWNFIELDS ---------- Brownfields Sites

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS ---------- A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

INDIAN ODI ---------- Report on the Status of Open Dumps on Indian Lands
DEBRIS REGION 9 ---------- Torres Martinez Reservation Illegal Dump Site Locations
ODI ---------- Open Dump Inventory
IHS OPEN DUMPS ---------- Open Dumps on Indian Land

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL ---------- Delisted National Clandestine Laboratory Register
CDL ---------- Clandestine Drug Lab Listing
US CDL ---------- National Clandestine Laboratory Register

Local Land Records

LIENS 2 ---------- CERCLA Lien Information

Records of Emergency Release Reports

HMIRS ---------- Hazardous Materials Information Reporting System

SPILLS	Release Notifications
SPILLS 90	SPILLS 90 data from FirstSearch

Other Ascertainable Records

RCRA NonGen / NLR	RCRA - Non Generators / No Longer Regulated
FUDS	Formerly Used Defense Sites
DOD	Department of Defense Sites
SCRD DRYCLEANERS	State Coalition for Remediation of Drycleaners Listing
US FIN ASSUR	Financial Assurance Information
EPA WATCH LIST	EPA WATCH LIST
2020 COR ACTION	2020 Corrective Action Program List
TSCA	Toxic Substances Control Act
TRIS	Toxic Chemical Release Inventory System
SSTS	Section 7 Tracking Systems
ROD	Records Of Decision
RMP	Risk Management Plans
RAATS	RCRA Administrative Action Tracking System
PRP	Potentially Responsible Parties
PADS	PCB Activity Database System
ICIS	Integrated Compliance Information System
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
MLTS	Material Licensing Tracking System
COAL ASH DOE	Steam-Electric Plant Operation Data
COAL ASH EPA	Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER	PCB Transformer Registration Database
RADINFO	Radiation Information Database
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
DOT OPS	Incident and Accident Data
CONSENT	Superfund (CERCLA) Consent Decrees
INDIAN RESERV	Indian Reservations
FUSRAP	Formerly Utilized Sites Remedial Action Program
UMTRA	Uranium Mill Tailings Sites
LEAD SMELTERS	Lead Smelter Sites
US AIRS	Aerometric Information Retrieval System Facility Subsystem
US MINES	Mines Master Index File
ABANDONED MINES	Abandoned Mines
FINDS	Facility Index System/Facility Registry System
DOCKET HWC	Hazardous Waste Compliance Docket Listing
UXO	Unexploded Ordnance Sites
ECHO	Enforcement & Compliance History Information
FUELS PROGRAM	EPA Fuels Program Registered Listing
AIRS	List of Permitted Facilities
DRYCLEANERS	Permitted Drycleaner Facility Listing
Financial Assurance	Financial Assurance Information Listing
UIC	Underground Injection Wells Listing

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR Hist Auto	EDR Exclusive Historical Auto Stations
EDR Hist Cleaner	EDR Exclusive Historical Cleaners

EXECUTIVE SUMMARY

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA HWS ---------- Recovered Government Archive State Hazardous Waste Facilities List
RGA LF ---------- Recovered Government Archive Solid Waste Facilities List
RGA LUST ---------- Recovered Government Archive Leaking Underground Storage Tank

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

STANDARD ENVIRONMENTAL RECORDS

Federal CERCLIS list

SEMS: SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

A review of the SEMS list, as provided by EDR, and dated 12/11/2017 has revealed that there is 1 SEMS site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
WAIAKEA POND/HAWAIIA	HILO	W 1/4 - 1/2 (0.435 mi.)	B9	15

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

A review of the RCRA-TSDF list, as provided by EDR, and dated 12/11/2017 has revealed that there is 1

RCRA-TSDF site within approximately 0.5 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
SHIPMAN GENERATING S	***20 BANYAN DRIVE***	***NNE 1/4 - 1/2 (0.421 mi.)***	***8***	***13***

State- and tribal - equivalent CERCLIS

SHWS: The State Hazardous Waste Sites records are the states' equivalent to CERCLIS. These sites may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. The data come from the Department of Health.

A review of the SHWS list, as provided by EDR, and dated 01/23/2018 has revealed that there are 22 SHWS sites within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
WAIAKEA UPLAND ARSEN	CORNER OF MILILANI A	S 1/4 - 1/2 (0.322 mi.)	A2	8
EXEMPT UST CLOSURE A	***458 KEKUANAOA ST***	***S 1/4 - 1/2 (0.335 mi.)***	***A3***	***9***
LARRY'S CHEVRON	***835 KILAUEA AVE***	***W 1/4 - 1/2 (0.447 mi.)***	***B10***	***16***
HELCO PIPELINE RELEA	KANOELEHUA AVE & HUA	ESE 1/4 - 1/2 (0.452 mi.)	11	18
HILO SHOPPING CENTER	***1255 KILAUEA AVE***	***SW 1/2 - 1 (0.524 mi.)***	***18***	***28***
STATIONERS CORPORATI	***708 KANOELEHUA AVE***	***SE 1/2 - 1 (0.636 mi.)***	***20***	***33***
SUN SUN LAU CHOP SUE	***1055 KINOOLE ST***	***WSW 1/2 - 1 (0.683 mi.)***	***22***	***36***
HILO QUALITY WASHERE	***210 HOKU ST***	***W 1/2 - 1 (0.717 mi.)***	***E23***	***37***
HILO QUALITY CLEANER	***865 KINOOLE ST***	***W 1/2 - 1 (0.760 mi.)***	***E24***	***39***
HILO SODA WORKS	***270 E KAWILI ST***	***S 1/2 - 1 (0.774 mi.)***	***25***	***44***
HATADA BAKERY (FORME	***55 KUKUAU ST***	***WNW 1/2 - 1 (0.835 mi.)***	***26***	***46***
HILO MACARONI FACTOR	***639 KINOOLE ST***	***W 1/2 - 1 (0.863 mi.)***	***27***	***47***
WOOD PROTECTION COMP	***150 KEAA ST***	***ENE 1/2 - 1 (0.866 mi.)***	***28***	***49***
HILO MECHANICAL, INC	50 HOLOMUA ST	SSE 1/2 - 1 (0.881 mi.)	29	50
USDA FOREST SERVICE	1643 KILAUEA AVE	S 1/2 - 1 (0.892 mi.)	31	51
HAWAII PEST CONTROL	56 WIWOOLE ST	SSE 1/2 - 1 (0.926 mi.)	32	52
KANOELEHUA INDUSTRIA	***20 POOKELA ST***	***SSE 1/2 - 1 (0.937 mi.)***	***33***	***53***
HILO ARSENIC	***33B LILIUOKALANI LN***	***WNW 1/2 - 1 (0.954 mi.)***	***34***	***53***

Lower Elevation	Address	Direction / Distance	Map ID	Page
KUAWA STREET SOCCER	KAMEHAMEHA HWY AND M	N 1/4 - 1/2 (0.320 mi.)	1	8
UST EXCAVATED BISHOP	BISHOP ST AND KAMEHA	NW 1/4 - 1/2 (0.456 mi.)	12	19
KHI INC. DBA BAYSIDE	***774 KAMEHAMEHA AVE***	***NW 1/2 - 1 (0.528 mi.)***	***19***	***29***
HELCO PIPELINE ANOMA	***126 BANYAN WY***	***NE 1/2 - 1 (0.655 mi.)***	***21***	***34***

State and tribal leaking storage tank lists

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the Department of Health's Active Leaking Underground Storage Tank Log Listing.

A review of the LUST list, as provided by EDR, and dated 08/01/2017 has revealed that there are 10 LUST sites within approximately 0.5 miles of the target property.

EXECUTIVE SUMMARY

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
EXCELSIOR DAIRY	***458 KEKAUANAOA ST***	***S 1/4 - 1/2 (0.335 mi.)***	***A4***	***11***
Release ID: 990210 Facility Id: 9-603524 Facility Status: Site Cleanup Completed (NFA)				
S.K. ODA, LTD.	***180 KALANIKOA ST***	***ENE 1/4 - 1/2 (0.338 mi.)***	***5***	***11***
Release ID: 900012 Facility Id: 9-600449 Facility Status: Site Cleanup Completed (NFA)				
PHILLIPS U DRIVE INC	***920 PIILANI ST***	***E 1/4 - 1/2 (0.349 mi.)***	***6***	***12***
Release ID: 940182 Facility Id: 9-600480 Facility Status: Site Cleanup Completed (NFA)				
LARRY'S CHEVRON	***835 KILAUEA AVE***	***W 1/4 - 1/2 (0.447 mi.)***	***B10***	***16***
Release ID: 030044 Facility Id: 9-601136 Facility Status: Site Cleanup Completed (NFA)				
DUKE'S SHELL	***1104 KILAUEA AVE.***	***SW 1/4 - 1/2 (0.475 mi.)***	***D15***	***23***
Release ID: 020029 Release ID: 930099 Facility Id: 9-601320 Facility Status: Site Cleanup Completed (NFA)				
PACIFIC RENT-ALL, IN	***1080 KILAUEA AVE***	***SW 1/4 - 1/2 (0.478 mi.)***	***D16***	***26***
Release ID: 940099 Facility Id: 9-601678 Facility Status: Site Cleanup Completed (NFA)				
AIM HILO	***761 KEKUANAOA ST***	***SE 1/4 - 1/2 (0.498 mi.)***	***17***	***26***
Release ID: 050009 Facility Id: 9-601195 Facility Status: Site Cleanup Completed (NFA)				

Lower Elevation	Address	Direction / Distance	Map ID	Page
JACK'S TOURS	***226 KANOELEHUA AVE***	***ENE 1/4 - 1/2 (0.414 mi.)***	***7***	***12***
Release ID: 030001 Facility Id: 9-603750 Facility Status: Site Cleanup Completed (NFA)				
TESORO GAS EXPRESS 8	***1672 KAMEHAMEHA AVE***	***NE 1/4 - 1/2 (0.464 mi.)***	***C13***	***20***
Release ID: 940057 Facility Id: 9-600708 Facility Status: Site Cleanup Completed (NFA)				
HARPER CAR & TRUCK R	***1690 KAMEHAMEHA AVE***	***NE 1/4 - 1/2 (0.466 mi.)***	***C14***	***22***
Release ID: 960054 Facility Id: 9-603156 Facility Status: Site Cleanup Completed (NFA)				

EXECUTIVE SUMMARY

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

A review of the EDR MGP list, as provided by EDR, has revealed that there is 1 EDR MGP site within approximately 1 mile of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
HILO GAS COMPANY LTD	51-53 PONAHAWAI ST	WNW 1/2 - 1 (0.892 mi.)	30	51

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 10 records.

Site Name	Database(s)
HILO JUDICIARY CENTER PROJECT	SHWS, ENG CONTROLS, INST CONTROL
HILO SAFEWAY/TARGET	SHWS, ENG CONTROLS, INST CONTROL
ARMY AVIATION SUPPORT FACILITY #2	SHWS
PACIFIC AQUACULTURE AND COASTAL RE	SHWS, BROWNFIELDS
HAWAII COUNTY KAMEHAMEHA AVENUE IM	SHWS
WAIAKEA MILL COMPANY - CAMP 1	SHWS
ARSENIC MILILANI STREET IN HILO	SHWS, INST CONTROL, SPILLS
WAILOA RIVER STATE RECREATION AREA	SHWS
KILAUEA VOLCANO AIR MONITORING	SEMS
HILO BAY FRONT SOCCER FIELD	SEMS-ARCHIVE

OVERVIEW MAP - 5207731.2S



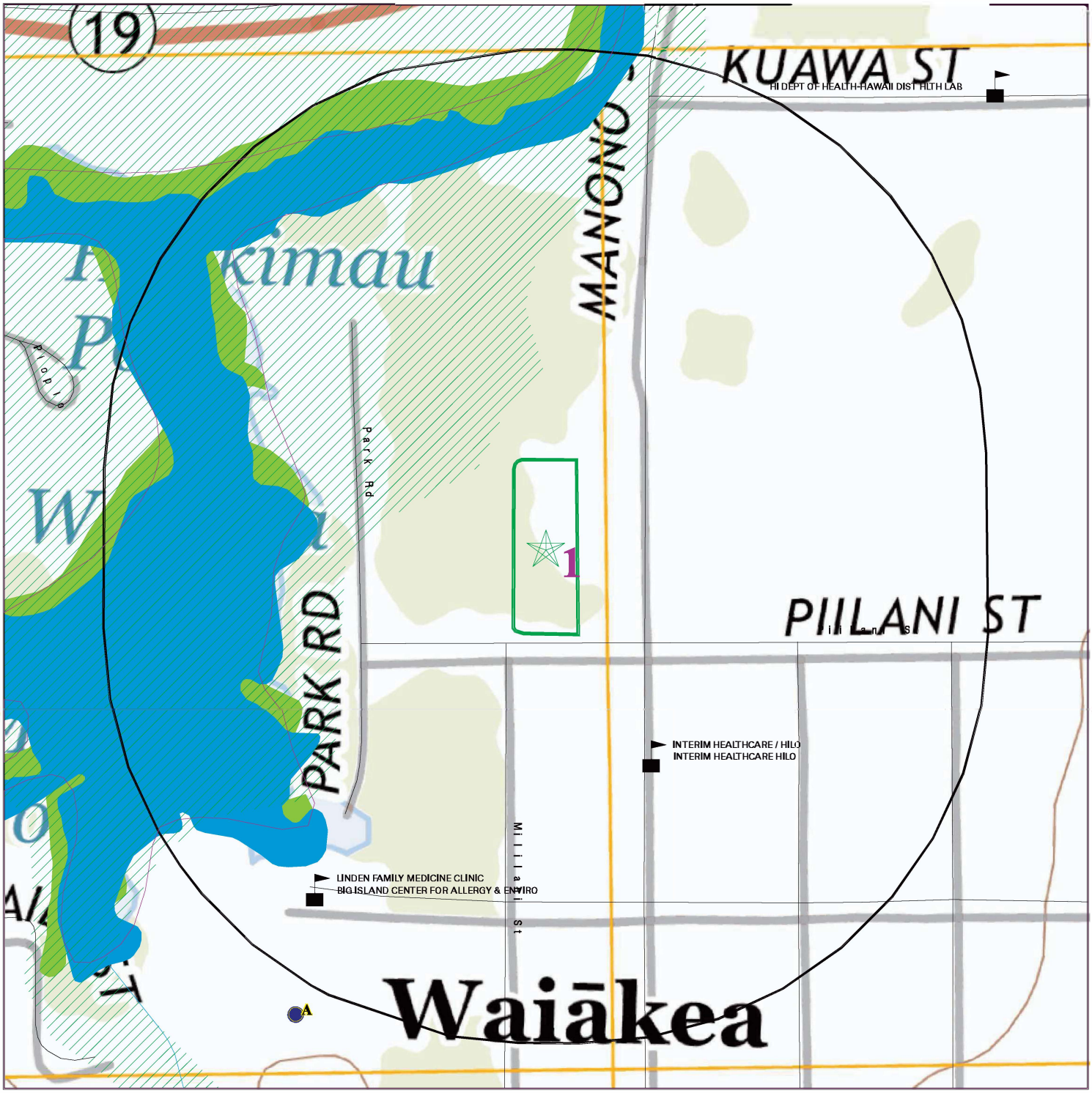
- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands
- Upgradient Area

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: 525 Piilani Street	CLIENT: Lehua Environmental Consultants, LLC
ADDRESS: 525 Piilani Street Hilo HI 96720	CONTACT: Kama
LAT/LONG: 19.71721 / 155.070996	INQUIRY #: 5207731.2s DATE: March 05, 2018 12:59 pm

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DETAIL MAP - 5207731.2S



0 1/16 1/8 1/4 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: 525 Piilani Street	CLIENT: Lehua Environmental Consultants, LLC
ADDRESS: 525 Piilani Street Hilo HI 96720	CONTACT: Kama
LAT/LONG: 19.71721 / 155.070996	INQUIRY #: 5207731.2s DATE: March 05, 2018 12:59 pm

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MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	0.001		0	NR	NR	NR	NR	0
Federal Delisted NPL site list								
Delisted NPL	1.000		0	0	0	0	NR	0
Federal CERCLIS list								
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
SEMS	0.500		0	0	1	NR	NR	1
Federal CERCLIS NFRAP site list								
SEMS-ARCHIVE	0.500		0	0	0	NR	NR	0
Federal RCRA CORRACTS facilities list								
CORRACTS	1.000		0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF	0.500		0	0	1	NR	NR	1
Federal RCRA generators list								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-CESQG	0.250		0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
LUCIS	0.500		0	0	0	NR	NR	0
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROL	0.500		0	0	0	NR	NR	0
Federal ERNS list								
ERNS	0.001		0	NR	NR	NR	NR	0
State- and tribal - equivalent CERCLIS								
SHWS	1.000		0	0	6	16	NR	22
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF	0.500		0	0	0	NR	NR	0
State and tribal leaking storage tank lists								
LUST	0.500		0	0	10	NR	NR	10
INDIAN LUST	0.500		0	0	0	NR	NR	0
State and tribal registered storage tank lists								
FEMA UST	0.250		0	0	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
UST	0.250		0	0	NR	NR	NR	0
INDIAN UST	0.250		0	0	NR	NR	NR	0
State and tribal institutional control / engineering control registries								
ENG CONTROLS	0.500		0	0	0	NR	NR	0
INST CONTROL	0.500		0	0	0	NR	NR	0
State and tribal voluntary cleanup sites								
VCP	0.500		0	0	0	NR	NR	0
INDIAN VCP	0.500		0	0	0	NR	NR	0
State and tribal Brownfields sites								
BROWNFIELDS	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
INDIAN ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
IHS OPEN DUMPS	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US HIST CDL	0.001		0	NR	NR	NR	NR	0
CDL	0.001		0	NR	NR	NR	NR	0
US CDL	0.001		0	NR	NR	NR	NR	0
Local Land Records								
LIENS 2	0.001		0	NR	NR	NR	NR	0
Records of Emergency Release Reports								
HMIRS	0.001		0	NR	NR	NR	NR	0
SPILLS	0.001		0	NR	NR	NR	NR	0
SPILLS 90	0.001		0	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
FUDS	1.000		0	0	0	0	NR	0
DOD	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
US FIN ASSUR	0.001		0	NR	NR	NR	NR	0
EPA WATCH LIST	0.001		0	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
TSCA	0.001		0	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
TRIS	0.001		0	NR	NR	NR	NR	0
SSTS	0.001		0	NR	NR	NR	NR	0
ROD	1.000		0	0	0	0	NR	0
RMP	0.001		0	NR	NR	NR	NR	0
RAATS	0.001		0	NR	NR	NR	NR	0
PRP	0.001		0	NR	NR	NR	NR	0
PADS	0.001		0	NR	NR	NR	NR	0
ICIS	0.001		0	NR	NR	NR	NR	0
FTTS	0.001		0	NR	NR	NR	NR	0
MLTS	0.001		0	NR	NR	NR	NR	0
COAL ASH DOE	0.001		0	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	0.001		0	NR	NR	NR	NR	0
RADINFO	0.001		0	NR	NR	NR	NR	0
HIST FTTS	0.001		0	NR	NR	NR	NR	0
DOT OPS	0.001		0	NR	NR	NR	NR	0
CONSENT	1.000		0	0	0	0	NR	0
INDIAN RESERV	0.001		0	NR	NR	NR	NR	0
FUSRAP	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
LEAD SMELTERS	0.001		0	NR	NR	NR	NR	0
US AIRS	0.001		0	NR	NR	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
ABANDONED MINES	0.001		0	NR	NR	NR	NR	0
FINDS	0.001		0	NR	NR	NR	NR	0
DOCKET HWC	0.001		0	NR	NR	NR	NR	0
UXO	1.000		0	0	0	0	NR	0
ECHO	0.001		0	NR	NR	NR	NR	0
FUELS PROGRAM	0.250		0	0	NR	NR	NR	0
AIRS	0.001		0	NR	NR	NR	NR	0
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
Financial Assurance	0.001		0	NR	NR	NR	NR	0
UIC	0.001		0	NR	NR	NR	NR	0
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	1.000		0	0	0	1	NR	1
EDR Hist Auto	0.125		0	NR	NR	NR	NR	0
EDR Hist Cleaner	0.125		0	NR	NR	NR	NR	0
EDR RECOVERED GOVERNMENT ARCHIVES								
Exclusive Recovered Govt. Archives								
RGA HWS	0.001		0	NR	NR	NR	NR	0
RGA LF	0.001		0	NR	NR	NR	NR	0
RGA LUST	0.001		0	NR	NR	NR	NR	0
- Totals --		0	0	0	18	17	0	35

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

1
North
1/4-1/2
0.320 mi.
1689 ft.

KUAWA STREET SOCCER FIELDS DEVELOPMENT SITE
KAMEHAMEHA HWY AND MANONO ST
HILO, HI 96720

SHWS **S118422838**
N/A

Relative:
Lower

Actual:
3 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Hawaii
Environmental Interest:	Kuawa Street Soccer Fields Development Site
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Program:	State
Project Manager:	John Peard
Hazard Priority:	Medium
Potential Hazards And Controls:	Hazard Present
Island:	Hawaii
SDAR Environmental Interest Name:	Kuawa Street Soccer Fields Development Site
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Potential Hazard And Controls:	Hazard Present
Priority:	Medium
Assessment:	Response Necessary
Response:	Response Ongoing
Nature of Contamination:	Found: Contaminants found over Tier 1 EALs in site screening: Lead and Arsenic.
Nature of Residual Contamination:	Not reported
Use Restrictions:	Controls Required to Manage Contamination
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	Not reported
Document Date:	Not reported
Document Number:	Not reported
Document Subject:	Not reported
Project Manager:	John Peard
Contact Information:	(808) 933-9921 Environmental Health Bldg, 1582 Kamehameha Ave, Hilo, HI 96720

A2
South
1/4-1/2
0.322 mi.
1698 ft.

WAIAKEA UPLAND ARSENIC SITE
CORNER OF MILILANI AND KEKUANAO STREETS
HILO, HI 96720

Site 1 of 3 in cluster A

SHWS **S110061849**
N/A

Relative:
Higher

Actual:
19 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Portion of Hawaii Cane Products site
Island:	Hawaii
Environmental Interest:	Waiakea Upland Arsenic Site
HID Number:	Not reported
Facility Registry Identifier:	110013775619
Lead Agency:	HEER
Program:	State
Project Manager:	John Peard
Hazard Priority:	Low

WAIAKEA UPLAND ARSENIC SITE (Continued) **S110061849**

Potential Hazards And Controls: Hazard Present
Island: Hawaii
SDAR Environmental Interest Name: Waiakea Upland Arsenic Site
HID Number: Not reported
Facility Registry Identifier: 110013775619
Lead Agency: HEER
Potential Hazard And Controls: Hazard Present
Priority: Low
Assessment: Assessment Ongoing
Response: Not reported
Nature of Contamination: Found: Arsenic in soil.
Nature of Residual Contamination: Not reported
Use Restrictions: Controls Required to Manage Contamination
Engineering Control: Not reported
Description of Restrictions: Not reported
Institutional Control: Not reported
Within Designated Areawide Contamination: Not reported
Site Closure Type: Not reported
Document Date: Not reported
Document Number: Not reported
Document Subject: Not reported
Project Manager: John Peard
Contact Information: (808) 933-9921 Environmental Health Bldg, 1582 Kamehameha Ave, Hilo, HI 96720

A3 **EXEMPT UST CLOSURE AT EXCELSIOR DAIRY** **SHWS 1006820203**
South **458 KEKUANAOA ST** **SPILLS N/A**
1/4-1/2 **HILO, HI 96720**
0.335 mi.
1771 ft. **Site 2 of 3 in cluster A**

Relative: **Higher**
Actual: **20 ft.**

SHWS:
Organization: Not reported
Supplemental Location: Not reported
Island: Hawaii
Environmental Interest: Exempt UST Closure at Excelsior Dairy
HID Number: Not reported
Facility Registry Identifier: 110013781201
Lead Agency: HEER
Program: State
Project Manager: Mark Sutterfield
Hazard Priority: NFA
Potential Hazards And Controls: No Hazard
Island: Hawaii
SDAR Environmental Interest Name: Exempt UST Closure at Excelsior Dairy
HID Number: Not reported
Facility Registry Identifier: 110013781201
Lead Agency: HEER
Potential Hazard And Controls: No Hazard
Priority: NFA
Assessment: Response Necessary
Response: Response Complete
Nature of Contamination: Found: Diesel
Nature of Residual Contamination: Diesel
Use Restrictions: No Hazard Present for Unrestricted Residential Use
Engineering Control: Not reported
Description of Restrictions: Not reported
Institutional Control: Not reported

EXEMPT UST CLOSURE AT EXCELSIOR DAIRY (Continued) **1006820203**

Within Designated Areawide Contamination: Not reported
Site Closure Type: No Further Action Letter - Unrestricted Residential Use
Document Date: 12/19/2005
Document Number: 2005-671-MS
Document Subject: NFA letter for diesel UST at Excelsior Dairy Hilo
Project Manager: Mark Sutterfield
Contact Information: (808) 586-4249 2385 Waimano Home Rd, Pearl City, HI 96782

HI SPILLS:
Island: Hawaii
Supplemental Loc. Text: Not reported
Case Number: 19991112-1052
HID Number: Not reported
Facility Registry Id: 110013781201
Lead and Program: HEER EP&R
ER: No
Units: Exempt UST Closure @ Excelsior Dairy
Substances: Diesel Fuel
Less Or Greater Than: Not reported
Numerical Quantity: Not reported
Units: Not reported
Activity Type: Response
Activity Lead: Bill Perry
Assignment End Date: Not reported
Result: Refer to ISST
File Under: Excelsior Dairy, Inc.
Latitude: 19.66932
Longitude: -155.307075

Island: Hawaii
Supplemental Loc. Text: Not reported
Case Number: 19991112-1052
HID Number: Not reported
Facility Registry Id: 110013781201
Lead and Program: HEER EP&R
ER: No
Units: Exempt UST Closure @ Excelsior Dairy
Substances: Diesel Fuel
Less Or Greater Than: Not reported
Numerical Quantity: Not reported
Units: Not reported
Activity Type: Response
Activity Lead: Bill Perry
Assignment End Date: Not reported
Result: Refer to ISST
File Under: Excelsior Dairy, Inc.
Latitude: 19.71148
Longitude: -155.071966

A4
South
1/4-1/2
0.335 mi.
1771 ft.

EXCELSIOR DAIRY
458 KEKAUANAOA ST
HILO, HI 96720

Site 3 of 3 in cluster A

LUST U003711780
UST N/A

Relative:
Higher

Actual:
20 ft.

LUST:
Facility ID: 9-603524
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 02/23/2006
Release ID: 990210
Project Officer: Shaobin Li

UST:
Facility ID: 9-603524
Owner: EXCELSIOR DIARY, INC
Owner Address: C/O MOUNTAIN VIEW DAIRY, INC POB 101
Owner City,St,Zip: Hilo, 96720 96720
Latitude: 19.711522
Longitude: -155.071813
Horizontal Reference Datum Name: NAD83
Horizontal Collection Method Name: Address Matching

Tank ID: R-2
Date Installed: 01/01/1970
Tank Status: Permanently Out of Use
Date Closed: 06/07/1999
Tank Capacity: 550
Substance: Gasoline

5
ENE
1/4-1/2
0.338 mi.
1787 ft.

S.K. ODA, LTD.
180 KALANIKOA ST
HILO, HI 96720

LUST U001236872
UST N/A

Relative:
Higher

Actual:
13 ft.

LUST:
Facility ID: 9-600449
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 09/27/1994
Release ID: 900012
Project Officer: Eric Sadoyama

UST:
Facility ID: 9-600449
Owner: S.K. ODA, LTD.
Owner Address: 1088 WAIHOLO ST
Owner City,St,Zip: Hilo, 96720 96720
Latitude: 19.719967
Longitude: -155.065869
Horizontal Reference Datum Name: NAD83
Horizontal Collection Method Name: Address Matching

Tank ID: R-1
Date Installed: 03/21/1961
Tank Status: Permanently Out of Use
Date Closed: Not reported
Tank Capacity: 6000
Substance: Gasoline

6
East
1/4-1/2
0.349 mi.
1841 ft.

PHILLIPS U DRIVE INC.
920 PIILANI ST
HILO, HI 96720

LUST U001236891
UST N/A

Relative:
Higher

Actual:
21 ft.

LUST:
Facility ID: 9-600480
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 08/18/1994
Release ID: 940182
Project Officer: Eric Sadoyama

UST:
Facility ID: 9-600480
Owner: PHILLIPS U DRIVE INC.
Owner Address: 920 PIILANI ST
Owner City,St,Zip: Hilo, 96720 96720
Latitude: 19.716300
Longitude: -155.065379
Horizontal Reference Datum Name: NAD83
Horizontal Collection Method Name: Address Matching

Tank ID: R-1
Date Installed: 04/24/1976
Tank Status: Permanently Out of Use
Date Closed: 03/19/1991
Tank Capacity: 8000
Substance: Gasoline

7
ENE
1/4-1/2
0.414 mi.
2188 ft.

JACK'S TOURS
226 KANOELEHUA AVE
HILO, HI 96720

LUST U003886215
UST N/A

Relative:
Lower

Actual:
11 ft.

LUST:
Facility ID: 9-603750
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 01/31/2003
Release ID: 030001
Project Officer: Jose Ruiz

UST:
Facility ID: 9-603750
Owner: JACK IWAO MIYASHIRO RECOVABLE LIVING TRUST
Owner Address: C/O ELLEN MIYASHIRO SAKAGAWA 5871 SOLEDAD ROAD
Owner City,St,Zip: Hilo, 96720 96720
Latitude: 19.719360
Longitude: -155.064476
Horizontal Reference Datum Name: NAD83
Horizontal Collection Method Name: Address Matching

Tank ID: R-1
Date Installed: Not reported
Tank Status: Permanently out of Use
Date Closed: 10/04/2002
Tank Capacity: 10000
Substance: Gasoline

JACK'S TOURS (Continued) **U003886215**

Tank ID: R-2
Date Installed: Not reported
Tank Status: Permanently out of Use
Date Closed: 10/04/2002
Tank Capacity: 10000
Substance: Diesel

Tank ID: R-3
Date Installed: Not reported
Tank Status: Permanently out of Use
Date Closed: 10/04/2002
Tank Capacity: 1000
Substance: Used Oil

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8 **SHIPMAN GENERATING STATION** **RCRA-TSDF 1007092162**
NNE **20 BANYAN DRIVE** **RCRA-SQG HIT000610899**
1/4-1/2 **HILO, HI 96720**
0.421 mi.
2225 ft.

Relative:
Lower

Actual:
8 ft.

RCRA-TSDF:
Date form received by agency: 03/19/2003
Facility name: SHIPMAN GENERATING STATION
Facility address: 20 BANYAN DRIVE
HILO, HI 96720
EPA ID: HIT000610899
Mailing address: P.O. BOX 1027
HILO, HI 96721-1027
Contact: DONN F FUKADA
Contact address: Not reported
Not reported
Contact country: US
Contact telephone: 808-543-4525
Contact email: Not reported
EPA Region: 09
Land type: Private
Classification: TSDF
Description: Handler is engaged in the treatment, storage or disposal of hazardous waste

Owner/Operator Summary:
Owner/operator name: HAWAII ELEC LIGHT CO
Owner/operator address: Not reported
Not reported
Owner/operator country: US
Owner/operator telephone: Not reported
Owner/operator email: Not reported
Owner/operator fax: Not reported
Owner/operator extension: Not reported
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: 01/01/1920
Owner/Op end date: Not reported

Owner/operator name: HAWAII ELECTRIC LIGHT COMPANY, INC.
Owner/operator address: Not reported

SHIPMAN GENERATING STATION (Continued) **1007092162**

HI
Owner/operator country: US
Owner/operator telephone: Not reported
Owner/operator email: Not reported
Owner/operator fax: Not reported
Owner/operator extension: Not reported
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: 01/01/1920
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: Yes
Used oil transfer facility: No
Used oil transporter: No

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D008
. Waste name: LEAD

Historical Generators:
Date form received by agency: 10/05/1993
Site name: HAWAII ELECTRIC LIGHT CO SHIPMAN GEN STE
Classification: Not a generator, verified

Date form received by agency: 07/29/1993
Site name: HAWAII ELECTRIC LIGHT CO SHIPMAN GEN STE
Classification: Not a generator, verified

Facility Has Received Notices of Violations:
Regulation violated: Not reported
Area of violation: Generators - Pre-transport
Date violation determined: 01/18/2008
Date achieved compliance: 09/03/2008
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 01/18/2008
Enf. disposition status: Not reported
Enf. disp. status date: Not reported

SHIPMAN GENERATING STATION (Continued) **1007092162**

Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: Generators - General
Date violation determined: 01/18/2008
Date achieved compliance: 09/03/2008
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 01/18/2008
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Evaluation Action Summary:
Evaluation date: 09/26/2007
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Generators - General
Date achieved compliance: 09/03/2008
Evaluation lead agency: State

Evaluation date: 09/26/2007
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Generators - Pre-transport
Date achieved compliance: 09/03/2008
Evaluation lead agency: State

B9 **WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT** **SEMS** **1000147193**
West **HILO** **HID982400475**
1/4-1/2 **HILO, HI 96720**
0.435 mi.
2296 ft. **Site 1 of 2 in cluster B**

Relative: Higher
Actual: 19 ft.

SEMS:
Site ID: 900302
EPA ID: HID982400475
Cong District: 2
FIPS Code: 15001
Latitude: Not reported
Longitude: Not reported
FF: N
NPL: Not on the NPL
Non NPL Status: Other Cleanup Activity: State-Lead Cleanup

SEMS Detail:
Region: 9
Site ID: 900302
EPA ID: HID982400475
Site Name: WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT
NPL: N
FF: N
OU: 0
Action Code: SI
Action Name: SI

WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT (Continued) **1000147193**

SEQ: 1
Start Date: Not reported
Finish Date: 3/26/1991
Qual: H
Current Action Lead: EPA Perf

Region: 9
Site ID: 900302
EPA ID: HID982400475
Site Name: WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT
NPL: N
FF: N
OU: 0
Action Code: PA
Action Name: PA
SEQ: 1
Start Date: Not reported
Finish Date: 12/13/1989
Qual: H
Current Action Lead: EPA Perf

Region: 9
Site ID: 900302
EPA ID: HID982400475
Site Name: WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT
NPL: N
FF: N
OU: 0
Action Code: DS
Action Name: DISCVRY
SEQ: 1
Start Date: 1988-08-01 00:00:00
Finish Date: 8/1/1988
Qual: Not reported
Current Action Lead: EPA Perf

B10 **LARRY'S CHEVRON** **SHWS** **U001237010**
West **835 KILAUEA AVE** **LUST** **N/A**
1/4-1/2 **HILO, HI 96720** **UST**
0.447 mi. **Financial Assurance**
2361 ft. **Site 2 of 2 in cluster B**

Relative: **Higher**
Actual: **19 ft.**

SHWS:
Organization: Not reported
Supplemental Location: Not reported
Island: Hawaii
Environmental Interest: Larry's Kaikoo Chevron
HID Number: Not reported
Facility Registry Identifier: 110013772471
Lead Agency: HEER
Program: State
Project Manager: Mark Sutterfield
Hazard Priority: NFA
Potential Hazards And Controls: No Hazard
Island: Hawaii
SDAR Environmental Interest Name: Larry's Kaikoo Chevron
HID Number: Not reported

LARRY'S CHEVRON (Continued) **U001237010**

Facility Registry Identifier: 110013772471
Lead Agency: HEER
Potential Hazard And Controls: No Hazard
Priority: NFA
Assessment: Response Necessary
Response: Response Complete
Nature of Contamination: Not reported
Nature of Residual Contamination: Petroleum contaminated soil
Use Restrictions: No Hazard Present for Unrestricted Residential Use
Engineering Control: Not reported
Description of Restrictions: Not reported
Institutional Control: Not reported
Within Designated Areawide Contamination: Not reported
Site Closure Type: No Further Action Letter - Unrestricted Residential Use
Document Date: 06/30/2004
Document Number: 2004-252-MS
Document Subject: NFA letter for Larry's Kilauea Chevron
Project Manager: Mark Sutterfield
Contact Information: (808) 586-4249 2385 Waimano Home Rd, Pearl City, HI 96782

LUST:
Facility ID: 9-601136
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 09/07/2004
Release ID: 030044
Project Officer: Richard Takaba

UST:
Facility ID: 9-601136
Owner: CHEVRON PRODUCTS COMPANY
Owner Address: 91-480 MALAKOLE ST.
Owner City,St,Zip: Hilo, 96720 96720
Latitude: 19.716121
Longitude: -155.078374
Horizontal Reference Datum Name: NAD83
Horizontal Collection Method Name: GPS

Tank ID: R-1
Date Installed: 07/17/1983
Tank Status: Permanently Out of Use
Date Closed: 08/20/2003
Tank Capacity: 10000
Substance: Gasoline

Tank ID: R-2
Date Installed: 07/17/1983
Tank Status: Permanently Out of Use
Date Closed: 08/20/2003
Tank Capacity: 10000
Substance: Gasoline

Tank ID: R-3
Date Installed: 07/17/1983
Tank Status: Permanently Out of Use

LARRY'S CHEVRON (Continued) **U001237010**

Date Closed: 08/20/2003
Tank Capacity: 10000
Substance: Gasoline

Tank ID: R-4
Date Installed: 07/17/1983
Tank Status: Permanently Out of Use
Date Closed: 08/20/2003
Tank Capacity: 1000
Substance: Used Oil

HI Financial Assurance:
Alt Facility ID: 9-601136
Tank Id: R-1
Tank Status: Permanently Out of Use
FRTYPE: Self Insured
Expiration Date: Not reported

Alt Facility ID: 9-601136
Tank Id: R-2
Tank Status: Permanently Out of Use
FRTYPE: Self Insured
Expiration Date: Not reported

Alt Facility ID: 9-601136
Tank Id: R-3
Tank Status: Permanently Out of Use
FRTYPE: Self Insured
Expiration Date: Not reported

Alt Facility ID: 9-601136
Tank Id: R-4
Tank Status: Permanently Out of Use
FRTYPE: Self Insured
Expiration Date: Not reported

11
ESE
1/4-1/2
0.452 mi.
2385 ft.

HELCO PIPELINE RELEASE HUALANI HILO **SHWS S106817545**
KANOELEHUA AVE & HUALANI ST **N/A**
HILO, HI 96720

Relative:
Higher

Actual:
30 ft.

SHWS:
Organization: Not reported
Supplemental Location: Not reported
Island: Hawaii
Environmental Interest: HELCO Pipeline Release Hualani Hilo
HID Number: Not reported
Facility Registry Identifier: Not reported
Lead Agency: HEER
Program: State
Project Manager: Not reported
Hazard Priority: NFA
Potential Hazards And Controls: No Hazard
Island: Hawaii
SDAR Environmental Interest Name: HELCO Pipeline Release Hualani Hilo

HELCO PIPELINE RELEASE HUALANI HILO (Continued) **S106817545**

HID Number: Not reported
Facility Registry Identifier: Not reported
Lead Agency: HEER
Potential Hazard And Controls: No Hazard
Priority: NFA
Assessment: Response Necessary
Response: Response Complete
Nature of Contamination: Found: Oil pipeline break
Nature of Residual Contamination: Not reported
Use Restrictions: No Hazard Present For Unrestricted Residential Use
Engineering Control: Not reported
Description of Restrictions: Not reported
Institutional Control: Not reported
Within Designated Areawide Contamination: Not reported
Site Closure Type: No Further Action Letter - Unrestricted Residential Use
Document Date: 02/16/2010
Document Number: 2010-123-RP
Document Subject: NFA -Hualani Pipeline Release, Removal Action Report, Hawaiian Electric Light Company, Hilo Hawaii
Project Manager: Not reported
Contact Information: (808) 586-4249 2385 Waimano Home Rd, Pearl City, HI 96782

12
NW
1/4-1/2
0.456 mi.
2406 ft.

UST EXCAVATED BISHOP AND KAMEHAMEHA **SHWS** **S118943724**
BISHOP ST AND KAMEHAMEHA AVE **N/A**
HILO, HI 96720

Relative:
Lower

Actual:
4 ft.

SHWS:
Organization: Not reported
Supplemental Location: Not reported
Island: Hawaii
Environmental Interest: UST excavated Bishop and Kamehameha
HID Number: Not reported
Facility Registry Identifier: Not reported
Lead Agency: HEER
Program: State
Project Manager: John Peard
Hazard Priority: Low
Potential Hazards And Controls: Hazard Undetermined
Island: Hawaii
SDAR Environmental Interest Name: UST excavated Bishop and Kamehameha
HID Number: Not reported
Facility Registry Identifier: Not reported
Lead Agency: HEER
Potential Hazard And Controls: Hazard Undetermined
Priority: Low
Assessment: Assessment Ongoing
Response: Not reported
Nature of Contamination: Not reported
Nature of Residual Contamination: Not reported
Use Restrictions: Undetermined
Engineering Control: Not reported
Description of Restrictions: Not reported
Institutional Control: Not reported
Within Designated Areawide Contamination: Not reported
Site Closure Type: Not reported
Document Date: Not reported

UST EXCAVATED BISHOP AND KAMEHAMEHA (Continued) **S118943724**

Document Number: Not reported
Document Subject: Not reported
Project Manager: John Peard
Contact Information: (808) 933-9921 Environmental Health Bldg, 1582 Kamehameha Ave, Hilo, HI 96720

C13 **TESORO GAS EXPRESS 82** **LUST U003402964**
NE **1672 KAMEHAMEHA AVE** **UST N/A**
1/4-1/2 **HILO, HI 96720** **Financial Assurance**
0.464 mi.
2449 ft. **Site 1 of 2 in cluster C**

Relative: **Lower**

Actual: **9 ft.**

LUST:
Facility ID: 9-600708
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 06/19/2000
Release ID: 940057
Project Officer: Jeffrey Ung

UST:
Facility ID: 9-600708
Owner: Tesoro Refining & Marketing Company, LLC
Owner Address: 3450 S. 344th Way, Suite 201
Owner City,St,Zip: Hilo, 96720 96720
Latitude: 19.722237
Longitude: -155.065577
Horizontal Reference Datum Name: NAD83
Horizontal Collection Method Name: GPS

Tank ID: R-1
Date Installed: 05/11/1956
Tank Status: **Permanently Out of Use**
Date Closed: 04/17/1994
Tank Capacity: 3000
Substance: Gasoline

Tank ID: R-2
Date Installed: 05/11/1956
Tank Status: **Permanently Out of Use**
Date Closed: 04/17/1994
Tank Capacity: 2000
Substance: Gasoline

Tank ID: R-5
Date Installed: 05/11/1956
Tank Status: **Permanently Out of Use**
Date Closed: 04/17/1994
Tank Capacity: 500
Substance: Used Oil

Tank ID: r-87
Date Installed: 04/01/1988
Tank Status: **Permanently Out of Use**
Date Closed: 05/04/2005

TESORO GAS EXPRESS 82 (Continued) **U003402964**

Tank Capacity: 8000
Substance: Gasoline

Tank ID: r-92
Date Installed: 04/01/1988
Tank Status: Permanently Out of Use
Date Closed: 05/04/2005
Tank Capacity: 8000
Substance: Gasoline

HI Financial Assurance:
Alt Facility ID: 9-600708
Tank Id: r-87
Tank Status: Permanently Out of Use
FRTYPE: Other
Expiration Date: Not reported

Alt Facility ID: 9-600708
Tank Id: r-92
Tank Status: Permanently Out of Use
FRTYPE: Guarantee
Expiration Date: Not reported

Alt Facility ID: 9-600708
Tank Id: r-87
Tank Status: Permanently Out of Use
FRTYPE: Guarantee
Expiration Date: Not reported

Alt Facility ID: 9-600708
Tank Id: R-5
Tank Status: Permanently Out of Use
FRTYPE: Other
Expiration Date: Not reported

Alt Facility ID: 9-600708
Tank Id: R-2
Tank Status: Permanently Out of Use
FRTYPE: Other
Expiration Date: Not reported

Alt Facility ID: 9-600708
Tank Id: R-2
Tank Status: Permanently Out of Use
FRTYPE: Guarantee
Expiration Date: Not reported

Alt Facility ID: 9-600708
Tank Id: R-1
Tank Status: Permanently Out of Use
FRTYPE: Guarantee
Expiration Date: Not reported

Alt Facility ID: 9-600708
Tank Id: R-1
Tank Status: Permanently Out of Use

TESORO GAS EXPRESS 82 (Continued) **U003402964**

FRTYPE: Other
Expiration Date: Not reported

Alt Facility ID: 9-600708
Tank Id: r-92
Tank Status: Permanently Out of Use
FRTYPE: Other
Expiration Date: Not reported

Alt Facility ID: 9-600708
Tank Id: R-5
Tank Status: Permanently Out of Use
FRTYPE: Guarantee
Expiration Date: Not reported

C14 **HARPER CAR & TRUCK RENTALS OF HAWAII** **LUST U003222397**
NE **1690 KAMEHAMEHA AVE** **UST N/A**
1/4-1/2 **HILO, HI 96720**
0.466 mi.
2460 ft. **Site 2 of 2 in cluster C**

Relative:
Lower

Actual:
9 ft.

LUST:
Facility ID: 9-603156
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 06/24/2000
Release ID: 960054
Project Officer: Richard Takaba

UST:
Facility ID: 9-603156
Owner: Harper Car & Truck Rentals of Hawaii
Owner Address: 4456 KALANIANAOLE AVE
Owner City,St,Zip: Hilo, 96720 96720
Latitude: 19.722400
Longitude: -155.064895
Horizontal Reference Datum Name: NAD83
Horizontal Collection Method Name: Address Matching

Tank ID: R-1
Date Installed: Not reported
Tank Status: Permanently Out of Use
Date Closed: 04/02/1996
Tank Capacity: 1000
Substance: Diesel

Tank ID: R-2
Date Installed: Not reported
Tank Status: Permanently Out of Use
Date Closed: 04/02/1996
Tank Capacity: 8050
Substance: Gasoline

D15
SW
1/4-1/2
0.475 mi.
2508 ft.

DUKE'S SHELL
1104 KILAUEA AVE.
HILO, HI 96720

Site 1 of 2 in cluster D

LUST **U001237039**
UST **N/A**
Financial Assurance

Relative:
Higher

Actual:
23 ft.

LUST:

Facility ID:	9-601320
Facility Status:	Site Cleanup Completed (NFA)
Facility Status Date:	09/18/2002
Release ID:	020029
Project Officer:	Jose Ruiz

Facility ID:	9-601320
Facility Status:	Site Cleanup Completed (NFA)
Facility Status Date:	06/19/2002
Release ID:	930099
Project Officer:	Jose Ruiz

UST:

Facility ID:	9-601320
Owner:	ALOHA PETROLEUM, LTD.
Owner Address:	1132 BISHOP STREET, SUITE 1700
Owner City,St,Zip:	Hilo, 96720 96720
Latitude:	19.712473
Longitude:	-155.077499

Horizontal Reference Datum Name: NAD83
Horizontal Collection Method Name: Map

Tank ID:	1
Date Installed:	03/22/1990
Tank Status:	**Currently in Use**
Date Closed:	Not reported
Tank Capacity:	12000
Substance:	Gasohol

Tank ID:	2
Date Installed:	03/22/1990
Tank Status:	**Currently in Use**
Date Closed:	Not reported
Tank Capacity:	12000
Substance:	Gasohol

Tank ID:	3
Date Installed:	03/22/1990
Tank Status:	**Currently in Use**
Date Closed:	Not reported
Tank Capacity:	12000
Substance:	Diesel

Tank ID:	R-1
Date Installed:	04/18/1972
Tank Status:	**Permanently Out of Use**
Date Closed:	03/22/1990
Tank Capacity:	8000
Substance:	Gasoline

DUKE'S SHELL (Continued) **U001237039**

Tank ID: R-2
Date Installed: 04/18/1972
Tank Status: **Permanently Out of Use**
Date Closed: 03/22/1990
Tank Capacity: 6000
Substance: Gasoline

Tank ID: R-3
Date Installed: 04/18/1972
Tank Status: **Permanently Out of Use**
Date Closed: 03/22/1990
Tank Capacity: 6000
Substance: Gasoline

Tank ID: R-4
Date Installed: 03/22/1990
Tank Status: **Permanently Out of Use**
Date Closed: 04/04/2002
Tank Capacity: 550
Substance: Used Oil

Tank ID: R-4
Date Installed: 04/18/1972
Tank Status: **Permanently Out of Use**
Date Closed: 03/22/1990
Tank Capacity: 550
Substance: Used Oil

HI Financial Assurance:
Alt Facility ID: 9-601320
Tank Id: R-2
Tank Status: Permanently Out of Use
FRTYPE: Not reported
Expiration Date: Not reported

Alt Facility ID: 9-601320
Tank Id: R-4
Tank Status: Permanently Out of Use
FRTYPE: Not reported
Expiration Date: Not reported

Alt Facility ID: 9-601320
Tank Id: R-3
Tank Status: Permanently Out of Use
FRTYPE: Not reported
Expiration Date: Not reported

Alt Facility ID: 9-601320
Tank Id: R-1
Tank Status: Permanently Out of Use
FRTYPE: Not reported
Expiration Date: Not reported

Alt Facility ID: 9-601320

DUKE'S SHELL (Continued) **U001237039**

Tank Id: 1
Tank Status: Currently in Use
FRTYPE: Not reported
Expiration Date: Not reported

Alt Facility ID: 9-601320
Tank Id: 3
Tank Status: Currently in Use
FRTYPE: Not reported
Expiration Date: Not reported

Alt Facility ID: 9-601320
Tank Id: 2
Tank Status: Currently in Use
FRTYPE: Not reported
Expiration Date: Not reported

Alt Facility ID: 9-601320
Tank Id: R-2
Tank Status: Permanently Out of Use
FRTYPE: Insurance
Expiration Date: 09/15/2016

Alt Facility ID: 9-601320
Tank Id: 1
Tank Status: Currently in Use
FRTYPE: Insurance
Expiration Date: 09/15/2016

Alt Facility ID: 9-601320
Tank Id: R-3
Tank Status: Permanently Out of Use
FRTYPE: Insurance
Expiration Date: 09/15/2016

Alt Facility ID: 9-601320
Tank Id: R-1
Tank Status: Permanently Out of Use
FRTYPE: Insurance
Expiration Date: 09/15/2016

Alt Facility ID: 9-601320
Tank Id: 2
Tank Status: Currently in Use
FRTYPE: Insurance
Expiration Date: 09/15/2016

Alt Facility ID: 9-601320
Tank Id: 3
Tank Status: Currently in Use
FRTYPE: Insurance
Expiration Date: 09/15/2016

Alt Facility ID: 9-601320
Tank Id: R-4
Tank Status: Permanently Out of Use
FRTYPE: Insurance

DUKE'S SHELL (Continued) **U001237039**

Expiration Date: 09/15/2016

D16 **PACIFIC RENT-ALL, INC** **LUST U001237102**
SW **1080 KILAUEA AVE** **UST N/A**
1/4-1/2 **HILO, HI 96720**
0.478 mi.
2523 ft. **Site 2 of 2 in cluster D**

Relative: Higher
Actual: 23 ft.

LUST:
Facility ID: 9-601678
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 11/07/1995
Release ID: 940099
Project Officer: Roger Brewer

UST:
Facility ID: 9-601678
Owner: MASAMI & MAE M. AITO
Owner Address: Not reported
Owner City,St,Zip: Hilo, 96720 96720
Latitude: 19.712573
Longitude: -155.077293
Horizontal Reference Datum Name: NAD
Horizontal Collection Method Name: Address Matching

Tank ID: r-1
Date Installed: 04/12/1973
Tank Status: Permanently Out of Use
Date Closed: 03/04/1994
Tank Capacity: 550
Substance: Gasoline

Tank ID: r-1
Date Installed: 04/12/1973
Tank Status: Permanently Out of Use
Date Closed: 03/04/1994
Tank Capacity: 550
Substance: Gasoline

---

17 **AIM HILO** **LUST U001237016**
SE **761 KEKUANAOA ST** **UST N/A**
1/4-1/2 **HILO, HI 96720** **Financial Assurance**
0.498 mi.
2629 ft.

Relative: Higher
Actual: 27 ft.

LUST:
Facility ID: 9-601195
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 08/11/2008
Release ID: 050009
Project Officer: Josh Nagashima

UST:
Facility ID: 9-601195

AIM HILO (Continued) **U001237016**

Owner: ALOHA PETROLEUM, LTD.
Owner Address: 1132 BISHOP STREET, SUITE 1700
Owner City,St,Zip: Hilo, 96720 96720
Latitude: 19.711845
Longitude: -155.064567
Horizontal Reference Datum Name: NAD83
Horizontal Collection Method Name: GPS

Tank ID: 87a
Date Installed: 04/04/1985
Tank Status: **Currently in Use**
Date Closed: Not reported
Tank Capacity: 8000
Substance: Gasohol

Tank ID: 92
Date Installed: 04/04/1985
Tank Status: **Currently in Use**
Date Closed: Not reported
Tank Capacity: 8000
Substance: Gasohol

Tank ID: 98b
Date Installed: 04/04/1985
Tank Status: **Currently in Use**
Date Closed: Not reported
Tank Capacity: 8000
Substance: Gasohol

HI Financial Assurance:
Alt Facility ID: 9-601195
Tank Id: 5
Tank Status: To be installed
FRTYPE: Insurance
Expiration Date: 04/01/2015

Alt Facility ID: 9-601195
Tank Id: 6
Tank Status: To be installed
FRTYPE: Insurance
Expiration Date: 04/01/2015

Alt Facility ID: 9-601195
Tank Id: 87a
Tank Status: Currently in Use
FRTYPE: Insurance
Expiration Date: 04/01/2015

Alt Facility ID: 9-601195
Tank Id: 92
Tank Status: Currently in Use
FRTYPE: Insurance
Expiration Date: 04/01/2015

Alt Facility ID: 9-601195

AIM HILO (Continued) **U001237016**

Tank Id: 98b
Tank Status: Currently in Use
FRTYPE: Insurance
Expiration Date: 04/01/2015

Alt Facility ID: 9-601195
Tank Id: 4
Tank Status: To be installed
FRTYPE: Insurance
Expiration Date: 04/01/2015

---

18 **HILO SHOPPING CENTER** **SHWS S106817730**
SW **1255 KILAUEA AVE** **SPILLS N/A**
1/2-1 **HILO, HI 96720**
0.524 mi.
2766 ft.

Relative:
Higher

Actual:
35 ft.

SHWS:
Organization: Not reported
Supplemental Location: Not reported
Island: Hawaii
Environmental Interest: Hilo Shopping Center
HID Number: Not reported
Facility Registry Identifier: Not reported
Lead Agency: HEER
Program: State
Project Manager: Mark Sutterfield
Hazard Priority: NFA
Potential Hazards And Controls: No Hazard
Island: Hawaii
SDAR Environmental Interest Name: Hilo Shopping Center
HID Number: Not reported
Facility Registry Identifier: Not reported
Lead Agency: HEER
Potential Hazard And Controls: No Hazard
Priority: NFA
Assessment: Response Necessary
Response: Response Complete
Nature of Contamination: Found: Diesel in soil
Nature of Residual Contamination: Petroleum contaminated soil
Use Restrictions: No Hazard Present for Unrestricted Residential Use
Engineering Control: Not reported
Description of Restrictions: Not reported
Institutional Control: Not reported
Within Designated Areawide Contamination: Not reported
Site Closure Type: No Further Action Letter - Unrestricted Residential Use
Document Date: 10/03/2005
Document Number: 2005-508-MS
Document Subject: NFA for 550-gallon diesel UST
Project Manager: Mark Sutterfield
Contact Information: (808) 586-4249 2385 Waimano Home Rd, Pearl City, HI 96782

HI SPILLS:
Island: Hawaii
Supplemental Loc. Text: Not reported
Case Number: 20040510-1040
HID Number: Not reported

HILO SHOPPING CENTER (Continued) **S106817730**

Facility Registry Id: Not reported
Lead and Program: HEER EP&R
ER: No
Units: Hilo Shopping Center non-regulated UST release
Substances: Diesel Fuel
Less Or Greater Than: <
Numerical Quantity: 25
Units: Gallons
Activity Type: Response
Activity Lead: Liz Galvez
Assignment End Date: Not reported
Result: Refer to ISST
File Under: Hilo Shopping Center
Latitude: 19.710069
Longitude: -155.076339

Island: Hawaii
Supplemental Loc. Text: Not reported
Case Number: 20040510-1040
HID Number: Not reported
Facility Registry Id: Not reported
Lead and Program: HEER EP&R
ER: No
Units: Hilo Shopping Center non-regulated UST release
Substances: Diesel Fuel
Less Or Greater Than: <
Numerical Quantity: 25
Units: Gallons
Activity Type: Response
Activity Lead: Liz Galvez
Assignment End Date: Not reported
Result: Refer to ISST
File Under: Hilo Shopping Center
Latitude: 19.66932
Longitude: -155.307075

19
NW
1/2-1
0.528 mi.
2786 ft.

Relative:
Lower

Actual:
4 ft.

KHI INC. DBA BAYSIDE CHEVRON **SHWS** **U001237007**
774 KAMEHAMEHA AVE **LUST** **N/A**
HILO, HI 96720 **UST**
INST CONTROL
SPILLS
Financial Assurance

SHWS:
Organization: Not reported
Supplemental Location: Kamehameha and Pauahi Street, SE corner
Island: Hawaii
Environmental Interest: Bayside Chevron Service
HID Number: Not reported
Facility Registry Identifier: 110013783646
Lead Agency: HEER
Program: State
Project Manager: Anna Fernandez
Hazard Priority: NFA
Potential Hazards And Controls: Hazard Managed With Controls
Island: Hawaii
SDAR Environmental Interest Name: Bayside Chevron Service
HID Number: Not reported

KHI INC. DBA BAYSIDE CHEVRON (Continued) **U001237007**

Facility Registry Identifier: 110013783646
Lead Agency: HEER
Potential Hazard And Controls: Hazard Managed With Controls
Priority: NFA
Assessment: Response Necessary
Response: Response Complete
Nature of Contamination: Found: TPH-O of 0.736 mg/l in groundwater in MW-3
Nature of Residual Contamination: Subsurface soil with TPH-G, UH-d, UH-o and total xylene concentrations exceeding HDOH EALs remains on site 3 feet below the station building.
Use Restrictions: Controls Required to Manage Contamination
Engineering Control: Not reported
Description of Restrictions: A soil management plan is required.
Institutional Control: Government - Hawaii Dept. of Health Letter Issued
Within Designated Areawide Contamination: Not reported
Site Closure Type: No Further Action Letter - Restricted Use
Document Date: 04/27/2007
Document Number: 2007-269-AF
Document Subject: No Further Action with Institutional Controls Determination
Project Manager: Anna Fernandez
Contact Information: (808) 586-4249 2385 Waimano Home Rd, Pearl City, HI 96782

LUST:
Facility ID: 9-601133
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 02/01/1999
Release ID: 970106
Project Officer: Richard Takaba

Facility ID: 9-601133
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 04/20/2004
Release ID: 040017
Project Officer: Richard Takaba

UST:
Facility ID: 9-601133
Owner: KHI dba Bayside Chevron
Owner Address: 774 Kamehameha Ave
Owner City,St,Zip: Hilo, 96720 96720
Latitude: 19.721900
Longitude: -155.078450
Horizontal Reference Datum Name: NAD83
Horizontal Collection Method Name: GPS

Tank ID: 1
Date Installed: 08/21/1983
Tank Status: **Currently In Use**
Date Closed: Not reported
Tank Capacity: 10000
Substance: Gasoline

Tank ID: 2
Date Installed: 08/21/1983
Tank Status: **Currently In Use**
Date Closed: Not reported

KHI INC. DBA BAYSIDE CHEVRON (Continued) **U001237007**

Tank Capacity: 10000
Substance: Gasohol

Tank ID: 3
Date Installed: 08/21/1983
Tank Status: Currently In Use
Date Closed: Not reported
Tank Capacity: 10000
Substance: Gasohol

Tank ID: R-005
Date Installed: 08/20/1969
Tank Status: Permanently Out of Use
Date Closed: 09/01/1983
Tank Capacity: 1000
Substance: Used Oil

Tank ID: R-4
Date Installed: 08/21/1983
Tank Status: Permanently Out of Use
Date Closed: 04/03/1997
Tank Capacity: 1000
Substance: Used Oil

INST CONTROL:
Potential hazards and controls: Hazard Managed With Controls
Supplemental Location: Kamehameha and Pauahi Street, SE corner
Zip Suffix: Not reported
Island: Hawaii
Institutional Control: Government - Hawaii Dept. of Health Letter Issued

HI SPILLS:
Island: Hawaii
Supplemental Loc. Text: Kamehameha and Pauahi Street, SE corner
Case Number: 20040629-1542
HID Number: Not reported
Facility Registry Id: 110013783646
Lead and Program: HEER EP&R
ER: Not reported
Units: Bayside Chevron Contaminated Soil
Substances: Not reported
Less Or Greater Than: Not reported
Numerical Quantity: Not reported
Units: Not reported
Activity Type: Response
Activity Lead: Mike Cripps
Assignment End Date: 2005-08-30 00:00:00
Result: Refer to ISST
File Under: Chevron Products Company
Latitude: 19.66932
Longitude: -155.307075

Island: Hawaii

KHI INC. DBA BAYSIDE CHEVRON (Continued) **U001237007**

Supplemental Loc. Text: Kamehameha and Pauahi Street, SE corner
Case Number: 20040629-1542
HID Number: Not reported
Facility Registry Id: 110013783646
Lead and Program: HEER EP&R
ER: Not reported
Units: Bayside Chevron Contaminated Soil
Substances: Not reported
Less Or Greater Than: Not reported
Numerical Quantity: Not reported
Units: Not reported
Activity Type: Response
Activity Lead: Mike Cripps
Assignment End Date: 2005-08-30 00:00:00
Result: Refer to ISST
File Under: Chevron Products Company
Latitude: 19.722126
Longitude: -155.079456

HI Financial Assurance:
Alt Facility ID: 9-601133
Tank Id: 1
Tank Status: Currently In Use
FRTYPE: Insurance
Expiration Date: 05/09/2016

Alt Facility ID: 9-601133
Tank Id: 2
Tank Status: Currently In Use
FRTYPE: Insurance
Expiration Date: 05/09/2016

Alt Facility ID: 9-601133
Tank Id: 3
Tank Status: Currently In Use
FRTYPE: Insurance
Expiration Date: 05/09/2016

Alt Facility ID: 9-601133
Tank Id: R-005
Tank Status: Permanently Out of Use
FRTYPE: Insurance
Expiration Date: 05/09/2016

Alt Facility ID: 9-601133
Tank Id: R-4
Tank Status: Permanently Out of Use
FRTYPE: Insurance
Expiration Date: 05/09/2016

20
SE
1/2-1
0.636 mi.
3356 ft.

STATIONERS CORPORATION OF HAWAII — **SHWS** **S108009231**
708 KANOELEHUA AVE — **SPILLS** **N/A**
HILO, HI 96720

Relative:
Higher

Actual:
29 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	ESA Limited Phase II Investigation
Island:	Hawaii
Environmental Interest:	Stationers Corporation of Hawaii
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Program:	State
Project Manager:	Clarence Calihan
Hazard Priority:	NFA
Potential Hazards And Controls:	No Hazard
Island:	Hawaii
SDAR Environmental Interest Name:	Stationers Corporation of Hawaii
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Potential Hazard And Controls:	No Hazard
Priority:	NFA
Assessment:	Response Necessary
Response:	Response Complete
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Not reported
Use Restrictions:	No Hazard Present For Unrestricted Residential Use
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action Letter - Unrestricted Residential Use
Document Date:	12/09/2005
Document Number:	2005-637-CAC
Document Subject:	Review of the Limited Phase II ESA
Project Manager:	Clarence Calihan
Contact Information:	(808) 586-4249 2385 Waimano Home Rd, Pearl City, HI 96782

HI SPILLS:

Island:	Hawaii
Supplemental Loc. Text:	ESA Limited Phase II Investigation
Case Number:	20051123-0823
HID Number:	Not reported
Facility Registry Id:	Not reported
Lead and Program:	HEER EP&R
ER:	No
Units:	Building Materials Survey - Typewriter Cleaning Station
Substances:	Unknown
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Not reported
Activity Type:	Response
Activity Lead:	Curtis Martin
Assignment End Date:	2005-11-23 00:00:00
Result:	SOSC NFA
File Under:	Stationers Corporation of Hawaii

STATIONERS CORPORATION OF HAWAII (Continued) **S108009231**

Latitude: 19.66932
Longitude: -155.307075

Island: Hawaii
Supplemental Loc. Text: ESA Limited Phase II Investigation
Case Number: 20051123-0823
HID Number: Not reported
Facility Registry Id: Not reported
Lead and Program: HEER EP&R
ER: No
Units: Building Materials Survey - Typewriter Cleaning Station
Substances: Unknown
Less Or Greater Than: Not reported
Numerical Quantity: Not reported
Units: Not reported
Activity Type: Response
Activity Lead: Curtis Martin
Assignment End Date: 2005-11-23 00:00:00
Result: SOSC NFA
File Under: Stationers Corporation of Hawaii
Latitude: 19.709235
Longitude: -155.064704

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21 **HELCO PIPELINE ANOMALY AT NORTHEAST SIDE OF SEASID** **SHWS S111677284**
NE **126 BANYAN WY** **SPILLS N/A**
1/2-1 **HILO, HI 96720**
0.655 mi.
3459 ft.

Relative: **Lower**

Actual: **3 ft.**

SHWS:
Organization: Not reported
Supplemental Location: Seaside Hotel
Island: Hawaii
Environmental Interest: HELCO Shipman Plant Bunker Fuel Line
HID Number: Not reported
Facility Registry Identifier: Not reported
Lead Agency: HEER
Program: State
Project Manager: Amelia Hicks
Hazard Priority: NFA
Potential Hazards And Controls: No Hazard
Island: Hawaii
SDAR Environmental Interest Name: HELCO Shipman Plant Bunker Fuel Line
HID Number: Not reported
Facility Registry Identifier: Not reported
Lead Agency: HEER
Potential Hazard And Controls: No Hazard
Priority: NFA
Assessment: Response Necessary
Response: Response Complete
Nature of Contamination: Not reported
Nature of Residual Contamination: TPH detected at maximum concentrations of 1,800 mg/kg (below State Unrestricted Tier 2 Environmental Action Levels (HDOH EALs). No indications of leaks or other structural failures along the pipeline and the excavated area was backfilled.
Use Restrictions: No Hazard Present For Unrestricted Residential Use
Engineering Control: Not reported
Description of Restrictions: Not reported

HELCO PIPELINE ANOMALY AT NORTHEAST SIDE OF SEASIDE HOTEL (Continued) **S111677284**

Institutional Control: Not reported
Within Designated Areawide Contamination: Not reported
Site Closure Type: No Further Action Letter - Unrestricted Residential Use
Document Date: 07/16/2012
Document Number: 2012-433-AH
Document Subject: No Further Action Determination for HELCO Shipman Plant Bunker Fuel Line
Project Manager: Amelia Hicks
Contact Information: (808) 586-4249 2385 Waimano Home Rd, Pearl City, HI 96782

HI SPILLS:
Island: Hawaii
Supplemental Loc. Text: Seaside Hotel
Case Number: 20100323-1647
HID Number: Not reported
Facility Registry Id: Not reported
Lead and Program: HEER EP&R
ER: None
Units: HELCO Shipman Plant Bunker Fuel Line
Substances: Diesel Fuel Bunker
Less Or Greater Than: Not reported
Numerical Quantity: 25
Units: Gallons
Activity Type: Response
Activity Lead: Liz Galvez
Assignment End Date: Not reported
Result: Not reported
File Under: Hawaii Electric Light Co., Inc. (HELCO)
Latitude: Not reported
Longitude: Not reported

Island: Hawaii
Supplemental Loc. Text: Seaside Hotel
Case Number: 20100323-1655
HID Number: Not reported
Facility Registry Id: Not reported
Lead and Program: HEER EP&R
ER: None
Units: HELCO pipeline anomaly
Substances: Bunker and Diesel
Less Or Greater Than: <
Numerical Quantity: 25
Units: Gallons
Activity Type: Response
Activity Lead: Liz Galvez
Assignment End Date: Not reported
Result: Not reported
File Under: Hawaii Electric Light Co., Inc. (HELCO)
Latitude: Not reported
Longitude: Not reported

22
WSW
1/2-1
0.683 mi.
3604 ft.

SUN SUN LAU CHOP SUEY HOUSE
1055 KINOOLE ST
HILO, HI 96720

SHWS **S106820539**
SPILLS **N/A**

Relative:
Higher

Actual:
48 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Hawaii
Environmental Interest:	Sun Sun Lau Chop Suey House (Report)
HID Number:	Not reported
Facility Registry Identifier:	110013778279
Lead Agency:	HEER
Program:	State
Project Manager:	Mark Sutterfield
Hazard Priority:	NFA
Potential Hazards And Controls:	No Hazard
Island:	Hawaii
SDAR Environmental Interest Name:	Sun Sun Lau Chop Suey House (Report)
HID Number:	Not reported
Facility Registry Identifier:	110013778279
Lead Agency:	HEER
Potential Hazard And Controls:	No Hazard
Priority:	NFA
Assessment:	Response Necessary
Response:	Response Complete
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Petroleum contaminated soil
Use Restrictions:	No Hazard Present for Unrestricted Residential Use
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action Letter - Unrestricted Residential Use
Document Date:	04/28/2005
Document Number:	2005-223-MS
Document Subject:	NFA for diesel UST release
Project Manager:	Mark Sutterfield
Contact Information:	(808) 586-4249 2385 Waimano Home Rd, Pearl City, HI 96782

HI SPILLS:

Island:	Hawaii
Supplemental Loc. Text:	Not reported
Case Number:	19951212-2
HID Number:	Not reported
Facility Registry Id:	110013778279
Lead and Program:	HEER EP&R
ER:	Not reported
Units:	Sun Sun Lau, Ltd.
Substances:	Diesel Fuel
Less Or Greater Than:	Not reported
Numerical Quantity:	150
Units:	Gallons
Activity Type:	Response
Activity Lead:	Bill Perry
Assignment End Date:	Not reported
Result:	Refer to ISST
File Under:	Sun Sun Lau Chop Suey House

SUN SUN LAU CHOP SUEY HOUSE (Continued) **S106820539**

Latitude:	19.66932
Longitude:	-155.307075
Island:	Hawaii
Supplemental Loc. Text:	Not reported
Case Number:	19951212-2
HID Number:	Not reported
Facility Registry Id:	110013778279
Lead and Program:	HEER EP&R
ER:	Not reported
Units:	Sun Sun Lau, Ltd.
Substances:	Diesel Fuel
Less Or Greater Than:	Not reported
Numerical Quantity:	150
Units:	Gallons
Activity Type:	Response
Activity Lead:	Bill Perry
Assignment End Date:	Not reported
Result:	Refer to ISST
File Under:	Sun Sun Lau Chop Suey House
Latitude:	19.712697
Longitude:	-155.081073

E23 **HILO QUALITY WASHERETTE** **SHWS** **1006820674**
West **210 HOKU ST** **INST CONTROL** **N/A**
1/2-1 **HILO, HI 96720** **SPILLS**
0.717 mi.
3788 ft. **Site 1 of 2 in cluster E**

Relative: **Higher**

Actual: **58 ft.**

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Hawaii
Environmental Interest:	Hilo Quality Washerette
HID Number:	Not reported
Facility Registry Identifier:	110013786741
Lead Agency:	HEER
Program:	State
Project Manager:	Eric Sadoyama
Hazard Priority:	Low
Potential Hazards And Controls:	Hazard Managed With Controls
Island:	Hawaii
SDAR Environmental Interest Name:	Hilo Quality Washerette
HID Number:	Not reported
Facility Registry Identifier:	110013786741
Lead Agency:	HEER
Potential Hazard And Controls:	Hazard Managed With Controls
Priority:	Low
Assessment:	Response Necessary
Response:	Response Ongoing
Nature of Contamination:	Found: Diesel in soil
Nature of Residual Contamination:	Not reported
Use Restrictions:	Controls Required to Manage Contamination
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Government - Hawaii Dept. of Health Letter Issued
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	Not reported

HILO QUALITY WASHERETTE (Continued) **1006820674**

Document Date: Not reported
Document Number: Not reported
Document Subject: Not reported
Project Manager: Eric Sadoyama
Contact Information: (808) 586-4249 2385 Waimano Home Rd, Pearl City, HI 96782

INST CONTROL:
Potential hazards and controls: Hazard Managed With Controls
Supplemental Location: Not reported
Zip Suffix: Not reported
Island: Hawaii
Institutional Control: Government - Hawaii Dept. of Health Letter Issued

HI SPILLS:
Island: Hawaii
Supplemental Loc. Text: Not reported
Case Number: 19960110-1425
HID Number: Not reported
Facility Registry Id: 110013786741
Lead and Program: HEER EP&R
ER: No
Units: Hilo Quality Washerette oil tank leaking diesel #2
Substances: Diesel Fuel #2
Less Or Greater Than: Not reported
Numerical Quantity: 200
Units: Gallons
Activity Type: Response
Activity Lead: Not reported
Assignment End Date: Not reported
Result: Refer to ISST
File Under: Hilo Quality Washerette
Latitude: 19.66932
Longitude: -155.307075

Island: Hawaii
Supplemental Loc. Text: Not reported
Case Number: 19960110-1425
HID Number: Not reported
Facility Registry Id: 110013786741
Lead and Program: HEER EP&R
ER: No
Units: Hilo Quality Washerette oil tank leaking diesel #2
Substances: Diesel Fuel #2
Less Or Greater Than: Not reported
Numerical Quantity: 200
Units: Gallons
Activity Type: Response
Activity Lead: Not reported
Assignment End Date: Not reported
Result: Refer to ISST
File Under: Hilo Quality Washerette
Latitude: 19.715372
Longitude: -155.08253

Island: Hawaii
Supplemental Loc. Text: Not reported

HILO QUALITY WASHERETTE (Continued) **1006820674**

Case Number: 19960124-0225
HID Number: Not reported
Facility Registry Id: 110013786741
Lead and Program: HEER EP&R
ER: Not reported
Units: Hilo Quality Washerette tank leaking diesel
Substances: Diesel Fuel
Less Or Greater Than: Not reported
Numerical Quantity: 200
Units: Gallons
Activity Type: Response
Activity Lead: Terry Corpus
Assignment End Date: Not reported
Result: Refer to ISST
File Under: Hilo Quality Washerette
Latitude: 19.715372
Longitude: -155.08253

Island: Hawaii
Supplemental Loc. Text: Not reported
Case Number: 19960124-0225
HID Number: Not reported
Facility Registry Id: 110013786741
Lead and Program: HEER EP&R
ER: Not reported
Units: Hilo Quality Washerette tank leaking diesel
Substances: Diesel Fuel
Less Or Greater Than: Not reported
Numerical Quantity: 200
Units: Gallons
Activity Type: Response
Activity Lead: Terry Corpus
Assignment End Date: Not reported
Result: Refer to ISST
File Under: Hilo Quality Washerette
Latitude: 19.66932
Longitude: -155.307075

E24 **HILO QUALITY CLEANERS** **RCRA-CESQG 1004688848**
West **865 KINOOLE ST** **SHWS HID982436487**
1/2-1 **HILO, HI 96720** **SPILLS**
0.760 mi. **FINDS**
4011 ft. **Site 2 of 2 in cluster E** **ECHO**
AIRS

Relative:
Higher

Actual:
64 ft.

RCRA-CESQG:
Date form received by agency: 10/26/1990
Facility name: HILO QUALITY CLEANERS
Facility address: 865 KINOOLE ST
HILO, HI 96720
EPA ID: HID982436487
Mailing address: KINOOLE ST
HILO, HI 96720
Contact: RONALD JOHNSON
Contact address: 865 KINOOLE ST
HILO, HI 96720
Contact country: US
Contact telephone: 808-935-1620

HILO QUALITY CLEANERS (Continued) **1004688848**

Contact email: Not reported
EPA Region: 09
Classification: Conditionally Exempt Small Quantity Generator
Description: Handler: generates 100 kg or less of hazardous waste per calendar month, and accumulates 1000 kg or less of hazardous waste at any time; or generates 1 kg or less of acutely hazardous waste per calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste

Owner/Operator Summary:
Owner/operator name: HILO QUALITY CLEANERS
Owner/operator address: NOT REQUIRED
NOT REQUIRED, ME 99999
Owner/operator country: Not reported
Owner/operator telephone: 415-555-1212
Owner/operator email: Not reported
Owner/operator fax: Not reported
Owner/operator extension: Not reported
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Owner/operator name: NOT REQUIRED
Owner/operator address: NOT REQUIRED
NOT REQUIRED, ME 99999
Owner/operator country: Not reported
Owner/operator telephone: 415-555-1212
Owner/operator email: Not reported
Owner/operator fax: Not reported
Owner/operator extension: Not reported
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No

HILO QUALITY CLEANERS (Continued) **1004688848**

User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Violation Status: No violations found

SHWS:
Organization: Not reported
Supplemental Location: Not reported
Island: Hawaii
Environmental Interest: Hilo Quality Cleaners
HID Number: Not reported
Facility Registry Identifier: 110005726526
Lead Agency: HEER
Program: State
Project Manager: Ross Kuge
Hazard Priority: NFA
Potential Hazards And Controls: Hazard Undetermined
Island: Hawaii
SDAR Environmental Interest Name: Hilo Quality Cleaners
HID Number: Not reported
Facility Registry Identifier: 110005726526
Lead Agency: HEER
Potential Hazard And Controls: Hazard Undetermined
Priority: NFA
Assessment: Response Necessary
Response: Response Complete
Nature of Contamination: Presumed: Unknown
Nature of Residual Contamination: Unknown
Use Restrictions: Undetermined
Engineering Control: Not reported
Description of Restrictions: Not reported
Institutional Control: Not reported
Within Designated Areawide Contamination: Not reported
Site Closure Type: Historic NFA - Incomplete Documentation
Document Date: 07/17/1997
Document Number: 1997-250-RK
Document Subject: Hazardous Waste Release Response Determination for Hilo Quality Cleaners, Facility at 865 Kinoole St, Hilo HI
Project Manager: Ross Kuge
Contact Information: (808) 586-4249 2385 Waimano Home Rd, Pearl City, HI 96782

HI SPILLS:
Island: Hawaii
Supplemental Loc. Text: Not reported
Case Number: 19971018-1909
HID Number: Not reported
Facility Registry Id: 110005726526
Lead and Program: HEER EP&R
ER: Not reported
Units: Hilo Quality Cleaners Diesel Spill
Substances: Diesel Fuel
Less Or Greater Than: Not reported
Numerical Quantity: 30
Units: Gallons

HILO QUALITY CLEANERS (Continued) **1004688848**

Activity Type: Response
Activity Lead: Bill Perry
Assignment End Date: Not reported
Result: SOSC NFA
File Under: Hilo Quality Cleaners
Latitude: 19.66932
Longitude: -155.307075

Island: Hawaii
Supplemental Loc. Text: Not reported
Case Number: 19971018-1909
HID Number: Not reported
Facility Registry Id: 110005726526
Lead and Program: HEER EP&R
ER: Not reported
Units: Hilo Quality Cleaners Diesel Spill
Substances: Diesel Fuel
Less Or Greater Than: Not reported
Numerical Quantity: 30
Units: Gallons
Activity Type: Response
Activity Lead: Bill Perry
Assignment End Date: Not reported
Result: SOSC NFA
File Under: Hilo Quality Cleaners
Latitude: 19.715911
Longitude: -155.082942

Island: Hawaii
Supplemental Loc. Text: Not reported
Case Number: 19940111
HID Number: Not reported
Facility Registry Id: 110005726526
Lead and Program: HEER EP&R
ER: Not reported
Units: Hilo Quality Cleaners oil impacted soils
Substances: diesel #6 bunker
Less Or Greater Than: Not reported
Numerical Quantity: Not reported
Units: Not reported
Activity Type: Response
Activity Lead: Terry Corpus
Assignment End Date: Not reported
Result: Refer to ISST
File Under: Hilo Quality Cleaners
Latitude: 19.66932
Longitude: -155.307075

Island: Hawaii
Supplemental Loc. Text: Not reported
Case Number: 19940111
HID Number: Not reported
Facility Registry Id: 110005726526
Lead and Program: HEER EP&R
ER: Not reported
Units: Hilo Quality Cleaners oil impacted soils
Substances: diesel #6 bunker

HILO QUALITY CLEANERS (Continued) **1004688848**

Less Or Greater Than: Not reported
Numerical Quantity: Not reported
Units: Not reported
Activity Type: Response
Activity Lead: Terry Corpus
Assignment End Date: Not reported
Result: Refer to ISST
File Under: Hilo Quality Cleaners
Latitude: 19.715911
Longitude: -155.082942

Island: Hawaii
Supplemental Loc. Text: Not reported
Case Number: 19950111
HID Number: Not reported
Facility Registry Id: 110005726526
Lead and Program: HEER EP&R
ER: Not reported
Units: Hilo Quality Cleaners tank removal
Substances: Diesel #6 Bunker
Less Or Greater Than: Not reported
Numerical Quantity: Not reported
Units: Not reported
Activity Type: Response
Activity Lead: Terry Corpus
Assignment End Date: Not reported
Result: Refer to ISST
File Under: Hilo Quality Cleaners
Latitude: 19.715911
Longitude: -155.082942

Island: Hawaii
Supplemental Loc. Text: Not reported
Case Number: 19950111
HID Number: Not reported
Facility Registry Id: 110005726526
Lead and Program: HEER EP&R
ER: Not reported
Units: Hilo Quality Cleaners tank removal
Substances: Diesel #6 Bunker
Less Or Greater Than: Not reported
Numerical Quantity: Not reported
Units: Not reported
Activity Type: Response
Activity Lead: Terry Corpus
Assignment End Date: Not reported
Result: Refer to ISST
File Under: Hilo Quality Cleaners
Latitude: 19.66932
Longitude: -155.307075

FINDS:

Registry ID: 110005726526

Environmental Interest/Information System
RCRAInfo is a national information system that supports the Resource

HILO QUALITY CLEANERS (Continued) **1004688848**

Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

STATE MASTER

Click this hyperlink while viewing on your computer to access additional FINDS: detail in the EDR Site Report.

ECHO:
- Envid: 1004688848
- Registry ID: 110005726526
- DFR URL: http://echo.epa.gov/detailed-facility-report?fid=110005726526

AIRS:
- Facility ID: 0521-01-N
- Island: Hawaii
- Mailing Address: 865 Kinoole Street
- Locale: Not reported
- Business Phone: 808-935-1620
- Mailing City,St,Zip: Hilo, Hawaii 96720
- Contact Name: Wayne Tajiri
- Contact Title: Engineer
- Date Permit Issue: 05/31/2013
- Date Permit Expire: 05/30/2018
- Description: One (1) 150 hp Superior Boiler Works Boiler and One (1) 200 hp York-Shipley Boiler1. Attachment of this permit encompasses the following equipment and associated appurtenances:a.150 hp Superior Boiler Works Boiler, model no. S12-0-50-RM7840L-F7T-UL-CSD-1, serial no. 13537; andb.200 hp York-Shipley Boiler, series 564, serial no. 02-21314H-14833.

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25 South 1/2-1 0.774 mi. 4086 ft. **HILO SODA WORKS** **SHWS U003155315**
270 E KAWILI ST **LUST N/A**
HILO, HI 96720 **UST**

Relative: Higher
Actual: 58 ft.

SHWS:
- Organization: Not reported
- Supplemental Location: Not reported
- Island: Hawaii
- Environmental Interest: Hilo Soda Works Tank Closure
- HID Number: Not reported
- Facility Registry Identifier: 110013786803
- Lead Agency: HEER
- Program: State
- Project Manager: Unassigned
- Hazard Priority: NFA
- Potential Hazards And Controls: No Hazard
- Island: Hawaii
- SDAR Environmental Interest Name: Hilo Soda Works Tank Closure
- HID Number: Not reported
- Facility Registry Identifier: 110013786803

HILO SODA WORKS (Continued) **U003155315**

Lead Agency: HEER
Potential Hazard And Controls: No Hazard
Priority: NFA
Assessment: Response Necessary
Response: Response Complete
Nature of Contamination: Not reported
Nature of Residual Contamination: Diesel and Gasoline USTs
Use Restrictions: No Hazard Present For Unrestricted Residential Use
Engineering Control: Not reported
Description of Restrictions: Not reported
Institutional Control: Not reported
Within Designated Areawide Contamination: Not reported
Site Closure Type: No Further Action Letter - Unrestricted Residential Use
Document Date: 09/15/1997
Document Number: 1997-340-RK
Document Subject: NFA for Hilo Soda Works site
Project Manager: Unassigned
Contact Information: (808) 586-4249 2385 Waimano Home Rd, Pearl City, HI 96782

LUST:
Facility ID: 9-603256
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 07/31/1997
Release ID: 970025
Project Officer: Jose Ruiz

UST:
Facility ID: 9-603256
Owner: HILO SODA WORKS
Owner Address: 145 KEOULA ST
Owner City,St,Zip: Hilo, 96720 96720
Latitude: 19.705588
Longitude: -155.068516
Horizontal Reference Datum Name: NAD83
Horizontal Collection Method Name: Address Matching

Tank ID: R-1
Date Installed: 01/01/1970
Tank Status: Permanently Out of Use
Date Closed: 12/04/1996
Tank Capacity: 550
Substance: Diesel

Tank ID: R-2
Date Installed: 01/01/1964
Tank Status: Permanently Out of Use
Date Closed: 12/04/1996
Tank Capacity: 550
Substance: Gasoline

26 WNW 1/2-1 0.835 mi. 4407 ft. **HATADA BAKERY (FORMER)** **55 KUKUAU ST** **HILO, HI 96720** **SHWS INST CONTROL SPILLS** **S106817321 N/A**

Relative: Higher

Actual: 25 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Hawaii
Environmental Interest:	Hatada Bakery, Former
HID Number:	Not reported
Facility Registry Identifier:	110013789258
Lead Agency:	HEER
Program:	State
Project Manager:	Mark Sutterfield
Hazard Priority:	Low
Potential Hazards And Controls:	Hazard Managed With Controls
Island:	Hawaii
SDAR Environmental Interest Name:	Hatada Bakery, Former
HID Number:	Not reported
Facility Registry Identifier:	110013789258
Lead Agency:	HEER
Potential Hazard And Controls:	Hazard Managed With Controls
Priority:	Low
Assessment:	Response Necessary
Response:	Response Ongoing
Nature of Contamination:	Found: Soil- TPH-D, acenaphthene, fluoranthene, benzo[a]pyrene. water-sheen and petroleum odor, benzene, acenaphthene, naphthalene, benzo[a]pyrene
Nature of Residual Contamination:	TPH-D, acenaphthene, floranthene, naphthalene and possibly benzo[a]pyrene in soil and possibly groundwater
Use Restrictions:	Controls Required to Manage Contamination
Engineering Control:	Not reported
Description of Restrictions:	Based on the site's tight working conditions, further site investigation is limited until demolition of the building or redevelopment of the property. Must resample when site is redeveloped.
Institutional Control:	Government - Hawaii Dept. of Health Letter Issued
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	Not reported
Document Date:	Not reported
Document Number:	Not reported
Document Subject:	Not reported
Project Manager:	Mark Sutterfield
Contact Information:	(808) 586-4249 2385 Waimano Home Rd, Pearl City, HI 96782

INST CONTROL:

Potential hazards and controls:	Hazard Managed With Controls
Supplemental Location:	Not reported
Zip Suffix:	Not reported
Island:	Hawaii
Institutional Control:	Government - Hawaii Dept. of Health Letter Issued

HI SPILLS:

Island:	Hawaii
Supplemental Loc. Text:	Not reported
Case Number:	19990108-1422
HID Number:	Not reported

HATADA BAKERY (FORMER) (Continued) **S106817321**

Facility Registry Id: 110013789258
Lead and Program: HEER EP&R
ER: Not reported
Units: Heating Oil Tank, Hatada Bakery
Substances: Not reported
Less Or Greater Than: Not reported
Numerical Quantity: Not reported
Units: Not reported
Activity Type: Response
Activity Lead: Terry Corpus
Assignment End Date: Not reported
Result: Refer to ISST
File Under: Hatada Bakery
Latitude: 19.719821
Longitude: -155.084015

Island: Hawaii
Supplemental Loc. Text: Not reported
Case Number: 19990108-1422
HID Number: Not reported
Facility Registry Id: 110013789258
Lead and Program: HEER EP&R
ER: Not reported
Units: Heating Oil Tank, Hatada Bakery
Substances: Not reported
Less Or Greater Than: Not reported
Numerical Quantity: Not reported
Units: Not reported
Activity Type: Response
Activity Lead: Terry Corpus
Assignment End Date: Not reported
Result: Refer to ISST
File Under: Hatada Bakery
Latitude: 19.66932
Longitude: -155.307075

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27 **HILO MACARONI FACTORY** **SHWS** **S106817724**
West **639 KINOOLE ST** **SPILLS** **N/A**
1/2-1 **HILO, HI 96720**
0.863 mi.
4558 ft.

Relative: **Higher**
Actual: **39 ft.**

SHWS:
Organization: Not reported
Supplemental Location: Not reported
Island: Hawaii
Environmental Interest: Hilo Macaroni Factory
HID Number: Not reported
Facility Registry Identifier: Not reported
Lead Agency: HEER
Program: State
Project Manager: Mark Sutterfield
Hazard Priority: NFA
Potential Hazards And Controls: No Hazard
Island: Hawaii
SDAR Environmental Interest Name: Hilo Macaroni Factory
HID Number: Not reported
Facility Registry Identifier: Not reported

HILO MACARONI FACTORY (Continued) **S106817724**

Lead Agency: HEER
Potential Hazard And Controls: No Hazard
Priority: NFA
Assessment: Response Necessary
Response: Response Complete
Nature of Contamination: Found: Diesel
Nature of Residual Contamination: Petroleum contaminated soil
Use Restrictions: No Hazard Present For Unrestricted Residential Use
Engineering Control: Not reported
Description of Restrictions: Not reported
Institutional Control: Not reported
Within Designated Areawide Contamination: Not reported
Site Closure Type: No Further Action Letter - Unrestricted Residential Use
Document Date: 04/22/2004
Document Number: 2004-178-MS
Document Subject: Review of Underground Storage Tank Closure Report, Former Hilo Macaroni Factory Ltd, Mar 2004
Project Manager: Mark Sutterfield
Contact Information: (808) 586-4249 2385 Waimano Home Rd, Pearl City, HI 96782

HI SPILLS:
Island: Hawaii
Supplemental Loc. Text: Not reported
Case Number: 20030918-1149
HID Number: Not reported
Facility Registry Id: Not reported
Lead and Program: HEER EP&R
ER: Not reported
Units: 1,000 gal diesel tank removal
Substances: Diesel Fuel
Less Or Greater Than: Not reported
Numerical Quantity: Not reported
Units: Unknown
Activity Type: Response
Activity Lead: Mike Cripps
Assignment End Date: Not reported
Result: SOSC NFA
File Under: Hilo Macaroni Factory Ltd
Latitude: 19.66932
Longitude: -155.307075

Island: Hawaii
Supplemental Loc. Text: Not reported
Case Number: 20030918-1149
HID Number: Not reported
Facility Registry Id: Not reported
Lead and Program: HEER EP&R
ER: Not reported
Units: 1,000 gal diesel tank removal
Substances: Diesel Fuel
Less Or Greater Than: Not reported
Numerical Quantity: Not reported
Units: Unknown
Activity Type: Response
Activity Lead: Mike Cripps
Assignment End Date: Not reported
Result: SOSC NFA

HILO MACARONI FACTORY (Continued) **S106817724**

File Under: Hilo Macaroni Factory Ltd
Latitude: 19.718997
Longitude: -155.0849

28
ENE
1/2-1
0.866 mi.
4575 ft.

WOOD PROTECTION COMPANY (HPM BUILDING SUPPLY) **SHWS** **S104657437**
150 KEAA ST **SPILLS** **N/A**
HILO, HI 96720

Relative:
Higher

Actual:
18 ft.

SHWS:
Organization: Not reported
Supplemental Location: Not reported
Island: Hawaii
Environmental Interest: HPM Building Supply DBA-Hawaii Wood Protection, Inc.
HID Number: HID981164254
Facility Registry Identifier: 110002148658
Lead Agency: HEER
Program: State
Project Manager: John Peard
Hazard Priority: Low
Potential Hazards And Controls: Hazard Present
Island: Hawaii
SDAR Environmental Interest Name: HPM Building Supply DBA-Hawaii Wood Protection, Inc.
HID Number: HID981164254
Facility Registry Identifier: 110002148658
Lead Agency: HEER
Potential Hazard And Controls: Hazard Present
Priority: Low
Assessment: Assessment Ongoing
Response: Not reported
Nature of Contamination: Presumed: Copper, chromium and arsenic in soil.
Nature of Residual Contamination: Not reported
Use Restrictions: Controls Required to Manage Contamination
Engineering Control: Not reported
Description of Restrictions: Not reported
Institutional Control: Not reported
Within Designated Areawide Contamination: Not reported
Site Closure Type: Not reported
Document Date: Not reported
Document Number: Not reported
Document Subject: Not reported
Project Manager: John Peard
Contact Information: (808) 933-9921 Environmental Health Bldg, 1582 Kamehameha Ave, Hilo, HI 96720

HI SPILLS:
Island: Hawaii
Supplemental Loc. Text: Not reported
Case Number: 19900722
HID Number: HID981164254
Facility Registry Id: 110002148658
Lead and Program: HEER EP&R
ER: Yes
Units: HPM Building Supply (Wood Protection Co.)
Substances: Chromated Copper Arsenate
Less Or Greater Than: Not reported

Figure 47

WOOD PROTECTION COMPANY (HPM BUILDING SUPPLY) (Continued) **S104657437**

Numerical Quantity: 4000
Units: Gallons
Activity Type: Response
Activity Lead: Mike Cripps
Assignment End Date: Not reported
Result: Refer to SDAR
File Under: HPM Building Supply
Latitude: 19.66932
Longitude: -155.307075

Island: Hawaii
Supplemental Loc. Text: Not reported
Case Number: 19900722
HID Number: HID981164254
Facility Registry Id: 110002148658
Lead and Program: HEER EP&R
ER: Yes
Units: HPM Building Supply (Wood Protection Co.)
Substances: Chromated Copper Arsenate
Less Or Greater Than: Not reported
Numerical Quantity: 4000
Units: Gallons
Activity Type: Response
Activity Lead: Mike Cripps
Assignment End Date: Not reported
Result: Refer to SDAR
File Under: HPM Building Supply
Latitude: 19.724579
Longitude: -155.058813

29
SSE
1/2-1
0.881 mi.
4651 ft.

HILO MECHANICAL, INC **SHWS** **1006820676**
50 HOLOMUA ST **N/A**
HILO, HI 96720

Relative:
Higher

Actual:
62 ft.

SHWS:
Organization: Not reported
Supplemental Location: Not reported
Island: Hawaii
Environmental Interest: Hilo Mechanical, Inc.
HID Number: Not reported
Facility Registry Identifier: 110013786778
Lead Agency: Not reported
Program: State
Project Manager: Unassigned
Hazard Priority: NFA
Potential Hazards And Controls: Hazard Undetermined
Island: Hawaii
SDAR Environmental Interest Name: Hilo Mechanical, Inc.
HID Number: Not reported
Facility Registry Identifier: 110013786778
Lead Agency: Not reported
Potential Hazard And Controls: Hazard Undetermined
Priority: NFA
Assessment: Assessment Ongoing
Response: Not reported
Nature of Contamination: Not reported

HILO MECHANICAL, INC (Continued) **1006820676**

Nature of Residual Contamination: Not reported
Use Restrictions: Undetermined
Engineering Control: Not reported
Description of Restrictions: Not reported
Institutional Control: Not reported
Within Designated Areawide Contamination: Not reported
Site Closure Type: No Further Action - Type Undetermined
Document Date: 03/23/1995
Document Number: Not reported
Document Subject: Not reported
Project Manager: Unassigned
Contact Information: (808) 586-4249 2385 Waimano Home Rd, Pearl City, HI 96782

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30 WNW 1/2-1 0.892 mi. 4708 ft.

HILO GAS COMPANY LTD **EDR MGP** **1008409004**
51-53 PONAHAWAI ST **N/A**
HILO, HI 96720

Relative: Lower

Actual: 11 ft.

Manufactured Gas Plants:
No additional information available

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31 South 1/2-1 0.892 mi. 4712 ft.

USDA FOREST SERVICE PSW EXPERIMENTAL STATION **SHWS** **1006819479**
1643 KILAUEA AVE **N/A**
HILO, HI 96720

Relative: Higher

Actual: 46 ft.

SHWS:
Organization: Not reported
Supplemental Location: PSW Experimental Station Kawili St & Kilauea Ave
Island: Hawaii
Environmental Interest: USDA Forest Service PSW Experimental Station
HID Number: HI0122390008
Facility Registry Identifier: 110013772845
Lead Agency: EPA
Program: State
Project Manager: Unassigned
Hazard Priority: NFA
Potential Hazards And Controls: No Hazard
Island: Hawaii
SDAR Environmental Interest Name: USDA Forest Service PSW Experimental Station
HID Number: HI0122390008
Facility Registry Identifier: 110013772845
Lead Agency: EPA
Potential Hazard And Controls: No Hazard
Priority: NFA
Assessment: Response Necessary
Response: Response Complete
Nature of Contamination: Not reported
Nature of Residual Contamination: Not reported
Use Restrictions: No Hazard Present For Unrestricted Residential Use
Engineering Control: Not reported
Description of Restrictions: Not reported

USDA FOREST SERVICE PSW EXPERIMENTAL STATION (Continued) **1006819479**

Institutional Control: Not reported
Within Designated Areawide Contamination: Not reported
Site Closure Type: No Further Action Letter - Unrestricted Residential Use
Document Date: 03/08/1986
Document Number: Not reported
Document Subject: PA, Review, USDA Forest Service PSE Experimental Station
Project Manager: Unassigned
Contact Information: (808) 586-4249 2385 Waimano Home Rd, Pearl City, HI 96782

32
SSE
1/2-1
0.926 mi.
4887 ft.

HAWAII PEST CONTROL **SHWS** **1006820888**
56 WIWOOLE ST **N/A**
HILO, HI 96720

Relative:
Higher

Actual:
53 ft.

SHWS:
Organization: Not reported
Supplemental Location: Unit A
Island: Hawaii
Environmental Interest: Hawaii Pest Control
HID Number: HI0000603266
Facility Registry Identifier: 110013789132
Lead Agency: HEER
Program: State
Project Manager: John Peard
Hazard Priority: Medium
Potential Hazards And Controls: Hazard Present
Island: Hawaii
SDAR Environmental Interest Name: Hawaii Pest Control
HID Number: HI0000603266
Facility Registry Identifier: 110013789132
Lead Agency: HEER
Potential Hazard And Controls: Hazard Present
Priority: Medium
Assessment: Response Necessary
Response: Response Ongoing
Nature of Contamination: Found: Organochlorine pesticides.
Nature of Residual Contamination: Not reported
Use Restrictions: Controls Required to Manage Contamination
Engineering Control: Not reported
Description of Restrictions: Not reported
Institutional Control: Not reported
Within Designated Areawide Contamination: Not reported
Site Closure Type: Not reported
Document Date: Not reported
Document Number: Not reported
Document Subject: Not reported
Project Manager: John Peard
Contact Information: (808) 933-9921 Environmental Health Bldg, 1582 Kamehameha Ave, Hilo, HI 96720

33
SSE
1/2-1
0.937 mi.
4946 ft.

KANOELEHUA INDUSTRIAL WAREHOUSE
20 POOKELA ST
HILO, HI 96720

SHWS **S110061615**
BROWNFIELDS **N/A**

Relative:
Higher

Actual:
66 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Kanoelehua Industrial Warehouse
Island:	Hawaii
Environmental Interest:	Kanoelehua Industrial Warehouse
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Program:	Brownfields
Project Manager:	Unassigned
Hazard Priority:	Low
Potential Hazards And Controls:	Hazard Undetermined
Island:	Hawaii
SDAR Environmental Interest Name:	Kanoelehua Industrial Warehouse
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Potential Hazard And Controls:	Hazard Undetermined
Priority:	Low
Assessment:	Assessment Ongoing
Response:	Not reported
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Not reported
Use Restrictions:	Undetermined
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	Not reported
Document Date:	Not reported
Document Number:	Not reported
Document Subject:	Not reported
Project Manager:	Unassigned
Contact Information:	(808) 586-4249 2385 Waimano Home Rd, Pearl City, HI 96782

BROWNFIELDS:

Program:	Brownfields
Supplemental Location:	Kanoelehua Industrial Warehouse
Island:	Hawaii
Zip Suffix:	Not reported

34
WNW
1/2-1
0.954 mi.
5037 ft.

HILO ARSENIC
33B LILIUOKALANI LN
HILO, HI 96720

SHWS **S108008859**
ENG CONTROLS **N/A**
INST CONTROL
SPILLS

Relative:
Higher

Actual:
13 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Hawaii
Environmental Interest:	Hilo Arsenic Spill Site
HID Number:	HI0001290816

HILO ARSENIC (Continued) **S108008859**

Facility Registry Identifier: 110009278824
Lead Agency: EPA
Program: Preliminary Assessment/Site Inspection
Project Manager: Laura Young
Hazard Priority: NFA
Potential Hazards And Controls: Hazard Managed With Controls
Island: Hawaii
SDAR Environmental Interest Name: Hilo Arsenic Spill Site
HID Number: HI0001290816
Facility Registry Identifier: 110009278824
Lead Agency: EPA
Potential Hazard And Controls: Hazard Managed With Controls
Priority: NFA
Assessment: Response Necessary
Response: Response Complete
Nature of Contamination: Found: Arsenic in soil. Contaminated soil bound in concrete slab on site.
Nature of Residual Contamination: Arsenic in soil. First 12-18 inches bound in concrete.
Use Restrictions: Controls Required to Manage Contamination
Engineering Control: Engineering Control Required
Description of Restrictions: Prohibit Any Activity That May Disturb the Integrity of the Capping System
Institutional Control: Government - Hawaii Dept. of Health Letter Issued
Within Designated Areawide Contamination: Not reported
Site Closure Type: Historic NFA - Restricted Use
Document Date: 09/04/1997
Document Number: 1997-326-LY
Document Subject: NFA letter for Hilo Arsenic Site
Project Manager: Laura Young
Contact Information: (808) 586-4249 2385 Waimano Home Rd, Pearl City, HI 96782

ENG CONTROLS:
Supplemental Location Text: Not reported
Zip Suffix: Not reported
Island: Hawaii
Potential Hazards And Controls: Hazard Managed With Controls
Engineering Control: Engineering Control Required

INST CONTROL:
Potential hazards and controls: Hazard Managed With Controls
Supplemental Location: Not reported
Zip Suffix: Not reported
Island: Hawaii
Institutional Control: Government - Hawaii Dept. of Health Letter Issued

HI SPILLS:
Island: Hawaii
Supplemental Loc. Text: Not reported
Case Number: 19950509
HID Number: HI0001290816
Facility Registry Id: 110009278824
Lead and Program: HEER EP&R
ER: Yes
Units: Hilo Arsenic
Substances: Sodium Arsenate, lead and cadmium
Less Or Greater Than: Not reported

HILO ARSENIC (Continued) **S108008859**

Numerical Quantity: 30
Units: Gallons
Activity Type: Response
Activity Lead: Mike Cripps
Assignment End Date: Not reported
Result: Refer to ISST
File Under: Hilo Arsenic
Latitude: 19.66932
Longitude: -155.307075

Island: Hawaii
Supplemental Loc. Text: Not reported
Case Number: 19950509
HID Number: HI0001290816
Facility Registry Id: 110009278824
Lead and Program: HEER EP&R
ER: Yes
Units: Hilo Arsenic
Substances: Sodium Arsenate, lead and cadmium
Less Or Greater Than: Not reported
Numerical Quantity: 30
Units: Gallons
Activity Type: Response
Activity Lead: Mike Cripps
Assignment End Date: Not reported
Result: Refer to ISST
File Under: Hilo Arsenic
Latitude: 19.7204
Longitude: -155.08506

Island: Hawaii
Supplemental Loc. Text: Not reported
Case Number: 19950509
HID Number: HI0001290816
Facility Registry Id: 110009278824
Lead and Program: HEER EP&R
ER: Yes
Units: Hilo Arsenic
Substances: Sodium Arsenate, lead and cadmium
Less Or Greater Than: Not reported
Numerical Quantity: 30
Units: Gallons
Activity Type: Response
Activity Lead: Mike Cripps
Assignment End Date: Not reported
Result: Refer to ISST
File Under: Hilo Arsenic
Latitude: 19.719482
Longitude: -155.084692

ORPHAN SUMMARY

	Site Name	Site Address	Zip	Database(s)
8	ARMY AVIATION SUPPORT FACILITY #2	HILO INTERNATIONAL AIRPORT BUI	96720	SHWS
9	PACIFIC AQUACULTURE AND COASTAL RE	KALANIANAOLE ST	96720	SHWS, BROWNFIELDS
4	HAWAII COUNTY KAMEHAMEHA AVENUE IM	KAMEHAMEHA AVE	96720	SHWS
3	KILAUEA VOLCANO AIR MONITORING	KILAUEA VOLCANO		SEMS
6	HILO JUDICIARY CENTER PROJECT	KILAUEA AVE	96720	SHWS, ENG CONTROLS, INST CONT
5	WAIAKEA MILL COMPANY - CAMP 1	KOHOLA, UHU, MANINI, KOLE STRE	96720	SHWS
4	HILO SAFEWAY/TARGET	MAKAALA ST X RAILROAD AVE	96720	SHWS, ENG CONTROLS, INST CONT
2	ARSENIC MILILANI STREET IN HILO	MILILANI ST	96720	SHWS, INST CONTROL, SPILLS
4	HILO BAY FRONT SOCCER FIELD	OFF KAMEHAMEHA AVE. BET PAUAHI	96720	SEMS-ARCHIVE
1	WAILOA RIVER STATE RECREATION AREA	PIILANI ST, KAMEHAMEHA AVE, BI	96720	SHWS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/22/2017
Date Made Active in Reports: 01/05/2018
Number of Days to Update: 14

Source: EPA
Telephone: N/A
Last EDR Contact: 02/06/2018
Next Scheduled EDR Contact: 04/16/2018
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/22/2017
Date Made Active in Reports: 01/05/2018
Number of Days to Update: 14

Source: EPA
Telephone: N/A
Last EDR Contact: 02/06/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Federal Delisted NPL site list

Delisted NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/22/2017
Date Made Active in Reports: 01/05/2018
Number of Days to Update: 14

Source: EPA
Telephone: N/A
Last EDR Contact: 02/06/2018
Next Scheduled EDR Contact: 04/16/2018
Data Release Frequency: Quarterly

Federal CERCLIS list

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 11/07/2016
Date Data Arrived at EDR: 01/05/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 92

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 01/05/2018
Next Scheduled EDR Contact: 04/16/2018
Data Release Frequency: Varies

SEMS: Superfund Enterprise Management System

SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/22/2017
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 21

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 02/06/2018
Next Scheduled EDR Contact: 04/30/2018
Data Release Frequency: Quarterly

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE: Superfund Enterprise Management System Archive

SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that. based upon available information, the location is not judged to be potential NPL site.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/22/2017
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 21

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 02/06/2018
Next Scheduled EDR Contact: 04/30/2018
Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/26/2017
Date Made Active in Reports: 02/09/2018
Number of Days to Update: 45

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 01/19/2018
Next Scheduled EDR Contact: 04/09/2018
Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/26/2017
Date Made Active in Reports: 02/09/2018
Number of Days to Update: 45

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 01/19/2018
Next Scheduled EDR Contact: 04/09/2018
Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/26/2017
Date Made Active in Reports: 02/09/2018
Number of Days to Update: 45

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 01/19/2018
Next Scheduled EDR Contact: 04/09/2018
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/26/2017
Date Made Active in Reports: 02/09/2018
Number of Days to Update: 45

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 01/19/2018
Next Scheduled EDR Contact: 04/09/2018
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/26/2017
Date Made Active in Reports: 02/09/2018
Number of Days to Update: 45

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 01/19/2018
Next Scheduled EDR Contact: 04/09/2018
Data Release Frequency: Quarterly

Federal institutional controls / engineering controls registries

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 05/22/2017
Date Data Arrived at EDR: 06/13/2017
Date Made Active in Reports: 09/15/2017
Number of Days to Update: 94

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 02/09/2018
Next Scheduled EDR Contact: 05/28/2018
Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 11/13/2017
Date Data Arrived at EDR: 11/27/2017
Date Made Active in Reports: 02/09/2018
Number of Days to Update: 74

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 02/27/2018
Next Scheduled EDR Contact: 06/11/2018
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 11/13/2017
Date Data Arrived at EDR: 11/27/2017
Date Made Active in Reports: 02/09/2018
Number of Days to Update: 74

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 02/27/2018
Next Scheduled EDR Contact: 06/11/2018
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 09/18/2017
Date Data Arrived at EDR: 09/21/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 22

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 01/19/2018
Next Scheduled EDR Contact: 04/09/2018
Data Release Frequency: Quarterly

State- and tribal - equivalent CERCLIS

SHWS: Sites List

Facilities, sites or areas in which the Office of Hazard Evaluation and Emergency Response has an interest, has investigated or may investigate under HRS 128D (includes CERCLIS sites).

Date of Government Version: 01/23/2018
Date Data Arrived at EDR: 02/21/2018
Date Made Active in Reports: 02/26/2018
Number of Days to Update: 5

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 02/21/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Semi-Annually

State and tribal landfill and/or solid waste disposal site lists

SWF/LF: Permitted Landfills in the State of Hawaii

Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 09/17/2012
Date Data Arrived at EDR: 04/03/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 37

Source: Department of Health
Telephone: 808-586-4245
Last EDR Contact: 12/28/2017
Next Scheduled EDR Contact: 04/09/2018
Data Release Frequency: Varies

State and tribal leaking storage tank lists

LUST: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 08/01/2017
Date Data Arrived at EDR: 08/30/2017
Date Made Active in Reports: 09/15/2017
Number of Days to Update: 16

Source: Department of Health
Telephone: 808-586-4228
Last EDR Contact: 03/02/2018
Next Scheduled EDR Contact: 06/11/2018
Data Release Frequency: Semi-Annually

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 04/25/2017
Date Data Arrived at EDR: 11/07/2017
Date Made Active in Reports: 12/08/2017
Number of Days to Update: 31

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 05/01/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 78
Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 04/14/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/06/2017
Number of Days to Update: 71
Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 04/24/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/06/2017
Number of Days to Update: 71
Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 10/14/2016
Date Data Arrived at EDR: 01/27/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 98
Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 01/19/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Semi-Annually

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 04/14/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/06/2017
Number of Days to Update: 71
Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 04/26/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 78
Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 04/13/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 78
Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

State and tribal registered storage tank lists

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 05/15/2017
Date Data Arrived at EDR: 05/30/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 136

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 01/09/2018
Next Scheduled EDR Contact: 04/23/2018
Data Release Frequency: Varies

UST: Underground Storage Tank Database
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 08/01/2017
Date Data Arrived at EDR: 08/30/2017
Date Made Active in Reports: 09/15/2017
Number of Days to Update: 16

Source: Department of Health
Telephone: 808-586-4228
Last EDR Contact: 03/02/2018
Next Scheduled EDR Contact: 06/11/2018
Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 04/26/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/06/2017
Number of Days to Update: 71

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 04/24/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 12/08/2017
Number of Days to Update: 134

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN UST R9: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 04/13/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 78

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN UST R10: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 04/25/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 78

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 05/01/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 78
Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 10/14/2016
Date Data Arrived at EDR: 01/27/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 98
Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 01/19/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Semi-Annually

INDIAN UST R1: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 04/14/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/06/2017
Number of Days to Update: 71
Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN UST R7: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 05/02/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/06/2017
Number of Days to Update: 71
Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

State and tribal institutional control / engineering control registries

ENG CONTROLS: Engineering Control Sites
A listing of sites with engineering controls in place.

Date of Government Version: 01/23/2018
Date Data Arrived at EDR: 02/21/2018
Date Made Active in Reports: 02/26/2018
Number of Days to Update: 5
Source: Department of Health
Telephone: 404-586-4249
Last EDR Contact: 02/21/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Varies

INST CONTROL: Sites with Institutional Controls
Voluntary Remediation Program and Brownfields sites with institutional controls in place.

Date of Government Version: 01/23/2018
Date Data Arrived at EDR: 02/21/2018
Date Made Active in Reports: 02/26/2018
Number of Days to Update: 5
Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 02/21/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Varies

State and tribal voluntary cleanup sites

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng
A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 07/27/2015
Date Data Arrived at EDR: 09/29/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 142

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 12/20/2017
Next Scheduled EDR Contact: 04/09/2018
Data Release Frequency: Varies

VCP: Voluntary Response Program Sites
Sites participating in the Voluntary Response Program. The purpose of the VRP is to streamline the cleanup process in a way that will encourage prospective developers, lenders, and purchasers to voluntarily cleanup properties.

Date of Government Version: 01/23/2018
Date Data Arrived at EDR: 02/21/2018
Date Made Active in Reports: 02/26/2018
Number of Days to Update: 5

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 02/21/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Varies

State and tribal Brownfields sites

BROWNFIELDS: Brownfields Sites
With certain legal exclusions and additions, the term 'brownfield site' means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.

Date of Government Version: 01/23/2018
Date Data Arrived at EDR: 02/21/2018
Date Made Active in Reports: 02/26/2018
Number of Days to Update: 5

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 02/21/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Varies

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites
Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 01/19/2018
Date Data Arrived at EDR: 01/19/2018
Date Made Active in Reports: 02/09/2018
Number of Days to Update: 21

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 01/19/2018
Next Scheduled EDR Contact: 04/02/2018
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 01/30/2018
Next Scheduled EDR Contact: 05/14/2018
Data Release Frequency: Varies

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 01/22/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: No Update Planned

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

IHS OPEN DUMPS: Open Dumps on Indian Land
A listing of all open dumps located on Indian Land in the United States.

Date of Government Version: 04/01/2014
Date Data Arrived at EDR: 08/06/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 176

Source: Department of Health & Human Serivces, Indian Health Service
Telephone: 301-443-1452
Last EDR Contact: 02/02/2018
Next Scheduled EDR Contact: 05/14/2018
Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL: National Clandestine Laboratory Register
A listing of clandestine drug lab locations that have been removed from the DEAs National Clandestine Laboratory Register.

Date of Government Version: 01/19/2018
Date Data Arrived at EDR: 01/24/2018
Date Made Active in Reports: 02/09/2018
Number of Days to Update: 16

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 02/27/2018
Next Scheduled EDR Contact: 06/11/2018
Data Release Frequency: No Update Planned

CDL: Clandestine Drug Lab Listing
A listing of clandestine drug lab site locations.

Date of Government Version: 08/04/2010
Date Data Arrived at EDR: 09/10/2010
Date Made Active in Reports: 10/22/2010
Number of Days to Update: 42

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 02/22/2018
Next Scheduled EDR Contact: 06/11/2018
Data Release Frequency: Varies

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 01/09/2018
Date Data Arrived at EDR: 01/24/2018
Date Made Active in Reports: 02/09/2018
Number of Days to Update: 16

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 02/27/2018
Next Scheduled EDR Contact: 06/11/2018
Data Release Frequency: Quarterly

Local Land Records

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/22/2017
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 21

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 02/06/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Semi-Annually

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 09/21/2017
Date Data Arrived at EDR: 09/21/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 22

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 01/19/2018
Next Scheduled EDR Contact: 04/09/2018
Data Release Frequency: Quarterly

SPILLS: Release Notifications

Releases of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988.

Date of Government Version: 02/16/2018
Date Data Arrived at EDR: 02/21/2018
Date Made Active in Reports: 02/27/2018
Number of Days to Update: 6

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 02/21/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Varies

SPILLS 90: SPILLS90 data from FirstSearch

Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 03/10/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/11/2013
Number of Days to Update: 39

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/26/2017
Date Made Active in Reports: 02/09/2018
Number of Days to Update: 45

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 01/19/2018
Next Scheduled EDR Contact: 04/09/2018
Data Release Frequency: Quarterly

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 01/31/2015
Date Data Arrived at EDR: 07/08/2015
Date Made Active in Reports: 10/13/2015
Number of Days to Update: 97

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 02/21/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 10/13/2017
Next Scheduled EDR Contact: 01/22/2018
Data Release Frequency: Semi-Annually

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 10/11/2017
Next Scheduled EDR Contact: 01/22/2018
Data Release Frequency: N/A

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 01/01/2017
Date Data Arrived at EDR: 02/03/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 63

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 02/16/2018
Next Scheduled EDR Contact: 05/28/2018
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 01/11/2018
Date Data Arrived at EDR: 01/19/2018
Date Made Active in Reports: 03/02/2018
Number of Days to Update: 42

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 01/19/2018
Next Scheduled EDR Contact: 04/09/2018
Data Release Frequency: Quarterly

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 01/31/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 04/22/2013
Date Data Arrived at EDR: 03/03/2015
Date Made Active in Reports: 03/09/2015
Number of Days to Update: 6

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 02/08/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Varies

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 06/21/2017
Date Made Active in Reports: 01/05/2018
Number of Days to Update: 198

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 12/22/2017
Next Scheduled EDR Contact: 04/02/2018
Data Release Frequency: Every 4 Years

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 01/10/2018
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 2

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 02/23/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Annually

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 01/25/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Annually

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/22/2017
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 21

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 02/06/2018
Next Scheduled EDR Contact: 03/19/2018
Data Release Frequency: Annually

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 11/02/2017
Date Data Arrived at EDR: 11/17/2017
Date Made Active in Reports: 12/08/2017
Number of Days to Update: 21

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 01/19/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties

A listing of verified Potentially Responsible Parties

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 10/17/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 3

Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 02/06/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 06/01/2017
Date Data Arrived at EDR: 06/09/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 126

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 01/12/2018
Next Scheduled EDR Contact: 04/23/2018
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 11/18/2016
Date Data Arrived at EDR: 11/23/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 79

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 01/09/2018
Next Scheduled EDR Contact: 04/23/2018
Data Release Frequency: Quarterly

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: Quarterly

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 08/30/2016
Date Data Arrived at EDR: 09/08/2016
Date Made Active in Reports: 10/21/2016
Number of Days to Update: 43

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 01/19/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Quarterly

COAL ASH DOE: Steam-Electric Plant Operation Data

A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 12/05/2017
Next Scheduled EDR Contact: 03/19/2018
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List

A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 07/01/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 12/08/2017
Next Scheduled EDR Contact: 03/19/2018
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 05/24/2017
Date Data Arrived at EDR: 11/30/2017
Date Made Active in Reports: 12/15/2017
Number of Days to Update: 15
Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 01/26/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

RADINFO: Radiation Information Database
The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 10/02/2017
Date Data Arrived at EDR: 10/05/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 8
Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 01/04/2018
Next Scheduled EDR Contact: 04/16/2018
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing
A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing
A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

DOT OPS: Incident and Accident Data
Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42
Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 01/19/2018
Next Scheduled EDR Contact: 05/14/2018
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 09/30/2017
Date Data Arrived at EDR: 11/10/2017
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 63

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 01/04/2018
Next Scheduled EDR Contact: 04/02/2018
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 02/22/2017
Date Made Active in Reports: 09/28/2017
Number of Days to Update: 218

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 02/23/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Biennially

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 07/14/2015
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 546

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 01/09/2018
Next Scheduled EDR Contact: 04/23/2018
Data Release Frequency: Semi-Annually

FUSRAP: Formerly Utilized Sites Remedial Action Program

DOE established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations.

Date of Government Version: 12/23/2016
Date Data Arrived at EDR: 12/27/2016
Date Made Active in Reports: 02/17/2017
Number of Days to Update: 52

Source: Department of Energy
Telephone: 202-586-3559
Last EDR Contact: 01/19/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Varies

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 06/23/2017
Date Data Arrived at EDR: 10/11/2017
Date Made Active in Reports: 11/03/2017
Number of Days to Update: 23

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 02/23/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 01/09/2018
Date Data Arrived at EDR: 02/06/2018
Date Made Active in Reports: 03/02/2018
Number of Days to Update: 24

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 02/06/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites
A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)
The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data
A listing of minor source facilities.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

US MINES: Mines Master Index File
Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 10/29/2017
Date Data Arrived at EDR: 11/28/2017
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 45

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 02/28/2018
Next Scheduled EDR Contact: 06/11/2018
Data Release Frequency: Semi-Annually

US MINES 2: Ferrous and Nonferrous Metal Mines Database Listing
This map layer includes ferrous (ferrous metal mines are facilities that extract ferrous metals, such as iron ore or molybdenum) and nonferrous (Nonferrous metal mines are facilities that extract nonferrous metals, such as gold, silver, copper, zinc, and lead) metal mines in the United States.

Date of Government Version: 12/05/2005
Date Data Arrived at EDR: 02/29/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 49

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 03/02/2018
Next Scheduled EDR Contact: 06/11/2018
Data Release Frequency: Varies

US MINES 3: Active Mines & Mineral Plants Database Listing
Active Mines and Mineral Processing Plant operations for commodities monitored by the Minerals Information Team of the USGS.

Date of Government Version: 04/14/2011
Date Data Arrived at EDR: 06/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 97

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 03/02/2018
Next Scheduled EDR Contact: 06/11/2018
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

ABANDONED MINES: Abandoned Mines

An inventory of land and water impacted by past mining (primarily coal mining) is maintained by OSMRE to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of AML impacts, as well as, information on the cost associated with the reclamation of those problems. The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

Date of Government Version: 09/25/2017
Date Data Arrived at EDR: 09/26/2017
Date Made Active in Reports: 10/20/2017
Number of Days to Update: 24

Source: Department of Interior
Telephone: 202-208-2609
Last EDR Contact: 12/19/2017
Next Scheduled EDR Contact: 03/26/2018
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 07/23/2017
Date Data Arrived at EDR: 09/06/2017
Date Made Active in Reports: 09/15/2017
Number of Days to Update: 9

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 02/23/2018
Next Scheduled EDR Contact: 06/18/2018
Data Release Frequency: Quarterly

UXO: Unexploded Ordnance Sites

A listing of unexploded ordnance site locations

Date of Government Version: 09/30/2016
Date Data Arrived at EDR: 10/31/2017
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 73

Source: Department of Defense
Telephone: 703-704-1564
Last EDR Contact: 01/02/2018
Next Scheduled EDR Contact: 04/30/2018
Data Release Frequency: Varies

ECHO: Enforcement & Compliance History Information

ECHO provides integrated compliance and enforcement information for about 800,000 regulated facilities nationwide.

Date of Government Version: 01/13/2018
Date Data Arrived at EDR: 01/19/2018
Date Made Active in Reports: 03/02/2018
Number of Days to Update: 42

Source: Environmental Protection Agency
Telephone: 202-564-2280
Last EDR Contact: 01/19/2018
Next Scheduled EDR Contact: 03/19/2018
Data Release Frequency: Quarterly

DOCKET HWC: Hazardous Waste Compliance Docket Listing

A complete list of the Federal Agency Hazardous Waste Compliance Docket Facilities.

Date of Government Version: 06/27/2017
Date Data Arrived at EDR: 11/21/2017
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 202-564-0527
Last EDR Contact: 03/02/2018
Next Scheduled EDR Contact: 06/11/2018
Data Release Frequency: Varies

FUELS PROGRAM: EPA Fuels Program Registered Listing

This listing includes facilities that are registered under the Part 80 (Code of Federal Regulations) EPA Fuels Programs. All companies now are required to submit new and updated registrations.

Date of Government Version: 11/20/2017
Date Data Arrived at EDR: 11/20/2017
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 53

Source: EPA
Telephone: 800-385-6164
Last EDR Contact: 02/21/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Quarterly

AIRS: List of Permitted Facilities
A listing of permitted facilities in the state.

Date of Government Version: 01/02/2018
Date Data Arrived at EDR: 01/04/2018
Date Made Active in Reports: 01/17/2018
Number of Days to Update: 13

Source: Department of Health
Telephone: 808-586-4200
Last EDR Contact: 01/02/2018
Next Scheduled EDR Contact: 04/16/2018
Data Release Frequency: Varies

DRYCLEANERS: Permitted Drycleaner Facility Listing
A listing of permitted drycleaner facilities in the state.

Date of Government Version: 01/02/2018
Date Data Arrived at EDR: 01/04/2018
Date Made Active in Reports: 01/17/2018
Number of Days to Update: 13

Source: Department of Health
Telephone: 808-586-4200
Last EDR Contact: 01/02/2018
Next Scheduled EDR Contact: 04/16/2018
Data Release Frequency: Varies

Financial Assurance: Financial Assurance Information Listing
A listing of financial assurance information for underground storage tank facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 12/18/2017
Date Data Arrived at EDR: 12/26/2017
Date Made Active in Reports: 01/16/2018
Number of Days to Update: 21

Source: Department of Health
Telephone: 808-586-4226
Last EDR Contact: 12/19/2017
Next Scheduled EDR Contact: 03/26/2018
Data Release Frequency: Varies

UIC: Underground Injection Wells Listing
A listing of underground injection well locations.

Date of Government Version: 02/07/2013
Date Data Arrived at EDR: 02/12/2013
Date Made Active in Reports: 04/09/2013
Number of Days to Update: 56

Source: Department of Health
Telephone: 808-586-4258
Last EDR Contact: 02/22/2018
Next Scheduled EDR Contact: 06/11/2018
Data Release Frequency: Varies

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants
The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR Hist Auto: EDR Exclusive Historical Auto Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR Hist Cleaner: EDR Exclusive Historical Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA HWS: Recovered Government Archive State Hazardous Waste Facilities List

The EDR Recovered Government Archive State Hazardous Waste database provides a list of SHWS incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Health in Hawaii.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/08/2014
Number of Days to Update: 191

Source: Department of Health
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Health in Hawaii.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/17/2014
Number of Days to Update: 200

Source: Department of Health
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Health in Hawaii.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/03/2014
Number of Days to Update: 186

Source: Department of Health
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

Oil/Gas Pipelines
Source: PennWell Corporation
Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Electric Power Transmission Line Data
Source: PennWell Corporation
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Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetlands Inventory
Source: Office of Planning
Telephone: 808-587-2895

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

STREET AND ADDRESS INFORMATION

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GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

525 PIILANI STREET
525 PIILANI STREET
HILO, HI 96720

TARGET PROPERTY COORDINATES

Latitude (North):	19.71721 - 19° 43' 1.96"
Longitude (West):	155.070996 - 155° 4' 15.59"
Universal Tranverse Mercator:	Zone 5
UTM X (Meters):	282938.7
UTM Y (Meters):	2181382.2
Elevation:	12 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	5949390 HILO, HI
Version Date:	2013

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principal investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

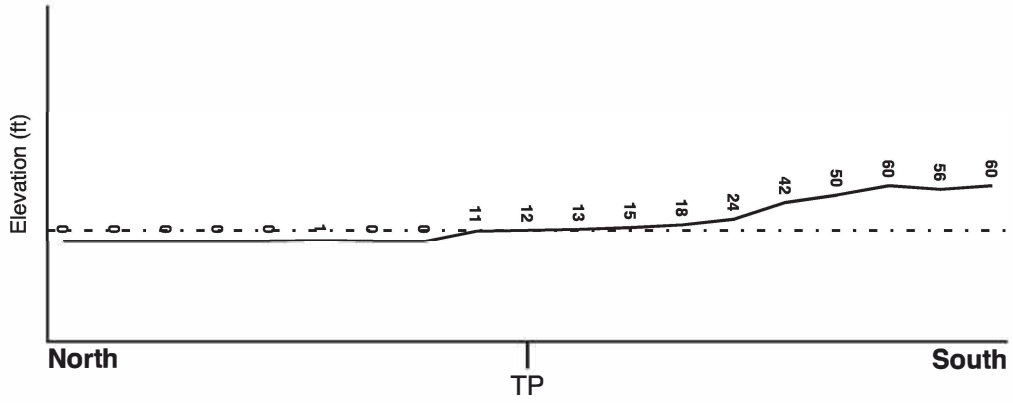
TOPOGRAPHIC INFORMATION

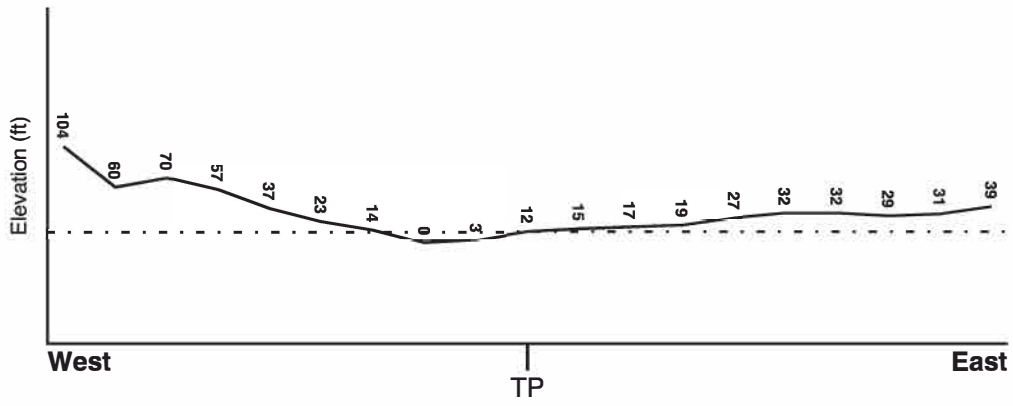
Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General NW

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES





Target Property Elevation: 12 ft.



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Flood Plain Panel at Target Property	FEMA Source Type
1551660880C	FEMA Q3 Flood data
Additional Panels in search area:	**FEMA Source Type**
1551660885C	FEMA Q3 Flood data

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
HILO	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

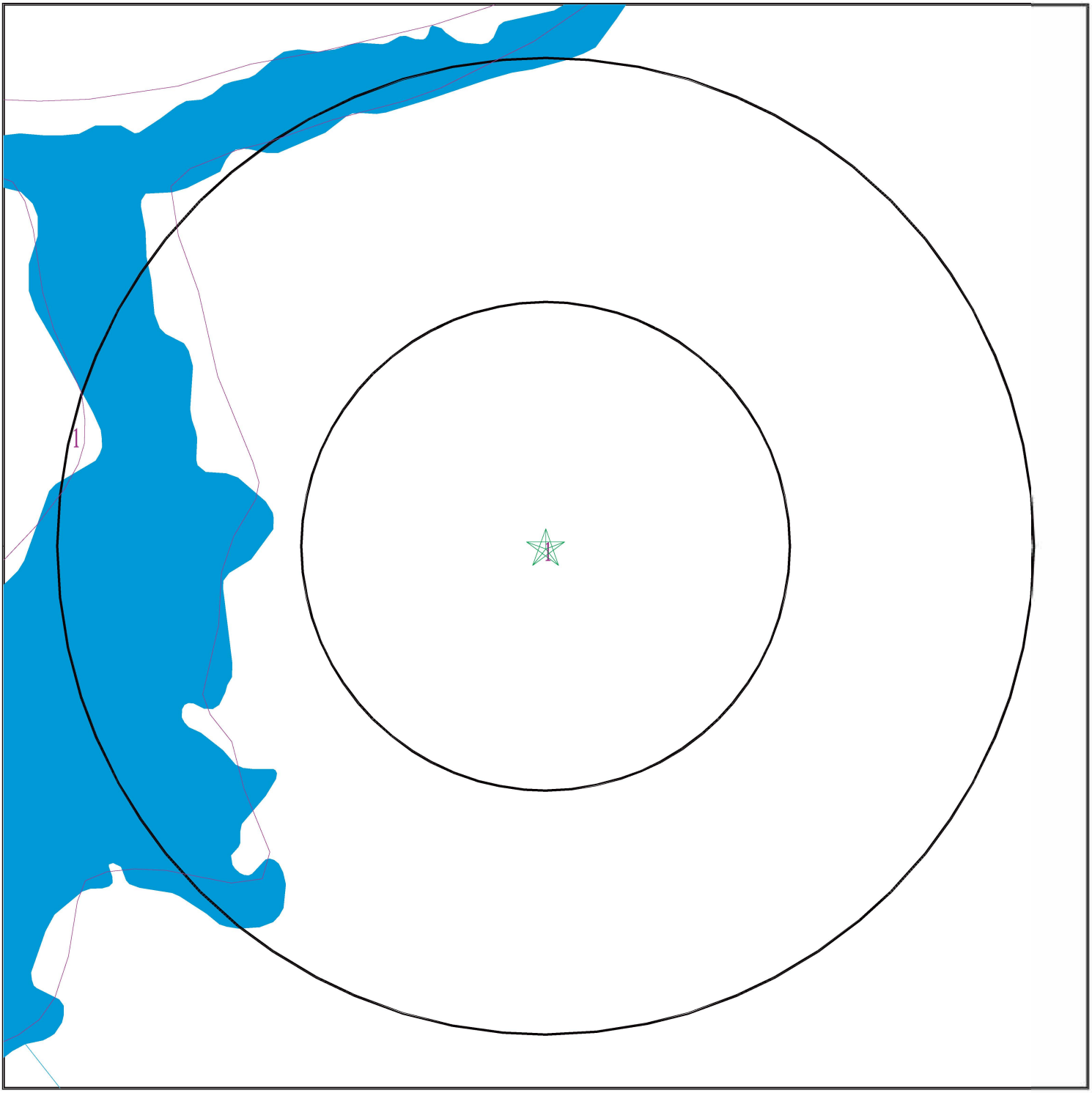
Era: -
System: -
Series: -
Code: N/A *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: -

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 5207731.2s



Target Property
SSURGO Soil
Water

SITE NAME:	525 Piilani Street	CLIENT:	Lehua Environmental Consultants, LLC
ADDRESS:	525 Piilani Street Hilo HI 96720	CONTACT:	Kama
LAT/LONG:	19.71721 / 155.070996	INQUIRY #:	5207731.2s
		DATE:	March 05, 2018 1:00 pm

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GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: Keaukaha

Soil Surface Texture: muck

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Well drained

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	7 inches	muck	A-8	Highly organic soils, Peat.	Max: 141 Min: 42.34	Max: Min:
2	7 inches	18 inches	bedrock	Not reported	Not reported	Max: 0.42 Min: 0.02	Max: Min:

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 0.001 miles
State Database	1.000

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A1	USGS40000268579	1/4 - 1/2 Mile SSW
B7	USGS40000268588	1/4 - 1/2 Mile NNE
B8	USGS40000268590	1/4 - 1/2 Mile NNE
B9	USGS40000268591	1/4 - 1/2 Mile NNE
B10	USGS40000268589	1/4 - 1/2 Mile NNE
B11	USGS40000268587	1/4 - 1/2 Mile NNE
12	USGS40000268586	1/2 - 1 Mile NE
13	USGS40000268582	1/2 - 1 Mile East

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A2	HI9000000004305	1/4 - 1/2 Mile SSW
B3	HI9000000004317	1/4 - 1/2 Mile NNE
B4	HI9000000004316	1/4 - 1/2 Mile NNE
B5	HI9000000004319	1/4 - 1/2 Mile NNE
B6	HI9000000004318	1/4 - 1/2 Mile NNE
C14	HI9000000004300	1/2 - 1 Mile SE
C15	HI9000000004301	1/2 - 1 Mile SE

PHYSICAL SETTING SOURCE MAP - 5207731.2s



County Boundary
Major Roads
Contour Lines
Airports
Earthquake epicenter, Richter 5 or greater
Water Wells
Public Water Supply Wells
Cluster of Multiple Icons

Groundwater Flow Direction
GI Indeterminate Groundwater Flow at Location
GV Groundwater Flow Varies at Location

SITE NAME:	525 Piilani Street	CLIENT:	Lehua Environmental Consultants, LLC
ADDRESS:	525 Piilani Street Hilo HI 96720	CONTACT:	Kama
		INQUIRY #:	5207731.2s
LAT/LONG:	19.71721 / 155.070996	DATE:	March 05, 2018 1:00 pm

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GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

	Database	EDR ID Number
A1 **SSW** **1/4 - 1/2 Mile** **Higher**	**FED USGS**	**USGS40000268579**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-194258155043401		
Monloc name:	8-4204-01 WAIAKEA VILLAGE		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20010000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	19.7130724
Longitude:	-155.073342	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	15.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19710101	Welldepth:	35
Welldepth units:	ft	Wellholedepth:	35
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

	Database	EDR ID Number
A2 **SSW** **1/4 - 1/2 Mile** **Higher**	**HI WELLS**	**HI9000000004305**

Wid:	8-4204-001	Island:	Hawaii
Well name:	Waiakea Village	Old name:	Not Reported
Yr drilled:	1971		
Driller:	Roscoe Moss Hawaii Inc		
Quad map:	67		
Long83dd:	-155.073333		
Lat83dd:	19.713056		
Gps:	0	Utm:	-1
Owner user:	Not Reported		
Land owner:	Not Reported		
Pump insta:	Not Reported		
Old number:	Not Reported	Well type:	PER
Casing dia:	14	Ground el:	Not Reported
Well depth:	35		
Solid case:	25	Perf case:	35
Use:	IND - Industrial		
Use year:	Not Reported		
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	1250

Test ddown:	2.4	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	700		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	QKL		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	Not Reported
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	521		
Pump mgd:	1.008		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	80401		
Latest hd:	Not Reported	Wcr:	06-AUG-71
Pir:	Not Reported		
Surveyor:	Not Reported		
T:	Not Reported	Site id:	HI9000000004305

B3
NNE
1/4 - 1/2 Mile
Lower

HI WELLS **HI9000000004317**

Wid:	8-4304-002	Island:	Hawaii
Well name:	Shipman 2	Old name:	Not Reported
Yr drilled:	1957		
Driller:	Bechtel		
Quad map:	67		
Long83dd:	-155.068889		
Lat83dd:	19.723889		
Gps:	0	Utm:	-1
Owner user:	Hawaii Electric Light Co., Inc., HELCO		
Land owner:	Not Reported		
Pump insta:	Not Reported		
Old number:	Not Reported	Well type:	DUG
Casing dia:	84	Ground el:	10
Well depth:	26		
Solid case:	Not Reported	Perf case:	Not Reported
Use:	UNU - Unused		
Use year:	Not Reported		
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	6600		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	QKL		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-16
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		

Pump mgd:	9.504		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(3) 2-1-001:024
Aqui code:	80401		
Latest hd:	Not Reported	Wcr:	01-JAN-57
Pir:	Not Reported		
Surveyor:	Not Reported		
T:	Not Reported	Site id:	HI9000000004317

B4
NNE
1/4 - 1/2 Mile
Lower

HI WELLS **HI9000000004316**

Wid:	8-4304-001	Island:	Hawaii
Well name:	Shipman 1A 1B	Old name:	Not Reported
Yr drilled:	1943		
Driller:	Bechtel		
Quad map:	67		
Long83dd:	-155.068889		
Lat83dd:	19.723889		
Gps:	0	Utm:	-1
Owner user:	Hawaii Electric Light Co., Inc., HELCO		
Land owner:	Not Reported		
Pump insta:	Not Reported		
Old number:	Not Reported	Well type:	Not Reported
Casing dia:	54	Ground el:	12
Well depth:	20		
Solid case:	Not Reported	Perf case:	Not Reported
Use:	IND - Geothermal, Thermoelectric Cooling, Power De		
Use year:	Not Reported		
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	5400		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-8
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	7.776		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(3) 2-1-001:024
Aqui code:	80401		
Latest hd:	Not Reported	Wcr:	01-JAN-43
Pir:	Not Reported		
Surveyor:	Not Reported		
T:	Not Reported	Site id:	HI9000000004316

Map ID
Direction
Distance
Elevation

	Database	EDR ID Number
B5		
NNE	**HI WELLS**	**HI9000000004319**
1/4 - 1/2 Mile		
Lower		

Wid:	8-4304-004	Island:	Hawaii
Well name:	Shipman 4A 4B	Old name:	Not Reported
Yr drilled:	1970		
Driller:	Not Reported		
Quad map:	67		
Long83dd:	-155.068889		
Lat83dd:	19.723889		
Gps:	0	Utm:	-1
Owner user:	Hawaii Electric Light Co., Inc., HELCO		
Land owner:	Not Reported		
Pump insta:	Not Reported		
Old number:	Not Reported	Well type:	DUG
Casing dia:	Not Reported	Ground el:	10
Well depth:	20		
Solid case:	Not Reported	Perf case:	Not Reported
Use:	IND - Geothermal, Thermoelectric Cooling, Power De		
Use year:	Not Reported		
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	19000		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	8800		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-10
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	12.672		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(3) 2-1-001:024
Aqui code:	80401		
Latest hd:	Not Reported	Wcr:	01-JAN-70
Pir:	Not Reported		
Surveyor:	Not Reported		
T:	Not Reported	Site id:	HI9000000004319

	Database	EDR ID Number
B6		
NNE	**HI WELLS**	**HI9000000004318**
1/4 - 1/2 Mile		
Lower		

Wid:	8-4304-003	Island:	Hawaii
Well name:	Shipman 3	Old name:	Not Reported
Yr drilled:	1971		
Driller:	Bechtel		
Quad map:	67		
Long83dd:	-155.068889		
Lat83dd:	19.723889		
Gps:	0	Utm:	-1
Owner user:	Hawaii Electric Light Co., Inc., HELCO		
Land owner:	Not Reported		

Pump insta:	Not Reported		
Old number:	Not Reported	Well type:	DUG
Casing dia:	Not Reported	Ground el:	10
Well depth:	20		
Solid case:	Not Reported	Perf case:	Not Reported
Use:	IND - Geothermal, Thermoelectric Cooling, Power De		
Use year:	Not Reported		
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	10000		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	6600		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	QKL		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-10
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	9.504		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(3) 2-1-001:024
Aqui code:	80401		
Latest hd:	Not Reported	Wcr:	01-JAN-71
Pir:	Not Reported		
Surveyor:	Not Reported		
T:	Not Reported	Site id:	HI9000000004318

B7
NNE
1/4 - 1/2 Mile
Lower

FED USGS **USGS40000268588**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-194337155041602		
Monloc name:	8-4304.01B -04		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20010000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	19.7239051
Longitude:	-155.0688978	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	8.00
Vert measure units:	feet	Vertacc measure val:	3
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		

Aquifer type:	Not Reported		
Construction date:	19710101	Welldepth:	16
Welldepth units:	ft	Wellholedepth:	16
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

B8
NNE **FED USGS** **USGS40000268590**
1/4 - 1/2 Mile
Lower

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-194337155041801		
Monloc name:	8-4304-01 WAIAKEA DUG WELL		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20010000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	19.7239051
Longitude:	-155.0688978	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	12.00
Vert measure units:	feet	Vertacc measure val:	2
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19440101	Welldepth:	20
Welldepth units:	ft	Wellholedepth:	20
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1972-04-05	12.47	

B9
NNE **FED USGS** **USGS40000268591**
1/4 - 1/2 Mile
Lower

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-194337155041802		
Monloc name:	8-4304.01A		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20010000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	19.7239051
Longitude:	-155.0688978	Sourcemap scale:	24000

Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	8.00
Vert measure units:	feet	Vertacc measure val:	1
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19700101	Welldepth:	Not Reported
Welldepth units:	Not Reported	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

B10
NNE **FED USGS** **USGS40000268589**
1/4 - 1/2 Mile
Lower

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-194337155041701		
Monloc name:	8-4304-02 WAIAKEA DUG WELL		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20010000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	19.7239052
Longitude:	-155.06862	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	10.20
Vert measure units:	feet	Vertacc measure val:	.1
Vert accmeasure units:	feet		
Vertcollection method:	Level or other surveying method		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Hawaii volcanic-rock aquifers		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19530101	Welldepth:	20
Welldepth units:	ft	Wellholedepth:	20
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

B11
NNE **FED USGS** **USGS40000268587**
1/4 - 1/2 Mile
Lower

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-194337155041601		
Monloc name:	8-4304-03 WAIAKEA		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20010000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	19.7239052
Longitude:	-155.0683422	Sourcemap scale:	24000

Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	10.20
Vert measure units:	feet	Vertacc measure val:	.1
Vert accmeasure units:	feet		
Vertcollection method:	Level or other surveying method		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19570101	Welldepth:	25.5
Welldepth units:	ft	Wellholedepth:	25.5
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

12
NE
1/2 - 1 Mile
Lower

FED USGS **USGS40000268586**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-194334155035801		
Monloc name:	8-4303.02		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20010000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	19.7230719
Longitude:	-155.0633422	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	10.00
Vert measure units:	feet	Vertacc measure val:	1
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	Not Reported
Welldepth units:	Not Reported	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

13
East
1/2 - 1 Mile
Higher

FED USGS **USGS40000268582**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-194317155034601		
Monloc name:	8-4303.01		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20010000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	19.71835
Longitude:	-155.0600088	Sourcemap scale:	24000

Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	20.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	Not Reported
Welldepth units:	Not Reported	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

C14
SE
1/2 - 1 Mile
Higher

HI WELLS **HI9000000004300**

Wid:	8-4203-013	Island:	Hawaii
Well name:	Glover Quarry A	Old name:	Not Reported
Yr drilled:	1948		
Driller:	Jas. W. Glover, Ltd.		
Quad map:	67		
Long83dd:	-155.059444		
Lat83dd:	19.709167		
Gps:	0	Utm:	-1
Owner user:	Jas. W. Glover, Ltd.		
Land owner:	Not Reported		
Pump insta:	Not Reported		
Old number:	Not Reported	Well type:	DUG
Casing dia:	72	Ground el:	23
Well depth:	25		
Solid case:	Not Reported	Perf case:	Not Reported
Use:	IND - Mining, Dust Control		
Use year:	Not Reported		
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	600		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	1984		
Draft yr:	Not Reported	Bot hole:	-2
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	.864		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	80401		
Latest hd:	Not Reported	Wcr:	01-JAN-48
Pir:	Not Reported		
Surveyor:	Not Reported		
T:	Not Reported	Site id:	HI9000000004300

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

	Database	EDR ID Number
C15 **SE** **1/2 - 1 Mile** **Higher**	**HI WELLS**	**HI9000000004301**

Wid:	8-4203-014	Island:	Hawaii
Well name:	Glover Quarry B	Old name:	Not Reported
Yr drilled:	1948		
Driller:	Jas. W. Glover, Ltd.		
Quad map:	67		
Long83dd:	-155.058889		
Lat83dd:	19.709444		
Gps:	0	Utm:	-1
Owner user:	Jas. W. Glover, Ltd.		
Land owner:	Not Reported		
Pump insta:	Not Reported		
Old number:	Not Reported	Well type:	DUG
Casing dia:	72	Ground el:	23
Well depth:	25		
Solid case:	Not Reported	Perf case:	Not Reported
Use:	IND - Mining, Dust Control		
Use year:	Not Reported		
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	350		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	1984		
Draft yr:	Not Reported	Bot hole:	-2
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	.504		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	80401		
Latest hd:	Not Reported	Wcr:	01-JAN-48
Pir:	Not Reported		
Surveyor:	Not Reported		
T:	Not Reported	Site id:	HI9000000004301

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

Federal EPA Radon Zone for HAWAII County: 3

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for Zip Code: 96720

Number of sites tested: 43

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	-0.112 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	-0.106 pCi/L	100%	0%	0%

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

HYDROLOGIC INFORMATION

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetlands Inventory
Source: Office of Planning
Telephone: 808-587-2895

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Service, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Well Index Database
Source: Commission on Water Resource Management
Telephone: 808-587-0214
CWRM maintains a Well Index Database to track specific information pertaining to the construction and installation of production wells in Hawaii

OTHER STATE DATABASE INFORMATION

RADON

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary faultlines, prepared in 1975 by the United State Geological Survey

PHYSICAL SETTING SOURCE RECORDS SEARCHED

STREET AND ADDRESS INFORMATION

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525 Piilani Street

525 Piilani Street

Hilo, HI 96720

Inquiry Number: 5207731.9

March 05, 2018

The EDR Aerial Photo Decade Package

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

03/05/18

Site Name:

525 Piilani Street
525 Piilani Street
Hilo, HI 96720
EDR Inquiry # 5207731.9

Client Name:

Lehua Environmental Consultants, LLC
P.O. Box 1018
Kamuela, HI 96743
Contact: Kama

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

Search Results:

Year	Scale	Details	Source
2000	1"=500'	Acquisition Date: June 16, 2000	USGS/DOQQ
1992	1"=500'	Flight Date: September 30, 1992	USGS
1988	1"=500'	Flight Date: October 01, 1988	USGS
1985	1"=500'	Flight Date: March 11, 1985	USGS
1977	1"=500'	Flight Date: January 03, 1977	USGS
1975	1"=1000'	Flight Date: July 17, 1975	USGS
1954	1"=500'	Flight Date: April 10, 1954	USGS

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INQUIRY #: 5207731.9
YEAR: 2000
= 500'
N
EDR



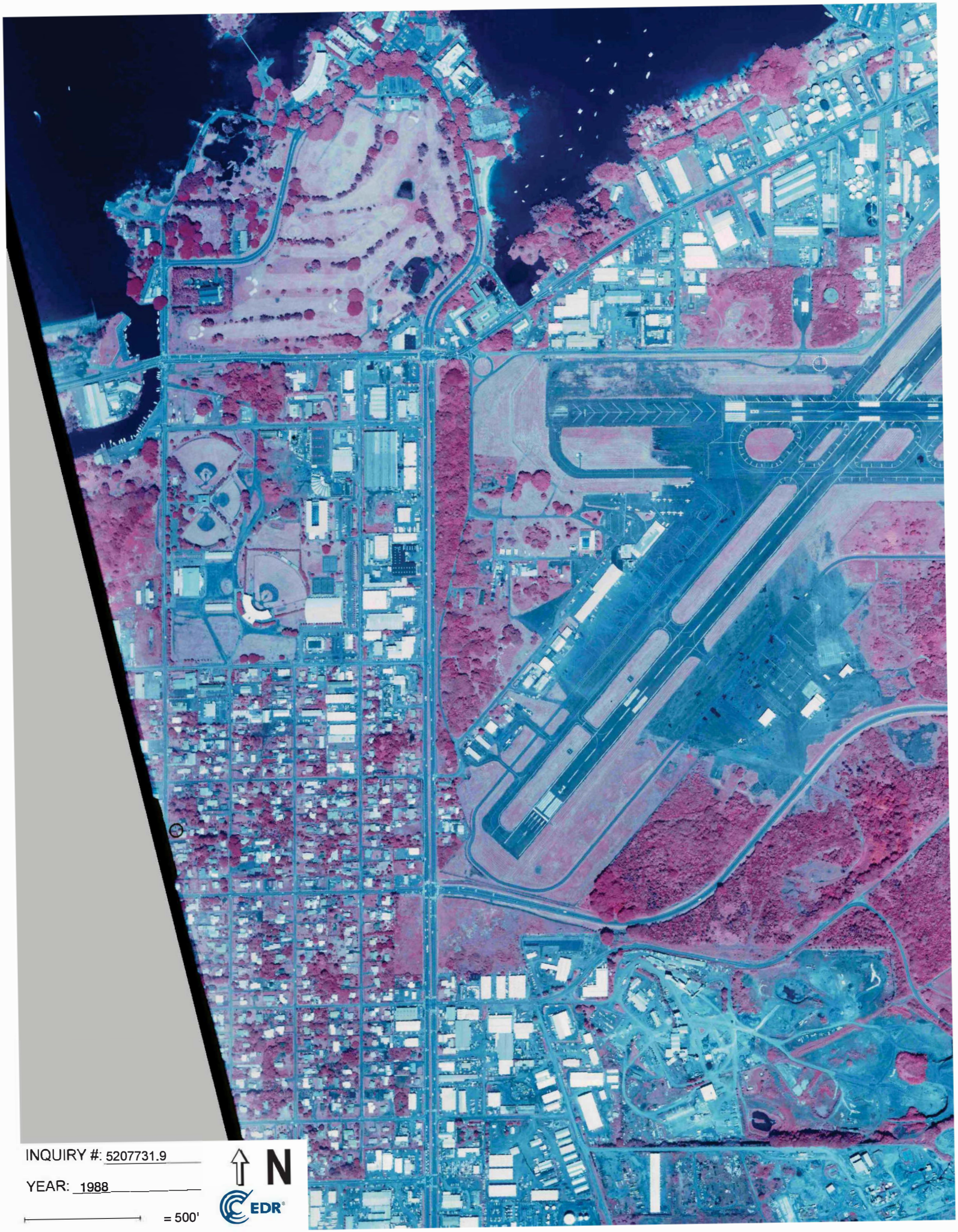
INQUIRY #: 5207731.9

YEAR: 1992

= 500'

N

EDR



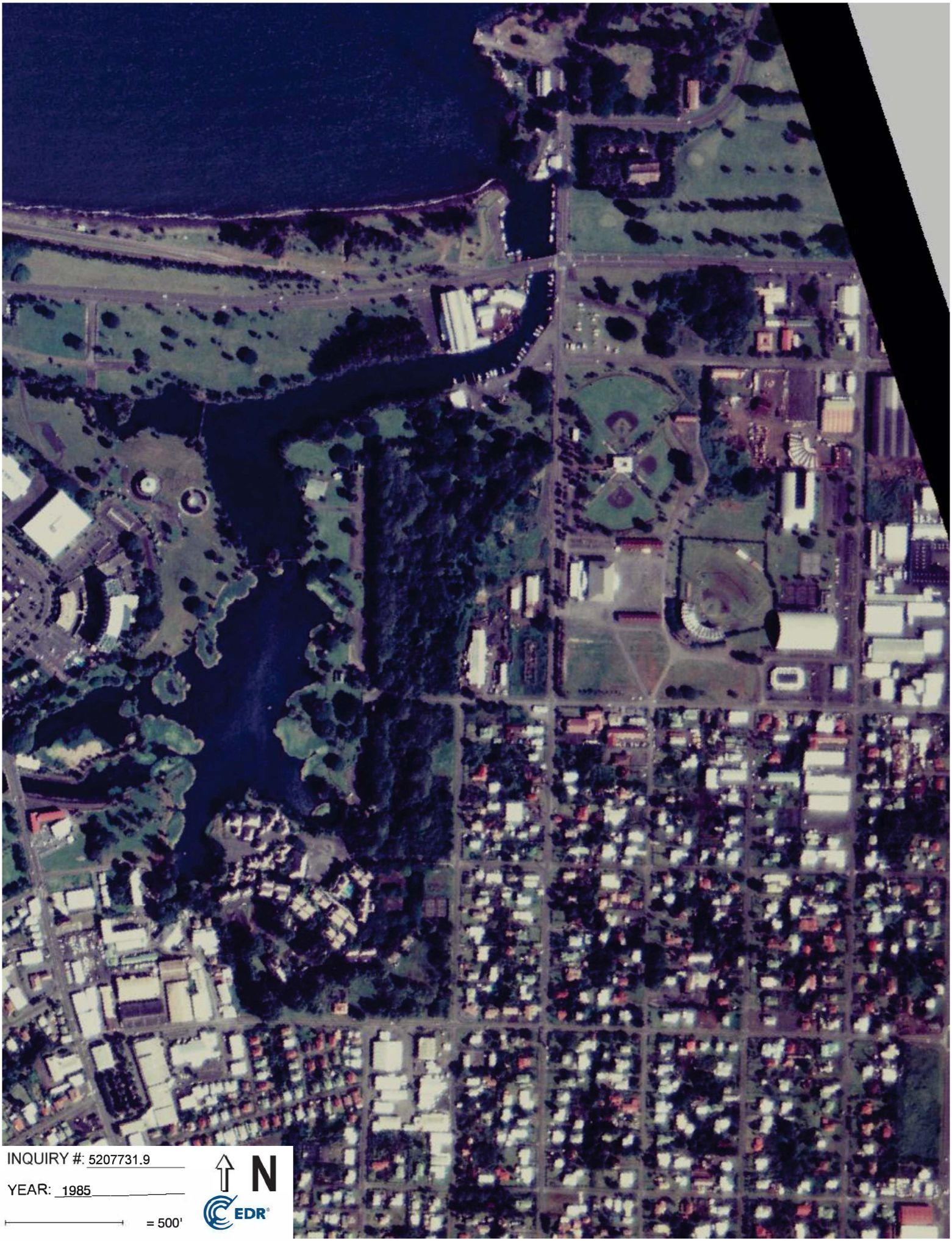
INQUIRY #: 5207731.9

YEAR: 1988

= 500'

N

EDR


INQUIRY #: 5207731.9
YEAR: 1985
= 500'
N
EDR



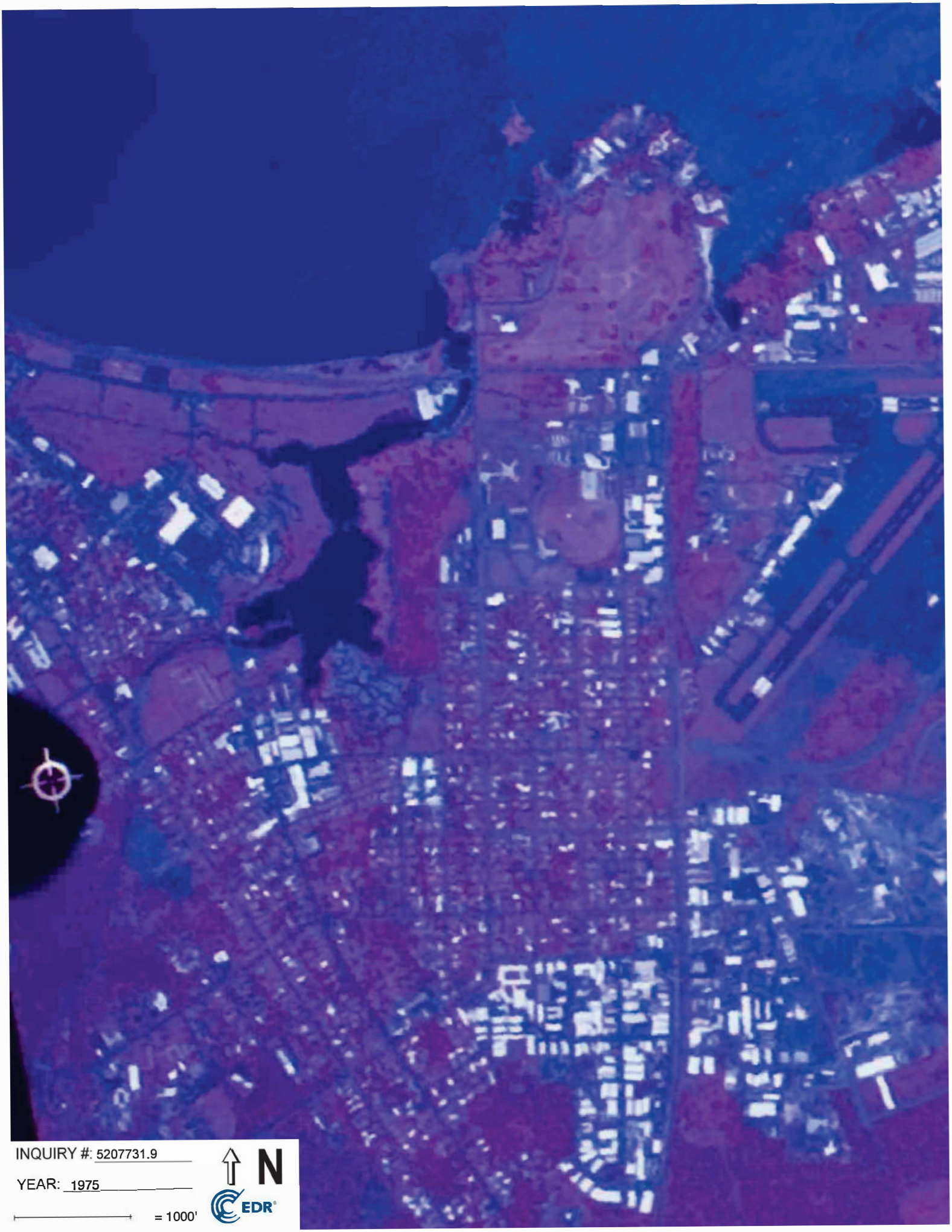
INQUIRY #: 5207731.9

YEAR: 1977

= 500'

N

EDR



INQUIRY #: 5207731.9

YEAR: 1975

= 1000'

N

EDR


INQUIRY #: 5207731.9
YEAR: 1954
= 500'
N
EDR

525 Piilani Street

525 Piilani Street

Hilo, HI 96720

Inquiry Number: 5207731.4

March 05, 2018

EDR Historical Topo Map Report

with QuadMatch™

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Historical Topo Map Report

03/05/18

Site Name:

525 Piilani Street
525 Piilani Street
Hilo, HI 96720
EDR Inquiry # 5207731.4

Client Name:

Lehua Environmental Consultants, LLC
P.O. Box 1018
Kamuela, HI 96743
Contact: Kama

EDR Topographic Map Library has been searched by EDR and maps covering the target property location as provided by Lehua Environmental Consultants, LLC were identified for the years listed below. EDR's Historical Topo Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topo Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the late 1800s.

Search Results:

P.O.# NA
Project: NA

Coordinates:

Latitude:	19.71721 19° 43' 2" North
Longitude:	-155.070996 -155° 4' 16" West
UTM Zone:	Zone 5 North
UTM X Meters:	282942.00
UTM Y Meters:	2181512.15
Elevation:	11.97' above sea level

Maps Provided:

2013
1995
1981
1980
1963
1932
1917
1914

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Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

2013 Source Sheets



Hilo

7.5-minute, 24000

1995 Source Sheets



Hilo

7.5-minute, 24000
Aerial Photo Revised 1995

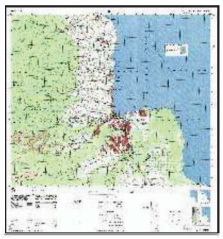
1981 Source Sheets



Hilo

7.5-minute, 24000
Aerial Photo Revised 1977

1980 Source Sheets



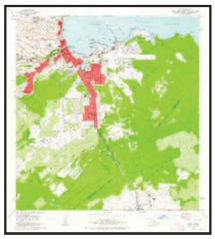
HILO

15-minute, 50000

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1963 Source Sheets



Hilo

7.5-minute, 24000
Aerial Photo Revised 1961

1932 Source Sheets



Hilo

15-minute, 62500

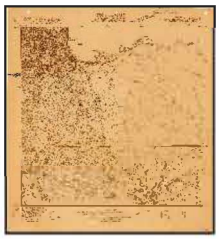
1917 Source Sheets



Hilo

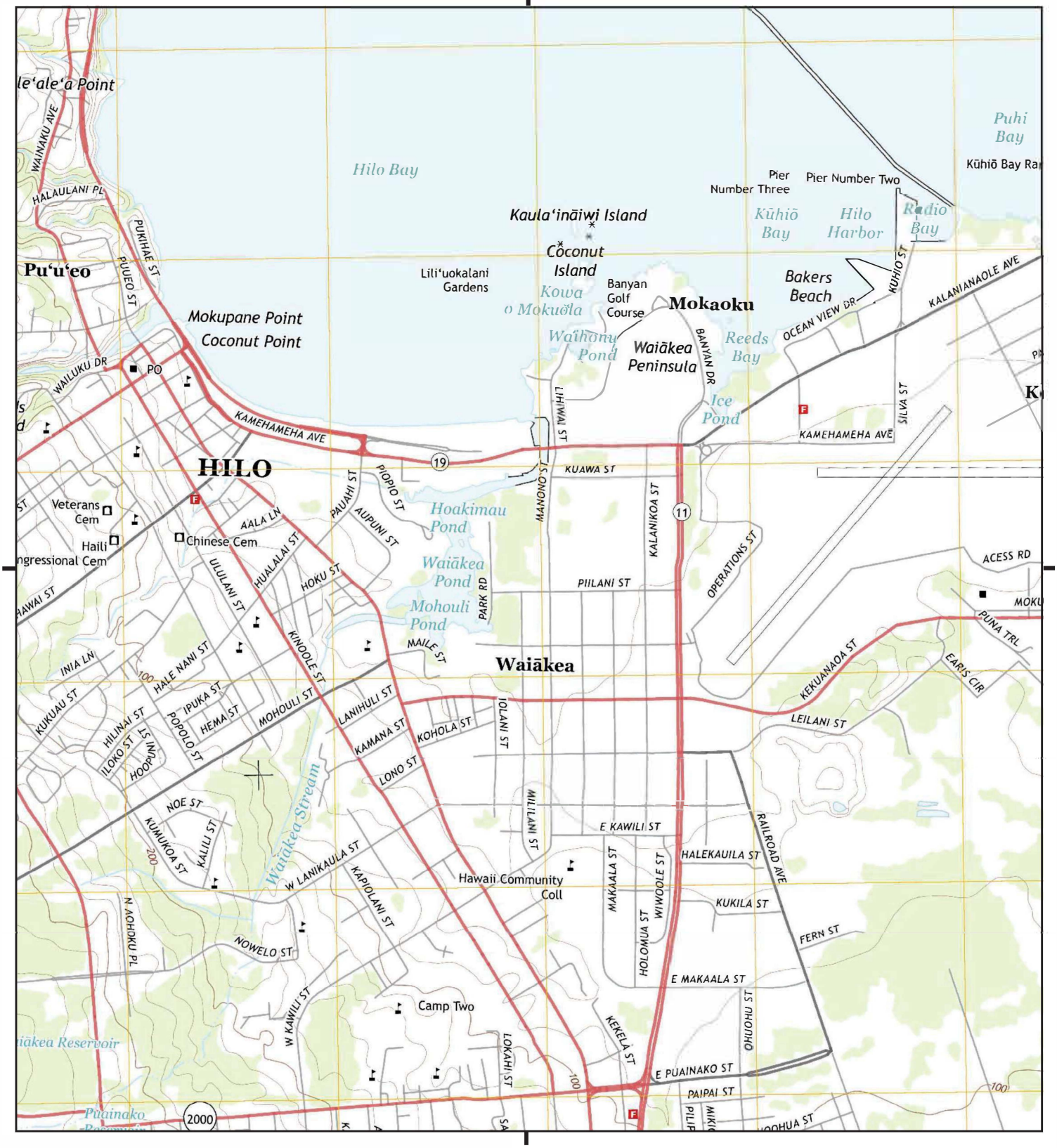
15-minute, 62500

1914 Source Sheets



WAIAKEA

7.5-minute, 31680



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Hilo, 2013, 7.5-minute

SITE NAME: 525 Piilani Street
ADDRESS: 525 Piilani Street
Hilo, HI 96720
CLIENT: Lehua Environmental Consultants, LLC

N



This report includes information from the following map sheet(s).

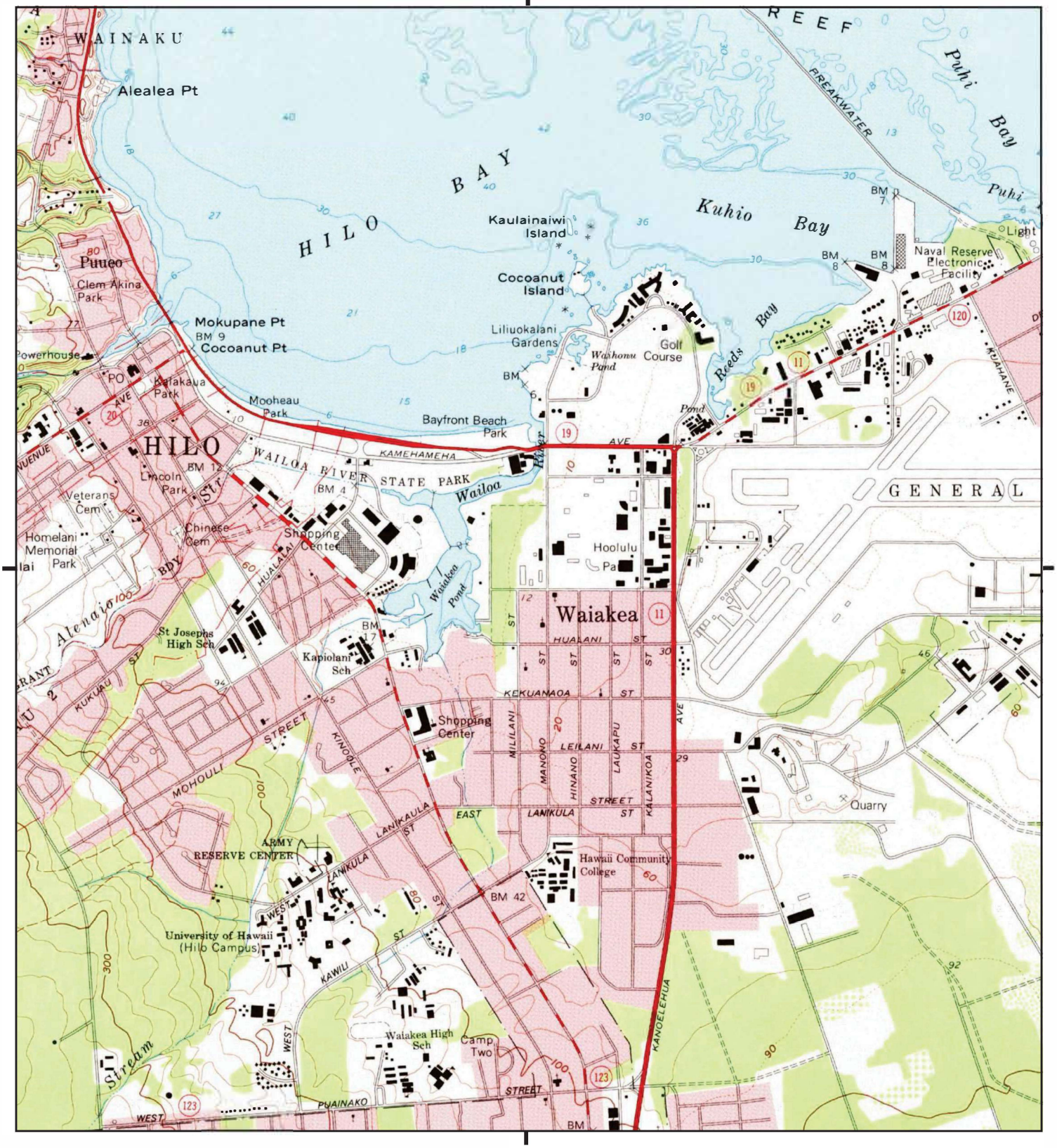
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Hilo, 1995, 7.5-minute

SITE NAME: 525 Piilani Street
ADDRESS: 525 Piilani Street
Hilo, HI 96720
CLIENT: Lehua Environmental Consultants, LLC

N



This report includes information from the following map sheet(s).

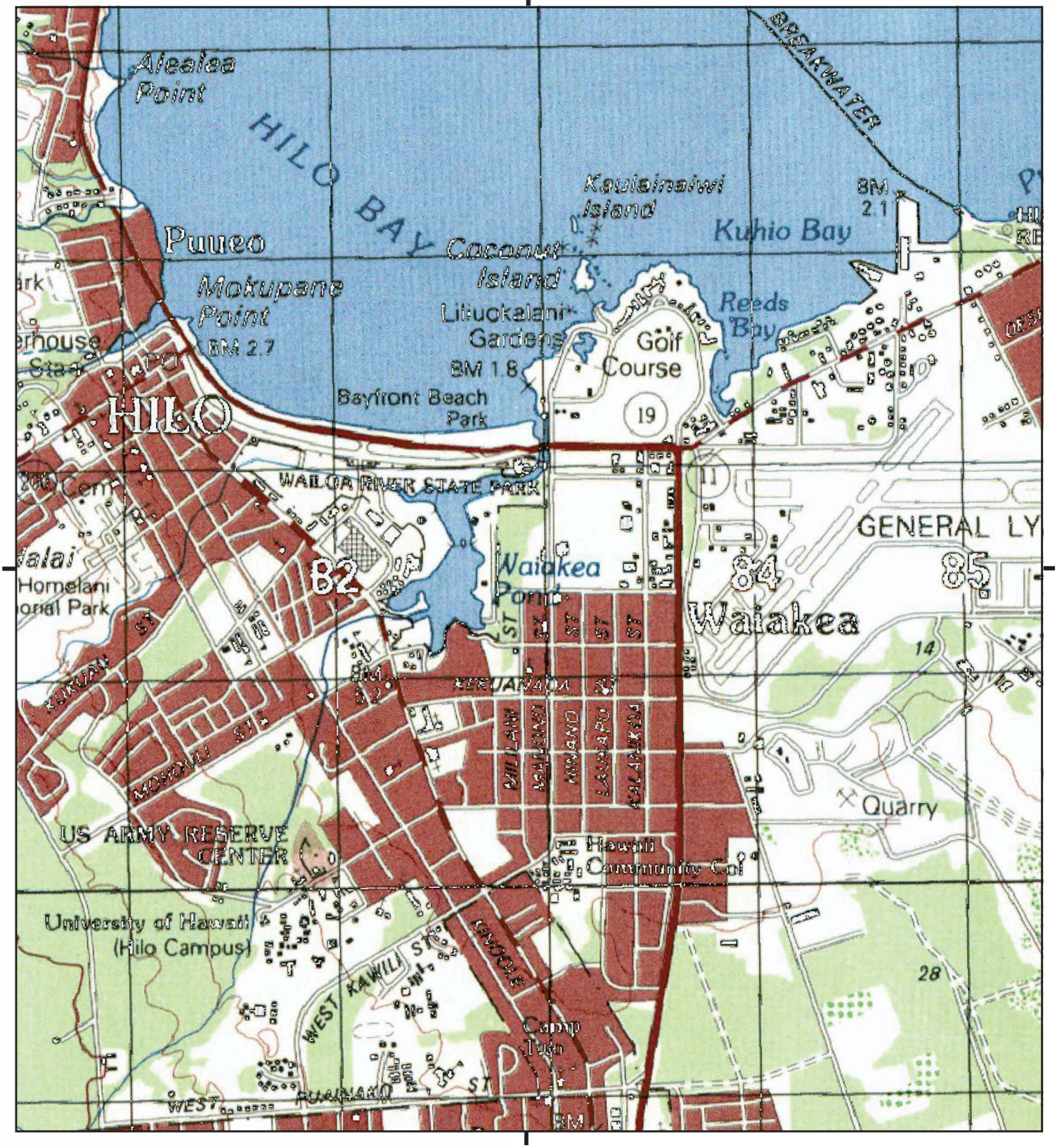
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Hilo, 1981, 7.5-minute

SITE NAME: 525 Piilani Street
ADDRESS: 525 Piilani Street
Hilo, HI 96720
CLIENT: Lehua Environmental Consultants, LLC

N



This report includes information from the following map sheet(s).

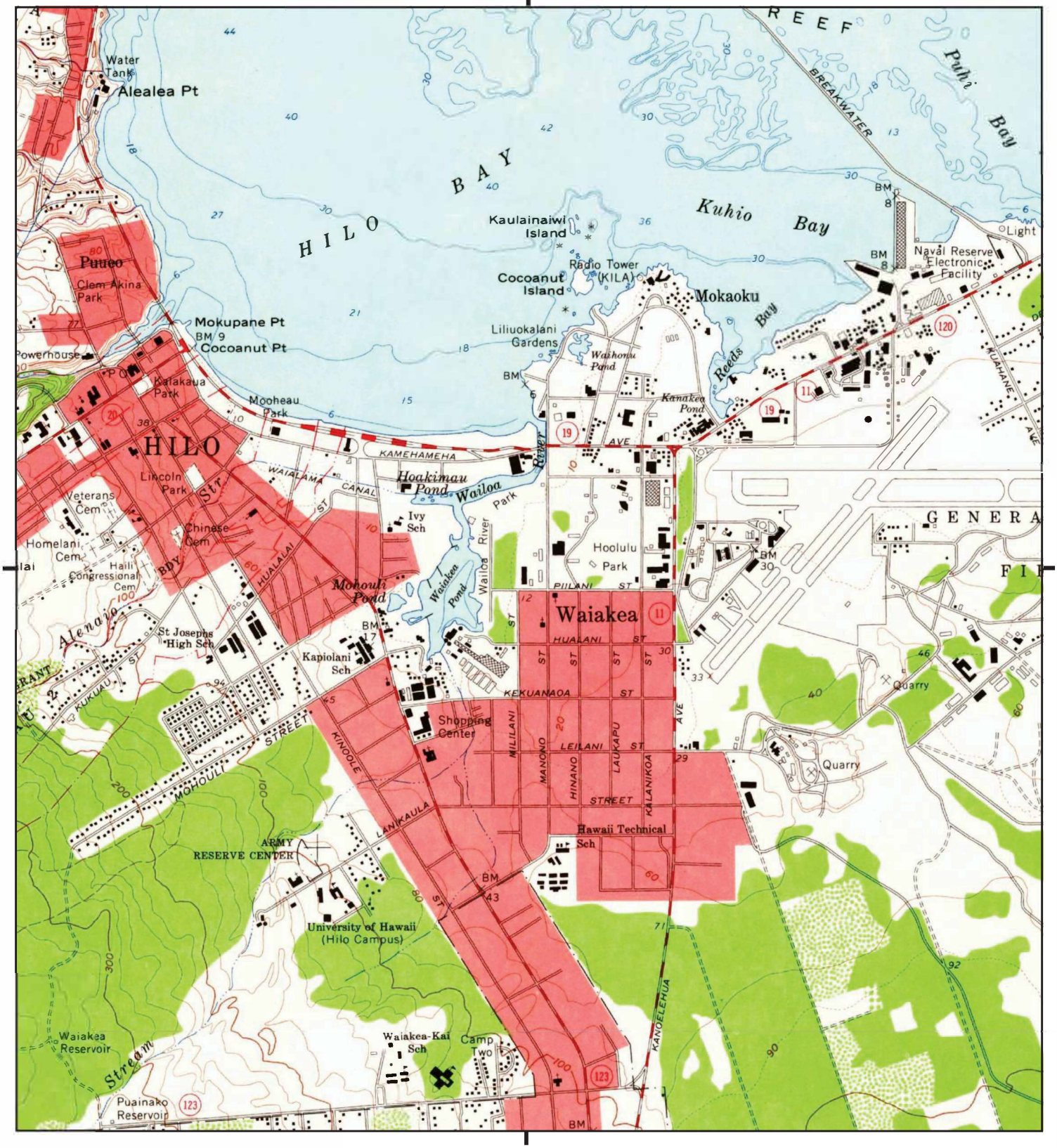
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, HILO, 1980, 15-minute

SITE NAME: 525 Piilani Street
ADDRESS: 525 Piilani Street
Hilo, HI 96720
CLIENT: Lehua Environmental Consultants, LLC

N



This report includes information from the following map sheet(s).

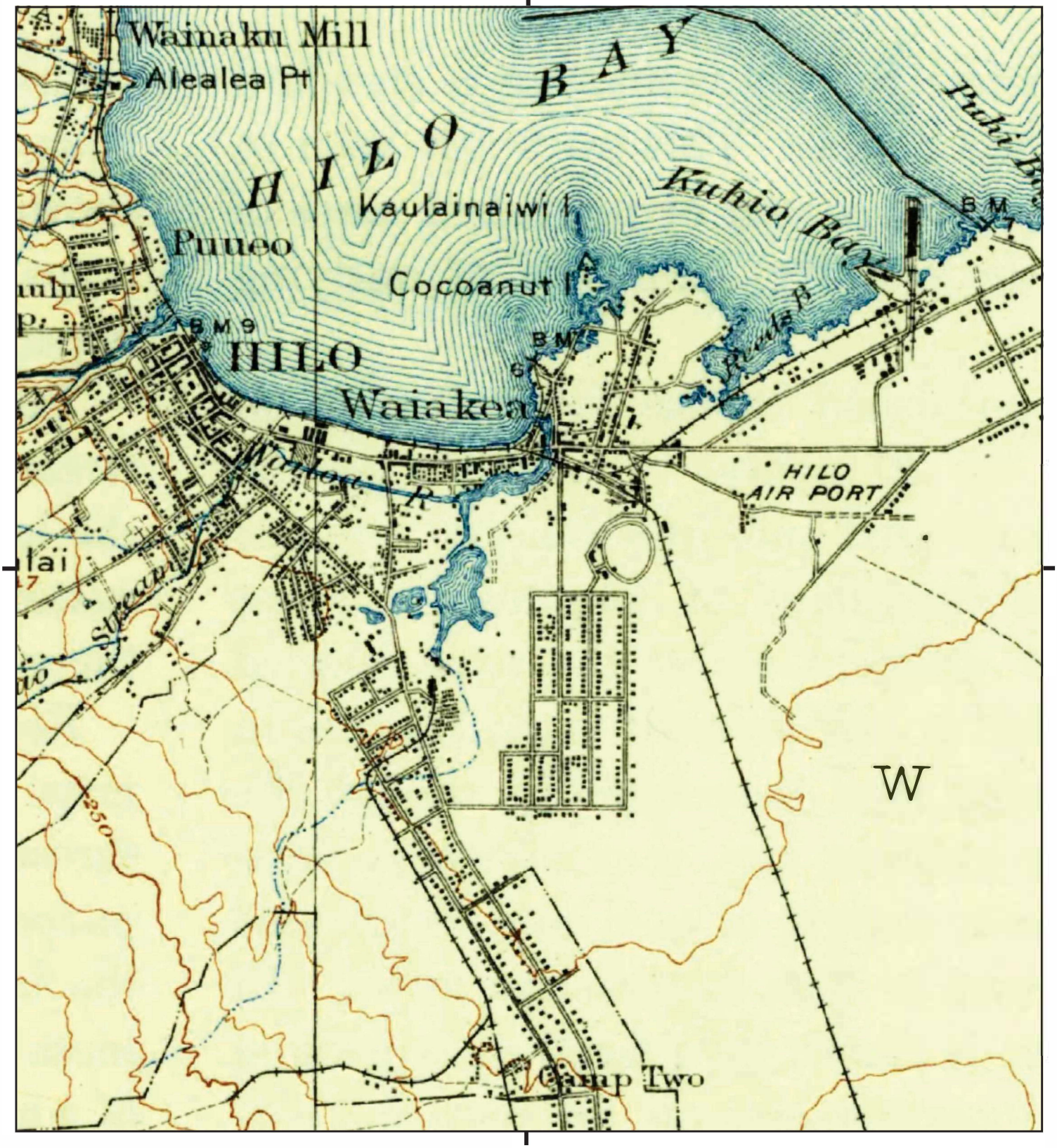
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Hilo, 1963, 7.5-minute

SITE NAME: 525 Piilani Street
ADDRESS: 525 Piilani Street
Hilo, HI 96720
CLIENT: Lehua Environmental Consultants, LLC

N



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Hilo, 1932, 15-minute

SITE NAME: 525 Piilani Street
ADDRESS: 525 Piilani Street
Hilo, HI 96720
CLIENT: Lehua Environmental Consultants, LLC

N



This report includes information from the following map sheet(s).

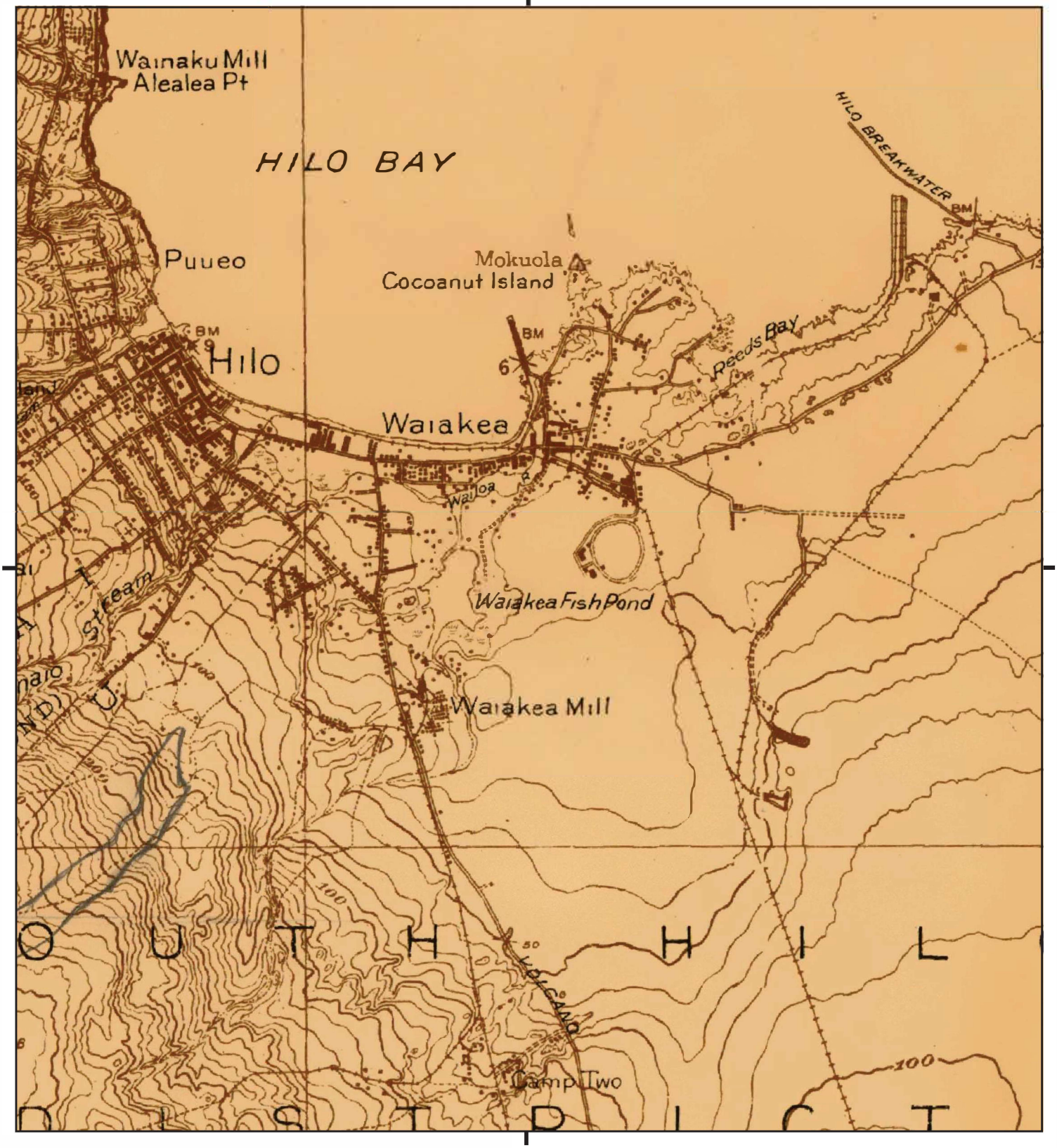
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Hilo, 1917, 15-minute

SITE NAME: 525 Piilani Street
ADDRESS: 525 Piilani Street
Hilo, HI 96720
CLIENT: Lehua Environmental Consultants, LLC

N



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, WAIAKEA, 1914, 7.5-minute

SITE NAME: 525 Piilani Street
ADDRESS: 525 Piilani Street
Hilo, HI 96720
CLIENT: Lehua Environmental Consultants, LLC

N

525 Piilani Street

525 Piilani Street

Hilo, HI 96720

Inquiry Number: 5207731.3

March 05, 2018

Certified Sanborn® Map Report

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

03/05/18

Site Name:

525 Piilani Street
525 Piilani Street
Hilo, HI 96720
EDR Inquiry # 5207731.3

Client Name:

Lehua Environmental Consultants, LLC
P.O. Box 1018
Kamuela, HI 96743
Contact: Kama

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Certified Sanborn Results:

Certification # 9DEA-4B20-AB9F

PO # NA

Project NA

Maps Provided:

1991
1987
1978
1974
1957
1921

Sanborn® Library search results

Certification #: 9DEA-4B20-AB9F

The Sanborn Library includes more than 1.2 million fire insurance maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow and others which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ☑ Library of Congress
- ☑ University Publications of America
- ☑ EDR Private Collection

The Sanborn Library LLC Since 1866™

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Sanborn Sheet Key

This Certified Sanborn Map Report is based upon the following Sanborn Fire Insurance map sheets.

1991 Source Sheets



Volume 1, Sheet 30

1987 Source Sheets



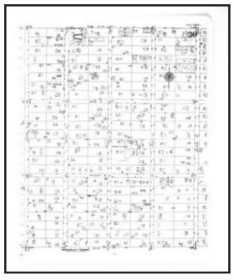
Volume 1, Sheet 30

1978 Source Sheets



Volume 1, Sheet 30

1974 Source Sheets



Volume 1, Sheet 30

Sanborn Sheet Key

This Certified Sanborn Map Report is based upon the following Sanborn Fire Insurance map sheets.

1957 Source Sheets



Volume 1, Sheet 30

1921 Source Sheets

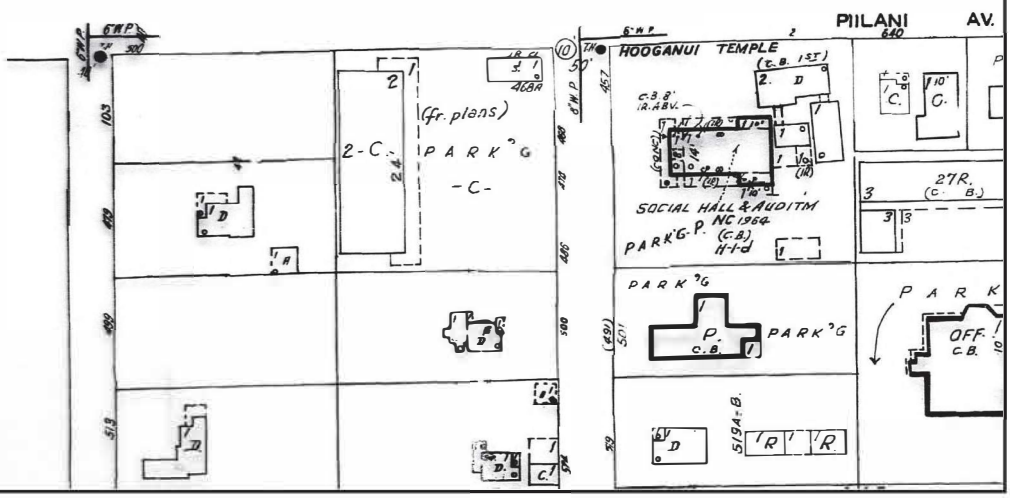


Volume 1, Sheet 30

Site Name: 525 Piilani Street
Address: 525 Piilani Street
City, ST, ZIP: Hilo, HI 96720
Client: Lehua Environmental Consultants, LLC
EDR Inquiry: 5207731.3
Order Date: 03/05/2018
Certification #: 9DEA-4B20-AB9F
Copyright: 1991

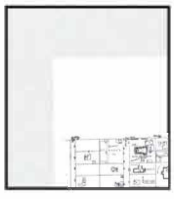
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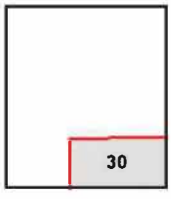
Certification # 9DEA-4B20-AB9F



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Outlined areas indicate map sheets within the collection.

0 Feet 150 300 600





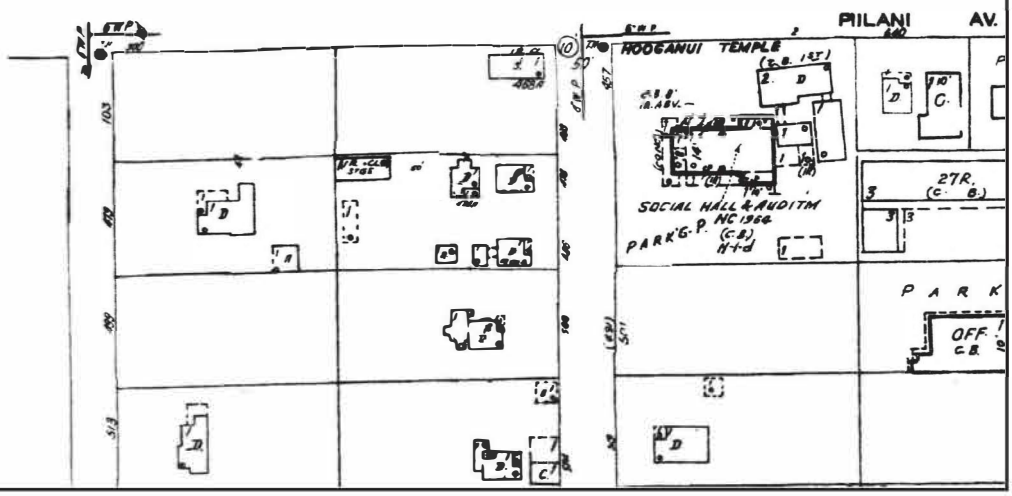
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Address: 525 Pilani Street
City, ST, ZIP: Hilo, HI 96720
Client: Lehua Environmental Consultants, LLC
EDR Inquiry: 5207731.3
Order Date: 03/05/2018
Certification #: 9DEA-4B20-AB9F
Copyright 1987

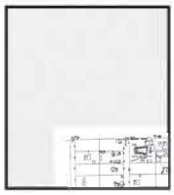
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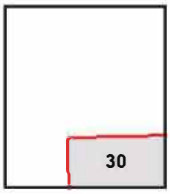
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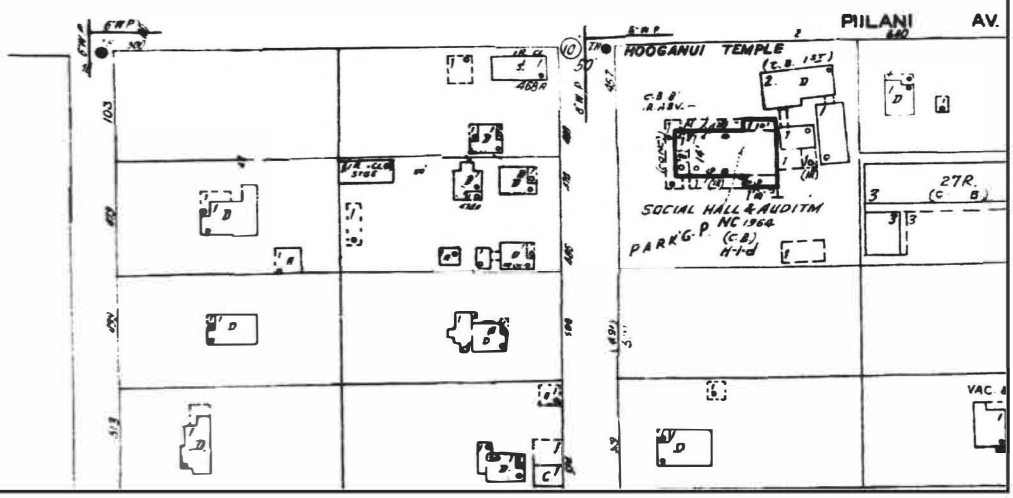


Volume 1, Sheet 30

Site Name: 525 Pilani Street
Address: 525 Pilani Street
City, ST, ZIP: Hilo, HI 96720
Client: Lehua Environmental Consultants, LLC
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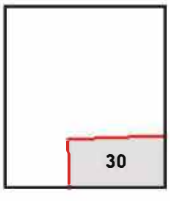
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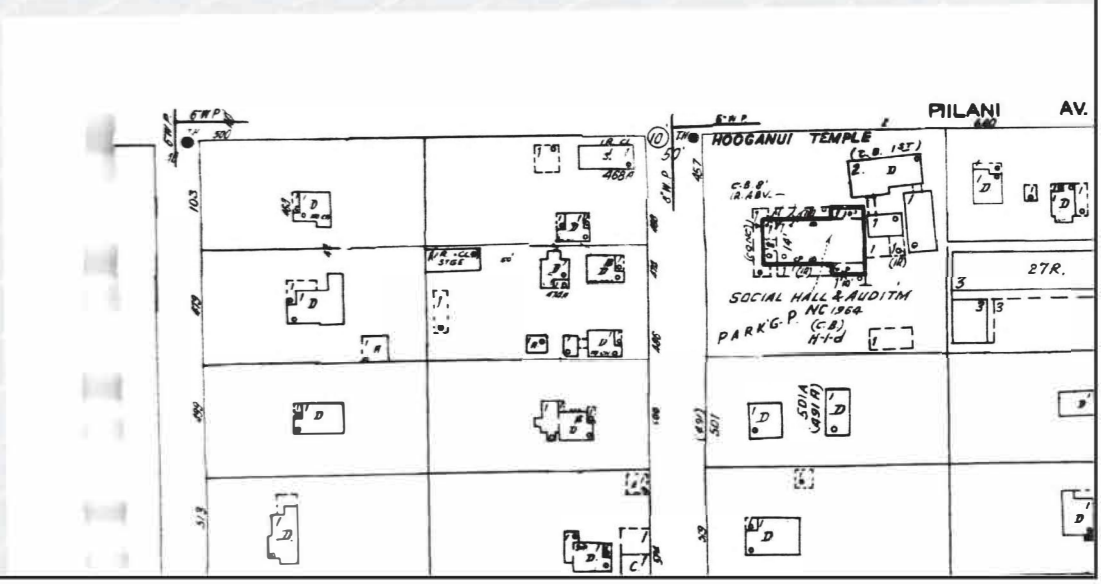
Volume 1, Sheet 30

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Site Name: 525 Piilani Street
Address: 525 Piilani Street
City, ST, ZIP: Hilo, HI 96720
Client: Lehua Environmental Consultants, LLC
EDR Inquiry: 5207731.3
Order Date: 03/05/2018
Certification #: 9DEA-4B20-AB9F
Copyright: 1974

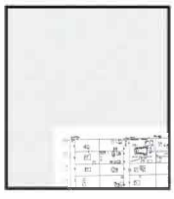
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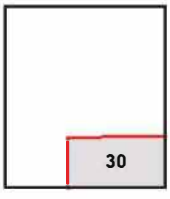
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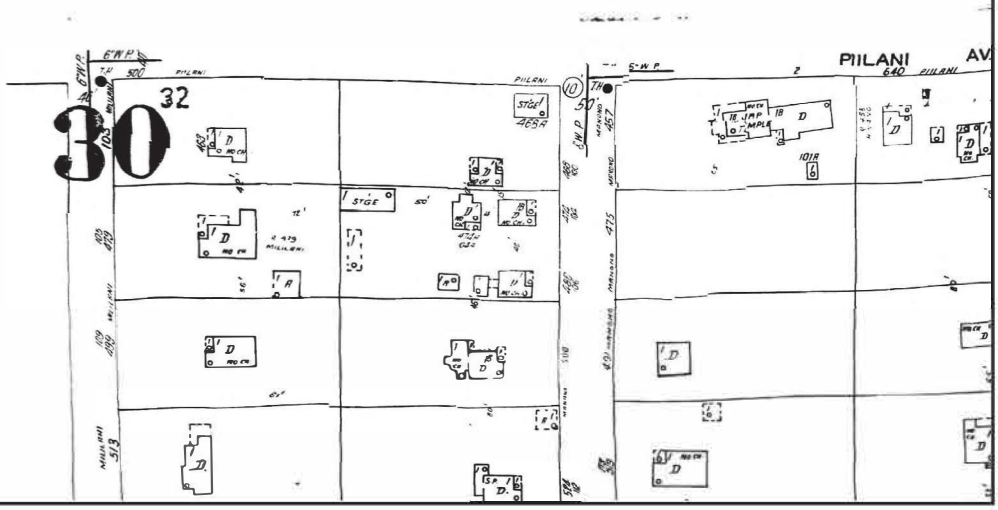
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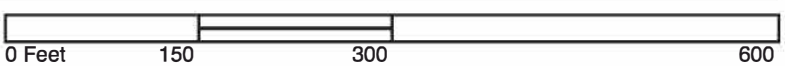
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City, ST, ZIP: Hilo, HI 96720
Client: Lehua Environmental Consultants, LLC
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Order Date: 03/05/2018
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Copyright: 1957

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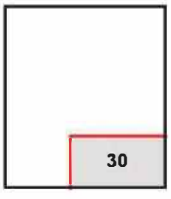
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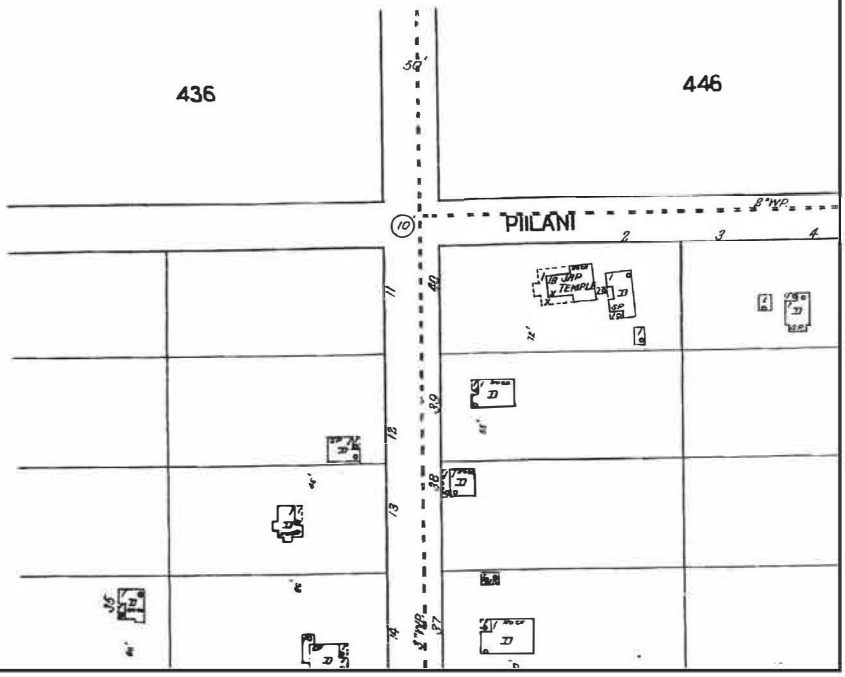
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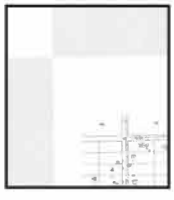
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City, ST, ZIP: Hilo, HI 96720
Client: Lehua Environmental Consultants, LLC
EDR Inquiry: 5207731.3
Order Date: 03/05/2018
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Copyright 1921

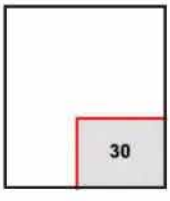
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Volume 1, Sheet 30

0 Feet 150 300 600

N

525 Piilani Street
525 Piilani Street
Hilo, HI 96720

Inquiry Number: 5207731.5
March 05, 2018

The EDR-City Directory Image Report

EDR® Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

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EXECUTIVE SUMMARY

DESCRIPTION

Environmental Data Resources, Inc.'s (EDR) City Directory Report is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's City Directory Report includes a search of available city directory data at 5 year intervals.

RECORD SOURCES

EDR's Digital Archive combines historical directory listings from sources such as Cole Information and Dun & Bradstreet. These standard sources of property information complement and enhance each other to provide a more comprehensive report.

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RESEARCH SUMMARY

The following research sources were consulted in the preparation of this report. A check mark indicates where information was identified in the source and provided in this report.

Year	Target Street	Cross Street	Source
2014	☑	☑	EDR Digital Archive
2010	☑	☑	EDR Digital Archive
2005	☑	☑	EDR Digital Archive
2000	☑	☑	EDR Digital Archive
1995	☑	☑	EDR Digital Archive
1992	☑	☑	EDR Digital Archive
1987	☑	☑	EDR Digital Archive
1982	☑	☐	EDR Digital Archive
1977	☑	☑	EDR Digital Archive

FINDINGS

TARGET PROPERTY STREET

525 Piilani Street
Hilo, HI 96720

Year	CD Image	Source
PIILANI ST		
2014	pg A2	EDR Digital Archive
2010	pg A4	EDR Digital Archive
2005	pg A6	EDR Digital Archive
2000	pg A8	EDR Digital Archive
1995	pg A10	EDR Digital Archive
1992	pg A12	EDR Digital Archive
1987	pg A14	EDR Digital Archive
1982	pg A15	EDR Digital Archive
1977	pg A17	EDR Digital Archive

FINDINGS

CROSS STREETS

Year	*CD Image*	*Source*	
MANONO ST			
2014	pg. A1	EDR Digital Archive	
2010	pg. A3	EDR Digital Archive	
2005	pg. A5	EDR Digital Archive	
2000	pg. A7	EDR Digital Archive	
1995	pg. A9	EDR Digital Archive	
1992	pg. A11	EDR Digital Archive	
1987	pg. A13	EDR Digital Archive	
1982	-	EDR Digital Archive	Street not listed in Source
1977	pg. A16	EDR Digital Archive	

City Directory Images

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

MANONO ST 2014

454	B & S ABURAMEN INC
	FREDDYS RESTAURANT
457	HILOHOOGANHJI
	KOYASAN SHINGON MISSION HAWAII
495	HAWAII GOVT EMPLOYEE ASSOC
500	HAWAII ISLAND PUB LNKS CMMTTEE
	ISLAND MORTGAGE
	LOVES BAKERY INC
	LY20 LLC
	TAKETA PATRICK Y APPRAISALS
	TRIPLE 7 AMUSEMENT
519	BIG ISLAND LAND CO LTD
	CARTER, GAYLE A
	FUJII, KAYNE
	OCCUPANT UNKNOWN,
	ULTIMATE ROOFING INC
533	BEARDSLEY, BONNIE J
	OCCUPANT UNKNOWN,
542	CHARTRAND, LIONEL K
554	KE KILOHANA OKA MALAMALAMA
557	FLEMING & ASSOCIATES LLC
571	LEASURE, HILLARY M
573	AIANA, ANNETTE
	OCCUPANT UNKNOWN,
576	OCCUPANT UNKNOWN,

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

PIILANI ST 2014

456	SIBAYAN, COREY
640	DEMELLO, ANTOINETTE M
	ELEGANT SERVICE VENTURES LLC
	T & C REALTY
648	ICC HOLDINGS LLC
	ISEMOTO CONTRACTING CO LTD
670	HAWAII CAMPER TOPS CORP
	ZAVARRO RHONDA
760	KIM S KARAOKE LOUNGE
	UN SIM MUKAI LLC
792	THELEN COLLIER
794	RICHARD CUNNINGHAM INC
799	HAWAII COUNTY RECREATION DIV
	RECREATION DIVISION
810	ITSUS FISHING SUPPLIES INC
820	BEAUTY SALON
	JOEYS
	KANOELEHUA INDUS AREA ASSN
	WONG LINDA E M
860	BOBS DISCOUNT TIRE

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

MANONO ST 2010

454	B & S ABURAMEN INC
	S YOKOYAMA INC
457	HILOHOOGANHJI
495	HAWAII GOVT EMPLOYEE ASSOC
500	ISLAND COMMUNITY LENDING CORP
	ISLAND MORTGAGE
	KALEHUA, ELDRED K
	LOVES BAKERY INC
	LY20 LLC
	TAKETA PATRICK Y APPRAISALS
	TRIPLE 7 AMUSEMENT
519	BIG ISLAND LAND CO LTD
	FUJII, KAYNE
	PUUEO LIMITED PARTNERSHIP
	ULTIMATE ROOFING
533	BEARDSLEY, BONNIE
	OCCUPANT UNKNOWN,
542	CHARTRAND, LIONEL K
554	KE KILOHANA OKA MALAMALAMA
557	DURRANT GROUP INC (PC)
	FLEMING & ASSOCIATES LLC
	ODA MCCARTY ARCHITECTS LTD
573	KAUI, PATLYNN
	OCCUPANT UNKNOWN,

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

PIILANI ST 2010

456	OCCUPANT UNKNOWN,
	SIBAYAN, KARLA
640	T & C REALTY
648	ICC HOLDINGS LLC
	ISEMOTO CONTRACTING CO LTD
670	HAWAII CAMPER TOPS CORP
760	MINAS LOUNGE INC
	UN SIM MUKAI LLC
792	KIRKENDALL KARL
	THELEN COLLIER
794	RICHARD CUNNINGHAM INC
799	LEARFIELD SPORT
810	ITSUS FISHING SUPPLIES INC
820	BEAUTY SALON
	HAWAII DRAFTING & DESIGN
	JOEYS
	KANOELEHUA INDUS AREA ASSN
	WONG LINDA E M
860	BOBS DISCOUNT TIRE

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

MANONO ST 2005

323	HAWAII COUNTY FAIR 2004
454	S YOKOYAMA INC
457	HILOHOOGANHJI
495	HAWAII GOVT EMPLOYEE ASSOC
500	DAIICHIYA-LOVES BAKERY INC
	ISLAND CMNTY LNDING CRPRPATION
	TAKETA PATRICK Y SRA
	TRIPLE 7 AMUSEMENT
519	BIG ISLAND LAND CO LTD
	DHJS PROPERTIES INC
	OCCUPANT UNKNOWN,
	RE MAX PROPERTIES
524	TANAKA, CYNTHIA
533	BEARDSLEY, BONNIE
	BENNETT, R
	OCCUPANT UNKNOWN,
542	OCCUPANT UNKNOWN,
	SANBORN, DWAYNE
554	KE KILOHANA OKA MALAMALAMA
557	DURRANT GROUP INC
	ODA / MCCARTY ARCHITECTS LTD
571	BUTLER, JOHN
	SEGAWA, HIDEO
572	MORA, CHARLARAE M
	PAREL, LEONOR
576	YAMAGUCHI, NOBUJIRO

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

PIILANI ST 2005

456	OCCUPANT UNKNOWN,
640	GOOD NEWS & PRISON MINISTRY
	T & C REALTY
	TOM ROWENA
648	ISEMOTO CONTRACTING CO LTD
670	HAWAII CAMPER TOPS CORP
	ZAVARRO RHONDA
760	MINAS LOUNGE INC
792	KIRKENDALL KARL
	THELEN COLLIER
794	RICHARD CUNNINGHAM INC
810	ITSUS FISHING SUPPLIES INC
820	ADRIAN, J
	BEAUTY SALON
	HAWAII DRAFTING & DESIGN
	KANOELEHUA INDUS AREA ASSN
	LINDAS
	OJANO, STACY D
	WONG LINDA E M

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

MANONO ST 2000

454 YOKOYAMA S INC
457 HILOHOOGANHJI
495 H G E A
500 DAIICHIYA-LOVES BAKERY INC
ISLAND COMMUNITY LENDING CORP
ROSCOE STEVEN S CONSTRUCTION
TAKETA PATRICK Y SRA
519 BRIGHT START INC
INTERIM HEALTHCARE INC
524 OCCUPANT UNKNOWN,
533 BEARDSLEY, BONNIE
BELL, TEDDY
542 CORDERO, JAMES
554 KE KILOHANA OKA MALAMALAMA
OCCUPANT UNKNOWN,
557 OCCUPANT UNKNOWN,
ODA-MC CARTY ARCHITECTS LTD
571 OCCUPANT UNKNOWN,
573 GOMES, K L
LANDGRAF, SHANNON

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

PIILANI ST 2000

456	PETTI, B
640	OCCUPANT UNKNOWN, T & C REALTY
648	ISEMOTO CONTRACTING CO LTD
670	HAWAII CAMPER TOPS CORP PERKUP COFFEE SERVICE
760	MINAS LOUNGE INC
792	KIRKENDALL KARL KIRKENDALL, KARL THELEN COLLIER
794	CUNNINGHAM RICHARD INC
810	ITSUS FISHING SUPPLIES INC
820	BEAUTY SALON HAWAII DRAFTING & DESIGN LINDAS

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

MANONO ST 1995

454	YOKOYAMA S INC
457	HILOHOOGANHJI
	KUKI, SOHKO
495	H G E A
500	LOVES BAKERY
	PLAYERS CHOICE INC
	TAKETA PATRICK Y SRA
	TAKETA, PATRICK Y
519	BARTMAN, A
	BRIGHT START INC
	INTERIM PERSONNEL
	PERSONNEL POOL TEMPORARY SVCS
524	JEWEL BOX ORCHIDS
533	BELL, TEDDY
	CIRCUS & CLOWNS UNLIMITED
	MASSMAN, SHELLY
	TAMAMOTO, HAJIME
542	CORDERO, JAMES
	TEIXEIRA, T
554	KE KILOHANA CHURCH
557	MURAKAMI, S
571	CLEMENT, JEREMY
572	ONGAIS, DAISY M
576	TANABE, ANTHONY J

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

PIILANI ST 1995

525	HAWAIIAN SUN PRODUCTS INC
640	ITSUS FISHING SUPPLIES INC
	T & C REALTY
648	ISEMOTO CONTRACTING CO LTD
670	ZAVARRO RHONDA
760	CHAPMANS LAND & CATTLE CO
	MINAS LOUNGE INC
810	HIRANO, MITSURU
811	ALOHA LUMBER COMPANY INC
820	ALOHA LUMBER COMPANY INC
	AUSTIN TSUTSUMI & ASSOCIATES
	AUSTIN TSUTSUMI & ASSOCS INC
	WOOD & TAIT INC

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

MANONO ST 1992

457	HILOHOOGANHJI
	KUKI, SOHKO
500	MARUO, KATSU
519	BARTMAN, A
533	MASSMAN, SHELLY
	TAMAMOTO, HAJIME
542	HIRAM, M
557	MURAKAMI, S
573	FIGUEROA, LAUREN A
576	TANABE, ANTHONY J

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

PIILANI ST 1992

456 PETTI, B
525 HAWAIIAN SUN PRODUCTS INC
638 ESSENTIAL CONCEPTS
640 CELLULAR HAWAII
ITSUS FISHING SUPPLIES INC
648 ISEMOTO CONTRACTING CO LTD
760 OLAA STEAKHOUSE
810 HIRANO, MITSURU
820 TAKETA PATRICK Y SRA

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

MANONO ST 1987

457 HILOHOOGANHJI

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

PIILANI ST 1987

638	DAHLBERG J REALTY LTD
	DAIRY QUEEN BIG ISLAND LTD
640	ITSUS FISHING SUPPLIES INC
	J J S DISCOUNTS UNLIMITED
648	ISEMOTO CONTRACTING CO LTD*

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

PIILANI ST 1982

638 HILO FIRE EXTINGUISHERS
640 ARLETTES PACKAGING
648 ALPHA EQUIPMENT INC
ISEMOTO CONTRACTING CO LTD*

Target Street	Cross Street	Source
-	✓	EDR Digital Archive

MANONO ST 1977

300 BLAIR LTD*
454 ITSUS FISHING SUPPLIES INC

Target Street	Cross Street	Source
✔	-	EDR Digital Archive

PIILANI ST 1977

638 HILO FIRE EXTINGUISHERS
640 ARLETTES PACKAGING
648 ALPHA EQUIPMENT INC
760 OLAA STEAK HOUSE INC

FINAL ENVIRONMENTAL ASSESSMENT

PI'ILANI SELF STORAGE WAREHOUSE

Appendix B
Storm Water Pollution Prevention Plan

STORM WATER POLLUTION PREVENTION PLAN

FOR THE CONSTRUCTION OF

Pi'ilani Self Storage

TMK (3) 2-2-033: 011

Prepared by:

Engineering Partners, Inc.

P.O. Box 4159

455-B E. Lanikaula Street

Hilo, Hawaii 96720

January 2023

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EXECUTIVE SUMMARY

The construction project "Pi'ilani Self Storage" will include a self storage warehouse in Hilo, Hawai'i. This Storm Water Pollution Prevention Plan, herein after referred to as SWPPP, describes the procedures that will be used to prevent non-point source pollution from spreading beyond the project site during construction. These procedures are specific to preventing pollution spread by storm water passing through the project site. This SWPPP has been developed according to Hawaii Administrative Rules, Chapter 11-55 with specific reference to Section 7 of Appendix C. The application of the procedures described herein will prevent pollutants from spreading beyond the project site by way of storm water runoff.

STORM WATER TEAM (HAR Chapter 11-55, Appendix C, Section 7.2.1)

The persons described below as part of this project's Storm Water Team are responsible for the development, modification, and implementation of the SWPPP.

Mr. Yen Wen Fang, P.E.

Mr. Fang is the Civil Engineer of Record and is responsible for the initial draft(s) of the SWPPP and any revisions necessary to obtain approval from the Department of Health – Clean Water Branch.

General Contractor

Responsibilities:

1. Install and maintain storm water runoff controls and Best Management Practices (BMP's) through the duration of the construction.
2. Conduct weekly inspections of the site to check storm water runoff control measures and BMP's to detect violations of and conditions which may cause violations.
3. Take immediate corrective action to repair, modify or replace any storm water control; clean up and properly dispose of spills and releases; remedy a permit violation.
4. Notify the Construction Project Manager of any violations, and corrective actions taken with regard to the storm water controls, BMPs, the Permit and the SWPPP.

Contact info to be provided at least 30 days prior to construction

Name:
Telephone:
Email:

Construction Project Manager

Responsibilities:

1. Oversee construction of the project and provide construction management services.
2. Submit additional information/documents necessary to complete the NPDES permit to the Owner.
3. Submit information/documents for compliance with the NPDES permit conditions to the Owner.
4. Conduct periodic site inspections for compliance with permit conditions. Check storm water runoff control measures and best management practices (BMPs) to detect violations of and conditions which may cause violations.
5. Recommend modification of the SWPPP to the Owner. Recommendations shall be based on site observations and input by other storm water team members.
6. Maintain records of any modifications to the SWPPP including monthly reports.
7. Ensure members of the storm water team are aware of changes to the SWPPP and ensure changes are implemented by the General Contractor at the construction site.
8. Immediately notify the Owner of any violations, and corrective actions taken with regard to the storm water controls, BMPs, the Permit and the SWPPP.
9. Notify the Owner of situations or occurrences which may impact use or operation of the facility or its employees and users.

Contact info to be provided at least 30 days prior to construction

Name:

Telephone:

Email:

NATURE OF CONSTRUCTION ACTIVITIES (HAR Chapter 11-55, Appendix C, 7.2.2)

The parcel area is approximately 2.57 acres. Of the overall project area, approximately 2.52 acres will be disturbed by the proposed construction activities. Construction activities will include storage warehouse construction, AC paving, landscaping, concrete walkways/ pavement, possible retaining wall construction, drainage improvements utility installation and site grading. The area expected to be disturbed at any one time should be no greater than 2.52 acres. Construction areas, including support areas such as stockpiles, and storage, will be confined to the project site.

EMERGENCY RELATED PROJECTS
(HAR Chapter 11-55, Appendix C, Section 7.2.3)

This is not an emergency project.

IDENTIFICATION OF OTHER SITE CONTRACTORS
(HAR Chapter 11-55, Appendix C, Section 7.2.4)

At this time, the contractors and subcontractors for this project have not been determined. Upon their determination, and at least 30 prior to the start of construction, a revised SWPPP identifying all site contractors will be submitted.

(General Contractor Company Name) TBD	
(General Contractor Contact Person Name) TBD	
(General Contractor Mailing Address) TBD	
(General Contractor Mailing City) TBD	*(GC Mailing State and Zip Code) TBD*
(General Contractor Telephone Number) TBD	
(General Contractor Email Address) TBD	

(Sub-Contractor #1 Company Name, as needed) TBD	
(Sub-Contractor Contact Person Name) TBD	
(Sub-Contractor Mailing Address) TBD	
(Sub-Contractor Mailing City) TBD	*(Sub Mailing State and Zip Code) TBD*
(Sub-Contractor Telephone Number) TBD	
(Sub-Contractor Email Address) TBD	

(Sub-Contractor #1 Company Name, as needed) TBD	
(Sub-Contractor Contact Person Name) TBD	
(Sub-Contractor Mailing Address) TBD	
(Sub-Contractor Mailing City) TBD	*(Sub Mailing State and Zip Code) TBD*
(Sub-Contractor Telephone Number) TBD	
(Sub-Contractor Email Address) TBD	

SEQUENCE AND ESTIMATED DATES OF CONSTRUCTION ACTIVITIES (HAR Chapter 11-55, Appendix C, Section 7.2.5)

The general sequence of construction activities and activity durations is provided in chronological order below:

Install Perimeter BMPs

The installation of perimeter BMPs will take approximately one week. Biosocks/silt fences will be placed along the perimeter of the site prior to the start of any other construction work. These Biosocks/silt fences will remain in place throughout the duration of the project to act as filters for storm water entering and exiting the project site. Interior BMPs will be installed as applicable based on the progress of the project.

Interior BMPs

Interior BMPs will be installed as applicable based on the progress of the project. For example, impermeable concrete truck washout basins will be utilized but these will not be necessary until concrete work begins.

Rough Grading

Rough grading operations will take approximately four weeks. Rough grading includes the excavation and embankment within the project site prior to any structural improvements. The initial stockpile/ storage area(s) will be created during this phase and sediment trapping wattles will be installed to surround their perimeter.

Retaining Walls (if needed)

Retaining walls would be constructed throughout the site. Concrete truck washout basins will be installed prior to any concrete trucks arriving onsite for the construction of the retaining walls.

Underground Utilities

Installation of underground utilities will take approximately 6 weeks. Underground piping for electrical, sewer, water, and other utilities will be installed in this phase.

Building Erection

Building erection will take approximately eight weeks. This phase of work include the installation of the building framing and exterior finish. There are no additional BMPs

required to be installed with this phase of work but the stockpile/storage area(s) may need to be modified.

Final Site Grading and Paving

Final site grading and paving will take approximately four weeks. This phase includes bringing the site up to final grades and the installation of Portland cement concrete pavement.

Site Finish Work and Landscaping

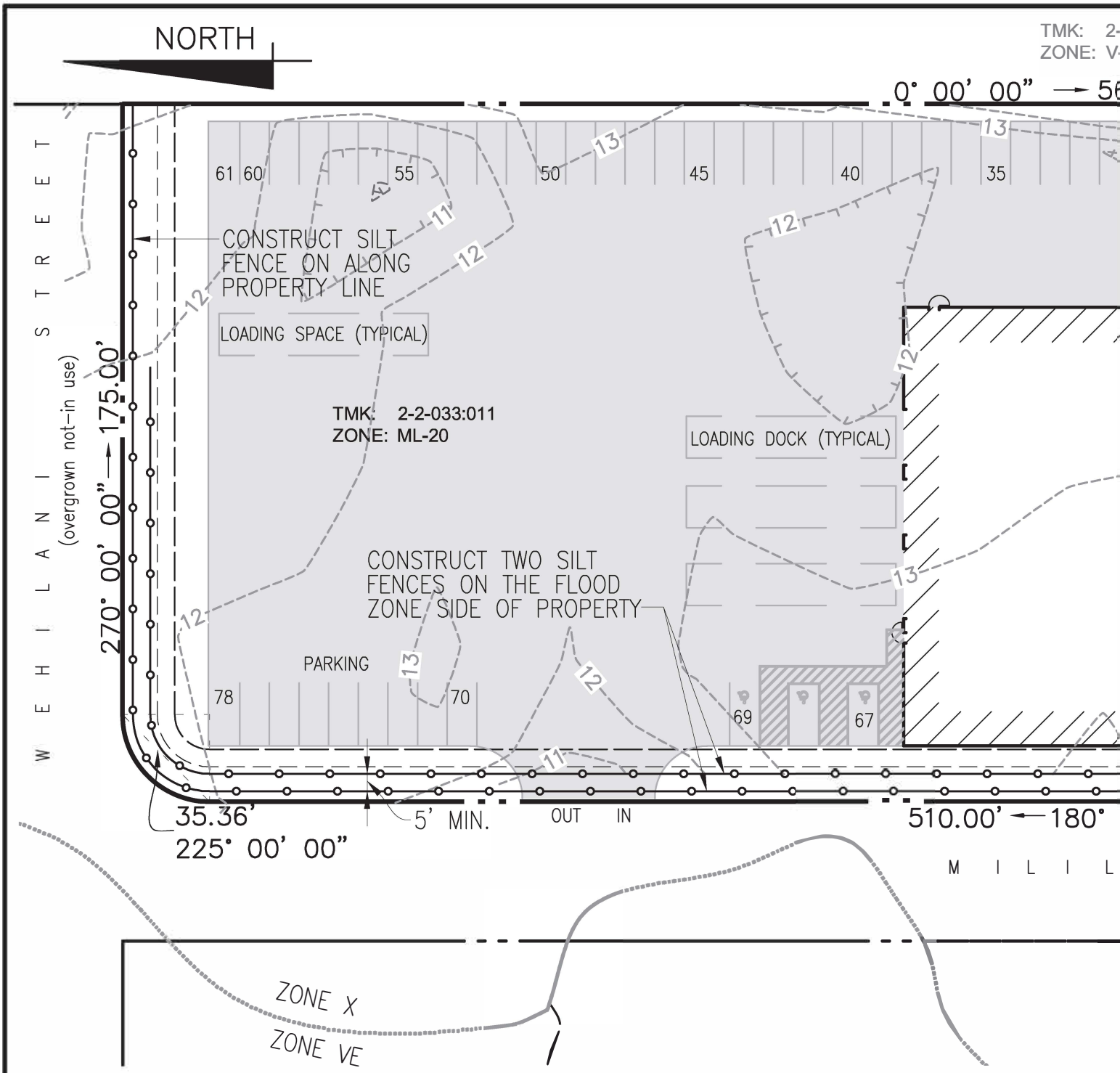
Site finish work and landscaping will take approximately four weeks. This phase includes the installation of planting, painting, and other minor finishing work required to complete the project.

Removal of Temporary BMPs

Removal of temporary will take approximately one week. However, this task may not begin until this are of the project has been accepted as complete by the owner and a maintenance period has elapsed, allowing all finishes to be cured and planting to be established.

Site Map

Hawaii Administrative Rules Chapter 11-55, Appendix C, Section 7.2.6



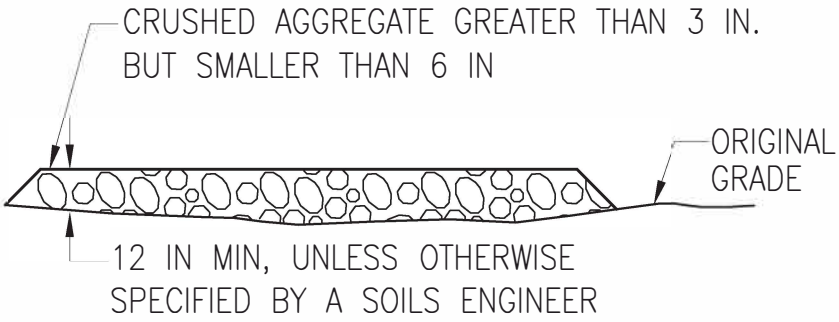
LEGEND

A BMP SITE PLAN

SCALE: 1" = 40'

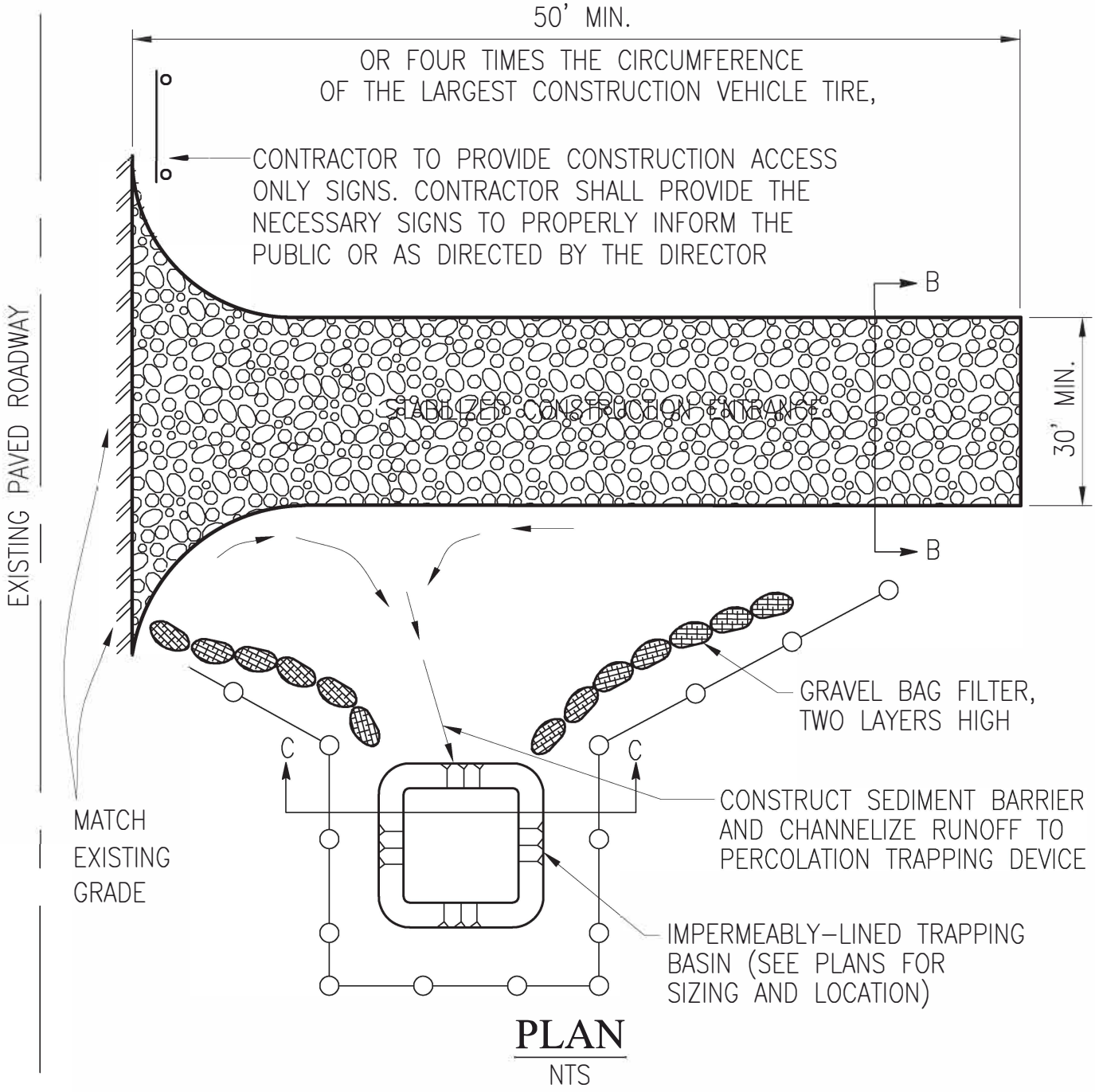
0 40' 80'

01/18/2023 10:59 am
M:\EO PROJECTS\2021 PROJECTS\17260-21-01 1893 BEV&KANAKA CAFE\4-DWG\CIVIL\BMP.DWG



SECTION B-B

NTS



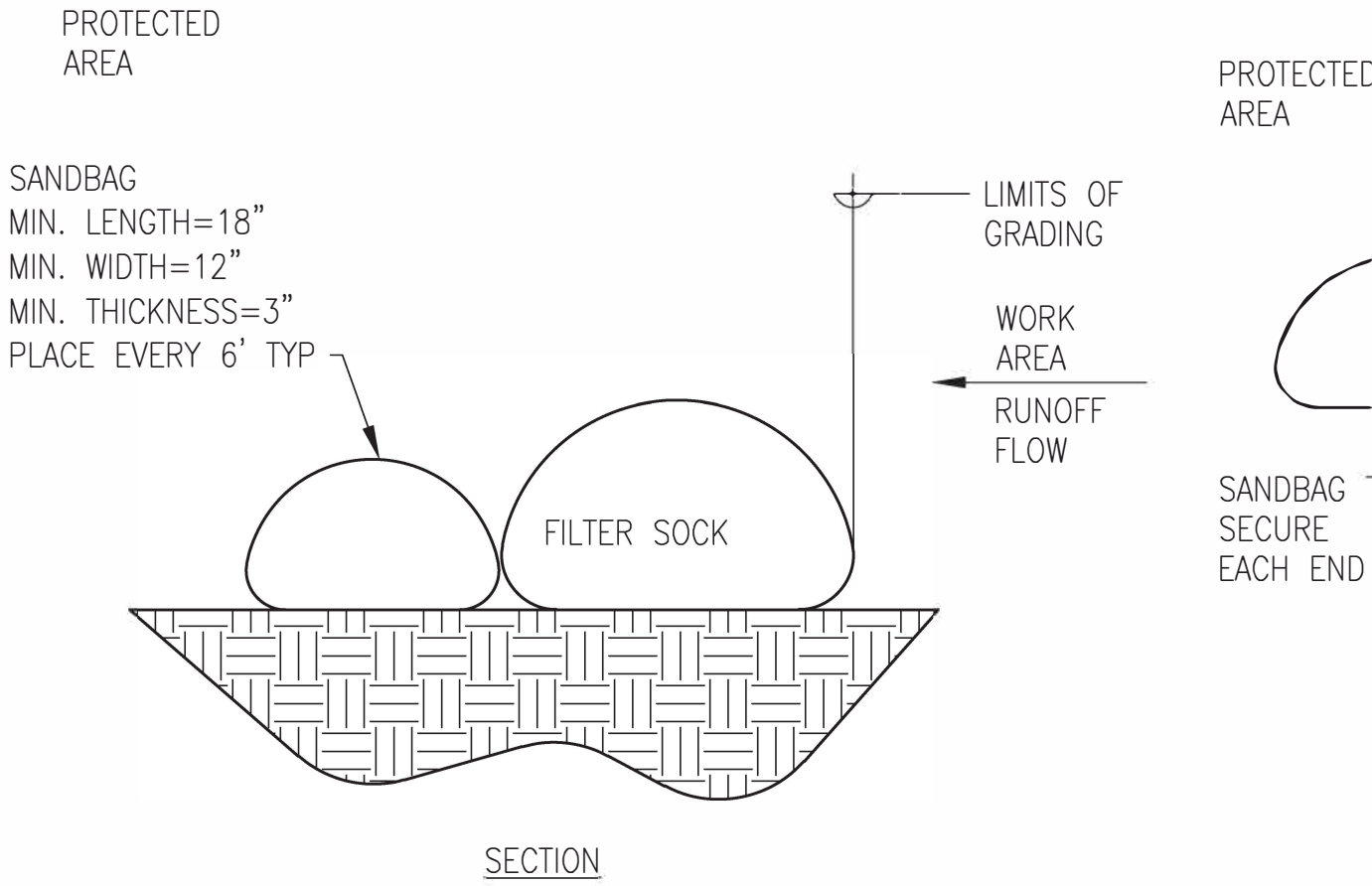
PLAN

NTS

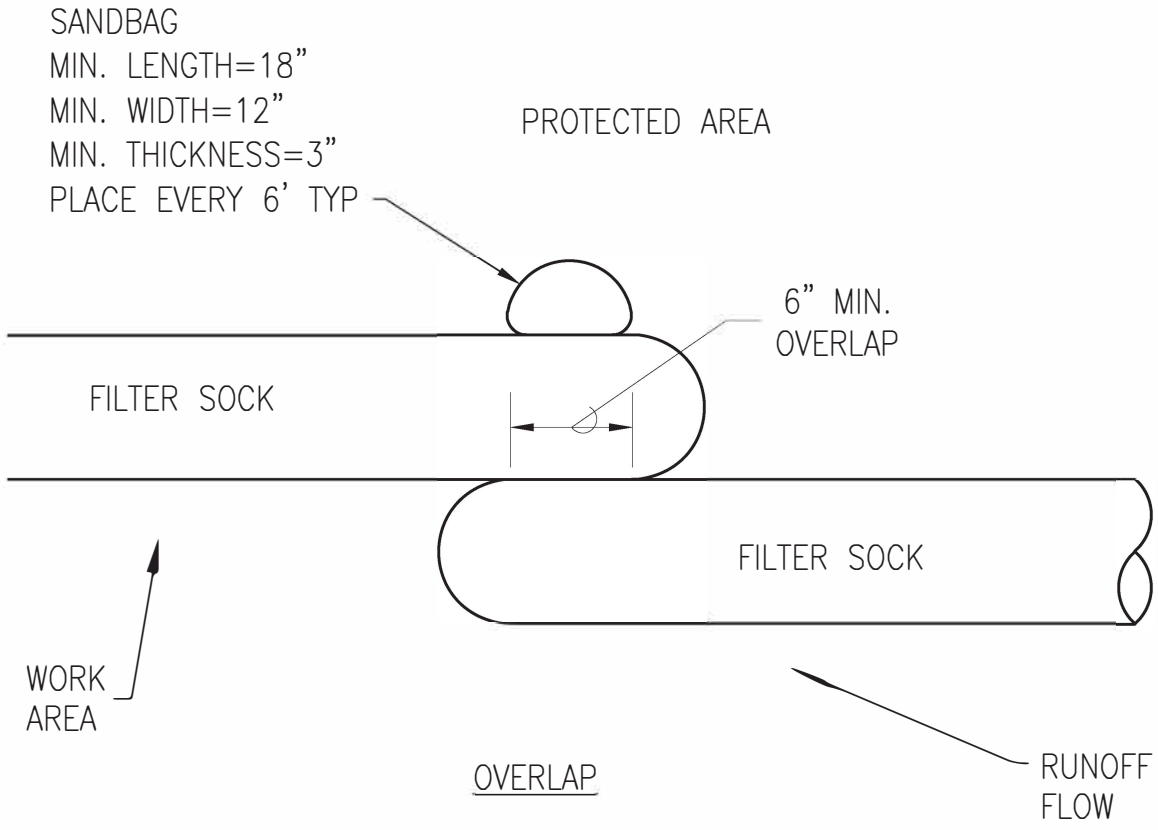
A STABILIZED CONST. ENTRANCE

SCALE: NOT TO SCALE

01/18/2023 10:55 am
M:\ED PROJECTS\2021 PROJECTS\17260-21-01 1893 BEV&KANAKA CAFE\4-DWG\CIVIL\BMP.DWG



SECTION



OVERLAP

A FILTER SOCK

SCALE: NOT TO SCALE

01/18/2023 10:55 am
M:\ED PROJECTS\2021 PROJECTS\17260-21-01 1893 BEV&KANAKA CAFE\4-DWGS\CIVIL\BMP.DWG

CONSTRUCTION SITE POLLUTANTS
(HAR Chapter 11-55, Appendix C, Section 7.2.7)

The following activities may result in pollutants being transported by storm water runoff:

Rough and Final Grading

Rough and final grading are ground moving activities. These activities will leave bare earth or imported aggregates exposed to weather. These activities may result in sediment being transported by storm water, introducing additional turbidity to receiving waters. Sediment trapping wattles will be installed to intercept storm water runoff as it enters and exits the project site. These wattles will filter the runoff, preventing sediment from being released from the project site.

Concrete Pours

Portland cement and other concrete constituents are pollutants which may affect turbidity and pH. These pollutants may be released while concrete is still in its plastic stage. Once the concrete has reached its initial set, there is no longer potential for these pollutants to be released. Concrete pours will be conducted in dry weather and covered if rain should come after the pour has started. Concrete truck washout will be directed to an impermeable basin where water will be allowed to evaporate and the remaining sludge will be disposed of offsite. Additionally, the sediment trapping wattles installed around the perimeter of the site will act as filters if any concrete is contained in the storm water runoff.

AC Pavement

AC paving operations potentially allow for the release of oils. Paving will be scheduled for sunny days to allow for maximum cure time prior to rainfall contacting the new pavement. Additionally, the sediment trapping wattles installed around the perimeter of the site will act as filters if any concrete is contained in the storm water runoff.

Fertilization for Landscaping

Fertilizers typically contain high levels of nitrogen, phosphorous, and potassium. These chemicals may result in algal blooms or other unwanted vegetative growth if they are released. Sediment trapping wattles installed around the perimeter of the site will act as filters if any of these nutrients are contained in the storm water runoff.

SOURCES OF NON-STORM WATER (HAR Chapter 11-55, Appendix C, Section 7.2.8)

Wash water will be directed into an impermeable basin where the water will be allowed to evaporate and the remaining sludge will be transported to the local landfill. If it is necessary to spray water for dust control, that water will be minimized to ensure no runoff is generated. There are no other sources of non-storm water anticipated during construction.

BUFFER DOCUMENTATION (HAR Chapter 11-55, Appendix C, Section 7.2.9)

There is no State water within 50 feet of the project's earth disturbances.

DESCRIPTION OF STORM WATER CONTROL MEASURES (HAR Chapter 11-55, Appendix C, Section 7.2.10)

The storm water control measures proposed for use on this project are described below.

Silt Fence

Sediment barrier composed of permeable geotextile filter fabric attached to support posts will be installed at the perimeter of the project site prior to any ground disturbing activities. Sil fence intercepts the flow of sediment laden runoff, which filters the water and traps the sediment.

Sediment Trapping Wattles (Biosock)

Mulch filled sediment trapping wattles (wattles) will be installed to surround the stockpiles and storage areas as well as to surround drywell and catch basin inlets.

Stabilized Construction Entrance/Exit

Stabilized construction entrance/exit shall be installed at the beginning of the project to access construction site from paved roads. Shall be a minimum of 12″ thick and 3″ to 6″ aggregate free of fines. This stabilized construction entrance/exit will reduce the amount of sediment tracked off-site by construction vehicles.

Compaction

Fill materials will be compacted as they are installed. This activity is intended to prevent future settlement as traffic loads are placed upon the fill, but has the added benefit of making these areas less susceptible to erosion.

Vegetation

Areas of the project site that do not receive pavement (including gravel pavement) will be vegetated after applying topsoil. This activity stabilizes the soil and also provides beautification of the area.

POLLUTION PREVENTION PROCEDURES (HAR Chapter 11-55, Appendix C, Section 7.2.11)

The following practices and procedures will be implemented during construction to prevent pollutants from leaving the project site.

Vehicle Maintenance

Unless it is an emergency situation, no vehicle maintenance or repairs will occur onsite. Vehicles with observed leaks will be removed from the site. No soaps, solvents, or detergents will be used for cleaning of construction equipment. When not in use, construction equipment and vehicles will be kept offsite or stored in a specific area contained by sediment trapping wattles.

Waste Transport

Wastes generated during construction will be loaded into covered dump trucks for transportation offsite. Where those wastes are reusable or recyclable, such as excavated rock material, they will be transported to the contractor's baseyard for storage and processing. Where the wastes generated are not reusable or recyclable, they will be transported to the local landfill.

PROCEDURES FOR INSPECTION, MAINTENANCE, AND CORRECTIVE ACTION (HAR Chapter 11-55, Appendix C, Section 7.2.12)

The General Contractor will perform one weekly inspections of the BMPs to ensure they are in place and functioning properly. If any deficiencies are observed at that time, they will be corrected prior to his leaving the jobsite. If a significant rainstorm occurs, whether during a workday or not, the General Contractor will inspect the BMPs immediately following the rain event and make any necessary corrections. See example inspection report at end of SWPPP and inspection reports shall be kept at site or at an easily accessible location, so that it can be made available at the time of an onsite inspection.
If at any time the General Contractor observes that the BMPs are not functioning as they were intended, he will consult with Mr. Fang to determine the appropriate corrective measures and immediately implement them upon making that determination.

STAFF TRAINING (HAR Chapter 11-55, Appendix C, Section 7.2.13)

Prior to commencement of earth-disturbing activities or pollutant-generating activities, whichever occurs first, the General Contractor must ensure that the following personnel understand the requirements of this permit and their specific responsibilities with respect to those requirements:

1. Personnel who are responsible for the design, installation, maintenance, and/or repair of storm water control (including pollution prevention measures).
2. Personnel responsible for the application and storage of chemicals.
3. Personnel who are responsible for conducting the required inspections.
4. Personnel who are responsible for taking corrective actions as required.

The General Contractor is not required to provide or document formal training for subcontractors or other outside service providers, but must ensure that such personnel understand any requirements of the permit that may be affected by the work they are subcontracted to perform. At a minimum, personnel must be trained to understand the following if related to the scope of their job duties (e.g. only personnel responsible for conducting inspections need to understand how to conduct inspections):

1. The location of all storm water control on the site required by this Permit, and how they are to be maintained.
2. The proper procedures to follow with respect to the Permit's pollution prevention requirements.
3. When and how to conduct inspections, record applicable findings, and take corrective measures.

DOCUMENTATION OF COMPLIANCE WITH SAFE DRINKING WATER ACT UNDERGROUND INJECTION CONTROL (UIC) REQUIREMENTS FOR CERTAIN SUBSURFACE STORM WATER CONTROLS (HAR Chapter 11-55, Appendix C, Section 7.2.14)

If using any of the following storm water controls at the site, as described below, the permittee must document any contact with the Department of Health's Safe Drinking Water Branch (SDWB) for implementing the requirements for underground injection wells in the Safe Drinking Water Act.

1. Infiltration trenches (if storm water is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system.
2. Commercially manufactured precast or pre-built proprietary subsurface detention vaults, chambers, or other devices designed to capture and infiltrate storm water flow.
3. Drywells, seepage pits, or improved sinkholes (if storm water is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has subsurface fluid distribution system).

INSPECTION REPORT FORM

____ Project/Site:_____ Permit No.:_____

_____ Weather:_____

ruction Best Management Practices (SSCBMPs) Plan	Yes	No	N/A	Date Corrected	Notes
S & SWPPP plan available at the site?					
rent and up-to-date?					
ons available at the site?					
s available at the site?					

Site Conditions	Yes	No	N/A	Notes and Corrective Actions
ering the construction site?				
olluted discharges off the site?				
olluted discharges from the site?				
e, or installation of sediment control ite?				
e, or installation of erosion control ite?				
erials/debris/trash/soil stored or t the site?				
ng from the site to receiving streets?				
ere additional or revised BMPs are				
ere BMPs may no longer be necessary ?				
tion indicate a need to update or revise an and/or accompanying drawings?				

Practices	Location	Installed Per Specifications (Y/N)	Adequate	Needs Maintenance	N/A	Date Corrected	Notes
ter Flowing onto and through the Project							
ection							
d Sediment Barriers							
Detention Ponds							
ess Structures							
d Sediment Control BMPs							

Practices	Location	Installed per Specifications (Y/N)	Adequate	Needs Maintenance	N/A	Date Corrected	Notes
l Waste Management							
eas							
hicle Fueling and Maintenance Practices							
n or Sediment Control BMPs							
Ps							

e SWPPP inspection documented above are:

hed, or inserted.

e person who performed the inspection documented above and that all information recorded on this form is a true and tion of what was observed at the construction site recorded above. Any photographs attached that were taken during true, accurate, and unaltered representation of what was observed during the inspection documented above.

_____ Date: _____

FINAL ENVIRONMENTAL ASSESSMENT

PI'ILANI SELF STORAGE WAREHOUSE

Appendix C
Archaeological Inventory Survey

1481-081018

FINAL

ARCHAEOLOGICAL INVENTORY SURVEY

TMK: (3) 2-2-033:011



WAIĀKEA AHUPUA'A

SOUTH HILO DISTRICT

ISLAND OF HAWAI'I

HAUN & ASSOCIATES

ARCHAEOLOGICAL, CULTURAL, AND HISTORICAL RESOURCE MANAGEMENT SERVICES

73-4161 KAAO ROAD, KAILUA-KONA HI 96740

PHONE: 808-325-2402 FAX: 808-325-1520

1481-081018

FINAL

ARCHAEOLOGICAL INVENTORY SURVEY

TMK: (3) 2-2-033:011

WAIĀKEA AHUPUA‘ A

SOUTH HILO DISTRICT

ISLAND OF HAWAI‘I

Prepared by:

Alan E. Haun, Ph.D.
and
Dave Henry, B.S.

Prepared for:

COLUMBUS East, LLC
2571 Lemon Road, Honolulu, HI
96815

August 2018

HAUN & ASSOCIATES
ARCHAEOLOGICAL, CULTURAL, AND HISTORICAL RESOURCE MANAGEMENT SERVICES
73-4161 KAAO ROAD, KAILUA-KONA HI 96740
PHONE: 808-325-2402 FAX: 808-325-1520

MANAGEMENT SUMMARY

Haun & Associates conducted an archaeological inventory survey (AIS) of the 2.57 acre TMK: (3) 2-2-033:011 located in Waiākea Ahupua'a, South Hilo District, Island of Hawai'i. The objective of the AIS is to satisfy current historic preservation regulatory review inventory requirements of the Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD), as contained within Hawai'i Administrative Rules, Title 13, DLNR, Subtitle 13, Chapters 276 and 284, State Historic Preservation Rules.

The survey identified one site in the project area consisting of a concrete slab interpreted as an historic foundation or walkway (Site 50-10-35-30889[1]). The site is assessed as significant solely for its information content. The site has yielded information important for understanding historic activity in the area. The mapping, written descriptions and photography of Site 30889 adequately document it and no further work or preservation is recommended.

Four displaced isolated objects were also identified during the project. These consist of a metal gear (Isolated Object 1), a concrete post (Isolated Object 2), and two concrete platforms (Isolated Object 3 and 4). The displaced gear and the concrete post are probably associated with the historic use of the project area; however, the two concrete platforms were brought to the project area in the 1990s and were used to support cooling towers.

The proposed project consists of the construction of a warehouse and adjacent office building with associated infrastructure to be located in the southern portion of the project area. There are no immediate plans for the development of the remainder of the parcel. The proposed project will consist of mechanically grading the project area in advance of the construction activity. Site 30889 will potentially be impacted during future development. This activity will have no effect on historic properties because Site 30889 requires no further work or preservation.

Cover photo: Vegetation in e*astern portion of project area (view to south)*

[1] All sites listed on the State Inventory of Historic Places (SIHP). Site numbers are 5 digit sequential numbers by island : 50 = State of Hawai'i, 10= Island of Hawai'i, 35= Hilo quadrangle, 30889=Site number

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INTRODUCTION

At the request of Ms. Fumiyo Okuda of COLUMBUS East, LLC, Haun & Associates conducted an archaeological inventory survey (AIS) of the 2.57 acre TMK:(3) 2-2-033:011 located in Waiākea Ahupua'a, South Hilo District, Island of Hawai'i (**Figure 1** and **Figure 2**). The objective of the AIS is to satisfy current historic preservation regulatory review inventory requirements of the Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD), as contained within Hawai'i Administrative Rules, Title 13, DLNR, Subtitle 13, Chapters 276 and 284, State Historic Preservation Rules (DLNR 2003).

The developer, COLUMBUS East, LLC plans to construct a warehouse and adjacent office building with associated infrastructure within the southern portion of the project area (**Figure 3**). There are no immediate plans for the development of the remainder of the parcel. The proposed project will consist of mechanically grading the project area in advance of the construction activity. One archaeological site was identified during the project consisting of an historic concrete slab (Site 30889). This site was recommended for no further work. The site is located outside the area of proposed development but may potentially be impacted during future development. This AIS is prepared in conjunction with a Special Management Area (SMA) permit application for the County of Hawai'i Planning Department.

The survey fieldwork was conducted between April 13 and April 18, 2018 by Haun & Associates Project Supervisor Solomon Kailihiwa, M.S and a crew of four archaeologists under the direction of Dr. Alan Haun. Approximately 16 person days of labor were required to complete the fieldwork portion of the project. Described in this final report are the project scope of work, field methods, background information, survey findings, and significance assessments of the sites with recommended treatments.

Scope of Work

Based on DLNR-SHPD rules for inventory surveys the following specific tasks were determined to constitute an appropriate scope of work for the project:

1. Conduct background review and research of existing archaeological and historical documentary literature relating to the project area and its immediate vicinity--including examination of Land Commission Awards, *ahupua'a* records, historic maps, archival materials, archaeological reports, and other historical sources;
2. Conduct a high intensity, 100% pedestrian survey coverage of the project area;
3. Conduct detailed recording of all potentially significant sites including scale plan drawings, written descriptions, and photographs, as appropriate;
4. Conduct limited subsurface testing (manual excavation) at selected sites to determine feature function;
5. Analyze background research and field data; and
6. Prepare and submit Final Report.

Project Area Description

The project area is a rectangular shaped 2.57 acre parcel located in Waiākea Ahupua'a between approximately 15 to 20 ft elevation. All elevations presented in this report are in feet above mean sea level (AMSL). The parcel is bordered to the south by Piilani Street and by vacant land to the north, west and east. The proposed extension of Mililani Street will extend along the west side of the parcel and the proposed Wehilani Street will extend along the north side (see **Figure 3**). **Figure 4** is an aerial view of the project area vicinity taken on January 21, 2013. The Waiākea Fish Pond is located to the west of the project area.



Figure 1. Portion of 1995 7.5' Hilo quadrangle showing project area parcels

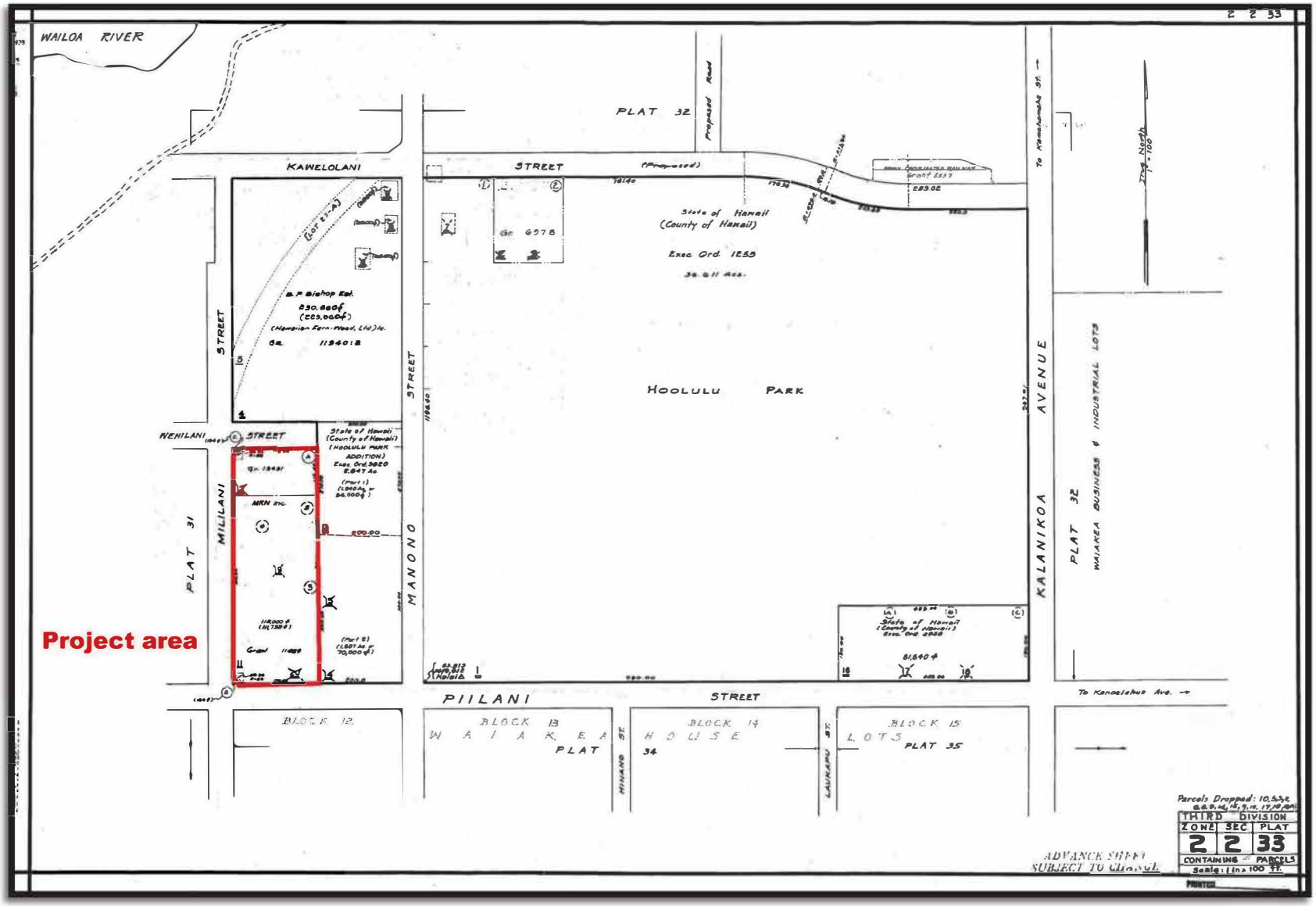


Figure 2. Tax Map Key 2-2-033 showing project area

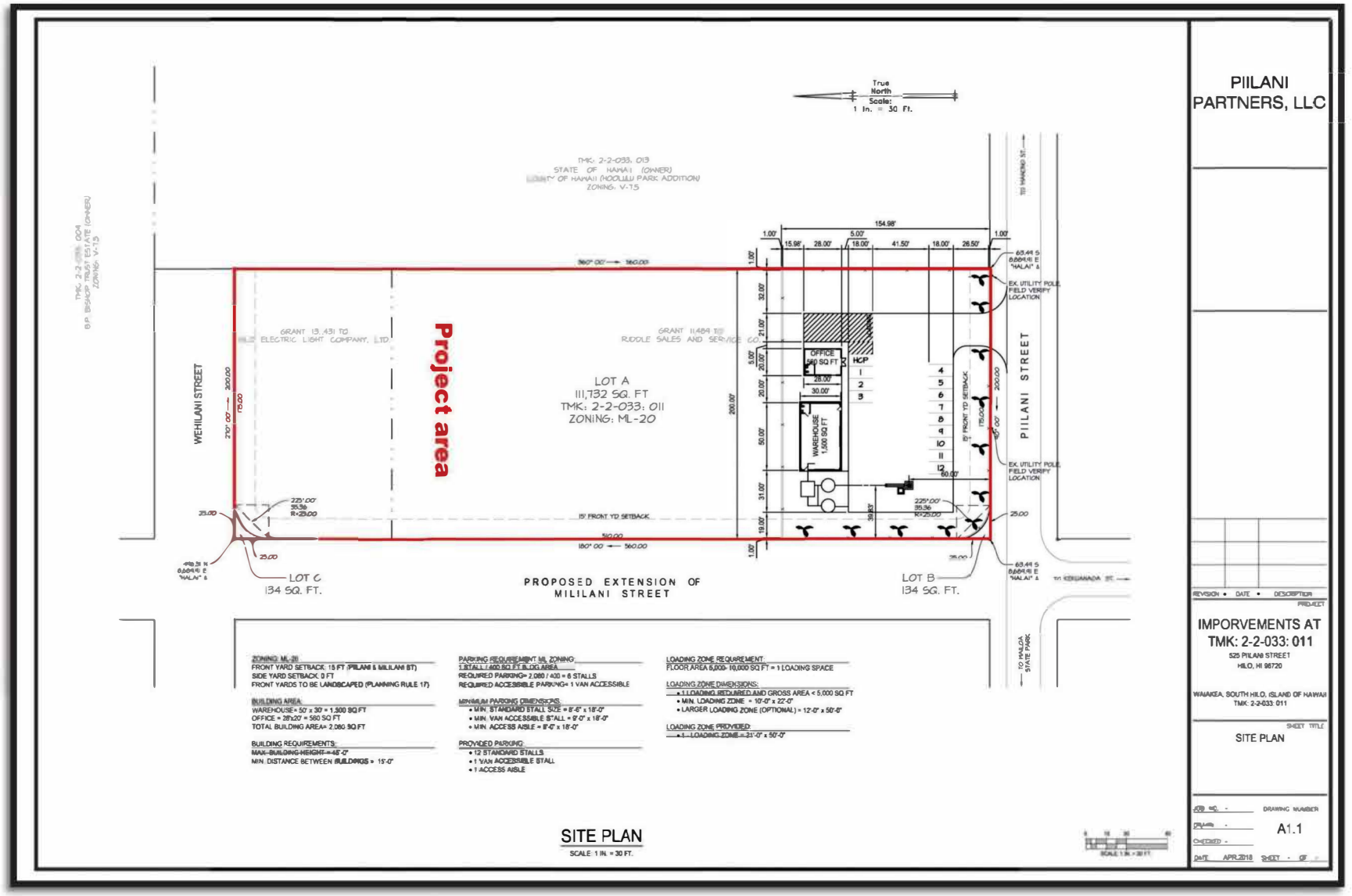


Figure 3. Proposed development within project area

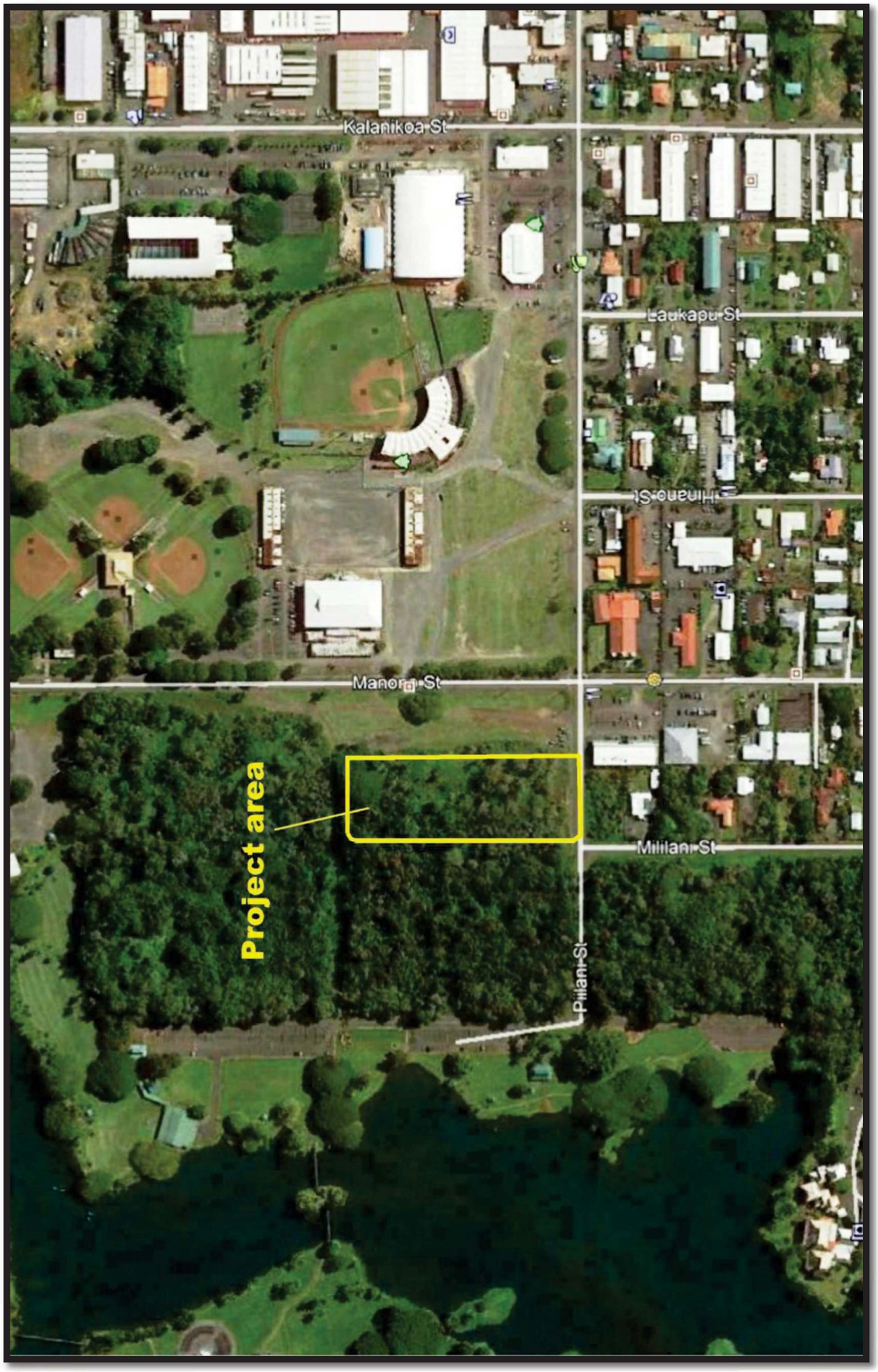


Figure 4. January 21, 2013 Aerial view of project area (from Google Earth)

The vegetation in the project area consists of bingabing (*Macaranga mappa*), tropical ash (*Fraxinus uhdei*) and banyan (*Ficus benghalensis*) trees, areca palms (*Areca catechu*), and various grasses and vines. The eastern half of the parcel is comprised of dense grass and trees that have been taken over by vines (see cover photo of this report). The western portion has a high canopy of trees with little grass (**Figure 5**). There is modern trash scattered throughout the parcel indicating the area has served as an informal dump for local residents (**Figure 6**).

The terrain throughout the project area is relatively level soil. The soil is Keaukaha extremely rocky muck on 6-20% slopes (rKFD). This soil consists of a surface layer of dark brown muck (8") over pahoehoe bedrock (Sato et al. 1973:27). The Keaukaha soil has rock outcrops over 25% of the surface, has a rapid permeability, a medium runoff and a slight erosion hazard. It also is primarily in native forest with cleared areas suitable for pasture. The underlying lava was deposited 750 to 1,500 years ago from Mauna Loa Volcano (Wolfe and Morris 2001:11 and Sheet 2).

Annual rainfall in the vicinity of the project area ranges from 3,550 to 4,400 mm (140 to 173 inches; Giambelluca et al. 2013). The mean average temperature in this general area is approximately 73.8 degrees F (usclimatedata.com). There are no surface water sources present in the project area. The project area is located approximately 600 meters inland from the shoreline at Hilo Bay and the mouth of the Wailea River (see **Figure 1**).

Methods

Archival research was conducted at the Hamilton Library Hawai'i and Pacific Collection at the University of Hawai'i at Manoa, the University of Hawai'i at Hilo Hawaiian Collection, the Land Survey Office and the Archives Division of the Hawai'i Department of Accounting and General Services, the Bishop Museum Archives, the State Historic Preservation Division library in Hilo, the State Survey Division, and the Hawai'i State Public Libraries in Honolulu and Hilo.

The field work portion of the project consisted of a 100% surface examination of the parcel with the surveyors walking transects at 10-meter intervals. Ground surface visibility throughout the parcel was fair to excellent. The features identified during the survey were flagged with pink and blue flagging tape and their locations were determined with the aid of a Garmin Global Positioning System (GPS) Model 60-series device using the North American Datum (NAD) 1983 datum. The accuracy of the GPS device for a single point is +/- 3-5 m. This accuracy was increased to approximately 2-3 meters by taking multiple points including property corners and overlying the plotted points on a scaled map using AutoCAD software.

The boundary for the sites documented during the project was defined based on proximity and probable age. Features that are likely of similar age (prehistoric, historic) and are less than 15 meters apart are considered to be one site. The sites in the project area were documented by preparing scaled plan maps, completing standardized site and feature forms, and photographic documentation.

A total of 2.0 sq meters of excavation was conducted during the project. Test Pit 1 was situated in the southern portion of the project area and Test Pit 2 was located adjacent to the Site 30889 concrete slab. The test pits were excavated in arbitrary levels within stratigraphic layers. Test Pit 1 was terminated on the bedrock substrate and Test Pit 2 was terminated in a culturally sterile deposit. The soil removed during excavation was screened through ¼ inch mesh hardware cloth. Following the excavation, a section drawing depicting the stratigraphy was prepared and post-excavation photographs were taken. The test pits were described using standard terminology, referencing USDA Soil Survey descriptions and Munsell Soil and Rock color notations. Texture and inclusion content were also noted. Cultural material recovered during the excavations was placed in paper bags labeled with the appropriate provenience information and transported to Haun & Associated laboratory for analysis.



Figure 5. Vegetation in western portion of the project area (view to east)



Figure 6. Modern debris within project area

ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

Historical Documentary Research

The project area is situated in the *ahupua'a* of Waiākea in South Hilo District. The *ahupua'a* is one of the largest in the district covering over 95,000 acres. The *ahupua'a* extends along the coast from the west side of Hilo Bay to the Puna District boundary and inland to approximately 6,000 ft elevation. Much of the following is summarized from *Hilo Bay: A Chronological History* (Kelly et al. 1981), an extensive and thorough compendium of historical information about Hilo including Waiākea.

Hawaiian traditional and legendary accounts attest to the longstanding importance of Waiākea. The chief of the Hilo region, Kulukulu'a, who resided in Waiākea, was the first conquest of 'Umi-a-Liloa in his campaign to unify the districts of Hawai'i Island. Hilo with its large bay, fishponds, wet taro fields, and abundant freshwater was a population center for commoners and royalty. Kamehameha I and his court resided in Hilo in the 1890s. In preparation for his planned invasion of Kauai in 1802, Kamehameha built a canoe fleet at Hilo, reportedly consisting of 800 vessels.

In 1824, a missionary station was established in Waiākea. Soon after, churches and schools were established. Whalers began stopping at Hilo in the mid-1820s. In the 1830s, a sawmill was built, and two stores were opened. By the end of the decade, a sugar cane plantation and mill were established on Ponahawai lands. By 1857, there were three sugar cane mills in the Hilo area. A sugar mill was established in Waiākea at the inland end of Waiākea Fishpond in the late 1870s. By 1880, 1,400 acres of sugar cane were in cultivation and by the end of the decade over 5,600 acres were cultivated. In the 1900s, the population of Hilo grew dramatically with the expansion of sugar cane cultivation, pineapple production, the timber industry, and other commercial developments.

Early historic accounts also document the importance of Hilo. In 1823, Ellis estimated the population to be 2,000 people in 400 houses. Ellis described the extensive use of *lauhala* thatch in house construction in Hilo. He described the land as intensively cultivated with plantains, bananas, sugar cane, taro, potatoes, melons, coconuts and breadfruit. Wet taro was grown in marshland mounds (*kipi*). Hilo was a center for trade among the people of Ka'u, Hamakua, and Hilo. Between the 1790s and 1820s, sandalwood was cut and brought to Hilo for export. *Pulu* from tree ferns and *pia* (arrowroot) were also exported. Ellis also describes coastal fishing.

In the 1840s, political acts of the Hawaiian Kingdom government would change the land tenure system in Hawai'i. All lands were segregated into one of three categories: "Crown Lands" owned by the occupant of the throne, "Government Lands" controlled by the state, and "*Konohiki* Lands" controlled by the chiefs; and "were all subject to the rights of native tenants" (Chinen 1958:29, Beamer 2014:143). In 1846, King Kamehameha III appointed a Board of Commissioners commonly known as the Land Commissioners, to "confirm or reject all claims to land arising previously to the 10th day of December, AD 1845." Notices were frequently posted in *The Polynesian* (Moffat and Kirkpatrick, 1995); however, the legislature did not acknowledge this act until June 7, 1848 (Chinen 1958:16; Moffat and Kirkpatrick 1995:48-49) and the act is known today as *The Great Māhele*. In 1850, the Kingdom government passed laws allowing foreigners to purchase fee simple lands (Speakman 2001:91). The Kuleana Act of 1850 allowed for fee simple land ownership by commoners.

The Waihona 'Aina (2000) Māhele Database; which is a compilation of data from the Indices of Awards (Indices 1929), Native Register (NR n.d.), Native Testimony (NT n.d.), Foreign Register (FR n.d.) and Foreign Testimony (FT n.d.) provides information on the Land Commission Awards (LCA) during the Māhele The Waihona 'Aina database (2000) lists 51 parcels claimed by 37 claimants within Waiākea in the mid-1800s (**Table 1**). All claims are for parcels

Table 1. Land commission Awards in Waiākea Ahupua'a

Apana awarded	Section	Ili	Land Use	Boundary North	Boundary East	Boundary South	Boundary West	Date Rec'd	Giver	Acre
1		Keawe Kapu	cultivated	Konohiki's waste land	Mikaeleiki	Kainea	Kainea		Konohiki Pea	4.4
1		N/D	cultivated, partly fenced	Kaulu	Kamanuhaku	Konohiki's waste land	Kalua		Parents	1.6
0		N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
0		Alenoho	house lot	N/D	N/D	N/D	N/D	N/D	N/D	N/D
0		Kolea	cultivated	N/D	N/D	N/D	N/D	N/D	N/D	
1		Kolea	planting plot	konohiki	ocean	Kekuanaoa	Kaihenui's house	1847	Kapuaakuni	0.6
1		Alenoho	cultivated field	Waiiani	Kahauai	Kaluahino	Kahue	1840	Kuiana	2.2
0		Alenoho	cultivated field	Kukuau	Manu	Kalana Stream	Kahue	1841	Kaiana	0
1		Kamakola	cultivated with 6 houses	Ili Ohelo	Pouoki's field	Mihaeleiki	road beside river	1843	Konhiki Pea	2.9
0		Puainako	house lot with 2 houses, grave	waste land	road to Volcano	waste land	waste land	1847	Kaunuohua	0
1		Alenoho	house lot	Kaapa	new road	waste land	waste land	1847	Kaunuohua	10.2
1		Kalihi	partly enclosed with 5 houses	Ili Alenoho	Ili Kolea	Ili Koloa	stone wall/gov't land	1841	Pea	12.2
0		Koleaiki	breadfruit tress, sweet potatoes, coffee	Kauhopu	Ili Koleanui	Ili Kalili	Ili Alenoho	1847	Konohiki	0
1		N/D	2 kihapais; hala grove	Kukuau Ahupua'a	konohiki	Kahue	konohiki	1844	Kahue	5
1		Kialoa 1	house lot with 4 houses; breafruit and kukui trees	konohiki	Ili Kinaauauwai	konohiki	Ili Kealou 2	Kam. 1 time	parents	1.3
1		N/D	N/D	Keaniho	konohiki	konohiki	konohiki	1844	Kaiana	3.7
0		Alenoho	2 cultivated fields	Aiko	stream	konohiki	main road	N/D	N/D	0
0		N/D	uncultivated	konohiki	konohiki	konohiki	konohiki	1847	Kamahiai	0
1		Hinaauauwai or Mahina auwai 5	4 kihapai; two houses	konohiki	Ili Haanaauauwai 1st	konohiki	Ili Kialoa/Kaiholena	Kam. 1 time	parents	4.2
1		Kolea						Kam. 1 time	parents	1.2
	1		house lot with 3 houses	Barenaba	Barenaba	Samuela	Keaonui			
	2		cultivated field	Barenaba	Samuela	Ili Waiuli	Kukaiholo			
	3		uncultivated with one house	Ili Walenoho	Pahulu	konohiki	Kupelea			
1		Kalonoho	cultivated with house	gov't land	gov't road	Moealoha	konohiki	Kam. 1 time	Makaimo	1.0
1		Kalonoho	3 field & 1 house	Kaiana	Alanui	Baranaba	konohiki	1839	Makaino	1.0
1		Kanahana	3 wet taro plots & 2 houses	fishpond	Ili Kuahua	konohiki	Ili Kaapea	1834	Kuahopu	1.0
1		Puahua	2 cultivated fields	konohiki	Ili Kialoa	Nakai	Ili Hanahaiau	1841	Konohiki Pea	0.2
2		Piopio								13.1
	1		4 cultivated kihapai & 2 houses	Kolea	Kaihenui	Niihau	Kalua			
	2		1 cultivated kihapai	Kekuaaoa's garden	Kaaiana	Kaihe	Kaihenui			
	3		1 kihapai taro mounds	Niihau	Kane	N/D	N/D			
	4		6 taro mounds	Kane	konohiki	Kauhi	Kaiamo			
	5		uncultivated	idle land	idle land	Samuela	Ili Alenoho			
	6		2 cultivated fields	Kahalelalu	idle land	Samuela	Kaihenui			
1		Piopio	N/D	N/D	N/D	N/D	N/D	N/D	Kamehamhea I	
0		Kalulunui	2 cultivated kihapai, road through lot	konohiki	konohiki	konohiki	konohiki	1847	Kamahiai	0
			pasture, cultivated plot, 2							

Table 1. Land Commission Awards in Waiākea ahupua'a (cont.)

Land Use	Boundary North	Boundary East	Boundary South
house lot	Kaulu	Kamanonaha	fishpond
cultivated	konohiki	konohiki	Kaehunui
3 cultivated fields	Kuahopu	Kauhi	Holeaniu
1 cultivated field	Heienui	Kuahope	konohiki
formerly cultivated	N/D	N/D	N/D
uncultivated	Kona	Nuihao	Kaniahiai
partly cultivated	Apua	Nuihao	Kaniahialio
partly cultivated	Aua	Nuiliae	Kaniahiai
uncultivated	Apua	konohiki	fishpond
3 fields & house	Kamaheii	konohiki	fishpond
house	Halai	sea	Barenaba
1 cultivated field & 1 house	Kuallaupu	konohiki	cart road
N/D	Kealiko	Beakey	konohiki
N/D	Wāhinealua	road	Barenaba

situated along the coast and immediately inland along the lower reaches of the Wailoa River less than 0.5 mi inland. No land commission awards are present within the project area.

Twenty-six parcels were awarded to 24 claimants. Chiefess Kamamalu was awarded the entire *ili* of Pi'opi'o under Land Commission Award (LCA) No. 7713. The remaining claims are for *kuleana* parcels ranging from 0.24 to 13.14 acres in area with an average of 3.6 acres. All, except five claims, were for single parcels. The testimonies for several awarded *kuleana* include claims for parcels that were not awarded.

The claim testimonies refer to 18 *ili* land divisions. Five *ili*; Kalonoho, Alenoho, Kolea, Pi'opi'o and Paeaahu; are mentioned two or more times and apparently were linear strips of land extending inland from the coast. *Ili* Kalonoho was situated next to the western *ahupua'a* boundary with Kukuau. Alenoho was the next *ili* to the east followed by Kolea, Pi'opi'o and Paeaahu. The latter two *ili* bordered the west bank of Wailoa River and Fishpond. Six *ili* for LCAs on the east side of the river, from the river mouth inland, consist of Kamakola, Keawe Kapu, Kialoa, Hinaauauwai, Puahua, and Kanahana. Kalihi was situated inland between Alenoho and Kolea. The geographic location of the remaining *ili* cannot be determined because they are mentioned in testimony for claims that were not awarded.

Land use described in the LCA claim testimony included agriculture, pasture, burial, and residence. Thirty-four houses are mentioned and LCA 2274 also describes the presence of a grave. Most of the claim testimony mentions cultivated fields. Crops include wet taro, sweet potatoes, breadfruit, coffee, and *kukui.* A *hala* (*Pandanus* spp.) grove and fishponds are also mentioned.

By 1857, there were three sugar cane mills in the Hilo area. Large tracts of land were put in cane cultivation and sugar cane was also grown by individuals around their houses. A sugar mill was established in Waiākea at the inland end of Waiākea Fishpond in the late 1870s. A railroad transport system was constructed for the Waiākea Mill between 1879 and 1880. **Figure 7** is a portions of Lyon's 1882 Register Map No. 892 obtained from the Archives Division of the Hawai'i Department of Accounting and General Services (http://ags.hawaii.gov/survey/map-search). This map shows the Waiākea Mill, located to the southwest of the project area, a wharf and the extent of an 1881 lava flow from Mauna Loa that threatened Hilo.

Between the 1860s and 1880s there were two wharf facilities on the west side of Waiākea Point, one on the Wailoa River, and on the west side of the bay at the foot of Waianuenue Street . By 1880, 1,400 acres of sugar cane were in cultivation and by the end of the decade over 5,600 acres were cultivated. In the 1900s, the population of

Hilo grew dramatically with the expansion of sugar cane cultivation, pineapple production, the timber industry, and other commercial developments.

Between 1900 and the 1930s, the population of Hilo grew dramatically with the expansion of sugar cane cultivation, pineapple production, timber industry and other commercial developments. In the 1910s, the Hilo Railroad Company expanded the rail system to Puna and Hilo Town. A railroad wharf was built north of the mouth of the Wailoa River. Between 1909 and 1913, the railroad was extended to the North Hilo and Hamakua Districts.

The opening of the Panama Canal and anticipated increase in trans-Pacific shipping lead to serious efforts to build a breakwater to protect shipping in Hilo Bay. Construction of the breakwater began in 1908. The breakwater was initially planned for a location just east of Coconut Island, but the plan was modified and the selected site was approximately 6,000 ft east of the island. The initial plans called for a 10,000-ft long breakwater along Blonde Reef. Stone for the structure was brought by railroad from quarries in Puna and Waiākea. The breakwater was completed in 1929.

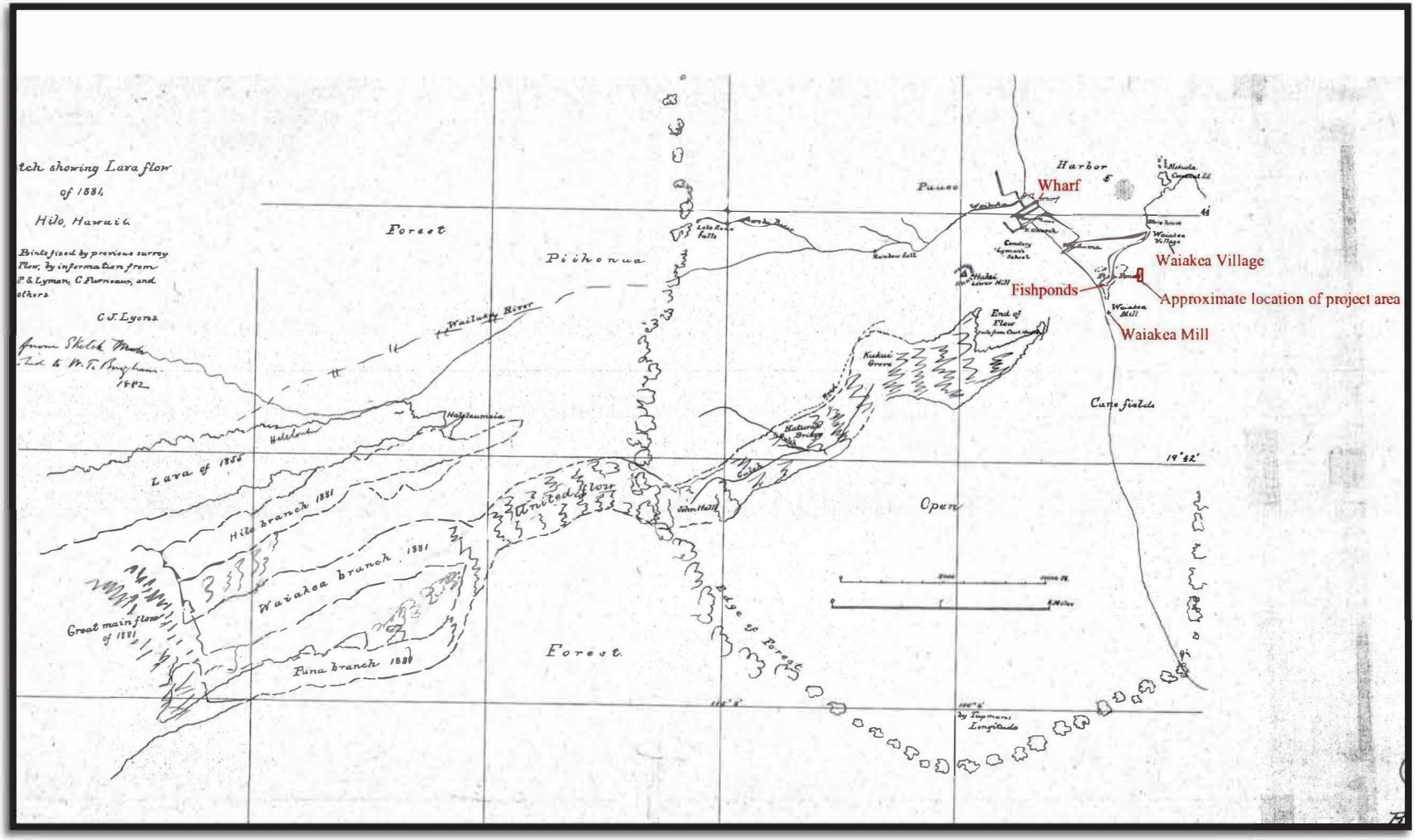


Figure 7. Portion of Lyon's 1882 Register Map No. 892 showing approximate locations of project area

By the 1910s, the existing railroad and government wharf facilities were inadequate to support shipping. In 1912, the Territorial Government contracted the construction of a new wharf approximately one mile east of Coconut Island and dredging of the adjacent portion of the bay. The new wharf, designated Kuhio Wharf, was completed in 1916. From the beginning, the wharf was congested and plans for a second wharf were made. Construction of the wharf began in 1921 and it was completed in 1923. A third wharf was completed in 1927.

In 1932 a Canec manufacturing plant was constructed along Waiākea Pond, located between the Waiākea Mill site and the project area. Canec was the brand name for a fiber board made from bagasse, the byproduct of sugarcane. **Figure 8** is a mid-20th Century map of the Hilo area prepared by the Work Projects Administration (WPA) showing the location of the Canec plant and the project area, obtained from the Archives Division of the Hawai'i Department of Accounting and General Services (http://ags.hawaii.gov/survey/map-search). The map also shows the railroad line extending past the project area to the west.

The following description of the Canec plant is provided by Peter Young as follows:

> Between 1879 and 1948, Waiākea Mill Company conducted mill operations at Waiākea Pond. Bagasse – a by-product of sugarcane – became a secondary industry, first as a fuel for the mills' boilers, then as the main ingredient for a wallboard product.
>
> As commercial fuel oils became increasingly available in the late 1920s, the use of bagasse as a fuel declined. This byproduct of production was then creatively used to manufacture a wallboard product for construction.
>
> In 1929, Hawaiian Cellulose Ltd, a subsidiary of the Waiākea Mill Company applied for a patent for the manufacture of it. (County of Hawai'i)
>
> On May 23, 1930, "The leading plantation agencies and a group of business men organize a $2,250,000 corporation for the manufacture of wallboard and other universally used bagasse fiber products. The name chosen was the Hawaiian Cane Products, Limited." (The Friend, June 1930)
>
> Later that year, the directors of the company "authorized the purchase of a one-hundred-ton daily capacity plant for the manufacture of insulating board from bagasse." (The Friend, October, 1930) (It ended up costing $2.5-million.)
>
> April 27, 1932, the company's Hilo plant (at Waiākea, adjoining Wailoa Pond) was opened; the company emphasized "the overseas distribution for which the industry aims." (The Friend, June 1, 1932) (By 1934, "five carloads were shipped ... to Manchuria." (Friend, July 1, 1934))
>
> Canec was originally the brand name for pressed fiber board made by Hawaiian Cane Products, Ltd., but it has become commonly used to refer to all pressed board of this type.
>
> It was formed into sheets similar in size to drywall, as well as other sizes for use as ceiling and wallboard. Canec was used for interior ceilings and walls in many residential and commercial structures throughout the state of Hawai'i. (DOH)
>
> Reportedly, Charles William Mason, a Scotsman who ended up in Ola'a on the Island of Hawai'i in 1919, was the inventor of Canec. Mason became the superintendent of Hawaiian Cane Products Company, Ltd., located in Hilo near the site of the Waiākea Mill Company. (Johnston)
>
> The use of Canec as a building material in Hawai'i gradually expanded during the 1930s, but greatly accelerated after World War II when construction volume rapidly increased.

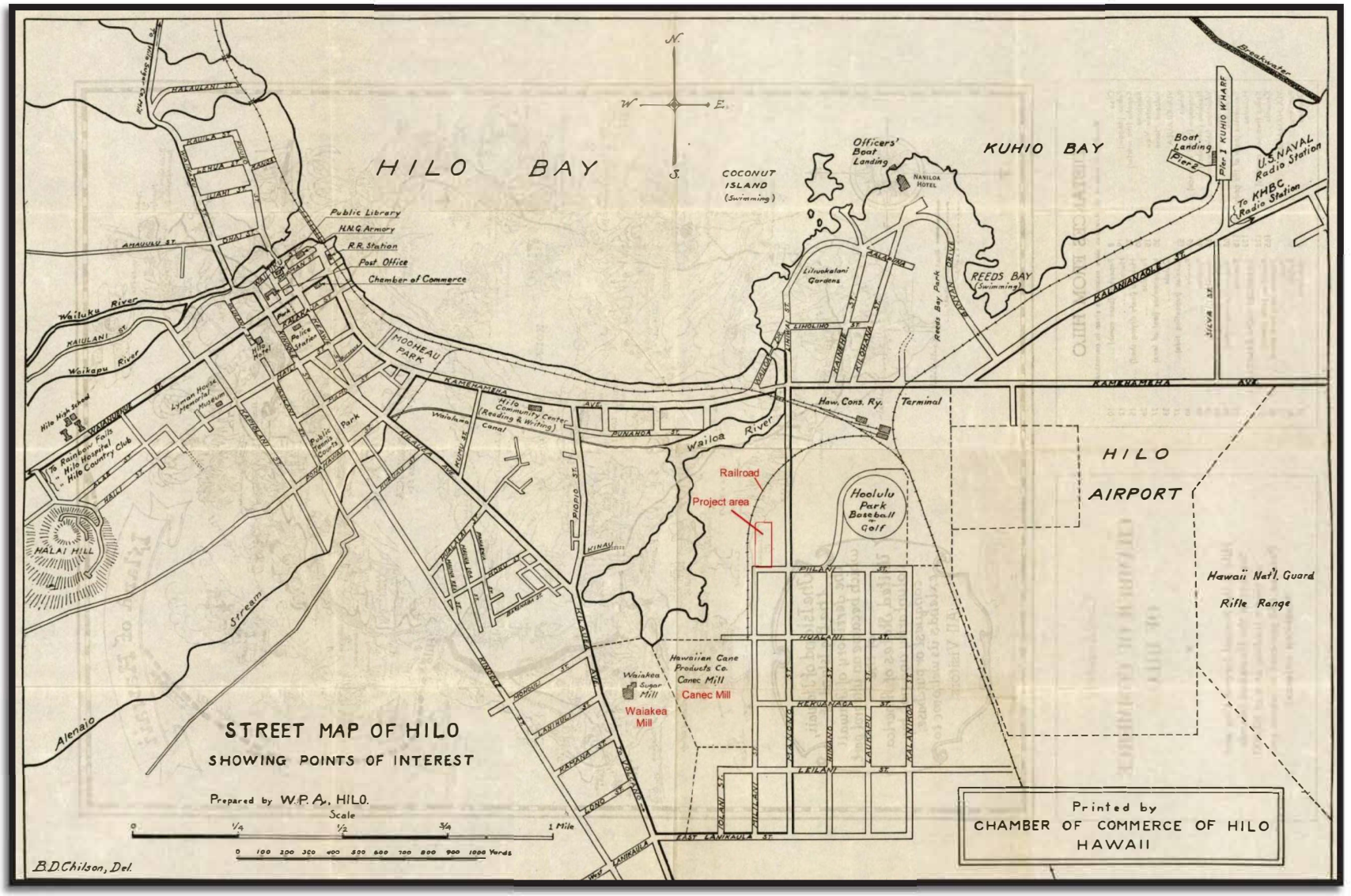


Figure 8. Mid-20th Century map of Hilo

> It was estimated that from the twelve plantations contributing bagasse to the canec plant, one million tons of bagasse would be available for the production of wallboard.
>
> Hawaiian Cane Products was sold to the Flintkote Company in 1948. That year, the Hilo plant manufactured 120,000,000-square feet of canec panels; from 1945 to 1955; the majority of the housing in the Islands featured cane walls and/or ceilings. (HHF) Some suggest the canec plant was destroyed by the May 23, 1960 tsunami that devastated Hilo; actually, a fire destroyed the canec plant a month earlier (April 3, 1960.)
>
> In 1971, the hotel complex known now as Waiākea Villas was built on the canec plant site (the adjacent Waiākea plant millpond was made part of Wailoa River State Park. (Young 2016 – imagesofolfhawaii.com)

Several devastating tsunamis have impacted the coastal Hilo area in the immediate vicinity of the project area. In 1877, a 16-ft high tsunami struck the coast of Waiākea destroying all houses within 100 yards of the shore along with a wharf, storehouse, a quarantine hospital on Coconut Island and a bridge. On April 1, 1946, a 7.1 magnitude earthquake occurred in the Aleutian Islands, generating a 50 ft high tsunami that struck Hilo, killing 159 people. (Hawaiimagazine.com)

Smaller tsunamis struck the area in 1952 and 1957, causing little damage to the Hilo area. Unfortunately, because of this many coastal Hilo residents refused to evacuate on May 23, 1960, when an 8.3 magnitude earthquake in Chile triggered a series of waves that struck the area (*ibid.*). Many that did leave returned when the first of the waves measured only 3 feet in height; however, subsequent waves would grow to a maximum height of 35 feet, resulting in the death of 61 people. Due to the devastation of the 1946 and 1960 tsunamis, much of Hilo's bayfront was not rebuilt and is now comprised of grassy park areas.

Figure 9 is an aerial photograph of the area taken in January 16, 1965 obtained from the University of Hawai'i at Manoa online library (http://magis.manoa.hawaii.edu). This photograph shows a large structure present within the project area. According to Suisan Company's property manager Mr. Harvey Taira, the properties manager for the Suisan Company has owned the property since the 1990s. He said that the parcel formerly contained a warehouse used for receiving fresh produce, and a dilapidated Quonset hut that was not used. Both of these structures were removed in the early 1990s. Potential remnants of this facility were identified during the present project, discussed in the Findings section of this report.

The northern portion of the project comprising approximately 23,000 sq feet (0.52 acres) was formerly designated as TMK: (3) 2-2-033:012 (see **Figure 2**) owned by the Hawaii Electric Light Company (HELCO) under Grant 13431. This areas was subsequently added to the adjacent Parcel 11, which was owned by Ruddle Sales and Service Company under Grant 11489 (see **Figure 2** and **Figure 3**).

In summary, historical documentary research indicates that the shoreline along Hilo Bay was intensively settled and cultivated. In the early 1800s, missionaries established a station at Hilo because of its large population, abundant freshwater and cultivation potential. Soon churches and schools were established. Whalers stopped at Hilo because of the protected anchorage and availability of freshwater and provisions. Sugar cane cultivation, cattle ranching, and trade rapidly changed the traditional subsistence economy during the early to mid-1800s. By the late 1800s, vast areas were producing sugar cane and large scale timber harvesting was underway. Transportation infrastructure included a railroad system and wharf facilities. The area underwent a dramatic increase in population as people came to the area to work for the plantations and other commercial enterprises. Despite the destructive effects of the multiple tsunamis that have impacted the area, Hilo continues to thrive as the largest community on the eastern coast of Hawai'i Island, due in large part to the resilience of the Hilo residents.

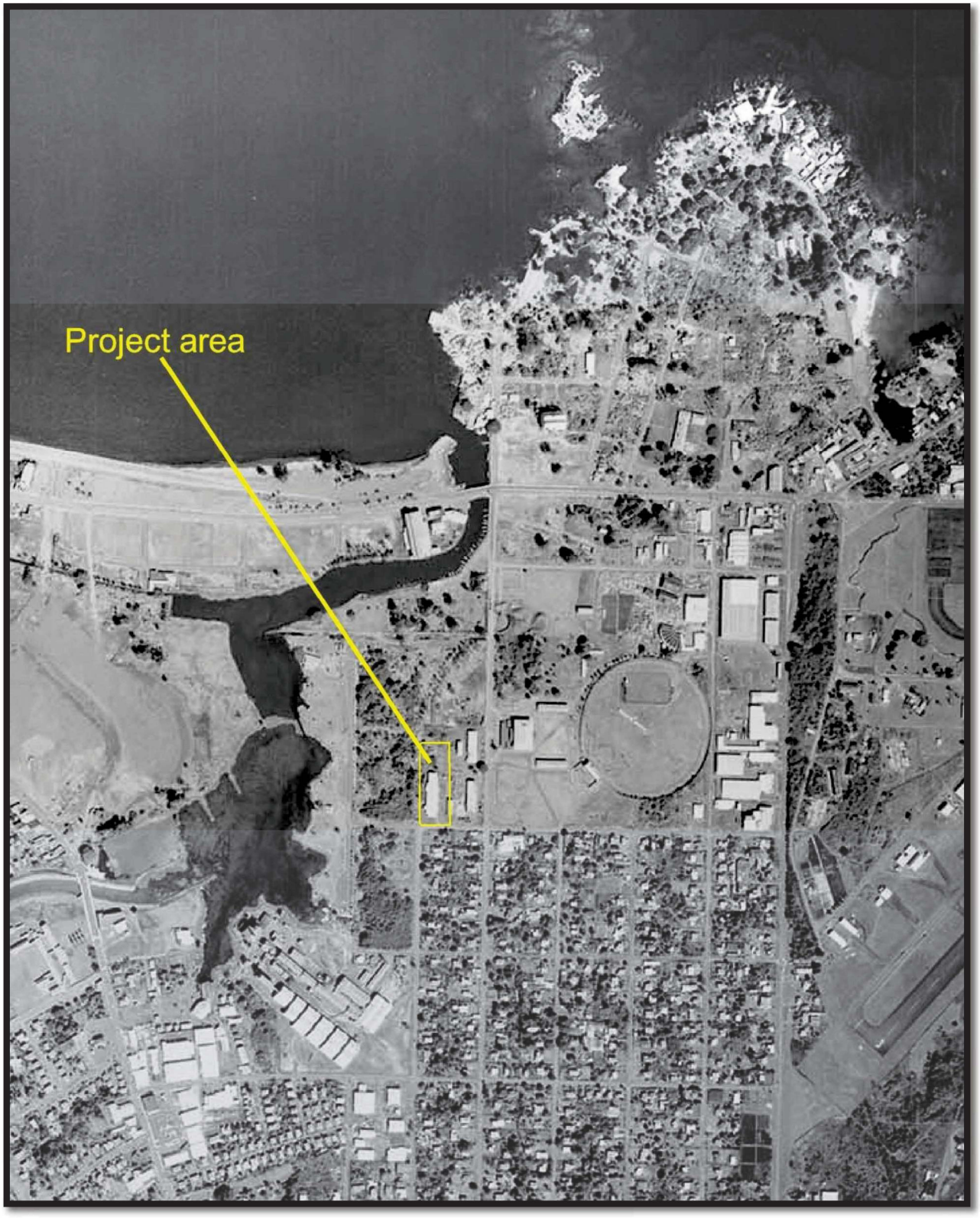


Figure 9. January 16, 1965 aerial photograph of project area

Previous Archaeological Research

A search of the DLNR-SHPD archaeological report database and other sources identified 29 archaeological projects in Waiākea; however, no previous archaeological work has been conducted in the project area. **Figure 10** shows the project locations and **Table 2** summarizes the projects. Not included in the figure or table are the studies by Stokes (Stokes and Dye 1991), which focused on major sites, primarily *heiau* throughout Hawai'i Island, a survey of east Hawai'i by Hudson (1932), the fishpond study of Kikuchi (1973), and the general, primarily archival, studies of McEldowney (1979) and Moniz (n.d.). None of the previous studies included the current project area. Stokes (Stokes and Dye 1991), relying in part on the earlier observations of Thrum, listed six *heiau* for the Hilo area; however, all were destroyed at the time of Stokes fieldwork in 1906. Ohele Heiau, a *luakini* temple, was reported for Waiākea.

The surveys in **Table 2** cover 1,800 acres of Waiākea between sea level and 5,100 ft elevation. The only traditional Hawaiian sites identified in the vicinity of the project area are an agricultural pit, the Puna Trail, and five *ahu* reported by Hammatt and Bush (2000), a sinkhole containing a human burial identified by Bush et al. (2000), and a terraced depression and associated low wall identified by Haun and Henry (2001). Hammatt and Bush attribute the absence of traditional sites to the massive ground disturbance of sugar cane cultivation and commercial and residential development of the Hilo area. Historic remains identified by the surveys consist of 38 sites with 357 features. Nearly all of the identified features are the result of stone clearing for sugar cane cultivation.

Table 2. Previous archaeological work in Waiākea

Author	Study Type*	Elevation (Ft AMSL)	Acreage	Historic Use	No of sites	No of Feas	Traditional Features	Historic Features
Kam (1983)	Archival research	0-5	1	None	1	1	*Heiau*	-
Haun and Henry (2000)	Inventory survey	0-15	20	Port	1	4	-	4
Walker and Rosendahl (1996)	Field inspection	0-460	130	Sugar cane/ developed	5	5	-	1
Haun and Henry (2001)	Inventory survey	35-40	66	Ranching/Air Field	4	5	Terraced depression and wall	3
Devereux, Borthwick, Hammatt and Orr (1997); Hammatt and Bush (2000); Wheeler, Bautista, Wilkinson and Hammatt (2014)	Reconnaissance, Inventory survey	40-80	504	Military	4	8	Pit, 5 *ahu*, and Puna Trail	3
Haun and Henry (2008)	Assessment	59-78	4.0	Sugar cane	0	-	-	-
McGerty and Spear (1999)	Inventory survey	70	3	Sugar cane	1	13	-	13
Maly, Walker and Rosendahl (1994); Spear (1995)	Inventory survey, Data recovery	70-80	5	Sugar cane	4	51	-	51
Kennedy and Ireland (1994)	Reconnaissance	70-80	8	?	0	-	-	-
Carson (1999)	Inventory survey	98-131	176	?	0	-	-	-
Haun and Henry (2016)	Assessment	100-105	5	Flood control	0	-	-	-
Borthwick and Hammatt (1993)	Inventory survey	120-140	11	Sugar cane	-	4	-	4
Rechtman and Henry (1998)	Inventory survey	120-205	40	Sugar cane	1	117	-	117
Borthwick, Collins, Folk and Hammatt (1993)	Inventory survey	140-330	163	Sugar cane	4	47	-	47
Haun and Henry (2007)	Assessment	151-183	1.4	Sugar cane	0	-	-	-
Hunt (1992); Hunt and McDermott (1993); Robins and Spear (1996); Elbe,Denham and Pantaleo (1997); Spear (1998); McGerty and Spear (1999); Dega (2000)	Reconnaissance, Inventory survey, Excavation	200-1500	106	Sugar cane	11	88	-	88
Robins, Fortinii and Spear (1996)	Inventory survey	200-1500	264	Sugar cane	3	18	-	18
Rosendahl (1994)	Field inspection	250-290	11	?	1	1	-	-
Escott (2004)	Inventory survey	300-380	258	Sugar cane	6	80	-	80
Bush, McDermott and Hammatt (2000); McDermott and Hammatt (2001)	Inventory survey	300-360	20	Sugar cane	1	1	Sinkhole w/burial	-
Rechtman (2001)	Inventory survey	5000-5100	5	Ranching	0	-	-	-
		Total	**1800**		**42**	**366**		**357**

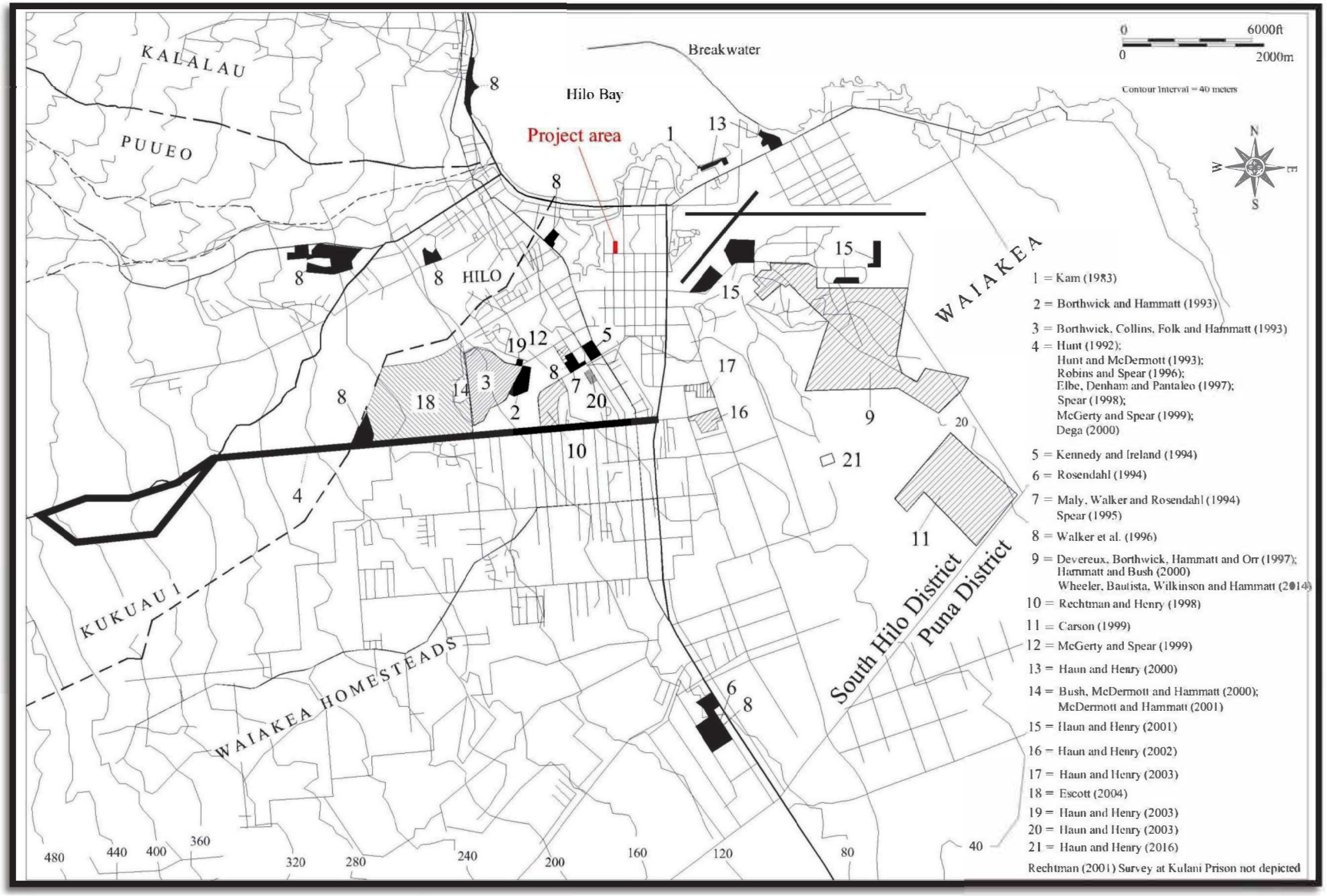


Figure 10. Previous archaeological work

McEldowney (1979) lists 53 traditional Hawaiian sites for Waiākea and 31 historic sites, primarily buildings. Most of the traditional sites were located by Hudson (1932) and Kikuchi (1973). The remaining six were identified during the Statewide Inventory Survey Nearly all were situated along the coast. The sites include 17 fishponds, seven burials, six platforms, five enclosures, three *heiau* including one previously identified by Stokes, three house foundations, three trail segments, two shrines, several miscellaneous features, and two complexes of platforms, enclosures, and terraces.

McEldowney used the limited site inventory and historic documentary evidence to develop a land use and settlement pattern model for the Hilo area. The model consists of five elevationally-defined zones: Coastal Settlement, Upland Agricultural, Lower Forest, Rainforest, and Sub-Alpine or Montane. The Coastal Settlement Zone extended approximately 0.5 miles inland from the shoreline between sea level and 50 ft elevation. The zone was the most densely populated with both permanent and temporary habitations, high status chiefly residences, and *heiau*. Settlements were concentrated at Hilo Bay and sheltered bays and coves. Also present were fishponds and gardens where breadfruit, coconut, *kukui*, banana, *wauke*, sugar cane, sweet potato, and wet and dryland taro were cultivated. The ocean provided fish and other marine resources.

The Upland Agricultural Zone was situated between approximately 50 ft and 1,500 ft elevation. Settlement in the zone consisted of scattered residences among economically beneficial trees and agricultural plots of dryland taro and bananas. Lava tubes were utilized for shelter. A pattern of shifting cultivation is believed to have converted the original forest cover to parkland of grass and scattered groves of trees. Wetland cultivation of taro occurred along streams.

The Lower Forest Zone ranged from 1,500 ft to 2,500 ft elevation. Timber and other forest resources such as medicinal plants, *olona*, and birds were gathered from the zone. Site types consisted of temporary habitations, trials, shrines, and minor agricultural features in forest clearings and along streams. Sites in the Rainforest Zone (2,500-5,000 ft elevation) and Subalpine or Montane Zone (5,000-9,000 ft) were limited to trails and associated temporary habitations. These zones were used for intra-island travel and gathering of valued resources including hardwoods, birds, and stone for tool making.

Project expectations

Based on previous archaeological research and historical documentary evidence, the project area is located in the McEldowney's densely populated Coastal Settlement Zone. The prehistoric use of this area may include permanent and temporary habitations, high status chiefly residences, and *heiau*. Due to the parcel within Hilo town proper and its proximity to the Waiākea Mill, historic structures may also be present.

CONSULTATION

The project area is currently owned by the Suisan Company. The project client, COLUMBUS East, LLC, is a developer who proposes to construct a warehouse and an office building on the property (see **Figure 3**). Consultation regarding the subject parcel was conducted by Dr. Alan Haun with Mr. Harvey Taira, the properties manager for Suisan Company on May 15, 2018. According to Mr. Taira, the project area was purchased by the Suisan Company in the early 1990s. Prior to the acquisition of the property contained a warehouse used for receiving fresh produce, and a dilapidated Quonset hut that was not in use. This warehouse is depicted in **Figure 9**. Soon after the Suisan Company purchased the land, the warehouse and Quonset hut were bulldozed.

Mr. Taira was shown photographs of two concrete platforms identified during the project, designated as Isolated Objects 3 and 4 (see **Figure 18**). According to Mr. Taira, these platforms, which were used as cooling tower supports for a cold storage facility elsewhere, were brought to the property by the Suisan Company on a forklift in the 1990s.

FINDINGS

The archaeological inventory survey identified one archaeological site and four displaced isolated objects in the project area. The site consists of a concrete slab (Site 30889). The isolated objects consist of a large metal gear and axle (Isolated Object 1), a displaced concrete post (Isolated Object 2) and two concrete platforms (Isolated Objects 3 and 4). The location of the site and isolated objects is presented in **Figure 11**.

Site 30889 is a formed concrete slab located in the northwestern portion of the project area. The slab is rectilinear in shape and is 32 feet, 9 inches (10.05 meters) long (west-northwest by east-southeast) and 6 feet, 1 inch (1.86 meters) wide. The southwestern corner of the slab is broken, with the remaining sides ranging in height from 0 to 6.25 inches (0.16 meters). A plan map and photographs of the site are presented in **Figure 12**.

The central and portions of the west end of the slab are covered in a thick root mat, with the remainder comprised of exposed concrete. The root from a tropical ash tree extends across the western side of the slab. An Areca palm and several bingabing trees are growing on or adjacent to the slab. Modern debris is scattered around the site.

A 1.0 by 1.0 meter test pit (Test Pit 2) was excavated adjacent to the Site 30089 slab (see **Figure 12**). This excavation revealed two deposits (**Figure 13**). Layer I consists of 0.3 to 0.36 meters of black (10YR 2/1) silty clay with 60% cobble and pebble inclusions with no cultural material. Layer II consists of 0.9 to 1.09 meters of boulder, cobble and pebble fill material with no cultural material.

Site 30889 is interpreted as an historic foundation or walkway based on its formal type and appearance. The site's integrity is altered and is in fair to good condition. The site is recommended for no further work as the mapping, written description and photography has adequately documented it. It is assessed as significant per HAR §13-284-6 under Criterion d (information content).

As stated, four isolated objects were also identified during the AIS (see **Figure 11**). Isolated object 1 is a large metal gear with an attached axle located in the northern portion of the project area. The gear is 0.67 meters in diameter with 0.04 meter cogs along the perimeter. "SR188" and "20T" are imprinted on the exterior side of the gear. The axle is 1.73 meters long and 0.065 meters in diameter and extends through the center of the gear. There is a 0.11 meter diameter wide metal hub at the other end with remnants of broken metal around its perimeter. Scattered modern trash is present in the area. Overviews of the object are presented in **Figure 14** and **Figure 15**.

Isolated object 2 is a displaced formed concrete post lying on the ground in the southern portion of the project area. The post is 13 feet, 2 inches (4.06 meters) long, 9.75 inches (0.25 meters) wide and 7.75 inches (0.2 meters) thick with beveled edges. There is a rectangular concrete base at one end that is 34.5 inches (0.88 meters) long, 31.75 inches (0.81 meters) wide and 11.25 inches (0.28 meter) thick. There is a projection off the main post that is 0.78 meters long, with identical widths and thickness. The end of this projection is broken and metal rebar reinforcing is visible within the concrete. No cultural material was found in association with the post. Overviews of this post are presented in **Figure 16 and Figure 17**.

Isolated Objects 3 and 4 consist of concrete platforms located in the north-central portion of the project area, 31.0 meters south of Site 30889. A plan map and photographs of these objects are presented in **Figure 18.**

Isolated Object 3 is a collapsed concrete platform located at the western end of the site. It consists of a rectangular concrete pad that is 10 feet, 5 inches (3.2 meters) long (east-west) and 6 feet, 1 inch (1.88 meters) wide and 3.5 inches (0.09 meters) thick. The top of the pad is 13 inches to 15.5 inches (0.34 to 0.4 meters) in height above the surrounding ground surface.

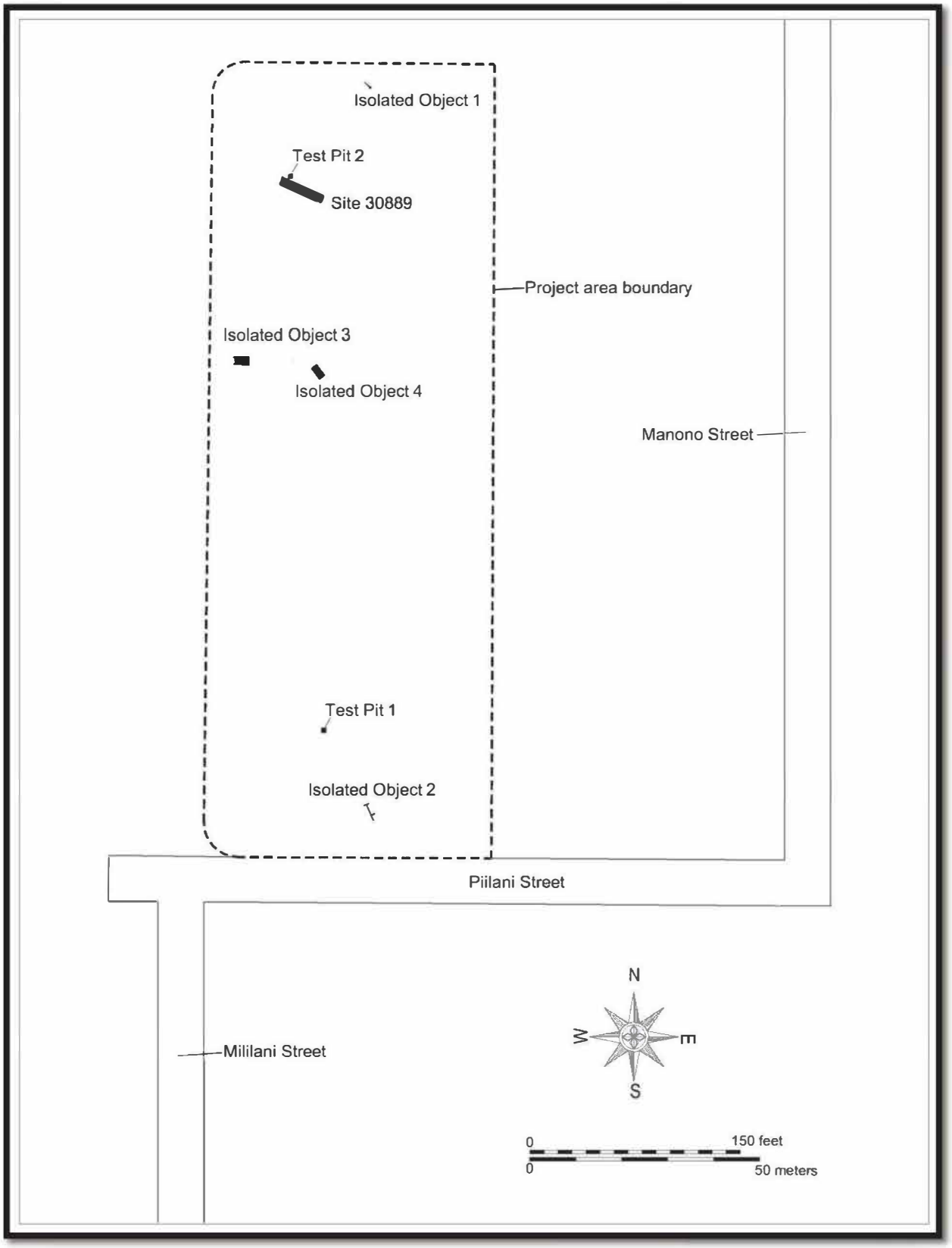


Figure 11. Site location map

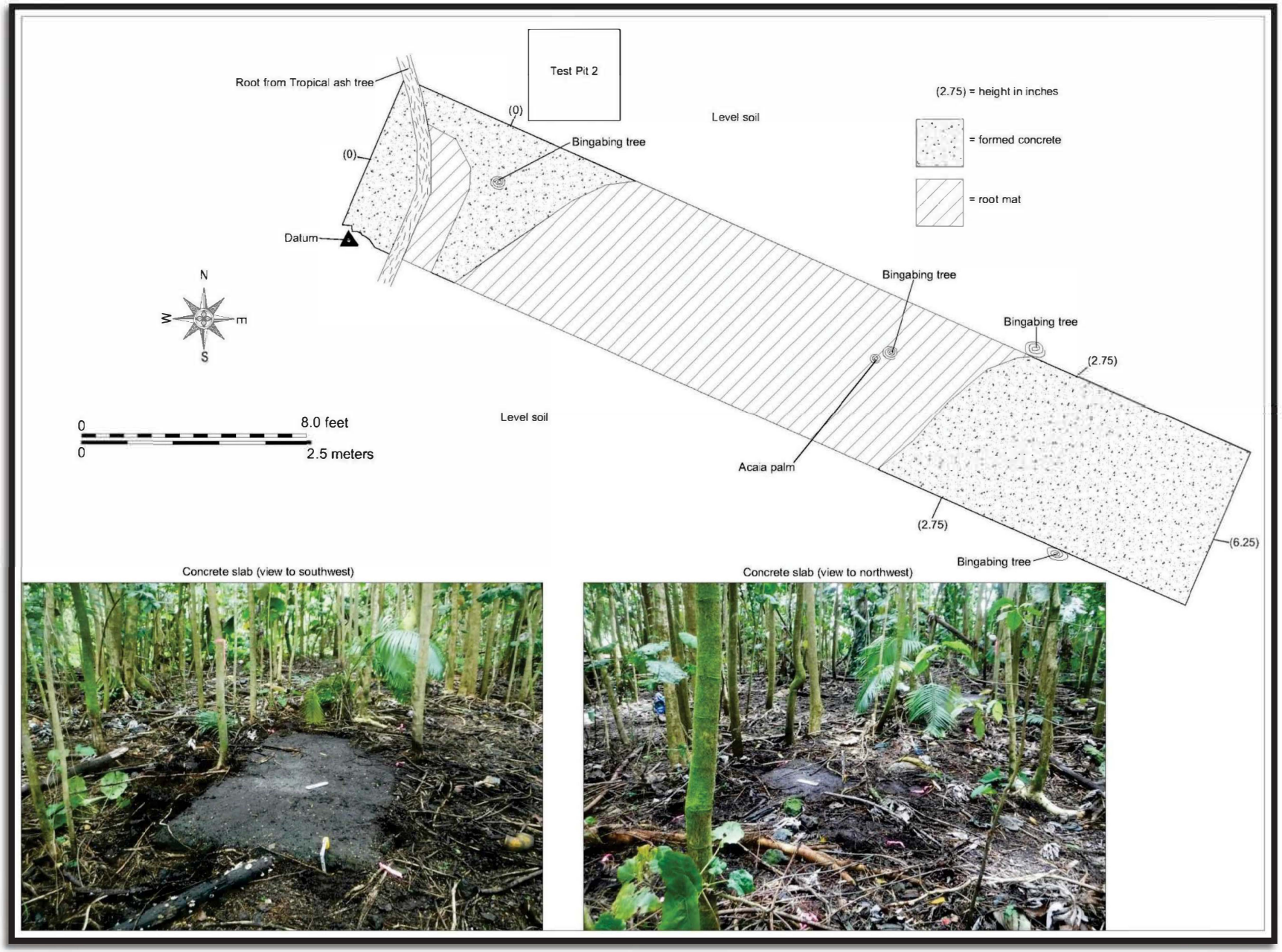


Figure 12. Site 30889 plan map and photographs

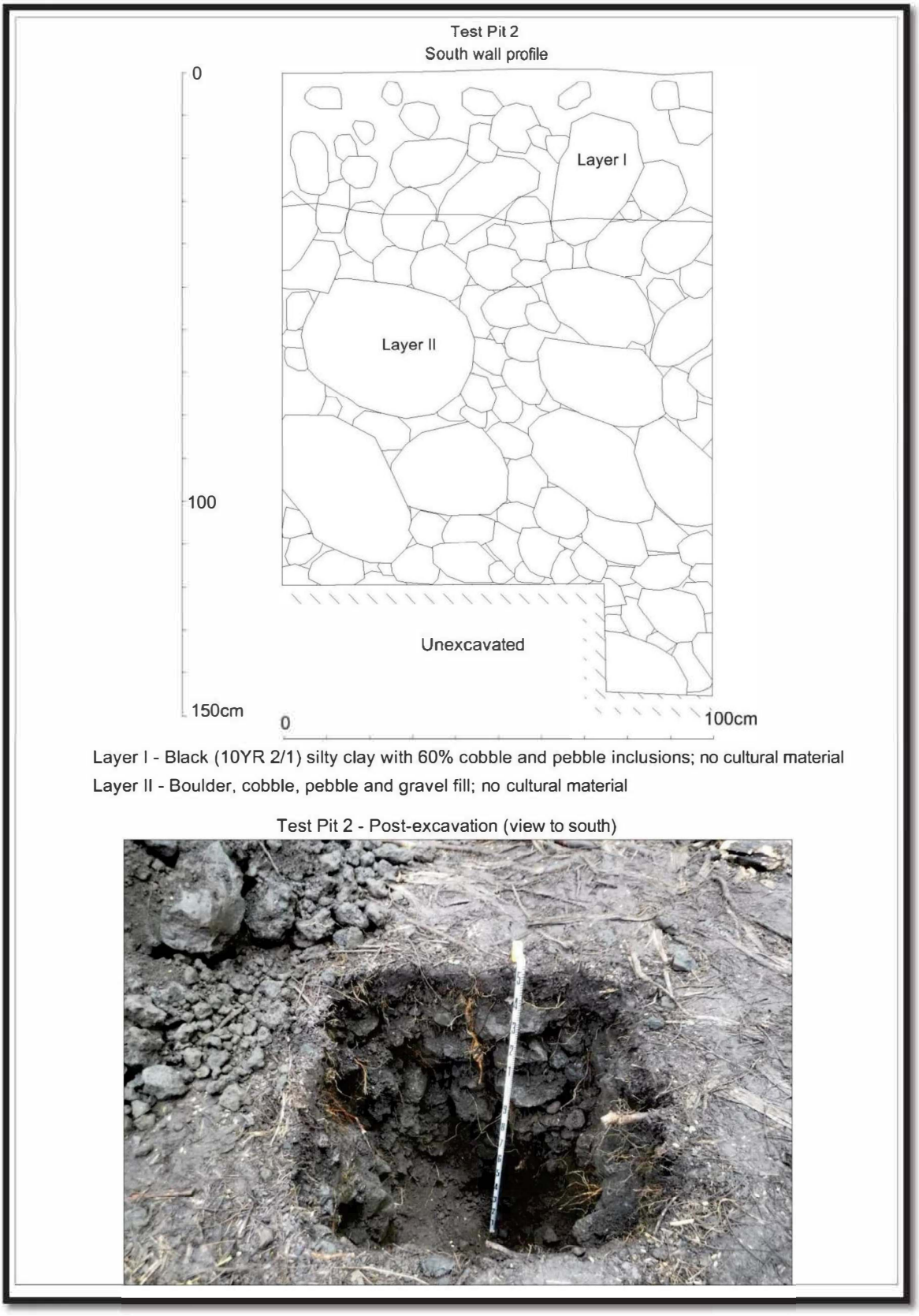


Figure 13. Test Pit 2 profile and photograph



Figure 14. Isolated object 1; metal gear (view to east)



Figure 15. Isolated object 1; metal gear (view to northwest)



Figure 16. Isolated object 2; concrete post (view to northeast)



Figure 17. Isolated object 2; concrete post (view to south)

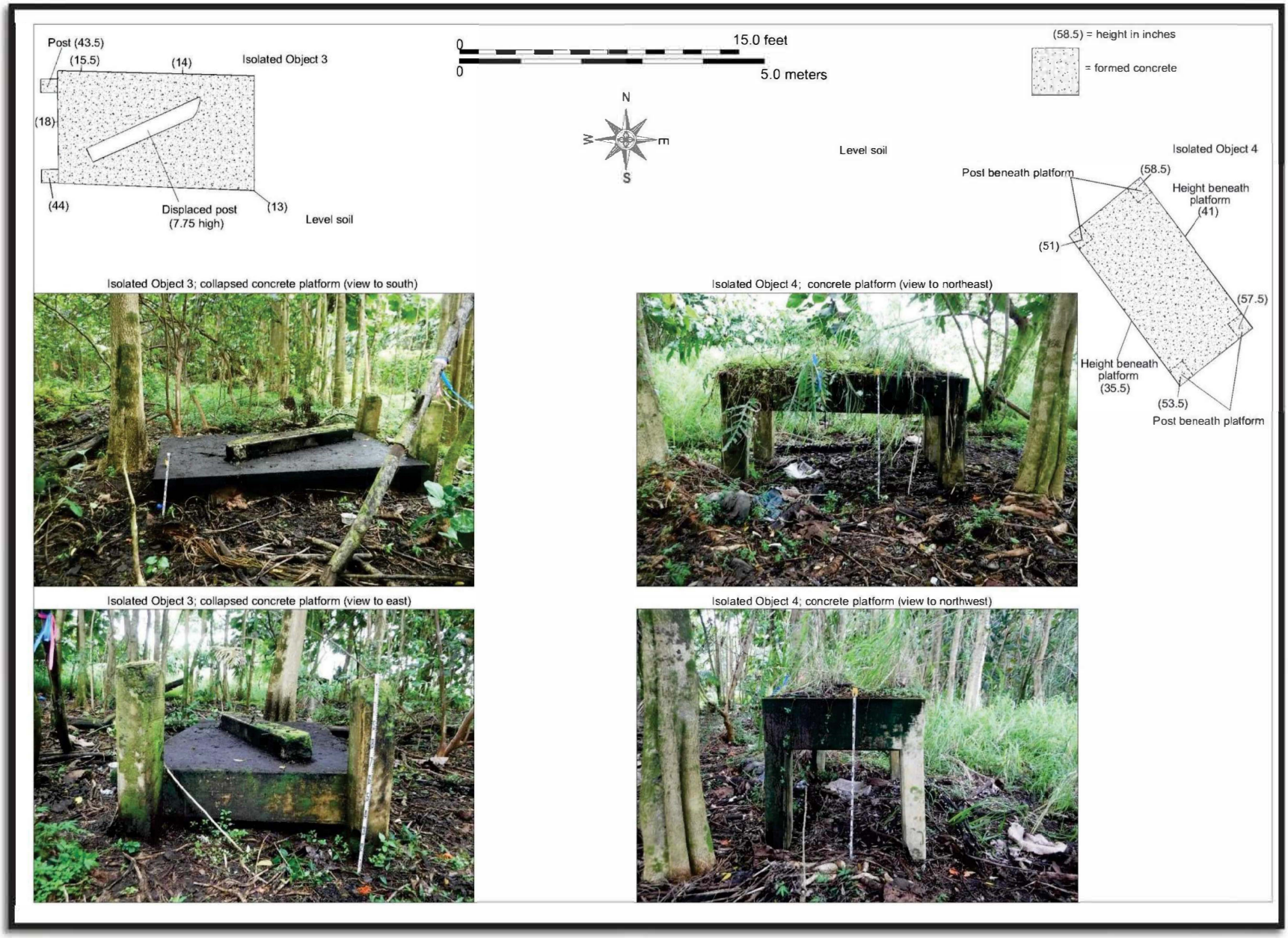


Figure 18. Isolated Objects 3 and 4 plan map and photographs

There are two vertical formed concrete posts set on the ground at the western end of the pad. These posts are 10.5 inches (0.26 meters) square with beveled edges, and are 43.5 to 44 inches (1.1 to 1.12 meters) tall. The top of each post is broken. There is a displaced post lying on the surface of the pad. Modern trash is scattered around the feature.

Isolated Object 4 is located 13.4 meters to the east-southeast of Isolated Object 3. This platform is intact and consists of four vertical posts that support a concrete pad. The feature is rectangular in shape and is 10 feet, 1 inch (3.08 meters) long (northwest by southeast) and 5 feet (1.55 meters) wide. The surface of the platform is a formed concrete pad that is 17.5 inches (0.45 meters) thick. The posts are 10.5 inches (0.26 meters) square with beveled edges. The surface of the platform is 51 to 58.5 inches (1.3 to 1.49 meters) in height above the ground surface. The bottom of the concrete pad is 35.5 to 41 inches (0.9 to 1.04 meters) above the ground. Modern trash is also present in the area surrounding this feature.

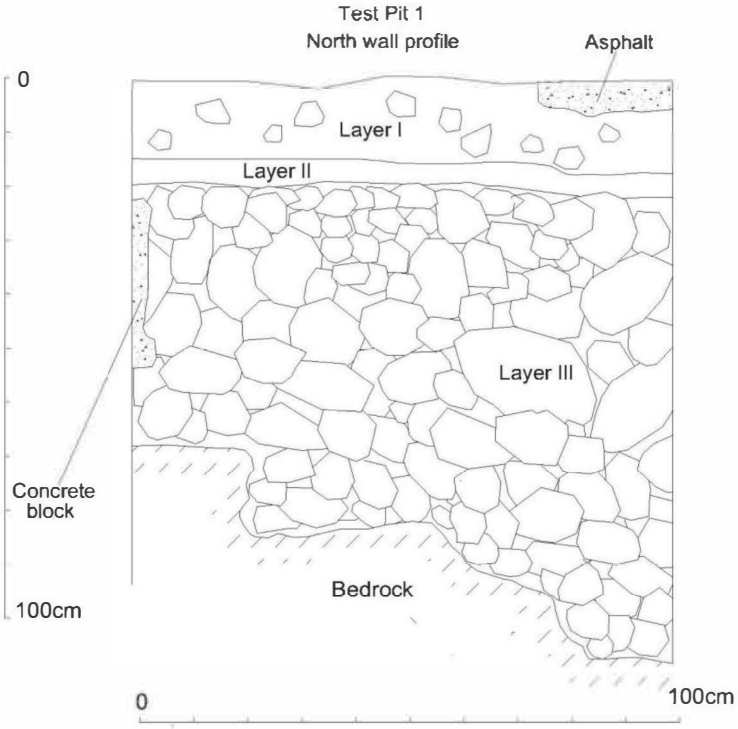
As stated in the Consultation section, according to Mr. Taira, these platforms which were used as cooling tower supports for a cold storage facility elsewhere and were brought to the property by the Suisan Company on a forklift in the 1990s.

A 1.0 by 1.0 meter test pit (Test Pit 1) was excavated in the southern portion of the project area, 25.0 meters north of Piilani Street (see **Figure 11**). This excavation revealed similar deposits to that observed in Test Pit 1 (**Figure 19**). Layer I consists of 0.14 to 0.18 meters of black (10YR 2/1) silty clay with 55% cobble and pebble inclusions. An intact section of asphalt paving is present in the northeast corner of the test pit. Cultural material from Layer I consists of amber, light green and colorless bottle glass fragments, and a threaded metal bolt (2.5 inches long with 3/4" square head).

Layer II consists of 0.04 to 0.08 meters of dark reddish brown (5YR 3/4) cinder gravel fill with no cultural material. Layer III consists of 0.48 to 0.86 meters of boulder, cobble and pebble fill. There is a 0.31 meter thick remnant of a concrete block located along the western side of the test pit. Cultural material from Layer III consists of a 2.25 inch piece of wire and a metal rod with a copper disk at one end.

The metal rod is 9 inches long and 1/2 inch in diameter (**Figure 20**). The copper disk is 1.5 inches in diameter and has "Lunkenheimer" and "Fig. 2129" embossed on one side (**Figure 21**). Lunkenheimer was a manufacturing company established in 1862 that produced bronze and iron valves (http://www.lunkenheimercvc.com). It is likely that this object is a portion of a valve designed to control the flow of water or other liquid.

The subsurface testing indicates that the project area has been modified by the introduction of fill material. Layer II and Layer III in Test Pit 1 and Layer II in Test Pit 2 are interpreted as imported fills based on their material composition and appearance. The presence of the surface sites in the project area, built on top of the Layer I soil deposit, suggest this soil was also an imported fill layer.



Layer I - Black (10YR 2/1) silty clay with 55% cobble and pebble inclusions; cultural material present

Layer II - Dark reddish brown (5YR 3/4) cinder gravel fill; no cultural material

Layer III - Very dark brown boulder, cobble, pebble and gravel fill; cultural material present

Test Pit 1 - Post-excavation (view to north)

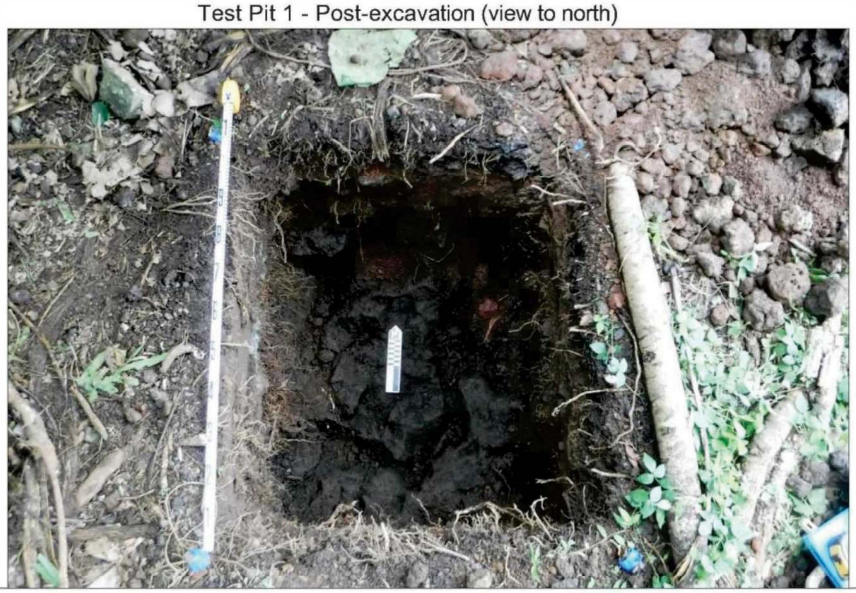


Figure 19. Test Pit 1 profile and photograph



Figure 20. Metal rod and copper disk from Test Pit 1



Figure 21. Metal rod and copper disk from Test Pit 1

CONCLUSION

Discussion

The results of historical and archaeological background research indicates that a warehouse was formerly located in the project area (see **Figure 9**). This facility was subsequently removed in the early 1990s. The potential remnants of this facility, represented by a concrete slab, a metal gear and a concrete post remain in the project area.

The project area is located in close proximity to the Waiākea Fish Pond and it is probable that the area was once extensively used prehistorically. However, subsurface testing during the project indicates that the subject parcel was significantly impacted by the historic introduction of fill material. No evidence of the pre-contact use of the project area was observed during the archaeological inventory survey.

Significance Assessments

The sites identified during the survey are assessed for significance based on Hawai'i Administrative Rules (HAR) §13-284-6. According to (HAR) §13-284-6 (b), a site must possess integrity of location, design, setting, materials, workmanship, feeling, and/or association and shall meet one or more of the following criteria:

1. **Criterion "a"**: Be associated with events that have made an important contribution to the broad patterns of our history;
2. **Criterion "b"**: Be associated with the lives of persons important in our past;
3. **Criterion "c"**: Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;
4. **Criterion "d"**: Have yielded, or is likely to yield, information important for research on prehistory or history; and
5. **Criterion "e":** Have an important traditional cultural value to the native Hawaiian people or to another ethnic group of the state due to associations with traditional cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group's history and cultural identity.

The site in the project area possesses integrity of location, design, materials, and workmanship. It is assessed as significant under Criterion "d". The site has yielded information important for understanding the historic use of the project area.

Treatment Recommendations

The mapping, written description and photography of the Site 30889 adequately document it and no further work or preservation is recommended. The developer plans to construct a warehouse and adjacent office building with associated infrastructure to be located in the southern portion of the project area. There are no immediate plans for the development of the remainder of the parcel. The proposed project will consist of mechanically grading the project area in advance of the construction activity. Site 30889 will likely be impacted during future development. This activity will have no effect on historic properties because Site 30889 requires no further work or preservation.

TRANSLATION OF HAWAIIAN WORDS[1]

ahupua'a - traditional Hawaiian land unit usually extending from the uplands to the sea

hala - The pandanus or screw pine (*Pandanus odoratissimus*)

heiau - Pre-Christian place of worship, shrine

'ili - next in importance to *ahupua'a* and usually a subdivision of an *ahupua'a*

konohiki - headman of an *ahupua'a* land division under the chief

kukui - Candlenut tree (*Aleurites moluccana*), a large tree in the spurge family bearing nuts containing oily kernels

kuleana - small piece of property, as within an *ahupua'a*

Māhele - land division of 1848

mauka -inland

olona - A native shrub (*Touchardia latifolia*), with large, ovate, fine-toothed leaves

pahoehoe - Smooth, unbroken type of lava, contrasting with *a'ā* lava

pia - General name for starch; starch made from arrowroot is called pia Hawai'i to distinguish from other starches

pulu - soft, glossy, yellow wool on the base of tree fern leaf stalks (*Cibotium* spp.).

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FINAL ENVIRONMENTAL ASSESSMENT

PI'ILANI SELF STORAGE WAREHOUSE

Appendix D
Traffic Impact Analysis Report

Pi'ilani Self Storage Warehouse

Traffic Impact Analysis Report

TMK (3) 2-2-033:011

Hilo, Hawaii

Prepared by

SSFM

INTERNATIONAL

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I. PROJECT DESCRIPTION

The proposed use is consistent with the property class "Industrial" and zoning "ML-20 Limited Industrial District" and is a three-floor self-storage warehouse with accompanying restrooms and elevators to serve the tenants. The design includes two porte-cochere on either end, North and South, to allow for large trucks and ADA parking stalls to park under roofed shelter and load/unload to the storage warehouse. The conceptual floor plan includes 88 storage units per floor for a total of 264 storage units within the warehouse.

The self-storage warehouse schematic site plan includes 24' wide two-way access driveways at Piilani Street and Mililani Street. The site plan provides for 28 total full size parking stalls including 2 ADA van accessible stalls. The site plan also provides for seven 12x50 foot loading zones for customer convenience.

The schematic design is three floors (12'-0" ground floor, 10'-0" floors 2 and 3 for a total height of 41 '-8" which is compliant with the zoning height limit of 45'-0". The schematic design aesthetic is meant to evoke the 1920's era of Hilo Town.

This traffic impact analysis report (TIAR) analyzed traffic operations and impacts for the AM and PM peak hours in alignment with County Code Section 25-2-46 Analysis was completed for Existing (2022) conditions, as well as for the Future Without Project, and Future With Project conditions for periods of five (5), ten (10), and twenty (20) years into the future corresponding to 2027, 2032, and 2042, respectively.

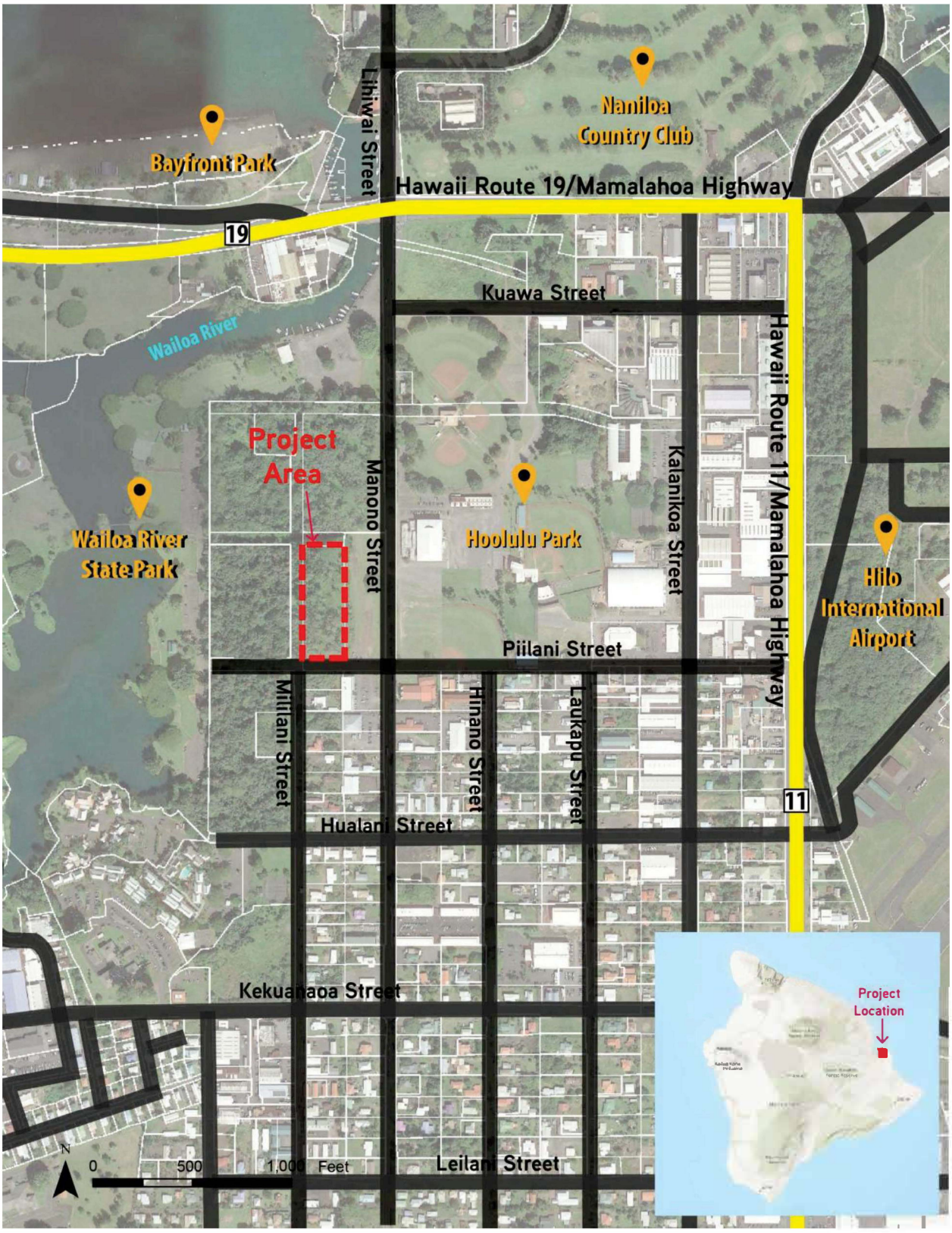


Figure 1: Project Location Map

II. EXISTING CONDITIONS

The Pi'ilani Self Storage Warehouse development is proposed within the NE corner of Piilani Street and Mililani Street. The area to the NW is primarily forested/undeveloped and is surrounded by the Waiakea Pond. The area to the NE has numerous recreational facilities, sporting fields, and an auditorium. The area to the south largely consists of single-family residential homes although there are also numerous small office buildings, restaurants, and shops interspersed through the area. Hilo town is located approximately 1.25 miles NW of the development while Hilo International Airport (ITO) is located approximately 2.00 miles to the east of the development. The University of Hawaii at Hilo and Hawaii Community College are located south of the development, approximately 1.60 miles and 0.80 miles, respectively.

A. Geometric Configuration

Hawaii Route 19 (also known as Kamehameha Avenue, Kalanianaole Street, Mamalahoa Highway and Hawaii Belt Road, but referred to as Hawaii Route 19 throughout this report for simplicity) is a State of Hawaii (State) owned roadway, extending from the Kuhio Wharf on Kuhio Street in the east (located in Hilo) to Lindsey Road in the west (located in Waimea), approximately 56-miles away. In the surrounding project area, Hawaii Route 19 is called Kamehameha Avenue and classified as a small urban principal arterial. In the study area, Hawaii Route 19 is a two-way, four-lane road travelling primarily in the east-west direction. Paved sidewalks with curb and gutter exist along both sides of the roadway. Between the study limits of Manono Street and Hawaii Route 11, there are marked five-foot wide curbside bike lanes in each direction along Hawaii Route 19. Within the study area, parking is not permitted along Hawaii Route 19. The posted speed limit is 35 MPH in the study area.

Hawaii Route 11 (also known as Mamalahoa Highway, Hawaii Belt Road, Volcano Road, and Kanoelehua Avenue, but referred to as Hawaii Route 11 throughout this report for simplicity) is a State-owned roadway, starting at Hawaii Route 19 in the north (located in Hilo) and circumnavigating the island until its intersection with Hawaii Route 190/Palani Road (located in Kailua-Kona), approximately 122-miles away. In the surrounding project area, it is called Kanoelehua Avenue and classified as a small urban principal arterial travelling primarily in the north-south direction. In the study area, Hawaii Route 11 is a two-way, five-lane, roadway divided by a landscaped median of varying width. Along Hawaii Route 11, there are three travel lanes in the southbound (SB) direction between Hawaii Route 19 and Piilani Street, while there are only two travel lanes in the northbound (NB) direction. There are no dedicated bike facilities along this stretch of roadway. There is a six-foot-wide shoulder in the SB direction, and a ten-foot-wide shoulder in the NB direction. Paved sidewalks with curb and gutter exist along the west side of the roadway. Within the study area, parking is not permitted along Hawaii Route 11. The posted speed limit is 35 MPH in the study area.

Manono Street is a County of Hawaii (County) owned roadway, extending from Hawaii Route 19 in the north (located in Hilo) to Kawili Street in the south (located in Hilo), 0.70-miles away, at which points it continues as Kawili Street. In the surrounding project area, it is classified as a major collector. In the study area, Manono Street is a two-way, two-lane road travelling primarily in the north-south direction. Paved sidewalks with curb and gutter exist along both sides of the roadway between Piilani Street and Hawaii Route 19; however, neither are present south of Piilani Street until just before the Kekuanaoa Street

intersection. There are no dedicated bike facilities along this stretch of roadway. There are marked shoulders of varying widths (four to six feet) along both sides of the roadway between Piilani Street and Hawaii Route 19; however, these drop off south of the Piilani Street intersection. Within the study area, parking is not permitted along Manono Street. The posted speed limit is 35 MPH in the study area.

Piilani Street is a County owned roadway, extending from the Wailoa River State Recreation Area parking lot (located in Hilo) in the west to Hawaii Route 11 (located in Hilo) in the east. In the surrounding project area, it is classified as a residential roadway. In the study area, Piilani Street is a two-way, two-lane, road travelling primarily in the east-west direction. Paved sidewalks and curb and gutter are not present along Piilani Street. East of Manono Street, a minimal width paved shoulder is present along the south side of the roadway, while a larger eight-foot shoulder is present along the north side of the roadway. No shoulders are provided along Piilani Street west of the Manono Street intersection. There are no dedicated bike facilities along the corridor. Posted signs along the corridor indicate that a pedestrian with visual impairments may live adjacent to the corridor. Within the study area, parking is not permitted along Piilani Street. Numerous vehicles were observed parked perpendicular to the roadway, outside of the paved shoulder. There is no posted speed limit along the entirety of the corridor, representative of a default 25 MPH requirement.

Kekuanaoa Street is a County owned roadway, extending from Kilauea Avenue (located in Hilo) in the west to Hawaii Route 11 (located in Hilo) in the east, at which point it continues as Airport Road towards Hilo International Airport (ITO). In the surrounding project area, it is classified as a major collector. In the study area, Kekuanaoa Street is a two-way, two-lane road travelling primarily in the east-west direction. Paved sidewalks with curb and gutter exist sporadically throughout the corridor but are not continuous throughout the study limits between Manono Street and Hawaii Route 11. There are no marked bike facilities along this stretch of roadway, nor are there shoulders. Within the study area, parking is not permitted along Kekuanaoa Street. The posted speed limit is 35 MPH in the study area.

Mililani Street, Hinano Street, Laukapu Street, and Kalanikoa Street are all County owned residential roadways of similar characteristics in the vicinity of the project area. In general, they are two-way, two-lane roads that travel primarily in the north-south direction between Piilani Street in the north (located in Hilo) and Kawili Street in the south (located in Hilo), although Kalanikoa Street extends all the way to Hawaii Route 19 in the north. In general, pavement width varies between 18- to 22-feet. Marked center lane lines are present on both Mililani Street and Kalanikoa Street throughout; however, they are only present at intersection approaches along Hinano Street and Laukapu Street. Paved sidewalks with curb and gutter are generally not present along these corridors, although some are sporadically located at intersections. There are no dedicated bike facilities along these corridors. Within the study area, the pavement width is not wide enough to permit parking; however, it is numerous vehicles were observed parked parallel to the roadway outside of the paved shoulder. The posted speed limit along these corridors is 25 MPH. Mililani Street north of Piilani Street, adjacent to the proposed development, is unimproved.

B. Study Intersections

In the surrounding area, five study intersections were analyzed, as shown in Figure 3. These were selected by identifying significant intersections anticipated to be impacted by project-related trips which would add 3% or greater traffic to their forecasted volumes, per HDOT standard practice. Existing multimodal facilities are shown in Figure 4, and existing intersection lane configurations are shown in Figure 5.

1. Hawaii Route 19 & Manono Street/Lihiwai Street

Hawaii Route 19 at Manono Street/Lihiwai Street is a signalized, four-leg, intersection. Manono Street is the southern approach to the intersection, which turns into Lihiwai Street north of the intersection. Both the westbound (WB) and eastbound (EB) approaches of Hawaii Route 19 have dedicated left and right turn lanes, along with two through lanes. The NB and SB approaches of Manono Street and Lihiwai Street have dedicated left turn lanes, along with a shared through-right lane. All approaches have protected-permitted left turn phasing. There are marked crosswalks on all legs of the intersection. Paved sidewalks with curb and gutter are provided on all sides of the intersection, with curb ramps at each corner. Auxiliary acceleration lanes for right-turning vehicles are provided along Hawaii Route 19 on both sides of the intersection. Through observation, it was determined that the traffic signal controller at Hawaii Route 19 and Manono Street/Lihiwai Street was fully-actuated. It was also observed that phase lengths varied each cycle depending on the vehicular demand. During numerous cycles, the protected-left turn phases along Hawaii Route 19 would be skipped if no vehicles were queued in the left turn only lanes. Vehicular loop detectors were identified in both the left turn only, as well as the through lanes at all four approaches to the intersection. Therefore, the traffic signal was modeled as actuated-uncoordinated.

2. Manono Street & Piilani Street

Manono Street at Piilani Street is a four-leg, stop-controlled, intersection. Stop-control is provided in the WB and EB directions along Piilani Street. All approach legs have one shared left-through-right lane. There is a marked crosswalk on the north side of the intersection with curb ramps provided. Paved sidewalks with curb and gutter are provided along Manono Street to the north of the intersection, but not to the south. The project site is situated NW of this intersection.

3. Hawaii Route 11 & Piilani Street

Hawaii Route 11 at Piilani Street is a three-leg, stop-controlled, intersection. Stop-control is provided in the EB direction along Piilani Street. The NB approach of Hawaii Route 11 has a dedicated left turn lane, along with two through lanes. The SB approach of Hawaii Route 11 has two through lanes, along with a shared through-right lane. The EB approach of Piilani Street functions as a shared left-right turn lane. An auxiliary median refuge lane on NB Hawaii Route 11 is provided for left-turning vehicles from Piilani Street, thereby allowing for EB left-turn traffic to only have to navigate one direction of Hawaii Route 11 at a time and reducing movement delay. There is a marked crosswalk on the west side of the intersection with curb ramps provided. Paved sidewalks with curb and gutter are provided along the western side of Hawaii Route 19.

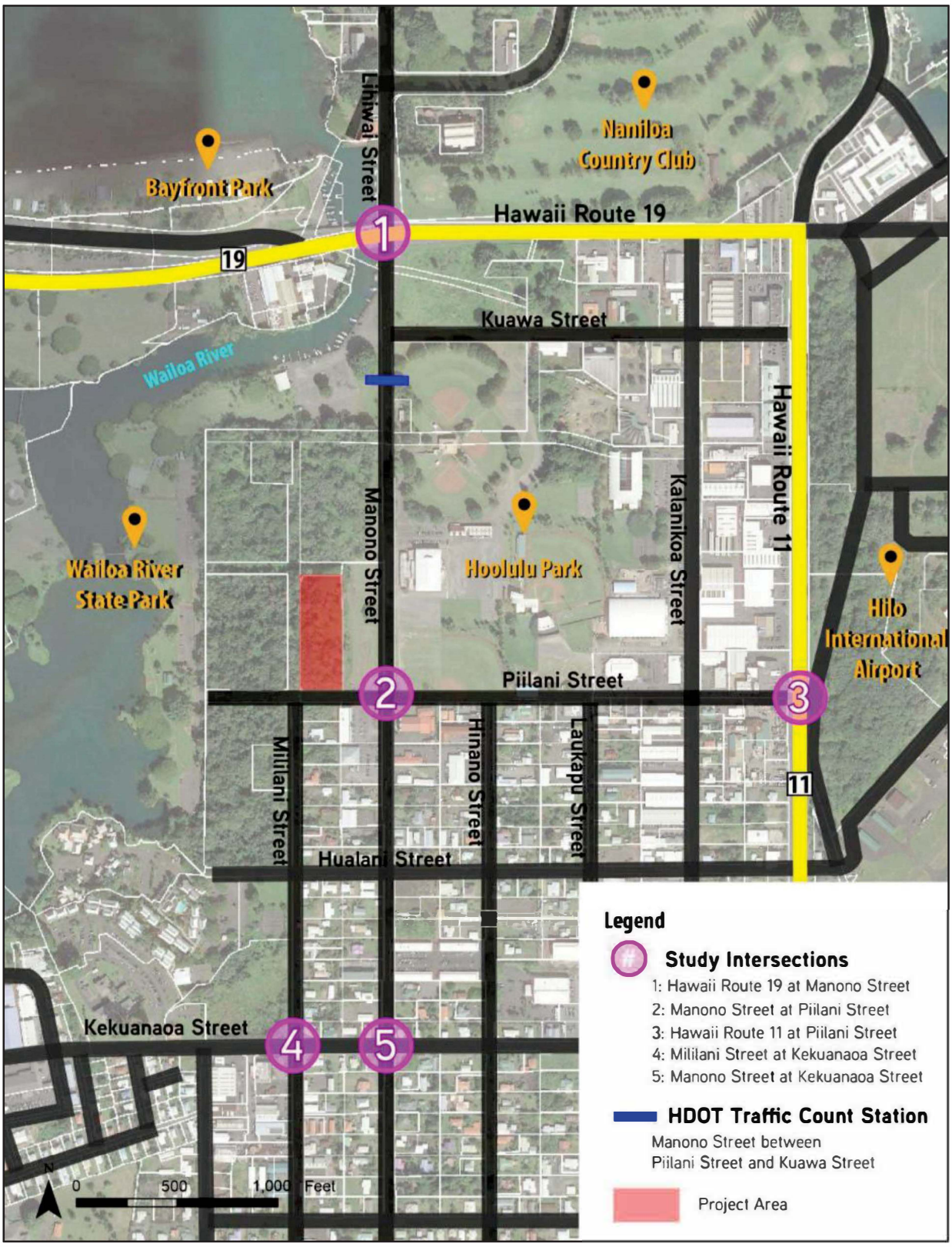


Figure 3: Study Intersections and HDOT Tube Count Stations

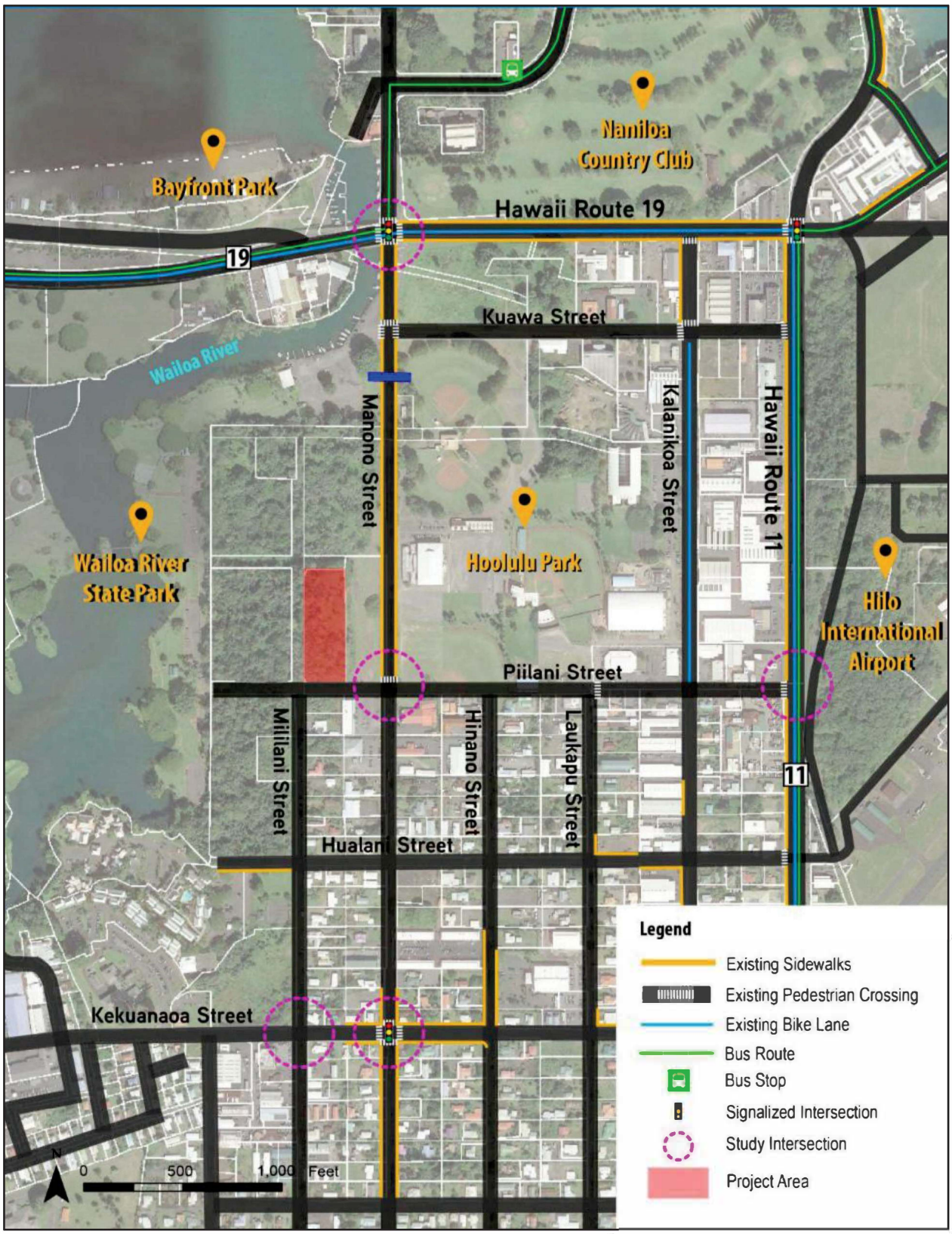


Figure 4: Existing Multimodal Facilities

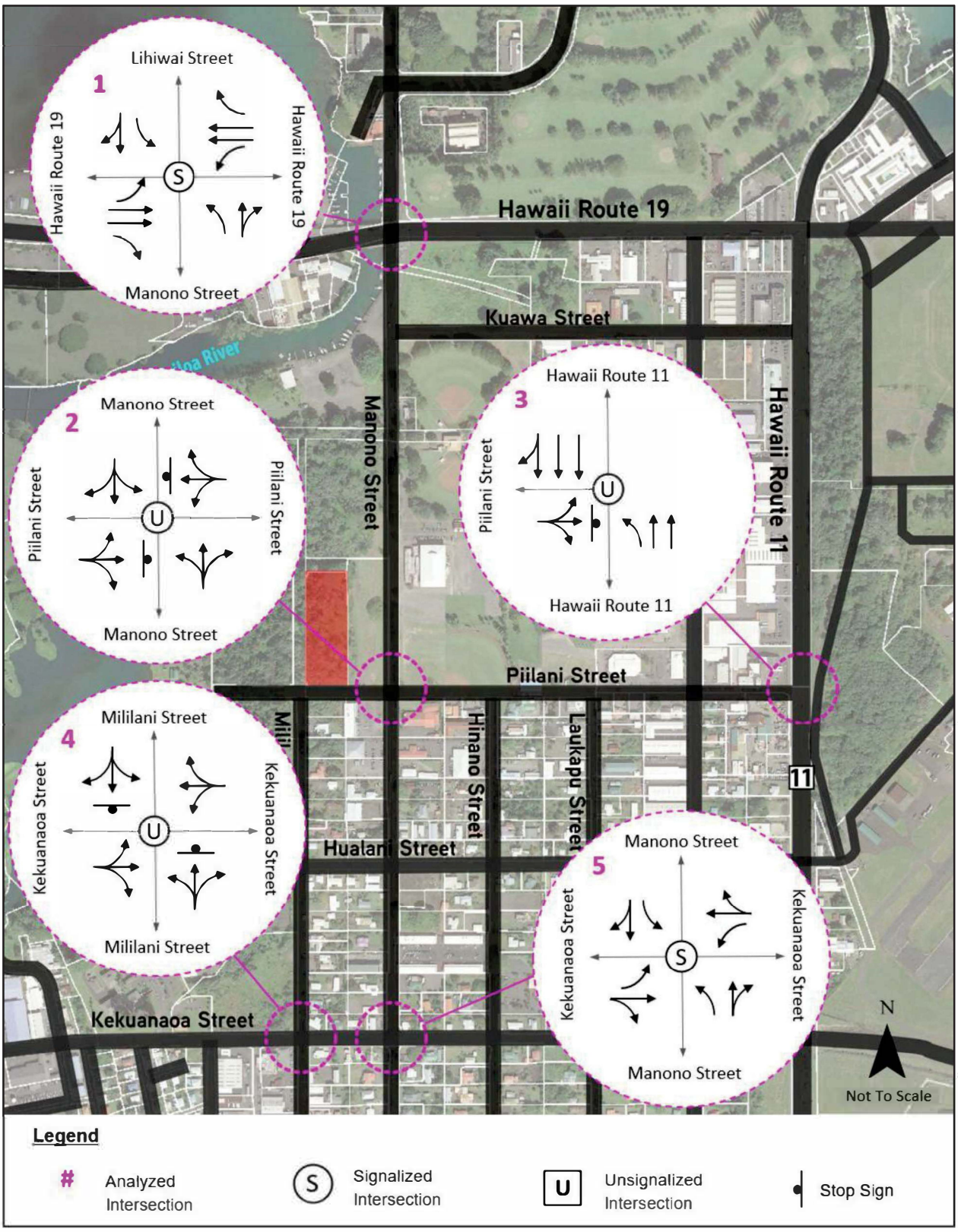


Figure 5: Existing Intersection Lane Configurations

4. Manono Street & Kekuanaoa Street

Manono Street at Kekuanaoa Street is a signalized, four-leg, intersection. All approaches have dedicated left turn lanes with protected-permitted left turn phasing, along with a shared through-right lane. There are marked crosswalks on all legs of the intersection. Paved sidewalks with curb and gutter are provided on all sides of the intersection, with curb ramps at each corner. Vehicular detection is unknown at the signalized intersection of Manono Street and Kekuanaoa Street. As a result, the traffic signal was modeled as pretimed, with cycle length and splits optimized for each peak hour.

5. Mililani Street & Kekuanaoa Street

Mililani Street at Kekuanaoa Street is a four-leg, stop-controlled, intersection. Stop-control is provided in the NB and SB directions along Mililani Street. All approach legs have one shared left-through-right lane. There are no marked crosswalks, paved sidewalk, or curb and gutter provided at the intersection.

C. Vehicle Volumes

1. 24-Hour Volume

Historic Hawaii Department of Transportation (HDOT) annual average daily traffic counts (AADT) on Manono Street between Kuawa Street and Piilani Street (see Figure 3 for count location) were available between 2013-2021, with the exception of 2017-2018 when no data was collected. 24-hour, two-directional counts were also collected on Wednesday, April 6th, 2022, at the same location. Appendix A includes the detailed historical HDOT traffic data and the 2022 24-hour tube count data results. A summary of the historical HDOT and recent 2022 counts is shown in Table 1.

Table 1: 24-Hour Volume on Manono Street between Kuawa Street and Piilani Street

Year	24-Hour Average ADT
2013	10,723
2014	10,370
2015	8,905
2016	8,031
2017	-
2018	-
2019	10,320
2020*	8,763
2021*	9,953
2022**	10,149
*Collected during Covid-19 Pandemic **Non-HDOT 24-Hour Counts	

Figure 6 shows the 24-hour volume distribution between 2019-2022 along Manono Street between Kuawa Street and Piilani Street. Although traffic volumes fluctuated from year to year, peak hour volumes generally occurred around the same time. The 2022 AM and PM peak hours were found to occur between 7:30-8:30 AM and 3:45-4:45 PM, respectively, with the PM peak hour having the heaviest daily volumes.

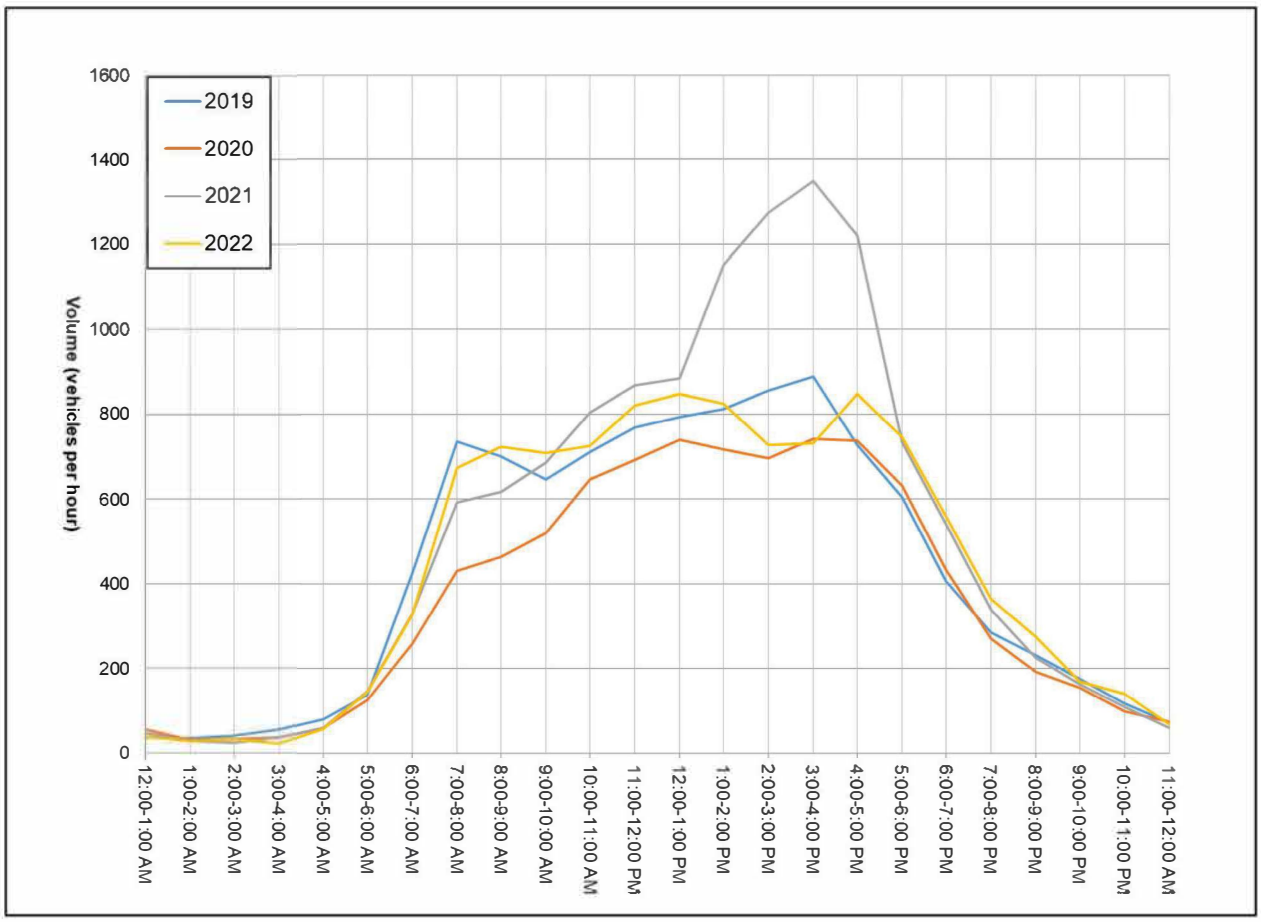


Figure 6: 24-Hour Volume Distribution on Manono Street between Kuawa Street and Piilani Street

(1) Covid-19 Traffic Impacts

The Covid-19 pandemic led to a 14-day quarantine of incoming travelers and the closure of non-essential businesses in the State of Hawaii beginning in March 2020. Towards the end of 2020, businesses began reopening, and non-essential employees began going back to work. Tourism slowly started to return as well. Beginning in the 2021 school year, Hawaii public schools reinstated in-person learning.

Based on data from Table 1, the 2022 24-hour volumes were similar to the pre-pandemic 2019 AADT. Additionally, throughout the pandemic, HDOT has periodically collected traffic counts at various stations to analyze traffic volumes and how they compare to pre-pandemic levels. The closest station to the proposed development is located on Hawaii Route 11 between Halekauila Street and Pohaku Street, approximately 0.90 miles south of the study intersection of Hawaii Route 11 and Piilani Street. The most recent data provided by HDOT was taken on December 15th, 2021, in which traffic volumes were approximately 5% higher than 2019 data. As a result, it can be assumed that counts collected on April 6th, 2022, are reflective of typical traffic volumes in the area, and no adjustment for Covid is needed.

2. Intersection Peak Turning Movement Counts

Turning movement counts were taken at the five study intersections on Wednesday, April 6th, 2022, from 6:30-9:30 AM, and 3:00-6:00 PM. The AM and PM peak hours occurred between 7:30-8:30 AM and 3:45-

4:45 PM, respectively. Appendix A includes the raw traffic count data at the study intersections. Figure 7 shows the AM and PM peak hour volumes at the study intersections.

3. Transit Facilities

The County public bus transit system (Hele-On) operates numerous routes throughout Hilo and the surrounding region. However, there are no existing bus stops within a half-mile radius of the proposed development. The closest bus stop is located at Banyan Drive east of Lihiwai Street (Stop ID 127), approximately 0.7 miles north of the development (~13-minute walk). This bus stop serves Route 101 – Intra-Hilo Keaukaha, which runs along Hawaii Route 19 and serves the Keaukaha community to the NE of Hilo, as well as ITO. The route operates Monday-Sunday between 6:15–7:43 PM (shortened schedules on Sundays), with busses arriving at the stop every hour. The next closest bus stops are located on Kawili Street at the Hawaii Community College Campus (Stop IDs 107, 175), approximately 0.9 miles south of the development (~19-minute walk). These bus stops serve numerous destinations via the following routes: Route 10 – Hilo to Ocean View, Route 11/Red Line – Hilo to Volcano, Route 101 – Intra-Hilo Keaukaha, and Route 103 – Waiakea-Uka. Service times vary between the routes. Bus ridership data is unavailable. Appendix B includes detailed bus route schedules and maps for each of these routes.

4. Pedestrian and Bicycle Volumes

Peak hour intersection pedestrian and bicycle volumes were taken at the existing study intersections on Wednesday, April 6th, 2022, from 6:30-9:30 AM and 3:00-6:00 PM. Pedestrian and bike volumes were minimal throughout all analyzed peaks. Hawaii Route 19 and Manono Street/Lihiwai Street had the highest amount of pedestrian activity, with up to six peak hour pedestrian crossings (PM peak), while Hawaii Route 11 and Piilani Street had the highest amount of bicycle activity, with six peak hour bicyclist movements recorded during the PM peak hour. Table 2 shows a summary of pedestrian and bicycle counts during the vehicular peak hours.

Table 2: Peak Hour Pedestrian and Bicycle Volumes

Intersection	Pedestrian		Bicyle	
	AM Peak	PM Peak	AM Peak	PM Peak
Hawaii Route 19 & Manono Street/Lihiwai Street	2	6	1	1
Hawaii Route 11 & Piilani Street	2	0	1	6
Manono Street & Piilani Street	1	4	2	0
Manono Street & Kekuanaoa Street	1	6	0	0
Mililani Street & Kekuanaoa Street	5	3	0	0

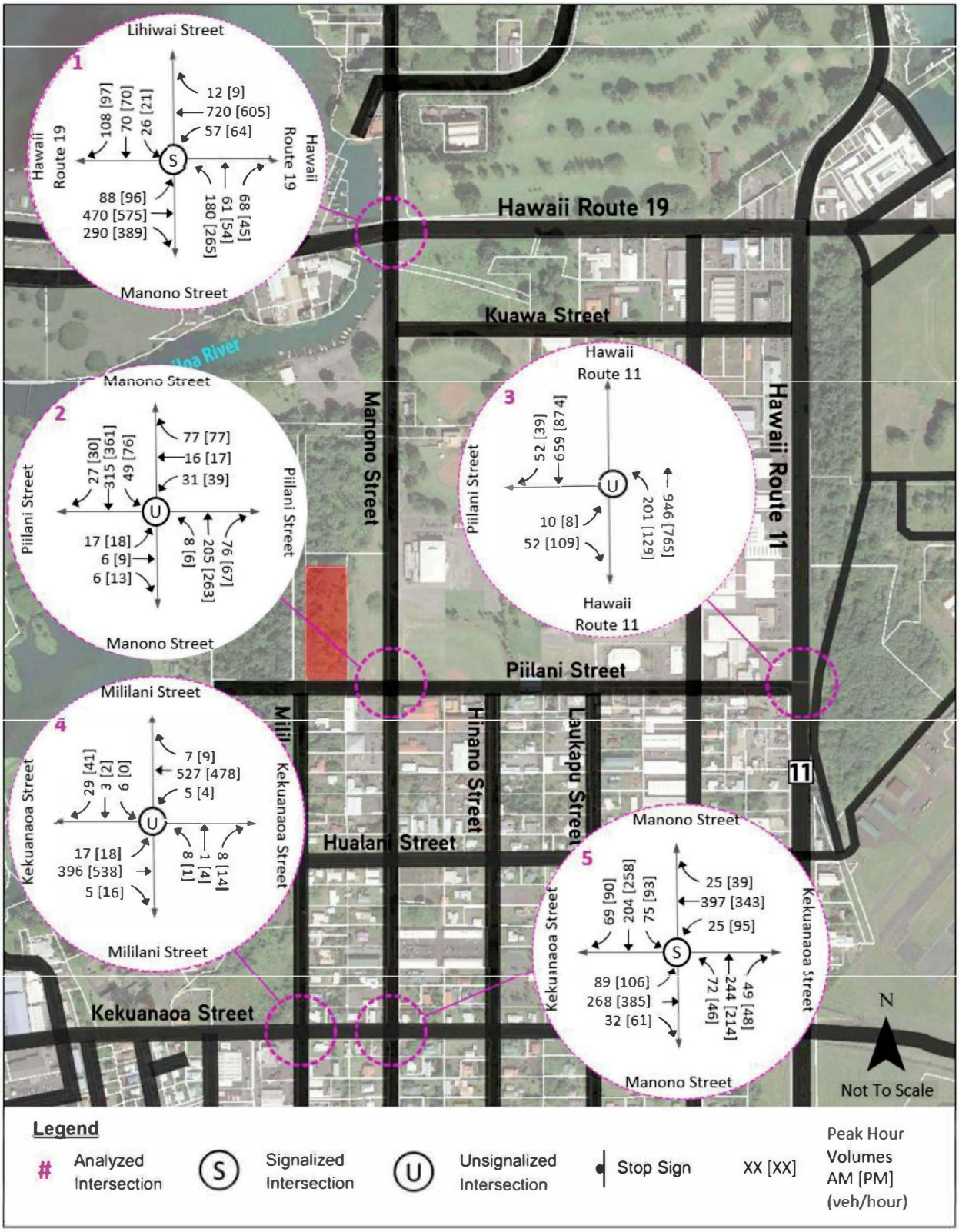


Figure 7: Existing (2022) Intersection Peak Hour Volumes

D. Existing Automobile LOS

1. Methodology

Level of service (LOS) is a rating system used in traffic engineering to measure the effectiveness of roadway operating conditions. There are six LOS ranging from A to F. LOS A is defined as being the least interrupted flow conditions with little or no delays, whereas LOS F is defined as conditions where extreme delays exist. Guidelines state that LOS D or better is appropriate for the study intersection and movements. Intersection LOS and delay was determined for the AM and PM peak hours using Synchro Version 10.0 traffic analysis software.

As stated in the *HCM6* (TRB, 2016), LOS for an all-way stop controlled (AWSC) and a two-way stop controlled (TWSC) intersection is determined by the measured control delay (see Table 3). Delay at an AWSC intersection is defined for the intersection as a whole and for each movement. Delay at a TWSC intersection is defined by each minor movement and not for the intersection as a whole. Vehicles traveling along the major, free-flow road of a TWSC intersection, proceed through with minimal delay. Those vehicles approaching the intersection along the minor movement (side-street) are controlled by a stop sign and thus experience delay attributable to the volume of vehicles passing along the free-flow road and the gaps available. As stated in the HCM6 (TRB, 2016), roundabouts (including mini-roundabouts) share the same control delay thresholds as AWSC and TWSC intersections.

Table 3: LOS Criteria for Unsignalized Intersections

Average Control Delay (s/veh)	LOS by v/c Ratio	
	<=1.0	>1.0
≤ 10.0	A	F
>10 and ≤15	B	F
>15 and ≤25	C	F
>25 and ≤35	D	F
>35 and ≤50	E	F
>50	F	F

Source: *HCM6* (TRB, 2016)

The LOS analysis for signalized intersections is determined by average total vehicle delay based on the methodologies of the *HCM6* (TRB, 2016), shown in Table 4. High numbers of vehicles passing through the intersection, long cycle lengths, inappropriate signal phasing, or poor signal progression can result in long delays, and consequently poor LOS.

Table 4: LOS Criteria for Signalized Intersections

Average Control Delay (s/veh)	LOS by v/c Ratio	
	<=1.0	>1.0
≤ 10.0	A	F
>10 and ≤20	B	F
>20 and ≤35	C	F
>35 and ≤55	D	F
>55 and ≤80	E	F
>80	F	F

Source: *HCM6* (TRB, 2016)

Another measure of intersection operation is the volume to capacity (v/c) ratio. This is the ratio of the volume of traffic utilizing the intersection compared to the maximum volume of vehicles that can be accommodated by the intersection during a specific period of time. A v/c ratio under 0.85 means the intersection is operating under capacity and excessive delays are not experienced. An intersection is operating near its capacity when v/c ratios range from 0.85 to 0.95. Unstable flows are expected when the v/c ratio is between 0.95 and 1.0. Any v/c ratio greater than or equal to 1.0 indicates that the intersection is operating at or above capacity which results in a LOS F per the *HCM* (TRB, 2016). A traffic movement can have a poor LOS but low v/c which suggests that the traffic volumes along that movement are low but must wait a long time to make the movement. This is common for low volume protected turn movements or side streets that must wait through a long cycle length for their phase to come up.

2. Existing Intersection LOS Results

Existing LOS and delay (in seconds per vehicle) were determined for the AM and PM peak hours using *Synchro 10* traffic analysis software. Table 5 shows the existing vehicular delay and LOS at each intersection, with the shaded rows indicating the overall intersection delay (applicable at signalized intersections only). Movements that operated at LOS E/F or v/c ≥ 1.0 are highlighted in yellow. Synchro reports for the Existing (2022) conditions can be found in Appendix C.

(1) Hawaii Route 19 & Manono Street/Lihiwai Street

The intersection and all movements at the signalized intersection of Hawaii Route 19 and Manono Street/Lihiwai Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

(2) Hawaii Route 11 & Piilani Street

As Synchro is unable to analyze the impacts of a median refuge lane when analyzing the EB left turning movements at Hawaii Route 11 and Piilani Street, NB through volumes were omitted as to only analyze the ability for EB left turning vehicles to find gaps in the SB traffic and NB left turning movements. With a median refuge lane, turning vehicles can complete their turn in two separate movements, limiting the number of potential conflict points when compared to a standard intersection (see Figure 8). All other movements at this intersection were analyzed with volumes as shown in Figure 7.

All movements at the unsignalized intersection of Hawaii Route 11 and Piilani Street resulted in appropriate LOS C or better and v/c < 1.0 during the AM and PM peak hours.

(3) Manono Street & Piilani Street

All movements at the unsignalized intersection of Manono Street and Piilani Street resulted in appropriate LOS C or better and v/c < 1.0 during the AM and PM peak hours.

(4) Manono Street & Kekuanaoa Street

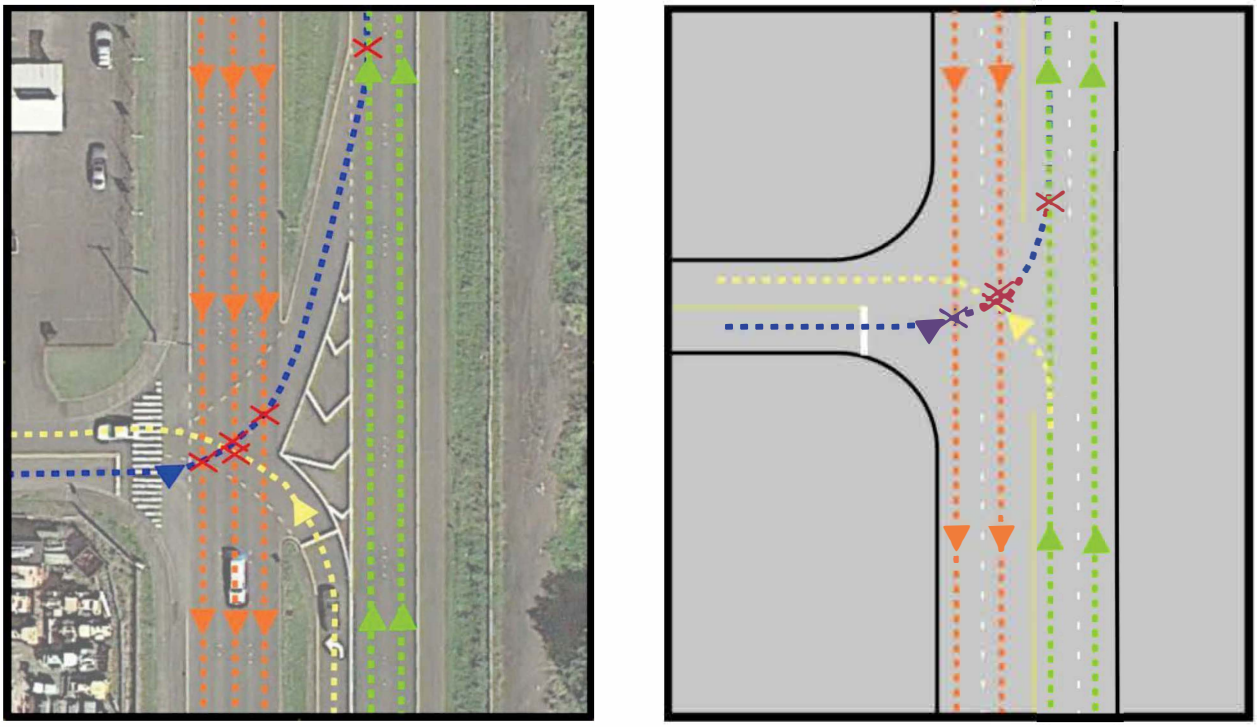
The intersection and all movements at the signalized intersection of Manono Street and Kekuanaoa Street resulted in appropriate LOS C or better and v/c < 1.0 during the AM and PM peak hours.

(5) Mililani Street & Kekuanaoa Street

All movements at the unsignalized intersection of Mililani Street and Kekuanaoa Street resulted in appropriate LOS C or better and v/c < 1.0 during the AM and PM peak hours.

Table 5: Existing (2022) LOS

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Hawaii Route 19 & Manono Street/Lihiwai Street	19.4	-	B	23.2	-	C
Hawaii Route 19 EB Left	12.5	0.27	B	15.1	0.27	B
Hawaii Route 19 EB Through	15.1	0.35	B	19.5	0.44	B
Hawaii Route 19 EB Right	18.0	0.48	B	26.7	0.68	C
Hawaii Route 19 WB Left	11.6	0.16	B	14.8	0.22	B
Hawaii Route 19 WB Through	17.6	0.52	B	20.3	0.48	C
Hawaii Route 19 WB Right	12.8	0.02	B	15.8	0.02	B
Manono Street NB Left	26.0	0.60	C	27.0	0.71	C
Manono Street NB Through-Right	25.5	0.37	C	22.3	0.23	C
Lihiwai Street SB Left	26.0	0.08	C	27.7	0.08	C
Lihiwai Street SB Through-Right	35.0	0.74	D	37.5	0.76	D
Hawaii Route 11 & Piilani Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Hawaii Route 11 NB Left	19.3	0.50	C	19.9	0.37	C
Hawaii Route 11 NB Through	-	-	-	-	-	-
Hawaii Route 11 SB Through-Right	-	-	-	-	-	-
Piilani Street EB Left-Right	20.2	0.23	C	20.8	0.39	C
Manono Street & Piilani Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Manono Street NB Left-Through-Right	8.1	0.01	A	8.2	0.01	A
Manono Street SB Left-Through-Right	8.1	0.05	A	8.2	0.07	A
Piilani Street EB Left-Through-Right	21.6	0.16	C	22.6	0.20	C
Piilani Street WB Left-Through-Right	17.2	0.35	C	20.9	0.41	C
Manono Street & Kekuanaoa Street	29.2	-	C	29.0	-	C
Manono Street NB Left	21.8	0.25	C	21.0	0.16	C
Manono Street NB Through-Right	32.3	0.64	C	28.6	0.51	C
Manono Street SB Left	22.7	0.28	C	21.5	0.26	C
Manono Street SB Through-Right	30.0	0.56	C	32.5	0.65	C
Kekuanaoa Street EB Left	22.6	0.35	C	20.5	0.31	C
Kekuanaoa Street EB Through-Right	25.8	0.52	C	32.0	0.72	C
Kekuanaoa Street WB Left	17.2	0.07	B	22.3	0.33	C
Kekuanaoa Street WB Through-Right	33.4	0.75	C	29.2	0.63	C
Mililani Street & Kekuanaoa Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Mililani Street NB Left-Through-Right	22.1	0.13	C	16.0	0.08	C
Mililani Street SB Left-Through-Right	17.3	0.15	C	12.8	0.12	B
Kekuanaoa Street EB Left-Through-Right	8.8	0.02	A	8.4	0.02	A
Kekuanaoa Street WB Left-Through-Right	8.3	0.01	A	8.6	0.00	A



(a) (b)

Figure 8: Vehicular Points (a) with a Median Refuge Lane vs (b) a Standard Intersection

III. FUTURE WITHOUT PROJECT CONDITIONS

Regional traffic growth and future surrounding area development's traffic were added to the roadway network and analyzed for Future conditions for the years 2027, 2032, and 2042.

A. Upcoming Planned Projects

1. STIP

Research was completed on March 29th, 2022 at the Statewide Transportation Improvements Program (STIP) FY 2019-2022 website. The STIP is a four-year forecast that identifies state and county transportation projects to be funded with Federal Highway and Federal Transit funds. There were no roadway construction or other projects listed in the STIP (2019-2022) that would impact the project area.

2. ERP (Previously OEQC)

Research was completed on March 29th, 2022 at the State of Hawaii *Environmental Review Program* (ERP) website, which as of July 2021 took the place of the former *Office of Environmental Quality Control* (OEQC) website. The ERP website provides Environmental Impact Statements (EIS) and Environmental Assessments (EA) available to the public. Projects from the ERP website in the surrounding area from 2017-2022 were reviewed.

(1) Hale Ola O Mohouli Affordable Housing

Hale Ola O Mohouli is an expansion of the existing Mohouli Senior Residences located on Mohouli Street between Komohana Street and Kukuau Street, approximately two miles southwest (SW) of the proposed development project site. The *Hale Ola o Mohouli Affordable Residential Development TIAR* (AECOM, 2021) was completed to analyze this expansion, which was reviewed to determine the potential future impact. The project proposes to add up to an additional 90 affordable residential units, and thus anticipates an additional 48 AM Peak Hour trips, and 68 PM Peak Hour trips. Due to its location two miles away, it can be assumed that the Hale Ola O Mohouli Affordable Housing expansion will have minimal impact on the Hawaiian Kingdom Brands project site, and therefore no trips from this facility were added.

(2) Hilo Iron Works

The *Hilo Iron Works TIAR* (SSFM, 2019) was reviewed to determine the potential future impact. The existing facility is located at the NW corner of Hawaii Route 19 and Manono Street, approximately 2,200 feet north of the proposed Hawaiian Kingdom Brands project site. The TIAR studied existing traffic within property. No new development was proposed within the property, and no significant change in vehicle trips was anticipated. Therefore, it can be assumed that traffic from this facility is already accounted for in the collected 2022 volumes, and therefore no additional trips from this facility were added.

(3) Bank of Hawaii

Bank of Hawaii is proposing a new facility at 1339 Kinoole Street in Hilo, Hawaii, approximately one mile SW of the proposed development. *The Hilo Bank of Hawaii TIAR* (SSFM, 2018) was completed to analyze this development, which was reviewed to determine the potential future impact. The project proposes to redevelop four existing single family dwelling units on the existing property, creating a 7,500 sf bank. The project's original complete build out was expected by 2020; however, as of March 2022, construction had yet to begin. It was anticipated that the project would add 53 additional AM Peak Hour trips, and 163

additional PM Peak Hour trips. However, the majority of this generated traffic was projected to be added along Lanikaula Street. Therefore, due to minimal impact in the area surrounding the Hawaiian Kingdom Brands project site, no additional trips from this facility were added.

(4) South Hilo Sanitary Landfill Closure

The *Traffic Assessment* (TA) *For The South Hilo Sanitary Landfill* (Wilson Okamoto, 2017) analyzed the traffic impacts projected as a result of closing the landfill (SHSL). With this closure, county waste trucks as well as commercial haulers will be diverted to the West Hawaii Sanitary Landfill (WHSL) located in Puuanahulu, 70-miles west of the existing site. These vehicles are projected to be rerouted to the WHSL via Saddle Road, with an anticipated 29 additional AM Peak Hour trips, and 12 additional PM Peak Hour trips. As of June 2020, the SHSL closure was nearly complete. Therefore, it can be assumed that traffic impacts from this closure were accounted for in the collected 2022 volumes, and thus no additional volume adjustments are needed.

(5) Island Naturals Complex

COH planners noted that Island Naturals Properties, LLC applied for a special management area (SMA) use permit in April 2021, proposing to construct a 67,685 sf retail and office complex at the NW corner of Mililani Street and Kekuanaoa Street on an existing 4.045-acre undeveloped lot, as detailed in the *County of Hawaii Planning Department Background Report – SMA 21-000079* (COH Planning Department, April 2021). The applicant currently operates a grocery store within a nearby strip mall in the Hilo Shopping Center located at the SE corner of the intersection of Kekuanaoa Street and Kilauea Avenue, approximately 0.25-miles away from the proposed site. The developer is looking to relocate their grocery store to this new site and develop a one-stop commercial retail and office center with other businesses aimed at providing goods and everyday services for both residents and visitors. The phasing of the development is still undecided; however, the applicant forecasts that full-buildout is anticipated by 2026.

No TIAR was completed as a part of this development's application. However, as a part of the permit, the applicant projects that the development will generate at least 50 vehicular movements during the peak hours. The developer also noted that retail operations will generally start post AM peak hour, around 10:00 AM, and that 50% of the applicant's employees begin work after 8:30 AM. It was also noted that at least 75% of employees leave before 3:30 PM and/or after 6:30 PM. With no TIAR and no specific trip generation or distribution provided for the development, the traffic impact specifics cannot be accurately predicted.

It should be noted that trip generation done based solely upon the proposed land uses documented in the application add up to 282 additional AM peak hour trips and 486 additional PM peak hour trips (see Table 6). The application estimates these total number of peak hour trips to be lower due to various trip reduction factors that are not explicitly explained. It is noted that due to the existing location of the grocery store, these trips are largely already in place within the surrounding roadway network. This would mean that cumulative trip generation may be limited to the other developments proposed within this complex. However, even without the trips resulting from the grocery store, total AM and PM peak hour trips result in 208 and 226 vehicles, respectively. It should be noted that the trip generation anticipated

by the Kanaka Beverage & Cafe development (to be discussed in a later section) is projected to be significantly lower than the unadjusted trip generation as part of the Island Naturals development.

Table 6: Island Naturals Complex Trip Generation

Phase/Land Use	Area (1000 SF)	ITE Land Use	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Phase 1								
Island Naturals Store	26.0	850 - Supermarket	44	30	74	130	130	260
Office Space	8.9	710 - General Office Building	18	3	21	4	18	22
Total:			**62**	**33**	**95**	**134**	**148**	**282**
Phase 2								
Drive-Through Restaurant	3.0	934 - Fast Food Restaurant with Drive-Through	68	66	134	52	47	99
Total:			**68**	**66**	**134**	**52**	**47**	**99**
Phase 3								
Retail Space	10.3	822 - Strip Retail Plaza (<40k)	18	11	29	40	40	80
Office Space	10.3	710 - General Office Building	21	3	24	4	21	25
Total:			**39**	**14**	**53**	**44**	**61**	**105**
Total of All Phases:			169	113	282	230	256	486

As a part of the buildout of the site, the Island Naturals Complex developer is proposing two full movement access driveways off of Mililani Street as well as Hualani Street. The proposal predicts that splitting left-turn movements between these side-street accesses will help reduce backup. The developer is also proposing two right-in right-out (RIRO) driveways off Kekuanaoa Street, which they state will eliminate or minimize back up of traffic along Kekuanaoa Avenue.

In response to the Island Naturals Complex proposal, the COH Department of Public Works (DPW) recommended they install a left-turn lane in the EB direction at the intersection of Kekuanaoa Street and Mililani Street; however, the applicant believes traffic impacts to the surrounding roadways will be reduced by the limited aforementioned accesses, and the status of this additional left-turn lane is unclear. No other known improvements are planned along the surrounding roadway network as a result of this proposed development.

Without a TIAR detailing more specific trip generation and distribution, future traffic volumes for this development cannot be accurately forecast and distributed as part of this report.

3. Federal-Aid Highways 2035 Transportation Plan for the District of Hawaii

The *Federal-Aid Highways 2035 Transportation Plan* (HDOT, 2014) lists various *Roadway Infrastructure Potential Solutions* on corridors throughout the study area, including:

- *Hawaii Route 11 between Hawaii Route 19/Kalanianaole Avenue and Makalika Street:*
  Proposed improvements include providing an additional two travel lanes with turn lanes at major intersections, bicycle facilities and sidewalks.
- *Hawaii Route 19 at Manono Street:*
  Proposed intersection operational improvements, although it is not specified what these specifically entail.
- *Manono Street between Hawaii Route 19 and Kawili Street*
  Proposed improvements include installing bike lanes.
- *Kekuanaoa Street between Kilauea Avenue and Hawaii Route 11*

Proposed improvements include providing an additional two travel lanes with separate turning lanes at major intersections, as well as bike lanes.

No specific construction dates were listed for these improvements. As such, for consideration of the worst-case scenario that utilizes the existing lane configurations, it was assumed that they will not be constructed in the near future and therefore were not applied to future analysis years.

B. Volumes

1. Background Growth

Various transportation plans and historical traffic volumes were considered when determining the background growth volume for the surrounding region. Covid-19 impacts to traffic volumes were considered as well.

The *Statewide Federal-Aid Highways 2035 Transportation Plan for the State of Hawaii* (CH2M, 2014) forecasts a compounded annual increase in traffic volumes of 1.28% between 2007 and 2035 in the South Hilo planning district (see Table 7).

Table 7: Traffic Forecast - Daily Vehicles Trips in South Hilo

Year	Statewide Federal-Aid Highway 2035 Transportation Plan	
	Population	Daily Vehicle Trips
2007	47,620	157,290
2035	50,540	224,570
Growth Rate	0.21%	1.28%

Historical HDOT traffic volumes along Manono Street varied between 2013-2022, with recorded traffic volumes being higher in 2013 (10,723) than pre-pandemic volumes in 2019 (10,320). Conservatively, a 1.28% growth rate, to align with the transportation plan forecast, was applied to high-volume regional traffic movements (identified with red arrows), as shown in Figure 9. Traffic impacts resulting from regional or other projects not identified in the STIP and ERP are assumed to be included in the 1.28% annual growth rate. Figures 10-12 show the resulting Future Without Project volumes forecast for 2027, 2032, and 2042, respectively.

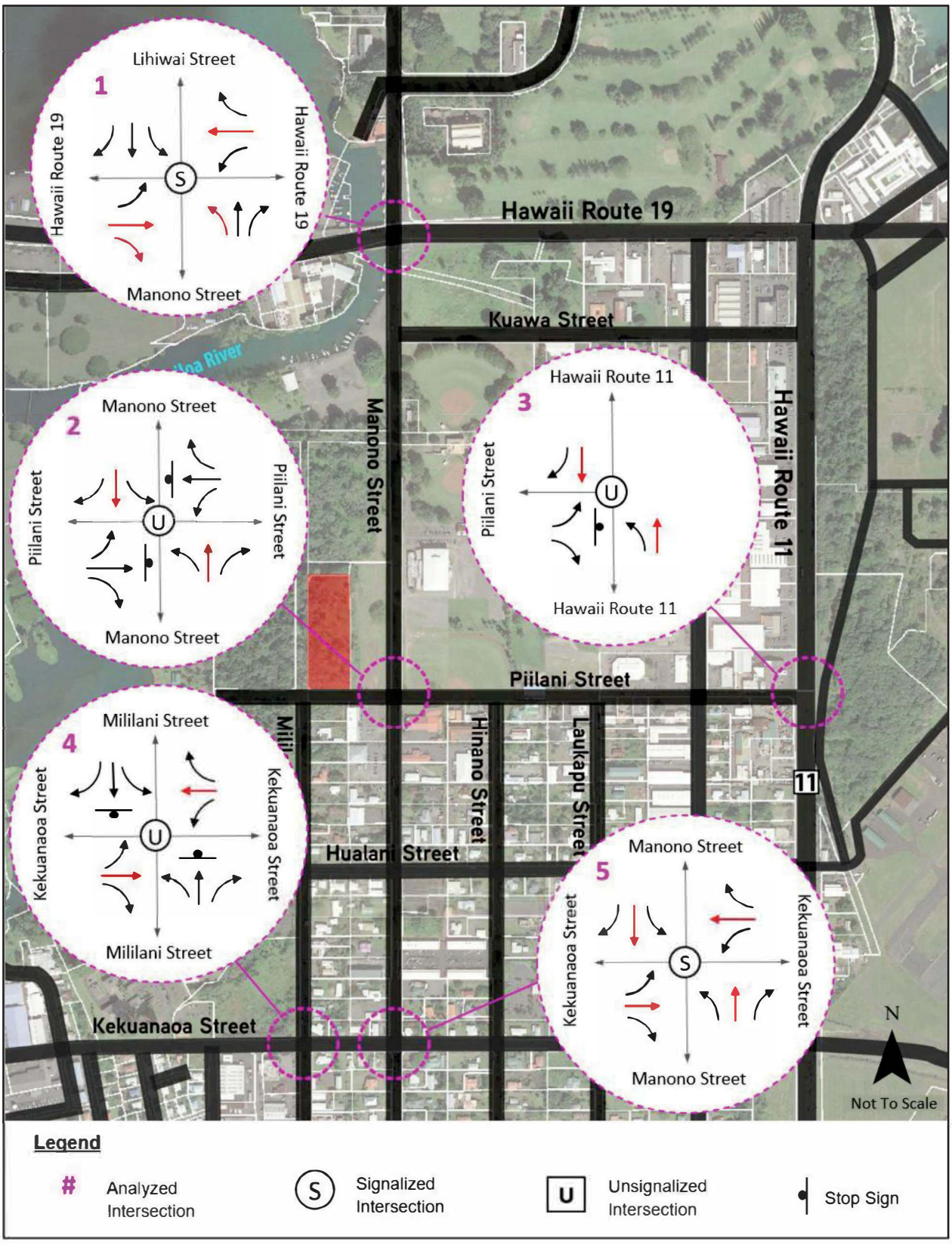


Figure 9: Study Intersection Regional Traffic Volume Movements

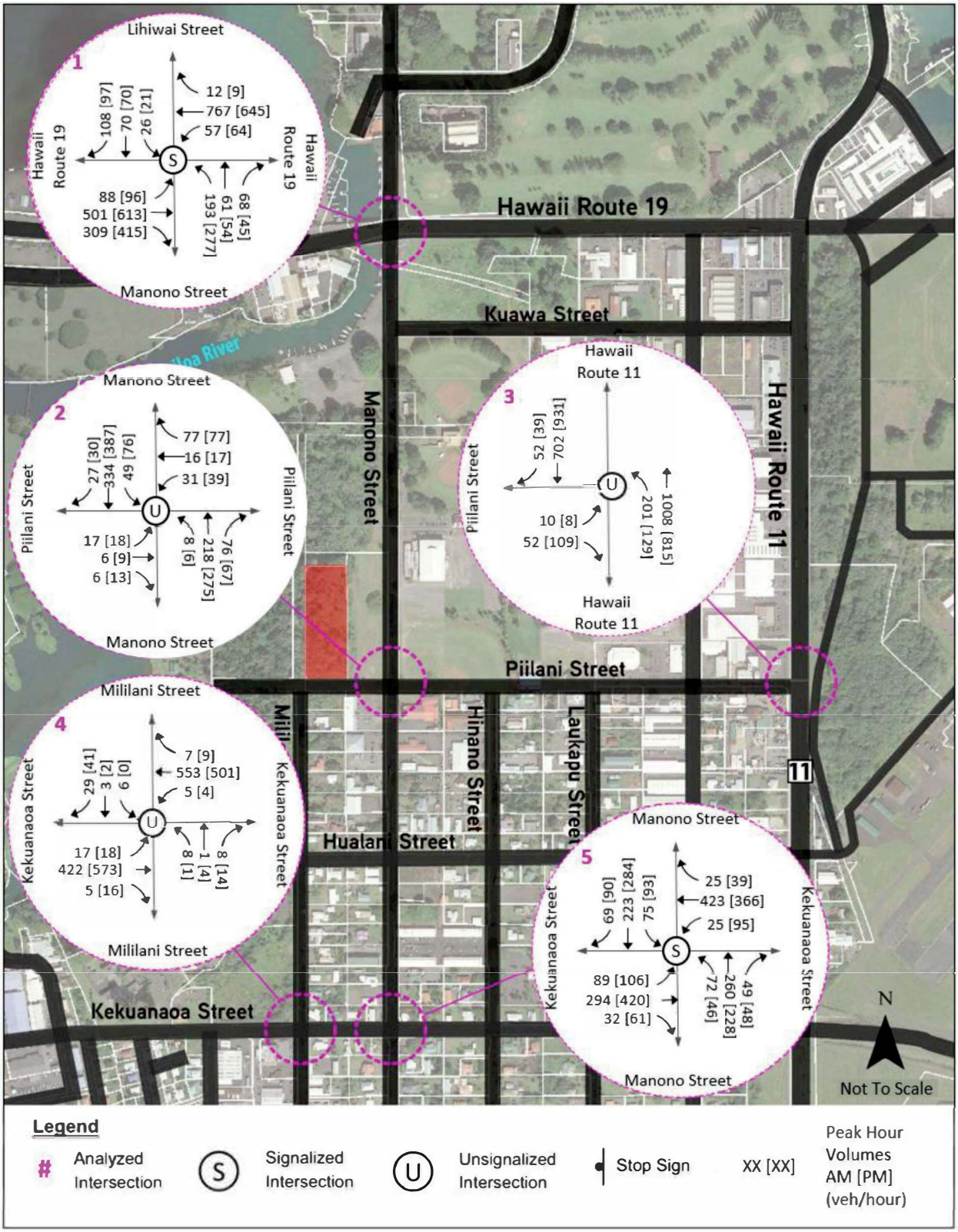


Figure 10: Future (2027) Without Project Peak Hour Volumes

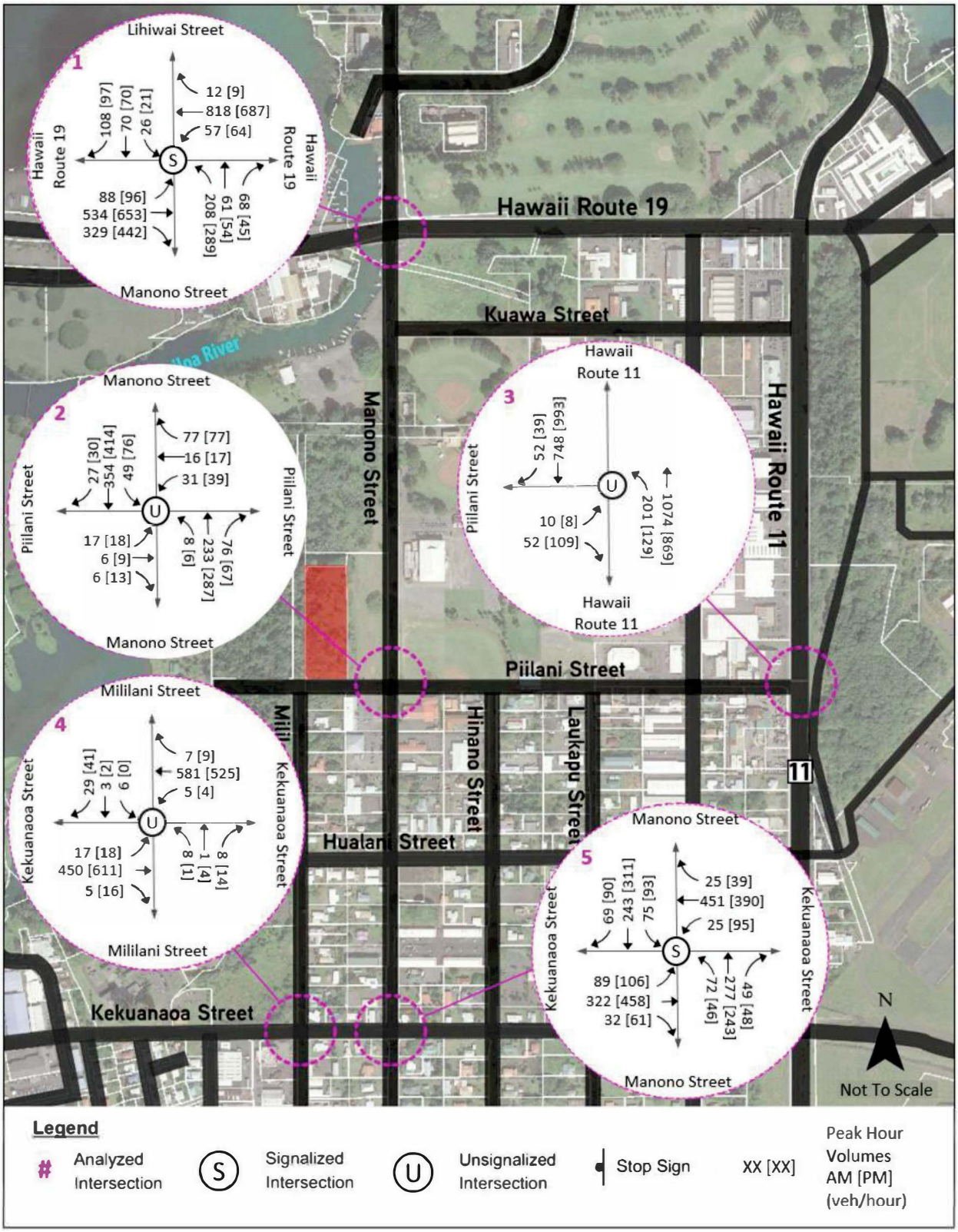


Figure 11: Future (2032) Without Project Peak Hour Volumes

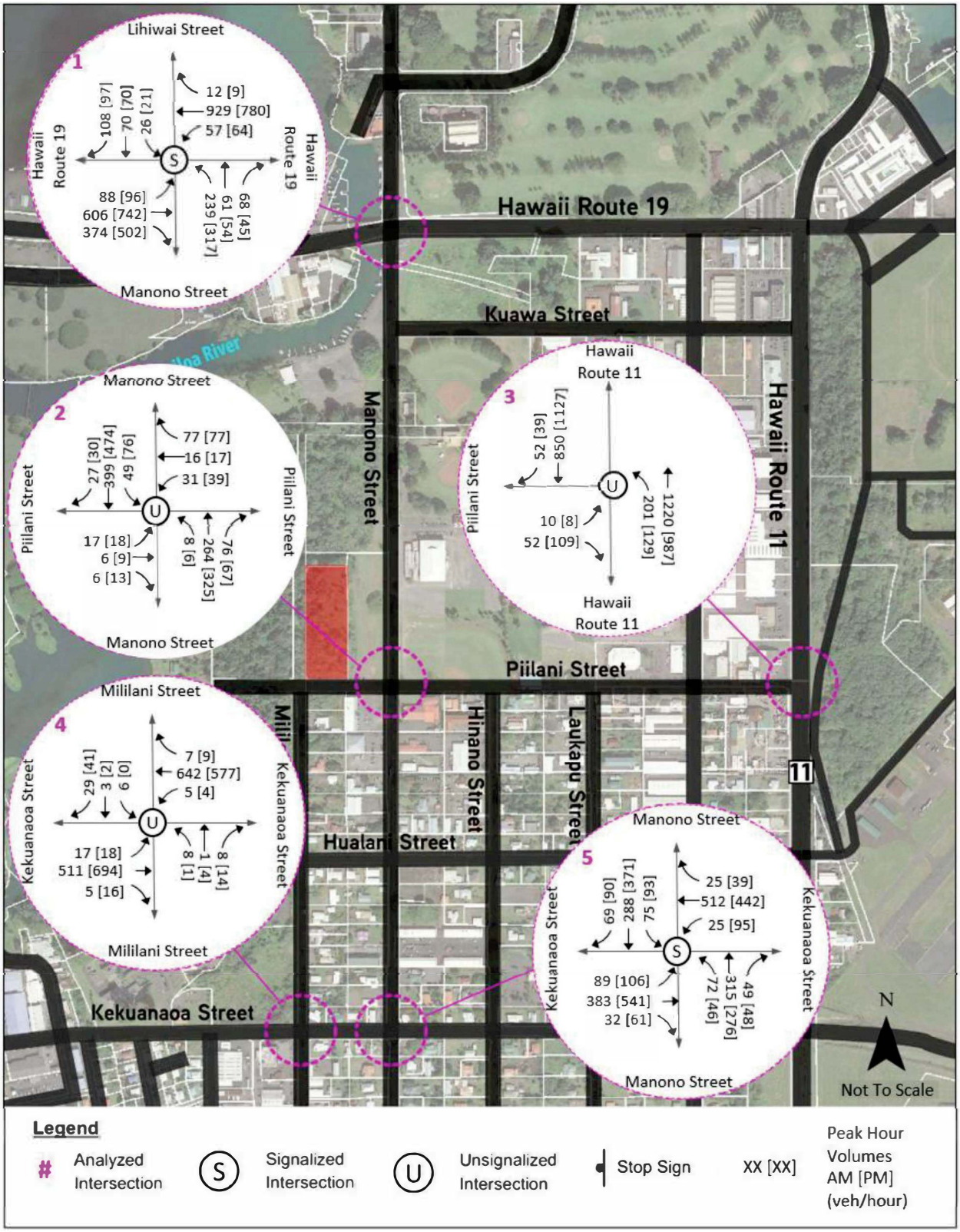


Figure 12: Future (2042) Without Project Peak Hour Volumes

C. Future Without Project LOS

1. Future (2027) Without Project Conditions

Future (2027) Without Project LOS and delay were determined for the AM and PM peak hours using *Synchro 10* traffic analysis software. Table 8 shows the existing vehicular delay and LOS at each intersection, with the shaded rows indicating the overall intersection delay (applicable at signalized intersections only). Movements that operated at LOS E/F or v/c ≥ 1.0 are highlighted in yellow. Synchro reports for the Future (2027) Without Project conditions can be found in Appendix D.

Table 8: Future (2027) Without Project Conditions

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Hawaii Route 19 & Manono Street/Lihiwai Street	20.2	-	C	24.0	-	C
Hawaii Route 19 EB Left	13.2	0.28	B	15.5	0.29	B
Hawaii Route 19 EB Through	15.8	0.38	B	20.2	0.47	C
Hawaii Route 19 EB Right	19.1	0.52	B	29.0	0.72	C
Hawaii Route 19 WB Left	12.1	0.17	B	15.2	0.23	B
Hawaii Route 19 WB Through	18.7	0.56	B	21.1	0.51	C
Hawaii Route 19 WB Right	13.2	0.02	B	16.0	0.02	B
Manono Street NB Left	26.6	0.62	C	27.8	0.73	C
Manono Street NB Through-Right	25.4	0.36	C	22.2	0.22	C
Lihiwai Street SB Left	26.8	0.08	C	27.9	0.08	C
Lihiwai Street SB Through-Right	36.0	0.74	D	37.8	0.77	D
Hawaii Route 11 & Piilani Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Hawaii Route 11 NB Left	20.8	0.52	C	21.7	0.40	C
Hawaii Route 11 NB Through	-	-	-	-	-	-
Hawaii Route 11 SB Through-Right	-	-	-	-	-	-
Piilani Street EB Left-Right	21.7	0.25	C	22.6	0.42	C
Manono Street & Piilani Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Manono Street NB Left-Through-Right	8.1	0.01	A	8.2	0.01	A
Manono Street SB Left-Through-Right	8.1	0.05	A	8.2	0.07	A
Piilani Street EB Left-Through-Right	22.8	0.16	C	24.0	0.22	C
Piilani Street WB Left-Through-Right	18.1	0.37	C	22.3	0.43	C
Manono Street & Kekuanaoa Street	31.1	-	C	31.3	-	C
Manono Street NB Left	21.3	0.25	C	19.8	0.15	B
Manono Street NB Through-Right	31.8	0.65	C	26.9	0.50	C
Manono Street SB Left	22.1	0.28	C	20.1	0.25	C
Manono Street SB Through-Right	29.6	0.58	C	30.8	0.65	C
Kekuanaoa Street EB Left	25.1	0.39	C	23.1	0.36	C
Kekuanaoa Street EB Through-Right	28.0	0.58	C	40.1	0.83	D
Kekuanaoa Street WB Left	18.1	0.08	B	25.8	0.40	C
Kekuanaoa Street WB Through-Right	38.7	0.83	D	31.9	0.68	C
Mililani Street & Kekuanaoa Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Mililani Street NB Left-Through-Right	24.0	0.15	C	16.9	0.08	C
Mililani Street SB Left-Through-Right	18.3	0.16	C	13.1	0.12	B
Kekuanaoa Street EB Left-Through-Right	8.9	0.02	A	8.5	0.02	A
Kekuanaoa Street WB Left-Through-Right	8.3	0.01	A	8.7	0.00	A

(1) Hawaii Route 19 & Manono Street/Lihiwai Street

The intersection and all movements at the signalized intersection of Hawaii Route 19 and Manono Street/Lihiwai Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

(2) Hawaii Route 11 & Piilani Street

All movements at the unsignalized intersection of Hawaii Route 11 and Piilani Street resulted in appropriate LOS C or better and v/c < 1.0 during the AM and PM peak hours.

(3) Manono Street & Piilani Street

All movements at the unsignalized intersection of Manono Street and Piilani Street resulted in appropriate LOS C or better and v/c < 1.0 during the AM and PM peak hours.

(4) Manono Street & Kekuanaoa Street

The intersection and all movements at the signalized intersection of Manono Street and Kekuanaoa Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

(5) Mililani Street & Kekuanaoa Street

All movements at the unsignalized intersection of Mililani Street and Kekuanaoa Street resulted in appropriate LOS C or better and v/c < 1.0 during the AM and PM peak hours.

2. Future (2027) Without Project Mitigation

No further mitigation is needed at any intersection for the Future (2027) Without Project conditions.

3. Future (2032) Without Project Conditions

Future (2032) Without Project LOS and delay were determined for the AM and PM peak hours using *Synchro 10* traffic analysis software. Table 9 shows the existing vehicular delay and LOS at each intersection, with the shaded rows indicating the overall intersection delay (applicable at signalized intersections only). Movements that operated at LOS E/F or v/c ≥ 1.0 are highlighted in yellow. Synchro reports for the Future (2032) Without Project conditions can be found in Appendix D.

(1) Hawaii Route 19 & Manono Street/Lihiwai Street

The intersection and all movements at the signalized intersection of Hawaii Route 19 and Manono Street/Lihiwai Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

(2) Hawaii Route 11 & Piilani Street

All movements at the unsignalized intersection of Hawaii Route 11 and Piilani Street resulted in appropriate LOS C or better and v/c < 1.0 during the AM and PM peak hours.

(3) Manono Street & Piilani Street

All movements at the unsignalized intersection of Manono Street and Piilani Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

(4) Manono Street & Kekuanaoa Street

The intersection and all movements at the signalized intersection of Manono Street and Kekuanaoa Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

(5) Mililani Street & Kekuanaoa Street

All movements at the unsignalized intersection of Mililani Street and Kekuanaoa Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

Table 9: Future (2032) Without Project Conditions

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Hawaii Route 19 & Manono Street/Lihiwai Street	20.6	-	C	25.2	-	C
Hawaii Route 19 EB Left	13.6	0.30	B	16.2	0.30	B
Hawaii Route 19 EB Through	16.1	0.40	B	21.1	0.51	C
Hawaii Route 19 EB Right	19.9	0.55	B	32.4	0.78	C
Hawaii Route 19 WB Left	12.2	0.18	B	15.9	0.24	B
Hawaii Route 19 WB Through	19.3	0.60	B	22.1	0.55	C
Hawaii Route 19 WB Right	13.2	0.02	B	16.4	0.02	B
Manono Street NB Left	28.3	0.67	C	27.6	0.74	C
Manono Street NB Through-Right	25.4	0.36	C	21.9	0.22	C
Lihiwai Street SB Left	26.8	0.08	C	28.3	0.08	C
Lihiwai Street SB Through-Right	36.0	0.74	D	38.3	0.77	D
Hawaii Route 11 & Piilani Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Hawaii Route 11 NB Left	22.6	0.55	C	24.0	0.43	C
Hawaii Route 11 NB Through	-	-	-	-	-	-
Hawaii Route 11 SB Through-Right	-	-	-	-	-	-
Piilani Street EB Left-Right	23.8	0.27	C	24.9	0.45	C
Manono Street & Piilani Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Manono Street NB Left-Through-Right	8.2	0.01	A	8.3	0.01	A
Manono Street SB Left-Through-Right	8.2	0.05	A	8.2	0.07	A
Piilani Street EB Left-Through-Right	24.3	0.18	C	25.6	0.23	D
Piilani Street WB Left-Through-Right	19.1	0.38	C	24.0	0.46	C
Manono Street & Kekuanaoa Street	33.2	-	C	33.0	-	C
Manono Street NB Left	21.7	0.27	C	21.1	0.17	C
Manono Street NB Through-Right	33.1	0.69	C	28.6	0.54	C
Manono Street SB Left	22.6	0.29	C	21.2	0.26	C
Manono Street SB Through-Right	30.7	0.62	C	34.2	0.72	C
Kekuanaoa Street EB Left	26.9	0.43	C	22.8	0.36	C
Kekuanaoa Street EB Through-Right	29.3	0.63	C	42.2	0.86	D
Kekuanaoa Street WB Left	18.5	0.09	B	26.5	0.42	C
Kekuanaoa Street WB Through-Right	43.1	0.87	D	31.7	0.70	C
Mililani Street & Kekuanaoa Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Mililani Street NB Left-Through-Right	26.0	0.16	D	17.9	0.09	C
Mililani Street SB Left-Through-Right	19.4	0.17	C	13.5	0.12	B
Kekuanaoa Street EB Left-Through-Right	9.0	0.02	A	8.6	0.02	A
Kekuanaoa Street WB Left-Through-Right	8.4	0.01	A	8.8	0.00	A

4. Future (2032) Without Project Mitigation

No further mitigation is needed at any intersection for the Future (2032) Without Project Conditions.

5. Future (2042) Without Project Conditions

Future (2042) Without Project LOS and delay were determined for the AM and PM peak hours using *Synchro 10* traffic analysis software. Table 10 shows the existing vehicular delay and LOS at each intersection, with the shaded rows indicating the overall intersection delay (applicable at signalized intersections only). Movements that operated at LOS E/F or v/c ≥ 1.0 are highlighted in yellow. Synchro reports for the Future (2042) Without Project conditions can be found in Appendix D.

Table 10: Future (2042) Without Project Conditions

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Hawaii Route 19 & Manono Street/Lihiwai Street	23.3	-	C	28.7	-	C
Hawaii Route 19 EB Left	16.2	0.36	B	17.7	0.35	B
Hawaii Route 19 EB Through	18.6	0.47	B	23.2	0.58	C
Hawaii Route 19 EB Right	24.3	0.65	C	43.5	0.89	D
Hawaii Route 19 WB Left	13.9	0.20	B	17.2	0.28	B
Hawaii Route 19 WB Through	23.2	0.71	C	24.5	0.63	C
Hawaii Route 19 WB Right	14.6	0.02	B	17.2	0.02	B
Manono Street NB Left	27.7	0.68	C	29.6	0.78	C
Manono Street NB Through-Right	24.4	0.32	C	21.9	0.21	C
Lihiwai Street SB Left	28.1	0.09	C	29.5	0.08	C
Lihiwai Street SB Through-Right	37.8	0.75	D	40.1	0.78	D
Hawaii Route 11 & Piilani Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Hawaii Route 11 NB Left	28.3	0.63	D	30.8	0.51	D
Hawaii Route 11 NB Through	-	-	-	-	-	-
Hawaii Route 11 SB Through-Right	-	-	-	-	-	-
Piilani Street EB Left-Right	30.7	0.34	D	32.7	0.54	D
Manono Street & Piilani Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Manono Street NB Left-Through-Right	8.4	0.01	A	8.5	0.01	A
Manono Street SB Left-Through-Right	8.3	0.05	A	8.4	0.07	A
Piilani Street EB Left-Through-Right	28.1	0.20	D	30.9	0.27	D
Piilani Street WB Left-Through-Right	21.9	0.43	C	29.7	0.53	D
Manono Street & Kekuanaoa Street	39.3	-	D	40.4	-	D
Manono Street NB Left	23.9	0.31	C	23.4	0.21	C
Manono Street NB Through-Right	39.1	0.79	D	31.5	0.62	C
Manono Street SB Left	25.1	0.34	C	22.7	0.30	C
Manono Street SB Through-Right	35.7	0.73	D	43.6	0.85	D
Kekuanaoa Street EB Left	30.7	0.50	C	23.6	0.39	C
Kekuanaoa Street EB Through-Right	31.3	0.71	C	56.7	0.97	E
Kekuanaoa Street WB Left	18.7	0.10	B	31.6	0.52	C
Kekuanaoa Street WB Through-Right	53.9	0.96	D	33.6	0.76	C
Mililani Street & Kekuanaoa Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Mililani Street NB Left-Through-Right	32.2	0.20	D	20.4	0.11	C
Mililani Street SB Left-Through-Right	22.5	0.20	C	14.5	0.14	B
Kekuanaoa Street EB Left-Through-Right	9.3	0.02	A	8.7	0.02	A
Kekuanaoa Street WB Left-Through-Right	8.6	0.01	A	9.1	0.01	A

(1) Hawaii Route 19 & Manono Street/Lihiwai Street

The intersection and all movements at the signalized intersection of Hawaii Route 19 and Manono Street/Lihiwai Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

(2) Hawaii Route 11 & Piilani Street

All movements at the unsignalized intersection of Hawaii Route 11 and Piilani Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

(3) Manono Street & Piilani Street

All movements at the unsignalized intersection of Manono Street and Piilani Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

(4) Manono Street & Kekuanaoa Street

At the signalized intersection of Manono Street and Kekuanaoa Street, the EB through-right lane resulted in poor LOS E during the PM peak hour (v/c ratio of 0.97). With increased traffic volumes along both Manono Street and Kekuanaoa Street, due to forecasted background growth, LOS deteriorates over time compared to the Existing (2022) conditions. All other movements at the signalized intersection of Manono Street and Kekuanaoa Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

(5) Mililani Street & Kekuanaoa Street

All movements at the unsignalized intersection of Mililani Street and Kekuanaoa Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

6. Future (2042) Without Project Mitigation

Potential mitigation was considered at Manono Street and Kekuanaoa Street for the Future (2042) Without Project Conditions.

(1) Manono Street & Kekuanaoa Street

Under the existing traffic signal configuration, the Kekuanaoa Street EB through-right lane is projected to operate at LOS E during the PM peak hour (v/c ratio of 0.97). Delay for this lane will increase compared to the Existing (2022) conditions due to continual background growth along both Manono Street and Kekuanaoa Street.

Currently, each approach has a dedicated left-turn lane and a shared through-right lane, with each Kekuanaoa Street leg being 45-feet wide. With excess roadway width present at the intersection, dedicated right turn lanes can be marked along Kekuanaoa Street in both the EB and WB directions, allowing the existing through-right lanes to be converted to through-only lanes. By separating turning movements, intersection capacity will increase, improving the overall LOS, which can be seen in Table 11. Synchro reports for the Future (2042) Without Project Mitigation can be found in Appendix E.

Table 11: Future (2042) Without Project Mitigation LOS Comparison at Manono Street and Kekuanaoa Street

Traffic Signal (Existing Lane Configuration)	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Manono Street & Kekuanaoa Street	39.3	-	D	40.4	-	D
Manono Street NB Left	23.9	0.31	C	23.4	0.21	C
Manono Street NB Through-Right	39.1	0.79	D	31.5	0.62	C
Manono Street SB Left	25.1	0.34	C	22.7	0.30	C
Manono Street SB Through-Right	35.7	0.73	D	43.6	0.85	D
Kekuanaoa Street EB Left	30.7	0.50	C	23.6	0.39	C
Kekuanaoa Street EB Through-Right	31.3	0.71	C	56.7	0.97	E
Kekuanaoa Street WB Left	18.7	0.10	B	31.6	0.52	C
Kekuanaoa Street WB Through-Right	53.9	0.96	D	33.6	0.76	C
Traffic Signal (Additional Right-Turn Lanes along Kekuanaoa Street)	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Manono Street & Kekuanaoa Street	35.8	-	D	34.1	-	C
Manono Street NB Left	23.9	0.31	C	23.4	0.21	C
Manono Street NB Through-Right	39.1	0.79	D	31.5	0.62	C
Manono Street SB Left	25.1	0.34	C	22.7	0.30	C
Manono Street SB Through-Right	35.7	0.73	D	43.6	0.85	D
Kekuanaoa Street EB Left	27.9	0.45	C	22.1	0.36	C
Kekuanaoa Street EB Through	29.0	0.64	C	40.0	0.85	D
Kekuanaoa Street EB Right	19.3	0.06	B	19.9	0.11	B
Kekuanaoa Street WB Left	18.1	0.09	B	25.9	0.42	C
Kekuanaoa Street WB Through	45.5	0.90	D	30.4	0.69	C
Kekuanaoa Street WB Right	19.2	0.05	B	19.4	0.07	B

Therefore, as part of mitigation for the Future (2042) Without Project conditions, it is recommended to consider reconfiguring the EB and WB approaches along Kekuanaoa Street to have dedicated right turn lanes, allowing the existing through-right lanes to be converted to through-only lanes.

IV. FUTURE WITH PROJECT CONDITIONS

The proposed development construction is anticipated to begin by early 2026, with completion expected by early 2027. Therefore, it is assumed that all project-related trips will be in place for all three Future With Project scenarios (2027, 2032, and 2042).

D. Future With Project Generated Volumes

1. Project Related Volumes

The expected traffic from the proposed project was determined using the following four-step methodology: trip generation, trip distribution, modal choice, and route assignment.

(1) Trip Generation

Trip generation was calculated using rates from *Trip Generation, 11th Edition* (ITE, September 2021) which is standard traffic engineering practice. The following land uses were considered for use with the proposed project:

- . Manufacturing (ITE Land Use Code 140) facilities are defined as areas where raw materials or parts are converted into finished products. Sizes and types of activity vary between facilities. This land use accounts for the manufacturing facility itself, as well as associated offices, warehouses, and research areas.
- . Fast-Food Restaurant with Drive-Through Window (ITE Land Use Code 934) are defined as restaurants with a large drive-through and carry-out clientele, with high turnover rates for any eat-in customers.

The resulting trip generation rates for the proposed development are provided in Table 12.

Table 12: Land Use Development Trip Generation Rates

Land Use Code	ITE Code	Independent Variable	AM Peak Hour			PM Peak Hour		
			Equation	In %	Out %	Equation	In %	Out %
Manufacturing	140	1000 Sq. Ft. GFA	T = 0.61 (X) + 9.54	76	24	T = 0.87 (X) - 17.50	31	69
Fast-Food Restaurant with Drive-Through Window	934	1000 Sq. Ft. GFA	T = 44.61 (X)	51	49	T = 33.03 (X)	52	48

Trip Generation, 11th Edition (ITE, September 2021) also provides average pass-by rates to be used for retail or commercial developments. Pass-by trips are characterized as trips that are made by traffic currently passing the site on an adjacent street or roadway. Pass-by rates for a Fast-Food Restaurant With Drive-Through are assumed to be applicable during the PM peak hour only (see Table 13).

Table 13: Pass-By-Rate (Trip Reduction) at Fast-Food Restaurant

Land Use Code	ITE Code	Average Pass-By-Rate (Trip Reduction)	
		AM Peak Hour	PM Peak Hour
Fast-Food Restaurant with Drive-Through Window	934	-	55.0%

The resulting estimated trips expected from the development were calculated and are shown in Table 14.

Table 14: Project Related Development Phasing and Trips Generated

Phase (Analysis Year)	Agency or Building Description	Land Use Code	Units	Independent Variable	AM Peak Hour			PM Peak Hour		
					In	Out	Total	In	Out	Total
2024	Manufacturing	140	30	1000 Sq. Ft. GFA	21	7	28	3	6	9
2024	Fast-Food Restaurant with Drive-Through Window	934	1.8	1000 Sq. Ft. GFA	*41*	*39*	*80*	*30*	*29*	*59*
Trip Reduction (Fast-Food Restaurant with Drive-Through Window)					-	-	-	-16	-16	-32
Totals					***62***	***46***	***108***	***17***	***19***	***36***

(2) Trip Distribution/Assignment

Project related trips were distributed/assigned along the four primary roadways in the surrounding area (Hawaii Route 19, Hawaii Route 11, Kekuanaoa Street, and Manono Street) based on their two-directional ADTs. These ADTs were based on information sourced from the 2018 Highway Performance Monitoring System Roads for Hawaii GIS Database (see Table 15). 2018 data was used to reflect pre-Covid traffic patterns as 2019 data was not available. It was assumed that project related trips would utilize these four local roadways in a manner similar with the 2018 traffic distributions. HPMS 2018 volumes can be seen in Appendix A.

Table 15: HPMS 2018 Roadway Volumes

HPMS 2018 GIS		
Hawaii Route 19 (at Manono)	16,800	**25%**
Hawaii Route 11 (at Piilani)	24,900	**38%**
Kekuanaoa Street (at Mililani and Kekuanaoa)	13,700	**21%**
Manono Street (at Kekuanaoa)	10,300	**16%**
Total	65,700	**100%**
*Source: 2018 Highway Performance Monitoring System Roads for Hawaii GIS Database		

Based on the ADT assessment:

- 25% of project related trips were distributed/assigned along Hawaii Route 19 via Manono Street. At the intersection of Hawaii Route 19 and Manono Street/Lihiwai Street, trips were distrusted based on the 2022 intersection turning movement volumes. It was assumed that an insignificant percent of traffic would from the north leg of the intersection (Lihiwai Street) due to the minimal development north of the intersection. Therefore, no traffic was distributed/assigned along this leg of the intersection.
- 38% of project related trips were distributed/assigned along Hawaii Route 11 via Piilani Street. At the intersection of Hawaii Route 11 and Piilani Street, trips were distributed based on the 2022 intersection turning movement volumes.
- 21% of project related trips were distrusted/assigned along Kekuanaoa Street via both Manono Street and Mililani Street. It was assumed that no project related trips would be coming from/going towards Airport Road and Hilo Airport. Additionally, all project related trips travelling on Hawaii Route 11 were assumed be distributed/assigned to the site via Piilani Street. Therefore, all project related trips along Kekuanaoa Street were assumed to be coming from/heading towards the west. Of the 21% of project related trips along Kekuanaoa Street, half were assumed to travel along Mililani Street, while the remaining half were assumed to travel along Manono Street. This assumption was made as Kekuanaoa

Street and Manono Street is a signalized intersection, while Kekuanaoa Street and Mililani Street is an unsignalized intersection. Vehicles are estimated to use both corridors dependent on observed traffic at the signalized intersection.

- 16% of project related trips were distrusted/assigned along the southern portion of Manono Street, which later continues as Kawili Street. This roadway may likely be used by students at the University of Hawaii at Hilo, located on Kawili Street, as well as by some residents in the single-family homes located south of Puainako Street.

Figure 13 shows the forecasted project related trips at the study intersections during the AM and PM peak hours which are expected to align with the calculated trips and proposed uses of the development.

(3) Modal Choice

To assume the worst-case conditions for traffic, all project related external trips were assumed to be by private vehicle only, as opposed to considering some trips be taken by foot, bike, or bus. This aligns with the limited multimodal infrastructure and limited transit use in the area.

E. Future With Project Volumes

Future With Project conditions were calculated through the following methods:

- Future (2027) With Project (see Figure 14) is a sum of Future (2027) Without Project (see Figure 10) and the additional site generated trips expected to be produced by the development (see Figure 13).
- Future (2032) With Project (See Figure 15) is a sum of Future (2032) Without Project (see Figure 11) and the additional site generated trips expected to be produced by the development (see Figure 13).
- Future (2042) With Project (See Figure 16) is a sum of Future (2042) Without Project (see Figure 12) and the additional site generated trips expected to be produced by the development (see Figure 13).

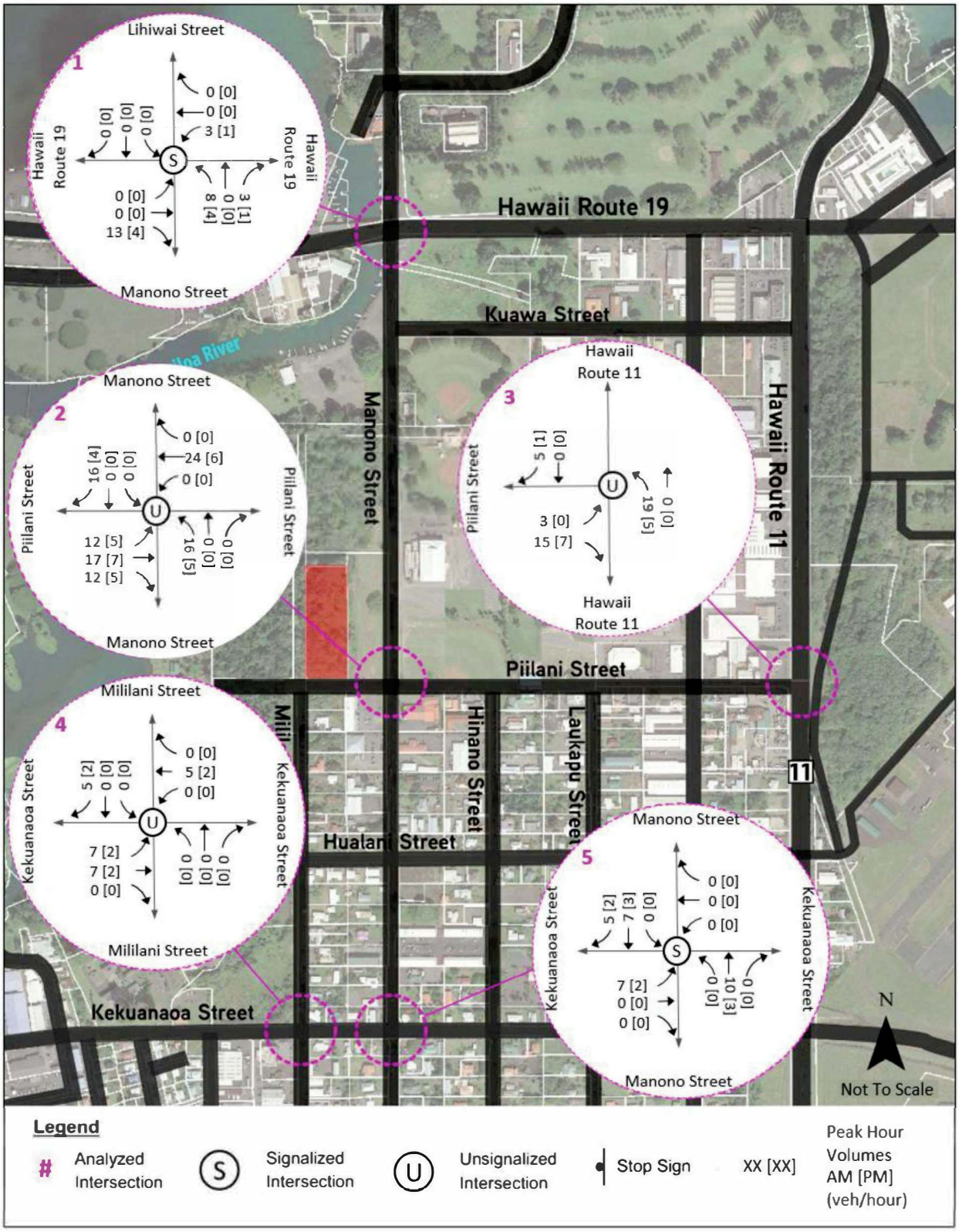


Figure 13: Kanaka Beverage & Cafe Project Related Trips

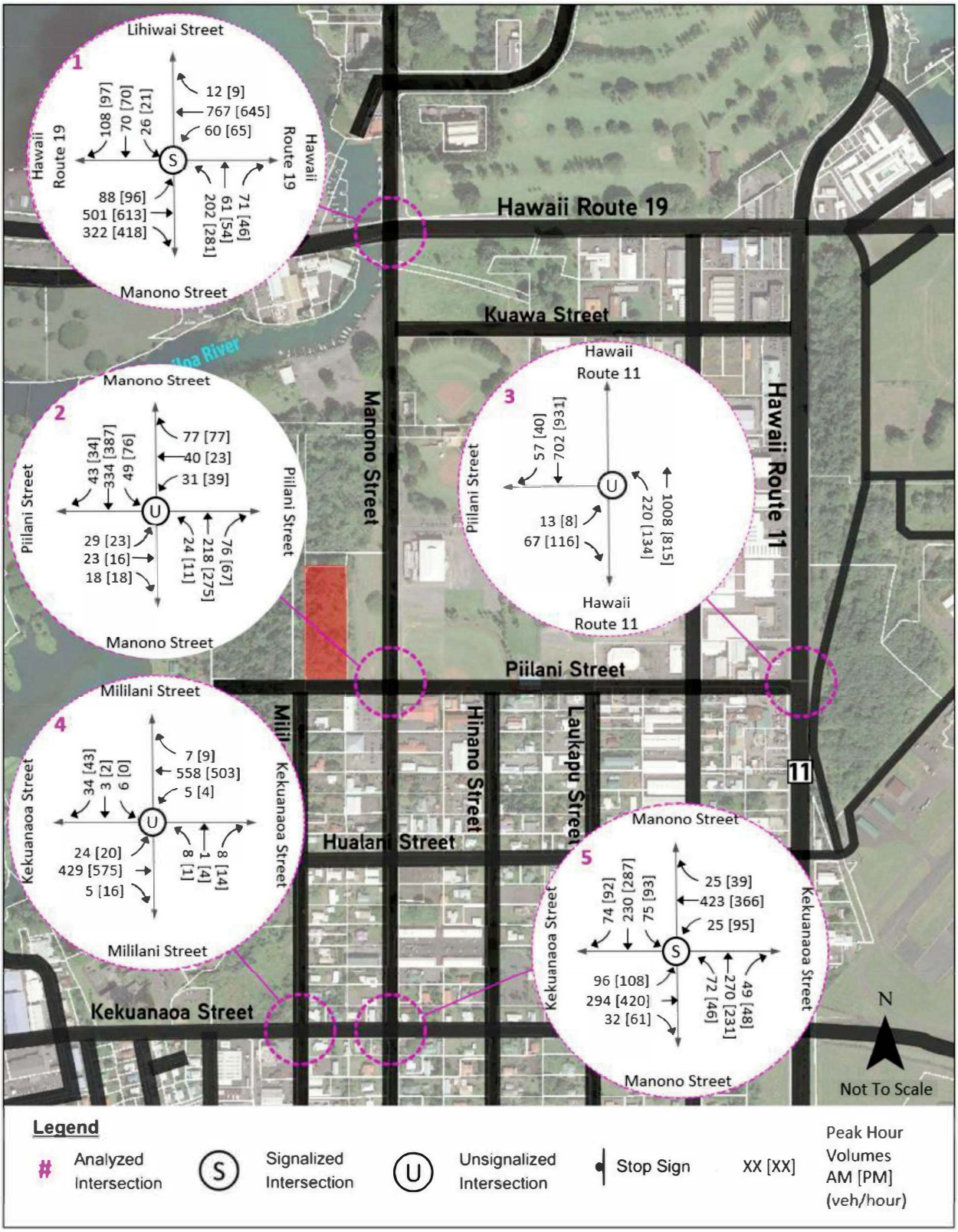


Figure 14: Future (2027) With Project Peak Hour Volumes

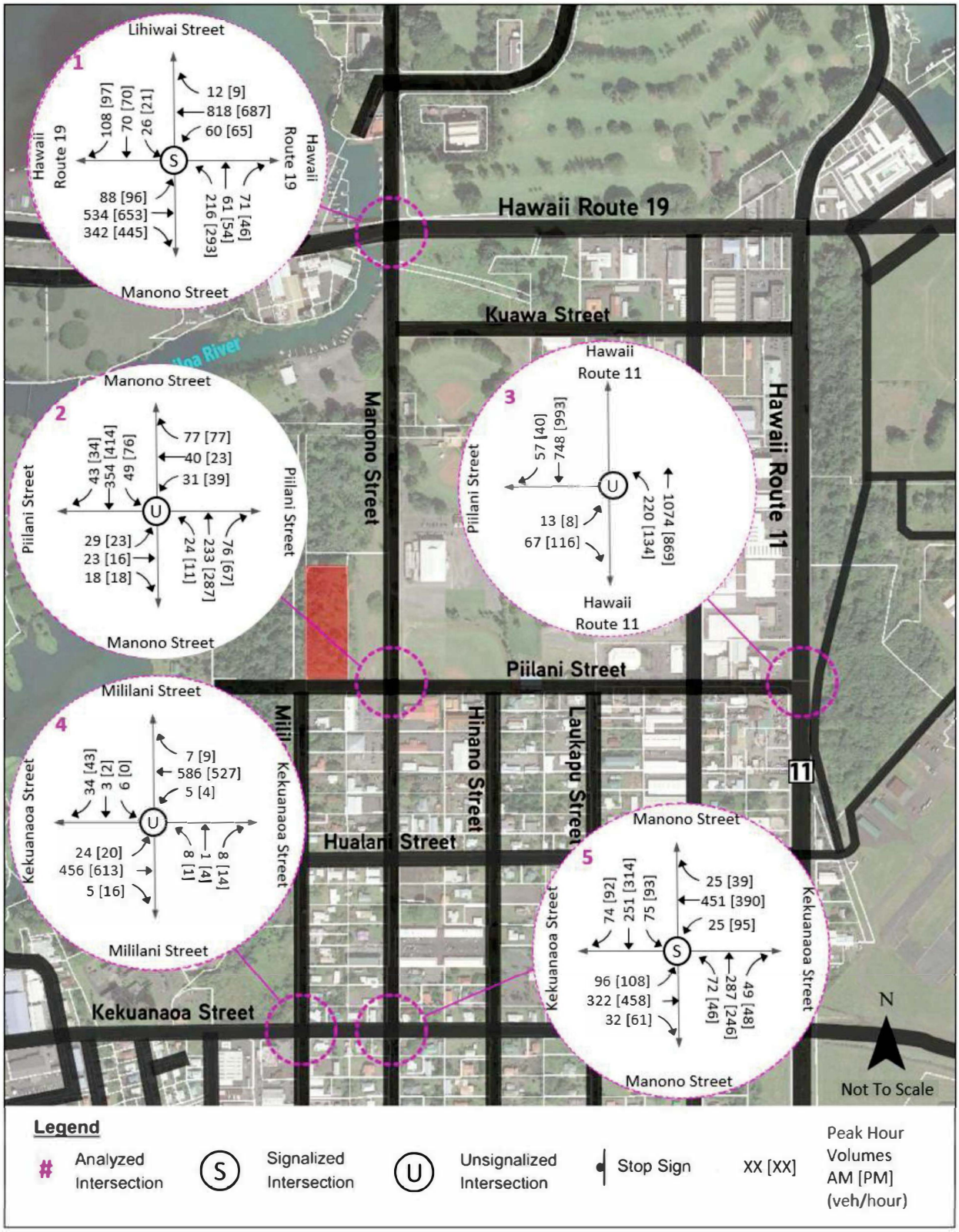


Figure 15: Future (2032) With Project Peak Hour Volumes

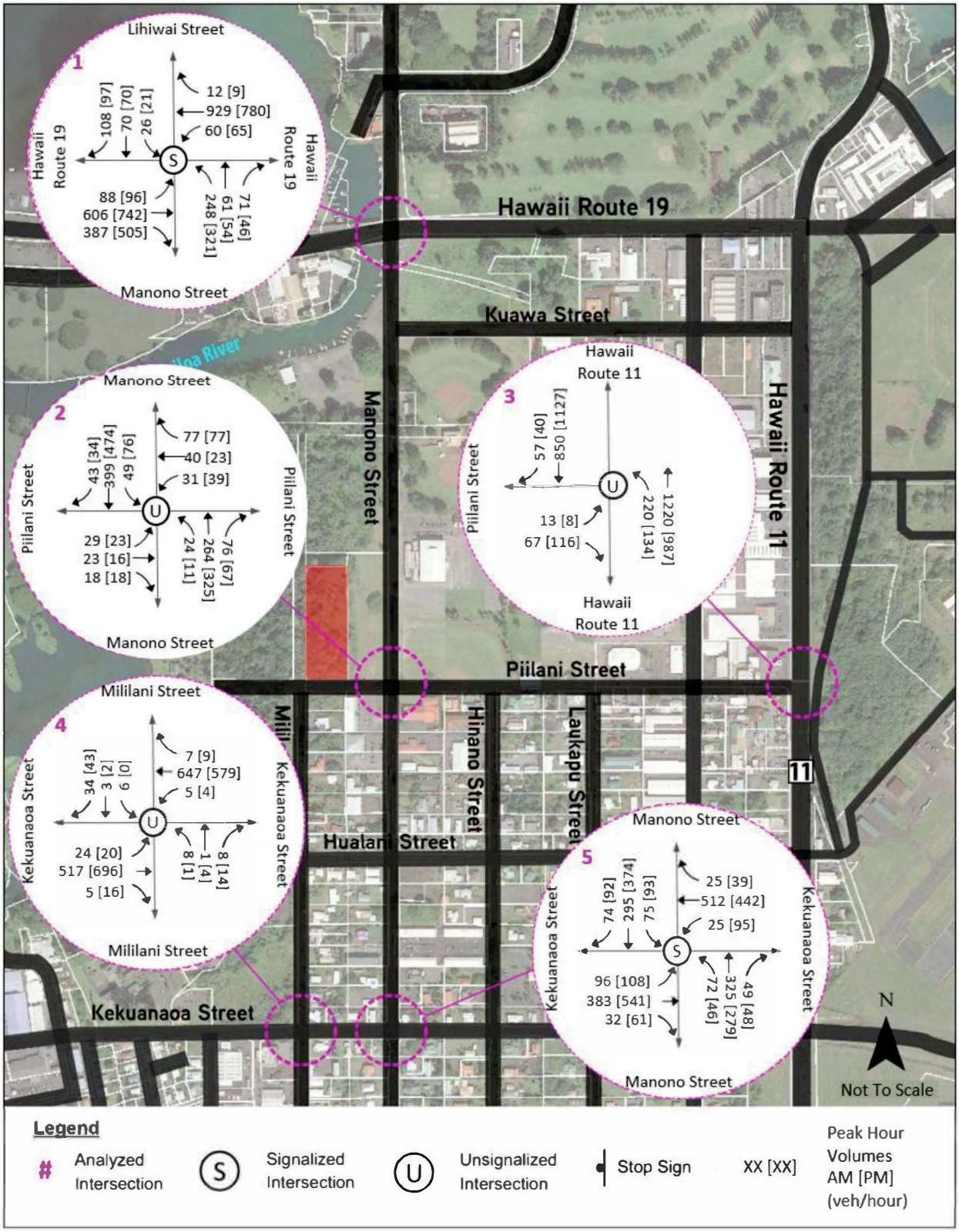


Figure 16: Future (2042) With Project Peak Hour Volumes

1. Future (2027) With Project Conditions

Future (2027) With Project LOS and delay were determined for the AM and PM peak hours using *Synchro 10* traffic analysis software. Table 16 shows the existing vehicular delay and LOS at each intersection, with the shaded rows indicating the overall intersection delay (applicable at signalized intersections only). Movements that operated at LOS E/F or v/c ≥ 1.0 are highlighted in yellow. Synchro reports for the Future (2027) With Project conditions can be found in Appendix F.

Table 16: Future (2027) With Project Conditions

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Hawaii Route 19 & Manono Street/Lihiwai Street	20.4	-	C	24.3	-	C
Hawaii Route 19 EB Left	13.2	0.28	B	15.7	0.29	B
Hawaii Route 19 EB Through	15.9	0.38	B	20.5	0.47	C
Hawaii Route 19 EB Right	19.7	0.54	B	29.8	0.74	C
Hawaii Route 19 WB Left	12.1	0.18	B	15.5	0.23	B
Hawaii Route 19 WB Through	18.7	0.56	B	21.4	0.51	C
Hawaii Route 19 WB Right	13.2	0.02	B	16.2	0.02	B
Manono Street NB Left	27.6	0.65	C	27.1	0.73	C
Manono Street NB Through-Right	25.5	0.37	C	22.1	0.22	C
Lihiwai Street SB Left	26.8	0.08	C	28.1	0.08	C
Lihiwai Street SB Through-Right	36.0	0.74	D	38.1	0.77	D
Hawaii Route 11 & Piilani Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Hawaii Route 11 NB Left	22.6	0.57	C	22.2	0.41	C
Hawaii Route 11 NB Through	-	-	-	-	-	-
Hawaii Route 11 SB Through-Right	-	-	-	-	-	-
Piilani Street EB Left-Right	25.3	0.34	D	23.4	0.44	C
Manono Street & Piilani Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Manono Street NB Left-Through-Right	8.3	0.03	A	8.3	0.01	A
Manono Street SB Left-Through-Right	8.1	0.05	A	8.2	0.07	A
Piilani Street EB Left-Through-Right	32.6	0.42	D	27.6	0.32	D
Piilani Street WB Left-Through-Right	26.5	0.53	D	25.5	0.49	D
Manono Street & Kekuanaoa Street	32.0	-	C	31.4	-	C
Manono Street NB Left	20.7	0.25	C	19.9	0.15	B
Manono Street NB Through-Right	30.9	0.65	C	27.0	0.50	C
Manono Street SB Left	21.5	0.27	C	20.1	0.25	C
Manono Street SB Through-Right	29.0	0.58	C	31.1	0.66	C
Kekuanaoa Street EB Left	27.5	0.44	C	23.2	0.37	C
Kekuanaoa Street EB Through-Right	29.3	0.60	C	40.1	0.83	D
Kekuanaoa Street WB Left	18.8	0.08	B	25.8	0.40	C
Kekuanaoa Street WB Through-Right	42.0	0.85	D	31.9	0.68	C
Mililani Street & Kekuanaoa Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Mililani Street NB Left-Through-Right	25.4	0.15	D	17.0	0.09	C
Mililani Street SB Left-Through-Right	18.5	0.18	C	13.2	0.13	B
Kekuanaoa Street EB Left-Through-Right	9.0	0.03	A	8.5	0.02	A
Kekuanaoa Street WB Left-Through-Right	8.4	0.01	A	8.7	0.00	A

(1) Hawaii Route 19 & Manono Street/Lihiwai Street

The intersection and all movements at the signalized intersection of Hawaii Route 19 and Manono Street/Lihiwai Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

(2) Hawaii Route 11 & Piilani Street

All movements at the unsignalized intersection of Hawaii Route 11 and Piilani Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

(3) Manono Street & Piilani Street

All movements at the unsignalized intersection of Manono Street and Piilani Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

(4) Manono Street & Kekuanaoa Street

The intersection and all movements at the signalized intersection of Manono Street and Kekuanaoa Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

(5) Mililani Street & Kekuanaoa Street

All movements at the unsignalized intersection of Mililani Street and Kekuanaoa Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

2. Future (2027) With Project Mitigation

No further mitigation is needed at any intersection for the Future (2027) With Project Conditions.

3. Future (2032) With Project Conditions

Future (2032) With Project LOS and delay were determined for the AM and PM peak hours using *Synchro 10* traffic analysis software. Table 17 shows the existing vehicular delay and LOS at each intersection, with the shaded rows indicating the overall intersection delay (applicable at signalized intersections only). Movements that operated at LOS E/F or v/c ≥ 1.0 are highlighted in yellow. Synchro reports for the Future (2032) With Project Conditions can be found in Appendix F.

(1) Hawaii Route 19 at Manono Street/Lihiwai Street

The intersection and all movements at the signalized intersection of Hawaii Route 19 and Manono Street/Lihiwai Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

(2) Hawaii Route 11 & Piilani Street

All movements at the unsignalized intersection of Hawaii Route 11 and Piilani Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

Table 17: Future (2032) With Project Conditions

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Hawaii Route 19 & Manono Street/Lihiwai Street	21.3	-	C	25.4	-	C
Hawaii Route 19 EB Left	14.1	0.31	B	16.4	0.31	B
Hawaii Route 19 EB Through	16.8	0.41	B	21.4	0.51	C
Hawaii Route 19 EB Right	21.2	0.58	C	33.3	0.79	C
Hawaii Route 19 WB Left	12.7	0.19	B	16.0	0.25	B
Hawaii Route 19 WB Through	20.0	0.61	B	22.3	0.55	C
Hawaii Route 19 WB Right	13.7	0.02	B	16.6	0.02	B
Manono Street NB Left	27.8	0.66	C	27.5	0.75	C
Manono Street NB Through-Right	25.1	0.35	C	21.9	0.22	C
Lihiwai Street SB Left	27.3	0.08	C	28.4	0.08	C
Lihiwai Street SB Through-Right	36.6	0.75	D	38.6	0.77	D
Hawaii Route 11 & Piilani Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Hawaii Route 11 NB Left	25.0	0.61	D	24.6	0.45	C
Hawaii Route 11 NB Through	-	-	-	-	-	-
Hawaii Route 11 SB Through-Right	-	-	-	-	-	-
Piilani Street EB Left-Right	30.2	0.40	D	25.9	0.48	D
Manono Street & Piilani Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Manono Street NB Left-Through-Right	8.3	0.03	A	8.3	0.01	A
Manono Street SB Left-Through-Right	8.2	0.05	A	8.2	0.07	A
Piilani Street EB Left-Through-Right	36.3	0.46	E	29.8	0.34	D
Piilani Street WB Left-Through-Right	29.3	0.57	D	27.7	0.51	D
Manono Street & Kekuanaoa Street	33.7	-	C	33.2	-	C
Manono Street NB Left	22.1	0.27	C	21.2	0.17	C
Manono Street NB Through-Right	33.9	0.71	C	28.7	0.55	C
Manono Street SB Left	23.0	0.30	C	21.2	0.27	C
Manono Street SB Through-Right	31.6	0.65	C	34.7	0.73	C
Kekuanaoa Street EB Left	28.0	0.46	C	22.9	0.37	C
Kekuanaoa Street EB Through-Right	29.3	0.63	C	42.4	0.87	D
Kekuanaoa Street WB Left	18.5	0.09	B	26.5	0.42	C
Kekuanaoa Street WB Through-Right	43.4	0.88	D	31.8	0.70	C
Mililani Street & Kekuanaoa Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Mililani Street NB Left-Through-Right	27.9	0.17	D	18.0	0.09	C
Mililani Street SB Left-Through-Right	19.7	0.19	C	13.6	0.13	B
Kekuanaoa Street EB Left-Through-Right	9.1	0.03	A	8.6	0.02	A
Kekuanaoa Street WB Left-Through-Right	8.5	0.01	A	8.9	0.00	A

(3) Manono Street & Piilani Street

At the unsignalized intersection of Manono Street and Piilani Street, the EB left-through-right lane will operate poorly at LOS E during the AM peak hour (v/c ratio of 0.46). With increased traffic volumes along Manono Street due to forecasted background growth, LOS will deteriorate compared to the previously analysis year, Future (2027) With Project conditions. All other movements at the unsignalized intersection of Manono Street and Piilani Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

(4) Manono Street & Kekuanaoa Street

The intersection and all movements at the signalized intersection of Manono Street and Kekuanaoa Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

(5) Mililani Street & Kekuanaoa Street

All movements at the unsignalized intersection of Mililani Street and Kekuanaoa Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

4. Future (2032) With Project Mitigation

Potential mitigation was considered at Manono Street and Piilani Street for the Future (2032) With Project conditions.

(1) Manono Street & Piilani Street

(i) Traffic Signal

The *Manual on Uniform Traffic Control Devices* (*MUTCD*) (FHWA, 2009) was used to perform a traffic signal warrant analysis at the intersection. The *MUTCD* states that a traffic control signal should not be installed unless one or more of these warrants are met. However, it also states that, "The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control system."

The *MUTCD* states that the Peak Hour Traffic Signal Warrant is only applicable at locations such as at a factory or school where shift changes or school hours cause a significant amount of traffic over a short period of time. It is not assumed that traffic volumes needed for the Eight-Hour and Four-Hour Traffic Signal warrants can be accurately forecasted to determine future traffic volumes in a manner similar to future peak hour traffic volumes. Therefore, the Peak Hour Traffic Signal Warrant was the only warrant available for a future analysis. To satisfy this warrant and merit the consideration of installing a traffic control signal, volume thresholds must fall above the applicable curve for any of the three peak hours throughout the day. Note that for this intersection, the lower curve (1 Lane & 1 Lane) was used for analysis.

Table 18 shows the approach traffic volumes used for analysis at Manono Street and Piilani Street. After plotting the corresponding traffic volumes, neither peak hour fell above the minimum (see Figure 17). Therefore, a traffic signal installation at the intersection of Manono Street and Piilani Street was not deemed appropriate at this time.

Table 18: Peak Hour Warrant Analysis for Future (2032) With Project Conditions at Manono Street and Piilani Street

Manono Street at Piilani Street			
Time	Major Approach Volume	Minor Approach Volume	Pass Peak-Hour Warrant?
7:30 - 8:30 AM	779	218	No
3:45 - 4:45 PM	889	196	No

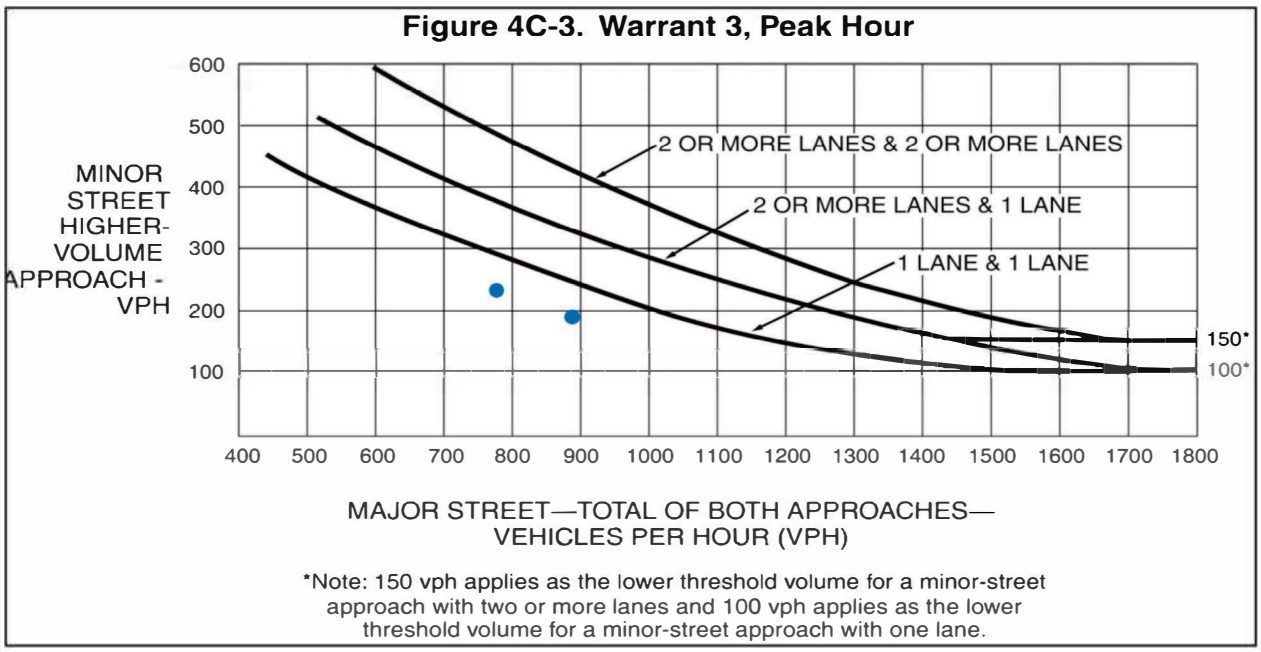


Figure 17: Peak Hour Volume Thresholds at Manono Street and Piilani Street (2032 With Project)

(ii) All-Way Stop Control

Conversion of a TWSC intersection to All-Way Stop Control (AWSC) will reduce delay on the minor-street stop-controlled approaches; however, it will introduce additional delay along the major-street that would not be present in existing TWSC conditions.

The *MUTCD* provides criteria for implementing AWSC at an intersection, which are shown below, along with their applicability:

- Minimum volumes:
  1) The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vph for any 8 hours of an average day; and
  2) The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour; but
  3) If the 85th-percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the values provided in the previous two statements. (*It is not assumed that Existing (2022) traffic volumes can be accurately forecasted with background growth rate to determine future traffic volumes in a manner similar to future peak hour traffic volumes. As a result, this analysis was only done using the Future (2032) With Project peak hour volumes, as shown in Figure 15. As seen in Table 19, the vehicular volume entering the intersection from the major street approaches averaged over 300 vph, and the minor street combined vehicular, pedestrian, and bicycle volume averaged at least 200 units over both peak hours. Therefore, the minimum volume criteria for implementing AWSC at the intersection was met when averaging the AM and PM peak hours.*)

Table 19: Manono Street and Piilani Street Future (2032) With Project Peak Hour Volumes

Time	Major Street Approach Volume	Minor Street Approach Volume
7:30 AM - 8:30 AM	779	218
4:00 PM - 5:00 PM	889	196
Hourly Average Volume	834	207

Table 20 shows the intersection results of Manono Street and Piilani Street as it would operate under AWSC. The EB left-through-right lane improved from LOS E (v/c ratio of 0.46) in its existing TWSC configuration to LOS B (v/c ratio of 0.18) in the AWSC configuration during the AM peak hour. All movements resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

Table 20: Manono Street and Piilani Street Future (2032) With Project Intersection Operations

TWSC (Existing Configuration)	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Manono Street & Piilani Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Manono Street NB Left-Through-Right	8.3	0.03	A	8.3	0.01	A
Manono Street SB Left-Through-Right	8.2	0.05	A	8.2	0.07	A
Piilani Street EB Left-Through-Right	36.3	0.46	E	29.8	0.34	D
Piilani Street WB Left-Through-Right	29.3	0.57	D	27.7	0.51	D
AWSC	**AM**			**PM**		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Manono Street & Piilani Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Manono Street NB Left-Through-Right	15.5	0.57	C	16.7	0.61	C
Manono Street SB Left-Through-Right	22.3	0.74	C	30.6	0.85	D
Piilani Street EB Left-Through-Right	11.4	0.18	B	11.3	0.17	B
Piilani Street WB Left-Through-Right	12.4	0.33	B	12.2	0.31	B

By Future (2032) With Project conditions, it is recommended to consider reconfiguring the intersection of Manono Street and Piilani Street to AWSC to mitigate excessive delay on the uncontrolled Piilani Street approaches.

5. Future (2042) With Project Conditions

Future (2042) With Project LOS and delay were determined for the AM and PM peak hours using *Synchro 10* traffic analysis software. The intersection of Manono Street and Piilani Street was analyzed under AWSC conditions, as recommended and discussed in the Future (2032) With Project conditions. Additionally, the lane reconfiguration mitigative measures at Manono Street and Kekuanaoa Street discussed in the Future (2042) Without Project analysis were assumed to be implemented by this time, and the following results are based off this preferred configuration. Table 21 shows the existing vehicular delay and LOS at each intersection, with the shaded rows indicating the overall intersection delay (applicable at signalized intersections only). Movements that operated at LOS E/F or v/c ≥ 1.0 are highlighted in yellow. Synchro reports for the Future (2042) With Project conditions can be found in Appendix F.

Table 21: Future (2042) With Project Conditions

Intersection	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Hawaii Route 19 & Manono Street/Lihiwai Street	23.6	-	C	29.1	-	C
Hawaii Route 19 EB Left	16.3	0.36	B	17.9	0.35	B
Hawaii Route 19 EB Through	18.7	0.48	B	23.5	0.58	C
Hawaii Route 19 EB Right	25.3	0.68	C	45.1	0.90	D
Hawaii Route 19 WB Left	14.0	0.21	B	17.4	0.28	B
Hawaii Route 19 WB Through	23.3	0.71	C	24.7	0.63	C
Hawaii Route 19 WB Right	14.7	0.02	B	17.4	0.02	B
Manono Street NB Left	28.7	0.70	C	29.4	0.78	C
Manono Street NB Through-Right	24.4	0.33	C	21.9	0.21	C
Lihiwai Street SB Left	28.1	0.09	C	29.7	0.08	C
Lihiwai Street SB Through-Right	37.8	0.75	D	40.3	0.78	D
Hawaii Route 11 & Piilani Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Hawaii Route 11 NB Left	32.3	0.69	D	31.7	0.53	D
Hawaii Route 11 NB Through	-	-	-	-		
Hawaii Route 11 SB Through-Right	-	-	-	-	-	-
Piilani Street EB Left-Right	44.2	0.51	E	34.7	0.57	D
Manono Street & Piilani Street	Unsignalized (AWSC)			Unsignalized (AWSC)		
Manono Street NB Left-Through-Right	20.8	0.69	C	19.5	0.67	C
Manono Street SB Left-Through-Right	39.8	0.89	E	43.6	0.94	E
Piilani Street EB Left-Through-Right	12.3	0.20	B	11.4	0.15	B
Piilani Street WB Left-Through-Right	13.6	0.36	B	12.5	0.30	B
Manono Street & Kekuanaoa Street	36.6	-	D	34.4	-	C
Manono Street NB Left	24.4	0.32	C	23.6	0.21	C
Manono Street NB Through-Right	40.9	0.81	D	31.7	0.63	C
Manono Street SB Left	25.7	0.35	C	22.8	0.30	C
Manono Street SB Through-Right	37.0	0.75	D	44.8	0.86	D
Kekuanaoa Street EB Left	29.1	0.49	C	22.2	0.37	C
Kekuanaoa Street EB Through	29.1	0.65	C	40.2	0.86	D
Kekuanaoa Street EB Right	19.3	0.06	B	19.9	0.11	B
Kekuanaoa Street WB Left	18.1	0.09	B	25.9	0.42	C
Kekuanaoa Street WB Through	45.7	0.91	D	30.4	0.69	C
Kekuanaoa Street WB Right	19.2	0.05	B	19.4	0.07	B
Mililani Street & Kekuanaoa Street	Unsignalized (TWSC)			Unsignalized (TWSC)		
Mililani Street NB Left-Through-Right	34.7	0.21	D	20.6	0.11	C
Mililani Street SB Left-Through-Right	22.9	0.22	C	14.5	0.14	B
Kekuanaoa Street EB Left-Through-Right	9.4	0.03	A	8.8	0.02	A
Kekuanaoa Street WB Left-Through-Right	8.7	0.01	A	9.1	0.01	A

(1) Hawaii Route 19 & Manono Street/Lihiwai Street

The intersection and all movements at the signalized intersection of Hawaii Route 19 and Manono Street/Lihiwai Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

(2) Hawaii Route 11 & Piilani Street

At the unsignalized intersection of Hawaii Route 11 and Piilani Street, the EB left-right lane will operate poorly at LOS E during the AM peak hour (v/c ratio of 0.51). With increased traffic volumes along Hawaii

Route 11 due to forecasted background growth, LOS will deteriorate compared to the previous analysis year, Future (2032) With Project conditions. All other movements at the unsignalized intersection of Hawaii Route 11 and Piilani Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

(3) Manono Street & Piilani Street

At the unsignalized intersection of Manono Street and Piilani Street, even after implementation of AWSC as recommended in the Future (2032) With Project analysis, the SB left-through-right lane will operate poorly at LOS E during the AM and PM peak hours (v/c ratio of 0.89 and 0.94, respectively). With increased traffic volumes along Manono Street due to forecasted background growth, LOS will deteriorate compared to the previous analysis year, Future (2032) With Project conditions. All other movements at the unsignalized intersection of Manono Street and Piilani Street resulted in appropriate LOS C or better and v/c < 1.0 during the AM and PM peak hours.

(4) Manono Street & Kekuanaoa Street

The intersection and all movements at the signalized intersection of Manono Street and Kekuanaoa Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

(5) Mililani Street & Kekuanaoa Street

All movements at the unsignalized intersection of Mililani Street and Kekuanaoa Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

6. Future (2042) With Project Mitigation

Potential mitigation was considered at Hawaii Route 11 and Piilani Street and at Manono Street and Piilani Street for the Future (2042) With Project conditions.

(1) Hawaii Route 11 & Piilani Street

Although the shared EB left-right lane at Hawaii Route 11 and Piilani Street is projected to operate poorly at LOS E (v/c ratio of 0.51) during the AM peak hour, traffic volumes along Piilani Street are not expected to significantly change from the previous analysis year, Future (2032) With Project conditions. However, EB left-turning movements at the intersection will experience higher overall delay, needing to find gaps in the SB traffic to cross three lanes, compared to EB right-turning movements, who only need to find gaps in the SB traffic to cross the nearest lane. EB left-turning volumes at the intersection are extremely low, with only 13 vehicles making this movement in the AM peak hour and 8 making it in the PM peak hour. The mainline movements along Hawaii Route 11 make up the majority of the intersection volume, all which operate at appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours. Additionally, the shared EB left-right lane is not approaching capacity, with a v/c ratio of only 0.51 during the AM peak hour, and 0.57 during the PM peak hour. It is recommended to monitor the intersection, but no mitigation is deemed appropriate at this time.

(2) Manono Street & Piilani Street

(i) Traffic Signal

The MUTCD was used to perform a traffic signal warrant analysis at the intersection of Manono Street and Piilani Street, similar to the analysis performed in the Future (2032) With Project conditions. Table 22

shows the approach traffic volumes used for analysis at Manono Street and Piilani Street. After plotting the corresponding traffic volumes, neither peak hour fell above the minimum threshold (1 Lane & 1 Lane) (see Figure 18). Therefore, a traffic signal installation at the intersection of Manono Street and Piilani Street was not deemed appropriate at this time. It is recommended to monitor the intersection, take future traffic counts, and re-run a traffic signal warrant (either an Eight-Hour or Four-Hour Warrant) into the future.

Table 22: Peak Hour Warrant Analysis for Future (2042) With Project Conditions at Manono Street and Piilani Street

Manono Street at Piilani Street			
Time	Major Approach Volume	Minor Approach Volume	Pass Peak-Hour Warrant?
7:30 - 8:30 AM	855	218	No
3:45 - 4:45 PM	987	196	No

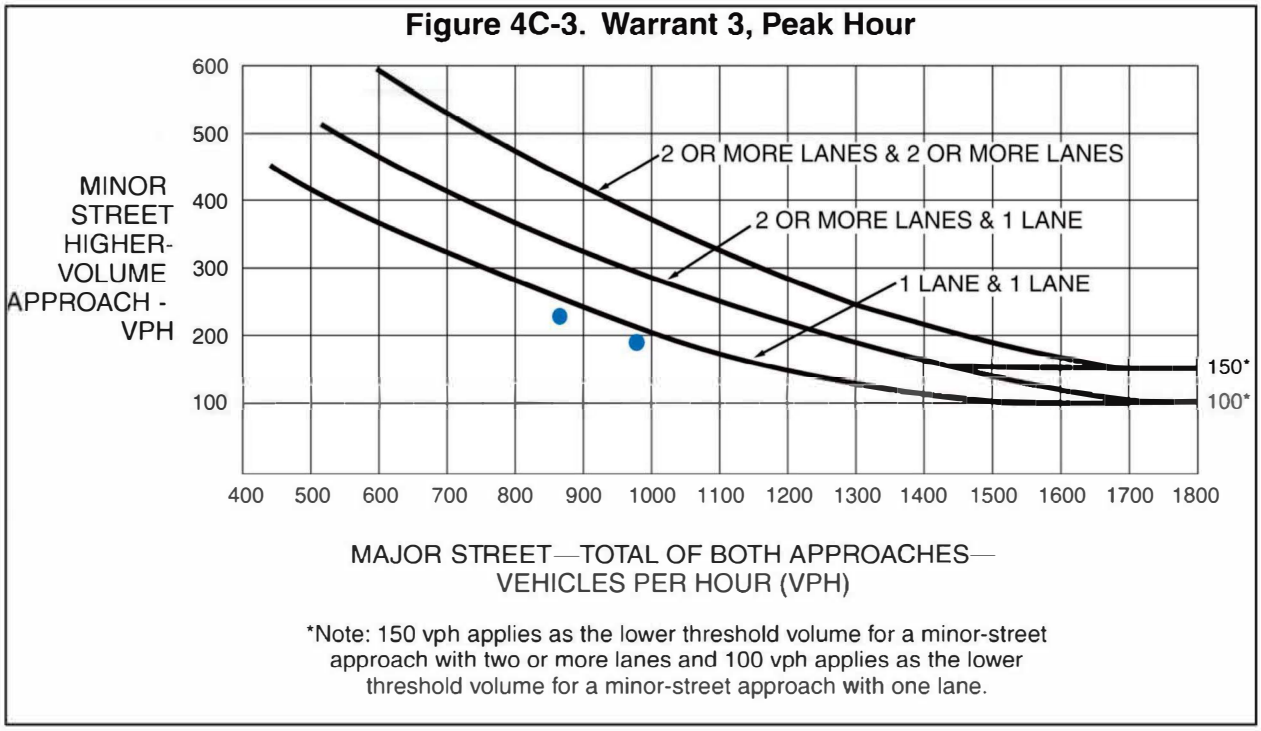


Figure 18: Peak Hour Volume Thresholds at Manono Street and Piilani Street (2042 With Project)

(ii) Mini-Roundabout

Mini-roundabouts share many commonalities as standard roundabouts in terms of their operational efficiency, intersection safety benefits, and traffic calming tendencies; however, unlike standard roundabouts, mini-roundabouts have a much more compact size, allowing them to be implemented at smaller intersections where there may be insufficient room for a standard roundabout. Additionally, the

center island within a mini-roundabout is typically fully traversable, allowing large heavy-vehicles to navigate the intersection without damaging the installation. FHWA released a technical summary on *Mini Roundabouts* (FHWA, 2010) detailing the benefits and constraints of mini-roundabouts, which can be seen in Table 23.

Table 23: Mini-Roundabout Benefits and Constraints (FHWA)

Benefit	Description and Constraining Factors
Compact Size	A mini-roundabout can often be developed to fit within existing right-of-way constraints. Note that mini-roundabouts are generally not recommended for intersections with more than four legs. However, in some cases there may be adequate spacing between legs to allow for two closely-spaced mini-roundabouts.
Operational Efficiency	A mini-roundabout may provide less delay for a critical movement or for an overall intersection in comparison to other intersection alternatives. However, as with all roundabout types, mini-roundabouts do not provide explicit priority to specific users such as trains, transit, or emergency vehicles.
Traffic Safety	Mini-roundabouts have been used successfully in the U.K. to improve safety at intersections with known crash problems, with reported crash rate reductions of approximately 30 percent as compared to signalized intersections.
Traffic Calming	Designed properly, a mini-roundabout reduces speeds and can be implemented as part of a broader traffic calming scheme. The low-speed environment also enhances the intersection for non-motorized users. However, mini-roundabouts cannot provide the same level of speed reduction as their larger counterparts and thus are less suited for roadways with speeds exceeding 30 to 35 mph (50 to 55 km/h).
Access Management	A mini-roundabout can be used to provide efficient access to a new or existing development. However, in the cases of large trucks and other large vehicles, the diameter may be too small to accommodate U-turn maneuvers that would be readily accommodated at a larger roundabout.
Aesthetics	In comparison to full-size roundabouts, mini-roundabouts do not allow opportunities for landscaping in the central island. As with comparably sized traditional intersections, landscaping opportunities are limited to the periphery of the intersection.
Environmental Benefits	A mini-roundabout may offer an environmental benefit compared to conventional intersections through reduced delay, fuel consumption, and vehicle emissions.
*Source: *Mini-Roundabouts Technical Summary (FHWA, 2010)*	

Operationally, FHWA recommends mini-roundabouts for intersections with total entering volumes no greater than 1,600 vehicles/hour (vph). Peak hour volumes at the Manono Street and Piilani Street intersection during the Future (2042) With Project conditions are 1,073 and 1,183 during the AM and PM peak hours, respectively, both considerably below the recommended hourly capacity.

At mini-roundabouts, the inscribed circular diameter (ICD), or the diagonally measured distance between the corners of the intersection, is typically between 50 to 80 feet, while the central island is between 16 to 45 feet in diameter. The existing diagonal measurement between TMK parcels is approximately 65-70 feet with approximately 60 feet of paved travelway. This is an adequate width to reconfigure as a mini-roundabout with a 5 feet shoulder on all sides. A conceptual rendering of a mini-roundabout at this intersection can be seen in Figure 19.

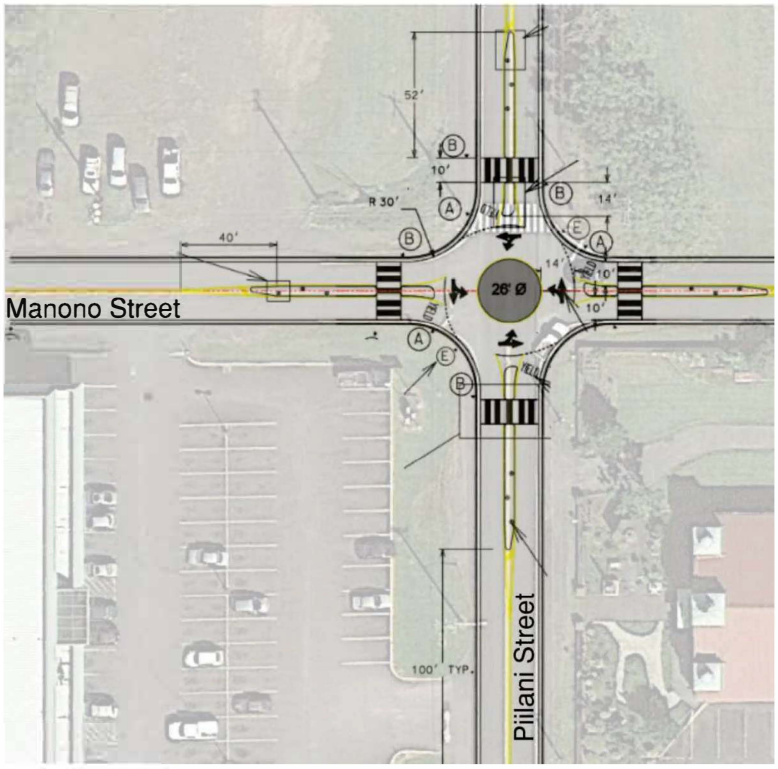


Figure 19: Conceptual Mini-Roundabout at Manono Street and Piilani Street

Mini-roundabouts have been implemented elsewhere on Hawaii island, including one at Halekii Street and Mamao Street in Kealakekua (see Figure 20).



Figure 20: Mini Roundabout at Halekii Street and Mamao Street in Kealakekua

Table 24 shows the intersection of Manono Street and Piilani Street as it would operate with a mini-roundabout. The SB left-through-right lane will improve from LOS E during the AM and PM peak hours (v/c ratio of 0.89 and 0.94, respectively) in AWSC configuration (recommended to be implemented in Future (2032) With Project) to LOS A in the mini-roundabout configuration. All movements resulted in appropriate LOS A and v/c < 1.0 during the AM and PM peak hours. Synchro reports for the Future (2042) With Project mitigation can be found in Appendix G.

Table 24: Manono Street and Piilani Street Future (2042) With Project Intersection Operations

AWSC (Proposed in Future [2032] With Project)	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Manono Street & Piilani Street	Unsignalized (AWSC)			Unsignalized (AWSC)		
Manono Street NB Left-Through-Right	20.8	0.69	C	19.5	0.67	C
Manono Street SB Left-Through-Right	39.8	0.89	E	43.6	0.94	E
Piilani Street EB Left-Through-Right	12.3	0.20	B	11.4	0.15	B
Piilani Street WB Left-Through-Right	13.6	0.36	B	12.5	0.30	B
Mini-Roundabout	AM			PM		
	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Manono Street & Piilani Street	7.0	-	A	7.0	-	A
Manono Street NB Left-Through-Right	7.0	0.37	A	6.0	0.36	A
Manono Street SB Left-Through-Right	8.0	0.48	A	8.0	0.50	A
Piilani Street EB Left-Through-Right	6.0	0.14	A	6.0	0.10	A
Piilani Street WB Left-Through-Right	6.0	0.21	A	6.0	0.18	A

By Future (2042) With Project conditions, it is recommended to consider reconfiguring the intersection of Manono Street and Piilani Street to a mini-roundabout. Alternatively, it is recommended to take traffic counts and monitor the intersection into the future for potential signal warrants passing.

V. SUMMARY AND RECOMMENDATIONS

The proposed use is consistent with the property class "Industrial" and zoning "ML-20 Limited Industrial District" and is a three-floor self-storage warehouse with accompanying restrooms and elevators to serve the tenants. The design includes two porte-cochere on either end, Nbrth and South, to allow for large trucks and ADA parking stalls to park under roofed shelter and load/unload to the storage warehouse. The conceptual floor plan includes 88 storage units per floor for a total of 264 storage units within the warehouse.

The self-storage warehouse schematic site plan includes 24' wide two-way access driveways at Piilani Street and Mililani Street. The site plan provides for 28 total full size parking stalls including 2 ADA van accessible stalls. The site plan also provides for seven 12x50 foot loading zones for customer convenience.

The schematic design is three floors (12'-0" ground floor, 10'-0" floors 2 and 3 for a total height of 41 '-8" which is compliant with the zoning height limit of 45'-0". The schematic design aesthetic is meant to evoke the 1920's era of Hilo Town.

This TIAR analyzed traffic conditions for the Existing (2022) conditions, as well as Future Without and Future With Project conditions corresponding to five (2027), ten (2032), and twenty (2042) years into the future. Anticipated future traffic growth and trips resulting from surrounding area development were included in Future Without as well as the Future With conditions. Additionally, the *ITE Trip Generation, 11th Edition* was used to determine the number of project generated trips expected based on the development size. Five study intersections which projected to add 3% or greater traffic to their forecasted volumes were analyzed, per HDOT standard practice.

In the Existing (2022) conditions, all intersections and individual lane movements operate with appropriate LOS D or better during the AM and PM peak hours. Similarly, all intersections and individual lane movements are projected to operate with appropriate LOS D or better during the AM and PM peak hours for the Future (2027) and Future (2032) Without Project conditions.

Concurrent with the Future (2042) Without Project conditions, it is projected that the EB through-right lane at Manono Street and Kekuanaoa Street will operate at LOS E during PM peak hour (v/c ratio of 0.97). With excess roadway width present at the intersection, it is recommended to consider reconfiguring both the EB and WB approaches to include 10-11 foot wide separated right turn lanes, allowing the existing through-right lanes to be converted to through-only lanes. In doing so, the intersection capacity will increase, improving the LOS for the EB through-right lane to an acceptable manner.

Concurrent with the Future (2032) With Project conditions, it is projected that the EB left-through-right lane at Manono Street and Piilani Street will operate at LOS E during the AM peak hour (v/c ratio of 0.46). A *MUTCD* Peak Hour traffic signal warrant was analyzed at the intersection but did not pass. Additionally, the intersection was analyzed under AWSC, where the intersection met minimum *MUTCD* volume thresholds averaged over the AM and PM peak hours. It is therefore recommended to consider reconfiguring the intersection to AWSC, which will result in acceptable LOS for all intersection movements.

Concurrent with the Future (2042) With Project conditions, it is project that the EB left-right lane at Hawaii Route 11 and Piilani Street will operate at LOS E during the AM peak hour (v/c ratio of 0.51). However, all mainline movements along Hawaii Route 11, which make up the majority of the

Concurrent with the Future (2042) With Project conditions, it is projected that the SB left-through-right lane at Manono Street and Piilani Street will operate at LOS E during the AM and PM peak hours (v/c ratio of 0.89 and 0.94, respectively), even after reconfiguring the AWSC, as recommended in the Future (2032) With Project conditions. A *MUTCD* Peak Hour traffic signal warrant was analyzed at the intersection but did not pass. Alternatively, the intersection was analyzed as a mini-roundabout, which shares many commonalities with standard roundabouts in terms of operational efficiency, intersection safety, and traffic calming, yet can be implemented at smaller intersections such as Manono Street and Piilani Street. Peak hour intersection volumes at the intersection are projected to be considerably below the FHWA recommended hourly capacity of a mini-roundabout. Alternatively, it is recommended to take traffic counts and monitor the intersection into the future for potential signal warrants passing.

VI. REFERENCES

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Appendix A – Traffic Count Data

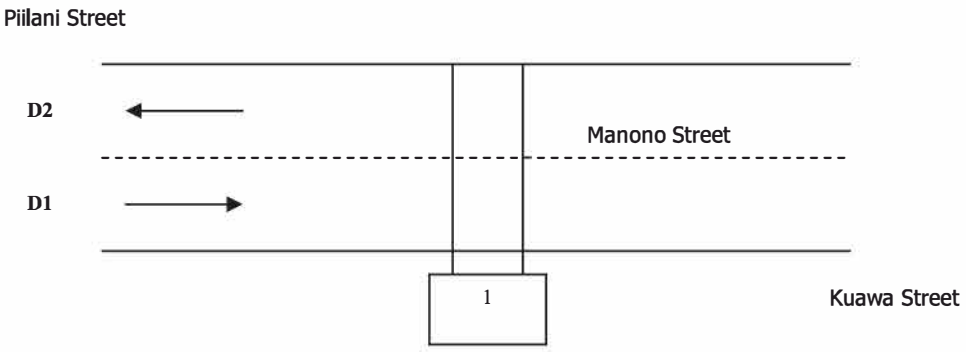
Traffic Data Service

Traffic Station Sketch

N

Island: Hawaii
Area: Hilo

Section ID/Station #: B71277000332



	Meter #	File Name	GPS
1.	bw89	D0718009_B71277000332 D0718010_B71277000332	19.72071, -155.07

Station Description:

Manono Street: Piilani Street to Kuawa Street

Survey Beginning Date/Time: 7/18/13 @ 0000		Survey Ending Date/Time: 7/19/13 @ 2400

Survey Method:	Road Tube	Data Type:	Class
Survey Crew:	LM		C1B
Sketch Updated:		By:	SR
Remarks:			

FACILITY NAME	JURI	FUNC CLASS	AREA TYPE	ROUTE NO.	ROUTE MILE
Manono Street		17		2770	

D1= Direction to End
D2= Direction to Begin

D1: Kuawa Street / Kamehameha Avenue
D2: Piilani Street / Haihai Street

29

Hawaii Department of Transportation

Highways Division **Highways Planning Survey Section**

2013 Program Count - Summary

2 **Town:** Hawaii **DIR 1:** +MP **DIR 2:** -MP **Final AADT:** 10300

BAN:COLLECTOR **Count Type:** CLASS **Counter Type:** Tube **Route No:** 2770

eet - Piilani Street to Kuawa St

2	TOTAL	TIME-AM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL
9	16	06:00-06:15	33	33	66	12:00-12:15	109	114	223	06:00-06:15	32	62	94
0	15	06:15-06:30	42	43	85	12:15-12:30	108	114	222	06:15-06:30	45	76	121
8	20	06:30-06:45	30	36	66	12:30-12:45	94	115	209	06:30-06:45	55	63	118
7	13	06:45-07:00	57	67	124	12:45-01:00	110	116	226	06:45-07:00	39	70	109
4	5	07:00-07:15	64	51	115	01:00-01:15	108	118	226	07:00-07:15	31	52	83
2	3	07:15-07:30	71	69	140	01:15-01:30	120	125	245	07:15-07:30	34	55	89
5	10	07:30-07:45	98	87	185	01:30-01:45	96	101	197	07:30-07:45	27	45	72
7	11	07:45-08:00	75	84	159	01:45-02:00	84	111	195	07:45-08:00	38	33	71
9	14	08:00-08:15	75	79	154	02:00-02:15	85	100	185	08:00-08:15	36	38	74
2	4	08:15-08:30	83	77	160	02:15-02:30	82	109	191	08:15-08:30	30	28	58
3	5	08:30-08:45	76	81	157	02:30-02:45	107	113	220	08:30-08:45	31	42	73
4	8	08:45-09:00	80	75	155	02:45-03:00	99	137	236	08:45-09:00	23	20	43
1	5	09:00-09:15	76	81	157	03:00-03:15	97	126	223	09:00-09:15	16	20	36
1	3	09:15-09:30	88	80	168	03:15-03:30	81	117	198	09:15-09:30	20	16	36
4	9	09:30-09:45	87	89	176	03:30-03:45	83	124	207	09:30-09:45	22	29	51
4	10	09:45-10:00	83	98	181	03:45-04:00	82	132	214	09:45-10:00	21	21	42
4	7	10:00-10:15	87	79	166	04:00-04:15	117	134	251	10:00-10:15	23	19	42
0	9	10:15-10:30	85	83	168	04:15-04:30	96	108	204	10:15-10:30	9	14	23
8	11	10:30-10:45	80	98	178	04:30-04:45	99	138	237	10:30-10:45	13	11	24
7	23	10:45-11:00	83	123	206	04:45-05:00	112	117	229	10:45-11:00	6	9	15
1	26	11:00-11:15	109	103	212	05:00-05:15	84	87	171	11:00-11:15	6	6	12
8	25	11:15-11:30	81	118	199	05:15-05:30	61	92	153	11:15-11:30	7	11	18
8	33	11:30-11:45	92	126	218	05:30-05:45	53	108	161	11:30-11:45	9	2	11
6	42	11:45-12:00	87	107	194	05:45-06:00	69	61	130	11:45-12:00	7	9	16

00-09:00)	DIR 1	DIR 2		PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	
				TWO DIRECTIONAL PEAK			
	07:30 AM to 08:30 AM			PM - PEAK HR TIME	04:00 PM to 05:00 PM		
	331	327	658	PM - PEAK HR VOLUME	424	497	921
			6.33	PM - K FACTOR (%)			8.86
	50.30	49.70	100.00	PM - D (%)	46.04	53.96	100.00
				DIRECTIONAL PEAK			
	07:30 AM to 08:30 AM	07:30 AM to 08:30 AM		PM - PEAK HR TIME	04:00 PM to 05:00 PM	03:45 PM to 04:45 PM	
	331	327		PM - PEAK HR VOLUME	424	512	
				PM PERIOD (12:00-24:00)			
				TWO DIRECTIONAL PEAK			
	10:45 AM to 11:45 AM			PM - PEAK HR TIME	04:00 PM to 05:00 PM		
	365	470	835	PM - PEAK HR VOLUME	424	497	921
			8.03	PM - K FACTOR (%)			8.86
	43.71	56.29	100.00	PM - D (%)	46.04	53.96	100.00

:00-15:00)				6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	Total
				AM 6-HR PERIOD (06:00-12:00)	1,822	1,967	3,789
	12:30 PM to 01:30 PM			AM 12-HR PERIOD (00:00-12:00)	2,002	2,114	4,116
	432	474	906	PM 6-HR PERIOD (12:00-18:00)	2,236	2,717	4,953
				PM 12-HR PERIOD (12:00-24:00)	2,816	3,468	6,284
	12:45 PM to 01:45 PM	12:30 PM to 01:30 PM		24 HOUR PERIOD	4,818	5,582	10,400
	434	474		D (%)	46.33	53.67	100.00

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Hawaii Department of Transportation

Highways Division — Highways Planning Survey Section

2013 Program Count - Summary

2

Town: Hawaii **DIR 1:** +MP **DIR 2:** -MP **Final AADT:** 10300

BAN:COLLECTOR **Count Type:** CLASS **Counter Type:** Tube **Route No:** 2770

eet - Piilani Street to Kuawa St

2	TOTAL	TIME-AM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL
9	17	06:00-06:15	22	27	49	12:00-12:15	89	114	203	06:00-06:15	55	68	123
2	8	06:15-06:30	32	34	66	12:15-12:30	96	111	207	06:15-06:30	78	70	148
4	12	06:30-06:45	33	42	75	12:30-12:45	122	107	229	06:30-06:45	47	69	116
5	8	06:45-07:00	47	40	87	12:45-01:00	93	115	208	06:45-07:00	61	59	120
0	16	07:00-07:15	47	56	103	01:00-01:15	104	116	220	07:00-07:15	56	64	120
2	5	07:15-07:30	56	58	114	01:15-01:30	96	114	210	07:15-07:30	40	71	111
5	7	07:30-07:45	81	88	169	01:30-01:45	92	113	205	07:30-07:45	56	73	129
5	8	07:45-08:00	83	74	157	01:45-02:00	88	99	187	07:45-08:00	40	49	89
5	5	08:00-08:15	62	77	139	02:00-02:15	89	111	200	08:00-08:15	39	40	79
0	2	08:15-08:30	56	100	156	02:15-02:30	98	103	201	08:15-08:30	40	45	85
4	6	08:30-08:45	85	69	154	02:30-02:45	84	109	193	08:30-08:45	25	35	60
0	4	08:45-09:00	86	99	185	02:45-03:00	110	105	215	08:45-09:00	33	43	76
0	5	09:00-09:15	87	90	177	03:00-03:15	89	130	219	09:00-09:15	33	32	65
3	4	09:15-09:30	88	89	177	03:15-03:30	74	108	182	09:15-09:30	50	36	86
4	9	09:30-09:45	72	120	192	03:30-03:45	111	117	228	09:30-09:45	33	40	73
0	8	09:45-10:00	84	113	197	03:45-04:00	96	121	217	09:45-10:00	42	30	72
4	10	10:00-10:15	71	95	166	04:00-04:15	119	121	240	10:00-10:15	33	41	74
6	16	10:15-10:30	75	91	166	04:15-04:30	98	144	242	10:15-10:30	27	32	59
7	16	10:30-10:45	73	109	182	04:30-04:45	106	118	224	10:30-10:45	29	23	52
5	14	10:45-11:00	92	111	203	04:45-05:00	103	136	239	10:45-11:00	40	28	68
3	16	11:00-11:15	103	104	207	05:00-05:15	107	109	216	11:00-11:15	17	27	44
3	24	11:15-11:30	112	120	232	05:15-05:30	68	80	148	11:15-11:30	14	23	37
3	36	11:30-11:45	106	133	239	05:30-05:45	82	99	181	11:30-11:45	19	26	45
7	53	11:45-12:00	110	95	205	05:45-06:00	67	99	166	11:45-12:00	14	15	29

00-09:00)	DIR 1	DIR 2		PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	
				TWO DIRECTIONAL PEAK			
	08:00 AM to 09:00 AM			PM - PEAK HR TIME	04:00 PM to 05:00 PM		
	289	345	634	PM - PEAK HR VOLUME	426	519	945
			5.74	PM - K FACTOR (%)			8.56
	45.58	54.42	100.00	PM - D (%)	45.08	54.92	100.00
				DIRECTIONAL PEAK			
	08:00 AM to 09:00 AM	08:00 AM to 09:00 AM		PM - PEAK HR TIME	04:00 PM to 05:00 PM	04:00 PM to 05:00 PM	
	289	345		PM - PEAK HR VOLUME	426	519	
				PM PERIOD (12:00-24:00)			
				TWO DIRECTIONAL PEAK			
	11:00 AM to 12:00 PM			PM - PEAK HR TIME	04:00 PM to 05:00 PM		
	431	452	883	PM - PEAK HR VOLUME	426	519	945
			7.99	PM - K FACTOR (%)			8.56
	48.81	51.19	100.00	PM - D (%)	45.08	54.92	100.00

9:00-15:00)				6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	Total
				AM 6-HR PERIOD (06:00-12:00)	1,763	2,034	3,797
	11:00 AM to 12:00 PM			AM 12-HR PERIOD (00:00-12:00)	1,926	2,180	4,106
	431	452	883	PM 6-HR PERIOD (12:00-18:00)	2,281	2,699	4,980
				PM 12-HR PERIOD (12:00-24:00)	3,202	3,738	6,940
	11:00 AM to 12:00 PM	10:45 AM to 11:45 AM		24 HOUR PERIOD	5,128	5,918	11,046
	431	468		D (%)	46.42	53.58	100.00

Run Date: 2014/05/28

Hawaii Department of Transportation
Highways Division
Highways Planning Survey Section

Vehicle Classification Data Summary
2013

Site ID: B71277000332 **Route No:** 2770 **Date From:** 2013/07/18 0:00

Town: Hawaii **Direction:** +MP **Date To:** 2013/07/19 23:45

Location: Manono Street - Piilani Street to Kuawa St

Functional Classification: 17 URBAN:COLLECTOR

REPORT TOTALS - 48 HOURS RECORDED

	VOLUME	%	NUMBER OF AXLES
Cycles	122	0.57%	244
PC	15394	71.78%	30788
2A-4T	5746	26.79%	11492
LIGHT VEHICLE TOTALS	21262	99.14%	42525
	HEAVY VEHICLES		
Bus	74	0.35%	185
SINGLE UNIT TRUCK			
2A-6T	57	0.27%	114
3A-SU	16	0.07%	48
4A-SU	3	0.01%	12
SINGLE-TRAILER TRUCKS			
4A-ST	21	0.10%	84
5A-ST	10	0.05%	50
6A-ST	0	0.00%	0
MULTI-TRAILER TRUCKS			
5A-MT	0	0.00%	0
6A-MT	0	0.00%	0
7A-MT	2	0.01%	14
HEAVY VEHICLE TOTALS	183	0.85%	507
CLASSIFIED VEHICLES TOTALS	21445 (A)	100.00%	43032 (B)
UNCLASSIFIED VEHICLES TOTALS	1	0.00%	

AXLE CORRECTION FACTOR (A/C) = 0.997

ROADTUBE EQUIVALENT(B/2) = 21516 (C)

PEAK HOUR VOLUME : 945 2013/07/19 16:00	PEAK HOUR TRUCK VOLUME	% TOTAL PEAK HOUR VOLUME	24 HOUR TRUCK VOLUME	AADT	% OF AADT	HPMS K-FACTOR (PEAK/AADT) (ITEM 66)
SINGLE UNIT TRUCKS (TYPE 4-7)	1	(65A-1) 0.11%	75	10300	(65A-2) 0.73%	9.17%
COMBINATION (TYPE 8-13)	2	(65B-1) 0.21%	16		(65B-2) 0.16%	9.17%

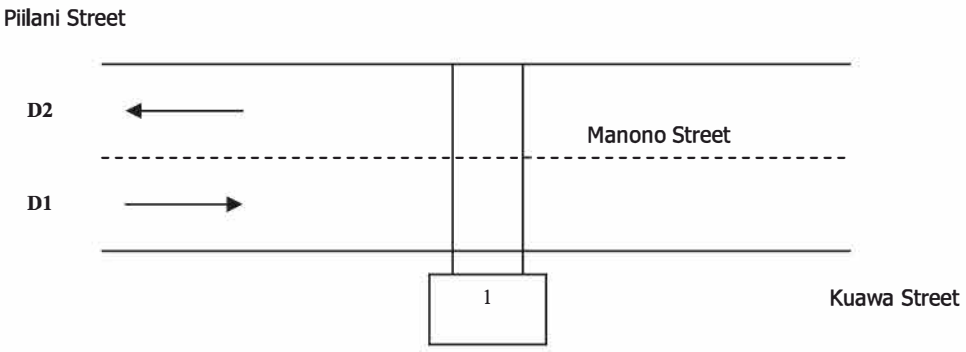
Traffic Data Service

Traffic Station Sketch

N

Island: Hawaii
Area: Hilo

Section ID/Station #: B71277000332



	Meter #	File Name	GPS
1.	bt31	D0310013_B71277000332 D0310014_B71277000332	19.72071, -155.07

Station Description:

Manono Street: Piilani Street to Kuawa Street

Survey Beginning Date/Time: 3/10/14@ 0000		Survey Ending Date/Time: 3/11/14@ 2400

Survey Method:	Road Tube	Data Type:	Class
Survey Crew:	LM		C1B
Sketch Updated:		By:	SR
Remarks:			

FACILITY NAME	JURI	FUNC CLASS	AREA TYPE	ROUTE NO.	ROUTE MILE
Manono Street		17		2770	

D1= Direction to End D2= Direction to Begin	D1: Kuawa Street / Kamehameha Avenue D2: Piilani Street / Haihai Street

0

Hawaii Department of Transportation

Highways Division **Highways Planning Survey Section**

2014 Program Count - Summary

2

Town: Hawaii **DIR 1:** +MP **DIR 2:** -MP **Final AADT:** 9900

BAN:COLLECTOR **Count Type:** CLASS **Counter Type:** Tube **Route No:** 2770

eet - Piilani Street to Kuawa St

2	TOTAL	TIME-AM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL
3	8	06:00-06:15	14	17	31	12:00-12:15	90	114	204	06:00-06:15	53	67	120
4	8	06:15-06:30	28	38	66	12:15-12:30	98	97	195	06:15-06:30	52	87	139
4	6	06:30-06:45	47	59	106	12:30-12:45	72	92	164	06:30-06:45	38	59	97
4	5	06:45-07:00	43	52	95	12:45-01:00	95	96	191	06:45-07:00	56	38	94
6	7	07:00-07:15	46	51	97	01:00-01:15	84	87	171	07:00-07:15	39	59	98
5	7	07:15-07:30	65	74	139	01:15-01:30	83	90	173	07:15-07:30	40	37	77
6	11	07:30-07:45	66	91	157	01:30-01:45	87	75	162	07:30-07:45	33	32	65
3	7	07:45-08:00	80	107	187	01:45-02:00	78	85	163	07:45-08:00	33	29	62
3	4	08:00-08:15	78	73	151	02:00-02:15	79	112	191	08:00-08:15	25	29	54
2	3	08:15-08:30	58	92	150	02:15-02:30	84	111	195	08:15-08:30	23	33	56
1	4	08:30-08:45	70	79	149	02:30-02:45	89	109	198	08:30-08:45	14	16	30
1	3	08:45-09:00	77	100	177	02:45-03:00	82	123	205	08:45-09:00	32	16	48
4	6	09:00-09:15	72	79	151	03:00-03:15	98	105	203	09:00-09:15	23	24	47
6	7	09:15-09:30	67	81	148	03:15-03:30	95	84	179	09:15-09:30	14	19	33
4	10	09:30-09:45	72	83	155	03:30-03:45	98	96	194	09:30-09:45	12	18	30
7	13	09:45-10:00	81	75	156	03:45-04:00	98	115	213	09:45-10:00	16	19	35
5	11	10:00-10:15	69	105	174	04:00-04:15	129	131	260	10:00-10:15	15	20	35
5	10	10:15-10:30	85	97	182	04:15-04:30	91	102	193	10:15-10:30	12	13	25
4	15	10:30-10:45	83	82	165	04:30-04:45	89	126	215	10:30-10:45	10	19	29
4	19	10:45-11:00	100	88	188	04:45-05:00	115	133	248	10:45-11:00	11	8	19
6	27	11:00-11:15	79	88	167	05:00-05:15	95	83	178	11:00-11:15	5	13	18
2	30	11:15-11:30	86	112	198	05:15-05:30	107	91	198	11:15-11:30	7	9	16
2	29	11:30-11:45	83	117	200	05:30-05:45	74	89	163	11:30-11:45	8	12	20
4	41	11:45-12:00	89	125	214	05:45-06:00	56	98	154	11:45-12:00	3	8	11

00-09:00)	DI R 1	DI R 2		PM COMMUTER PERI OD(15:00-19:00)	DI R 1	DI R 2	
				TWO DI RECTI ONALPEAK			
	07:30 AM to 08:30 AM			PM - PEAK HR TIME	04:00 PM to 05:00 PM		
	282	363	645	PM - PEAK HR VOLUME	424	492	916
			6.61	PM - K FACTOR (%)			9.38
	43.72	56.28	100.00	PM - D (%)	46.29	53.71	100.00
				DI RECTI ONALPEAK			
	07:15 AM to 08:15 AM	07:30 AM to 08:30 AM		PM - PEAK HR TIME	04:00 PM to 05:00 PM	04:00 PM to 05:00 PM	
	289	363		PM - PEAK HR VOLUME	424	492	

				PM PERI OD(12:00-24:00)			
				TWO DI RECTI ONALPEAK			
	11:00 AM to 12:00 PM			PM - PEAK HR TIME	04:00 PM to 05:00 PM		
	337	442	779	PM - PEAK HR VOLUME	424	492	916
			7.98	PM - K FACTOR (%)			9.38
	43.26	56.74	100.00	PM - D (%)	46.29	53.71	100.00

:00-15:00)				6-HR, 12-HR, 24-HR PERI ODS	DI R 1	DI R 2	Total
				AM 6-HR PERI OD(06:00-12:00)	1,638	1,965	3,603
	11:15 AM to 12:15 PM			AM 12-HR PERI OD(00:00-12:00)	1,794	2,100	3,894
	348	468	816	PM 6-HR PERI OD(12:00-18:00)	2,166	2,444	4,610
				PM 12-HR PERI OD(12:00-24:00)	2,740	3,128	5,868
	11:30 AM to 12:30 PM	11:15 AM to 12:15 PM		24 HOUR PERI OD	4,534	5,228	9,762
	360	468		D (%)	46.45	53.55	100.00

0

Hawaii Department of Transportation

Highways Division **Highways Planning Survey Section**

2014 Program Count - Summary

2 **Town:** Hawaii **DIR 1:** +MP **DIR 2:** -MP **Final AADT:** 9900

BAN:COLLECTOR **Count Type:** CLASS **Counter Type:** Tube **Route No:** 2770

eet - Piilani Street to Kuawa St

2	TOTAL	TIME-AM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL
3	11	06:00-06:15	19	20	39	12:00-12:15	97	98	195	06:00-06:15	72	84	156
5	14	06:15-06:30	46	54	100	12:15-12:30	84	117	201	06:15-06:30	67	95	162
7	15	06:30-06:45	50	50	100	12:30-12:45	104	104	208	06:30-06:45	53	93	146
7	11	06:45-07:00	50	52	102	12:45-01:00	96	108	204	06:45-07:00	48	80	128
6	7	07:00-07:15	58	61	119	01:00-01:15	96	104	200	07:00-07:15	55	65	120
4	5	07:15-07:30	66	89	155	01:15-01:30	81	129	210	07:15-07:30	37	69	106
2	15	07:30-07:45	84	86	170	01:30-01:45	97	129	226	07:30-07:45	26	42	68
3	7	07:45-08:00	81	117	198	01:45-02:00	76	115	191	07:45-08:00	18	24	42
6	7	08:00-08:15	72	104	176	02:00-02:15	107	119	226	08:00-08:15	36	36	72
4	5	08:15-08:30	87	91	178	02:15-02:30	102	117	219	08:15-08:30	28	22	50
3	8	08:30-08:45	86	91	177	02:30-02:45	95	120	215	08:30-08:45	37	38	75
3	8	08:45-09:00	74	100	174	02:45-03:00	95	131	226	08:45-09:00	36	16	52
2	3	09:00-09:15	75	83	158	03:00-03:15	105	130	235	09:00-09:15	29	30	59
3	4	09:15-09:30	90	98	188	03:15-03:30	103	118	221	09:15-09:30	24	29	53
3	10	09:30-09:45	82	106	188	03:30-03:45	102	126	228	09:30-09:45	28	28	56
6	14	09:45-10:00	69	74	143	03:45-04:00	97	138	235	09:45-10:00	18	19	37
7	13	10:00-10:15	76	93	169	04:00-04:15	143	134	277	10:00-10:15	10	23	33
5	9	10:15-10:30	74	101	175	04:15-04:30	125	124	249	10:15-10:30	15	13	28
5	15	10:30-10:45	72	89	161	04:30-04:45	103	151	254	10:30-10:45	19	14	33
7	20	10:45-11:00	88	100	188	04:45-05:00	106	118	224	10:45-11:00	7	8	15
2	12	11:00-11:15	89	92	181	05:00-05:15	118	119	237	11:00-11:15	8	12	20
0	24	11:15-11:30	91	111	202	05:15-05:30	104	146	250	11:15-11:30	9	9	18
1	28	11:30-11:45	85	111	196	05:30-05:45	86	94	180	11:30-11:45	7	16	23
6	50	11:45-12:00	107	89	196	05:45-06:00	74	81	155	11:45-12:00	6	5	11

00-09:00)	DIR 1	DIR 2		PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	
				TWO DIRECTIONAL PEAK			
	07:45 AM to 08:45 AM			PM - PEAK HR TIME	03:45 PM to 04:45 PM		
	326	403	729	PM - PEAK HR VOLUME	468	547	1015
			6.64	PM - K FACTOR (%)			9.25
	44.72	55.28	100.00	PM - D (%)	46.11	53.89	100.00
				DIRECTIONAL PEAK			
	07:45 AM to 08:45 AM	07:45 AM to 08:45 AM		PM - PEAK HR TIME	04:00 PM to 05:00 PM	03:45 PM to 04:45 PM	
	326	403		PM - PEAK HR VOLUME	477	547	
				PM PERIOD (12:00-24:00)			
				TWO DIRECTIONAL PEAK			
	11:00 AM to 12:00 PM			PM - PEAK HR TIME	03:45 PM to 04:45 PM		
	372	403	775	PM - PEAK HR VOLUME	468	547	1015
			7.06	PM - K FACTOR (%)			9.25
	48.00	52.00	100.00	PM - D (%)	46.11	53.89	100.00

:00-15:00)				6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	Total
				AM 6-HR PERIOD (06:00-12:00)	1,771	2,062	3,833
	02:00 PM to 03:00 PM			AM 12-HR PERIOD (00:00-12:00)	1,936	2,212	4,148
	399	487	886	PM 6-HR PERIOD (12:00-18:00)	2,396	2,870	5,266
				PM 12-HR PERIOD (12:00-24:00)	3,089	3,740	6,829
	02:00 PM to 03:00 PM	01:15 PM to 02:15 PM		24 HOUR PERIOD	5,025	5,952	10,977
	399	492		D (%)	45.78	54.22	100.00

Run Date: 2015/04/14

Hawaii Department of Transportation
Highways Division
Highways Planning Survey Section

Vehicle Classification Data Summary
2014

Site ID: B71277000332 **Route No:** 2770 **Date From:** 2014/03/10 0:00

Town: Hawaii **Direction:** +MP **Date To:** 2014/03/11 23:45

Location: Manono Street - Piilani Street to Kuawa St

Functional Classification: 17 URBAN:COLLECTOR

REPORT TOTALS - 48 HOURS RECORDED

	VOLUME	%	NUMBER OF AXLES
Cycles	158	0.76%	315
PC	14991	72.28%	29982
2A-4T	5340	25.75%	10680
LIGHT VEHICLE TOTALS	20489	98.79%	40977
	HEAVY VEHICLES		
Bus	113	0.54%	283
SINGLE UNIT TRUCK			
2A-6T	59	0.28%	118
3A-SU	34	0.16%	102
4A-SU	3	0.01%	12
SINGLE-TRAILER TRUCKS			
4A-ST	24	0.12%	96
5A-ST	13	0.06%	65
6A-ST	3	0.01%	18
MULTI-TRAILER TRUCKS			
5A-MT	1	0.00%	5
6A-MT	0	0.00%	0
7A-MT	0	0.00%	0
HEAVY VEHICLE TOTALS	250	1.21%	699
CLASSIFIED VEHICLES TOTALS	20739 (A)	100.00%	41676 (B)
UNCLASSIFIED VEHICLES TOTALS	0	0.00%	

AXLE CORRECTION FACTOR (A/C) = 0.995

ROADTUBE EQUIVALENT(B/2) = 20838 (C)

PEAK HOUR VOLUME : 1004 2014/03/11 16:00	PEAK HOUR TRUCK VOLUME	% TOTAL PEAK HOUR VOLUME	24 HOUR TRUCK VOLUME	AADT	% OF AADT	HPMS K-FACTOR (PEAK/AADT) (ITEM 66)
SINGLE UNIT TRUCKS (TYPE 4-7)	8	(65A-1) 0.80%	104	9900	(65A-2) 1.05%	10.14%
COMBINATION (TYPE 8-13)	0	(65B-1) 0.00%	20		(65B-2) 0.20%	10.14%

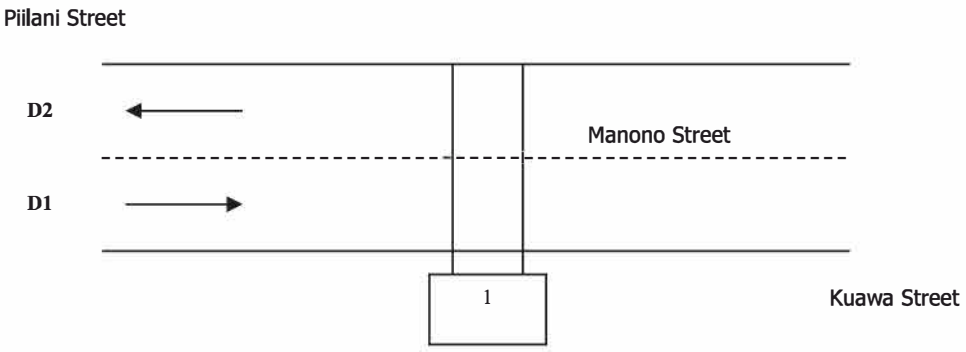
Traffic Data Service

Traffic Station Sketch

N

Island: Hawaii
Area: Hilo

Section ID/Station #: B71277000332



	Meter #	File Name	GPS
1.	bt31	D0806019_B71277000332 D0806020_B71277000332	19.72071, -155.07

Station Description:

Manono Street: Piilani Street to Kuawa Street

Survey Beginning Date/Time: 8/6/15@ 0000		Survey Ending Date/Time: 8/7/15@ 2400	
Survey Method:	Road Tube	Data Type:	Class
Survey Crew:	LM		C1B
Sketch Updated:		By:	SR
Remarks:			

FACILITY NAME	JURI	FUNC CLASS	AREA TYPE	ROUTE NO.	ROUTE MILE
Manono Street		17		2770	

D1= Direction to End
D2= Direction to Begin

D1: Kuawa Street / Kamehameha Avenue
D2: Piilani Street / Haihai Street

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Hawaii Department of Transportation

Highways Division — Highways Planning Survey Section

2015 Program Count - Summary

Town: Hawaii **DIR 1:** +MP **DIR 2:** -MP **Final AADT:** 8200

BAN:COLLECTOR **Count Type:** CLASS **Counter Type:** Tube **Route No:** 2770

eet - Piilani Street to Kuawa St

2	TOTAL	TIME-AM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL
6	13	06:00-06:15	29	17	46	12:00-12:15	90	71	161	06:00-06:15	45	70	115
5	15	06:15-06:30	43	50	93	12:15-12:30	90	72	162	06:15-06:30	64	70	134
0	25	06:30-06:45	41	49	90	12:30-12:45	64	86	150	06:30-06:45	61	67	128
5	11	06:45-07:00	58	56	114	12:45-01:00	70	79	149	06:45-07:00	55	61	116
0	17	07:00-07:15	51	42	93	01:00-01:15	60	68	128	07:00-07:15	40	51	91
7	13	07:15-07:30	65	61	126	01:15-01:30	73	73	146	07:15-07:30	36	63	99
9	17	07:30-07:45	76	75	151	01:30-01:45	65	78	143	07:30-07:45	38	42	80
4	8	07:45-08:00	55	88	143	01:45-02:00	58	85	143	07:45-08:00	35	23	58
8	8	08:00-08:15	68	82	150	02:00-02:15	80	80	160	08:00-08:15	29	39	68
8	9	08:15-08:30	53	63	116	02:15-02:30	64	75	139	08:15-08:30	36	22	58
4	6	08:30-08:45	66	51	117	02:30-02:45	55	80	135	08:30-08:45	42	27	69
4	5	08:45-09:00	58	66	124	02:45-03:00	63	82	145	08:45-09:00	34	26	60
4	12	09:00-09:15	56	36	92	03:00-03:15	87	62	149	09:00-09:15	36	24	60
5	15	09:15-09:30	59	64	123	03:15-03:30	79	71	150	09:15-09:30	17	19	36
2	13	09:30-09:45	54	63	117	03:30-03:45	64	75	139	09:30-09:45	46	19	65
1	4	09:45-10:00	60	77	137	03:45-04:00	79	74	153	09:45-10:00	28	19	47
8	15	10:00-10:15	71	48	119	04:00-04:15	93	85	178	10:00-10:15	24	19	43
8	17	10:15-10:30	47	65	112	04:15-04:30	86	79	165	10:15-10:30	21	19	40
8	20	10:30-10:45	73	60	133	04:30-04:45	102	86	188	10:30-10:45	17	17	34
6	19	10:45-11:00	80	88	168	04:45-05:00	91	86	177	10:45-11:00	17	6	23
9	28	11:00-11:15	60	71	131	05:00-05:15	75	68	143	11:00-11:15	13	14	27
6	26	11:15-11:30	65	70	135	05:15-05:30	61	68	129	11:15-11:30	15	12	27
4	38	11:30-11:45	49	81	130	05:30-05:45	48	89	137	11:30-11:45	16	11	27
0	54	11:45-12:00	90	67	157	05:45-06:00	60	86	146	11:45-12:00	12	7	19

00-09:00)	DIR 1	DIR 2		PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	
				TWO DIRECTIONAL PEAK			
	07:15 AM to 08:15 AM			PM - PEAK HR TIME	04:00 PM to 05:00 PM		
	264	306	570	PM - PEAK HR VOLUME	372	336	708
			6.73	PM - K FACTOR (%)			8.36
	46.32	53.68	100.00	PM - D (%)	52.54	47.46	100.00
				DIRECTIONAL PEAK			
	07:15 AM to 08:15 AM	07:30 AM to 08:30 AM		PM - PEAK HR TIME	04:00 PM to 05:00 PM	04:00 PM to 05:00 PM	
	264	308		PM - PEAK HR VOLUME	372	336	
				PM PERIOD (12:00-24:00)			
				TWO DIRECTIONAL PEAK			
	07:15 AM to 08:15 AM			PM - PEAK HR TIME	04:00 PM to 05:00 PM		
	264	306	570	PM - PEAK HR VOLUME	372	336	708
			6.73	PM - K FACTOR (%)			8.36
	46.32	53.68	100.00	PM - D (%)	52.54	47.46	100.00

:00-15:00)				6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	Total
				AM 6-HR PERIOD (06:00-12:00)	1,427	1,490	2,917
	11:45 AM to 12:45 PM			AM 12-HR PERIOD (00:00-12:00)	1,669	1,656	3,325
	334	296	630	PM 6-HR PERIOD (12:00-18:00)	1,757	1,858	3,615
				PM 12-HR PERIOD (12:00-24:00)	2,534	2,605	5,139
	11:45 AM to 12:45 PM	01:45 PM to 02:45 PM		24 HOUR PERIOD	4,203	4,261	8,464
	334	320		D (%)	49.66	50.34	100.00

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Hawaii Department of Transportation

Highways Division **Highways Planning Survey Section**

2015 Program Count - Summary

Town: Hawaii **DIR 1:** +MP **DIR 2:** -MP **Final AADT:** 8200

BAN:COLLECTOR **Count Type:** CLASS **Counter Type:** Tube **Route No:** 2770

eet - Piilani Street to Kuawa St

2	TOTAL	TIME-AM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL
7	13	06:00-06:15	24	20	44	12:00-12:15	76	89	165	06:00-06:15	86	65	151
1	14	06:15-06:30	47	51	98	12:15-12:30	85	82	167	06:15-06:30	81	66	147
4	14	06:30-06:45	39	39	78	12:30-12:45	76	96	172	06:30-06:45	66	74	140
1	19	06:45-07:00	58	42	100	12:45-01:00	96	81	177	06:45-07:00	62	55	117
4	8	07:00-07:15	56	43	99	01:00-01:15	63	100	163	07:00-07:15	48	58	106
4	7	07:15-07:30	70	56	126	01:15-01:30	83	76	159	07:15-07:30	47	42	89
8	10	07:30-07:45	68	54	122	01:30-01:45	83	79	162	07:30-07:45	45	40	85
4	7	07:45-08:00	69	70	139	01:45-02:00	90	65	155	07:45-08:00	37	59	96
7	10	08:00-08:15	55	80	135	02:00-02:15	79	83	162	08:00-08:15	47	38	85
4	4	08:15-08:30	71	66	137	02:15-02:30	78	77	155	08:15-08:30	42	27	69
8	4	08:30-08:45	66	52	118	02:30-02:45	82	92	174	08:30-08:45	30	37	67
2	3	08:45-09:00	68	70	138	02:45-03:00	90	90	180	08:45-09:00	34	34	68
5	9	09:00-09:15	74	56	130	03:00-03:15	90	87	177	09:00-09:15	23	56	79
7	15	09:15-09:30	74	74	148	03:15-03:30	106	70	176	09:15-09:30	46	24	70
2	12	09:30-09:45	49	62	111	03:30-03:45	83	80	163	09:30-09:45	34	40	74
7	24	09:45-10:00	74	67	141	03:45-04:00	96	107	203	09:45-10:00	36	32	68
7	15	10:00-10:15	62	74	136	04:00-04:15	106	82	188	10:00-10:15	32	24	56
8	12	10:15-10:30	94	77	171	04:15-04:30	120	81	201	10:15-10:30	21	37	58
8	15	10:30-10:45	86	86	172	04:30-04:45	86	82	168	10:30-10:45	19	23	42
0	20	10:45-11:00	71	75	146	04:45-05:00	90	78	168	10:45-11:00	23	32	55
6	17	11:00-11:15	84	63	147	05:00-05:15	71	70	141	11:00-11:15	24	20	44
1	17	11:15-11:30	93	73	166	05:15-05:30	56	71	127	11:15-11:30	14	17	31
0	24	11:30-11:45	81	80	161	05:30-05:45	79	71	150	11:30-11:45	18	30	48
4	47	11:45-12:00	99	67	166	05:45-06:00	80	67	147	11:45-12:00	17	14	31

00-09:00)	DIR 1	DIR 2		PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	
				TWO DIRECTIONAL PEAK			
	07:30 AM to 08:30 AM			PM - PEAK HR TIME	03:45 PM to 04:45 PM		
	263	270	533	PM - PEAK HR VOLUME	408	352	760
			5.70	PM - K FACTOR (%)			8.13
	49.34	50.66	100.00	PM - D (%)	53.68	46.32	100.00
				DIRECTIONAL PEAK			
	07:00 AM to 08:00 AM	07:30 AM to 08:30 AM		PM - PEAK HR TIME	03:45 PM to 04:45 PM	03:45 PM to 04:45 PM	
	263	270		PM - PEAK HR VOLUME	408	352	
				PM PERIOD (12:00-24:00)			
				TWO DIRECTIONAL PEAK			
	11:00 AM to 12:00 PM			PM - PEAK HR TIME	03:45 PM to 04:45 PM		
	357	283	640	PM - PEAK HR VOLUME	408	352	760
			6.85	PM - K FACTOR (%)			8.13
	55.78	44.22	100.00	PM - D (%)	53.68	46.32	100.00

:00-15:00)				6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	Total
				AM 6-HR PERIOD (06:00-12:00)	1,632	1,497	3,129
	12:00 PM to 01:00 PM			AM 12-HR PERIOD (00:00-12:00)	1,803	1,666	3,469
	333	348	681	PM 6-HR PERIOD (12:00-18:00)	2,044	1,956	4,000
				PM 12-HR PERIOD (12:00-24:00)	2,976	2,900	5,876
	11:00 AM to 12:00 PM	12:15 PM to 01:15 PM		24 HOUR PERIOD	4,779	4,566	9,345
	357	359		D (%)	51.14	48.86	100.00

Run Date: 2016/05/19

Hawaii Department of Transportation
Highways Division
Highways Planning Survey Section

Vehicle Classification Data Summary
2015

Site ID: B71277000332 **Route No:** 2770 **Date From:** 2015/08/06 0:00

Town: Hawaii **Direction:** +MP **Date To:** 2015/08/07 23:45

Location: Manono Street - Piilani Street to Kuawa St

Functional Classification: 17 URBAN:COLLECTOR

REPORT TOTALS - 48 HOURS RECORDED

	VOLUME	%	NUMBER OF AXLES
Cycles	37	0.21%	75
PC	12913	72.51%	25826
2A-4T	4574	25.68%	9148
LIGHT VEHICLE TOTALS	17524	98.40%	35049
	HEAVY VEHICLES		
Bus	86	0.48%	215
SINGLE UNIT TRUCK			
2A-6T	79	0.44%	158
3A-SU	48	0.27%	144
4A-SU	13	0.07%	52
SINGLE-TRAILER TRUCKS			
4A-ST	22	0.12%	88
5A-ST	8	0.04%	40
6A-ST	2	0.01%	12
MULTI-TRAILER TRUCKS			
5A-MT	2	0.01%	10
6A-MT	17	0.10%	102
7A-MT	8	0.04%	56
HEAVY VEHICLE TOTALS	285	1.60%	877
CLASSIFIED VEHICLES TOTALS	17809 (A)	100.00%	35926 (B)
UNCLASSIFIED VEHICLES TOTALS	-0	-0.00%	

AXLE CORRECTION FACTOR (A/C) = 0.991

ROADTUBE EQUIVALENT(B/2) = 17963 (C)

PEAK HOUR VOLUME : 725 2015/08/07 16:00	PEAK HOUR TRUCK VOLUME	% TOTAL PEAK HOUR VOLUME	24 HOUR TRUCK VOLUME	AADT	% OF AADT	HPMS K-FACTOR (PEAK/AADT) (ITEM 66)
SINGLE UNIT TRUCKS (TYPE 4-7)	9	(65A-1) 1.24%	113	8200	(65A-2) 1.38%	8.84%
COMBINATION (TYPE 8-13)	5	(65B-1) 0.69%	29		(65B-2) 0.35%	8.84%

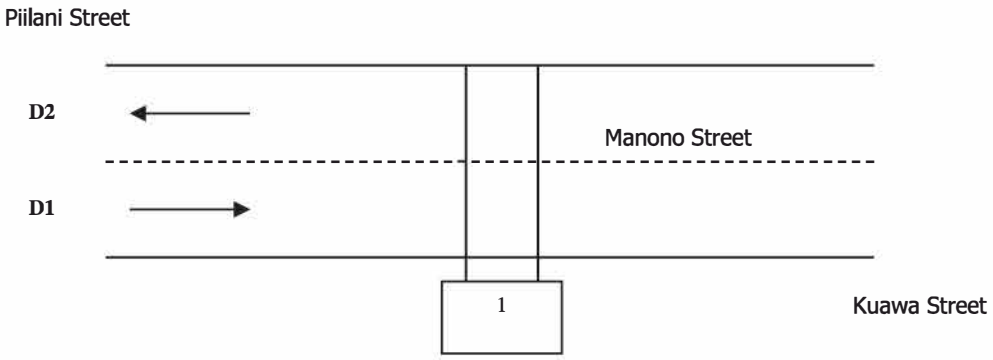
Traffic Data Service

Traffic Station Sketch

N

Island: Hawaii
Area: Hilo

Section ID/Station #: B71277000332



	Meter #	File Name	GPS
1.	bt31	D0413025_B71277000332 D0413026_B71277000332	19.72071, -155.07

Station Description:

Manono Street: Piilani Street to Kuawa Street

Survey Beginning Date/Time: 4/13/16 @ 0000		Survey Ending Date/Time: 4/14/16 @ 2400

Survey Method:	Road Tube	Data Type:	Vol
Survey Crew:	LM		
Sketch Updated:		By:	SR
Remarks:			

FACILITY NAME	JURI	FUNC CLASS	AREA TYPE	ROUTE NO.	ROUTE MILE
Manono Street		17		2770	

D1= Direction to End
D2= Direction to Begin

D1: Kuawa Street / Kamehameha Avenue
D2: Piilani Street / Haihai Street

4

Hawaii Department of Transportation

Highways Division — Highways Planning Survey Section

2016 Program Count - Summary

Town: Hawaii **DIR 1:** +MP **DIR 2:**-MP **Final AADT:** 7600

BAN:COLLECTOR **Count Type:** VOLUME **Counter Type:** Tube **Route No:** 2770

eet - Piilani Street to Kuawa St

2	TOTAL	TIME-AM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL
5	12	06:00-06:15	25	22	47	12:00-12:15	64	67	131	06:00-06:15	66	42	108
4	17	06:15-06:30	41	21	62	12:15-12:30	64	69	133	06:15-06:30	58	41	99
4	11	06:30-06:45	56	24	80	12:30-12:45	58	65	123	06:30-06:45	35	51	86
4	6	06:45-07:00	51	34	85	12:45-01:00	64	59	123	06:45-07:00	59	53	112
3	6	07:00-07:15	48	32	80	01:00-01:15	56	62	118	07:00-07:15	39	24	63
3	8	07:15-07:30	52	46	98	01:15-01:30	52	73	125	07:15-07:30	52	33	85
4	8	07:30-07:45	67	48	115	01:30-01:45	61	82	143	07:30-07:45	34	21	55
3	6	07:45-08:00	48	69	117	01:45-02:00	58	90	148	07:45-08:00	28	14	42
1	4	08:00-08:15	62	45	107	02:00-02:15	84	76	160	08:00-08:15	25	12	37
0	2	08:15-08:30	69	54	123	02:15-02:30	71	81	152	08:15-08:30	32	13	45
0	3	08:30-08:45	57	40	97	02:30-02:45	74	77	151	08:30-08:45	26	7	33
0	3	08:45-09:00	60	48	108	02:45-03:00	59	60	119	08:45-09:00	24	9	33
1	2	09:00-09:15	58	40	98	03:00-03:15	88	83	171	09:00-09:15	20	13	33
2	3	09:15-09:30	59	46	105	03:15-03:30	75	77	152	09:15-09:30	15	10	25
0	4	09:30-09:45	46	67	113	03:30-03:45	78	63	141	09:30-09:45	15	11	26
2	7	09:45-10:00	50	62	112	03:45-04:00	79	61	140	09:45-10:00	13	6	19
1	3	10:00-10:15	58	62	120	04:00-04:15	86	59	145	10:00-10:15	8	9	17
3	12	10:15-10:30	52	75	127	04:15-04:30	98	83	181	10:15-10:30	13	13	26
2	9	10:30-10:45	76	73	149	04:30-04:45	85	90	175	10:30-10:45	8	3	11
3	17	10:45-11:00	64	86	150	04:45-05:00	93	78	171	10:45-11:00	14	9	23
3	10	11:00-11:15	62	67	129	05:00-05:15	77	56	133	11:00-11:15	10	3	13
4	14	11:15-11:30	67	97	164	05:15-05:30	69	61	130	11:15-11:30	6	3	9
0	24	11:30-11:45	64	71	135	05:30-05:45	68	45	113	11:30-11:45	8	1	9
4	37	11:45-12:00	73	67	140	05:45-06:00	46	43	89	11:45-12:00	5	5	10

00-09:00)	DIR 1	DIR 2		PM COMMUTER PERIOD (15:00-19:00)	DIR 1	DIR 2	
				TWO DIRECTIONAL PEAK			
	07:30 AM to 08:30 AM			PM - PEAK HR TIME	04:00 PM to 05:00 PM		
	246	216	462	PM - PEAK HR VOLUME	362	310	672
			6.35	PM - K FACTOR (%)			9.24
	53.25	46.75	100.00	PM - D (%)	53.87	46.13	100.00
				DIRECTIONAL PEAK			
	08:00 AM to 09:00 AM	07:30 AM to 08:30 AM		PM - PEAK HR TIME	04:00 PM to 05:00 PM	04:00 PM to 05:00 PM	
	248	216		PM - PEAK HR VOLUME	362	310	

				PM PERIOD (12:00-24:00)			
				TWO DIRECTIONAL PEAK			
	10:30 AM to 11:30 AM			PM - PEAK HR TIME	04:00 PM to 05:00 PM		
	269	323	592	PM - PEAK HR VOLUME	362	310	672
			8.14	PM - K FACTOR (%)			9.24
	45.44	54.56	100.00	PM - D (%)	53.87	46.13	100.00

:00-15:00)				6-HR, 12-HR, 24-HR PERIODS	DIR 1	DIR 2	Total
				AM 6-HR PERIOD (06:00-12:00)	1,365	1,296	2,661
	01:45 PM to 02:45 PM			AM 12-HR PERIOD (00:00-12:00)	1,517	1,372	2,889
	287	324	611	PM 6-HR PERIOD (12:00-18:00)	1,707	1,660	3,367
				PM 12-HR PERIOD (12:00-24:00)	2,320	2,066	4,386
	02:00 PM to 03:00 PM	01:30 PM to 02:30 PM		24 HOUR PERIOD	3,837	3,438	7,275
	288	329		D (%)	52.74	47.26	100.00

Hawaii Department of Transportation
Highways Division — Highways Planning Survey Section
2016 Program Count - Summary

Town: Hawaii **DIR 1:** +MP **DIR 2:**-MP **Final AADT:** 7600

BAN:COLLECTOR **Count Type:** VOLUME **Counter Type:** Tube **Route No:** 2770

eet - Piilani Street to Kuawa St

2	TOTAL	TIME-AM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL
0	3	06:00-06:15	28	11	39	12:00-12:15	85	92	177	06:00-06:15	67	73	140
2	4	06:15-06:30	49	24	73	12:15-12:30	72	93	165	06:15-06:30	65	77	142
3	10	06:30-06:45	52	28	80	12:30-12:45	92	78	170	06:30-06:45	54	65	119
1	3	06:45-07:00	47	28	75	12:45-01:00	68	103	171	06:45-07:00	43	75	118
1	8	07:00-07:15	58	22	80	01:00-01:15	79	83	162	07:00-07:15	33	75	108
1	4	07:15-07:30	49	40	89	01:15-01:30	80	89	169	07:15-07:30	36	56	92
6	10	07:30-07:45	69	53	122	01:30-01:45	84	75	159	07:30-07:45	27	37	64
2	4	07:45-08:00	57	69	126	01:45-02:00	70	86	156	07:45-08:00	37	28	65
1	4	08:00-08:15	68	69	137	02:00-02:15	83	72	155	08:00-08:15	33	17	50
0	2	08:15-08:30	68	39	107	02:15-02:30	76	87	163	08:15-08:30	26	24	50
1	6	08:30-08:45	71	43	114	02:30-02:45	99	100	199	08:30-08:45	21	16	37
0	3	08:45-09:00	69	44	113	02:45-03:00	99	97	196	08:45-09:00	38	15	53
3	5	09:00-09:15	63	51	114	03:00-03:15	84	125	209	09:00-09:15	23	20	43
0	1	09:15-09:30	66	54	120	03:15-03:30	101	103	204	09:15-09:30	16	15	31
0	4	09:30-09:45	67	64	131	03:30-03:45	88	102	190	09:30-09:45	19	17	36
1	5	09:45-10:00	65	82	147	03:45-04:00	85	97	182	09:45-10:00	14	20	34
3	12	10:00-10:15	50	65	115	04:00-04:15	119	100	219	10:00-10:15	13	6	19
3	9	10:15-10:30	51	64	115	04:15-04:30	102	101	203	10:15-10:30	20	7	27
7	12	10:30-10:45	62	82	144	04:30-04:45	106	149	255	10:30-10:45	7	12	19
2	13	10:45-11:00	73	87	160	04:45-05:00	96	138	234	10:45-11:00	15	7	22
3	14	11:00-11:15	72	76	148	05:00-05:15	78	99	177	11:00-11:15	7	6	13
1	24	11:15-11:30	79	78	157	05:15-05:30	108	72	180	11:15-11:30	14	6	20
4	13	11:30-11:45	77	78	155	05:30-05:45	79	105	184	11:30-11:45	13	6	19
7	23	11:45-12:00	78	73	151	05:45-06:00	89	74	163	11:45-12:00	9	7	16

00-09:00)	DI R 1	DI R 2		PM COMMUTER PERI OD(15:00-19:00)	DI R1	DI R2	
				TWO DI RECTI ONALPEAK			
	07:30 AM to 08:30 AM			PM - PEAK HR TIME	04:00 PM to 05:00 PM		
	262	230	492	PM - PEAK HR VOLUME	423	488	911
			5.60	PM - K FACTOR (%)			10.37
	53.25	46.75	100.00	PM - D (%)	46.43	53.57	100.00
				DI RECTI ONALPEAK			
	08:00 AM to 09:00 AM	07:15 AM to 08:15 AM		PM - PEAK HR TIME	04:00 PM to 05:00 PM	04:00 PM to 05:00 PM	
	276	231		PM - PEAK HR VOLUME	423	488	
				PM PERI OD(12:00-24:00)			
				TWO DI RECTI ONALPEAK			
	10:45 AM to 11:45 AM			PM - PEAK HR TIME	04:00 PM to 05:00 PM		
	301	319	620	PM - PEAK HR VOLUME	423	488	911
			7.06	PM - K FACTOR (%)			10.37
	48.55	51.45	100.00	PM - D (%)	46.43	53.57	100.00

:00-15:00)				6-HR, 12-HR, 24-HR PERI ODS	DI R 1	DI R 2	Total
				AM 6-HR PERI OD(06:00-12:00)	1,488	1,324	2,812
	02:00 PM to 03:00 PM			AM 12-HR PERI OD(00:00-12:00)	1,622	1,386	3,008
	357	356	713	PM 6-HR PERI OD(12:00-18:00)	2,122	2,320	4,442
				PM 12-HR PERI OD(12:00-24:00)	2,772	3,007	5,779
	02:00 PM to 03:00 PM	12:00 PM to 01:00 PM		24 HOUR PERI OD	4,394	4,393	8,787
	357	366		D (%)	50.01	49.99	100.00

HDOT RIMS Traffic Station Analyzer (v48)

Run Date: 24-MAR-22

State of Hawaii, Department of Transportation, Highways Division
15 Minute Volume Report

Site ID: B71277000332
Functional Class: URBAN:COLLECTOR
Location:
Town: Hawaii
Count Type: CLASS
DATE: 18-SEP-19
DIR 1: +MP
Counter Type: Tube
DIR 2: -MP

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:30 to 08:30 AM		
AM - PEAK HR VOLUME	351	468	819
AM - K FACTOR(%)			7.52
AM - D(%)	42.86	57.14	100
DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:45 to 08:45 AM	07:30 to 08:30 AM	
AM - PEAK HR VOLUME	360	468	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	D
TWO DIRECTIONAL PEAK		
PM - PEAK HR TIME	04:15 to 05:15 PM	
PM - PEAK HR VOLUME	478	52
PM - K FACTOR(%)		
PM -D(%)	47.51	52
DIRECTIONAL PEAK		
PM - PEAK HR TIME	03:45 to 04:45 PM	04
PM - PEAK HR VOLUME	497	52

AM PERIOD (00:00-12:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:30 to 08:30 AM		
AM - PEAK HR VOLUME	351	468	819
AM - K FACTOR(%)			7.52
AM - D(%)	42.86	57.14	100

PM PERIOD (12:00-24:00)	DIR 1	D
TWO DIRECTIONAL PEAK		
PM - PEAK HR TIME	04:15 to 05:15 PM	
PM - PEAK HR VOLUME	478	52
PM - K FACTOR(%)		
PM -D(%)	47.51	52

NON COMMUTER PERIOD (09:00-15:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PEAK HR TIME	02:30 to 03:30 PM		
PEAK HR VOLUME	398	435	833
DIRECTIONAL PEAK			
PEAK HR TIME	02:30 to 03:30 PM	01:00 to 02:00 PM	
PEAK HR VOLUME	398	443	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	D
AM 6-HR PERIOD (06:00-12:00)	1,857	2,
AM 12-HR PERIOD (00:00-12:00)	2,040	2,
PM 6-HR PERIOD (12:00-18:00)	2,406	2,
PM 12-HR PERIOD (12:00-24:00)	3,046	3,
24-HR PERIOD (12:00-24:00)	5,086	5,
D%	46.69	53

TIME - AM	DIR1	DIR 2	TOTAL
12:00 - 12:15	5	5	10
12:15 - 12:30	7	5	12
12:30 - 12:45	6	10	16
12:45 - 01:00	2	4	6
01:00 - 01:15	2	4	6
01:15 - 01:30	1	9	10
01:30 - 01:45	5	7	12
01:45 - 02:00	2	1	3
02:00 - 02:15	4	6	10
02:15 - 02:30	3	1	4
02:30 - 02:45	0	9	9
02:45 - 03:00	4	6	10
03:00 - 03:15	4	6	10
03:15 - 03:30	7	6	13
03:30 - 03:45	6	3	9
03:45 - 04:00	10	7	17
04:00 - 04:15	11	6	17
04:15 - 04:30	4	9	13
04:30 - 04:45	10	11	21
04:45 - 05:00	15	13	28
05:00 - 05:15	18	11	29
05:15 - 05:30	16	12	28
05:30 - 05:45	17	13	30
05:45 - 06:00	24	23	47

TIME - AM	DIR1	DIR 2	TOTAL
06:00 - 06:15	29	40	69
06:15 - 06:30	64	59	123
06:30 - 06:45	60	59	119
06:45 - 07:00	55	70	125
07:00 - 07:15	79	77	156
07:15 - 07:30	69	87	156
07:30 - 07:45	91	126	217
07:45 - 08:00	79	122	201
08:00 - 08:15	86	106	192
08:15 - 08:30	95	114	209
08:30 - 08:45	100	79	179
08:45 - 09:00	74	72	146
09:00 - 09:15	74	80	154
09:15 - 09:30	68	90	158
09:30 - 09:45	78	86	164
09:45 - 10:00	83	102	185
10:00 - 10:15	83	95	178
10:15 - 10:30	73	82	155
10:30 - 10:45	72	94	166
10:45 - 11:00	98	90	188
11:00 - 11:15	94	123	217
11:15 - 11:30	96	99	195
11:30 - 11:45	85	116	201
11:45 - 12:00	72	104	176

TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	104	107	211
12:15 - 12:30	96	100	196
12:30 - 12:45	81	113	194
12:45 - 01:00	97	86	183
01:00 - 01:15	93	98	191
01:15 - 01:30	87	117	204
01:30 - 01:45	97	121	218
01:45 - 02:00	93	107	200
02:00 - 02:15	107	92	199
02:15 - 02:30	81	99	180
02:30 - 02:45	101	110	211
02:45 - 03:00	102	115	217
03:00 - 03:15	94	102	196
03:15 - 03:30	101	108	209
03:30 - 03:45	91	85	176
03:45 - 04:00	124	115	239
04:00 - 04:15	120	102	222
04:15 - 04:30	124	116	240
04:30 - 04:45	129	144	273
04:45 - 05:00	104	148	252
05:00 - 05:15	121	120	241
05:15 - 05:30	102	111	213
05:30 - 05:45	83	149	232
05:45 - 06:00	74	93	167

HDOT RIMS Traffic Station Analyzer (v48)

release 48 Set Screen Reader Mode On

HDOT RIMS Traffic Station Analyzer (v48)

Run Date: 24-MAR-22

State of Hawaii, Department of Transportation, Highways Division
15 Minute Volume Report

Site ID: B71277000332
Functional Class: URBAN:COLLECTOR
Location:
Town: Hawaii
Count Type: CLASS
DATE: 19-SEP -19
DIR 1: +MP
Counter Type: Tube
DIR 2: -MP

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:15 to 08:15 AM		
AM - PEAK HR VOLUME	318	467	785
AM - K FACTOR(%)			8.05
AM - D(%)	40.51	59.49	100
DIRECTIONAL PEAK			
AM - PEAK HR TIME	08:30 to 09:30 AM	07:15 to 08:15 AM	
AM - PEAK HR VOLUME	320	467	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	D
TWO DIRECTIONAL PEAK		
PM - PEAK HR TIME	03:00 to 04:00 PM	
PM - PEAK HR VOLUME	437	5
PM - K FACTOR(%)		
PM -D(%)	45.71	5
DIRECTIONAL PEAK		
PM - PEAK HR TIME	03:15 to 04:15 PM	0
PM - PEAK HR VOLUME	462	5

AM PERIOD (00:00-12:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	11:45 to 12:45 PM		
AM - PEAK HR VOLUME	381	445	826
AM - K FACTOR(%)			8.48
AM - D(%)	40.51	59.49	100

PM PERIOD (12:00-24:00)	DIR 1	D
TWO DIRECTIONAL PEAK		
PM - PEAK HR TIME	02:45 to 03:45 PM	
PM - PEAK HR VOLUME	414	5
PM - K FACTOR(%)		
PM -D(%)	45.71	5

NON COMMUTER PERIOD (09:00-15:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PEAK HR TIME	02:45 to 03:45 PM		
PEAK HR VOLUME	414	563	977
DIRECTIONAL PEAK			
PEAK HR TIME	02:45 to 03:45 PM	02:45 to 03:45 PM	
PEAK HR VOLUME	414	563	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	D
AM 6-HR PERIOD (06:00-12:00)	1,770	2,
AM 12-HR PERIOD (00:00-12:00)	1,972	2,
PM 6-HR PERIOD (12:00-18:00)	2,368	1,
PM 12-HR PERIOD (12:00-24:00)	3,480	1,
24-HR PERIOD (12:00-24:00)	5,452	4,
D%	55.94	4

TIME - AM	DIR1	DIR 2	TOTAL
12:00 - 12:15	6	9	15
12:15 - 12:30	2	1	3
12:30 - 12:45	3	1	4
12:45 - 01:00	4	3	7
01:00 - 01:15	6	6	12
01:15 - 01:30	4	4	8
01:30 - 01:45	3	7	10
01:45 - 02:00	7	4	11
02:00 - 02:15	4	6	10
02:15 - 02:30	1	10	11
02:30 - 02:45	4	3	7
02:45 - 03:00	7	12	19
03:00 - 03:15	10	2	12
03:15 - 03:30	9	9	18
03:30 - 03:45	7	7	14
03:45 - 04:00	8	6	14
04:00 - 04:15	6	9	15
04:15 - 04:30	9	7	16
04:30 - 04:45	13	11	24
04:45 - 05:00	12	11	23
05:00 - 05:15	11	7	18
05:15 - 05:30	15	9	24
05:30 - 05:45	25	21	46
05:45 - 06:00	26	27	53

TIME - AM	DIR1	DIR 2	TOTAL
06:00 - 06:15	33	31	64
06:15 - 06:30	57	64	121
06:30 - 06:45	60	52	112
06:45 - 07:00	54	60	114
07:00 - 07:15	66	85	151
07:15 - 07:30	72	105	177
07:30 - 07:45	87	105	192
07:45 - 08:00	84	132	216
08:00 - 08:15	75	125	200
08:15 - 08:30	65	81	146
08:30 - 08:45	87	81	168
08:45 - 09:00	77	83	160
09:00 - 09:15	81	80	161
09:15 - 09:30	75	89	164
09:30 - 09:45	65	95	160
09:45 - 10:00	67	78	145
10:00 - 10:15	82	96	178
10:15 - 10:30	80	110	190
10:30 - 10:45	82	87	169
10:45 - 11:00	79	114	193
11:00 - 11:15	86	99	185
11:15 - 11:30	77	89	166
11:30 - 11:45	93	92	185
11:45 - 12:00	86	123	209

TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	91	104	195
12:15 - 12:30	88	105	193
12:30 - 12:45	116	113	229
12:45 - 01:00	89	96	185
01:00 - 01:15	101	95	196
01:15 - 01:30	70	115	185
01:30 - 01:45	107	104	211
01:45 - 02:00	100	115	215
02:00 - 02:15	103	116	219
02:15 - 02:30	98	118	216
02:30 - 02:45	105	113	218
02:45 - 03:00	96	152	248
03:00 - 03:15	92	150	242
03:15 - 03:30	119	131	250
03:30 - 03:45	107	130	237
03:45 - 04:00	119	108	227
04:00 - 04:15	117	55	172
04:15 - 04:30	94	0	94
04:30 - 04:45	91	0	91
04:45 - 05:00	110	0	110
05:00 - 05:15	118	0	118
05:15 - 05:30	81	0	81
05:30 - 05:45	76	0	76
05:45 - 06:00	80	0	80

HDOT RIMS Traffic Station Analyzer (v48)

release 48 Set Screen Reader Mode On

HDOT RIMS Traffic Station Analyzer (v48)

Run Date: 24-MAR-22

State of Hawaii, Department of Transportation, Highways Division
15 Minute Volume Report

Site ID: B71277000332
Functional Class: URBAN:COLLECTOR
Location:

Town: Hawaii
Count Type: CLASS
DATE: 10-DEC-20

DIR 1: +MP
Counter Type: Tube

DIR 2: -MP

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	08:45 to 09:45 AM		
AM - PEAK HR VOLUME	246	246	492
AM - K FACTOR(%)			6.01
AM - D(%)	50	50	100
DIRECTIONAL PEAK			
AM - PEAK HR TIME	08:45 to 09:45 AM	08:45 to 09:45 AM	
AM - PEAK HR VOLUME	246	246	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	D
TWO DIRECTIONAL PEAK		
PM - PEAK HR TIME	03:45 to 04:45 PM	
PM - PEAK HR VOLUME	337	3
PM - K FACTOR(%)		
PM -D(%)	47.33	5
DIRECTIONAL PEAK		
PM - PEAK HR TIME	03:00 to 04:00 PM	0
PM - PEAK HR VOLUME	341	3

AM PERIOD (00:00-12:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	10:45 to 11:45 AM		
AM - PEAK HR VOLUME	312	364	676
AM - K FACTOR(%)			8.25
AM - D(%)	50	50	100

PM PERIOD (12:00-24:00)	DIR 1	D
TWO DIRECTIONAL PEAK		
PM - PEAK HR TIME	03:45 to 04:45 PM	
PM - PEAK HR VOLUME	337	3
PM - K FACTOR(%)		
PM -D(%)	47.33	5

NON COMMUTER PERIOD (09:00-15:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PEAK HR TIME	02:15 to 03:15 PM		
PEAK HR VOLUME	302	398	700
DIRECTIONAL PEAK			
PEAK HR TIME	10:30 to 11:30 AM	02:15 to 03:15 PM	
PEAK HR VOLUME	342	398	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	D
AM 6-HR PERIOD (06:00-12:00)	1,396	1,
AM 12-HR PERIOD (00:00-12:00)	1,548	1,
PM 6-HR PERIOD (12:00-18:00)	1,789	2,
PM 12-HR PERIOD (12:00-24:00)	2,315	2,
24-HR PERIOD (12:00-24:00)	3,863	4,
D%	47.17	5

TIME - AM	DIR1	DIR 2	TOTAL
12:00 - 12:15	5	9	14
12:15 - 12:30	1	10	11
12:30 - 12:45	4	4	8
12:45 - 01:00	1	4	5
01:00 - 01:15	0	2	2
01:15 - 01:30	3	2	5
01:30 - 01:45	1	3	4
01:45 - 02:00	2	4	6
02:00 - 02:15	1	3	4
02:15 - 02:30	6	1	7
02:30 - 02:45	5	1	6
02:45 - 03:00	4	7	11
03:00 - 03:15	6	1	7
03:15 - 03:30	7	1	8
03:30 - 03:45	6	3	9
03:45 - 04:00	3	3	6
04:00 - 04:15	6	3	9
04:15 - 04:30	4	2	6
04:30 - 04:45	7	2	9
04:45 - 05:00	11	6	17
05:00 - 05:15	6	5	11
05:15 - 05:30	17	7	24
05:30 - 05:45	21	12	33
05:45 - 06:00	25	13	38

TIME - AM	DIR1	DIR 2	TOTAL
06:00 - 06:15	22	16	38
06:15 - 06:30	28	52	80
06:30 - 06:45	31	40	71
06:45 - 07:00	38	35	73
07:00 - 07:15	39	35	74
07:15 - 07:30	54	52	106
07:30 - 07:45	57	58	115
07:45 - 08:00	50	56	106
08:00 - 08:15	65	68	133
08:15 - 08:30	52	56	108
08:30 - 08:45	52	45	97
08:45 - 09:00	57	66	123
09:00 - 09:15	64	62	126
09:15 - 09:30	66	59	125
09:30 - 09:45	59	59	118
09:45 - 10:00	49	63	112
10:00 - 10:15	61	90	151
10:15 - 10:30	62	72	134
10:30 - 10:45	97	70	167
10:45 - 11:00	89	87	176
11:00 - 11:15	79	92	171
11:15 - 11:30	77	84	161
11:30 - 11:45	67	101	168
11:45 - 12:00	81	72	153

TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	73	98	171
12:15 - 12:30	63	96	159
12:30 - 12:45	72	78	150
12:45 - 01:00	78	72	150
01:00 - 01:15	75	73	148
01:15 - 01:30	93	87	180
01:30 - 01:45	75	85	160
01:45 - 02:00	75	96	171
02:00 - 02:15	72	78	150
02:15 - 02:30	72	96	168
02:30 - 02:45	63	100	163
02:45 - 03:00	72	94	166
03:00 - 03:15	95	108	203
03:15 - 03:30	78	81	159
03:30 - 03:45	73	95	168
03:45 - 04:00	95	77	172
04:00 - 04:15	76	94	170
04:15 - 04:30	72	84	156
04:30 - 04:45	94	120	214
04:45 - 05:00	57	96	153
05:00 - 05:15	78	82	160
05:15 - 05:30	62	86	148
05:30 - 05:45	75	79	154
05:45 - 06:00	51	94	145

HDOT RIMS Traffic Station Analyzer (v48)

release 48 Set Screen Reader Mode On

HDOT RIMS Traffic Station Analyzer (v48)

Run Date: 24-MAR-22

State of Hawaii, Department of Transportation, Highways Division
15 Minute Volume Report

Site ID: B71277000332
Functional Class: URBAN:COLLECTOR
Location:
Town: Hawaii
Count Type: CLASS
DATE: 11-DEC-20
DIR 1: +MP
Counter Type: Tube
DIR 2: -MP

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	08:30 to 09:30 AM		
AM - PEAK HR VOLUME	276	277	553
AM - K FACTOR(%)			5.92
AM - D(%)	49.91	50.09	100
DIRECTIONAL PEAK			
AM - PEAK HR TIME	08:45 to 09:45 AM	08:30 to 09:30 AM	
AM - PEAK HR VOLUME	287	277	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	D
TWO DIRECTIONAL PEAK		
PM - PEAK HR TIME	03:45 to 04:45 PM	
PM - PEAK HR VOLUME	405	3
PM - K FACTOR(%)		
PM -D(%)	51.2	4
DIRECTIONAL PEAK		
PM - PEAK HR TIME	03:15 to 04:15 PM	0
PM - PEAK HR VOLUME	411	4

AM PERIOD (00:00-12:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	11:45 to 12:45 PM		
AM - PEAK HR VOLUME	358	448	806
AM - K FACTOR(%)			8.63
AM - D(%)	49.91	50.09	100

PM PERIOD (12:00-24:00)	DIR 1	D
TWO DIRECTIONAL PEAK		
PM - PEAK HR TIME	12:00 to 01:00 PM	
PM - PEAK HR VOLUME	385	4
PM - K FACTOR(%)		
PM -D(%)	51.2	4

NON COMMUTER PERIOD (09:00-15:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PEAK HR TIME	12:00 to 01:00 PM		
PEAK HR VOLUME	385	461	846
DIRECTIONAL PEAK			
PEAK HR TIME	12:00 to 01:00 PM	12:00 to 01:00 PM	
PEAK HR VOLUME	385	461	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	D
AM 6-HR PERIOD (06:00-12:00)	1,514	1,
AM 12-HR PERIOD (00:00-12:00)	1,684	1,
PM 6-HR PERIOD (12:00-18:00)	2,142	2,
PM 12-HR PERIOD (12:00-24:00)	2,749	3,
24-HR PERIOD (12:00-24:00)	4,433	4,
D%	47.49	5

TIME - AM	DIR1	DIR 2	TOTAL
12:00 - 12:15	2	5	7
12:15 - 12:30	10	8	18
12:30 - 12:45	3	5	8
12:45 - 01:00	5	5	10
01:00 - 01:15	2	3	5
01:15 - 01:30	7	3	10
01:30 - 01:45	2	8	10
01:45 - 02:00	2	4	6
02:00 - 02:15	4	5	9
02:15 - 02:30	2	4	6
02:30 - 02:45	4	2	6
02:45 - 03:00	2	2	4
03:00 - 03:15	3	3	6
03:15 - 03:30	5	3	8
03:30 - 03:45	8	7	15
03:45 - 04:00	4	3	7
04:00 - 04:15	10	4	14
04:15 - 04:30	5	6	11
04:30 - 04:45	11	7	18
04:45 - 05:00	15	4	19
05:00 - 05:15	11	6	17
05:15 - 05:30	16	12	28
05:30 - 05:45	13	6	19
05:45 - 06:00	24	21	45

TIME - AM	DIR1	DIR 2	TOTAL
06:00 - 06:15	18	13	31
06:15 - 06:30	20	46	66
06:30 - 06:45	31	37	68
06:45 - 07:00	45	41	86
07:00 - 07:15	41	40	81
07:15 - 07:30	51	42	93
07:30 - 07:45	77	54	131
07:45 - 08:00	78	76	154
08:00 - 08:15	58	44	102
08:15 - 08:30	44	59	103
08:30 - 08:45	63	68	131
08:45 - 09:00	67	62	129
09:00 - 09:15	67	70	137
09:15 - 09:30	79	77	156
09:30 - 09:45	74	56	130
09:45 - 10:00	64	68	132
10:00 - 10:15	73	86	159
10:15 - 10:30	70	92	162
10:30 - 10:45	88	84	172
10:45 - 11:00	74	98	172
11:00 - 11:15	75	92	167
11:15 - 11:30	95	100	195
11:30 - 11:45	86	103	189
11:45 - 12:00	76	102	178

TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	90	118	208
12:15 - 12:30	95	111	206
12:30 - 12:45	97	117	214
12:45 - 01:00	103	115	218
01:00 - 01:15	74	95	169
01:15 - 01:30	86	97	183
01:30 - 01:45	108	113	221
01:45 - 02:00	96	100	196
02:00 - 02:15	82	103	185
02:15 - 02:30	99	94	193
02:30 - 02:45	82	94	176
02:45 - 03:00	87	102	189
03:00 - 03:15	82	130	212
03:15 - 03:30	99	89	188
03:30 - 03:45	100	93	193
03:45 - 04:00	100	83	183
04:00 - 04:15	112	101	213
04:15 - 04:30	89	97	186
04:30 - 04:45	104	105	209
04:45 - 05:00	69	103	172
05:00 - 05:15	89	83	172
05:15 - 05:30	76	86	162
05:30 - 05:45	70	82	152
05:45 - 06:00	53	117	170

HDOT RIMS Traffic Station Analyzer (v48)

release 48 Set Screen Reader Mode On

HDOT RIMS Traffic Station Analyzer (v48)

Run Date: 24-MAR-22

State of Hawaii, Department of Transportation, Highways Division
15 Minute Volume Report

Site ID: B71277000332
Functional Class: URBAN:COLLECTOR
Location:

Town: Hawaii
Count Type: CLASS
DATE: 26-APR-21

DIR 1: +MP
Counter Type: Tube

DIR 2: -MP

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:45 to 08:45 AM		
AM - PEAK HR VOLUME	290	324	614
AM - K FACTOR(%)			5.81
AM - D(%)	47.23	52.77	100
DIRECTIONAL PEAK			
AM - PEAK HR TIME	07:45 to 08:45 AM	07:30 to 08:30 AM	
AM - PEAK HR VOLUME	290	324	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	D
TWO DIRECTIONAL PEAK		
PM - PEAK HR TIME	03:45 to 04:45 PM	
PM - PEAK HR VOLUME	496	54
PM - K FACTOR(%)		
PM -D(%)	47.51	52
DIRECTIONAL PEAK		
PM - PEAK HR TIME	03:45 to 04:45 PM	03
PM - PEAK HR VOLUME	496	54

AM PERIOD (00:00-12:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	11:30 to 12:30 PM		
AM - PEAK HR VOLUME	404	436	840
AM - K FACTOR(%)			7.95
AM - D(%)	47.23	52.77	100

PM PERIOD (12:00-24:00)	DIR 1	D
TWO DIRECTIONAL PEAK		
PM - PEAK HR TIME	03:45 to 04:45 PM	
PM - PEAK HR VOLUME	496	54
PM - K FACTOR(%)		
PM -D(%)	47.51	52

NON COMMUTER PERIOD (09:00-15:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PEAK HR TIME	02:30 to 03:30 PM		
PEAK HR VOLUME	431	526	957
DIRECTIONAL PEAK			
PEAK HR TIME	02:30 to 03:30 PM	02:30 to 03:30 PM	
PEAK HR VOLUME	431	526	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	D
AM 6-HR PERIOD (06:00-12:00)	1,710	1,
AM 12-HR PERIOD (00:00-12:00)	1,875	2,
PM 6-HR PERIOD (12:00-18:00)	2,320	2,
PM 12-HR PERIOD (12:00-24:00)	2,876	3,
24-HR PERIOD (12:00-24:00)	4,751	5,
D%	44.94	55

TIME - AM	DIR1	DIR 2	TOTAL
12:00 - 12:15	5	11	16
12:15 - 12:30	5	8	13
12:30 - 12:45	4	8	12
12:45 - 01:00	5	4	9
01:00 - 01:15	3	5	8
01:15 - 01:30	5	5	10
01:30 - 01:45	4	6	10
01:45 - 02:00	0	2	2
02:00 - 02:15	1	2	3
02:15 - 02:30	3	3	6
02:30 - 02:45	2	3	5
02:45 - 03:00	2	2	4
03:00 - 03:15	4	5	9
03:15 - 03:30	7	7	14
03:30 - 03:45	6	1	7
03:45 - 04:00	2	8	10
04:00 - 04:15	6	1	7
04:15 - 04:30	4	11	15
04:30 - 04:45	8	6	14
04:45 - 05:00	9	6	15
05:00 - 05:15	14	9	23
05:15 - 05:30	18	10	28
05:30 - 05:45	19	14	33
05:45 - 06:00	29	23	52

TIME - AM	DIR1	DIR 2	TOTAL
06:00 - 06:15	34	21	55
06:15 - 06:30	36	46	82
06:30 - 06:45	43	43	86
06:45 - 07:00	56	56	112
07:00 - 07:15	40	51	91
07:15 - 07:30	66	69	135
07:30 - 07:45	68	82	150
07:45 - 08:00	78	86	164
08:00 - 08:15	62	80	142
08:15 - 08:30	76	76	152
08:30 - 08:45	74	82	156
08:45 - 09:00	61	77	138
09:00 - 09:15	62	63	125
09:15 - 09:30	71	80	151
09:30 - 09:45	76	74	150
09:45 - 10:00	71	91	162
10:00 - 10:15	87	99	186
10:15 - 10:30	83	115	198
10:30 - 10:45	88	93	181
10:45 - 11:00	84	102	186
11:00 - 11:15	95	116	211
11:15 - 11:30	87	114	201
11:30 - 11:45	109	109	218
11:45 - 12:00	103	105	208

TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	94	113	207
12:15 - 12:30	98	109	207
12:30 - 12:45	84	110	194
12:45 - 01:00	113	131	244
01:00 - 01:15	90	129	219
01:15 - 01:30	75	101	176
01:30 - 01:45	81	92	173
01:45 - 02:00	82	122	204
02:00 - 02:15	93	119	212
02:15 - 02:30	71	112	183
02:30 - 02:45	122	130	252
02:45 - 03:00	107	132	239
03:00 - 03:15	103	140	243
03:15 - 03:30	99	124	223
03:30 - 03:45	93	123	216
03:45 - 04:00	123	136	259
04:00 - 04:15	133	132	265
04:15 - 04:30	111	138	249
04:30 - 04:45	129	142	271
04:45 - 05:00	101	119	220
05:00 - 05:15	77	133	210
05:15 - 05:30	88	107	195
05:30 - 05:45	83	94	177
05:45 - 06:00	70	90	160

HDOT RIMS Traffic Station Analyzer (v48)

release 48 Set Screen Reader Mode On

HDOT RIMS Traffic Station Analyzer (v48)

Run Date: 24-MAR-22

State of Hawaii, Department of Transportation, Highways Division
15 Minute Volume Report

Site ID: B71277000332
Functional Class: URBAN:COLLECTOR
Location:

Town: Hawaii
Count Type: CLASS
DATE: 27-APR-21

DIR 1: +MP
Counter Type: Tube

DIR 2: -MP

AM COMMUTER PERIOD (05:00-09:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	08:45 to 09:45 AM		
AM - PEAK HR VOLUME	382	366	748
AM - K FACTOR(%)			5.36
AM - D(%)	51.07	48.93	100
DIRECTIONAL PEAK			
AM - PEAK HR TIME	08:45 to 09:45 AM	07:30 to 08:30 AM	
AM - PEAK HR VOLUME	382	370	

PM COMMUTER PERIOD (15:00-19:00)	DIR 1	D
TWO DIRECTIONAL PEAK		
PM - PEAK HR TIME	03:30 to 04:30 PM	
PM - PEAK HR VOLUME	1,080	8
PM - K FACTOR(%)		
PM -D(%)	57.05	4
DIRECTIONAL PEAK		
PM - PEAK HR TIME	03:30 to 04:30 PM	0
PM - PEAK HR VOLUME	1,080	8

AM PERIOD (00:00-12:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
AM - PEAK HR TIME	10:30 to 11:30 AM		
AM - PEAK HR VOLUME	473	459	932
AM - K FACTOR(%)			6.68
AM - D(%)	51.07	48.93	100

PM PERIOD (12:00-24:00)	DIR 1	D
TWO DIRECTIONAL PEAK		
PM - PEAK HR TIME	03:30 to 04:30 PM	
PM - PEAK HR VOLUME	1,080	8
PM - K FACTOR(%)		
PM -D(%)	57.05	4

NON COMMUTER PERIOD (09:00-15:00)	DIR 1	DIR 2	TOTAL
TWO DIRECTIONAL PEAK			
PEAK HR TIME	02:45 to 03:45 PM		
PEAK HR VOLUME	887	803	1,690
DIRECTIONAL PEAK			
PEAK HR TIME	02:45 to 03:45 PM	02:00 to 03:00 PM	
PEAK HR VOLUME	887	803	

6-HR, 12-HR, 24-HR PERIODS	DIR 1	D
AM 6-HR PERIOD (06:00-12:00)	2,102	2,
AM 12-HR PERIOD (00:00-12:00)	2,268	2,
PM 6-HR PERIOD (12:00-18:00)	4,138	3,
PM 12-HR PERIOD (12:00-24:00)	4,731	4,
24-HR PERIOD (12:00-24:00)	6,999	6,
D%	50.14	4

TIME - AM	DIR1	DIR 2	TOTAL
12:00 - 12:15	1	8	9
12:15 - 12:30	4	6	10
12:30 - 12:45	5	9	14
12:45 - 01:00	3	7	10
01:00 - 01:15	0	1	1
01:15 - 01:30	1	3	4
01:30 - 01:45	5	6	11
01:45 - 02:00	1	7	8
02:00 - 02:15	5	2	7
02:15 - 02:30	0	4	4
02:30 - 02:45	4	6	10
02:45 - 03:00	5	3	8
03:00 - 03:15	0	4	4
03:15 - 03:30	3	6	9
03:30 - 03:45	4	4	8
03:45 - 04:00	1	8	9
04:00 - 04:15	5	5	10
04:15 - 04:30	3	8	11
04:30 - 04:45	10	16	26
04:45 - 05:00	12	6	18
05:00 - 05:15	13	8	21
05:15 - 05:30	28	11	39
05:30 - 05:45	23	19	42
05:45 - 06:00	30	23	53

TIME - AM	DIR1	DIR 2	TOTAL
06:00 - 06:15	21	22	43
06:15 - 06:30	37	43	80
06:30 - 06:45	51	60	111
06:45 - 07:00	39	48	87
07:00 - 07:15	56	59	115
07:15 - 07:30	74	70	144
07:30 - 07:45	69	94	163
07:45 - 08:00	105	116	221
08:00 - 08:15	85	82	167
08:15 - 08:30	80	78	158
08:30 - 08:45	78	74	152
08:45 - 09:00	80	87	167
09:00 - 09:15	99	86	185
09:15 - 09:30	116	90	206
09:30 - 09:45	87	103	190
09:45 - 10:00	111	88	199
10:00 - 10:15	105	86	191
10:15 - 10:30	114	82	196
10:30 - 10:45	115	115	230
10:45 - 11:00	116	122	238
11:00 - 11:15	123	118	241
11:15 - 11:30	119	104	223
11:30 - 11:45	112	103	215
11:45 - 12:00	110	107	217

TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	132	115	247
12:15 - 12:30	129	108	237
12:30 - 12:45	98	114	212
12:45 - 01:00	114	105	219
01:00 - 01:15	177	202	379
01:15 - 01:30	202	180	382
01:30 - 01:45	171	187	358
01:45 - 02:00	223	187	410
02:00 - 02:15	230	211	441
02:15 - 02:30	215	199	414
02:30 - 02:45	191	203	394
02:45 - 03:00	220	190	410
03:00 - 03:15	214	196	410
03:15 - 03:30	211	212	423
03:30 - 03:45	242	205	447
03:45 - 04:00	271	202	473
04:00 - 04:15	267	193	460
04:15 - 04:30	300	213	513
04:30 - 04:45	101	132	233
04:45 - 05:00	100	129	229
05:00 - 05:15	93	91	184
05:15 - 05:30	79	98	177
05:30 - 05:45	76	107	183
05:45 - 06:00	82	97	179

HDOT RIMS Traffic Station Analyzer (v48)

release 48 Set Screen Reader Mode On

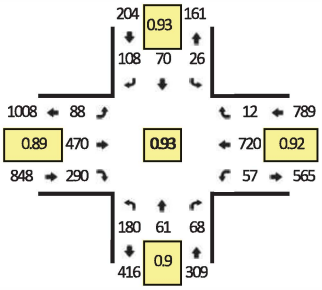
Type of peak hour being reported: Intersection Peak

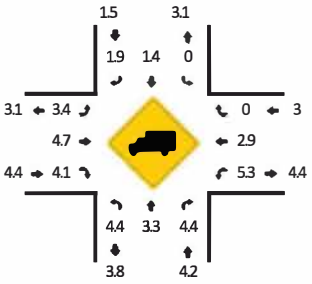
Method for determining peak hour: Total Entering Volume

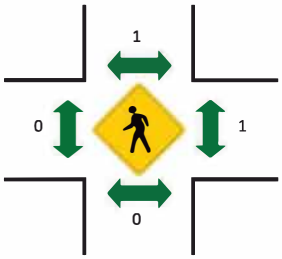
LOCATION: Manono St -- Hawaii Route 19/Mamalahoa Hwy
CITY/STATE: Hilo, HI

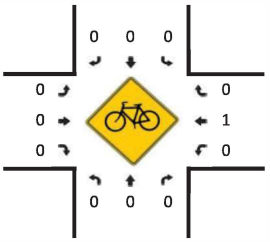
QC JOB #: 15767801
DATE: Wed, Apr 6 2022

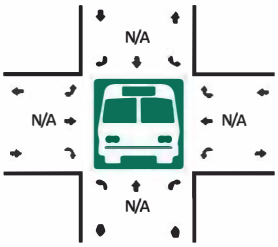
Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

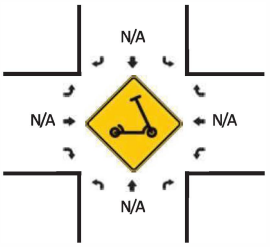


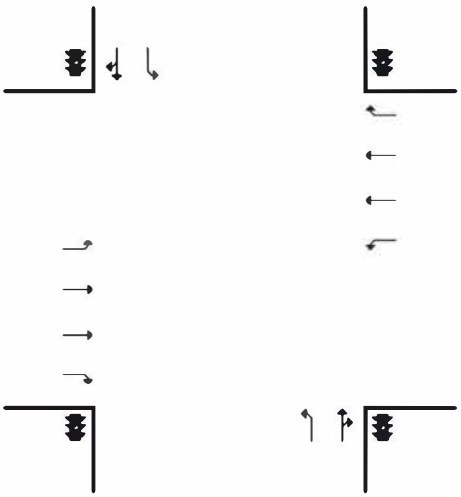












15-Min Count Period Beginning At	Manono St (Northbound)				Manono St (Southbound)				Hawaii Route 19/Mamalahoa Hwy (Eastbound)				Hawaii Route 19/Mamalahoa Hwy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	21	11	7	0	2	4	12	0	7	57	47	0	3	105	3	0	279	
6:45 AM	21	12	14	0	2	6	15	0	13	80	47	0	5	115	2	0	332	
7:00 AM	47	12	8	0	6	17	18	0	20	103	63	0	10	144	1	0	449	
7:15 AM	46	15	10	0	2	16	12	0	21	116	74	0	12	157	2	0	483	1543
7:30 AM	55	14	17	0	5	21	23	0	15	133	79	0	11	198	4	1	576	1840
7:45 AM	40	18	14	0	4	10	34	0	26	124	88	0	14	185	4	0	561	2069
8:00 AM	37	15	17	0	8	19	28	0	23	110	65	0	20	170	2	0	514	2134
8:15 AM	48	14	20	0	9	20	23	0	24	103	58	0	11	167	2	0	499	2150
8:30 AM	31	11	18	0	7	26	37	0	22	113	72	0	20	156	4	0	517	2091
8:45 AM	47	12	30	0	5	24	16	0	26	124	88	0	11	119	4	0	506	2036
9:00 AM	39	12	19	0	10	16	27	0	17	105	63	0	12	121	9	0	450	1972
9:15 AM	48	14	11	0	9	21	29	0	19	105	61	0	16	137	4	0	474	1947

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	220	56	68	0	20	84	92	0	60	532	316	0	44	792	16	4	2304
Heavy Trucks	4	0	8		0	0	0		4	48	12		0	12	0		88
Buses																	
Pedestrians		0				4				0				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 4/14/2022 4:25 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

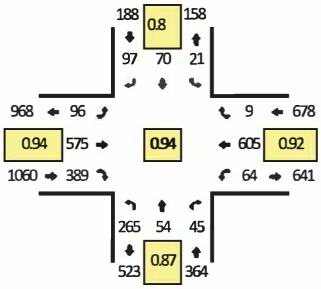
Type of peak hour being reported: Intersection Peak

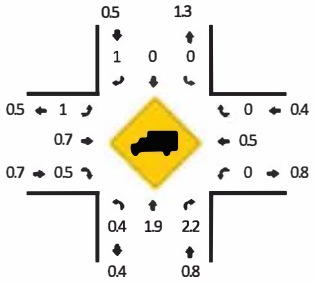
Method for determining peak hour: Total Entering Volume

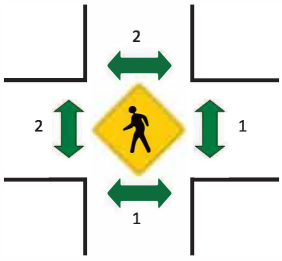
LOCATION: Manono St -- Hawaii Route 19/Mamalahoa Hwy
CITY/STATE: Hilo, HI

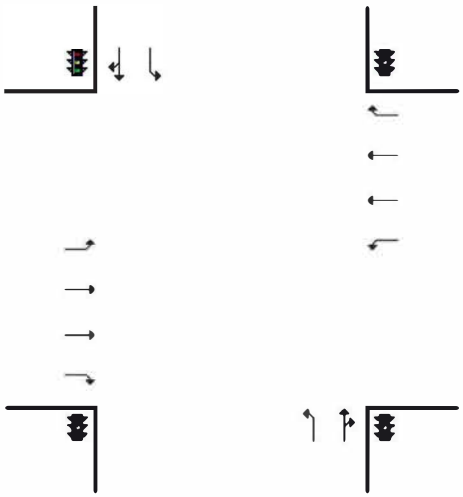
QC JOB #: 15767803
DATE: Wed, Apr 6 2022

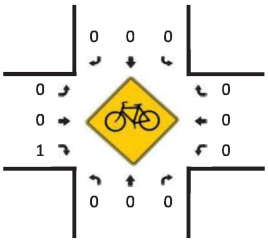
Peak-Hour: 3:45 PM -- 4:45 PM
Peak 15-Min: 4:00 PM -- 4:15 PM

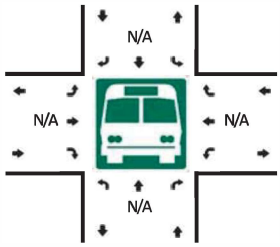


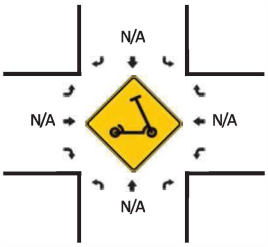












15-Min Count Period Beginning At	Manono St (Northbound)				Manono St (Southbound)				Hawaii Route 19/Mamalahoa Hwy (Eastbound)				Hawaii Route 19/Mamalahoa Hwy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	61	8	15	0	5	17	19	0	23	126	84	0	12	156	3	0	529	
3:15 PM	58	11	11	0	6	17	16	0	28	131	74	0	12	178	1	0	543	
3:30 PM	59	8	11	0	6	10	24	0	28	126	98	0	11	160	2	0	543	
3:45 PM	55	18	14	0	1	16	24	0	27	143	97	0	14	129	5	0	543	2158
4:00 PM	77	15	13	0	10	21	28	0	27	149	105	0	14	147	1	0	607	2236
4:15 PM	63	13	9	0	5	17	27	0	22	127	87	1	15	169	0	0	555	2248
4:30 PM	70	8	9	0	5	16	18	0	19	156	100	0	21	160	3	0	585	2290
4:45 PM	51	20	15	0	5	10	14	0	27	122	90	0	10	131	2	0	497	2244
5:00 PM	51	13	13	0	9	13	28	0	31	117	59	0	11	107	4	0	456	2093
5:15 PM	47	21	14	0	3	19	28	0	22	114	70	0	7	110	2	0	457	1995
5:30 PM	55	16	6	0	3	16	20	0	26	103	56	0	6	118	5	0	430	1840
5:45 PM	29	11	4	0	12	15	27	0	23	113	63	0	9	78	3	0	387	1730

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	308	60	52	0	40	84	112	0	108	596	420	0	56	588	4	0	2428
Heavy Trucks	4	0	4		0	0	0		0	4	4		0	4	0		20
Buses																	
Pedestrians		0				8				8				0			16
Bicycles	0	0	0		0	0	0		0	0	4		0	0	0		4
Scooters																	

Comments:

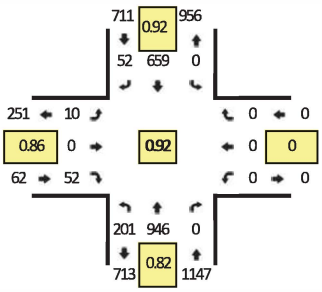
Report generated on 4/14/2022 4:26 PM

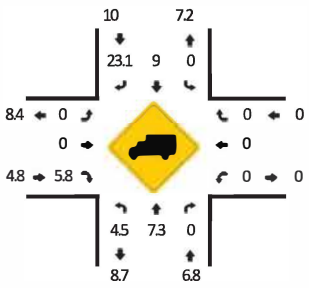
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

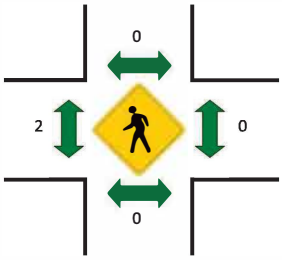
Type of peak hour being reported: System-wide Peak | Method for determining peak hour: Total Entering Volume

LOCATION: Hawaii Route 11/Mamalahoa Hwy -- Piilani St | **QC JOB #:** 15767804
CITY/STATE: Hilo, HI | **DATE:** Wed, Apr 6 2022

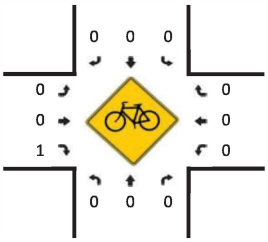
Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

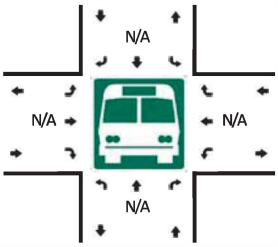




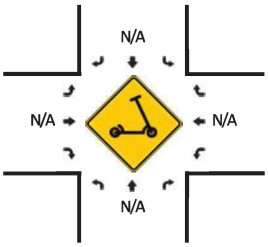












15-Min Count Period Beginning At	Hawaii Route 11/Mamalahoa Hwy (Northbound)				Hawaii Route 11/Mamalahoa Hwy (Southbound)				Piilani St (Eastbound)				Piilani St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	35	171	0	0	0	88	2	0	2	0	8	0	0	0	0	0	306	
6:45 AM	44	183	0	1	0	123	3	0	1	0	9	0	0	0	0	0	364	
7:00 AM	59	229	0	1	0	135	6	0	0	0	11	0	0	0	0	0	441	
7:15 AM	48	210	0	0	0	164	2	0	2	0	11	0	0	0	0	0	437	1548
7:30 AM	70	279	0	0	0	146	11	0	4	0	13	0	0	0	0	0	523	1765
7:45 AM	56	218	0	0	0	182	11	0	2	0	16	0	0	0	0	0	485	1886
8:00 AM	37	251	0	1	0	177	17	0	1	0	15	0	0	0	0	0	499	1944
8:15 AM	36	198	0	1	0	154	13	0	3	0	8	0	0	0	0	0	413	1920
8:30 AM	31	206	0	0	0	173	25	0	2	0	44	0	0	0	0	0	481	1878
8:45 AM	41	177	0	0	0	191	29	0	2	0	21	0	0	0	0	0	461	1854
9:00 AM	28	169	0	0	0	183	19	0	3	0	24	0	0	0	0	0	426	1781
9:15 AM	26	191	0	0	0	201	14	1	1	0	11	0	0	0	0	0	445	1813

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	280	1116	0	0	0	584	44	0	16	0	52	0	0	0	0	0	2092
Heavy Trucks	20	44	0		0	44	16		0	0	4		0	0	0		128
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 4/15/2022 6:54 AM

SOURCE: Quality Counts, LLC (http: //www. qualitycounts.net) 1-877-580-2212

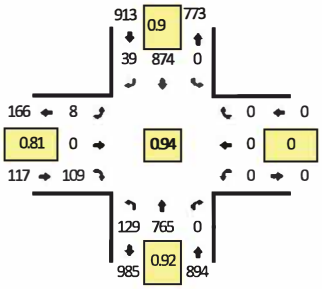
Type of peak hour being reported: System-wide Peak

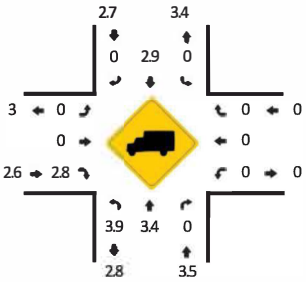
Method for determining peak hour: Total Entering Volume

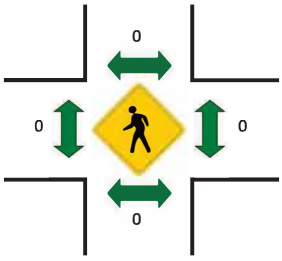
LOCATION: Hawaii Route 11/Mamalahoa Hwy -- Piilani St
CITY/STATE: Hilo, HI

QC JOB #: 15767806
DATE: Wed, Apr 6 2022

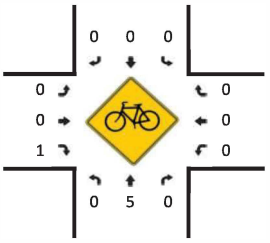
Peak-Hour: 3:45 PM -- 4:45 PM
Peak 15-Min: 4:00 PM -- 4:15 PM

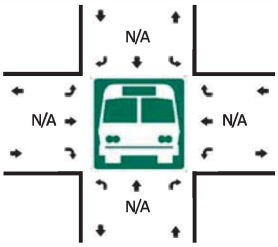




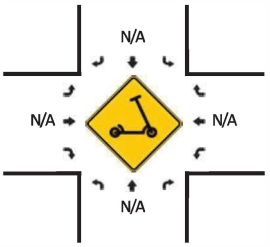












15-Min Count Period Beginning At	Hawaii Route 11/Mamalahoa Hwy (Northbound)				Hawaii Route 11/Mamalahoa Hwy (Southbound)				Piilani St (Eastbound)				Piilani St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	37	222	0	2	0	196	10	0	2	0	34	0	0	0	0	0	503	
3:15 PM	17	218	0	1	0	218	9	0	3	0	25	0	0	0	0	0	491	
3:30 PM	44	212	0	2	0	211	7	0	1	0	21	0	0	0	0	0	498	
3:45 PM	44	199	0	0	0	210	7	0	1	0	19	0	0	0	0	0	480	1972
4:00 PM	28	199	0	1	0	232	15	0	2	0	34	0	0	0	0	0	511	1980
4:15 PM	29	181	0	0	0	186	8	0	2	0	30	0	0	0	0	0	436	1925
4:30 PM	26	186	0	1	0	246	9	0	3	0	26	0	0	0	0	0	497	1924
4:45 PM	42	171	0	0	0	192	1	0	2	0	27	0	0	0	0	0	435	1879
5:00 PM	11	158	0	0	0	172	8	0	1	0	27	0	0	0	0	0	377	1745
5:15 PM	19	157	0	0	0	166	3	0	0	0	15	0	0	0	0	0	360	1669
5:30 PM	22	170	0	0	0	174	4	0	2	0	14	0	0	0	0	0	386	1558
5:45 PM	21	149	0	0	0	176	6	0	2	0	12	0	0	0	0	0	366	1489

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	112	796	0	4	0	928	60	0	8	0	136	0	0	0	0	0	2044
Heavy Trucks	4	24	0		0	40	0		0	0	4		0	0	0		72
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

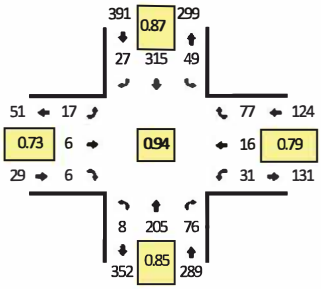
Report generated on 4/15/2022 6:58 AM

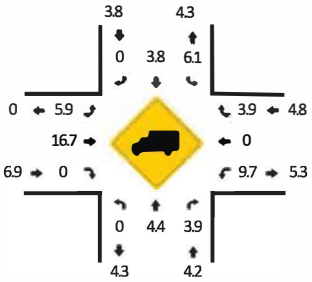
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

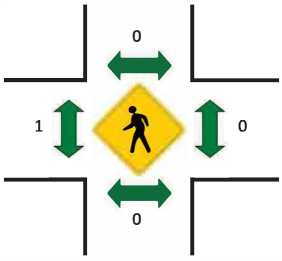
Type of peak hour being reported: System-wide Peak | Method for determining peak hour: Total Entering Volume

LOCATION: Manono St -- Piilani St | **QC JOB #:** 15767807
CITY/STATE: Hilo, HI | **DATE:** Wed, Apr 6 2022

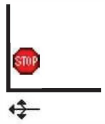
Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

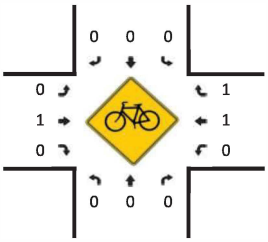


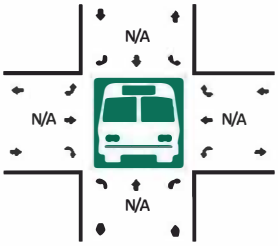






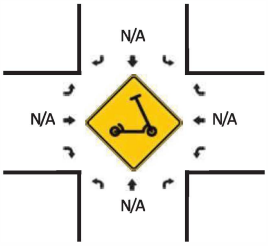












15-Min Count Period Beginning At	Manono St (Northbound)				Manono St (Southbound)				Piilani St (Eastbound)				Piilani St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	1	26	14	0	9	38	1	0	2	1	0	0	4	2	7	0	105	
6:45 AM	0	31	16	0	6	43	4	0	1	2	0	0	2	4	11	0	120	
7:00 AM	0	54	15	0	11	61	10	0	0	0	3	0	1	3	8	0	166	
7:15 AM	2	40	13	0	10	55	5	0	6	3	1	0	4	7	18	0	164	555
7:30 AM	2	61	22	0	8	86	7	0	5	2	3	0	6	3	16	0	221	671
7:45 AM	0	47	19	0	14	77	6	0	4	2	0	0	3	3	19	0	194	745
8:00 AM	4	42	17	0	15	90	8	0	3	0	1	0	13	7	15	0	215	794
8:15 AM	2	55	18	0	12	62	6	0	5	2	2	0	9	3	27	0	203	833
8:30 AM	0	48	14	0	14	83	7	0	5	1	1	0	5	4	19	0	201	813
8:45 AM	0	50	21	0	12	87	8	0	5	3	2	0	8	12	22	0	230	849
9:00 AM	1	44	14	0	20	75	5	0	1	9	3	0	9	2	30	0	213	847
9:15 AM	1	49	14	0	12	74	4	0	2	5	3	0	3	5	19	0	191	835

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	8	244	88	0	32	344	28	0	20	8	12	0	24	12	64	0	884
Heavy Trucks	0	12	4		4	8	0		0	0	0		0	0	0		28
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	4	0		4
Scooters																	

Comments:

Report generated on 4/15/2022 6:54 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

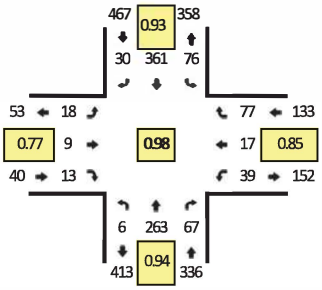
Type of peak hour being reported: Intersection Peak

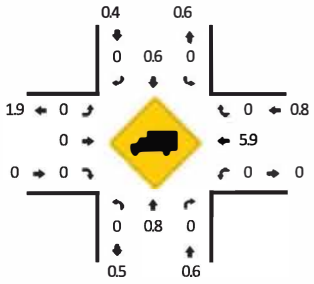
Method for determining peak hour: Total Entering Volume

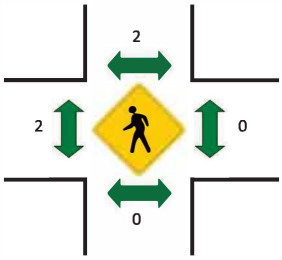
LOCATION: Manono St -- Piilani St
CITY/STATE: Hilo, HI

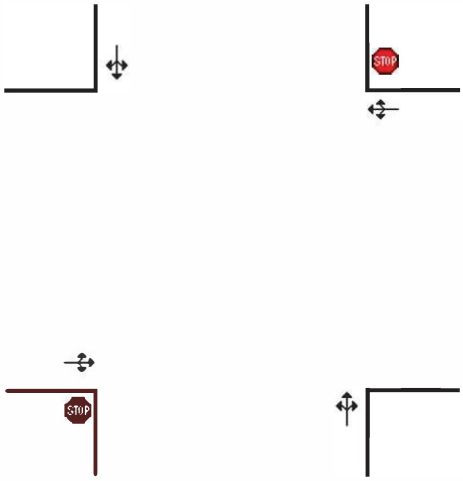
QC JOB #: 15767809
DATE: Wed, Apr 6 2022

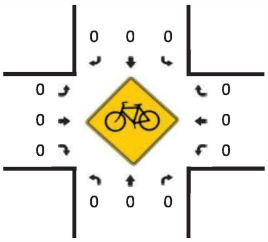
Peak-Hour: 3:45 PM -- 4:45 PM
Peak 15-Min: 3:45 PM -- 4:00 PM

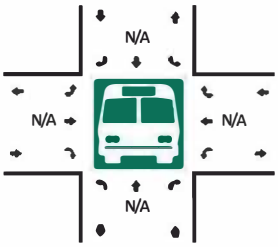


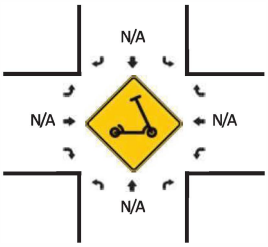












15-Min Count Period Beginning At	Manono St (Northbound)				Manono St (Southbound)				Piilani St (Eastbound)				Piilani St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	1	41	13	0	9	95	9	0	1	6	2	0	9	8	20	0	214	
3:15 PM	4	56	13	0	22	66	5	0	8	6	2	0	8	6	16	0	212	
3:30 PM	1	60	20	0	9	88	5	0	6	4	1	0	6	5	18	0	223	
3:45 PM	3	71	15	0	12	95	8	0	3	3	6	0	10	5	19	0	250	899
4:00 PM	0	66	13	0	21	101	4	0	5	2	1	0	7	5	22	0	247	932
4:15 PM	2	59	24	0	21	71	12	0	7	3	3	0	13	5	21	0	241	961
4:30 PM	1	67	15	0	22	94	6	0	3	1	3	0	9	2	15	0	238	976
4:45 PM	0	63	13	0	23	81	10	0	6	0	3	0	12	7	14	0	232	958
5:00 PM	3	62	13	0	11	80	6	0	1	2	1	0	2	6	20	0	207	918
5:15 PM	0	54	11	0	15	77	2	0	4	0	2	0	5	2	12	0	184	861
5:30 PM	1	48	17	0	12	57	5	0	6	4	1	0	8	8	14	0	181	804
5:45 PM	0	58	10	0	7	63	2	0	3	3	1	0	4	8	6	0	165	737

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	12	284	60	0	48	380	32	0	12	12	24	0	40	20	76	0	1000
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	4	0		4
Buses																	
Pedestrians		0				4				0				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 4/14/2022 4:26 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

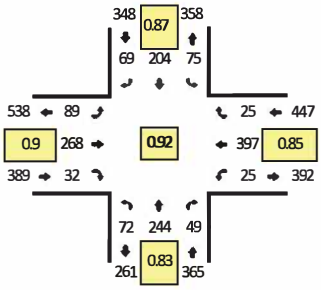
Type of peak hour being reported: Intersection Peak

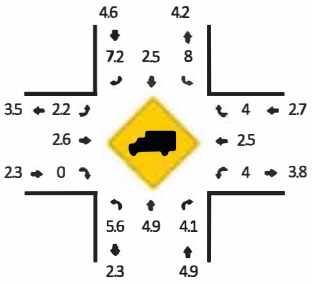
Method for determining peak hour: Total Entering Volume

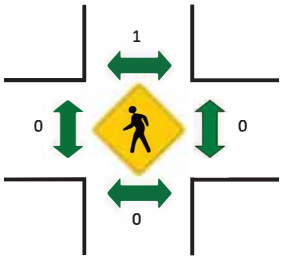
LOCATION: Manono St -- Kekuanaoa St
CITY/STATE: Hilo, HI

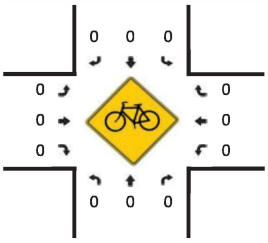
QC JOB #: 15767810
DATE: Wed, Apr 6 2022

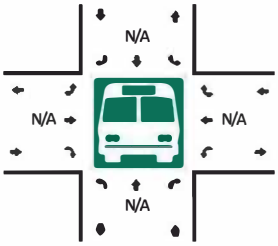
Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

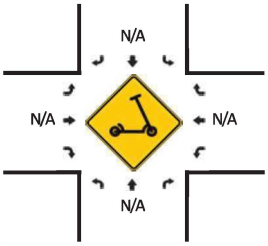












15-Min Count Period Beginning At	Manono St (Northbound)				Manono St (Southbound)				Kekuanaoa St (Eastbound)				Kekuanaoa St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	8	33	19	0	13	27	6	0	16	46	3	0	4	48	4	0	227	
6:45 AM	8	44	13	0	9	22	9	0	7	65	1	0	6	61	5	0	250	
7:00 AM	10	50	9	0	13	43	13	0	10	54	6	0	4	94	7	0	313	
7:15 AM	14	53	12	0	17	43	13	0	24	57	13	0	4	93	6	0	349	1139
7:30 AM	25	68	17	0	17	40	13	0	26	73	9	0	6	120	6	0	420	1332
7:45 AM	27	60	7	0	18	61	21	0	20	64	8	0	7	91	4	0	388	1470
8:00 AM	8	64	14	0	18	55	20	0	24	71	8	0	6	94	8	0	390	1547
8:15 AM	12	52	11	0	22	48	15	0	19	60	7	0	6	92	7	0	351	1549
8:30 AM	10	42	4	0	14	38	12	0	23	66	8	0	4	87	8	0	316	1445
8:45 AM	15	53	9	0	26	68	19	0	23	82	13	0	8	86	15	0	417	1474
9:00 AM	11	33	13	0	17	43	24	0	16	73	12	0	8	93	15	0	358	1442
9:15 AM	12	50	5	0	19	56	25	0	19	72	7	0	11	74	10	0	360	1451

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	100	272	68	0	68	160	52	0	104	292	36	0	24	480	24	0	1680
Heavy Trucks	12	4	0		0	0	4		4	8	0		0	8	0		40
Buses																	
Pedestrians		0				4				0				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

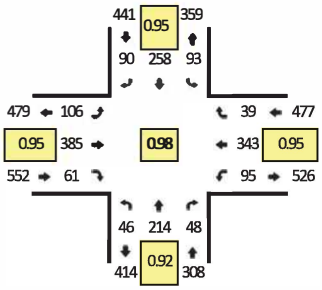
Report generated on 4/14/2022 4:25 PM

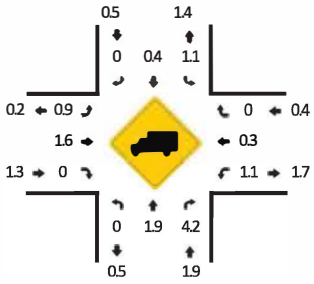
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

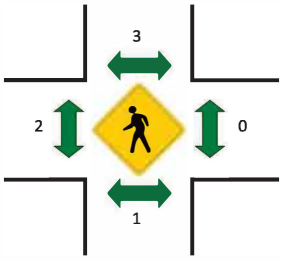
Type of peak hour being reported: System-wide Peak | Method for determining peak hour: Total Entering Volume

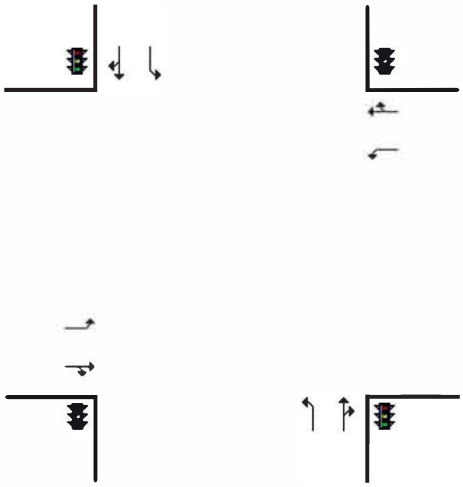
LOCATION: Manono St -- Kekuanaoa St | **QC JOB #:** 15767812
CITY/STATE: Hilo, HI | **DATE:** Wed, Apr 6 2022

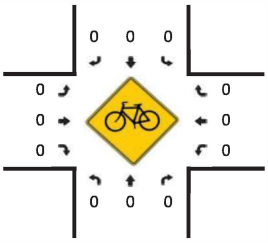
Peak-Hour: 3:45 PM -- 4:45 PM
Peak 15-Min: 4:30 PM -- 4:45 PM

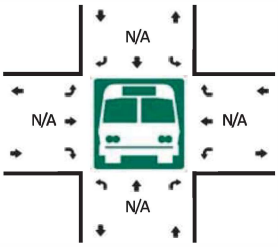


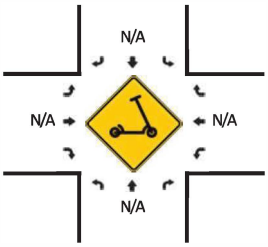












15-Min Count Period Beginning At	Manono St (Northbound)				Manono St (Southbound)				Kekuanaoa St (Eastbound)				Kekuanaoa St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	11	43	8	0	25	76	25	0	15	95	8	0	11	110	10	0	437	
3:15 PM	19	67	13	0	14	54	18	0	21	82	8	0	14	85	6	0	401	
3:30 PM	13	69	12	0	17	66	17	0	26	99	7	0	15	112	5	0	458	
3:45 PM	10	44	16	0	22	66	26	0	30	101	13	0	13	83	15	0	439	1735
4:00 PM	13	58	10	0	22	62	27	0	30	86	18	0	36	84	4	0	450	1748
4:15 PM	11	52	10	0	23	57	20	0	25	105	15	0	23	82	11	0	434	1781
4:30 PM	12	60	12	0	26	73	17	0	21	93	15	0	23	94	9	0	455	1778
4:45 PM	13	65	9	0	19	59	16	0	26	87	6	0	19	76	7	0	402	1741
5:00 PM	10	49	2	0	20	65	15	0	22	84	10	0	25	67	4	0	373	1664
5:15 PM	11	46	2	0	12	72	10	0	26	66	10	0	8	54	6	0	323	1553
5:30 PM	7	54	8	0	13	54	14	0	20	60	7	0	11	56	5	0	309	1407
5:45 PM	8	48	20	0	14	44	13	0	16	55	4	0	2	57	4	0	285	1290

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	48	240	48	0	104	292	68	0	84	372	60	0	92	376	36	0	1820
Heavy Trucks	0	0	8		0	0	0		0	8	0		0	4	0		20
Buses																	
Pedestrians		0				8				0				0			8
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 4/15/2022 6:58 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

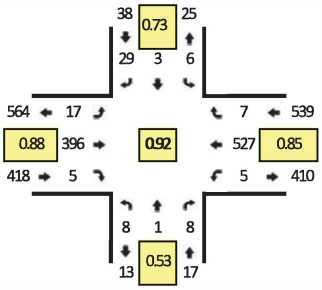
Type of peak hour being reported: Intersection Peak

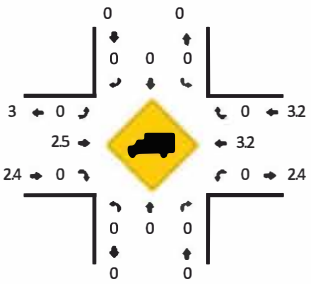
Method for determining peak hour: Total Entering Volume

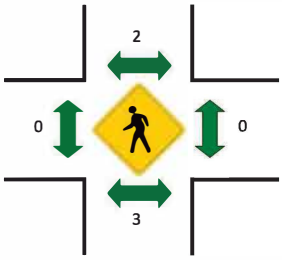
LOCATION: Mililani St -- Kekuanaoa St
CITY/STATE: Hilo, HI

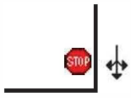
QC JOB #: 15767813
DATE: Wed, Apr 6 2022

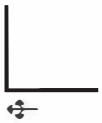
Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

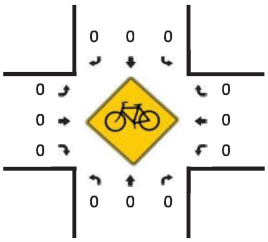


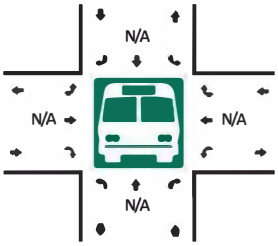




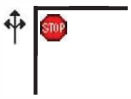


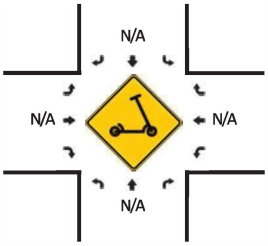












15-Min Count Period Beginning At	Mililani St (Northbound)				Mililani St (Southbound)				Kekuanaoa St (Eastbound)				Kekuanaoa St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	2	0	1	0	1	0	1	0	1	57	1	0	0	62	0	0	126	
6:45 AM	2	1	3	0	2	1	5	0	1	70	1	0	0	77	0	0	163	
7:00 AM	0	2	0	0	1	1	18	0	7	71	0	0	2	99	3	0	204	
7:15 AM	1	1	0	0	0	0	7	0	7	75	1	0	0	124	2	0	218	711
7:30 AM	1	1	2	0	4	2	7	0	5	113	1	0	2	129	4	0	271	856
7:45 AM	6	0	2	0	1	1	7	0	7	90	1	0	1	157	1	0	274	967
8:00 AM	1	0	0	0	0	0	5	0	1	98	2	0	2	125	1	0	235	998
8:15 AM	0	0	4	0	1	0	10	0	4	95	1	0	0	116	1	0	232	1012
8:30 AM	3	1	0	0	0	0	8	0	5	79	0	0	1	103	3	0	203	944
8:45 AM	0	1	1	0	1	1	15	0	8	110	1	0	0	121	2	0	261	931
9:00 AM	1	0	2	0	2	1	6	0	4	105	3	0	0	121	2	0	247	943
9:15 AM	1	0	0	0	0	0	7	0	3	103	0	0	2	112	1	0	229	940

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	24	0	8	0	4	4	28	0	28	360	4	0	4	628	4	0	1096
Heavy Trucks	0	0	0		0	0	0		0	8	0		0	20	0		28
Buses																	
Pedestrians		12				0				0				0			12
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 4/14/2022 4:25 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

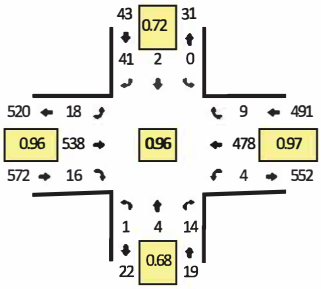
Type of peak hour being reported: Intersection Peak

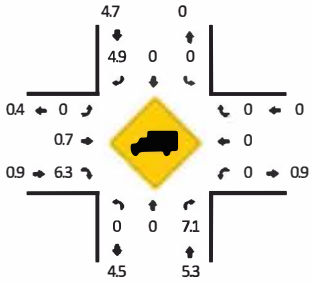
Method for determining peak hour: Total Entering Volume

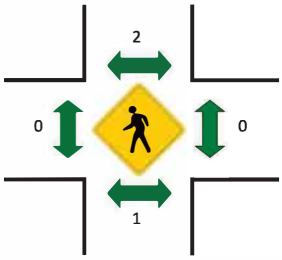
LOCATION: Mililani St -- Kekuanaoa St
CITY/STATE: Hilo, HI

QC JOB #: 15767815
DATE: Wed, Apr 6 2022

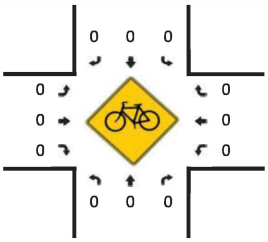
Peak-Hour: 3:45 PM -- 4:45 PM
Peak 15-Min: 4:15 PM -- 4:30 PM

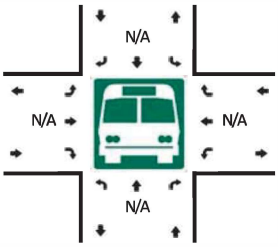




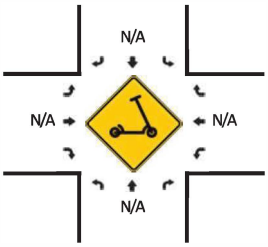












15-Min Count Period Beginning At	Mililani St (Northbound)				Mililani St (Southbound)				Kekuanaoa St (Eastbound)				Kekuanaoa St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:00 PM	3	1	0	0	0	3	12	0	6	119	0	0	0	142	3	0	289	
3:15 PM	0	1	1	0	0	1	11	0	8	112	2	0	1	139	2	0	278	
3:30 PM	1	0	0	0	0	1	10	0	5	133	1	0	0	120	3	0	274	
3:45 PM	0	0	4	0	0	0	15	0	4	129	4	0	1	122	3	0	282	1123
4:00 PM	1	1	4	0	0	1	6	0	4	135	3	0	2	116	2	0	275	1109
4:15 PM	0	3	4	0	0	1	13	0	5	139	5	0	1	119	2	0	292	1123
4:30 PM	0	0	2	0	0	0	7	0	5	135	4	0	0	121	2	0	276	1125
4:45 PM	1	0	1	0	1	1	7	0	4	118	4	0	1	110	3	0	251	1094
5:00 PM	1	0	1	0	0	0	11	0	2	112	1	0	0	77	6	0	211	1030
5:15 PM	0	1	3	0	4	0	9	0	4	100	0	0	1	80	4	0	206	944
5:30 PM	1	0	0	0	0	1	10	0	5	93	3	0	1	57	5	0	176	844
5:45 PM	3	1	0	0	0	4	10	0	7	78	1	0	0	86	2	1	193	786

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	12	16	0	0	4	52	0	20	556	20	0	4	476	8	0	1168
Heavy Trucks	0	0	0		0	0	0		0	4	0		0	0	0		4
Buses																	
Pedestrians		4				4				0				0			8
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 4/14/2022 4:27 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of report: Tube Count - Volume Data

LOCATION: Manono St btwn Kuawa St and Piilani St
SPECIFIC LOCATION:
CITY/STATE: Hilo, HI

Start Time	Mon	Tue	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic
			6 Apr 22						
12:00 AM			40			40			40
01:00 AM			28			28			28
02:00 AM			34			34			34
03:00 AM			23			23			23
04:00 AM			57			57			57
05:00 AM			144			144			144
06:00 AM			328			328			328
07:00 AM			674			674			674
08:00 AM			724			724			724
09:00 AM			684			684			684
10:00 AM			749			749			749
11:00 AM			**803**			**803**			**803**
12:00 PM			818			818			818
01:00 PM			789			789			789
02:00 PM			715			715			715
03:00 PM			765			765			765
04:00 PM			**834**			**834**			**834**
05:00 PM			620			620			620
06:00 PM			471			471			471
07:00 PM			301			301			301
08:00 PM			236			236			236
09:00 PM			154			154			154
10:00 PM			102			102			102
11:00 PM			56			56			56
Day Total			10149			10149			10149
% Weekday Average			100%						
% Week Average			100%			100%			
AM Peak Volume			11:00 AM 803			11:00 AM 803			11:00 AM 803
PM Peak Volume			4:00 PM 834			4:00 PM 834			4:00 PM 834

Comments:

Report generated on 4/14/2022 4:23 PM

SOURCE: Quality Counts

Quality Counts
DATA THAT DRIVES COMMUNITIES

ArcGIS My Map

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- Hawaii 2018 PR - Hawaii PR 2018
  - Topographic



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- Hawaii 2018 PR - Hawaii PR 2018
  - Topographic



ArcGIS My Map

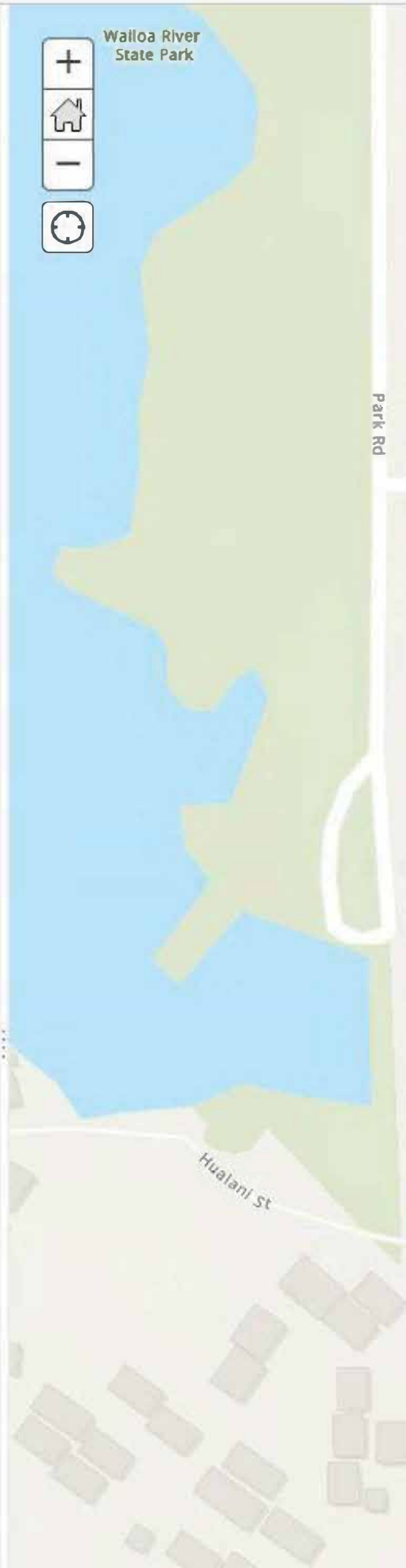
Details | Basemap

About | Content | Legend

Contents

Hawaii 2018 PR - Hawaii PR 2018

Topographic



Appendix B – Bus Route Maps

Route 10: Hilo

Effective Ap

Southbound to Oceanvi

	Hilo							Kea'au	Kurtistown	Fern Acres	Mou V
	A	B	C	D	E	F	G	H	I	J	
	Mo'oheau Bus Terminal (329 Kamemehameha Ave)	Aupuni Street @ Pauahi Street (Aupuni Center, County Building)	Kilauea Avenue @ Across Kohala Street (Across from Hilo Shopping Center)	Kapiolani St @ Lanikaula St - University of Hawaii-Hilo	W. Kawili St @ Waiakea High School	Kawili Street @ Hawaii Community College	Ohu Ohu Street @ Prince Kuhio Plaza (Macy's Mens, Children & Home)	Old Volcano Road @ Kea'au Pahoa Rd (US Post Office)	Highway 11 @ Kurtistown Park (across bus shelter)	Highway 11 @ farside of N. Kulani Road	Highway 11 @ farside of
Bus Stop ID#	100	101	103	105	106	107	110	901	903	**TBA**	9
	3:30 PM	**3:34 PM**	**3:36 PM**	**3:39 PM**	**3:40 PM**	**3:41 PM**	**3:46 PM**	**3:56 PM**	**4:01 PM**	**4:06 PM**	**4:1**

This route operates Monday-Saturday only. There is no Sunday or holiday service.

--- = bus does not serve timepoint.

To read the timetable, read from left to right to follow the course of the route and then read down for the times that the bus

without notice. Times are approximate and may vary depending on traffic conditions, weather and other conditions.

Not all Hele-On bus stops are shown. Please flag the bus along its route at safe intersections where the bus can safely pul

$15.00 entrance fee or a visitor pass required to get off the bus at Hawai'i Volcanoes National Park. Entrance fees are vai

Route 10: Hilo

Effective Ap

Northbour

	Ocean View	Waiohinu	Naalehu	Punalulu	Pahala	Hawai'i Volcanoes National Park	Volcano Village		Glenwood	Mount View
	T	S	R	Q	P	O	M	N	L	K
	Ocean View Park & Ride @ Prince Kuhio Blvd	Hwy 11 @ Kamaoa Road (in front Wong Yuen Store)	Hwy 11 @ Ohai Road (Naalehu Elementary School)	Punaluu Road @ Punaluu Beach Park	Kamani St @ Pahala Shopping Center	Crater Rim Drive @ Visitor Center	Old Volcano Road @ across Volcano General Store	Cooper Center Park & Ride Lot	Highway 11 @ Glenwood Park (across Hirono Store)	Highway 11 @ St. Theresa's Church
Bus Stop ID#	802	803	805	807	808	809	918	**TBA**	919	920
	6:40 AM	7:00 AM	7:05 AM	7:07 AM	7:30 AM	8:10 AM	8:12 AM	8:13 AM	8:16 AM	8:25 A

Route 11: Red Line - Hilo / Volcano

Effective April 3, 2022

Southbound to Hawai'i Volcanoes National Park

	Hilo							Kea'au	Kurtistown	Fern Acres	Mo V
	A	B	C	D	E	F	G	H	I	J	
	Mo'oheau Bus Terminal (329 Kamemehameha Ave)	Aupuni Street @ Pauahi Street (Aupuni Center, County Building)	Kilauea Avenue @ Across Kohala Street (Across from Hilo Shopping Center)	Kapiolani St @ Lanikaula St - University of Hawaii-Hilo	W. Kawili St @ Waiakea High School	Kawili Street @ UH-Hawaii Community College	Ohu Ohu Street @ Prince Kuhio Plaza (Macy's Mens, Children & Home)	Old Volcano Road @ Kea'au Pahoa Rd (US Post Office)	Highway 11 @ Kurtistown Park (across bus shelter)	Highway 11 @ farside of N. Kulani Road	Highway 11 @ farside of
Bus Stop ID#	100	101	103	105	106	107	110	901	903	**TBA**	
	5:00 AM	5:04 AM	5:06 AM	5:08 AM	5:11 AM	5:12 AM	5:17 AM	5:27 AM	5:32 AM	5:37 AM	5:4
	7:40 AM	7:44 AM	7:46 AM	7:48 AM	7:51 AM	7:52 AM	7:57 AM	8:07 AM	8:12 AM	8:17 AM	8:2
	10:40 AM	10:44 AM	10:46 AM	10:48 AM	10:51 AM	10:52 AM	10:57 AM	11:07 AM	11:12 AM	11:17 AM	11
	1:40 PM	**1:44 PM**	**1:46 PM**	**1:48 PM**	**1:51 PM**	**1:52 PM**	**1:57 PM**	**2:07 PM**	**2:12 PM**	**2:17 PM**	**2:**
	4:40 PM	**4:44 PM**	**4:46 PM**	**4:48 PM**	**4:51 PM**	**4:52 PM**	**4:57 PM**	**5:07 PM**	**5:12 PM**	**5:17 PM**	**5:**

Monday through Friday only

Everyday service

--- = bus does not serve timepoint.

To read the timetable, read from left to right to follow the course of the route and then read down for the times that the bus op**boldface type**. Schedules are subject to change without notice. Times are approximate and may vary depending on traffic co

Not all Hele-On bus stops are shown. Please flag the bus along its route at safe intersections where the bus can safely pull o"Bus Stop" sign.

$15.00 entrance fee or a visitor pass required to get off the bus at Hawai'i Volcanoes National Park. Entrance fees are vaild f

Route 11: Red Line - Hilo / Volcan

Effective April 3, 2022

Northbound to Hilo

Hawai'i Volcanoes National Park	Volcano Village		Glenwood	Mountain View	Fern Acres	Kurtistown	Kea'au	
O	M	N	L	K	J	I	H	G
Crater Rim Drive @ Visitor Center	Old Volcano Road @ across Volcano General Store	Cooper Center Park & Ride Lot	Highway 11 @ Glenwood Park (across Hirono Store)	Highway 11 @ St. Theresa's Church	Highway 11 @ S Kulani Road	Highway 11 @ Across from Kurtistown Park	Old Volcano Road @ Keaau-Pahoa Road (HMSA building, farside)	Ohu Ohu Street @ Prince Kuhio Plaza (Macy's Mens, Children & Home)
Bus Stop ID#	809	918	TBA	919	920	TBA	921	924	110
6:15 AM	6:20 AM	6:21 AM	6:27 AM	6:33 AM	6:38 AM	6:43 AM	6:49 AM	7:02 AM
9:15 AM	9:20 AM	9:21 AM	9:27 AM	9:33 AM	9:38 AM	9:43 AM	9:49 AM	10:02 AM
12:15 PM	**12:20 PM**	**12:21 PM**	**12:27 PM**	**12:33 PM**	**12:38 PM**	**12:43 PM**	**12:49 PM**	**1:02 PM**
3:15 PM	**3:20 PM**	**3:21 PM**	**3:27 PM**	**3:33 PM**	**3:38 PM**	**3:43 PM**	**3:49 PM**	**4:02 PM**
6:15 PM	**6:20 PM**	**6:21 PM**	**6:27 PM**	**6:33 PM**	**6:38 PM**	**6:43 PM**	**6:49 PM**	**7:02 PM**

uly 1, 2013

one-way trip. Bus
lo round trip fares
ct to change.

o change is given!

General	Discount*
$2.00	$1.00
$15.00	$7.50
$60.00	$45.00
FREE	FREE
FREE	FREE

with valid school ID
rsity, seniors age 60
showing age, persons
unty of Hawai'i Mass
nt Card and Medicare
other passengers pay

nthly Passes are
of Hawai'i Mass
eau Bus Terminal, or
check, credit card or
nty of Hawai'i) & the
tickets requested to
Transit Agency, 25

Be Around!

s, questions or
-On transit services
of Hawai'i Mass
08) 961-8744, fax to:
unty of Hawai'i Mass
treet, Hilo, HI 96720
awaiicounty.gov.

Transit Administrator

How To Use This Timetable

Each of our routes has a unique name and number and the route destination is on the front and right side of the bus. The schedule shows the departure times of the bus as it travels along the route. **Read the timetable from left to right.**

Time points are shown on the map and on the timetable. See the timetable to estimate the arrival time at your bus stop. Since safe driving is always a priority, traffic, weather and other conditions can change arrival times. ***Please plan accordingly.***

How To Ride A Hele-On Bus

Prior to boarding a Hele-On bus, wait at a blue and white Hele-On Bus Stop, red and white bus stop or Kona Trolley sign and wait on the proper side of the roadway. In some cases, you may need to flag the bus (at a safe pullover location) due to no sign being available. Arrive at least five (5) minutes before the bus is due to arrive.

- If you are unfamiliar with your stop, sit or stand behind the white line in the front of the bus and ask the bus operator to notify you when your stop is approaching.
- Ask the bus operator if you are not sure if the bus goes to your desired bus stop.
- Be mindful of changes in the schedule, overall conditions and weather.
- No eating, drinking or smoking of any kind.
- No boarding with surfboards or body boards.
- Electronic devices may be played with earphones set a at low level and talking on cellular phones are to not be used on the bus.
- Shoes and shirt are required to ride.
- No rowdy behavior on the bus.
- No spitting or expectorating on the bus.
- No flammable, explosive, sharp or toxic materials.
- No obstructing, fighting or interfering with the bus operator or bus operations.
- Only five bags are allowed on the bus.

Violators of these rules can result in a fine, suspension from riding the bus and/or imprisonment as defined in the Hawaii County Code 2-27-3 and/or Hawaii Revised Statutes.

HELE-ON

Route 101: Keaukaha Route Timetable

Take The Trip!



7 day a week service between Downtown Hilo @ Mo'oheau Bus Terminal and King's Landing in Hilo

Telephone: (808) 961-8744
TDD/TTY: 711
www.heleonbus.org

Effective Sunday, October 3, 2021

Route 101: Keaukaha (Monday-Saturday)

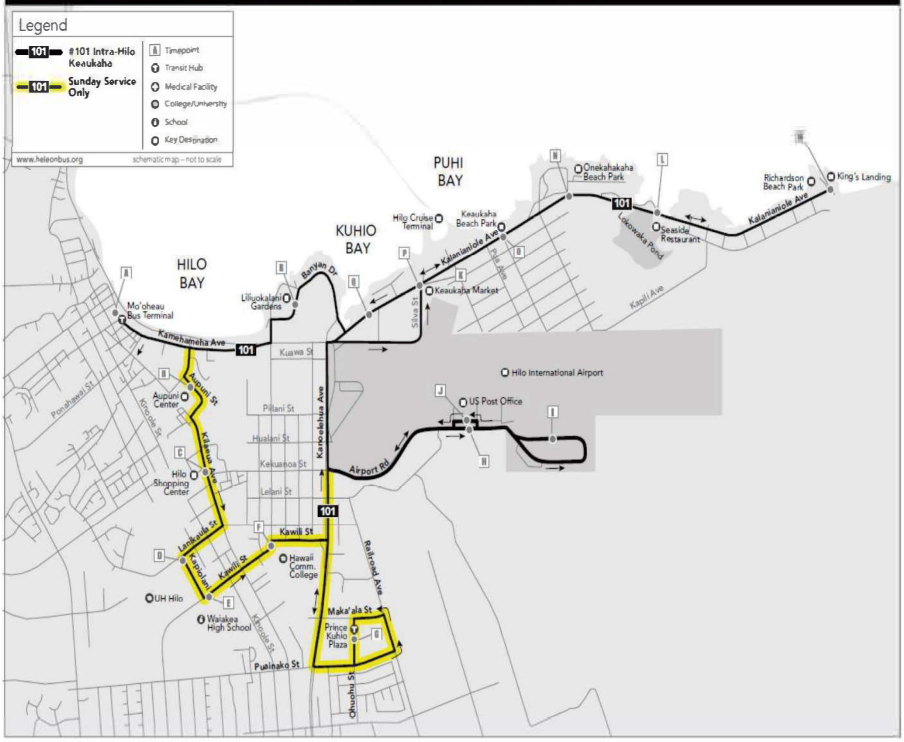
Effective October 3, 2021

Counter Clockwise Loop to Mo'oheau Bus Terminal

Hilo

L	N	O	P	Q	R	A
...Ave @ Carlsmith Beach Park	Kalanianaole Ave @ Onehakahaka Rd - Onehakahaka Beach Park	Kalanianaole Ave @ Pua Ave - UHH Pacific Aquaculture Center	Kalanianaole Ave @ Kumau St - Oceanfront Kitchen	Kalanianaole Ave @ Pond's Restaurant before Banyan Way	Banyan Drive @ Lili'uokalani Park and Gardens	Mo'oheau Bus Terminal (329 Kamehameha Ave)
121	122	123	124	125	126	100
6:55 AM	7:00 AM	7:01 AM	7:02 AM	7:03 AM	7:06 AM	7:11 AM
7:55 AM	8:00 AM	8:01 AM	8:02 AM	8:03 AM	8:06 AM	8:11 AM
8:55 AM	9:00 AM	9:01 AM	9:02 AM	9:03 AM	9:06 AM	9:11 AM
9:55 AM	10:00 AM	10:01 AM	10:02 AM	10:03 AM	10:06 AM	10:11 AM
0:55 AM	11:00 AM	11:01 AM	11:02 AM	11:03 AM	11:06 AM	11:11 AM
1:55 AM	**12:00 PM**	**12:01 PM**	**12:02 PM**	**12:03 PM**	**12:06 PM**	**12:11 PM**
2:55 PM	**1:00 PM**	**1:01 PM**	**1:02 PM**	**1:03 PM**	**1:06 PM**	**1:11 PM**
1:55 PM	**2:00 PM**	**2:01 PM**	**2:02 PM**	**2:03 PM**	**2:06 PM**	**2:11 PM**
2:55 PM	**3:00 PM**	**3:01 PM**	**3:02 PM**	**3:03 PM**	**3:06 PM**	**3:11 PM**
3:55 PM	**4:00 PM**	**4:01 PM**	**4:02 PM**	**4:03 PM**	**4:06 PM**	**4:11 PM**
4:55 PM	**5:00 PM**	**5:01 PM**	**5:02 PM**	**5:03 PM**	**5:06 PM**	**5:11 PM**
5:55 PM	**6:00 PM**	**6:01 PM**	**6:02 PM**	**6:03 PM**	**6:06 PM**	**6:11 PM**
6:55 PM	**7:00 PM**	**7:01 PM**	**7:02 PM**	**7:03 PM**	**7:06 PM**	**7:11 PM**
---	---	---	---	---	---	---

Hele-On Bus Schedule - #101 Intra-Hilo Keaukaha



Route 101: Keaukaha (Sunday & Holidays)

Counter Clockwise Loop to Mo'oheau Bus Terminal

Effective October 3, 2021

Hilo

L	M		M	L	N	O	P	Q	R	A
...Seaside Resturant	End of Kalanianaole Ave @ King's Landing/Richardson's Beach Park	Bus Stop ID#	End of Kalanianaole Ave @ King's Landing/Richardson's Beach Park	Kalanianaole Ave @ Carlsmith Beach Park	Kalanianaole Ave @ Onehakahaka Rd - Onehakahaka Beach Park	Kalanianaole Ave @ Pua Ave - UHH Pacific Aquaculture Center	Kalanianaole Ave @ Kumau St - Oceanfront Kitchen	Kalanianaole Ave @ Pond's Restaurant before Banyan Way	Banyan Drive @ Lili'uokalani Park and Gardens	Mo'oheau Bus Terminal (329 Kamehameha Ave)
118	120		120	121	122	123	124	125	126	100
51 AM	9:53 AM		9:53 AM	9:55 AM	10:00 AM	10:01 AM	10:02 AM	10:03 AM	10:06 AM	10:11 AM
51 AM	10:53 AM		10:53 AM	10:55 AM	11:00 AM	11:01 AM	11:02 AM	11:03 AM	11:06 AM	11:11 AM
51 AM	11:53 AM		11:53 AM	11:55 AM	**12:00 PM**	**12:01 PM**	**12:02 PM**	**12:03 PM**	**12:06 PM**	**12:11 PM**
51 PM	**12:53 PM**		**12:53 PM**	**12:55 PM**	**1:00 PM**	**1:01 PM**	**1:02 PM**	**1:03 PM**	**1:06 PM**	**1:11 PM**
51 PM	**1:53 PM**		**1:53 PM**	**1:55 PM**	**2:00 PM**	**2:01 PM**	**2:02 PM**	**2:03 PM**	**2:06 PM**	**2:11 PM**
51 PM	**2:53 PM**		**2:53 PM**	**2:55 PM**	**3:00 PM**	**3:01 PM**	**3:02 PM**	**3:03 PM**	**3:06 PM**	**3:11 PM**
51 PM	**3:53 PM**		**3:53 PM**	**3:55 PM**	**4:00 PM**	**4:01 PM**	**4:02 PM**	**4:03 PM**	**4:06 PM**	**4:11 PM**
51 PM	**4:53 PM**		**4:53 PM**	**4:55 PM**	**5:00 PM**	**5:01 PM**	**5:02 PM**	**5:03 PM**	**5:06 PM**	**5:11 PM**
51 PM	**5:53 PM**		---	---	---	---	---	---	---	---

...hen read down for ...otice. Times are ...ons.

Not all Hele-On bus stops are shown. Please flag the bus along its route at safe intersections where the bus can safely pull over or board at a bus shelter, a Kona Trolley Stop sign, a Hele-On Bus Stop or a red/white or blue Bus Stop sign.

- - - means timepoint is not served.

AM times are shown in lightface type. **PM times are in boldface type.**

Please recycle. Share this bus schedule with someone else if you do not need it.

Route 103: Waiakea-Uka

Southbound to Haihai Street @ Kupulau Road

Effective April 4, 2022

Hilo

	A	B	C	D	E	F	H	I	J	K
	Mo'oheau Bus Terminal (329 Kamemehameha Ave)	Aupuni Street @ Pauahi Street (Aupuni Center, County Building)	Kilauea Avenue @ Across Kohala Street (Across from Hilo Shopping Center)	Kapiolani St @ Lanikaula St - University of Hawaii-Hilo	W. Kawili St @ Waiakea High School	Kawili Street @ Hawaii Community College	Kilauea Avenue @ East Kahaopea Street	Kinoole St @ W. Kahaopea St - Kino'ole Plaza/Kino'ole Sr Housing	Kilauea Avenue @ Palai Street	Haihai Street @ before Laula Street - Hilo Municiple Golf Course
Bus Stop ID#	100	101	103	105	106	107	158	159	160	162
	---	---	---	---	---	---	6:33 AM	6:34 AM	6:35 AM	6:36 AM
	7:15 AM	7:20 AM	7:23 AM	7:27 AM	7:28 AM	7:29 AM	7:33 AM	7:34 AM	7:35 AM	7:36 AM
	8:15 AM	8:20 AM	8:23 AM	8:27 AM	8:28 AM	8:29 AM	8:33 AM	8:34 AM	8:35 AM	8:36 AM
	9:15 AM	9:20 AM	9:23 AM	9:27 AM	9:28 AM	9:29 AM	9:33 AM	9:34 AM	9:35 AM	9:36 AM
	10:15 AM	10:20 AM	10:23 AM	10:27 AM	10:28 AM	10:29 AM	10:33 AM	10:34 AM	10:35 AM	10:36 AM
	11:15 AM	11:20 AM	11:23 AM	11:27 AM	11:28 AM	11:29 AM	11:33 AM	11:34 AM	11:35 AM	11:36 AM
	12:15 PM	**12:20 PM**	**12:23 PM**	**12:27 PM**	**12:28 PM**	**12:29 PM**	**12:33 PM**	**12:34 PM**	**12:35 PM**	**12:36 PM**
	1:15 PM	**1:20 PM**	**1:23 PM**	**1:27 PM**	**1:28 PM**	**1:29 PM**	**1:33 PM**	**1:34 PM**	**1:35 PM**	**1:36 PM**
	2:15 PM	**2:20 PM**	**2:23 PM**	**2:27 PM**	**2:28 PM**	**2:29 PM**	**2:33 PM**	**2:34 PM**	**2:35 PM**	**2:36 PM**
	3:15 PM	**3:20 PM**	**3:23 PM**	**3:27 PM**	**3:28 PM**	**3:29 PM**	**3:33 PM**	**3:34 PM**	**3:35 PM**	**3:36 PM**
	4:15 PM	**4:20 PM**	**4:23 PM**	**4:27 PM**	**4:28 PM**	**4:29 PM**	**4:33 PM**	**4:34 PM**	**4:35 PM**	**4:36 PM**
	5:15 PM	**5:20 PM**	**5:23 PM**	**5:27 PM**	**5:28 PM**	**5:29 PM**	**5:33 PM**	**5:34 PM**	**5:35 PM**	**5:36 PM**
	6:15 PM	**6:20 PM**	**6:23 PM**	**6:27 PM**	**6:28 PM**	**6:29 PM**	**6:33 PM**	**6:34 PM**	**6:35 PM**	**6:36 PM**

This route operates Monday-Saturday only. There is no Sunday or holiday service.

--- = bus does not serve timepoint.

To read the timetable, read from left to right to follow the course of the route and then read down for the times that the bus c
shown in lightface type. **PM times are in boldface type**. Schedules are subject to change without notice. Times are approx
depending on traffic conditions, weather and other conditions.

Not all Hele-On bus stops are shown. Please flag the bus along its route at safe intersections where the bus can safely pull
Hele-On Bus Stop sign or a red/white or blue "Bus Stop" sign.

Appendix C – Analysis Report Existing Conditions



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	88	470	290	57	720	12	180	61	68	26	70	108
Future Volume (veh/h)	88	470	290	57	720	12	180	61	68	26	70	108
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1826	1841	1826	1856	1900	1841	1856	1841	1900	1885	1870
Adj Flow Rate, veh/h	99	528	326	62	783	13	200	68	76	28	75	116
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.90	0.90	0.90	0.93	0.93	0.93
Percent Heavy Veh, %	3	5	4	5	3	0	4	3	4	0	1	2
Cap, veh/h	371	1501	674	386	1492	666	331	182	204	340	101	157
Arrive On Green	0.06	0.43	0.43	0.05	0.42	0.42	0.10	0.23	0.23	0.03	0.15	0.15
Sat Flow, veh/h	1767	3469	1558	1739	3526	1575	1753	800	894	1810	666	1031
Grp Volume(v), veh/h	99	528	326	62	783	13	200	0	144	28	0	191
Grp Sat Flow(s),veh/h/ln	1767	1735	1558	1739	1763	1575	1753	0	1693	1810	0	1697
Q Serve(g_s), s	2.4	7.8	11.4	1.5	12.6	0.4	7.0	0.0	5.5	1.0	0.0	8.2
Cycle Q Clear(g_c), s	2.4	7.8	11.4	1.5	12.6	0.4	7.0	0.0	5.5	1.0	0.0	8.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.53	1.00		0.61
Lane Grp Cap(c), veh/h	371	1501	674	386	1492	666	331	0	386	340	0	258
V/C Ratio(X)	0.27	0.35	0.48	0.16	0.52	0.02	0.60	0.00	0.37	0.08	0.00	0.74
Avail Cap(c_a), veh/h	408	1501	674	417	1492	666	331	0	1044	405	0	979
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.1	14.5	15.5	11.4	16.3	12.8	22.9	0.0	24.9	25.9	0.0	30.9
Incr Delay (d2), s/veh	0.4	0.6	2.5	0.2	1.3	0.1	3.1	0.0	0.6	0.1	0.0	4.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	2.9	4.3	0.5	4.9	0.1	3.0	0.0	2.1	0.4	0.0	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.5	15.1	18.0	11.6	17.6	12.8	26.0	0.0	25.5	26.0	0.0	35.0
LnGrp LOS	B	B	B	B	B	B	C	A	C	C	A	D
Approach Vol, veh/h		953			858			344			219	
Approach Delay, s/veh		15.8			17.1			25.8			33.9	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.7	38.0	7.2	22.4	9.4	37.3	13.0	16.6
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	33.0	5.0	47.0	6.0	32.0	8.0	44.0
Max Q Clear Time (g_c+I1), s	3.5	13.4	3.0	7.5	4.4	14.6	9.0	10.2
Green Ext Time (p_c), s	0.0	4.5	0.0	0.9	0.0	5.0	0.0	1.3

Intersection Summary	
HCM 6th Ctrl Delay	19.4
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	52	201	0	659	52
Future Vol, veh/h	10	52	201	0	659	52
Conflicting Peds, #/hr	0	0	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	425	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	82	82	92	92
Heavy Vehicles, %	0	6	4	0	9	23
Mvmt Flow	12	60	245	0	716	57

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1237	389	775	0	-	0
Stage 1	747	-	-	-	-	-
Stage 2	490	-	-	-	-	-
Critical Hdwy	6.25	7.22	5.38	-	-	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.65	3.96	3.14	-	-	-
Pot Cap-1 Maneuver	202	512	495	-	-	-
Stage 1	358	-	-	-	-	-
Stage 2	568	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	101	511	494	-	-	-
Mov Cap-2 Maneuver	101	-	-	-	-	-
Stage 1	180	-	-	-	-	-
Stage 2	567	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.2	19.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	494	-	309	-	-
HCM Lane V/C Ratio	0.496	-	0.233	-	-
HCM Control Delay (s)	19.3	-	20.2	-	-
HCM Lane LOS	C	-	C	-	-
HCM 95th %tile Q(veh)	2.7	-	0.9	-	-

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	17	6	6	31	16	77	8	205	76	49	315	27
Future Vol, veh/h	17	6	6	31	16	77	8	205	76	49	315	27
Conflicting Peds, #/hr	1	0	0	0	0	1	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	73	73	73	79	79	79	85	85	85	87	87	87
Heavy Vehicles, %	11	17	0	9	8	7	0	4	1	4	4	0
Mvmt Flow	23	8	8	39	20	97	9	241	89	56	362	31

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	854	839	379	802	810	287	394	0	0	330	0	0
Stage 1	491	491	-	304	304	-	-	-	-	-	-	-
Stage 2	363	348	-	498	506	-	-	-	-	-	-	-
Critical Hdwy	7.21	6.67	6.2	7.19	6.58	6.27	4.1	-	-	4.14	-	-
Critical Hdwy Stg 1	6.21	5.67	-	6.19	5.58	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.21	5.67	-	6.19	5.58	-	-	-	-	-	-	-
Follow-up Hdwy	3.599	4.153	3.3	3.581	4.072	3.363	2.2	-	-	2.236	-	-
Pot Cap-1 Maneuver	269	286	672	294	307	740	1176	-	-	1218	-	-
Stage 1	543	524	-	691	652	-	-	-	-	-	-	-
Stage 2	638	608	-	541	530	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	209	267	671	269	286	739	1175	-	-	1218	-	-
Mov Cap-2 Maneuver	209	267	-	269	286	-	-	-	-	-	-	-
Stage 1	538	493	-	685	646	-	-	-	-	-	-	-
Stage 2	531	603	-	494	498	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	21.6	17.2	0.2	1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1175	-	-	257	450	1218	-	-
HCM Lane V/C Ratio	0.008	-	-	0.155	0.349	0.046	-	-
HCM Control Delay (s)	8.1	0	-	21.6	17.2	8.1	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.5	1.5	0.1	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	89	268	32	25	397	25	72	244	49	75	204	69
Future Volume (veh/h)	89	268	32	25	397	25	72	244	49	75	204	69
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1856	1900	1841	1870	1841	1811	1826	1841	1781	1870	1796
Adj Flow Rate, veh/h	99	298	36	29	467	29	87	294	59	86	234	79
Peak Hour Factor	0.90	0.90	0.90	0.85	0.85	0.85	0.83	0.83	0.83	0.87	0.87	0.87
Percent Heavy Veh, %	2	3	0	4	2	4	6	5	4	8	2	7
Cap, veh/h	287	577	70	394	620	38	346	459	92	311	416	140
Arrive On Green	0.06	0.36	0.36	0.06	0.36	0.36	0.06	0.31	0.31	0.06	0.31	0.31
Sat Flow, veh/h	1781	1624	196	1753	1742	108	1725	1476	296	1697	1338	452
Grp Volume(v), veh/h	99	0	334	29	0	496	87	0	353	86	0	313
Grp Sat Flow(s),veh/h/ln	1781	0	1820	1753	0	1851	1725	0	1773	1697	0	1789
Q Serve(g_s), s	3.1	0.0	13.0	0.9	0.0	21.2	3.0	0.0	15.4	3.0	0.0	13.1
Cycle Q Clear(g_c), s	3.1	0.0	13.0	0.9	0.0	21.2	3.0	0.0	15.4	3.0	0.0	13.1
Prop In Lane	1.00		0.11	1.00		0.06	1.00		0.17	1.00		0.25
Lane Grp Cap(c), veh/h	287	0	647	394	0	658	346	0	551	311	0	557
V/C Ratio(X)	0.35	0.00	0.52	0.07	0.00	0.75	0.25	0.00	0.64	0.28	0.00	0.56
Avail Cap(c_a), veh/h	287	0	647	394	0	658	346	0	551	311	0	557
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.3	0.0	22.9	16.8	0.0	25.5	20.1	0.0	26.7	20.5	0.0	25.9
Incr Delay (d2), s/veh	3.3	0.0	2.9	0.4	0.0	7.8	1.7	0.0	5.6	2.2	0.0	4.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	5.8	0.4	0.0	10.2	1.3	0.0	7.1	1.3	0.0	6.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.6	0.0	25.8	17.2	0.0	33.4	21.8	0.0	32.3	22.7	0.0	30.0
LnGrp LOS	C	A	C	B	A	C	C	A	C	C	A	C
Approach Vol, veh/h		433			525			440			399	
Approach Delay, s/veh		25.1			32.5			30.2			28.4	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	33.0	10.0	37.0	10.0	33.0	10.0	37.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	28.0	5.0	32.0	5.0	28.0	5.0	32.0
Max Q Clear Time (g_c+I1), s	5.0	17.4	2.9	15.0	5.0	15.1	5.1	23.2
Green Ext Time (p_c), s	0.0	1.5	0.0	1.7	0.0	1.4	0.0	2.0

Intersection Summary	
HCM 6th Ctrl Delay	29.2
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	17	396	5	5	527	7	8	1	8	6	3	29
Future Vol, veh/h	17	396	5	5	527	7	8	1	8	6	3	29
Conflicting Peds, #/hr	2	0	3	3	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	85	85	85	53	53	53	73	73	73
Heavy Vehicles, %	0	2	0	0	3	0	0	0	0	0	0	0
Mvmt Flow	19	450	6	6	620	8	15	2	15	8	4	40

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	630	0	0	459	0	0	1152	1136	456	1138	1135	626
Stage 1	-	-	-	-	-	-	494	494	-	638	638	-
Stage 2	-	-	-	-	-	-	658	642	-	500	497	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	962	-	-	1113	-	-	176	204	609	180	204	488
Stage 1	-	-	-	-	-	-	561	550	-	468	474	-
Stage 2	-	-	-	-	-	-	457	472	-	557	548	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	960	-	-	1110	-	-	154	196	607	169	196	487
Mov Cap-2 Maneuver	-	-	-	-	-	-	154	196	-	169	196	-
Stage 1	-	-	-	-	-	-	544	534	-	454	469	-
Stage 2	-	-	-	-	-	-	413	467	-	527	532	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.1	22.1	17.3
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	242	960	-	-	1110	-	-	344
HCM Lane V/C Ratio	0.133	0.02	-	-	0.005	-	-	0.151
HCM Control Delay (s)	22.1	8.8	0	-	8.3	0	-	17.3
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0	-	-	0.5



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	96	575	389	64	605	9	265	54	45	21	70	97
Future Volume (veh/h)	96	575	389	64	605	9	265	54	45	21	70	97
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1900	1900	1900	1900	1900	1870	1870	1900	1900	1885
Adj Flow Rate, veh/h	102	612	414	70	658	10	305	62	52	26	88	121
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.87	0.87	0.87	0.80	0.80	0.80
Percent Heavy Veh, %	1	1	0	0	0	0	0	2	2	0	0	1
Cap, veh/h	376	1394	612	322	1382	615	428	274	230	343	115	158
Arrive On Green	0.05	0.39	0.39	0.05	0.38	0.38	0.16	0.29	0.29	0.03	0.16	0.16
Sat Flow, veh/h	1795	3582	1572	1810	3610	1606	1810	939	788	1810	723	994
Grp Volume(v), veh/h	102	612	414	70	658	10	305	0	114	26	0	209
Grp Sat Flow(s),veh/h/ln	1795	1791	1572	1810	1805	1606	1810	0	1727	1810	0	1717
Q Serve(g_s), s	2.8	10.3	17.9	1.9	11.3	0.3	10.9	0.0	4.1	1.0	0.0	9.6
Cycle Q Clear(g_c), s	2.8	10.3	17.9	1.9	11.3	0.3	10.9	0.0	4.1	1.0	0.0	9.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.46	1.00		0.58
Lane Grp Cap(c), veh/h	376	1394	612	322	1382	615	428	0	504	343	0	273
V/C Ratio(X)	0.27	0.44	0.68	0.22	0.48	0.02	0.71	0.00	0.23	0.08	0.00	0.76
Avail Cap(c_a), veh/h	452	1394	612	367	1382	615	469	0	987	404	0	773
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.7	18.5	20.8	14.5	19.2	15.8	22.4	0.0	22.1	27.6	0.0	33.1
Incr Delay (d2), s/veh	0.4	1.0	5.9	0.3	1.2	0.0	4.6	0.0	0.2	0.1	0.0	4.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	4.2	7.3	0.7	4.6	0.1	4.9	0.0	1.6	0.4	0.0	4.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.1	19.5	26.7	14.8	20.3	15.8	27.0	0.0	22.3	27.7	0.0	37.5
LnGrp LOS	B	B	C	B	C	B	C	A	C	C	A	D
Approach Vol, veh/h		1128			738			419			235	
Approach Delay, s/veh		21.8			19.7			25.7			36.4	
Approach LOS		C			B			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.0	37.0	7.2	29.0	9.5	36.5	18.1	18.1
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	6.0	32.0	5.0	47.0	8.0	30.0	15.0	37.0
Max Q Clear Time (g_c+I1), s	3.9	19.9	3.0	6.1	4.8	13.3	12.9	11.6
Green Ext Time (p_c), s	0.0	4.5	0.0	0.7	0.1	4.0	0.2	1.3

Intersection Summary	
HCM 6th Ctrl Delay	23.2
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	109	129	0	874	39
Future Vol, veh/h	8	109	129	0	874	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	425	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	92	92	90	90
Heavy Vehicles, %	0	3	4	3	3	0
Mvmt Flow	10	135	140	0	971	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1273	507	1014	0	-	0
Stage 1	993	-	-	-	-	-
Stage 2	280	-	-	-	-	-
Critical Hdwy	6.25	7.16	5.38	-	-	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.65	3.93	3.14	-	-	-
Pot Cap-1 Maneuver	193	435	380	-	-	-
Stage 1	253	-	-	-	-	-
Stage 2	722	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	122	435	380	-	-	-
Mov Cap-2 Maneuver	122	-	-	-	-	-
Stage 1	160	-	-	-	-	-
Stage 2	722	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.8	19.9	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	380	-	370	-	-
HCM Lane V/C Ratio	0.369	-	0.39	-	-
HCM Control Delay (s)	19.9	-	20.8	-	-
HCM Lane LOS	C	-	C	-	-
HCM 95th %tile Q(veh)	1.7	-	1.8	-	-

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	18	9	13	39	17	77	6	263	67	76	361	30
Future Vol, veh/h	18	9	13	39	17	77	6	263	67	76	361	30
Conflicting Peds, #/hr	2	0	0	0	0	2	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	85	85	85	94	94	94	93	93	93
Heavy Vehicles, %	0	0	0	0	6	0	0	1	0	0	1	0
Mvmt Flow	23	12	17	46	20	91	6	280	71	82	388	32

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	955	933	406	911	914	318	422	0	0	351	0	0
Stage 1	570	570	-	328	328	-	-	-	-	-	-	-
Stage 2	385	363	-	583	586	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.56	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4.054	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	240	268	649	257	269	727	1148	-	-	1219	-	-
Stage 1	510	509	-	689	640	-	-	-	-	-	-	-
Stage 2	642	628	-	502	491	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	182	242	648	224	243	726	1146	-	-	1219	-	-
Mov Cap-2 Maneuver	182	242	-	224	243	-	-	-	-	-	-	-
Stage 1	505	463	-	684	636	-	-	-	-	-	-	-
Stage 2	539	624	-	435	447	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	22.6	20.9	0.1	1.3
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1146	-	-	256	380	1219	-	-
HCM Lane V/C Ratio	0.006	-	-	0.203	0.412	0.067	-	-
HCM Control Delay (s)	8.2	0	-	22.6	20.9	8.2	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.7	2	0.2	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	106	385	61	95	343	39	46	214	48	93	258	90
Future Volume (veh/h)	106	385	61	95	343	39	46	214	48	93	258	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1870	1900	1885	1900	1900	1900	1870	1841	1885	1900	1900
Adj Flow Rate, veh/h	112	405	64	100	361	41	50	233	52	98	272	95
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95
Percent Heavy Veh, %	1	2	0	1	0	0	0	2	4	1	0	0
Cap, veh/h	362	560	89	303	577	66	321	460	103	380	418	146
Arrive On Green	0.07	0.36	0.36	0.06	0.34	0.34	0.06	0.31	0.31	0.06	0.31	0.31
Sat Flow, veh/h	1795	1575	249	1795	1675	190	1810	1479	330	1795	1344	469
Grp Volume(v), veh/h	112	0	469	100	0	402	50	0	285	98	0	367
Grp Sat Flow(s),veh/h/ln	1795	0	1824	1795	0	1865	1810	0	1810	1795	0	1814
Q Serve(g_s), s	3.5	0.0	20.1	3.2	0.0	16.2	1.6	0.0	11.6	3.3	0.0	15.7
Cycle Q Clear(g_c), s	3.5	0.0	20.1	3.2	0.0	16.2	1.6	0.0	11.6	3.3	0.0	15.7
Prop In Lane	1.00		0.14	1.00		0.10	1.00		0.18	1.00		0.26
Lane Grp Cap(c), veh/h	362	0	649	303	0	642	321	0	563	380	0	564
V/C Ratio(X)	0.31	0.00	0.72	0.33	0.00	0.63	0.16	0.00	0.51	0.26	0.00	0.65
Avail Cap(c_a), veh/h	362	0	649	303	0	642	321	0	563	380	0	564
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.3	0.0	25.2	19.4	0.0	24.7	20.0	0.0	25.3	19.9	0.0	26.8
Incr Delay (d2), s/veh	2.2	0.0	6.9	2.9	0.0	4.6	1.0	0.0	3.2	1.6	0.0	5.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	9.4	1.5	0.0	7.6	0.7	0.0	5.3	1.5	0.0	7.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.5	0.0	32.0	22.3	0.0	29.2	21.0	0.0	28.6	21.5	0.0	32.5
LnGrp LOS	C	A	C	C	A	C	C	A	C	C	A	C
Approach Vol, veh/h		581			502			335			465	
Approach Delay, s/veh		29.8			27.8			27.5			30.2	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	33.0	10.0	37.0	10.0	33.0	11.0	36.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	28.0	5.0	32.0	5.0	28.0	6.0	31.0
Max Q Clear Time (g_c+I1), s	5.3	13.6	5.2	22.1	3.6	17.7	5.5	18.2
Green Ext Time (p_c), s	0.0	1.3	0.0	2.0	0.0	1.6	0.0	1.9

Intersection Summary	
HCM 6th Ctrl Delay	29.0
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	18	538	16	4	478	9	1	4	14	0	2	41
Future Vol, veh/h	18	538	16	4	478	9	1	4	14	0	2	41
Conflicting Peds, #/hr	2	0	1	1	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	97	97	97	68	68	68	72	72	72
Heavy Vehicles, %	0	1	6	0	0	0	0	0	7	0	0	5
Mvmt Flow	19	560	17	4	493	9	1	6	21	0	3	57

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	504	0	0	578	0	0	1144	1120	570	1128	1124	500
Stage 1	-	-	-	-	-	-	608	608	-	508	508	-
Stage 2	-	-	-	-	-	-	536	512	-	620	616	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.27	7.1	6.5	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.363	3.5	4	3.345
Pot Cap-1 Maneuver	1071	-	-	1006	-	-	179	208	512	183	207	565
Stage 1	-	-	-	-	-	-	486	489	-	551	542	-
Stage 2	-	-	-	-	-	-	532	540	-	479	485	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1069	-	-	1005	-	-	155	201	512	167	200	564
Mov Cap-2 Maneuver	-	-	-	-	-	-	155	201	-	167	200	-
Stage 1	-	-	-	-	-	-	473	476	-	536	538	-
Stage 2	-	-	-	-	-	-	473	536	-	442	472	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.1	16	12.8
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	354	1069	-	-	1005	-	-	520
HCM Lane V/C Ratio	0.079	0.018	-	-	0.004	-	-	0.115
HCM Control Delay (s)	16	8.4	0	-	8.6	0	-	12.8
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	0.4

Appendix D – Analysis Report Future Without Project Conditions



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	88	500	309	57	767	12	193	61	68	26	70	108
Future Volume (veh/h)	88	500	309	57	767	12	193	61	68	26	70	108
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1826	1841	1826	1856	1900	1841	1856	1841	1900	1885	1870
Adj Flow Rate, veh/h	99	562	347	62	834	13	214	68	76	28	75	116
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.90	0.90	0.90	0.93	0.93	0.93
Percent Heavy Veh, %	3	5	4	5	3	0	4	3	4	0	1	2
Cap, veh/h	348	1495	671	366	1487	664	345	190	212	335	101	156
Arrive On Green	0.06	0.43	0.43	0.05	0.42	0.42	0.12	0.24	0.24	0.03	0.15	0.15
Sat Flow, veh/h	1767	3469	1558	1739	3526	1575	1753	800	894	1810	666	1031
Grp Volume(v), veh/h	99	562	347	62	834	13	214	0	144	28	0	191
Grp Sat Flow(s),veh/h/ln	1767	1735	1558	1739	1763	1575	1753	0	1693	1810	0	1697
Q Serve(g_s), s	2.4	8.6	12.8	1.5	14.0	0.4	7.7	0.0	5.5	1.0	0.0	8.4
Cycle Q Clear(g_c), s	2.4	8.6	12.8	1.5	14.0	0.4	7.7	0.0	5.5	1.0	0.0	8.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.53	1.00		0.61
Lane Grp Cap(c), veh/h	348	1495	671	366	1487	664	345	0	401	335	0	256
V/C Ratio(X)	0.28	0.38	0.52	0.17	0.56	0.02	0.62	0.00	0.36	0.08	0.00	0.74
Avail Cap(c_a), veh/h	361	1495	671	395	1487	664	345	0	1017	398	0	933
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.8	15.1	16.3	11.9	17.1	13.2	23.2	0.0	24.9	26.7	0.0	31.8
Incr Delay (d2), s/veh	0.4	0.7	2.8	0.2	1.5	0.1	3.4	0.0	0.5	0.1	0.0	4.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	3.3	4.9	0.6	5.5	0.1	3.3	0.0	2.2	0.4	0.0	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.2	15.8	19.1	12.1	18.7	13.2	26.6	0.0	25.4	26.8	0.0	36.0
LnGrp LOS	B	B	B	B	B	B	C	A	C	C	A	D
Approach Vol, veh/h		1008			909			358			219	
Approach Delay, s/veh		16.7			18.1			26.1			34.9	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.7	38.7	7.3	23.5	9.4	38.0	14.0	16.8
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	33.0	5.0	47.0	5.0	33.0	9.0	43.0
Max Q Clear Time (g_c+I1), s	3.5	14.8	3.0	7.5	4.4	16.0	9.7	10.4
Green Ext Time (p_c), s	0.0	4.8	0.0	0.9	0.0	5.3	0.0	1.3

Intersection Summary	
HCM 6th Ctrl Delay	20.2
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	52	201	0	702	52
Future Vol, veh/h	10	52	201	0	702	52
Conflicting Peds, #/hr	0	0	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	425	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	82	82	92	92
Heavy Vehicles, %	0	6	4	0	9	23
Mvmt Flow	12	60	245	0	763	57

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1284	412	822	0	-	0
Stage 1	794	-	-	-	-	-
Stage 2	490	-	-	-	-	-
Critical Hdwy	6.25	7.22	5.38	-	-	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.65	3.96	3.14	-	-	-
Pot Cap-1 Maneuver	190	495	470	-	-	-
Stage 1	335	-	-	-	-	-
Stage 2	568	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	90	494	469	-	-	-
Mov Cap-2 Maneuver	90	-	-	-	-	-
Stage 1	160	-	-	-	-	-
Stage 2	567	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	21.7	20.8	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	469	-	287	-	-
HCM Lane V/C Ratio	0.523	-	0.251	-	-
HCM Control Delay (s)	20.8	-	21.7	-	-
HCM Lane LOS	C	-	C	-	-
HCM 95th %tile Q(veh)	3	-	1	-	-

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	17	6	6	31	16	77	8	218	76	49	334	27
Future Vol, veh/h	17	6	6	31	16	77	8	218	76	49	334	27
Conflicting Peds, #/hr	1	0	0	0	0	1	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	73	73	73	79	79	79	85	85	85	87	87	87
Heavy Vehicles, %	11	17	0	9	8	7	0	4	1	4	4	0
Mvmt Flow	23	8	8	39	20	97	9	256	89	56	384	31

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	891	876	401	839	847	302	416	0	0	345	0	0
Stage 1	513	513	-	319	319	-	-	-	-	-	-	-
Stage 2	378	363	-	520	528	-	-	-	-	-	-	-
Critical Hdwy	7.21	6.67	6.2	7.19	6.58	6.27	4.1	-	-	4.14	-	-
Critical Hdwy Stg 1	6.21	5.67	-	6.19	5.58	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.21	5.67	-	6.19	5.58	-	-	-	-	-	-	-
Follow-up Hdwy	3.599	4.153	3.3	3.581	4.072	3.363	2.2	-	-	2.236	-	-
Pot Cap-1 Maneuver	254	272	653	277	292	726	1154	-	-	1203	-	-
Stage 1	528	512	-	678	642	-	-	-	-	-	-	-
Stage 2	626	599	-	527	518	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	196	253	652	252	271	725	1153	-	-	1203	-	-
Mov Cap-2 Maneuver	196	253	-	252	271	-	-	-	-	-	-	-
Stage 1	522	480	-	671	636	-	-	-	-	-	-	-
Stage 2	519	593	-	480	486	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	22.8	18.1	0.2	1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1153	-	-	242	430	1203	-	-
HCM Lane V/C Ratio	0.008	-	-	0.164	0.365	0.047	-	-
HCM Control Delay (s)	8.1	0	-	22.8	18.1	8.1	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.6	1.6	0.1	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	89	294	32	25	423	25	72	260	49	75	223	69
Future Volume (veh/h)	89	294	32	25	423	25	72	260	49	75	223	69
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1856	1900	1841	1870	1841	1811	1826	1841	1781	1870	1796
Adj Flow Rate, veh/h	99	327	36	29	498	29	87	313	59	86	256	79
Peak Hour Factor	0.90	0.90	0.90	0.85	0.85	0.85	0.83	0.83	0.83	0.87	0.87	0.87
Percent Heavy Veh, %	2	3	0	4	2	4	6	5	4	8	2	7
Cap, veh/h	252	566	62	359	603	35	344	481	91	311	442	136
Arrive On Green	0.06	0.34	0.34	0.06	0.34	0.34	0.06	0.32	0.32	0.06	0.32	0.32
Sat Flow, veh/h	1781	1642	181	1753	1750	102	1725	1494	282	1697	1371	423
Grp Volume(v), veh/h	99	0	363	29	0	527	87	0	372	86	0	335
Grp Sat Flow(s),veh/h/ln	1781	0	1823	1753	0	1852	1725	0	1775	1697	0	1794
Q Serve(g_s), s	3.2	0.0	14.7	0.9	0.0	23.5	3.0	0.0	16.2	3.0	0.0	14.0
Cycle Q Clear(g_c), s	3.2	0.0	14.7	0.9	0.0	23.5	3.0	0.0	16.2	3.0	0.0	14.0
Prop In Lane	1.00		0.10	1.00		0.06	1.00		0.16	1.00		0.24
Lane Grp Cap(c), veh/h	252	0	628	359	0	638	344	0	572	311	0	578
V/C Ratio(X)	0.39	0.00	0.58	0.08	0.00	0.83	0.25	0.00	0.65	0.28	0.00	0.58
Avail Cap(c_a), veh/h	252	0	628	359	0	638	344	0	572	311	0	578
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.6	0.0	24.1	17.7	0.0	27.0	19.5	0.0	26.2	19.9	0.0	25.4
Incr Delay (d2), s/veh	4.5	0.0	3.9	0.4	0.0	11.7	1.8	0.0	5.6	2.2	0.0	4.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	6.7	0.4	0.0	11.8	1.3	0.0	7.4	1.3	0.0	6.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.1	0.0	28.0	18.1	0.0	38.7	21.3	0.0	31.8	22.1	0.0	29.6
LnGrp LOS	C	A	C	B	A	D	C	A	C	C	A	C
Approach Vol, veh/h		462			556			459			421	
Approach Delay, s/veh		27.4			37.6			29.8			28.1	
Approach LOS		C			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	34.0	10.0	36.0	10.0	34.0	10.0	36.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	29.0	5.0	31.0	5.0	29.0	5.0	31.0
Max Q Clear Time (g_c+I1), s	5.0	18.2	2.9	16.7	5.0	16.0	5.2	25.5
Green Ext Time (p_c), s	0.0	1.6	0.0	1.8	0.0	1.6	0.0	1.6

Intersection Summary	
HCM 6th Ctrl Delay	31.1
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	17	422	5	5	553	7	8	1	8	6	3	29
Future Vol, veh/h	17	422	5	5	553	7	8	1	8	6	3	29
Conflicting Peds, #/hr	2	0	3	3	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	85	85	85	53	53	53	73	73	73
Heavy Vehicles, %	0	2	0	0	3	0	0	0	0	0	0	0
Mvmt Flow	19	480	6	6	651	8	15	2	15	8	4	40

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	661	0	0	489	0	0	1213	1197	486	1199	1196	657
Stage 1	-	-	-	-	-	-	524	524	-	669	669	-
Stage 2	-	-	-	-	-	-	689	673	-	530	527	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	937	-	-	1085	-	-	160	187	585	164	188	468
Stage 1	-	-	-	-	-	-	540	533	-	450	459	-
Stage 2	-	-	-	-	-	-	439	457	-	536	532	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	935	-	-	1082	-	-	139	179	583	154	180	467
Mov Cap-2 Maneuver	-	-	-	-	-	-	139	179	-	154	180	-
Stage 1	-	-	-	-	-	-	523	516	-	437	454	-
Stage 2	-	-	-	-	-	-	394	452	-	506	516	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.1	24	18.3
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	221	935	-	-	1082	-	-	323
HCM Lane V/C Ratio	0.145	0.021	-	-	0.005	-	-	0.161
HCM Control Delay (s)	24	8.9	0	-	8.3	0	-	18.3
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0	-	-	0.6



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	96	612	414	64	644	9	276	54	45	21	70	97
Future Volume (veh/h)	96	612	414	64	644	9	276	54	45	21	70	97
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1900	1900	1900	1900	1900	1870	1870	1900	1900	1885
Adj Flow Rate, veh/h	102	651	440	70	700	10	317	62	52	26	88	121
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.87	0.87	0.87	0.80	0.80	0.80
Percent Heavy Veh, %	1	1	0	0	0	0	0	2	2	0	0	1
Cap, veh/h	357	1384	608	306	1373	611	435	278	233	342	115	158
Arrive On Green	0.05	0.39	0.39	0.05	0.38	0.38	0.16	0.30	0.30	0.03	0.16	0.16
Sat Flow, veh/h	1795	3582	1572	1810	3610	1606	1810	939	788	1810	723	994
Grp Volume(v), veh/h	102	651	440	70	700	10	317	0	114	26	0	209
Grp Sat Flow(s),veh/h/ln	1795	1791	1572	1810	1805	1606	1810	0	1727	1810	0	1717
Q Serve(g_s), s	2.8	11.3	19.7	1.9	12.3	0.3	11.5	0.0	4.1	1.0	0.0	9.7
Cycle Q Clear(g_c), s	2.8	11.3	19.7	1.9	12.3	0.3	11.5	0.0	4.1	1.0	0.0	9.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.46	1.00		0.58
Lane Grp Cap(c), veh/h	357	1384	608	306	1373	611	435	0	512	342	0	273
V/C Ratio(X)	0.29	0.47	0.72	0.23	0.51	0.02	0.73	0.00	0.22	0.08	0.00	0.77
Avail Cap(c_a), veh/h	433	1384	608	349	1373	611	465	0	980	402	0	767
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.1	19.0	21.6	14.9	19.7	16.0	22.5	0.0	21.9	27.8	0.0	33.3
Incr Delay (d2), s/veh	0.4	1.1	7.3	0.4	1.4	0.0	5.3	0.0	0.2	0.1	0.0	4.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	4.6	8.2	0.8	5.1	0.1	5.2	0.0	1.6	0.4	0.0	4.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.5	20.2	29.0	15.2	21.1	16.0	27.8	0.0	22.2	27.9	0.0	37.8
LnGrp LOS	B	C	C	B	C	B	C	A	C	C	A	D
Approach Vol, veh/h		1193			780			431			235	
Approach Delay, s/veh		23.0			20.5			26.3			36.7	
Approach LOS		C			C			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.0	37.0	7.3	29.5	9.5	36.5	18.6	18.2
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	6.0	32.0	5.0	47.0	8.0	30.0	15.0	37.0
Max Q Clear Time (g_c+I1), s	3.9	21.7	3.0	6.1	4.8	14.3	13.5	11.7
Green Ext Time (p_c), s	0.0	4.3	0.0	0.7	0.1	4.2	0.2	1.3

Intersection Summary	
HCM 6th Ctrl Delay	24.0
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	109	129	0	931	39
Future Vol, veh/h	8	109	129	0	931	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	425	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	92	92	90	90
Heavy Vehicles, %	0	3	4	3	3	0
Mvmt Flow	10	135	140	0	1034	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1336	539	1077	0	-	0
Stage 1	1056	-	-	-	-	-
Stage 2	280	-	-	-	-	-
Critical Hdwy	6.25	7.16	5.38	-	-	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.65	3.93	3.14	-	-	-
Pot Cap-1 Maneuver	177	415	354	-	-	-
Stage 1	232	-	-	-	-	-
Stage 2	722	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	107	415	354	-	-	-
Mov Cap-2 Maneuver	107	-	-	-	-	-
Stage 1	140	-	-	-	-	-
Stage 2	722	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	22.6	21.7	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	354	-	347	-	-
HCM Lane V/C Ratio	0.396	-	0.416	-	-
HCM Control Delay (s)	21.7	-	22.6	-	-
HCM Lane LOS	C	-	C	-	-
HCM 95th %tile Q(veh)	1.8	-	2	-	-

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	18	9	13	39	17	77	6	274	67	76	386	30
Future Vol, veh/h	18	9	13	39	17	77	6	274	67	76	386	30
Conflicting Peds, #/hr	2	0	0	0	0	2	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	85	85	85	94	94	94	93	93	93
Heavy Vehicles, %	0	0	0	0	6	0	0	1	0	0	1	0
Mvmt Flow	23	12	17	46	20	91	6	291	71	82	415	32

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	993	971	433	949	952	329	449	0	0	362	0	0
Stage 1	597	597	-	339	339	-	-	-	-	-	-	-
Stage 2	396	374	-	610	613	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.56	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4.054	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	226	255	627	242	255	717	1122	-	-	1208	-	-
Stage 1	493	495	-	680	633	-	-	-	-	-	-	-
Stage 2	633	621	-	485	477	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	170	230	626	210	230	716	1120	-	-	1208	-	-
Mov Cap-2 Maneuver	170	230	-	210	230	-	-	-	-	-	-	-
Stage 1	489	449	-	675	629	-	-	-	-	-	-	-
Stage 2	531	617	-	418	433	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	24	22.3	0.1	1.3
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1120	-	-	241	362	1208	-	-
HCM Lane V/C Ratio	0.006	-	-	0.216	0.432	0.068	-	-
HCM Control Delay (s)	8.2	0	-	24	22.3	8.2	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.8	2.1	0.2	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	106	420	61	95	365	39	46	228	48	93	283	90
Future Volume (veh/h)	106	420	61	95	365	39	46	228	48	93	283	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1870	1900	1885	1900	1900	1900	1870	1841	1885	1900	1900
Adj Flow Rate, veh/h	112	442	64	100	384	41	50	248	52	98	298	95
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95
Percent Heavy Veh, %	1	2	0	1	0	0	0	2	4	1	0	0
Cap, veh/h	312	532	77	250	562	60	331	499	105	398	460	147
Arrive On Green	0.06	0.33	0.33	0.06	0.33	0.33	0.06	0.33	0.33	0.06	0.33	0.33
Sat Flow, veh/h	1795	1596	231	1795	1687	180	1810	1498	314	1795	1380	440
Grp Volume(v), veh/h	112	0	506	100	0	425	50	0	300	98	0	393
Grp Sat Flow(s),veh/h/ln	1795	0	1828	1795	0	1867	1810	0	1813	1795	0	1819
Q Serve(g_s), s	3.7	0.0	23.0	3.2	0.0	17.7	1.6	0.0	11.9	3.2	0.0	16.5
Cycle Q Clear(g_c), s	3.7	0.0	23.0	3.2	0.0	17.7	1.6	0.0	11.9	3.2	0.0	16.5
Prop In Lane	1.00		0.13	1.00		0.10	1.00		0.17	1.00		0.24
Lane Grp Cap(c), veh/h	312	0	609	250	0	622	331	0	604	398	0	606
V/C Ratio(X)	0.36	0.00	0.83	0.40	0.00	0.68	0.15	0.00	0.50	0.25	0.00	0.65
Avail Cap(c_a), veh/h	312	0	609	250	0	622	331	0	604	398	0	606
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.9	0.0	27.7	21.1	0.0	25.9	18.9	0.0	24.0	18.6	0.0	25.5
Incr Delay (d2), s/veh	3.2	0.0	12.5	4.7	0.0	6.0	1.0	0.0	2.9	1.5	0.0	5.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	11.6	1.6	0.0	8.5	0.7	0.0	5.4	1.4	0.0	7.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.1	0.0	40.1	25.8	0.0	31.9	19.8	0.0	26.9	20.1	0.0	30.8
LnGrp LOS	C	A	D	C	A	C	B	A	C	C	A	C
Approach Vol, veh/h		618			525			350			491	
Approach Delay, s/veh		37.0			30.7			25.9			28.7	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	35.0	10.0	35.0	10.0	35.0	10.0	35.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	30.0	5.0	30.0	5.0	30.0	5.0	30.0
Max Q Clear Time (g_c+I1), s	5.2	13.9	5.2	25.0	3.6	18.5	5.7	19.7
Green Ext Time (p_c), s	0.0	1.5	0.0	1.4	0.0	1.8	0.0	1.8

Intersection Summary	
HCM 6th Ctrl Delay	31.3
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	18	573	16	4	500	9	1	4	14	0	2	41
Future Vol, veh/h	18	573	16	4	500	9	1	4	14	0	2	41
Conflicting Peds, #/hr	2	0	1	1	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	97	97	97	68	68	68	72	72	72
Heavy Vehicles, %	0	1	6	0	0	0	0	0	7	0	0	5
Mvmt Flow	19	597	17	4	515	9	1	6	21	0	3	57

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	526	0	0	615	0	0	1203	1179	607	1187	1183	522
Stage 1	-	-	-	-	-	-	645	645	-	530	530	-
Stage 2	-	-	-	-	-	-	558	534	-	657	653	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.27	7.1	6.5	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.363	3.5	4	3.345
Pot Cap-1 Maneuver	1051	-	-	974	-	-	163	192	487	167	191	549
Stage 1	-	-	-	-	-	-	464	471	-	536	530	-
Stage 2	-	-	-	-	-	-	518	528	-	457	467	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1049	-	-	973	-	-	141	185	487	152	184	548
Mov Cap-2 Maneuver	-	-	-	-	-	-	141	185	-	152	184	-
Stage 1	-	-	-	-	-	-	451	457	-	520	526	-
Stage 2	-	-	-	-	-	-	459	524	-	420	453	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.1	16.9	13.1
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	331	1049	-	-	973	-	-	502
HCM Lane V/C Ratio	0.084	0.018	-	-	0.004	-	-	0.119
HCM Control Delay (s)	16.9	8.5	0	-	8.7	0	-	13.1
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	0.4



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	88	533	329	57	817	12	207	61	68	26	70	108
Future Volume (veh/h)	88	533	329	57	817	12	207	61	68	26	70	108
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1826	1841	1826	1856	1900	1841	1856	1841	1900	1885	1870
Adj Flow Rate, veh/h	99	599	370	62	888	13	230	68	76	28	75	116
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.90	0.90	0.90	0.93	0.93	0.93
Percent Heavy Veh, %	3	5	4	5	3	0	4	3	4	0	1	2
Cap, veh/h	331	1495	671	351	1487	664	345	190	212	335	101	156
Arrive On Green	0.06	0.43	0.43	0.05	0.42	0.42	0.12	0.24	0.24	0.03	0.15	0.15
Sat Flow, veh/h	1767	3469	1558	1739	3526	1575	1753	800	894	1810	666	1031
Grp Volume(v), veh/h	99	599	370	62	888	13	230	0	144	28	0	191
Grp Sat Flow(s),veh/h/ln	1767	1735	1558	1739	1763	1575	1753	0	1693	1810	0	1697
Q Serve(g_s), s	2.4	9.3	13.9	1.5	15.2	0.4	8.4	0.0	5.5	1.0	0.0	8.4
Cycle Q Clear(g_c), s	2.4	9.3	13.9	1.5	15.2	0.4	8.4	0.0	5.5	1.0	0.0	8.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.53	1.00		0.61
Lane Grp Cap(c), veh/h	331	1495	671	351	1487	664	345	0	401	335	0	256
V/C Ratio(X)	0.30	0.40	0.55	0.18	0.60	0.02	0.67	0.00	0.36	0.08	0.00	0.74
Avail Cap(c_a), veh/h	344	1495	671	402	1487	664	345	0	1017	398	0	933
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.0	15.3	16.6	12.0	17.5	13.2	23.5	0.0	24.9	26.7	0.0	31.8
Incr Delay (d2), s/veh	0.5	0.8	3.2	0.2	1.8	0.1	4.9	0.0	0.5	0.1	0.0	4.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	3.5	5.3	0.6	6.0	0.1	3.7	0.0	2.2	0.4	0.0	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.6	16.1	19.9	12.2	19.3	13.2	28.3	0.0	25.4	26.8	0.0	36.0
LnGrp LOS	B	B	B	B	B	B	C	A	C	C	A	D
Approach Vol, veh/h		1068			963			374			219	
Approach Delay, s/veh		17.2			18.7			27.2			34.9	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.7	38.7	7.3	23.5	9.4	38.0	14.0	16.8
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	6.0	32.0	5.0	47.0	5.0	33.0	9.0	43.0
Max Q Clear Time (g_c+I1), s	3.5	15.9	3.0	7.5	4.4	17.2	10.4	10.4
Green Ext Time (p_c), s	0.0	4.9	0.0	0.9	0.0	5.5	0.0	1.3

Intersection Summary	
HCM 6th Ctrl Delay	20.6
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	6.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	52	201	0	748	52
Future Vol, veh/h	10	52	201	0	748	52
Conflicting Peds, #/hr	0	0	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	425	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	82	82	92	92
Heavy Vehicles, %	0	6	4	0	9	23
Mvmt Flow	12	60	245	0	813	57

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1334	437	872	0	-	0
Stage 1	844	-	-	-	-	-
Stage 2	490	-	-	-	-	-
Critical Hdwy	6.25	7.22	5.38	-	-	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.65	3.96	3.14	-	-	-
Pot Cap-1 Maneuver	178	477	445	-	-	-
Stage 1	312	-	-	-	-	-
Stage 2	568	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	79	476	444	-	-	-
Mov Cap-2 Maneuver	79	-	-	-	-	-
Stage 1	139	-	-	-	-	-
Stage 2	567	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	23.8	22.7	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	444	-	263	-	-
HCM Lane V/C Ratio	0.552	-	0.274	-	-
HCM Control Delay (s)	22.6	-	23.8	-	-
HCM Lane LOS	C	-	C	-	-
HCM 95th %tile Q(veh)	3.3	-	1.1	-	-

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	17	6	6	31	16	77	8	232	76	49	354	27
Future Vol, veh/h	17	6	6	31	16	77	8	232	76	49	354	27
Conflicting Peds, #/hr	1	0	0	0	0	1	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	73	73	73	79	79	79	85	85	85	87	87	87
Heavy Vehicles, %	11	17	0	9	8	7	0	4	1	4	4	0
Mvmt Flow	23	8	8	39	20	97	9	273	89	56	407	31

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	931	916	424	879	887	319	439	0	0	362	0	0
Stage 1	536	536	-	336	336	-	-	-	-	-	-	-
Stage 2	395	380	-	543	551	-	-	-	-	-	-	-
Critical Hdwy	7.21	6.67	6.2	7.19	6.58	6.27	4.1	-	-	4.14	-	-
Critical Hdwy Stg 1	6.21	5.67	-	6.19	5.58	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.21	5.67	-	6.19	5.58	-	-	-	-	-	-	-
Follow-up Hdwy	3.599	4.153	3.3	3.581	4.072	3.363	2.2	-	-	2.236	-	-
Pot Cap-1 Maneuver	238	257	634	261	277	710	1132	-	-	1186	-	-
Stage 1	513	500	-	664	631	-	-	-	-	-	-	-
Stage 2	613	588	-	511	506	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	182	238	633	237	257	709	1131	-	-	1186	-	-
Mov Cap-2 Maneuver	182	238	-	237	257	-	-	-	-	-	-	-
Stage 1	507	468	-	657	625	-	-	-	-	-	-	-
Stage 2	506	582	-	464	474	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	24.3	19.1	0.2	0.9
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1131	-	-	226	411	1186	-	-
HCM Lane V/C Ratio	0.008	-	-	0.176	0.382	0.047	-	-
HCM Control Delay (s)	8.2	0	-	24.3	19.1	8.2	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.6	1.8	0.1	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	89	321	32	25	450	25	72	277	49	75	243	69
Future Volume (veh/h)	89	321	32	25	450	25	72	277	49	75	243	69
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1856	1900	1841	1870	1841	1811	1826	1841	1781	1870	1796
Adj Flow Rate, veh/h	99	357	36	29	529	29	87	334	59	86	279	79
Peak Hour Factor	0.90	0.90	0.90	0.85	0.85	0.85	0.83	0.83	0.83	0.87	0.87	0.87
Percent Heavy Veh, %	2	3	0	4	2	4	6	5	4	8	2	7
Cap, veh/h	232	571	58	338	605	33	328	487	86	297	452	128
Arrive On Green	0.06	0.34	0.34	0.06	0.34	0.34	0.06	0.32	0.32	0.06	0.32	0.32
Sat Flow, veh/h	1781	1658	167	1753	1757	96	1725	1511	267	1697	1402	397
Grp Volume(v), veh/h	99	0	393	29	0	558	87	0	393	86	0	358
Grp Sat Flow(s),veh/h/ln	1781	0	1825	1753	0	1853	1725	0	1778	1697	0	1799
Q Serve(g_s), s	3.2	0.0	16.2	0.9	0.0	25.4	3.0	0.0	17.3	3.0	0.0	15.2
Cycle Q Clear(g_c), s	3.2	0.0	16.2	0.9	0.0	25.4	3.0	0.0	17.3	3.0	0.0	15.2
Prop In Lane	1.00		0.09	1.00		0.05	1.00		0.15	1.00		0.22
Lane Grp Cap(c), veh/h	232	0	629	338	0	638	328	0	573	297	0	580
V/C Ratio(X)	0.43	0.00	0.63	0.09	0.00	0.87	0.27	0.00	0.69	0.29	0.00	0.62
Avail Cap(c_a), veh/h	232	0	629	338	0	638	328	0	573	297	0	580
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.2	0.0	24.6	18.0	0.0	27.7	19.7	0.0	26.5	20.2	0.0	25.8
Incr Delay (d2), s/veh	5.7	0.0	4.6	0.5	0.0	15.4	2.0	0.0	6.6	2.5	0.0	4.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	7.5	0.4	0.0	13.3	1.3	0.0	8.0	1.3	0.0	7.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.9	0.0	29.3	18.5	0.0	43.1	21.7	0.0	33.1	22.6	0.0	30.7
LnGrp LOS	C	A	C	B	A	D	C	A	C	C	A	C
Approach Vol, veh/h		492			587			480			444	
Approach Delay, s/veh		28.8			41.9			31.0			29.1	
Approach LOS		C			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	34.0	10.0	36.0	10.0	34.0	10.0	36.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	29.0	5.0	31.0	5.0	29.0	5.0	31.0
Max Q Clear Time (g_c+I1), s	5.0	19.3	2.9	18.2	5.0	17.2	5.2	27.4
Green Ext Time (p_c), s	0.0	1.6	0.0	1.9	0.0	1.6	0.0	1.2

Intersection Summary	
HCM 6th Ctrl Delay	33.2
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	17	449	5	5	580	7	8	1	8	6	3	29
Future Vol, veh/h	17	449	5	5	580	7	8	1	8	6	3	29
Conflicting Peds, #/hr	2	0	3	3	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	85	85	85	53	53	53	73	73	73
Heavy Vehicles, %	0	2	0	0	3	0	0	0	0	0	0	0
Mvmt Flow	19	510	6	6	682	8	15	2	15	8	4	40

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	692	0	0	519	0	0	1274	1258	516	1260	1257	688
Stage 1	-	-	-	-	-	-	554	554	-	700	700	-
Stage 2	-	-	-	-	-	-	720	704	-	560	557	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	912	-	-	1057	-	-	145	172	563	149	173	450
Stage 1	-	-	-	-	-	-	520	517	-	433	444	-
Stage 2	-	-	-	-	-	-	422	443	-	516	515	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	910	-	-	1054	-	-	126	165	561	139	166	449
Mov Cap-2 Maneuver	-	-	-	-	-	-	126	165	-	139	166	-
Stage 1	-	-	-	-	-	-	503	500	-	420	439	-
Stage 2	-	-	-	-	-	-	378	438	-	486	499	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.1	26	19.4
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	203	910	-	-	1054	-	-	302
HCM Lane V/C Ratio	0.158	0.021	-	-	0.006	-	-	0.172
HCM Control Delay (s)	26	9	0	-	8.4	0	-	19.4
HCM Lane LOS	D	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0	-	-	0.6



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	96	652	441	64	687	9	289	54	45	21	70	97
Future Volume (veh/h)	96	652	441	64	687	9	289	54	45	21	70	97
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1900	1900	1900	1900	1900	1870	1870	1900	1900	1885
Adj Flow Rate, veh/h	102	694	469	70	747	10	332	62	52	26	88	121
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.87	0.87	0.87	0.80	0.80	0.80
Percent Heavy Veh, %	1	1	0	0	0	0	0	2	2	0	0	1
Cap, veh/h	335	1370	601	288	1358	604	447	285	239	340	114	157
Arrive On Green	0.05	0.38	0.38	0.05	0.38	0.38	0.17	0.30	0.30	0.03	0.16	0.16
Sat Flow, veh/h	1795	3582	1572	1810	3610	1606	1810	939	788	1810	723	994
Grp Volume(v), veh/h	102	694	469	70	747	10	332	0	114	26	0	209
Grp Sat Flow(s),veh/h/ln	1795	1791	1572	1810	1805	1606	1810	0	1727	1810	0	1717
Q Serve(g_s), s	2.9	12.4	22.0	1.9	13.6	0.3	12.1	0.0	4.1	1.0	0.0	9.8
Cycle Q Clear(g_c), s	2.9	12.4	22.0	1.9	13.6	0.3	12.1	0.0	4.1	1.0	0.0	9.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.46	1.00		0.58
Lane Grp Cap(c), veh/h	335	1370	601	288	1358	604	447	0	524	340	0	272
V/C Ratio(X)	0.30	0.51	0.78	0.24	0.55	0.02	0.74	0.00	0.22	0.08	0.00	0.77
Avail Cap(c_a), veh/h	388	1370	601	330	1358	604	503	0	970	399	0	718
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.7	19.8	22.8	15.4	20.5	16.4	22.5	0.0	21.7	28.2	0.0	33.8
Incr Delay (d2), s/veh	0.5	1.3	9.7	0.4	1.6	0.1	5.2	0.0	0.2	0.1	0.0	4.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	5.1	9.4	0.8	5.7	0.1	5.5	0.0	1.6	0.4	0.0	4.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.2	21.1	32.4	15.9	22.1	16.4	27.6	0.0	21.9	28.3	0.0	38.3
LnGrp LOS	B	C	C	B	C	B	C	A	C	C	A	D
Approach Vol, veh/h		1265			827			446			235	
Approach Delay, s/veh		24.9			21.5			26.2			37.2	
Approach LOS		C			C			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.0	37.0	7.3	30.4	9.5	36.5	19.4	18.2
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	6.0	32.0	5.0	47.0	7.0	31.0	17.0	35.0
Max Q Clear Time (g_c+I1), s	3.9	24.0	3.0	6.1	4.9	15.6	14.1	11.8
Green Ext Time (p_c), s	0.0	3.9	0.0	0.7	0.0	4.5	0.3	1.3

Intersection Summary	
HCM 6th Ctrl Delay	25.2
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	109	129	0	992	39
Future Vol, veh/h	8	109	129	0	992	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	425	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	92	92	90	90
Heavy Vehicles, %	0	3	4	3	3	0
Mvmt Flow	10	135	140	0	1102	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1404	573	1145	0	-	0
Stage 1	1124	-	-	-	-	-
Stage 2	280	-	-	-	-	-
Critical Hdwy	6.25	7.16	5.38	-	-	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.65	3.93	3.14	-	-	-
Pot Cap-1 Maneuver	162	394	327	-	-	-
Stage 1	211	-	-	-	-	-
Stage 2	722	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	93	394	327	-	-	-
Mov Cap-2 Maneuver	93	-	-	-	-	-
Stage 1	121	-	-	-	-	-
Stage 2	722	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	24.9	24	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	327	-	323	-	-
HCM Lane V/C Ratio	0.429	-	0.447	-	-
HCM Control Delay (s)	24	-	24.9	-	-
HCM Lane LOS	C	-	C	-	-
HCM 95th %tile Q(veh)	2.1	-	2.2	-	-

Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	18	9	13	39	17	77	6	287	67	76	413	30
Future Vol, veh/h	18	9	13	39	17	77	6	287	67	76	413	30
Conflicting Peds, #/hr	2	0	0	0	0	2	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	85	85	85	94	94	94	93	93	93
Heavy Vehicles, %	0	0	0	0	6	0	0	1	0	0	1	0
Mvmt Flow	23	12	17	46	20	91	6	305	71	82	444	32

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1036	1014	462	992	995	343	478	0	0	376	0	0
Stage 1	626	626	-	353	353	-	-	-	-	-	-	-
Stage 2	410	388	-	639	642	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.56	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4.054	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	212	240	604	227	241	704	1095	-	-	1194	-	-
Stage 1	475	480	-	668	624	-	-	-	-	-	-	-
Stage 2	623	612	-	468	463	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	158	216	603	195	216	703	1093	-	-	1194	-	-
Mov Cap-2 Maneuver	158	216	-	195	216	-	-	-	-	-	-	-
Stage 1	471	434	-	663	620	-	-	-	-	-	-	-
Stage 2	521	608	-	401	419	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	25.6	24	0.1	1.2
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1093	-	-	226	343	1194	-	-
HCM Lane V/C Ratio	0.006	-	-	0.23	0.456	0.068	-	-
HCM Control Delay (s)	8.3	0	-	25.6	24	8.2	0	-
HCM Lane LOS	A	A	-	D	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.9	2.3	0.2	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	106	457	61	95	389	39	46	243	48	93	310	90
Future Volume (veh/h)	106	457	61	95	389	39	46	243	48	93	310	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1870	1900	1885	1900	1900	1900	1870	1841	1885	1900	1900
Adj Flow Rate, veh/h	112	481	64	100	409	41	50	264	52	98	326	95
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95
Percent Heavy Veh, %	1	2	0	1	0	0	0	2	4	1	0	0
Cap, veh/h	309	556	74	237	585	59	297	489	96	372	455	133
Arrive On Green	0.06	0.34	0.34	0.06	0.34	0.34	0.06	0.32	0.32	0.06	0.32	0.32
Sat Flow, veh/h	1795	1616	215	1795	1698	170	1810	1517	299	1795	1413	412
Grp Volume(v), veh/h	112	0	545	100	0	450	50	0	316	98	0	421
Grp Sat Flow(s),veh/h/ln	1795	0	1831	1795	0	1868	1810	0	1815	1795	0	1824
Q Serve(g_s), s	3.6	0.0	25.0	3.2	0.0	18.7	1.6	0.0	12.9	3.2	0.0	18.3
Cycle Q Clear(g_c), s	3.6	0.0	25.0	3.2	0.0	18.7	1.6	0.0	12.9	3.2	0.0	18.3
Prop In Lane	1.00		0.12	1.00		0.09	1.00		0.16	1.00		0.23
Lane Grp Cap(c), veh/h	309	0	631	237	0	644	297	0	585	372	0	588
V/C Ratio(X)	0.36	0.00	0.86	0.42	0.00	0.70	0.17	0.00	0.54	0.26	0.00	0.72
Avail Cap(c_a), veh/h	309	0	631	237	0	644	297	0	585	372	0	588
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.5	0.0	27.5	21.1	0.0	25.5	19.9	0.0	25.0	19.4	0.0	26.9
Incr Delay (d2), s/veh	3.3	0.0	14.7	5.4	0.0	6.2	1.2	0.0	3.6	1.7	0.0	7.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	12.9	1.6	0.0	9.0	0.7	0.0	5.9	1.5	0.0	8.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.8	0.0	42.2	26.5	0.0	31.7	21.1	0.0	28.6	21.2	0.0	34.2
LnGrp LOS	C	A	D	C	A	C	C	A	C	C	A	C
Approach Vol, veh/h		657			550			366			519	
Approach Delay, s/veh		38.9			30.7			27.6			31.7	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	34.0	10.0	36.0	10.0	34.0	10.0	36.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	29.0	5.0	31.0	5.0	29.0	5.0	31.0
Max Q Clear Time (g_c+I1), s	5.2	14.9	5.2	27.0	3.6	20.3	5.6	20.7
Green Ext Time (p_c), s	0.0	1.5	0.0	1.3	0.0	1.7	0.0	2.0

Intersection Summary	
HCM 6th Ctrl Delay	33.0
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	18	610	16	4	524	9	1	4	14	0	2	41
Future Vol, veh/h	18	610	16	4	524	9	1	4	14	0	2	41
Conflicting Peds, #/hr	2	0	1	1	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	97	97	97	68	68	68	72	72	72
Heavy Vehicles, %	0	1	6	0	0	0	0	0	7	0	0	5
Mvmt Flow	19	635	17	4	540	9	1	6	21	0	3	57

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	551	0	0	653	0	0	1266	1242	645	1250	1246	547
Stage 1	-	-	-	-	-	-	683	683	-	555	555	-
Stage 2	-	-	-	-	-	-	583	559	-	695	691	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.27	7.1	6.5	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.363	3.5	4	3.345
Pot Cap-1 Maneuver	1029	-	-	943	-	-	147	176	463	151	175	531
Stage 1	-	-	-	-	-	-	442	452	-	520	516	-
Stage 2	-	-	-	-	-	-	502	514	-	436	449	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1027	-	-	942	-	-	126	169	463	137	168	530
Mov Cap-2 Maneuver	-	-	-	-	-	-	126	169	-	137	168	-
Stage 1	-	-	-	-	-	-	429	438	-	504	512	-
Stage 2	-	-	-	-	-	-	443	510	-	399	436	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.1	17.9	13.5
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	307	1027	-	-	942	-	-	482
HCM Lane V/C Ratio	0.091	0.018	-	-	0.004	-	-	0.124
HCM Control Delay (s)	17.9	8.6	0	-	8.8	0	-	13.5
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	0.4



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	88	606	374	57	928	12	239	61	68	26	70	108
Future Volume (veh/h)	88	606	374	57	928	12	239	61	68	26	70	108
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1826	1841	1826	1856	1900	1841	1856	1841	1900	1885	1870
Adj Flow Rate, veh/h	99	681	420	62	1009	13	266	68	76	28	75	116
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.90	0.90	0.90	0.93	0.93	0.93
Percent Heavy Veh, %	3	5	4	5	3	0	4	3	4	0	1	2
Cap, veh/h	276	1434	644	304	1427	637	393	213	238	329	99	154
Arrive On Green	0.05	0.41	0.41	0.05	0.40	0.40	0.15	0.27	0.27	0.03	0.15	0.15
Sat Flow, veh/h	1767	3469	1558	1739	3526	1575	1753	800	894	1810	666	1031
Grp Volume(v), veh/h	99	681	420	62	1009	13	266	0	144	28	0	191
Grp Sat Flow(s),veh/h/ln	1767	1735	1558	1739	1763	1575	1753	0	1693	1810	0	1697
Q Serve(g_s), s	2.6	11.7	17.7	1.7	19.5	0.4	9.9	0.0	5.6	1.1	0.0	8.8
Cycle Q Clear(g_c), s	2.6	11.7	17.7	1.7	19.5	0.4	9.9	0.0	5.6	1.1	0.0	8.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.53	1.00		0.61
Lane Grp Cap(c), veh/h	276	1434	644	304	1427	637	393	0	451	329	0	253
V/C Ratio(X)	0.36	0.47	0.65	0.20	0.71	0.02	0.68	0.00	0.32	0.09	0.00	0.75
Avail Cap(c_a), veh/h	288	1434	644	351	1427	637	395	0	976	387	0	833
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.4	17.5	19.2	13.6	20.2	14.6	23.2	0.0	24.0	28.0	0.0	33.3
Incr Delay (d2), s/veh	0.8	1.1	5.1	0.3	3.0	0.1	4.6	0.0	0.4	0.1	0.0	4.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	4.5	7.0	0.6	7.9	0.2	4.3	0.0	2.2	0.5	0.0	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.2	18.6	24.3	13.9	23.2	14.6	27.7	0.0	24.4	28.1	0.0	37.8
LnGrp LOS	B	B	C	B	C	B	C	A	C	C	A	D
Approach Vol, veh/h		1200			1084			410			219	
Approach Delay, s/veh		20.4			22.6			26.6			36.5	
Approach LOS		C			C			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.8	38.7	7.3	26.7	9.5	38.0	16.9	17.2
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	6.0	32.0	5.0	47.0	5.0	33.0	12.0	40.0
Max Q Clear Time (g_c+I1), s	3.7	19.7	3.1	7.6	4.6	21.5	11.9	10.8
Green Ext Time (p_c), s	0.0	4.9	0.0	0.9	0.0	5.3	0.0	1.3

Intersection Summary	
HCM 6th Ctrl Delay	23.3
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	7.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	52	201	0	849	52
Future Vol, veh/h	10	52	201	0	849	52
Conflicting Peds, #/hr	0	0	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	425	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	82	82	92	92
Heavy Vehicles, %	0	6	4	0	9	23
Mvmt Flow	12	60	245	0	923	57

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1444	492	982	0	-	0
Stage 1	954	-	-	-	-	-
Stage 2	490	-	-	-	-	-
Critical Hdwy	6.25	7.22	5.38	-	-	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.65	3.96	3.14	-	-	-
Pot Cap-1 Maneuver	153	439	393	-	-	-
Stage 1	268	-	-	-	-	-
Stage 2	568	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	57	438	392	-	-	-
Mov Cap-2 Maneuver	57	-	-	-	-	-
Stage 1	100	-	-	-	-	-
Stage 2	567	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	30.7	28.3	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	392	-	211	-	-
HCM Lane V/C Ratio	0.625	-	0.342	-	-
HCM Control Delay (s)	28.3	-	30.7	-	-
HCM Lane LOS	D	-	D	-	-
HCM 95th %tile Q(veh)	4.1	-	1.4	-	-

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	17	6	6	31	16	77	8	264	76	49	399	27
Future Vol, veh/h	17	6	6	31	16	77	8	264	76	49	399	27
Conflicting Peds, #/hr	1	0	0	0	0	1	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	73	73	73	79	79	79	85	85	85	87	87	87
Heavy Vehicles, %	11	17	0	9	8	7	0	4	1	4	4	0
Mvmt Flow	23	8	8	39	20	97	9	311	89	56	459	31

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1021	1006	476	969	977	357	491	0	0	400	0	0
Stage 1	588	588	-	374	374	-	-	-	-	-	-	-
Stage 2	433	418	-	595	603	-	-	-	-	-	-	-
Critical Hdwy	7.21	6.67	6.2	7.19	6.58	6.27	4.1	-	-	4.14	-	-
Critical Hdwy Stg 1	6.21	5.67	-	6.19	5.58	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.21	5.67	-	6.19	5.58	-	-	-	-	-	-	-
Follow-up Hdwy	3.599	4.153	3.3	3.581	4.072	3.363	2.2	-	-	2.236	-	-
Pot Cap-1 Maneuver	207	227	593	226	245	676	1083	-	-	1148	-	-
Stage 1	480	473	-	633	607	-	-	-	-	-	-	-
Stage 2	584	566	-	479	479	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	155	209	592	203	226	675	1082	-	-	1148	-	-
Mov Cap-2 Maneuver	155	209	-	203	226	-	-	-	-	-	-	-
Stage 1	474	441	-	626	600	-	-	-	-	-	-	-
Stage 2	477	560	-	432	446	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	28.1	21.9	0.2	0.9
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1082	-	-	195	367	1148	-	-
HCM Lane V/C Ratio	0.009	-	-	0.204	0.428	0.049	-	-
HCM Control Delay (s)	8.4	0	-	28.1	21.9	8.3	0	-
HCM Lane LOS	A	A	-	D	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.7	2.1	0.2	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	89	382	32	25	511	25	72	314	49	75	288	69
Future Volume (veh/h)	89	382	32	25	511	25	72	314	49	75	288	69
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1856	1900	1841	1870	1841	1811	1826	1841	1781	1870	1796
Adj Flow Rate, veh/h	99	424	36	29	601	29	87	378	59	86	331	79
Peak Hour Factor	0.90	0.90	0.90	0.85	0.85	0.85	0.83	0.83	0.83	0.87	0.87	0.87
Percent Heavy Veh, %	2	3	0	4	2	4	6	5	4	8	2	7
Cap, veh/h	198	600	51	305	629	30	279	480	75	253	454	108
Arrive On Green	0.06	0.36	0.36	0.06	0.36	0.36	0.06	0.31	0.31	0.06	0.31	0.31
Sat Flow, veh/h	1781	1686	143	1753	1769	85	1725	1542	241	1697	1459	348
Grp Volume(v), veh/h	99	0	460	29	0	630	87	0	437	86	0	410
Grp Sat Flow(s),veh/h/ln	1781	0	1830	1753	0	1855	1725	0	1783	1697	0	1808
Q Serve(g_s), s	3.1	0.0	19.5	0.9	0.0	29.8	3.0	0.0	20.1	3.0	0.0	18.2
Cycle Q Clear(g_c), s	3.1	0.0	19.5	0.9	0.0	29.8	3.0	0.0	20.1	3.0	0.0	18.2
Prop In Lane	1.00		0.08	1.00		0.05	1.00		0.14	1.00		0.19
Lane Grp Cap(c), veh/h	198	0	650	305	0	660	279	0	555	253	0	562
V/C Ratio(X)	0.50	0.00	0.71	0.10	0.00	0.96	0.31	0.00	0.79	0.34	0.00	0.73
Avail Cap(c_a), veh/h	198	0	650	305	0	660	279	0	555	253	0	562
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.0	0.0	25.0	18.0	0.0	28.3	21.0	0.0	28.3	21.5	0.0	27.6
Incr Delay (d2), s/veh	8.7	0.0	6.4	0.6	0.0	25.6	2.9	0.0	10.8	3.6	0.0	8.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	9.1	0.4	0.0	17.1	1.4	0.0	9.8	1.4	0.0	8.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.7	0.0	31.3	18.7	0.0	53.9	23.9	0.0	39.1	25.1	0.0	35.7
LnGrp LOS	C	A	C	B	A	D	C	A	D	C	A	D
Approach Vol, veh/h		559			659			524			496	
Approach Delay, s/veh		31.2			52.4			36.6			33.9	
Approach LOS		C			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	33.0	10.0	37.0	10.0	33.0	10.0	37.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	28.0	5.0	32.0	5.0	28.0	5.0	32.0
Max Q Clear Time (g_c+I1), s	5.0	22.1	2.9	21.5	5.0	20.2	5.1	31.8
Green Ext Time (p_c), s	0.0	1.3	0.0	2.0	0.0	1.5	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	39.3
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	17	510	5	5	641	7	8	1	8	6	3	29
Future Vol, veh/h	17	510	5	5	641	7	8	1	8	6	3	29
Conflicting Peds, #/hr	2	0	3	3	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	85	85	85	53	53	53	73	73	73
Heavy Vehicles, %	0	2	0	0	3	0	0	0	0	0	0	0
Mvmt Flow	19	580	6	6	754	8	15	2	15	8	4	40

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	764	0	0	589	0	0	1416	1400	586	1402	1399	760
Stage 1	-	-	-	-	-	-	624	624	-	772	772	-
Stage 2	-	-	-	-	-	-	792	776	-	630	627	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	858	-	-	996	-	-	116	142	514	119	142	409
Stage 1	-	-	-	-	-	-	477	481	-	395	412	-
Stage 2	-	-	-	-	-	-	385	410	-	473	479	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	856	-	-	993	-	-	99	135	513	110	135	408
Mov Cap-2 Maneuver	-	-	-	-	-	-	99	135	-	110	135	-
Stage 1	-	-	-	-	-	-	460	464	-	381	407	-
Stage 2	-	-	-	-	-	-	341	405	-	442	462	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.1	32.2	22.5
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	164	856	-	-	993	-	-	257
HCM Lane V/C Ratio	0.196	0.023	-	-	0.006	-	-	0.203
HCM Control Delay (s)	32.2	9.3	0	-	8.6	0	-	22.5
HCM Lane LOS	D	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.7	0.1	-	-	0	-	-	0.7



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	96	741	501	64	780	9	317	54	45	21	70	97
Future Volume (veh/h)	96	741	501	64	780	9	317	54	45	21	70	97
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1900	1900	1900	1900	1900	1870	1870	1900	1900	1885
Adj Flow Rate, veh/h	102	788	533	70	848	10	364	62	52	26	88	121
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.87	0.87	0.87	0.80	0.80	0.80
Percent Heavy Veh, %	1	1	0	0	0	0	0	2	2	0	0	1
Cap, veh/h	296	1360	597	254	1350	600	468	297	249	334	113	155
Arrive On Green	0.05	0.38	0.38	0.05	0.37	0.37	0.19	0.32	0.32	0.03	0.16	0.16
Sat Flow, veh/h	1795	3582	1572	1810	3610	1606	1810	939	788	1810	723	994
Grp Volume(v), veh/h	102	788	533	70	848	10	364	0	114	26	0	209
Grp Sat Flow(s),veh/h/ln	1795	1791	1572	1810	1805	1606	1810	0	1727	1810	0	1717
Q Serve(g_s), s	3.0	15.2	27.6	2.0	16.7	0.3	13.9	0.0	4.2	1.0	0.0	10.2
Cycle Q Clear(g_c), s	3.0	15.2	27.6	2.0	16.7	0.3	13.9	0.0	4.2	1.0	0.0	10.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.46	1.00		0.58
Lane Grp Cap(c), veh/h	296	1360	597	254	1350	600	468	0	546	334	0	268
V/C Ratio(X)	0.35	0.58	0.89	0.28	0.63	0.02	0.78	0.00	0.21	0.08	0.00	0.78
Avail Cap(c_a), veh/h	325	1360	597	273	1350	600	525	0	934	389	0	652
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.0	21.4	25.3	16.7	22.3	17.1	23.0	0.0	21.7	29.4	0.0	35.2
Incr Delay (d2), s/veh	0.7	1.8	18.2	0.6	2.2	0.1	6.6	0.0	0.2	0.1	0.0	4.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	6.3	12.9	0.8	7.1	0.1	6.4	0.0	1.7	0.5	0.0	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.7	23.2	43.5	17.2	24.5	17.2	29.6	0.0	21.9	29.5	0.0	40.1
LnGrp LOS	B	C	D	B	C	B	C	A	C	C	A	D
Approach Vol, veh/h		1423			928			478			235	
Approach Delay, s/veh		30.4			23.9			27.8			38.9	
Approach LOS		C			C			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.1	38.0	7.3	32.5	9.6	37.5	21.2	18.6
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	33.0	5.0	47.0	6.0	32.0	19.0	33.0
Max Q Clear Time (g_c+I1), s	4.0	29.6	3.0	6.2	5.0	18.7	15.9	12.2
Green Ext Time (p_c), s	0.0	2.2	0.0	0.7	0.0	4.8	0.4	1.2

Intersection Summary	
HCM 6th Ctrl Delay	28.7
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	109	129	0	1127	39
Future Vol, veh/h	8	109	129	0	1127	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	425	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	92	92	90	90
Heavy Vehicles, %	0	3	4	3	3	0
Mvmt Flow	10	135	140	0	1252	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1554	648	1295	0	-	0
Stage 1	1274	-	-	-	-	-
Stage 2	280	-	-	-	-	-
Critical Hdwy	6.25	7.16	5.38	-	-	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.65	3.93	3.14	-	-	-
Pot Cap-1 Maneuver	132	352	276	-	-	-
Stage 1	170	-	-	-	-	-
Stage 2	722	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	65	352	276	-	-	-
Mov Cap-2 Maneuver	65	-	-	-	-	-
Stage 1	84	-	-	-	-	-
Stage 2	722	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	32.7	30.8	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	276	-	270	-	-
HCM Lane V/C Ratio	0.508	-	0.535	-	-
HCM Control Delay (s)	30.8	-	32.7	-	-
HCM Lane LOS	D	-	D	-	-
HCM 95th %tile Q(veh)	2.7	-	2.9	-	-

Intersection	
Int Delay, s/veh	5.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	18	9	13	39	17	77	6	324	67	76	473	30
Future Vol, veh/h	18	9	13	39	17	77	6	324	67	76	473	30
Conflicting Peds, #/hr	2	0	0	0	0	2	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	85	85	85	94	94	94	93	93	93
Heavy Vehicles, %	0	0	0	0	6	0	0	1	0	0	1	0
Mvmt Flow	23	12	17	46	20	91	6	345	71	82	509	32

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1141	1119	527	1097	1100	383	543	0	0	416	0	0
Stage 1	691	691	-	393	393	-	-	-	-	-	-	-
Stage 2	450	428	-	704	707	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.56	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4.054	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	179	209	555	192	209	669	1036	-	-	1154	-	-
Stage 1	438	449	-	636	599	-	-	-	-	-	-	-
Stage 2	592	588	-	431	432	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	130	186	554	163	186	668	1034	-	-	1154	-	-
Mov Cap-2 Maneuver	130	186	-	163	186	-	-	-	-	-	-	-
Stage 1	434	402	-	631	594	-	-	-	-	-	-	-
Stage 2	490	583	-	364	387	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	30.9	29.7	0.1	1.1
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1034	-	-	190	298	1154	-	-
HCM Lane V/C Ratio	0.006	-	-	0.273	0.525	0.071	-	-
HCM Control Delay (s)	8.5	0	-	30.9	29.7	8.4	0	-
HCM Lane LOS	A	A	-	D	D	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1.1	2.9	0.2	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	106	540	61	95	442	39	46	275	48	93	370	90
Future Volume (veh/h)	106	540	61	95	442	39	46	275	48	93	370	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1870	1900	1885	1900	1900	1900	1870	1841	1885	1900	1900
Adj Flow Rate, veh/h	112	568	64	100	465	41	50	299	52	98	389	95
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95
Percent Heavy Veh, %	1	2	0	1	0	0	0	2	4	1	0	0
Cap, veh/h	285	587	66	194	612	54	240	483	84	332	459	112
Arrive On Green	0.06	0.36	0.36	0.06	0.36	0.36	0.06	0.31	0.31	0.06	0.31	0.31
Sat Flow, veh/h	1795	1650	186	1795	1720	152	1810	1551	270	1795	1474	360
Grp Volume(v), veh/h	112	0	632	100	0	506	50	0	351	98	0	484
Grp Sat Flow(s),veh/h/ln	1795	0	1836	1795	0	1872	1810	0	1821	1795	0	1834
Q Serve(g_s), s	3.5	0.0	30.4	3.1	0.0	21.5	1.6	0.0	14.8	3.3	0.0	22.2
Cycle Q Clear(g_c), s	3.5	0.0	30.4	3.1	0.0	21.5	1.6	0.0	14.8	3.3	0.0	22.2
Prop In Lane	1.00		0.10	1.00		0.08	1.00		0.15	1.00		0.20
Lane Grp Cap(c), veh/h	285	0	653	194	0	666	240	0	566	332	0	571
V/C Ratio(X)	0.39	0.00	0.97	0.52	0.00	0.76	0.21	0.00	0.62	0.30	0.00	0.85
Avail Cap(c_a), veh/h	285	0	653	194	0	666	240	0	566	332	0	571
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.6	0.0	28.5	22.1	0.0	25.6	21.5	0.0	26.5	20.4	0.0	29.0
Incr Delay (d2), s/veh	4.0	0.0	28.2	9.5	0.0	8.0	2.0	0.0	5.0	2.3	0.0	14.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	17.6	1.7	0.0	10.5	0.8	0.0	6.9	1.5	0.0	11.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.6	0.0	56.7	31.6	0.0	33.6	23.4	0.0	31.5	22.7	0.0	43.6
LnGrp LOS	C	A	E	C	A	C	C	A	C	C	A	D
Approach Vol, veh/h		744			606			401			582	
Approach Delay, s/veh		51.7			33.3			30.5			40.0	
Approach LOS		D			C			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	33.0	10.0	37.0	10.0	33.0	10.0	37.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	28.0	5.0	32.0	5.0	28.0	5.0	32.0
Max Q Clear Time (g_c+I1), s	5.3	16.8	5.1	32.4	3.6	24.2	5.5	23.5
Green Ext Time (p_c), s	0.0	1.5	0.0	0.0	0.0	1.1	0.0	2.0

Intersection Summary	
HCM 6th Ctrl Delay	40.4
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	18	693	16	4	577	9	1	4	14	0	2	41
Future Vol, veh/h	18	693	16	4	577	9	1	4	14	0	2	41
Conflicting Peds, #/hr	2	0	1	1	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	97	97	97	68	68	68	72	72	72
Heavy Vehicles, %	0	1	6	0	0	0	0	0	7	0	0	5
Mvmt Flow	19	722	17	4	595	9	1	6	21	0	3	57

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	606	0	0	740	0	0	1408	1384	732	1392	1388	602
Stage 1	-	-	-	-	-	-	770	770	-	610	610	-
Stage 2	-	-	-	-	-	-	638	614	-	782	778	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.27	7.1	6.5	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.363	3.5	4	3.345
Pot Cap-1 Maneuver	982	-	-	876	-	-	118	145	413	121	144	494
Stage 1	-	-	-	-	-	-	396	413	-	485	488	-
Stage 2	-	-	-	-	-	-	468	486	-	390	410	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	980	-	-	875	-	-	100	139	413	108	138	493
Mov Cap-2 Maneuver	-	-	-	-	-	-	100	139	-	108	138	-
Stage 1	-	-	-	-	-	-	383	399	-	468	484	-
Stage 2	-	-	-	-	-	-	409	482	-	353	396	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.1	20.4	14.5
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	261	980	-	-	875	-	-	440
HCM Lane V/C Ratio	0.107	0.019	-	-	0.005	-	-	0.136
HCM Control Delay (s)	20.4	8.7	0	-	9.1	0	-	14.5
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0	-	-	0.5

Appendix E – Analysis Report Future Without Project Conditions Mitigation

4: Manono Street & Kekuanaoa Street

04/20/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	89	382	32	25	511	25	72	314	49	75	288	69
Future Volume (veh/h)	89	382	32	25	511	25	72	314	49	75	288	69
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1856	1900	1841	1870	1841	1811	1826	1841	1781	1870	1796
Adj Flow Rate, veh/h	99	424	36	29	601	29	87	378	59	86	331	79
Peak Hour Factor	0.90	0.90	0.90	0.85	0.85	0.85	0.83	0.83	0.83	0.87	0.87	0.87
Percent Heavy Veh, %	2	3	0	4	2	4	6	5	4	8	2	7
Cap, veh/h	219	660	572	328	665	554	279	480	75	253	454	108
Arrive On Green	0.06	0.36	0.36	0.06	0.36	0.36	0.06	0.31	0.31	0.06	0.31	0.31
Sat Flow, veh/h	1781	1856	1608	1753	1870	1558	1725	1542	241	1697	1459	348
Grp Volume(v), veh/h	99	424	36	29	601	29	87	0	437	86	0	410
Grp Sat Flow(s),veh/h/ln	1781	1856	1608	1753	1870	1558	1725	0	1783	1697	0	1808
Q Serve(g_s), s	3.1	17.2	1.3	0.9	27.5	1.1	3.0	0.0	20.1	3.0	0.0	18.2
Cycle Q Clear(g_c), s	3.1	17.2	1.3	0.9	27.5	1.1	3.0	0.0	20.1	3.0	0.0	18.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.14	1.00		0.19
Lane Grp Cap(c), veh/h	219	660	572	328	665	554	279	0	555	253	0	562
V/C Ratio(X)	0.45	0.64	0.06	0.09	0.90	0.05	0.31	0.00	0.79	0.34	0.00	0.73
Avail Cap(c_a), veh/h	219	660	572	328	665	554	279	0	555	253	0	562
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.3	24.2	19.1	17.6	27.5	19.0	21.0	0.0	28.3	21.5	0.0	27.6
Incr Delay (d2), s/veh	6.6	4.8	0.2	0.5	18.0	0.2	2.9	0.0	10.8	3.6	0.0	8.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	8.0	0.5	0.4	14.8	0.4	1.4	0.0	9.8	1.4	0.0	8.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.9	29.0	19.3	18.1	45.5	19.2	23.9	0.0	39.1	25.1	0.0	35.7
LnGrp LOS	C	C	B	B	D	B	C	A	D	C	A	D
Approach Vol, veh/h		559			659			524			496	
Approach Delay, s/veh		28.2			43.1			36.6			33.9	
Approach LOS		C			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	33.0	10.0	37.0	10.0	33.0	10.0	37.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	28.0	5.0	32.0	5.0	28.0	5.0	32.0
Max Q Clear Time (g_c+I1), s	5.0	22.1	2.9	19.2	5.0	20.2	5.1	29.5
Green Ext Time (p_c), s	0.0	1.3	0.0	2.1	0.0	1.5	0.0	1.0

Intersection Summary	
HCM 6th Ctrl Delay	35.8
HCM 6th LOS	D

4: Manono Street & Kekuanaoa Street

04/20/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	106	540	61	95	442	39	46	275	48	93	370	90
Future Volume (veh/h)	106	540	61	95	442	39	46	275	48	93	370	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1870	1900	1885	1900	1900	1900	1870	1841	1885	1900	1900
Adj Flow Rate, veh/h	112	568	64	100	465	41	50	299	52	98	389	95
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95
Percent Heavy Veh, %	1	2	0	1	0	0	0	2	4	1	0	0
Cap, veh/h	312	665	570	239	676	570	240	483	84	332	459	112
Arrive On Green	0.06	0.36	0.36	0.06	0.36	0.36	0.06	0.31	0.31	0.06	0.31	0.31
Sat Flow, veh/h	1795	1870	1603	1795	1900	1603	1810	1551	270	1795	1474	360
Grp Volume(v), veh/h	112	568	64	100	465	41	50	0	351	98	0	484
Grp Sat Flow(s),veh/h/ln	1795	1870	1603	1795	1900	1603	1810	0	1821	1795	0	1834
Q Serve(g_s), s	3.5	25.3	2.4	3.1	18.8	1.5	1.6	0.0	14.8	3.3	0.0	22.2
Cycle Q Clear(g_c), s	3.5	25.3	2.4	3.1	18.8	1.5	1.6	0.0	14.8	3.3	0.0	22.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.15	1.00		0.20
Lane Grp Cap(c), veh/h	312	665	570	239	676	570	240	0	566	332	0	571
V/C Ratio(X)	0.36	0.85	0.11	0.42	0.69	0.07	0.21	0.00	0.62	0.30	0.00	0.85
Avail Cap(c_a), veh/h	312	665	570	239	676	570	240	0	566	332	0	571
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.9	26.8	19.5	20.6	24.7	19.2	21.5	0.0	26.5	20.4	0.0	29.0
Incr Delay (d2), s/veh	3.2	13.2	0.4	5.3	5.7	0.2	2.0	0.0	5.0	2.3	0.0	14.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	13.0	0.9	1.6	9.1	0.6	0.8	0.0	6.9	1.5	0.0	11.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.1	40.0	19.9	25.9	30.4	19.4	23.4	0.0	31.5	22.7	0.0	43.6
LnGrp LOS	C	D	B	C	C	B	C	A	C	C	A	D
Approach Vol, veh/h		744			606			401			582	
Approach Delay, s/veh		35.6			28.9			30.5			40.0	
Approach LOS		D			C			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	33.0	10.0	37.0	10.0	33.0	10.0	37.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	28.0	5.0	32.0	5.0	28.0	5.0	32.0
Max Q Clear Time (g_c+I1), s	5.3	16.8	5.1	27.3	3.6	24.2	5.5	20.8
Green Ext Time (p_c), s	0.0	1.5	0.0	1.6	0.0	1.1	0.0	2.2

Intersection Summary	
HCM 6th Ctrl Delay	34.1
HCM 6th LOS	C

Appendix F – Analysis Report Future With Project Conditions



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	88	501	322	60	767	12	202	61	71	26	70	108
Future Volume (veh/h)	88	501	322	60	767	12	202	61	71	26	70	108
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1826	1841	1826	1856	1900	1841	1856	1841	1900	1885	1870
Adj Flow Rate, veh/h	99	563	362	65	834	13	224	68	79	28	75	116
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.90	0.90	0.90	0.93	0.93	0.93
Percent Heavy Veh, %	3	5	4	5	3	0	4	3	4	0	1	2
Cap, veh/h	348	1491	670	365	1487	664	345	185	215	335	101	156
Arrive On Green	0.06	0.43	0.43	0.05	0.42	0.42	0.12	0.24	0.24	0.03	0.15	0.15
Sat Flow, veh/h	1767	3469	1558	1739	3526	1575	1753	782	909	1810	666	1031
Grp Volume(v), veh/h	99	563	362	65	834	13	224	0	147	28	0	191
Grp Sat Flow(s),veh/h/ln	1767	1735	1558	1739	1763	1575	1753	0	1691	1810	0	1697
Q Serve(g_s), s	2.4	8.6	13.5	1.6	14.0	0.4	8.1	0.0	5.7	1.0	0.0	8.4
Cycle Q Clear(g_c), s	2.4	8.6	13.5	1.6	14.0	0.4	8.1	0.0	5.7	1.0	0.0	8.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.54	1.00		0.61
Lane Grp Cap(c), veh/h	348	1491	670	365	1487	664	345	0	401	335	0	256
V/C Ratio(X)	0.28	0.38	0.54	0.18	0.56	0.02	0.65	0.00	0.37	0.08	0.00	0.74
Avail Cap(c_a), veh/h	361	1491	670	392	1487	664	345	0	1016	398	0	933
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.8	15.2	16.6	11.9	17.1	13.2	23.4	0.0	24.9	26.7	0.0	31.8
Incr Delay (d2), s/veh	0.4	0.7	3.1	0.2	1.5	0.1	4.3	0.0	0.6	0.1	0.0	4.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	3.3	5.2	0.6	5.5	0.1	3.6	0.0	2.2	0.4	0.0	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.2	15.9	19.7	12.1	18.7	13.2	27.6	0.0	25.5	26.8	0.0	36.0
LnGrp LOS	B	B	B	B	B	B	C	A	C	C	A	D
Approach Vol, veh/h		1024			912			371			219	
Approach Delay, s/veh		17.0			18.1			26.8			34.9	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.8	38.6	7.3	23.5	9.4	38.0	14.0	16.8
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	33.0	5.0	47.0	5.0	33.0	9.0	43.0
Max Q Clear Time (g_c+I1), s	3.6	15.5	3.0	7.7	4.4	16.0	10.1	10.4
Green Ext Time (p_c), s	0.0	4.8	0.0	0.9	0.0	5.3	0.0	1.3

Intersection Summary	
HCM 6th Ctrl Delay	20.4
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	66	219	0	702	56
Future Vol, veh/h	12	66	219	0	702	56
Conflicting Peds, #/hr	0	0	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	425	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	82	82	92	92
Heavy Vehicles, %	0	6	4	0	9	23
Mvmt Flow	14	77	267	0	763	61

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1330	414	826	0	-	0
Stage 1	796	-	-	-	-	-
Stage 2	534	-	-	-	-	-
Critical Hdwy	6.25	7.22	5.38	-	-	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.65	3.96	3.14	-	-	-
Pot Cap-1 Maneuver	178	493	468	-	-	-
Stage 1	334	-	-	-	-	-
Stage 2	540	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	76	492	467	-	-	-
Mov Cap-2 Maneuver	76	-	-	-	-	-
Stage 1	143	-	-	-	-	-
Stage 2	539	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	25.3	22.5	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	467	-	267	-	-
HCM Lane V/C Ratio	0.572	-	0.34	-	-
HCM Control Delay (s)	22.5	-	25.3	-	-
HCM Lane LOS	C	-	D	-	-
HCM 95th %tile Q(veh)	3.5	-	1.4	-	-

Intersection	
Int Delay, s/veh	7.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	29	23	18	31	40	77	24	218	76	49	334	43
Future Vol, veh/h	29	23	18	31	40	77	24	218	76	49	334	43
Conflicting Peds, #/hr	1	0	0	0	0	1	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	73	73	73	79	79	79	85	85	85	87	87	87
Heavy Vehicles, %	11	17	0	9	8	7	0	4	1	4	4	0
Mvmt Flow	40	32	25	39	51	97	28	256	89	56	384	49

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	954	923	410	906	903	302	434	0	0	345	0	0
Stage 1	522	522	-	357	357	-	-	-	-	-	-	-
Stage 2	432	401	-	549	546	-	-	-	-	-	-	-
Critical Hdwy	7.21	6.67	6.2	7.19	6.58	6.27	4.1	-	-	4.14	-	-
Critical Hdwy Stg 1	6.21	5.67	-	6.19	5.58	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.21	5.67	-	6.19	5.58	-	-	-	-	-	-	-
Follow-up Hdwy	3.599	4.153	3.3	3.581	4.072	3.363	2.2	-	-	2.236	-	-
Pot Cap-1 Maneuver	230	255	646	250	271	726	1136	-	-	1203	-	-
Stage 1	522	507	-	646	618	-	-	-	-	-	-	-
Stage 2	585	576	-	508	508	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	156	232	645	201	246	725	1135	-	-	1203	-	-
Mov Cap-2 Maneuver	156	232	-	201	246	-	-	-	-	-	-	-
Stage 1	505	475	-	626	599	-	-	-	-	-	-	-
Stage 2	449	558	-	428	476	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	32.6	26.5	0.6	0.9
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1135	-	-	224	350	1203	-	-
HCM Lane V/C Ratio	0.025	-	-	0.428	0.535	0.047	-	-
HCM Control Delay (s)	8.3	0	-	32.6	26.5	8.1	0	-
HCM Lane LOS	A	A	-	D	D	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	2	3	0.1	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	96	294	32	25	423	25	72	270	49	75	230	74
Future Volume (veh/h)	96	294	32	25	423	25	72	270	49	75	230	74
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1856	1900	1841	1870	1841	1811	1826	1841	1781	1870	1796
Adj Flow Rate, veh/h	107	327	36	29	498	29	87	325	59	86	264	85
Peak Hour Factor	0.90	0.90	0.90	0.85	0.85	0.85	0.83	0.83	0.83	0.87	0.87	0.87
Percent Heavy Veh, %	2	3	0	4	2	4	6	5	4	8	2	7
Cap, veh/h	239	547	60	345	583	34	348	501	91	317	452	145
Arrive On Green	0.06	0.33	0.33	0.06	0.33	0.33	0.06	0.33	0.33	0.06	0.33	0.33
Sat Flow, veh/h	1781	1642	181	1753	1750	102	1725	1504	273	1697	1355	436
Grp Volume(v), veh/h	107	0	363	29	0	527	87	0	384	86	0	349
Grp Sat Flow(s),veh/h/ln	1781	0	1823	1753	0	1852	1725	0	1777	1697	0	1792
Q Serve(g_s), s	3.5	0.0	14.9	0.9	0.0	23.9	2.9	0.0	16.5	2.9	0.0	14.5
Cycle Q Clear(g_c), s	3.5	0.0	14.9	0.9	0.0	23.9	2.9	0.0	16.5	2.9	0.0	14.5
Prop In Lane	1.00		0.10	1.00		0.06	1.00		0.15	1.00		0.24
Lane Grp Cap(c), veh/h	239	0	608	345	0	617	348	0	592	317	0	597
V/C Ratio(X)	0.45	0.00	0.60	0.08	0.00	0.85	0.25	0.00	0.65	0.27	0.00	0.58
Avail Cap(c_a), veh/h	239	0	608	345	0	617	348	0	592	317	0	597
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.5	0.0	25.0	18.4	0.0	28.0	19.0	0.0	25.5	19.4	0.0	24.8
Incr Delay (d2), s/veh	6.0	0.0	4.3	0.5	0.0	14.0	1.7	0.0	5.4	2.1	0.0	4.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	6.9	0.4	0.0	12.4	1.3	0.0	7.5	1.3	0.0	6.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.5	0.0	29.3	18.8	0.0	42.0	20.7	0.0	30.9	21.5	0.0	29.0
LnGrp LOS	C	A	C	B	A	D	C	A	C	C	A	C
Approach Vol, veh/h		470			556			471			435	
Approach Delay, s/veh		28.9			40.8			29.0			27.5	
Approach LOS		C			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	35.0	10.0	35.0	10.0	35.0	10.0	35.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	30.0	5.0	30.0	5.0	30.0	5.0	30.0
Max Q Clear Time (g_c+I1), s	4.9	18.5	2.9	16.9	4.9	16.5	5.5	25.9
Green Ext Time (p_c), s	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.2

Intersection Summary	
HCM 6th Ctrl Delay	32.0
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	24	429	5	5	558	7	8	1	8	6	3	34
Future Vol, veh/h	24	429	5	5	558	7	8	1	8	6	3	34
Conflicting Peds, #/hr	2	0	3	3	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	85	85	85	53	53	53	73	73	73
Heavy Vehicles, %	0	2	0	0	3	0	0	0	0	0	0	0
Mvmt Flow	27	488	6	6	656	8	15	2	15	8	4	47

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	666	0	0	497	0	0	1246	1226	494	1228	1225	662
Stage 1	-	-	-	-	-	-	548	548	-	674	674	-
Stage 2	-	-	-	-	-	-	698	678	-	554	551	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	933	-	-	1077	-	-	152	180	579	156	180	465
Stage 1	-	-	-	-	-	-	524	520	-	448	457	-
Stage 2	-	-	-	-	-	-	434	455	-	520	519	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	931	-	-	1074	-	-	129	170	577	145	170	464
Mov Cap-2 Maneuver	-	-	-	-	-	-	129	170	-	145	170	-
Stage 1	-	-	-	-	-	-	501	498	-	429	452	-
Stage 2	-	-	-	-	-	-	383	450	-	484	497	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.1	25.4	18.5
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	208	931	-	-	1074	-	-	325
HCM Lane V/C Ratio	0.154	0.029	-	-	0.005	-	-	0.181
HCM Control Delay (s)	25.4	9	0	-	8.4	0	-	18.5
HCM Lane LOS	D	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0	-	-	0.7



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	96	613	418	65	645	9	281	54	46	21	70	97
Future Volume (veh/h)	96	613	418	65	645	9	281	54	46	21	70	97
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1900	1900	1900	1900	1900	1870	1870	1900	1900	1885
Adj Flow Rate, veh/h	102	652	445	71	701	10	323	62	53	26	88	121
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.87	0.87	0.87	0.80	0.80	0.80
Percent Heavy Veh, %	1	1	0	0	0	0	0	2	2	0	0	1
Cap, veh/h	354	1376	604	303	1366	607	442	279	239	340	114	157
Arrive On Green	0.05	0.38	0.38	0.05	0.38	0.38	0.17	0.30	0.30	0.03	0.16	0.16
Sat Flow, veh/h	1795	3582	1572	1810	3610	1606	1810	930	795	1810	723	994
Grp Volume(v), veh/h	102	652	445	71	701	10	323	0	115	26	0	209
Grp Sat Flow(s),veh/h/ln	1795	1791	1572	1810	1805	1606	1810	0	1725	1810	0	1717
Q Serve(g_s), s	2.8	11.4	20.2	1.9	12.5	0.3	11.7	0.0	4.2	1.0	0.0	9.7
Cycle Q Clear(g_c), s	2.8	11.4	20.2	1.9	12.5	0.3	11.7	0.0	4.2	1.0	0.0	9.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.46	1.00		0.58
Lane Grp Cap(c), veh/h	354	1376	604	303	1366	607	442	0	518	340	0	272
V/C Ratio(X)	0.29	0.47	0.74	0.23	0.51	0.02	0.73	0.00	0.22	0.08	0.00	0.77
Avail Cap(c_a), veh/h	429	1376	604	346	1366	607	505	0	974	400	0	721
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.3	19.3	22.0	15.1	20.0	16.2	22.5	0.0	21.9	28.0	0.0	33.6
Incr Delay (d2), s/veh	0.4	1.2	7.8	0.4	1.4	0.0	4.6	0.0	0.2	0.1	0.0	4.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	4.7	8.5	0.8	5.2	0.1	5.2	0.0	1.6	0.4	0.0	4.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.7	20.5	29.8	15.5	21.4	16.2	27.1	0.0	22.1	28.1	0.0	38.1
LnGrp LOS	B	C	C	B	C	B	C	A	C	C	A	D
Approach Vol, veh/h		1199			782			438			235	
Approach Delay, s/veh		23.5			20.8			25.8			37.0	
Approach LOS		C			C			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.0	37.0	7.3	30.0	9.5	36.5	19.1	18.2
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	6.0	32.0	5.0	47.0	8.0	30.0	17.0	35.0
Max Q Clear Time (g_c+I1), s	3.9	22.2	3.0	6.2	4.8	14.5	13.7	11.7
Green Ext Time (p_c), s	0.0	4.2	0.0	0.7	0.1	4.2	0.3	1.3

Intersection Summary	
HCM 6th Ctrl Delay	24.3
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	116	134	0	931	40
Future Vol, veh/h	8	116	134	0	931	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	425	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	92	92	90	90
Heavy Vehicles, %	0	3	4	3	3	0
Mvmt Flow	10	143	146	0	1034	44

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1348	539	1078	0	-	0
Stage 1	1056	-	-	-	-	-
Stage 2	292	-	-	-	-	-
Critical Hdwy	6.25	7.16	5.38	-	-	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.65	3.93	3.14	-	-	-
Pot Cap-1 Maneuver	174	415	353	-	-	-
Stage 1	232	-	-	-	-	-
Stage 2	712	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	102	415	353	-	-	-
Mov Cap-2 Maneuver	102	-	-	-	-	-
Stage 1	136	-	-	-	-	-
Stage 2	712	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	23.4	22.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	353	-	346	-	-
HCM Lane V/C Ratio	0.413	-	0.442	-	-
HCM Control Delay (s)	22.2	-	23.4	-	-
HCM Lane LOS	C	-	C	-	-
HCM 95th %tile Q(veh)	2	-	2.2	-	-

Intersection	
Int Delay, s/veh	6.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	23	16	18	39	23	77	11	275	67	76	387	34
Future Vol, veh/h	23	16	18	39	23	77	11	275	67	76	387	34
Conflicting Peds, #/hr	2	0	0	0	0	2	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	85	85	85	94	94	94	93	93	93
Heavy Vehicles, %	0	0	0	0	6	0	0	1	0	0	1	0
Mvmt Flow	30	21	23	46	27	91	12	293	71	82	416	37

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1015	989	437	974	972	331	455	0	0	364	0	0
Stage 1	601	601	-	353	353	-	-	-	-	-	-	-
Stage 2	414	388	-	621	619	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.56	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4.054	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	219	249	624	233	249	715	1116	-	-	1206	-	-
Stage 1	491	493	-	668	624	-	-	-	-	-	-	-
Stage 2	620	612	-	478	474	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	159	223	623	192	223	714	1114	-	-	1206	-	-
Mov Cap-2 Maneuver	159	223	-	192	223	-	-	-	-	-	-	-
Stage 1	483	447	-	659	615	-	-	-	-	-	-	-
Stage 2	509	603	-	399	430	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	27.6	25.5	0.3	1.3
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1114	-	-	232	336	1206	-	-
HCM Lane V/C Ratio	0.011	-	-	0.319	0.487	0.068	-	-
HCM Control Delay (s)	8.3	0	-	27.6	25.5	8.2	0	-
HCM Lane LOS	A	A	-	D	D	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1.3	2.5	0.2	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	108	420	61	95	366	39	46	231	48	93	287	92
Future Volume (veh/h)	108	420	61	95	366	39	46	231	48	93	287	92
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1870	1900	1885	1900	1900	1900	1870	1841	1885	1900	1900
Adj Flow Rate, veh/h	114	442	64	100	385	41	50	251	52	98	302	97
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95
Percent Heavy Veh, %	1	2	0	1	0	0	0	2	4	1	0	0
Cap, veh/h	312	532	77	250	562	60	327	501	104	396	459	147
Arrive On Green	0.06	0.33	0.33	0.06	0.33	0.33	0.06	0.33	0.33	0.06	0.33	0.33
Sat Flow, veh/h	1795	1596	231	1795	1687	180	1810	1502	311	1795	1377	442
Grp Volume(v), veh/h	114	0	506	100	0	426	50	0	303	98	0	399
Grp Sat Flow(s),veh/h/ln	1795	0	1828	1795	0	1867	1810	0	1813	1795	0	1819
Q Serve(g_s), s	3.7	0.0	23.0	3.2	0.0	17.7	1.6	0.0	12.0	3.2	0.0	16.9
Cycle Q Clear(g_c), s	3.7	0.0	23.0	3.2	0.0	17.7	1.6	0.0	12.0	3.2	0.0	16.9
Prop In Lane	1.00		0.13	1.00		0.10	1.00		0.17	1.00		0.24
Lane Grp Cap(c), veh/h	312	0	609	250	0	622	327	0	604	396	0	606
V/C Ratio(X)	0.37	0.00	0.83	0.40	0.00	0.68	0.15	0.00	0.50	0.25	0.00	0.66
Avail Cap(c_a), veh/h	312	0	609	250	0	622	327	0	604	396	0	606
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.9	0.0	27.7	21.1	0.0	25.9	18.9	0.0	24.0	18.7	0.0	25.6
Incr Delay (d2), s/veh	3.3	0.0	12.5	4.7	0.0	6.0	1.0	0.0	3.0	1.5	0.0	5.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	11.6	1.6	0.0	8.5	0.7	0.0	5.4	1.4	0.0	7.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.2	0.0	40.1	25.8	0.0	31.9	19.9	0.0	27.0	20.1	0.0	31.1
LnGrp LOS	C	A	D	C	A	C	B	A	C	C	A	C
Approach Vol, veh/h		620			526			353			497	
Approach Delay, s/veh		37.0			30.8			26.0			29.0	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	35.0	10.0	35.0	10.0	35.0	10.0	35.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	30.0	5.0	30.0	5.0	30.0	5.0	30.0
Max Q Clear Time (g_c+I1), s	5.2	14.0	5.2	25.0	3.6	18.9	5.7	19.7
Green Ext Time (p_c), s	0.0	1.5	0.0	1.4	0.0	1.8	0.0	1.8

Intersection Summary	
HCM 6th Ctrl Delay	31.4
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	575	16	4	503	9	1	4	14	0	2	43
Future Vol, veh/h	20	575	16	4	503	9	1	4	14	0	2	43
Conflicting Peds, #/hr	2	0	1	1	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	97	97	97	68	68	68	72	72	72
Heavy Vehicles, %	0	1	6	0	0	0	0	0	7	0	0	5
Mvmt Flow	21	599	17	4	519	9	1	6	21	0	3	60

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	530	0	0	617	0	0	1214	1189	609	1197	1193	526
Stage 1	-	-	-	-	-	-	651	651	-	534	534	-
Stage 2	-	-	-	-	-	-	563	538	-	663	659	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.27	7.1	6.5	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.363	3.5	4	3.345
Pot Cap-1 Maneuver	1048	-	-	973	-	-	160	190	486	164	188	546
Stage 1	-	-	-	-	-	-	461	468	-	534	528	-
Stage 2	-	-	-	-	-	-	514	526	-	454	464	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1046	-	-	972	-	-	137	182	486	149	180	545
Mov Cap-2 Maneuver	-	-	-	-	-	-	137	182	-	149	180	-
Stage 1	-	-	-	-	-	-	446	453	-	516	524	-
Stage 2	-	-	-	-	-	-	453	522	-	416	449	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.1	17	13.2
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	327	1046	-	-	972	-	-	500
HCM Lane V/C Ratio	0.085	0.02	-	-	0.004	-	-	0.125
HCM Control Delay (s)	17	8.5	0	-	8.7	0	-	13.2
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	0.4



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	88	534	342	60	818	12	216	61	71	26	70	108
Future Volume (veh/h)	88	534	342	60	818	12	216	61	71	26	70	108
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1826	1841	1826	1856	1900	1841	1856	1841	1900	1885	1870
Adj Flow Rate, veh/h	99	600	384	65	889	13	240	68	79	28	75	116
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.90	0.90	0.90	0.93	0.93	0.93
Percent Heavy Veh, %	3	5	4	5	3	0	4	3	4	0	1	2
Cap, veh/h	323	1470	660	343	1466	655	362	193	225	333	100	155
Arrive On Green	0.06	0.42	0.42	0.05	0.42	0.42	0.13	0.25	0.25	0.03	0.15	0.15
Sat Flow, veh/h	1767	3469	1558	1739	3526	1575	1753	782	909	1810	666	1031
Grp Volume(v), veh/h	99	600	384	65	889	13	240	0	147	28	0	191
Grp Sat Flow(s),veh/h/ln	1767	1735	1558	1739	1763	1575	1753	0	1691	1810	0	1697
Q Serve(g_s), s	2.5	9.6	15.0	1.7	15.6	0.4	8.8	0.0	5.7	1.0	0.0	8.6
Cycle Q Clear(g_c), s	2.5	9.6	15.0	1.7	15.6	0.4	8.8	0.0	5.7	1.0	0.0	8.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.54	1.00		0.61
Lane Grp Cap(c), veh/h	323	1470	660	343	1466	655	362	0	418	333	0	255
V/C Ratio(X)	0.31	0.41	0.58	0.19	0.61	0.02	0.66	0.00	0.35	0.08	0.00	0.75
Avail Cap(c_a), veh/h	336	1470	660	391	1466	655	362	0	1001	394	0	898
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.6	15.9	17.5	12.4	18.1	13.7	23.3	0.0	24.6	27.1	0.0	32.3
Incr Delay (d2), s/veh	0.5	0.8	3.7	0.3	1.9	0.1	4.5	0.0	0.5	0.1	0.0	4.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	3.7	5.8	0.6	6.2	0.1	3.9	0.0	2.2	0.4	0.0	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.1	16.8	21.2	12.7	20.0	13.7	27.8	0.0	25.1	27.3	0.0	36.6
LnGrp LOS	B	B	C	B	B	B	C	A	C	C	A	D
Approach Vol, veh/h		1083			967			387			219	
Approach Delay, s/veh		18.1			19.4			26.8			35.4	
Approach LOS		B			B			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.8	38.6	7.3	24.6	9.4	38.0	15.0	16.9
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	6.0	32.0	5.0	47.0	5.0	33.0	10.0	42.0
Max Q Clear Time (g_c+I1), s	3.7	17.0	3.0	7.7	4.5	17.6	10.8	10.6
Green Ext Time (p_c), s	0.0	4.8	0.0	0.9	0.0	5.5	0.0	1.3

Intersection Summary	
HCM 6th Ctrl Delay	21.3
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	7.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	67	220	0	748	57
Future Vol, veh/h	13	67	220	0	748	57
Conflicting Peds, #/hr	0	0	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	425	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	82	82	92	92
Heavy Vehicles, %	0	6	4	0	9	23
Mvmt Flow	15	78	268	0	813	62

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1382	440	877	0	-	0
Stage 1	846	-	-	-	-	-
Stage 2	536	-	-	-	-	-
Critical Hdwy	6.25	7.22	5.38	-	-	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.65	3.96	3.14	-	-	-
Pot Cap-1 Maneuver	166	474	442	-	-	-
Stage 1	311	-	-	-	-	-
Stage 2	539	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	65	473	441	-	-	-
Mov Cap-2 Maneuver	65	-	-	-	-	-
Stage 1	122	-	-	-	-	-
Stage 2	538	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	30.2	25	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	441	-	234	-	-
HCM Lane V/C Ratio	0.608	-	0.398	-	-
HCM Control Delay (s)	25	-	30.2	-	-
HCM Lane LOS	D	-	D	-	-
HCM 95th %tile Q(veh)	3.9	-	1.8	-	-

Intersection	
Int Delay, s/veh	8.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	29	23	18	31	40	77	24	233	76	49	354	43
Future Vol, veh/h	29	23	18	31	40	77	24	233	76	49	354	43
Conflicting Peds, #/hr	1	0	0	0	0	1	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	73	73	73	79	79	79	85	85	85	87	87	87
Heavy Vehicles, %	11	17	0	9	8	7	0	4	1	4	4	0
Mvmt Flow	40	32	25	39	51	97	28	274	89	56	407	49

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	995	964	433	947	944	320	457	0	0	363	0	0
Stage 1	545	545	-	375	375	-	-	-	-	-	-	-
Stage 2	450	419	-	572	569	-	-	-	-	-	-	-
Critical Hdwy	7.21	6.67	6.2	7.19	6.58	6.27	4.1	-	-	4.14	-	-
Critical Hdwy Stg 1	6.21	5.67	-	6.19	5.58	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.21	5.67	-	6.19	5.58	-	-	-	-	-	-	-
Follow-up Hdwy	3.599	4.153	3.3	3.581	4.072	3.363	2.2	-	-	2.236	-	-
Pot Cap-1 Maneuver	215	241	627	234	256	709	1114	-	-	1185	-	-
Stage 1	507	495	-	632	607	-	-	-	-	-	-	-
Stage 2	572	565	-	493	496	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	143	218	626	186	232	708	1113	-	-	1185	-	-
Mov Cap-2 Maneuver	143	218	-	186	232	-	-	-	-	-	-	-
Stage 1	490	463	-	612	588	-	-	-	-	-	-	-
Stage 2	436	547	-	413	464	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	36.3	29.3	0.6	0.9
HCM LOS	E	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1113	-	-	208	330	1185	-	-
HCM Lane V/C Ratio	0.025	-	-	0.461	0.568	0.048	-	-
HCM Control Delay (s)	8.3	0	-	36.3	29.3	8.2	0	-
HCM Lane LOS	A	A	-	E	D	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	2.2	3.3	0.1	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	96	322	32	25	451	25	72	287	49	75	251	74
Future Volume (veh/h)	96	322	32	25	451	25	72	287	49	75	251	74
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1856	1900	1841	1870	1841	1811	1826	1841	1781	1870	1796
Adj Flow Rate, veh/h	107	358	36	29	531	29	87	346	59	86	289	85
Peak Hour Factor	0.90	0.90	0.90	0.85	0.85	0.85	0.83	0.83	0.83	0.87	0.87	0.87
Percent Heavy Veh, %	2	3	0	4	2	4	6	5	4	8	2	7
Cap, veh/h	230	571	57	337	605	33	317	490	84	289	447	132
Arrive On Green	0.06	0.34	0.34	0.06	0.34	0.34	0.06	0.32	0.32	0.06	0.32	0.32
Sat Flow, veh/h	1781	1658	167	1753	1757	96	1725	1520	259	1697	1388	408
Grp Volume(v), veh/h	107	0	394	29	0	560	87	0	405	86	0	374
Grp Sat Flow(s),veh/h/ln	1781	0	1825	1753	0	1853	1725	0	1779	1697	0	1797
Q Serve(g_s), s	3.5	0.0	16.2	0.9	0.0	25.6	3.0	0.0	18.0	3.0	0.0	16.0
Cycle Q Clear(g_c), s	3.5	0.0	16.2	0.9	0.0	25.6	3.0	0.0	18.0	3.0	0.0	16.0
Prop In Lane	1.00		0.09	1.00		0.05	1.00		0.15	1.00		0.23
Lane Grp Cap(c), veh/h	230	0	629	337	0	638	317	0	573	289	0	579
V/C Ratio(X)	0.46	0.00	0.63	0.09	0.00	0.88	0.27	0.00	0.71	0.30	0.00	0.65
Avail Cap(c_a), veh/h	230	0	629	337	0	638	317	0	573	289	0	579
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.4	0.0	24.7	18.0	0.0	27.7	19.9	0.0	26.8	20.3	0.0	26.1
Incr Delay (d2), s/veh	6.6	0.0	4.7	0.5	0.0	15.7	2.1	0.0	7.2	2.6	0.0	5.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	7.5	0.4	0.0	13.4	1.3	0.0	8.4	1.3	0.0	7.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.0	0.0	29.3	18.5	0.0	43.4	22.1	0.0	33.9	23.0	0.0	31.6
LnGrp LOS	C	A	C	B	A	D	C	A	C	C	A	C
Approach Vol, veh/h		501			589			492			460	
Approach Delay, s/veh		29.0			42.2			31.8			30.0	
Approach LOS		C			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	34.0	10.0	36.0	10.0	34.0	10.0	36.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	29.0	5.0	31.0	5.0	29.0	5.0	31.0
Max Q Clear Time (g_c+I1), s	5.0	20.0	2.9	18.2	5.0	18.0	5.5	27.6
Green Ext Time (p_c), s	0.0	1.6	0.0	1.9	0.0	1.6	0.0	1.2

Intersection Summary	
HCM 6th Ctrl Delay	33.7
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	24	456	5	5	586	7	8	1	8	6	3	34
Future Vol, veh/h	24	456	5	5	586	7	8	1	8	6	3	34
Conflicting Peds, #/hr	2	0	3	3	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	85	85	85	53	53	53	73	73	73
Heavy Vehicles, %	0	2	0	0	3	0	0	0	0	0	0	0
Mvmt Flow	27	518	6	6	689	8	15	2	15	8	4	47

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	699	0	0	527	0	0	1309	1289	524	1291	1288	695
Stage 1	-	-	-	-	-	-	578	578	-	707	707	-
Stage 2	-	-	-	-	-	-	731	711	-	584	581	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	907	-	-	1050	-	-	138	165	557	142	165	446
Stage 1	-	-	-	-	-	-	505	504	-	429	441	-
Stage 2	-	-	-	-	-	-	416	439	-	501	503	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	905	-	-	1047	-	-	116	156	555	131	156	445
Mov Cap-2 Maneuver	-	-	-	-	-	-	116	156	-	131	156	-
Stage 1	-	-	-	-	-	-	482	481	-	410	436	-
Stage 2	-	-	-	-	-	-	366	434	-	465	480	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.1	27.9	19.7
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	189	905	-	-	1047	-	-	304
HCM Lane V/C Ratio	0.17	0.03	-	-	0.006	-	-	0.194
HCM Control Delay (s)	27.9	9.1	0	-	8.5	0	-	19.7
HCM Lane LOS	D	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.6	0.1	-	-	0	-	-	0.7



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	96	653	445	65	687	9	293	54	46	21	70	97
Future Volume (veh/h)	96	653	445	65	687	9	293	54	46	21	70	97
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1900	1900	1900	1900	1900	1870	1870	1900	1900	1885
Adj Flow Rate, veh/h	102	695	473	71	747	10	337	62	53	26	88	121
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.87	0.87	0.87	0.80	0.80	0.80
Percent Heavy Veh, %	1	1	0	0	0	0	0	2	2	0	0	1
Cap, veh/h	334	1364	599	286	1353	602	452	285	243	339	114	157
Arrive On Green	0.05	0.38	0.38	0.05	0.37	0.37	0.18	0.31	0.31	0.03	0.16	0.16
Sat Flow, veh/h	1795	3582	1572	1810	3610	1606	1810	930	795	1810	723	994
Grp Volume(v), veh/h	102	695	473	71	747	10	337	0	115	26	0	209
Grp Sat Flow(s),veh/h/ln	1795	1791	1572	1810	1805	1606	1810	0	1725	1810	0	1717
Q Serve(g_s), s	2.9	12.5	22.4	2.0	13.7	0.3	12.4	0.0	4.2	1.0	0.0	9.8
Cycle Q Clear(g_c), s	2.9	12.5	22.4	2.0	13.7	0.3	12.4	0.0	4.2	1.0	0.0	9.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.46	1.00		0.58
Lane Grp Cap(c), veh/h	334	1364	599	286	1353	602	452	0	528	339	0	271
V/C Ratio(X)	0.31	0.51	0.79	0.25	0.55	0.02	0.75	0.00	0.22	0.08	0.00	0.77
Avail Cap(c_a), veh/h	386	1364	599	328	1353	602	522	0	965	397	0	694
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.8	20.0	23.1	15.6	20.7	16.5	22.5	0.0	21.7	28.3	0.0	33.9
Incr Delay (d2), s/veh	0.5	1.4	10.2	0.4	1.6	0.1	5.0	0.0	0.2	0.1	0.0	4.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	5.2	9.7	0.8	5.7	0.1	5.5	0.0	1.6	0.4	0.0	4.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.4	21.4	33.3	16.0	22.3	16.6	27.5	0.0	21.9	28.4	0.0	38.6
LnGrp LOS	B	C	C	B	C	B	C	A	C	C	A	D
Approach Vol, veh/h		1270			828			452			235	
Approach Delay, s/veh		25.4			21.7			26.0			37.5	
Approach LOS		C			C			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.0	37.0	7.3	30.7	9.5	36.5	19.7	18.3
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	6.0	32.0	5.0	47.0	7.0	31.0	18.0	34.0
Max Q Clear Time (g_c+I1), s	4.0	24.4	3.0	6.2	4.9	15.7	14.4	11.8
Green Ext Time (p_c), s	0.0	3.8	0.0	0.7	0.0	4.5	0.4	1.3

Intersection Summary	
HCM 6th Ctrl Delay	25.4
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	116	134	0	993	40
Future Vol, veh/h	8	116	134	0	993	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	425	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	92	92	90	90
Heavy Vehicles, %	0	3	4	3	3	0
Mvmt Flow	10	143	146	0	1103	44

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1417	574	1147	0	-	0
Stage 1	1125	-	-	-	-	-
Stage 2	292	-	-	-	-	-
Critical Hdwy	6.25	7.16	5.38	-	-	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.65	3.93	3.14	-	-	-
Pot Cap-1 Maneuver	159	394	327	-	-	-
Stage 1	210	-	-	-	-	-
Stage 2	712	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	88	394	327	-	-	-
Mov Cap-2 Maneuver	88	-	-	-	-	-
Stage 1	116	-	-	-	-	-
Stage 2	712	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	25.9	24.6	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	327	-	322	-	-
HCM Lane V/C Ratio	0.445	-	0.475	-	-
HCM Control Delay (s)	24.6	-	25.9	-	-
HCM Lane LOS	C	-	D	-	-
HCM 95th %tile Q(veh)	2.2	-	2.4	-	-

Intersection	
Int Delay, s/veh	6.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	23	16	18	39	23	77	11	287	67	76	414	34
Future Vol, veh/h	23	16	18	39	23	77	11	287	67	76	414	34
Conflicting Peds, #/hr	2	0	0	0	0	2	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	85	85	85	94	94	94	93	93	93
Heavy Vehicles, %	0	0	0	0	6	0	0	1	0	0	1	0
Mvmt Flow	30	21	23	46	27	91	12	305	71	82	445	37

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1056	1030	466	1015	1013	343	484	0	0	376	0	0
Stage 1	630	630	-	365	365	-	-	-	-	-	-	-
Stage 2	426	400	-	650	648	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.56	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4.054	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	205	235	601	219	235	704	1089	-	-	1194	-	-
Stage 1	473	478	-	658	616	-	-	-	-	-	-	-
Stage 2	610	605	-	461	460	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	148	210	600	179	210	703	1087	-	-	1194	-	-
Mov Cap-2 Maneuver	148	210	-	179	210	-	-	-	-	-	-	-
Stage 1	465	432	-	649	607	-	-	-	-	-	-	-
Stage 2	500	597	-	382	416	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	29.8	27.7	0.3	1.2
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1087	-	-	218	318	1194	-	-
HCM Lane V/C Ratio	0.011	-	-	0.34	0.514	0.068	-	-
HCM Control Delay (s)	8.3	0	-	29.8	27.7	8.2	0	-
HCM Lane LOS	A	A	-	D	D	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1.4	2.8	0.2	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	108	458	61	95	390	39	46	246	48	93	314	92
Future Volume (veh/h)	108	458	61	95	390	39	46	246	48	93	314	92
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1870	1900	1885	1900	1900	1900	1870	1841	1885	1900	1900
Adj Flow Rate, veh/h	114	482	64	100	411	41	50	267	52	98	331	97
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95
Percent Heavy Veh, %	1	2	0	1	0	0	0	2	4	1	0	0
Cap, veh/h	308	557	74	237	585	58	292	490	95	370	455	133
Arrive On Green	0.06	0.34	0.34	0.06	0.34	0.34	0.06	0.32	0.32	0.06	0.32	0.32
Sat Flow, veh/h	1795	1616	215	1795	1699	169	1810	1520	296	1795	1411	413
Grp Volume(v), veh/h	114	0	546	100	0	452	50	0	319	98	0	428
Grp Sat Flow(s),veh/h/ln	1795	0	1831	1795	0	1869	1810	0	1816	1795	0	1824
Q Serve(g_s), s	3.7	0.0	25.1	3.2	0.0	18.8	1.6	0.0	13.0	3.2	0.0	18.7
Cycle Q Clear(g_c), s	3.7	0.0	25.1	3.2	0.0	18.8	1.6	0.0	13.0	3.2	0.0	18.7
Prop In Lane	1.00		0.12	1.00		0.09	1.00		0.16	1.00		0.23
Lane Grp Cap(c), veh/h	308	0	631	237	0	644	292	0	585	370	0	588
V/C Ratio(X)	0.37	0.00	0.87	0.42	0.00	0.70	0.17	0.00	0.55	0.27	0.00	0.73
Avail Cap(c_a), veh/h	308	0	631	237	0	644	292	0	585	370	0	588
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.5	0.0	27.6	21.1	0.0	25.5	20.0	0.0	25.1	19.5	0.0	27.0
Incr Delay (d2), s/veh	3.4	0.0	14.8	5.4	0.0	6.3	1.3	0.0	3.6	1.7	0.0	7.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	12.9	1.6	0.0	9.0	0.7	0.0	5.9	1.5	0.0	9.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.9	0.0	42.4	26.5	0.0	31.8	21.2	0.0	28.7	21.2	0.0	34.7
LnGrp LOS	C	A	D	C	A	C	C	A	C	C	A	C
Approach Vol, veh/h		660			552			369			526	
Approach Delay, s/veh		39.0			30.9			27.7			32.2	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	34.0	10.0	36.0	10.0	34.0	10.0	36.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	29.0	5.0	31.0	5.0	29.0	5.0	31.0
Max Q Clear Time (g_c+I1), s	5.2	15.0	5.2	27.1	3.6	20.7	5.7	20.8
Green Ext Time (p_c), s	0.0	1.5	0.0	1.3	0.0	1.6	0.0	2.0

Intersection Summary	
HCM 6th Ctrl Delay	33.2
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	613	16	4	527	9	1	4	14	0	2	43
Future Vol, veh/h	20	613	16	4	527	9	1	4	14	0	2	43
Conflicting Peds, #/hr	2	0	1	1	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	97	97	97	68	68	68	72	72	72
Heavy Vehicles, %	0	1	6	0	0	0	0	0	7	0	0	5
Mvmt Flow	21	639	17	4	543	9	1	6	21	0	3	60

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	554	0	0	657	0	0	1278	1253	649	1261	1257	550
Stage 1	-	-	-	-	-	-	691	691	-	558	558	-
Stage 2	-	-	-	-	-	-	587	562	-	703	699	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.27	7.1	6.5	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.363	3.5	4	3.345
Pot Cap-1 Maneuver	1026	-	-	940	-	-	144	174	461	148	173	529
Stage 1	-	-	-	-	-	-	438	449	-	518	515	-
Stage 2	-	-	-	-	-	-	499	513	-	431	445	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1024	-	-	939	-	-	122	167	461	133	166	528
Mov Cap-2 Maneuver	-	-	-	-	-	-	122	167	-	133	166	-
Stage 1	-	-	-	-	-	-	424	434	-	500	511	-
Stage 2	-	-	-	-	-	-	438	509	-	393	430	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.1	18	13.6
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	304	1024	-	-	939	-	-	481
HCM Lane V/C Ratio	0.092	0.02	-	-	0.004	-	-	0.13
HCM Control Delay (s)	18	8.6	0	-	8.9	0	-	13.6
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	0.4



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	88	606	387	60	929	12	248	61	71	26	70	108
Future Volume (veh/h)	88	606	387	60	929	12	248	61	71	26	70	108
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1826	1841	1826	1856	1900	1841	1856	1841	1900	1885	1870
Adj Flow Rate, veh/h	99	681	435	65	1010	13	276	68	79	28	75	116
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.90	0.90	0.90	0.93	0.93	0.93
Percent Heavy Veh, %	3	5	4	5	3	0	4	3	4	0	1	2
Cap, veh/h	275	1428	641	302	1425	636	394	209	243	328	99	154
Arrive On Green	0.05	0.41	0.41	0.05	0.40	0.40	0.15	0.27	0.27	0.03	0.15	0.15
Sat Flow, veh/h	1767	3469	1558	1739	3526	1575	1753	782	909	1810	666	1031
Grp Volume(v), veh/h	99	681	435	65	1010	13	276	0	147	28	0	191
Grp Sat Flow(s),veh/h/ln	1767	1735	1558	1739	1763	1575	1753	0	1691	1810	0	1697
Q Serve(g_s), s	2.6	11.7	18.6	1.7	19.5	0.4	10.4	0.0	5.7	1.1	0.0	8.8
Cycle Q Clear(g_c), s	2.6	11.7	18.6	1.7	19.5	0.4	10.4	0.0	5.7	1.1	0.0	8.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.54	1.00		0.61
Lane Grp Cap(c), veh/h	275	1428	641	302	1425	636	394	0	452	328	0	253
V/C Ratio(X)	0.36	0.48	0.68	0.21	0.71	0.02	0.70	0.00	0.33	0.09	0.00	0.75
Avail Cap(c_a), veh/h	287	1428	641	348	1425	636	394	0	973	387	0	832
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.5	17.6	19.6	13.6	20.3	14.6	23.3	0.0	24.0	28.0	0.0	33.3
Incr Delay (d2), s/veh	0.8	1.1	5.7	0.4	3.0	0.1	5.4	0.0	0.4	0.1	0.0	4.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	4.6	7.4	0.7	8.0	0.2	4.6	0.0	2.2	0.5	0.0	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.3	18.7	25.3	14.0	23.3	14.7	28.7	0.0	24.4	28.1	0.0	37.8
LnGrp LOS	B	B	C	B	C	B	C	A	C	C	A	D
Approach Vol, veh/h		1215			1088			423			219	
Approach Delay, s/veh		20.9			22.7			27.2			36.6	
Approach LOS		C			C			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.9	38.6	7.4	26.8	9.5	38.0	17.0	17.2
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	6.0	32.0	5.0	47.0	5.0	33.0	12.0	40.0
Max Q Clear Time (g_c+I1), s	3.7	20.6	3.1	7.7	4.6	21.5	12.4	10.8
Green Ext Time (p_c), s	0.0	4.8	0.0	0.9	0.0	5.3	0.0	1.3

Intersection Summary	
HCM 6th Ctrl Delay	23.6
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	9.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	67	220	0	850	57
Future Vol, veh/h	13	67	220	0	850	57
Conflicting Peds, #/hr	0	0	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	425	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	82	82	92	92
Heavy Vehicles, %	0	6	4	0	9	23
Mvmt Flow	15	78	268	0	924	62

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1493	495	988	0	-	0
Stage 1	957	-	-	-	-	-
Stage 2	536	-	-	-	-	-
Critical Hdwy	6.25	7.22	5.38	-	-	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.65	3.96	3.14	-	-	-
Pot Cap-1 Maneuver	143	437	391	-	-	-
Stage 1	267	-	-	-	-	-
Stage 2	539	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	45	436	390	-	-	-
Mov Cap-2 Maneuver	45	-	-	-	-	-
Stage 1	83	-	-	-	-	-
Stage 2	538	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	44.2	32.3	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	390	-	181	-	-
HCM Lane V/C Ratio	0.688	-	0.514	-	-
HCM Control Delay (s)	32.3	-	44.2	-	-
HCM Lane LOS	D	-	E	-	-
HCM 95th %tile Q(veh)	5	-	2.6	-	-

Intersection	
Intersection Delay, s/veh	27.5
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	29	23	18	31	40	77	24	264	76	49	399	43
Future Vol, veh/h	29	23	18	31	40	77	24	264	76	49	399	43
Peak Hour Factor	0.73	0.73	0.73	0.79	0.79	0.79	0.85	0.85	0.85	0.87	0.87	0.87
Heavy Vehicles, %	11	17	0	9	8	7	0	4	1	4	4	0
Mvmt Flow	40	32	25	39	51	97	28	311	89	56	459	49
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	12.3	13.6	20.8	39.8
HCM LOS	B	B	C	E

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	7%	41%	21%	10%
Vol Thru, %	73%	33%	27%	81%
Vol Right, %	21%	26%	52%	9%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	364	70	148	491
LT Vol	24	29	31	49
Through Vol	264	23	40	399
RT Vol	76	18	77	43
Lane Flow Rate	428	96	187	564
Geometry Grp	1	1	1	1
Degree of Util (X)	0.689	0.197	0.355	0.902
Departure Headway (Hd)	5.795	7.383	6.818	5.756
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	621	484	526	632
Service Time	3.848	5.462	4.887	3.756
HCM Lane V/C Ratio	0.689	0.198	0.356	0.892
HCM Control Delay	20.8	12.3	13.6	39.8
HCM Lane LOS	C	B	B	E
HCM 95th-tile Q	5.4	0.7	1.6	11.2



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	96	383	32	25	512	25	72	325	49	75	295	74
Future Volume (veh/h)	96	383	32	25	512	25	72	325	49	75	295	74
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1856	1900	1841	1870	1841	1811	1826	1841	1781	1870	1796
Adj Flow Rate, veh/h	107	426	36	29	602	29	87	392	59	86	339	85
Peak Hour Factor	0.90	0.90	0.90	0.85	0.85	0.85	0.83	0.83	0.83	0.87	0.87	0.87
Percent Heavy Veh, %	2	3	0	4	2	4	6	5	4	8	2	7
Cap, veh/h	218	660	572	327	665	554	269	482	73	244	449	113
Arrive On Green	0.06	0.36	0.36	0.06	0.36	0.36	0.06	0.31	0.31	0.06	0.31	0.31
Sat Flow, veh/h	1781	1856	1608	1753	1870	1558	1725	1551	233	1697	1443	362
Grp Volume(v), veh/h	107	426	36	29	602	29	87	0	451	86	0	424
Grp Sat Flow(s),veh/h/ln	1781	1856	1608	1753	1870	1558	1725	0	1784	1697	0	1805
Q Serve(g_s), s	3.4	17.3	1.3	0.9	27.5	1.1	3.0	0.0	21.0	3.0	0.0	19.0
Cycle Q Clear(g_c), s	3.4	17.3	1.3	0.9	27.5	1.1	3.0	0.0	21.0	3.0	0.0	19.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.13	1.00		0.20
Lane Grp Cap(c), veh/h	218	660	572	327	665	554	269	0	555	244	0	562
V/C Ratio(X)	0.49	0.65	0.06	0.09	0.91	0.05	0.32	0.00	0.81	0.35	0.00	0.75
Avail Cap(c_a), veh/h	218	660	572	327	665	554	269	0	555	244	0	562
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.5	24.3	19.1	17.6	27.6	19.0	21.2	0.0	28.6	21.7	0.0	27.9
Incr Delay (d2), s/veh	7.7	4.8	0.2	0.5	18.1	0.2	3.2	0.0	12.3	4.0	0.0	9.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	8.1	0.5	0.4	14.9	0.4	1.4	0.0	10.4	1.4	0.0	9.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.1	29.1	19.3	18.1	45.7	19.2	24.4	0.0	40.9	25.7	0.0	37.0
LnGrp LOS	C	C	B	B	D	B	C	A	D	C	A	D
Approach Vol, veh/h		569			660			538			510	
Approach Delay, s/veh		28.5			43.3			38.2			35.1	
Approach LOS		C			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	33.0	10.0	37.0	10.0	33.0	10.0	37.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	28.0	5.0	32.0	5.0	28.0	5.0	32.0
Max Q Clear Time (g_c+I1), s	5.4	23.0	2.9	19.3	5.0	21.0	5.4	29.5
Green Ext Time (p_c), s	0.0	1.2	0.0	2.2	0.0	1.4	0.0	1.0

Intersection Summary	
HCM 6th Ctrl Delay	36.6
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	24	517	5	5	647	7	8	1	8	6	3	34
Future Vol, veh/h	24	517	5	5	647	7	8	1	8	6	3	34
Conflicting Peds, #/hr	2	0	3	3	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	85	85	85	53	53	53	73	73	73
Heavy Vehicles, %	0	2	0	0	3	0	0	0	0	0	0	0
Mvmt Flow	27	588	6	6	761	8	15	2	15	8	4	47

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	771	0	0	597	0	0	1451	1431	594	1433	1430	767
Stage 1	-	-	-	-	-	-	648	648	-	779	779	-
Stage 2	-	-	-	-	-	-	803	783	-	654	651	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	853	-	-	989	-	-	110	136	509	113	136	405
Stage 1	-	-	-	-	-	-	462	469	-	392	409	-
Stage 2	-	-	-	-	-	-	380	407	-	459	468	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	851	-	-	986	-	-	91	128	508	104	128	404
Mov Cap-2 Maneuver	-	-	-	-	-	-	91	128	-	104	128	-
Stage 1	-	-	-	-	-	-	439	446	-	373	404	-
Stage 2	-	-	-	-	-	-	329	402	-	423	445	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.1	34.7	22.9
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	153	851	-	-	986	-	-	260
HCM Lane V/C Ratio	0.21	0.032	-	-	0.006	-	-	0.227
HCM Control Delay (s)	34.7	9.4	0	-	8.7	0	-	22.9
HCM Lane LOS	D	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.8	0.1	-	-	0	-	-	0.8



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	96	742	505	65	780	9	321	54	46	21	70	97
Future Volume (veh/h)	96	742	505	65	780	9	321	54	46	21	70	97
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1900	1900	1900	1900	1900	1870	1870	1900	1900	1885
Adj Flow Rate, veh/h	102	789	537	71	848	10	369	62	53	26	88	121
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.87	0.87	0.87	0.80	0.80	0.80
Percent Heavy Veh, %	1	1	0	0	0	0	0	2	2	0	0	1
Cap, veh/h	294	1354	595	253	1344	598	472	297	254	333	113	155
Arrive On Green	0.05	0.38	0.38	0.05	0.37	0.37	0.19	0.32	0.32	0.03	0.16	0.16
Sat Flow, veh/h	1795	3582	1572	1810	3610	1606	1810	930	795	1810	723	994
Grp Volume(v), veh/h	102	789	537	71	848	10	369	0	115	26	0	209
Grp Sat Flow(s),veh/h/ln	1795	1791	1572	1810	1805	1606	1810	0	1725	1810	0	1717
Q Serve(g_s), s	3.0	15.3	28.2	2.1	16.8	0.3	14.1	0.0	4.2	1.0	0.0	10.2
Cycle Q Clear(g_c), s	3.0	15.3	28.2	2.1	16.8	0.3	14.1	0.0	4.2	1.0	0.0	10.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.46	1.00		0.58
Lane Grp Cap(c), veh/h	294	1354	595	253	1344	598	472	0	550	333	0	268
V/C Ratio(X)	0.35	0.58	0.90	0.28	0.63	0.02	0.78	0.00	0.21	0.08	0.00	0.78
Avail Cap(c_a), veh/h	322	1354	595	271	1344	598	543	0	929	388	0	629
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.2	21.6	25.6	16.8	22.5	17.3	23.0	0.0	21.7	29.6	0.0	35.4
Incr Delay (d2), s/veh	0.7	1.8	19.5	0.6	2.3	0.1	6.4	0.0	0.2	0.1	0.0	4.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	6.4	13.3	0.9	7.1	0.1	6.5	0.0	1.7	0.5	0.0	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.9	23.5	45.1	17.4	24.7	17.4	29.4	0.0	21.9	29.7	0.0	40.3
LnGrp LOS	B	C	D	B	C	B	C	A	C	C	A	D
Approach Vol, veh/h		1428			929			484			235	
Approach Delay, s/veh		31.2			24.1			27.6			39.2	
Approach LOS		C			C			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.1	38.0	7.3	32.8	9.6	37.5	21.6	18.6
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	33.0	5.0	47.0	6.0	32.0	20.0	32.0
Max Q Clear Time (g_c+I1), s	4.1	30.2	3.0	6.2	5.0	18.8	16.1	12.2
Green Ext Time (p_c), s	0.0	1.9	0.0	0.7	0.0	4.8	0.4	1.2

Intersection Summary	
HCM 6th Ctrl Delay	29.1
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	6.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	116	134	0	1127	40
Future Vol, veh/h	8	116	134	0	1127	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	425	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	92	92	90	90
Heavy Vehicles, %	0	3	4	3	3	0
Mvmt Flow	10	143	146	0	1252	44

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1566	648	1296	0	-	0
Stage 1	1274	-	-	-	-	-
Stage 2	292	-	-	-	-	-
Critical Hdwy	6.25	7.16	5.38	-	-	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.65	3.93	3.14	-	-	-
Pot Cap-1 Maneuver	130	352	276	-	-	-
Stage 1	170	-	-	-	-	-
Stage 2	712	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	61	352	276	-	-	-
Mov Cap-2 Maneuver	61	-	-	-	-	-
Stage 1	80	-	-	-	-	-
Stage 2	712	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	34.7	31.7	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	276	-	269	-	-
HCM Lane V/C Ratio	0.528	-	0.569	-	-
HCM Control Delay (s)	31.7	-	34.7	-	-
HCM Lane LOS	D	-	D	-	-
HCM 95th %tile Q(veh)	2.9	-	3.2	-	-

Intersection	
Intersection Delay, s/veh	29.8
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	23	16	18	39	23	77	11	325	67	76	474	34
Future Vol, veh/h	23	16	18	39	23	77	11	325	67	76	474	34
Peak Hour Factor	0.77	0.77	0.77	0.85	0.85	0.85	0.94	0.94	0.94	0.93	0.93	0.93
Heavy Vehicles, %	0	0	0	0	6	0	0	1	0	0	1	0
Mvmt Flow	30	21	23	46	27	91	12	346	71	82	510	37
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	11.4	12.5	19.5	43.6
HCM LOS	B	B	C	E

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	40%	28%	13%
Vol Thru, %	81%	28%	17%	81%
Vol Right, %	17%	32%	55%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	403	57	139	584
LT Vol	11	23	39	76
Through Vol	325	16	23	474
RT Vol	67	18	77	34
Lane Flow Rate	429	74	164	628
Geometry Grp	1	1	1	1
Degree of Util (X)	0.673	0.146	0.301	0.933
Departure Headway (Hd)	5.648	7.112	6.616	5.457
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	643	505	545	672
Service Time	3.648	5.145	4.642	3.457
HCM Lane V/C Ratio	0.667	0.147	0.301	0.935
HCM Control Delay	19.5	11.4	12.5	43.6
HCM Lane LOS	C	B	B	E
HCM 95th-tile Q	5.2	0.5	1.3	12.7



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	108	541	61	95	442	39	46	279	48	93	374	92
Future Volume (veh/h)	108	541	61	95	442	39	46	279	48	93	374	92
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1870	1900	1885	1900	1900	1900	1870	1841	1885	1900	1900
Adj Flow Rate, veh/h	114	569	64	100	465	41	50	303	52	98	394	97
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95
Percent Heavy Veh, %	1	2	0	1	0	0	0	2	4	1	0	0
Cap, veh/h	312	665	570	239	676	570	235	484	83	329	458	113
Arrive On Green	0.06	0.36	0.36	0.06	0.36	0.36	0.06	0.31	0.31	0.06	0.31	0.31
Sat Flow, veh/h	1795	1870	1603	1795	1900	1603	1810	1555	267	1795	1471	362
Grp Volume(v), veh/h	114	569	64	100	465	41	50	0	355	98	0	491
Grp Sat Flow(s),veh/h/ln	1795	1870	1603	1795	1900	1603	1810	0	1821	1795	0	1833
Q Serve(g_s), s	3.6	25.4	2.4	3.1	18.8	1.5	1.6	0.0	15.0	3.3	0.0	22.7
Cycle Q Clear(g_c), s	3.6	25.4	2.4	3.1	18.8	1.5	1.6	0.0	15.0	3.3	0.0	22.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.15	1.00		0.20
Lane Grp Cap(c), veh/h	312	665	570	239	676	570	235	0	567	329	0	570
V/C Ratio(X)	0.37	0.86	0.11	0.42	0.69	0.07	0.21	0.00	0.63	0.30	0.00	0.86
Avail Cap(c_a), veh/h	312	665	570	239	676	570	235	0	567	329	0	570
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.9	26.9	19.5	20.6	24.7	19.2	21.6	0.0	26.5	20.5	0.0	29.2
Incr Delay (d2), s/veh	3.3	13.3	0.4	5.3	5.7	0.2	2.1	0.0	5.2	2.3	0.0	15.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	13.1	0.9	1.6	9.1	0.6	0.8	0.0	7.0	1.5	0.0	11.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.2	40.2	19.9	25.9	30.4	19.4	23.6	0.0	31.7	22.8	0.0	44.8
LnGrp LOS	C	D	B	C	C	B	C	A	C	C	A	D
Approach Vol, veh/h		747			606			405			589	
Approach Delay, s/veh		35.7			28.9			30.7			41.1	
Approach LOS		D			C			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	33.0	10.0	37.0	10.0	33.0	10.0	37.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	5.0	28.0	5.0	32.0	5.0	28.0	5.0	32.0
Max Q Clear Time (g_c+I1), s	5.6	17.0	5.1	27.4	3.6	24.7	5.6	20.8
Green Ext Time (p_c), s	0.0	1.5	0.0	1.6	0.0	1.0	0.0	2.2

Intersection Summary	
HCM 6th Ctrl Delay	34.4
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	696	16	4	579	9	1	4	14	0	2	43
Future Vol, veh/h	20	696	16	4	579	9	1	4	14	0	2	43
Conflicting Peds, #/hr	2	0	1	1	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	97	97	97	68	68	68	72	72	72
Heavy Vehicles, %	0	1	6	0	0	0	0	0	7	0	0	5
Mvmt Flow	21	725	17	4	597	9	1	6	21	0	3	60

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	608	0	0	743	0	0	1418	1393	735	1401	1397	604
Stage 1	-	-	-	-	-	-	777	777	-	612	612	-
Stage 2	-	-	-	-	-	-	641	616	-	789	785	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.27	7.1	6.5	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.363	3.5	4	3.345
Pot Cap-1 Maneuver	980	-	-	873	-	-	116	143	411	119	142	493
Stage 1	-	-	-	-	-	-	393	410	-	484	487	-
Stage 2	-	-	-	-	-	-	466	485	-	387	407	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	978	-	-	872	-	-	97	136	411	105	135	492
Mov Cap-2 Maneuver	-	-	-	-	-	-	97	136	-	105	135	-
Stage 1	-	-	-	-	-	-	378	394	-	465	483	-
Stage 2	-	-	-	-	-	-	404	481	-	349	392	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.1	20.6	14.5
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	258	978	-	-	872	-	-	440
HCM Lane V/C Ratio	0.108	0.021	-	-	0.005	-	-	0.142
HCM Control Delay (s)	20.6	8.8	0	-	9.1	0	-	14.5
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0	-	-	0.5

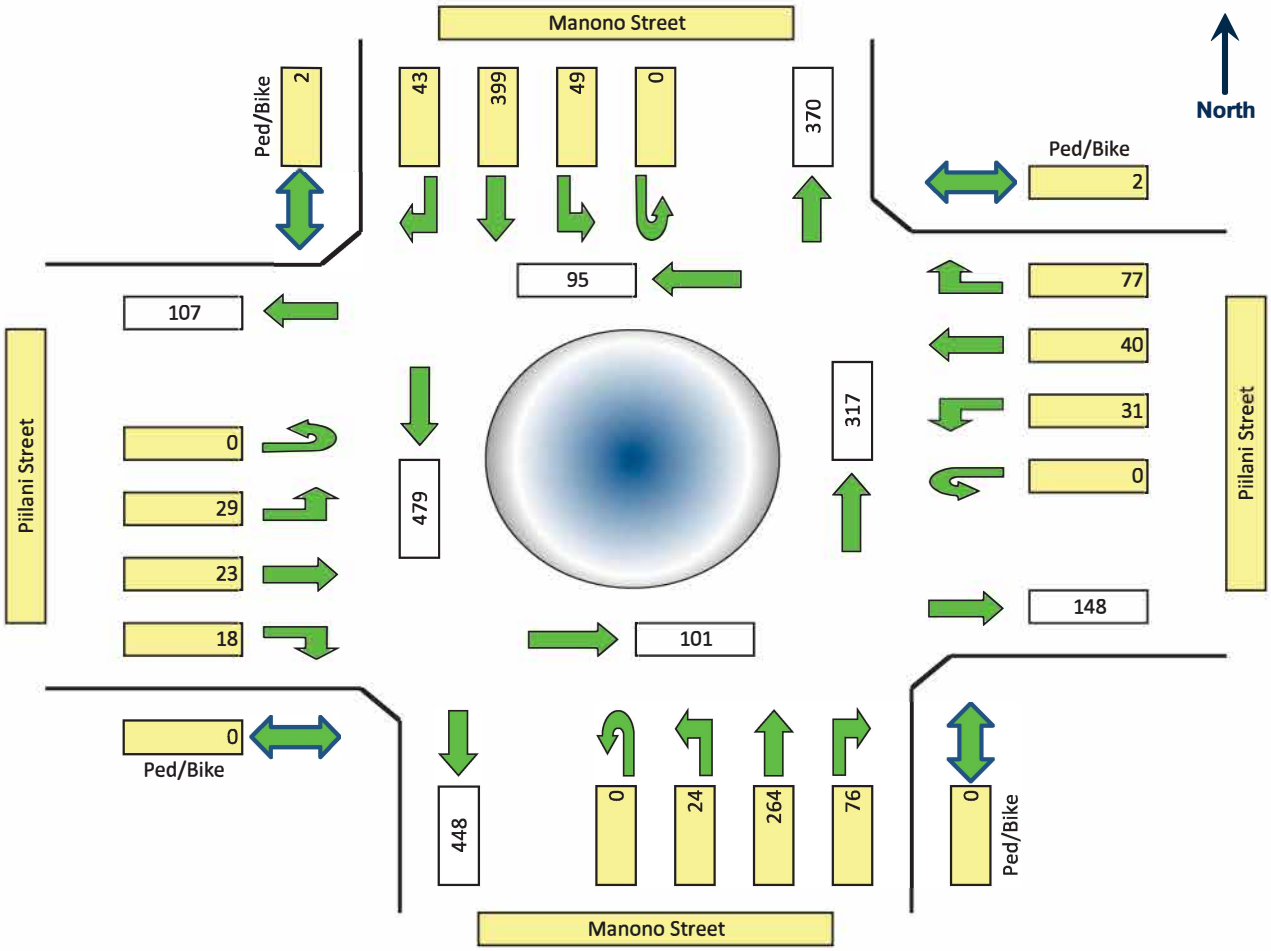
Appendix G – Analysis Report Future With Mitigation

Roundabout Capacity Analysis

HCM 6th Edition Methodology

Project Name:	**Manono Street at Piilani Street**
Project/File #:	
Scenario:	**HCM 6th Edition - 2042 AM W Project**

Volume Inputs and Roundabout Flows



HCM 6th Edition Roundabout Analysis Individual Lane Results

Approach:	Northbound	Southbound	Eastbound	Westbound
Street Name:	Manono Street	Manono Street	Piilani Street	Piilani Street
Configuration:	Left/Thru/Right (1 lane)	Left/Thru/Right (1 lane)	Left/Thru/Right (1 lane)	Left/Thru/Right (1 lane)
Right Turn Bypass:	No Separate Bypass	No Separate Bypass	No Separate Bypass	No Separate Bypass
Peak Hour Factor:	0.85	0.87	0.73	0.79
% Bicycles:	0%	0%	0%	0%
% Heavy Vehicles:	4%	4%	7%	5%
Adjusted Entry Flow:	428	564	97	187
Capacity:	1154	1172	718	879
v/c Ratio:	0.37	0.48	0.14	0.21
Delay (seconds/veh):	7	8	6	6
Level of Service (LOS):	A	A	A	A
95th %ile Queue (veh):	1.7	2.7	0.5	0.8
Approach Delay:	7 Seconds/Vehicle	8 Seconds/Vehicle	6 Seconds/Vehicle	6 Seconds/Vehicle
Approach LOS:	A	A	A	A
Exit Lanes Required:	Minimum 1 Exit Lane	Minimum 1 Exit Lane	Minimum 1 Exit Lane	Minimum 1 Exit Lane

HCM 6th Edition Roundabout Analysis Overall Intersection Results

Average Control Delay is 7 seconds and LOS A. **All Approach Lanes have a v/c ratio under 0.85.**

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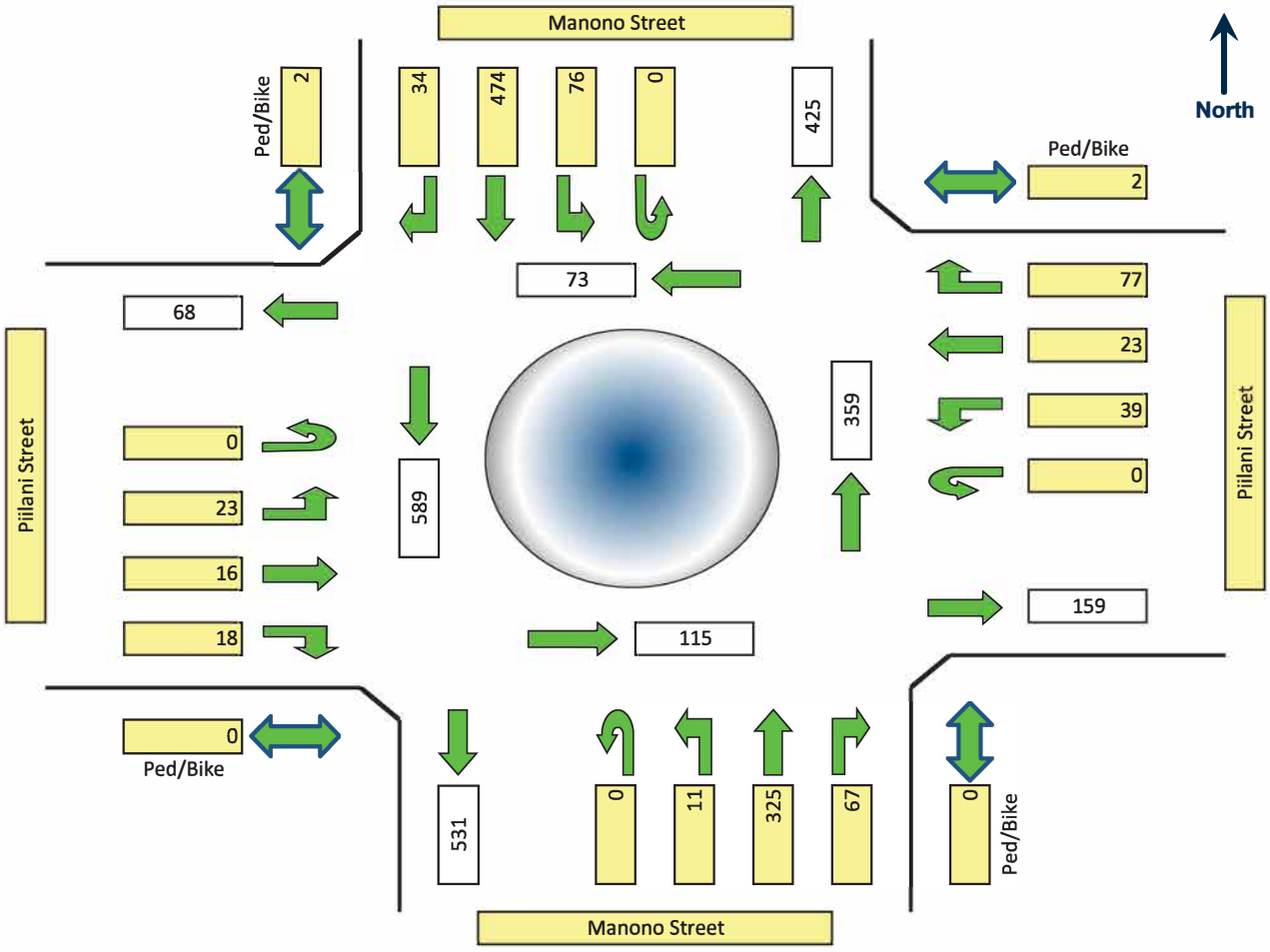
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Roundabout Capacity Analysis

HCM 6th Edition Methodology

Project Name:	Manono Street at Piilani Street
Project/File #:	
Scenario:	HCM 6th Edition - 2042 PM W Project

Volume Inputs and Roundabout Flows



HCM 6th Edition Roundabout Analysis Individual Lane Results

Approach:	Northbound	Southbound	Eastbound	Westbound
Street Name:	Manono Street	Manono Street	Piilani Street	Piilani Street
Configuration:	Left/Thru/Right (1 lane)	Left/Thru/Right (1 lane)	Left/Thru/Right (1 lane)	Left/Thru/Right (1 lane)
Right Turn Bypass:	No Separate Bypass	No Separate Bypass	No Separate Bypass	No Separate Bypass
Peak Hour Factor:	0.94	0.93	0.77	0.85
% Bicycles:	0%	0%	0%	0%
% Heavy Vehicles:	1%	0%	0%	1%
Adjusted Entry Flow:	428	628	74	164
Capacity:	1198	1260	718	920
v/c Ratio:	0.36	0.50	0.10	0.18
Delay (seconds/veh):	6	8	6	6
Level of Service (LOS):	A	A	A	A
95th %ile Queue (veh):	1.6	2.9	0.3	0.6
Approach Delay:	6 Seconds/Vehicle	8 Seconds/Vehicle	6 Seconds/Vehicle	6 Seconds/Vehicle
Approach LOS:	A	A	A	A
Exit Lanes Required:	Minimum 1 Exit Lane	Minimum 1 Exit Lane	Minimum 1 Exit Lane	Minimum 1 Exit Lane

HCM 6th Edition Roundabout Analysis Overall Intersection Results

Average Control Delay is 7 seconds and LOS A. **All Approach Lanes have a v/c ratio under 0.85.**

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FINAL ENVIRONMENTAL ASSESSMENT

PI'ILANI SELF STORAGE WAREHOUSE

Appendix E
Comments in Response to Early Consultation

OMITTED, NON APPLICABLE

Appendix F

A CULTURAL IMPACT ASSESSMENT FOR PROPERTY LOCATED AT 525 PI'ILANI STREET WAIĀKEA AHUPUA'A, SOUTH HILO DISTRICT, ISLAND OF HAWAI'I

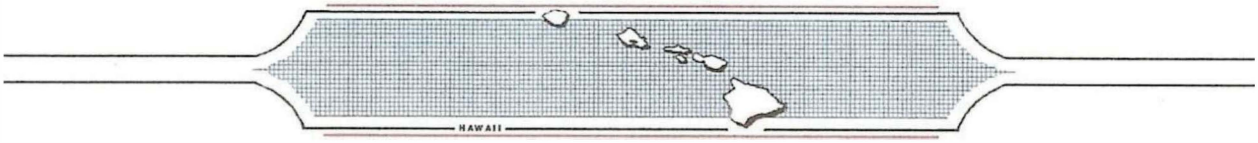
[TMK: (3) 2-2-033:011]

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SEPTEMBER 2023

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SCIENTIFIC CONSULTANT SERVICES Inc.



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INTRODUCTION

At the request of Talon Properties, LLC, Scientific Consultant Services, Inc. (SCS) conducted a Cultural Impact Assessment (CIA) for an undeveloped lot located at 525 Piʻilani Street [TMK: (3) 2-2-033:011], lands of Waiākea Ahupuaʻa, South Hilo District, Island of Hawaiʻi (Figures 1, 2, and 3). The project area is located 0.6 kilometers (km) south of Hilo Bay Front Beach Park. The project area is bounded to the east by a graded empty lot, to the south by Piʻilani Street, and by undeveloped land to the north and west. Parcel 011 is 2.5712 acres and is zoned industrial. The CIA was undertaken as part of a proposed plan to construct a storage warehouse building. The property is owned by Talon Properties, LLC.

The Constitution of the State of Hawaiʻi clearly states the duty of the State and its agencies is to preserve, protect, and prevent interference with the traditional and customary rights of native Hawaiians. Article XII, Section 7 requires the State to "protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by *ahupuaʻa* tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778" (2000). In spite of the establishment of the foreign concept of private ownership and western-style government, Kamehameha III (Kauikeaouli) preserved the people's traditional right to subsistence.

As a result, in 1850 the Hawaiian Government confirmed the traditional access rights to native Hawaiian *ahupuaʻa* tenants to gather specific natural resources for customary uses from undeveloped private property and waterways under the Hawaiʻi Revised Statutes (HRS) 7-1. In 1992, the State of Hawaiʻi Supreme Court, reaffirmed HRS 7-1 and expanded it to include, "native Hawaiian rights…may extend beyond the *ahupuaʻa* in which a native Hawaiian resides where such rights have been customarily and traditionally exercised in this manner" (Pele Defense Fund v. Paty, 73 Haw.578, 1992). Act 50, enacted by the Legislature of the State of Hawaii (2000) with House Bill 2895, relating to Environmental Impact Statements, proposes that:

> …there is a need to clarify that the preparation of environmental assessments or environmental impact statements should identify and address effects on Hawaiʻi's culture, and traditional and customary rights… [H.B. NO. 2895].

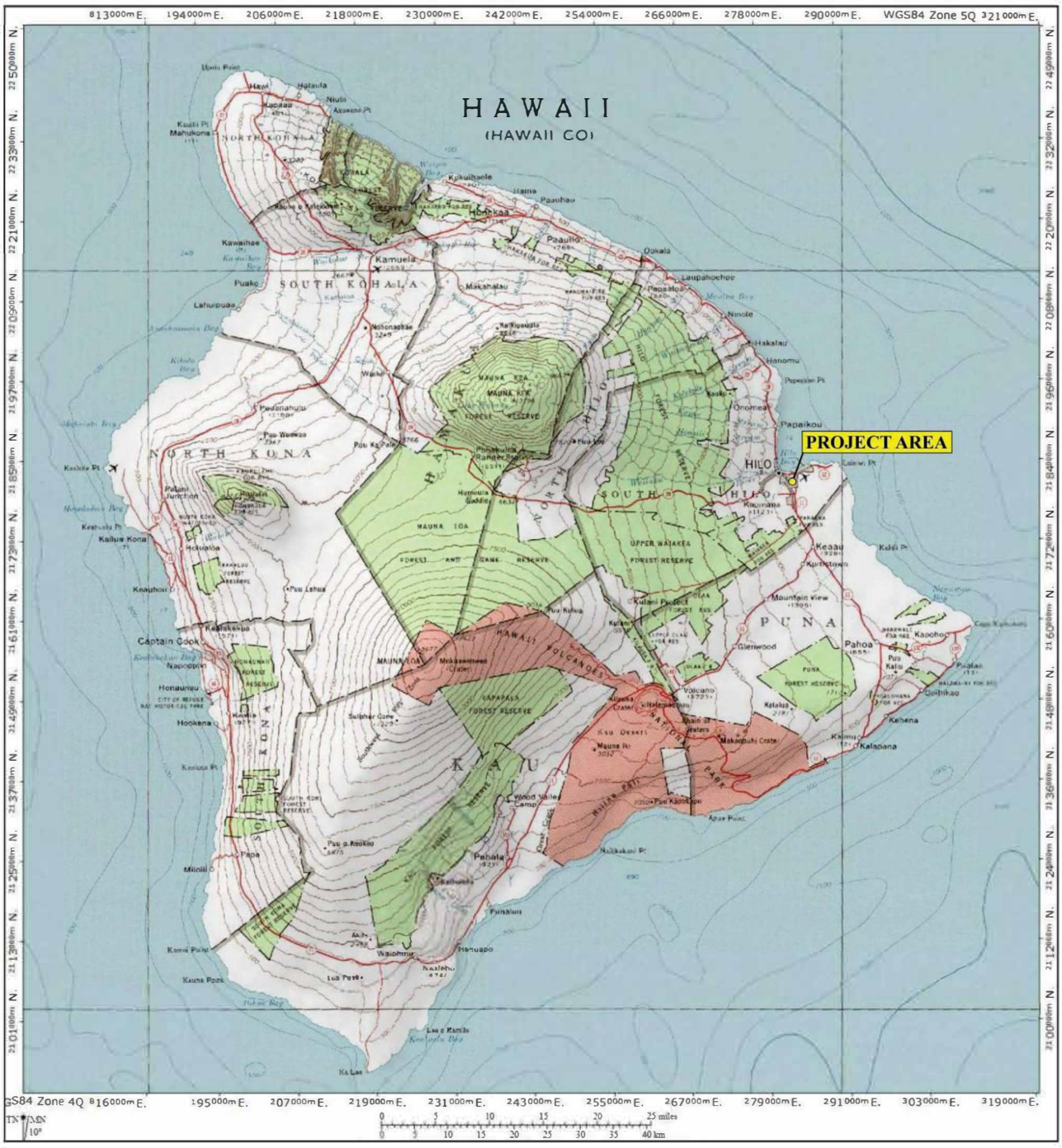


Figure 1: 5,500 K-Series Map of Hawai'i Showing Location of Project Area (National Geographic Topo!, 2003. Sources: National Geographic Society, USGS).

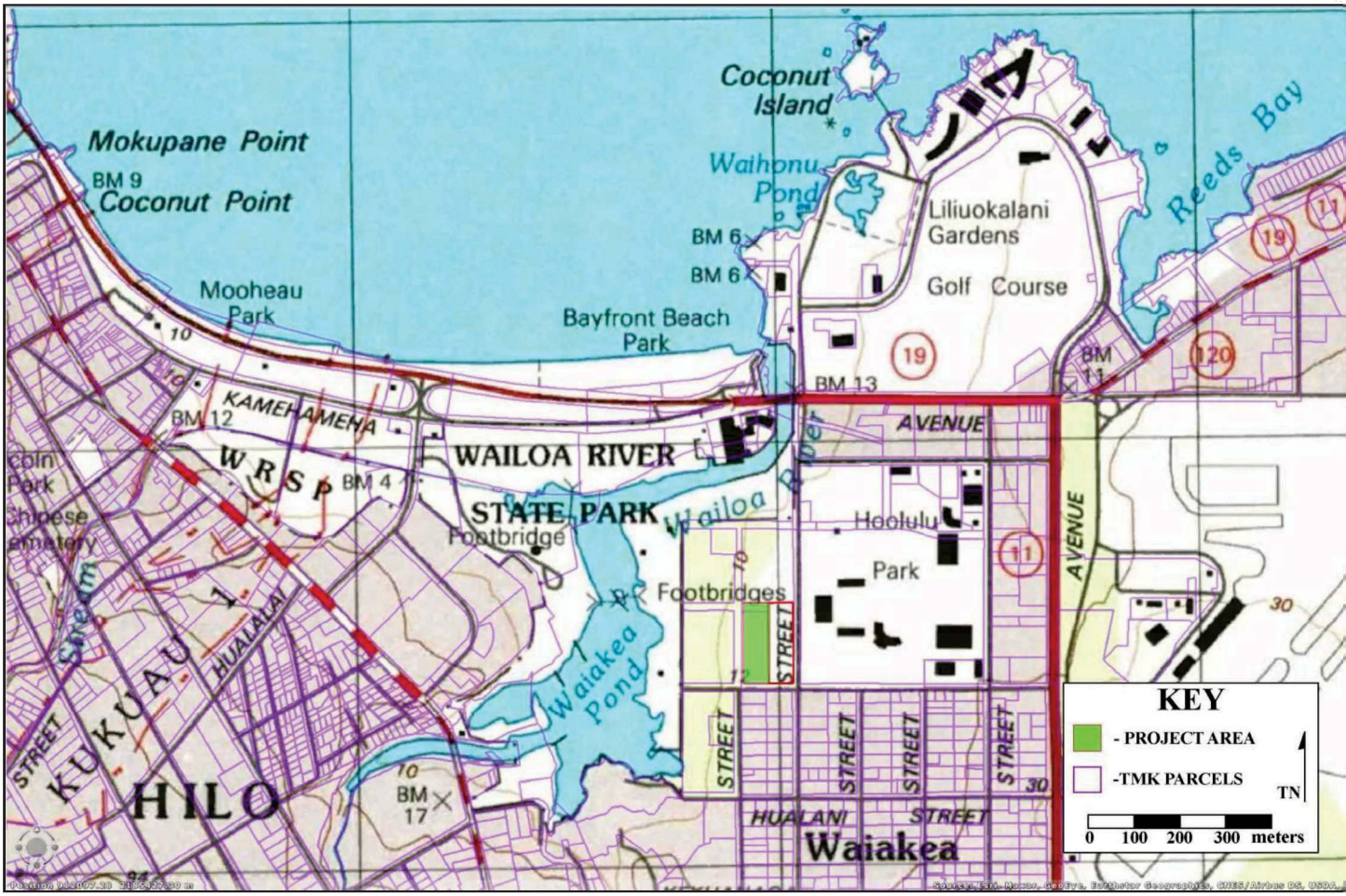


Figure 2: 7.5-Minute Series USGS Topographic Map Showing Location of Project Area (Hilo Quad, ESR Sources: National Geographic Society, USGS, County of Hawai'i Planning Department).

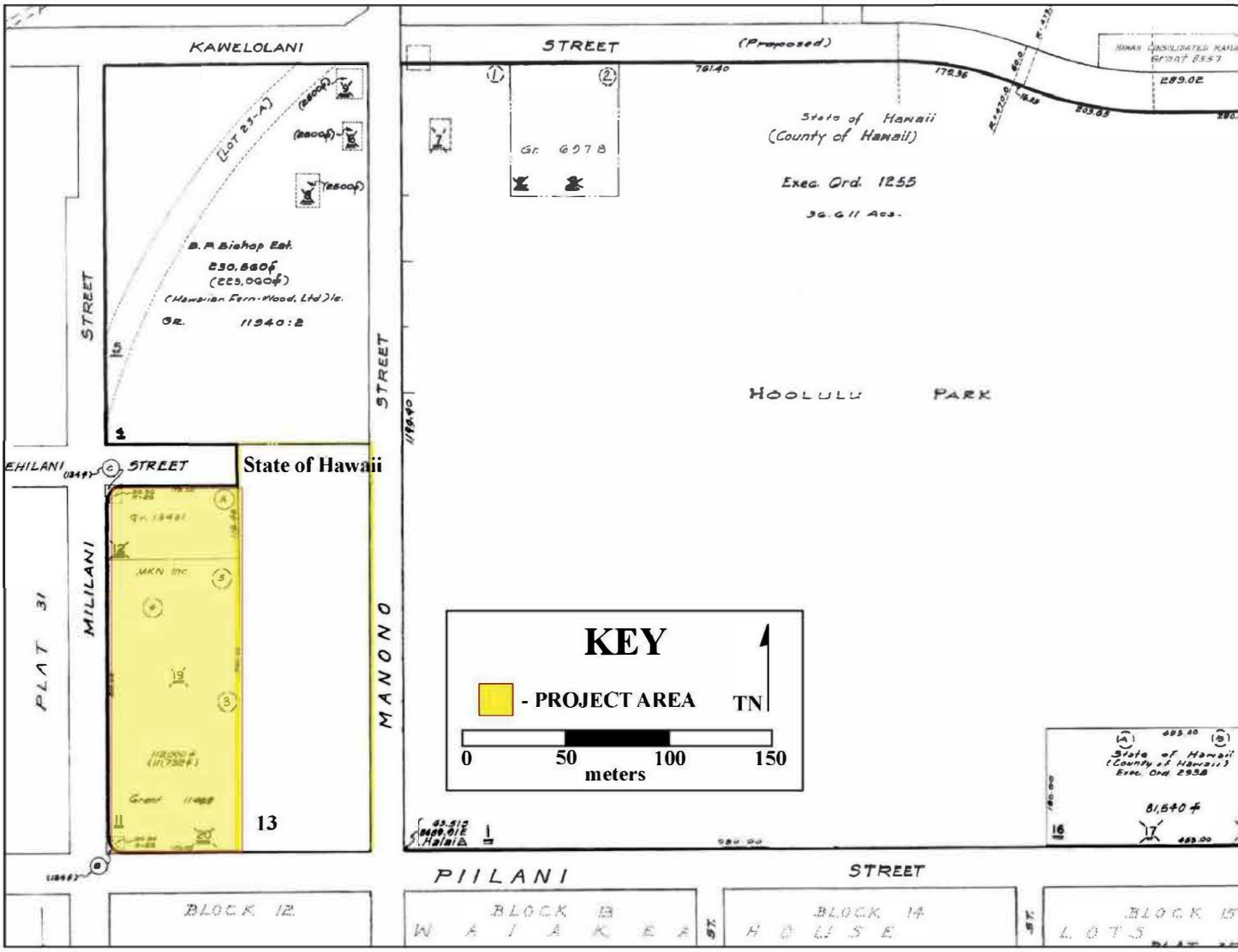


Figure 3: Portion of TMK: (3) 2-2-033 Map Showing Project Area Location (County of Hawai'i Planning


Wailoa River State Recreation Area
Kalanikoa St
Kalanikoa St
Kalanikoa St

Act 50 requires state agencies and other developers to assess the effects of proposed land use or shoreline developments on the "cultural practices of the community and State" as part of the HRS Chapter 343 environmental review process (2001).

Its purpose has broadened, "to promote and protect cultural beliefs, practices and resources of native Hawaiians [and] other ethnic groups, and it also amends the definition of 'significant effect' to be re-defined as "the sum of effects on the quality of the environment including actions that are…contrary to the State's environmental policies…or adversely affect the economic welfare, social welfare, or cultural practices of the community and State" (H.B. 2895, Act 50, 2000).

Thus, Act 50 requires an assessment of cultural practices to be included in the Environmental Assessments and the Environmental Impact Statements, and to be taken into consideration during the planning process. The concept of geographical expansion is recognized by using, as an example, "the broad geographical area, e.g. district or *ahupua'a*" (OEQC 1997). It was decided that the process should identify 'anthropological' cultural practices, rather than 'social' cultural practices. For example, *limu* (edible seaweed) gathering would be considered an anthropological cultural practice, while a modern-day marathon would be considered a social cultural practice. According to the Guidelines for Assessing Cultural Impacts established by the Hawaii State Office of Environmental Quality Control:

> The types of cultural practices and beliefs subject to assessment may include subsistence, commercial, residential, agricultural, access-related, recreational, and religious and spiritual customs. The types of cultural resources subject to assessment may include traditional cultural properties or other types of historic sites, both manmade and natural, which support such cultural beliefs (OEQC 1997).

This Cultural Impact Assessment involves evaluating the probability of impacts on identified cultural resources, including values, rights, beliefs, objects, records, properties, and stories occurring within the project area and its vicinity (H.B. 2895, Act 50, 2000).

METHODOLOGY

This Cultural Impact Assessment was prepared in accordance with the methodology and content protocol provided in the Guidelines for Assessing Cultural Impacts (OEQC 1997). In outlining the "Cultural Impact Assessment Methodology", the OEQC states: …information may be obtained through scoping, community meetings, ethnographic interviews and oral histories… (1997).

The report contains archival and documentary research, as well as communication with organizations having knowledge of the project area, its cultural resources, and its practices and beliefs. This Cultural Impact Assessment was prepared in accordance with the methodology and content protocol provided in the Guidelines for Assessing Cultural Impacts (OEQC 1997). The assessment concerning cultural impacts should address, but not be limited to, the following matters:

(1) a discussion of the methods applied and results of consultation with individuals and organizations identified by the preparer as being familiar with cultural practices and features associated with the project area, including any constraints of limitations with might have affected the quality of the information obtained;

(2) a description of methods adopted by the preparer to identify, locate, and select the persons interviewed, including a discussion of the level of effort undertaken;

(3) ethnographic and oral history interview procedures, including the circumstances under which the interviews were conducted, and any constraints or limitations which might have affected the quality of the information obtained;

(4) biographical information concerning the individuals and organizations consulted, their particular expertise, and their historical and genealogical relationship to the project area, as well as information concerning the persons submitting information or interviewed, their particular knowledge and cultural expertise, if any, and their historical and genealogical relationship to the project area;

(5) a discussion concerning historical and cultural source materials consulted, the institutions and repositories searched, and the level of effort undertaken, as well as the particular perspective of the authors, if appropriate, any opposing views, and any other relevant constraints, limitations or biases;

(6) a discussion concerning the cultural resources, practices and beliefs identified, and for the resources and practices, their location within the broad geographical area in which the proposed action is located, as well as their direct or indirect significance or connection to the project site;

(7) a discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project;

(8) an explanation of confidential information that has been withheld from public disclosure in the assessment;

(9) a discussion concerning any conflicting information in regard to identified cultural resources, practices and beliefs;

(10) an analysis of the potential effect of any proposed physical alteration on cultural resources, practices or beliefs; the potential of the proposed action to isolate cultural resources, practices or beliefs from their setting; and the potential of the proposed action to introduce elements which may alter the setting in which cultural practices take place, and;

(11) the inclusion of bibliography of references, and attached records of interviews, which were allowed to be disclosed.

Based on the inclusion of the above information, assessments of the potential effects on cultural resources in the project area and recommendations for mitigation of these effects can be proposed.

ARCHIVAL RESEARCH

Archival research focused on a historical documentary study involving both published and unpublished sources. These included legendary accounts of native and early foreign writers; early historical journals and narratives; historic maps and land records such as Land Commission Awards, Royal Patent Grants, and Boundary Commission records; historic accounts, and previous archaeological project reports.

INTERVIEW METHODOLOGY

Interviews are conducted in accordance with applicable state laws and guidelines. Individuals and/or groups who have knowledge of traditional practices and beliefs associated with a project area or who know of historical properties within a project area are sought for consultation. Individuals who have particular knowledge of traditions passed down from preceding generations and a personal familiarity with the project area are invited to share their relevant information. Often people are recommended for their expertise, and indeed, organizations, such as Hawaiian Civic Clubs, the Island Branch of Office of Hawaiian Affairs, historical societies, Island Trail

clubs, and Planning Commissions are depended upon for their recommendations of suitable informants. These groups are invited to contribute their input, and suggest further avenues of inquiry, as well as specific individuals to interview.

If knowledgeable individuals are identified, personal interviews are sometimes taped and then transcribed. These draft transcripts are returned to each of the participants for their review and comments. After corrections are made, each individual signs a release form, making the information available for this study. When telephone interviews occur, a summary of the information is often sent for correction and approval, or dictated by the informant and then incorporated into the document. Key topics discussed with the interviewees vary from project to project, but usually include: personal association to the *ahupua'a*, land use in the project's vicinity; knowledge of traditional trails, gathering areas, water sources, religious sites; place names and their meanings; stories that were handed down concerning special places or events in the vicinity of the project area; evidence of previous activities identified while in the project vicinity.

In this case, letters with maps and descriptions of the project area were sent to individuals and organizations whose jurisdiction includes knowledge of the area with an invitation for consultation. Consultation for Parcel 011 and adjoining Parcel 013 (Escott 2022) was sought from Kai Markell, the Director of Native Rights, Land and Culture, Office of Hawaiian Affairs (OHA); Kamakana Ferreira, OHA Lead Compliance Specialist; Shane Palacat Nelsen, OHA West Hawai'i Representative; Lauren Morawski, OHA Archaeologist; Jordan Kea Calpito, SHPD Burial Sites Specialist; Sean Naleimaile, State Historic Preservation Division (SHPD) Hawai'i Island Lead Archaeologist Nicole Mello, SHPD Hawai'i Island Archaeologist; and Joshua Gastilo, SHPD Hawai'i Island Archaeologist; Terri Napeahi, Waiākea Ahupua'a Crown Land Heirs member; Lakea Trask, Waiākea Ahupua'a Crown Land Heirs member; and Iokepa Kaolulokaeo, Waiākea Ahupua'a Crown Land Heirs member.

If cultural resources are identified based on the information received from these organizations and/or additional informants, an assessment of the potential effects on the identified cultural resources in the project area and recommendations for mitigation of these effects can be proposed. Public notices were placed in the September 2021 and September 2023 issue of the Office of Hawaiian Affairs (OHA) Ka Wai Ola Newspaper. Public notices were also published in the Honolulu Star-Advertiser, and the Hawai'i Tribune Herald on three separate days in September.

PROJECT AREA NATURAL ENVIRONMENT

The project area is partially landscaped undeveloped land situated along the coastline between 0 m (0 feet) to 3 m (10 feet) above mean sea level (amsl). The project area substrate is alluvial and colluvial sand (Wolfe and Morris 1996). Rainfall in the project area is high, ranging between 203 and 305 centimeters (80 and 120 inches) per year (Kelly et al. 1981). Natural drainage in the area runs from west to east. There are no seasonal gulches or drainage spillways in the immediate area.

HISTORICAL AND CULTURAL CONTEXTS

Many archaeologists believe that Hawai‘i Island was first settled around A.D. 1,000 by people sailing from the Marquesas (Athens et al. 2014; Dye 2011; Kahn et al. 2014; Kirch 2011; Kirch and McCoy 2007; Mulrooney et al. 2011; Rieth et al. 2011; Wilmhurst et al. 2011a and 2011b). An article published in the Journal of Archaeological Science reviewing radiocarbon dates recovered at archaeological sites on the Island of Hawai‘i suggests that, by relying on only carbon samples from short-lived plant remains, the most reliable dates point to initial Polynesian colonization of Hawai‘i Island occurring between A.D. 1220 and 1261 (Rieth et al. 2011:2747).

The recent studies that included Hawai‘i Island short-lived radiocarbon dating samples assess samples recovered exclusively from sites in North Kohala, South Kohala and Hāmākua (Rieth et al. 2011) or from South Point in Ka‘ū (Dye 1992; Kirch 2011). Many of the former region sites are rock shelters and the latter are sand dune sites. Sixteen radiocarbon samples from North Kohala, South Kohala and Hāmākua returned conventional radiocarbon ages from 400 to 781 years before present (Rieth et al. 2011:2745). The early date is consistent with ranges of A.D. 1040-1090 and A.D. 1120-1280 from Ka Lae in South Point, Ka‘ū discussed by Kirch (2011:20). All of the samples were recovered from sites in arid environments that have not been disturbed by modern development or human activity. There are no short-live tree species radiocarbon dates from Hilo where there has been a lot of development associated disturbance and where environmental conditions for radiocarbon sample preservation is less favorable.

Early settlers established settlements on the windward shores in likely places such as Waipi‘o, Waimanu, and Hilo Bay. People at these locations were able to sustain themselves through inshore and pelagic fishing, gathering shellfish from the shore and

strand, plant and animal husbandry, and the utilization of natural terrestrial flora and fauna (Kirch and Kelly 1975; Pearson et al. 1971; Kirch 1985). The pattern of this early settlement is thought to have consisted of widely spaced, permanent home bases that gradually expanded to form a nearly continuous zone of permanent settlement along the windward coasts as local populations grew.

PRE-CONTACT ACCOUNTS OF HILO

Hilo is likely one of the first two main settlement areas on the island (Kirch 1985), due to its calm and sizable bay, permanent supply of fresh water from the Wailuku River, and fertile and arable soils near the bay. Indeed, one of the early Polynesian travelers to Hawai‘i was named Hiro, or Hilo (Beckwith 1970; Henry 1995), and the attachment of his namesakes to this place supplies some circumstantial evidence to the early occupation here.

The coming of Pa‘ao to Hawai‘i is commemorated in a legend associated with Hilo. Pa‘ao is said to have made his first home in Hawai‘i on a rock at the mouth of the Wailuku River (Reed 1987; Westervelt 1977). The subsequent history retained through oral history over the centuries is anchored on the events, often romantic and violent, of the struggle for power. Pa‘ao affected the overthrown of the ancient lineages of power and supplanted them with the new Pili line by intrigues and warfare in Hilo (Westervelt 1977).

There is another story associated with Hilo that relates directly to the struggle between the old lineages of authority (Nanaula) versus the new ones represented by Pa‘ao and Pili. Kaupe‘epe‘e, from the older Nanaula line, resisted the authority of the newcomers (Kalākaua 1990:84). He traveled to Hilo and captured a chiefess from her home in Hilo Bay, and returned to Moloka‘i. A series of phenomenal battles transpired at his Moloka‘i fortress, leading eventually to the return of the chiefess to her home (Beckwith 1970:464-466; Fornander 1996: 32; Pukui et al. 1974:42). This set of legendary events emphasizes the place of power that Hilo had during this pivotal time in Hawaiian history.

The chronology of developments in Hilo is portrayed in the oral traditions that were written down in the 19th century regarding struggles for power. Chiefs from Hilo and Puna banded together to raid O‘ahu. They were slaughtered in Kipapa Gulch in ‘Ewa, where "the head of Hilo was cut off and carried in triumph to Honouliuli, and stuck

up at a place still called Poo-Hilo" (Fornander 1996:90). That did not deter Kulukulua, a subsequent Hilo chief, from successfully attacking O'ahu forces to retrieve a loved one (Elbert 1959:288-290).

One of the earliest account of Hilo appears in 'Umi-a-Liloa's (A.D. 1600–1620) conquest of the Island of Hawai'i, which established Hilo as a royal center by the sixteenth century. In the account, 'Umi-a-Liloa began his conquest of the Island of Hawai'i by defeating chief Kulukulu'ā, who lived in Waiākea, and the other chiefs of Hilo (Kamakau 1992:16–17). A lack of understanding with the Hilo chief Kulukulua was the purported reason for his attacking Hilo, but his subsequent actions, that of traveling around the island with his forces, indicates that 'Umi merely started his campaign of asserting his military authority over the entire island at the important seat of power of Hilo (Kamakau 1961:17).

'Umi-a-Liloa's second son, Keawe-nui-a-'Umi, ruled Hāmākua, Hilo, and Puna from his residence at Hilo (Kamakau 1992: 34). It was from Hilo that he waged war on the Kona chiefs and unified the island. Keawe-nui-a-'Umi's descendants single handedly continued rule for many generations from Hilo.

The chiefs of Hilo fought those from Kona for "several centuries" (Kamakau 1961:62). "It is said that the cause which started the war between the chiefs of Hilo and Kona was the cruel treatment of Kua'ana, chief of Hilo, by the chiefs of Kona. He was the son of 'I…" (Kamakau 1961:62). Sometimes the victory went to the chiefs of Kona, but more often to the chiefs of Hilo. Locations of these battles are not disclosed in the written histories.

After the death of Keawe-nui-a-'Umi the kingdom was divided into three parts and was established under warring chiefs; Hilo was ruled by Kumalae-nui-pu'awa-lau and his son Makua (Kamakau 1992: 45). It was during the period of time that Kamehameha I was born. Kalani'ōpu'u's grandson, Keoua Kuahu'ula and nephew Kamehameha vied for control over the six chiefdoms constituting the island kingdom and Keoua conquered Hilo chief Keawe-mau-hili and harvested the benefits for a short time only to be vanquished by Kamehameha I late in 1791.

Hilo played a prominent role in the long campaign of conquest of the islands by Kamehameha I. The first major battle campaign after the ascendance of Kamehameha I at Mokuʻōhai took place at Hilo, and is referred to as the Battle of the Bitter Rains.

Kamehameha I went by land from Kona to Hilo, and descended upon Keawemaʻuhili at Pūʻāinakō for three days of battle. Forces from Maui in support of Keawemaʻuhili joined in the battle, and armies fought over the uplands and shoreline of Hilo for three more days. "Kamehameha's forces were badly used in these battles. Ka-lani-malokulolu-i-ke-poʻo-ka-lani was almost killed at Halaʻi. The army was saved only by getting to the sea and going aboard Keʻe-au-moku's fleet" (Kamakau 1961:125).

Years later, Keawemaʻuhili became an ally of Kamehameha. While Kamehameha I was battling for control over Maui, Kamehameha's Hawaiʻi island nemesis, Keōuakūʻahuʻula, made a decisive move on Hilo.

When Keouakuahuula heard of the assistance in men and canoes which Keawemauhili of Hilo had furnished to Kamehameha on his expedition to Maui, he was greatly irritated, and considered it as a breach of the agreement between them to jointly oppose Kamehameha's pretensions to sovereignty. To punish, therefore, his former ally, Keoua invaded Hilo. A battle was fought at Alae in Hilo-paliku, in which Keawemauhili was killed, and Keoua added the district of Hilo to his own possessions of Puna and Kau [Fornander 1996:240].

After another series of later battles in Hāmākua between Kamehameha and Keōua, "Keoua retired to Hilo; Kamehameha went back to Waipiʻo and Kohala" (Kamakau 1961:151-152). Keōua "stayed at Piʻopiʻo for two days and on the third day he returned to Puna. From Puna he announced that he was the *mōʻi* of all of Hawaiʻi Kuauli…" (Desha 2000:271). It was immediately following this episode that a significant portion of Keōua's forces were destroyed by rock and ash spewing from the volcano Kilauea during their trek to Kaʻū.

Kamehameha I selected Hilo as his base of operations in preparation for launching an attack on Oʻahu and the western islands. Upon one trip to Hilo "(i)t is thought that there were as many as seven *mano* [twenty eight thousand] people who gathered at the shore at Kaipalaoa when the *aliʻi* landed in their regal garments" (Desha 2000:369). Kamehameha developed a rapport with Vancouver. During one of Vancouver's visits to Hilo "he sent Lieutenant Puget ashore with a red British flag on a

wooden staff to wave in the breezes of Hilo. By that flag, the island of Hawai‘i was to escape being troubled by other governmental powers" (Desha 2000:379).

Even after Kamehameha I was successful in subduing O‘ahu at the battle of Nu‘uanu, events in Hilo required his attention. A *kapu* chief from Maui named Namakeha‘ fomented rebellion in the eastern half of the island of Hawai‘i while Kamehameha was in O‘ahu. Kamehameha I returned to Hawaii to make war on Na-makeha‘ and his followers. The battle took place at Hilo. Na-makeha‘ was defeated, fled, and hid in the bush until he was captured. He was made a mock of by his enemies, and in January, 1797, with the consent of Kamehameha, he was offered in sacrifice to the gods in the heiau of Kaipalaoa in Pi‘ihonua, Hilo…This was the last of the battles fought by Kamehameha I to unite the islands [Kamakau 1961:174]. The last battle that Kamehameha I ever fought was in Hilo.

Hilo continued to be place of power after the death of Kamehameha I and after the breaking of the *kapu*. Kalākaua had a residence in Hilo, as did Governess Ruth Ke‘eilikolani (Zambucka 1992). Kamehameha III visited in 1829 and 1830 (Kelly et al. 1981). Governor Kuakini had a mill in Ponahawai. Several of the *ahupua‘a* fronting Hilo Bay were personal lands of Kamehameha I (Kelly et al. 1981:40).

Waiākea, which had been retained as a personal land by Kamehameha I … was at some later time held by the chiefess Ka-unu-o-hua, a granddaughter of Keawe-mau-hili … She surrendered it in the Māhele of 1848 and it became a Crown Land (Indices … 1929:26) (Kelly et al. 1981:40). Kamehameha’s son Liholiho was born in Hilo in November 1797 (Kamakau 1992:22). Waiākea was inherited by Liholiho after Kamehameha’s death. The *‘ili kūpono* of Pi‘opi‘o and its royal fishpond were given to his favorite wife, Ka‘ahumanu.

THE MAKA‘ĀINANANA

Rulers and would-be rulers would come and go, but the *maka‘āinana*, the common folk, lived on and farmed the land and fished for generations in the Hilo area. The houses and gardens in the Hilo Bay area were concentrated inland (south) of the shoreline, with perhaps 2,000 people living in 400 houses there in 1823 (Ellis 1917:253). The map of Hilo Bay drawn during the Byron expedition (1824-1825) provides a good depiction of settlement in the area (Figure 4). The Hilo Bay settlement was divided into

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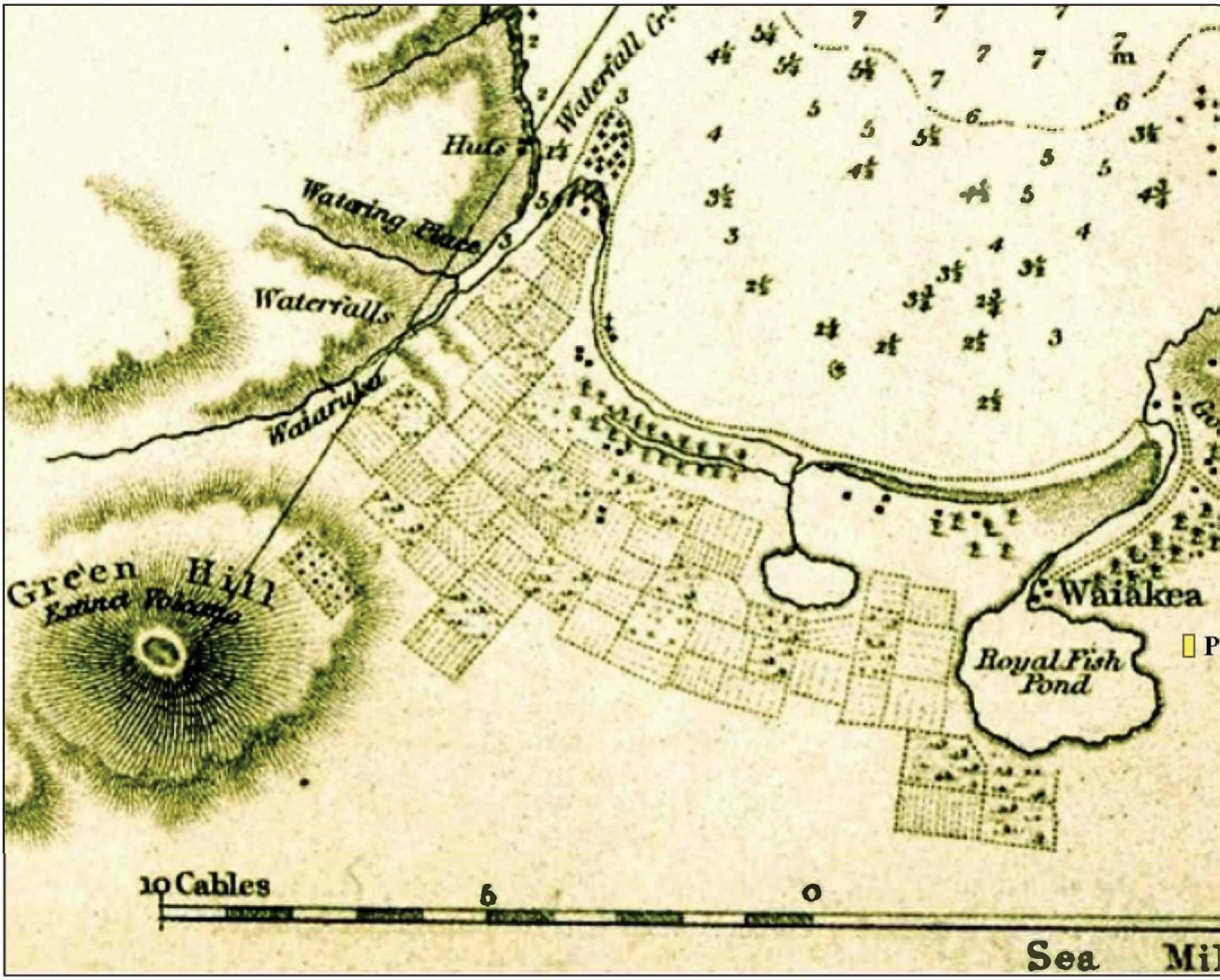


Figure 5: Portion of 1825 Map of Hilo Bay and Project Area Location (Malden 1825).

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five *ahupua'a* (administrative divisions under *konohiki* control) that included, from west to east, Pi'ihonua, Punahoa 1st, Punahoa 2nd, Ponahawai, Kūkūau, and Waiākea.

From a traditional Hawaiian cultural point of view, the *ahupua'a* can be understood as a most basic land-use unit. Families and individuals felt they were deeply connected to the *ahupua'a* that they lived within (Handy and Handy 1972:42). There was not so much a sense that people owned the land, but that people belonged to the land in which they lived and had a responsibility to nurture it. It was this deep connection to the land that informed each individual's right to collect the produce of their *ahupua'a*.

Each *ahupua'a* was administered by a *konohiki*, or lesser chief-landlord who was subject to an *ali'i 'ai ahupua'a*, or the chief who controlled the resources of an *ahupua'a* (Maly and Maly 2001:7). The *maka'āinana* tended the fields and collected the abundance of their *ahupua'a* for their own needs, as well as those of the *konohiki* and the *ali'i*. Those who lived in each *ahupua'a* had claim to the differing resources from all elevations of their *ahupua'a*. The timing of planting and harvesting, the timing and quotas for fishing, the religious rituals and ceremonies that promoted the abundance of natural resources, and the cultural mores that laid out how food was distributed to all members of Hawaiian society were regulated by traditional cultural and religious practices so that all members of each *ahupua'a* shared in the bounty of the *ahupua'a*.

The natural environment and resources within the *ahupua'a* were imbued with sacredness and were the focus of the traditional Hawaiian religious and social practices (Maly and Maly 2001:5). Many of the religious rituals, practices, and ceremonies were centered on maintaining the fertility and abundance of the natural resources. "The significance of rituals and ceremonial observances in cultivation and indeed in all aspects of life was of great importance to the well-being of the ancient Hawaiians, and cannot be over-emphasized, or overlooked when viewing traditional sites of the cultural landscape" (Maly and Maly 2001:6).

HILO BAY AREA HEIAU

There were several *heiau* that once existed in Hilo (Figure 6). The *heiau* were wholly or partially destroyed during the Historic era and their exact locations are no longer known. Several of the *heiau* were *luakini* class or *po'okanaka* class *heiau*

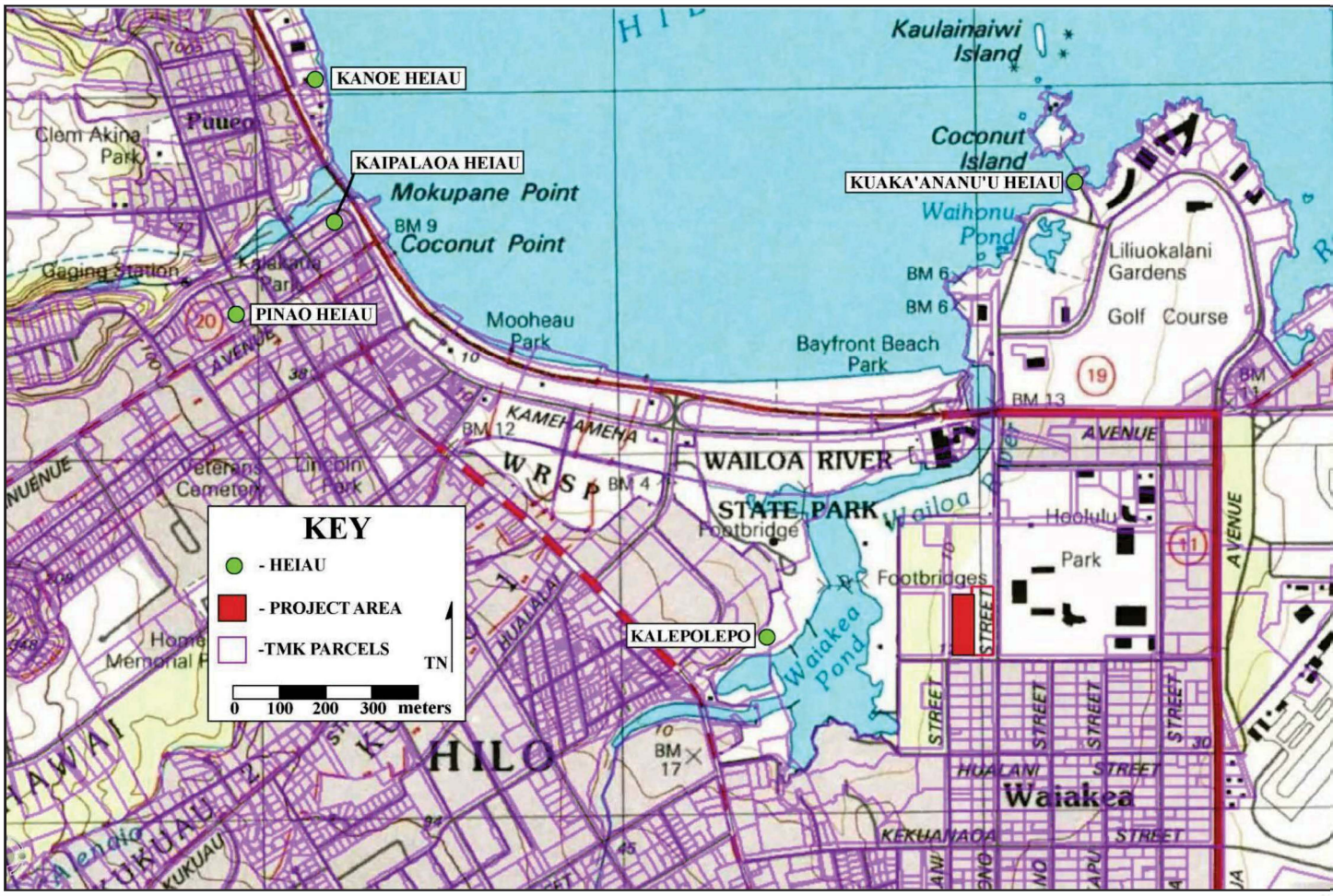


Figure 6: 7.5-Minute Series USGS Topographic Map Showing Location of Project Area and Former *Heia* 2013. Data Sources: National Geographic Society, USGS, County of Hawai'i Planning Department).

associated with human sacrifice. *Heiau* where human sacrifices were made required a second, separate nearby *heiau* associated with their sacred functioning.

One of the oldest *luakini heiau* in the Hilo Bay area, Kanoa (or Kanowa) Heiau, once existed on the sea cliff at the end of modern Kanoa Street. There are several pre-Contact era traditional *mo'olelo* associated with Kanoa Heiau. It was said to be the location where Umi's father-in-law threatened to have Umi sacrificed if he found that Umi had lied about the use of whale ivory for the making of a *lei niho paloa*. It was also said that Kalaniopuu dedicated Kanoa Heiau to his war god before attacking Imakaloa in Puna. Koanoa Heiau was dismantled in 1853 and its stones were used to build roads in 1898.

Kaipalaoa Heiau was a *luakini heiau* once located at Mokupane Point near the site of the old Armory Building between modern Waikuku Drive and Shipman Street. There are several pre-Contact era traditional *mo'olelo* associated with Kaipalaoa Heiau. It was said that Keoua sacrificed the body of his enemy Keawemauhili after defeating him in battle in 1791. The cutting ceremony of Liholiho's (King Kamehameha II) *piko* was said to have been conducted at Kaipalaoa Heiau. King Kamehameha's proclamation of Māmalahoa Law was also said to have made at Kaipalaoa Heiau.

Pinao Heiau was a *luakini heiau* located near the intersection of Wainuenue Street and Ululani Street. Two very large rectangular stones used to construct the heiau were called Piano and Naha and now sit within the front lawn of the Hilo Public Library on Wainuenue Street. It is said that Kamehameha I once lifted Naha stone, proving that he was the rightful ruler of Hawai'i.

Kūaka'ananu'u Heiau was a *luakini heiau* located on the point called Maka'oku at the northwest end of modern Kelipio Place, Queen Lili'uokalani Gardens. Kūaka'ananu'u Heiau was dedicated to Kū the war god. There was a *pu'uhonua* on Moku'ola (modern Cocnut Island) across from Kūaka'ananu'u Heiau. The *heiau* was two-tiered, pyramidal in shape with a ceremonial chamber in the center of the structure. Kūaka'ananu'u Heiau was dismantled in the 1860s by Captain Thomas Spencer. Spencer used the rocks to construct a wharf at 'Ōhele near the mouth of the Wailoa River.

A rectangular stone called Makaokuikalani was taken from the Kūaka'ananu'u Heiau ceremonial chamber, along with 22 other stones from the *heiau*. They were stored

for safe-keeping on the Napeahi *ʻohana kuleana* property across from the modern Wailoa River boat ramp. Several of the stones are now curated on the boat harbor property.

Kalepolepo Heiau was once located at Kalepolepo, west of Waiākea Fish Pond and just north of Mohoʻuli Fish Pond. It was said that Kapaieie Heiau was a place where area *kahuna* met to discuss important matters.

Kapaieie Heiau was a *heiau* located near Honokawailani in Waiākea Ahupuaʻa. It was said that many people were sacrificed there after battles between Hilo and Puna warriors.

Two agricultural *heiau*, Kiniakua Heiau and Kahinihiniʻula Heiau once existed near Waikapu Springs and within Punahoa Ahupuaʻa, respectively.

Papio Heaiu once existed in Piʻihonua Ahupuaʻa between Lauiole Falls and Keaniani Falls. Koa logs from the area nearby were carved into canoes used by King Kamehameha I during his conquest of Kauaʻi.

FISHPONDS FOR THE ALIʻI AND THE MAKAʻĀINANANA

Kikuchi (1973) recognized the variations and complexities of fishpond design, and devised a classificatory system that recognizes 7 variants of *loko kuapā*, 3 variants of *loko puʻuone*, 4 variants of *loko wai*, 1 *loko iʻa kalo*, 12 variants of *loko ʻumeʻiki*, 2 variants of *kaheka*, and 2 variants of *kahē paniwai* (Kikuchi 1973:227-232). Royal fishponds are situated east and north of the project area (Figure 7 and Figure 8).

Loko kuapā were controlled by the *aliʻi*, and built by the local inhabitants (Summers 1964). Mullet (*ʻamaʻama*) and milkfish (*awa*) were the most common fish kept in this type of pond, in part, because their food (microbenthos) grew best in brackish water. Other fish raised and kept in ponds are *awaʻaua, kaku, aholehole, ʻoʻopu, ʻopae* and *puhi* (Summers 1964; Titcomb 1952). Pond caretakers could eat these as they wished, but "those kinds reserved for the chiefs they would eat secretly" (Kamakau, cited in Summers 1964:11). Ponds were built at least as early as the 1400s (Summers 1964:12), and probably many were built earlier than that. One fishpond on the West Loch of Pearl Harbor has been securely dated with radiocarbon assay to circa 1000 AD (Wolforth et al. 1997).

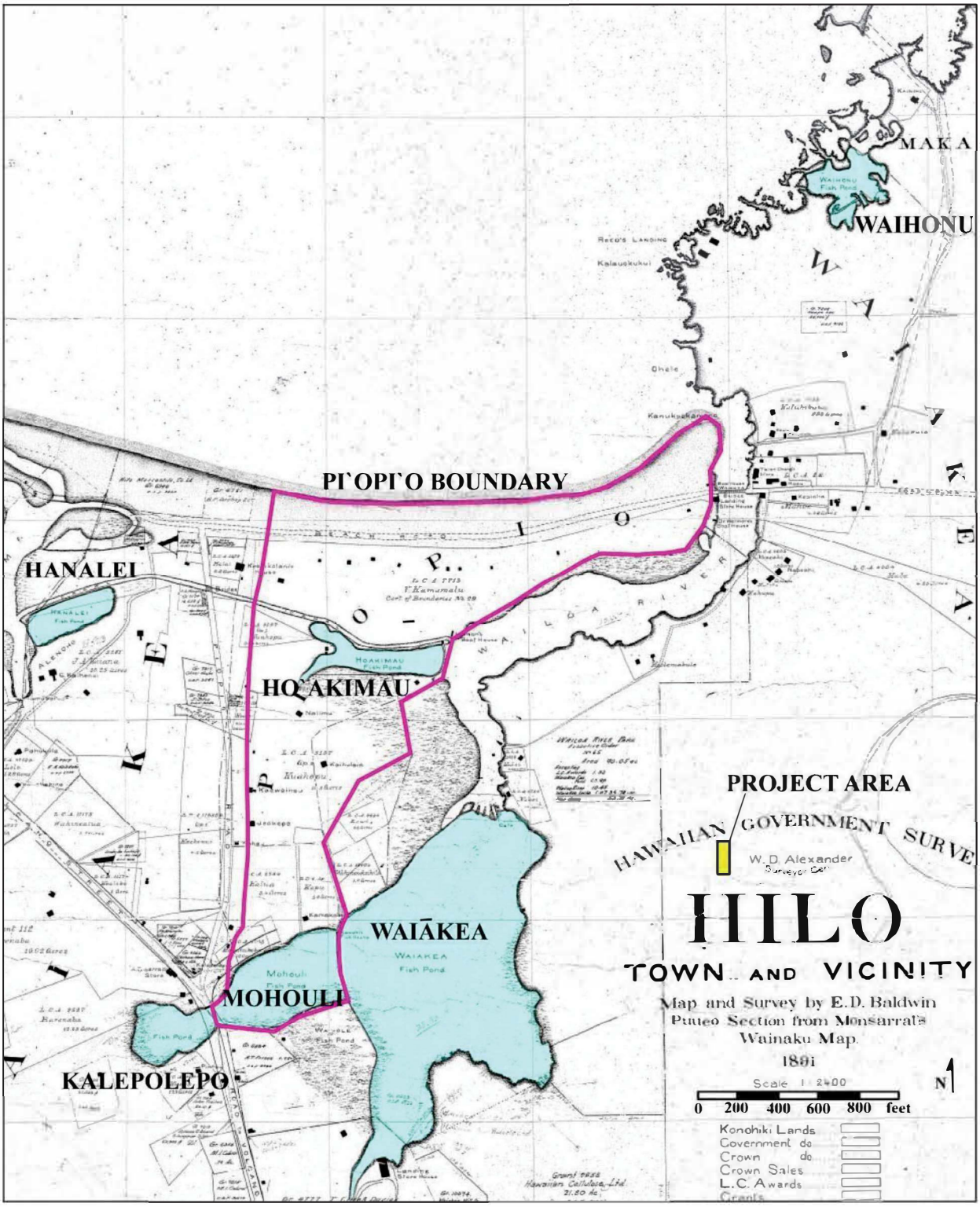


Figure 7: Portion of Hilo Town and Vicinity Map Showing Locations of Project Area, the *'Ili Kūpono* of Pi'opi'o, and Neighboring Fishponds (Baldwin 1891).

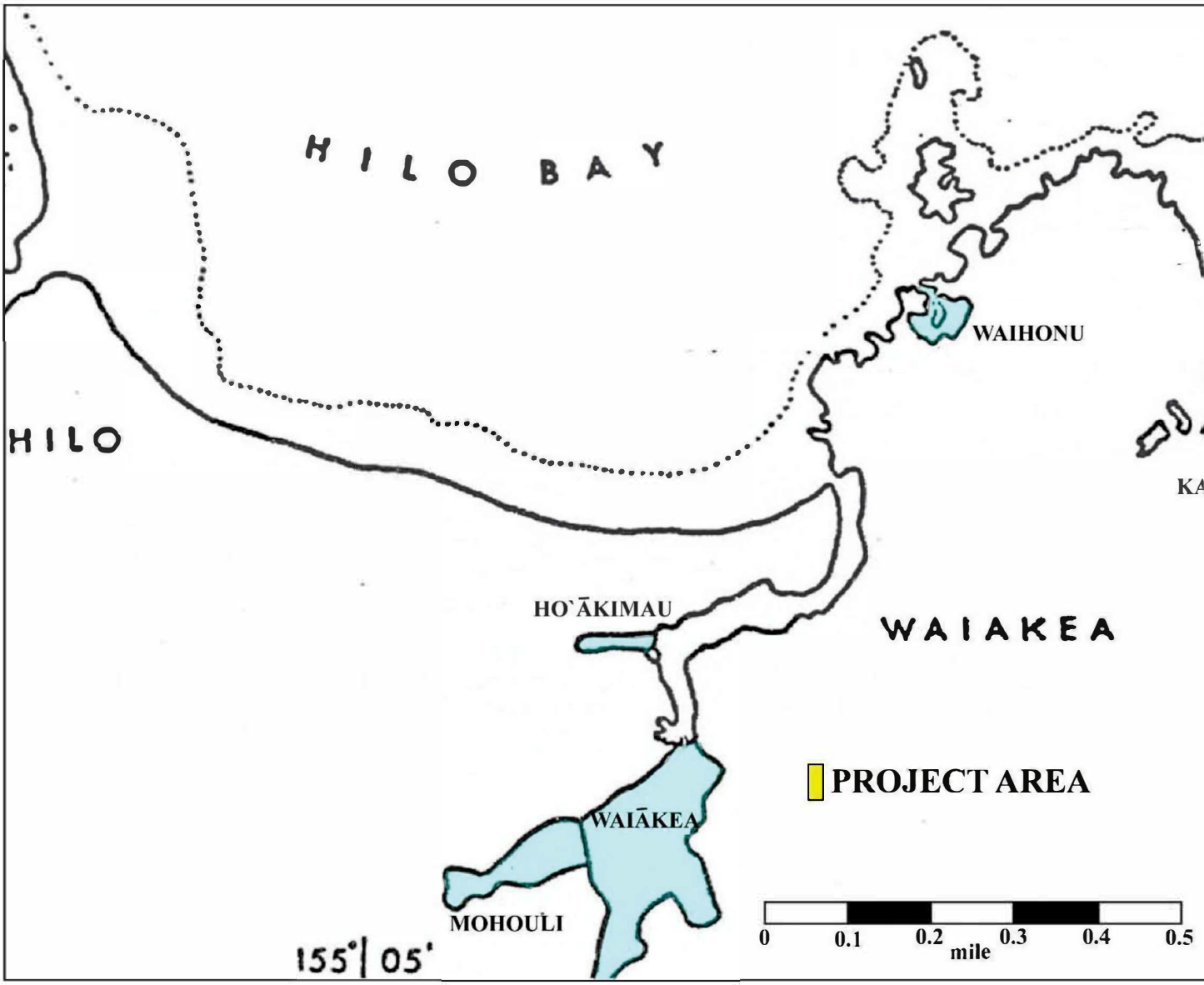


Figure 8: Fishponds Identified by Kikuchi (1973:33).

Royal fishponds were located in the western boundary of Waiākea (Kamakau 1961:152) with fish from these ponds being reserved for the *ali‘i*. These ponds were said to be favorites of Hi‘iaka and Pele. This was invoked as one possible explanation for the volcanic eruption that decimated Keōua's marching army across Kilauea. Keōua had apparently not treated the Waiolama ponds with their due respect as he was passing through after a battle against chief Kamehameha (Desha 2000).

In 1823 Ellis observed small huts alongside the Waiākea ponds for the pond caretakers. In addition, it "was custom to build small watch houses from which to guard the fish from being stolen at high tide, of from being killed by pigs and dogs; when the tides receded the fish would return to the middle of the pond out of reach of thieves" (Kamakau 1976:48).

In addition to the royal ponds, there were *pu‘uone* ponds that belonged to the commoners, and other non-royal inhabitants (Kamakau 1976:49). The *pu‘uone* ponds near the sea (*loko kai pu‘uone*) were much desired by farmers, and these ponds they stocked (*ho‘oholo*) with fish. *Pu‘uone* ponds were close to shore ponds, *loko kuapo*, or to the seashore, and next to the mouths (*nuku*) of streams. The farmer cleared away the *mokae* sedges, *‘aka‘akai* bulrushes, and the weeds, and deepened the pond, piling up the muck on the sides, until he had a clean pond. Then he stocked it with *awa* and fish fry, *pua i‘a* - two or three gourds full - until the pond was full of fish [Kamakau 1976:49].

There were at least two shore ponds within the bay area at Hilo, but no early information on them has been found. These ponds, Waihonu and Kanakea, were natural indentations of the shoreline and required little in the way of rock walls that characterize the typical shore ponds (Kamakau 1976:47-48: Summers 1964:2-12). Ponds such as these were called *loko i‘a*, and were used for storing excess fish rather than for fish culture (Summers 1964:I) [Kelly et al. 1981:15].

Kamakau refers to the shore ponds as *loko kuapa*. He uses *loko i‘a* as the generic term for all types of fishponds (Kamakau 1976:47-49). There are approximately 10 other fishponds to the east of Hilo along the Keaukaha shoreline (Kikuchi 1973: 34). One, the large pond named Lokowaka, is associated with the *mo‘o* Waka (Kikuchi 1973:262). "Waka, a *mo‘o*, dived into the pool to escape Pele who was jealous of Waka's interest in a man" (Pukui et al. 1974:134).

The project area is east of the royal fishponds associated with the *ʻili kūpono* of Piʻopiʻo, "a place of residence of chiefs from ancient times" (Desha 2000:76) (see Figure 7). There is one historical development that involves three generations of island *mōʻī* at Piʻopiʻo. While the young Kamehameha I was staying there in 1752 with the current *mōʻī* Alapaʻinui, Kalaniopuʻu attempted, and failed, to abduct Kamehameha. This precipitated an attack on the warriors of Kalaniopuʻu at Kalepolepo "by Alapai's men, who had followed Kalaniopuʻu from Hilo. First the warriors from the lowland gained, then those from the upland, until night fell and the battle was postponed until the next day" (Iʻi 1959:3). Later when Kalaniopuʻu became the island ruler, he had a house in Piʻopiʻo, and that is where he died (Fornander 1996:142, 201).

Piʻopiʻo was under *aliʻi* control for centuries prior to modern land ownership codes and regulations were implemented in Hawaiʻi during the Māhele in the middle 1800s. The land between the royal fishponds and the ocean (the project area) was given to Victoria Kamāmalu (Princess Kaʻahumanu IV) during the Māhele. Victoria Kamāmalu, then, was granddaughter of Kamehameha I. Her brothers by same parents (Kinaʻu and Kekuanaoʻa) were Alexander Liholiho (who became Kamehameha IV), and Lot (who became Kamehameha V).

EARLY HISTORIC ACCOUNTS OF HILO

Early accounts of settlements along the windward shores describe the area as divided into several distinct environmental regions (Ellis 1963: 291-292). At Hilo Bay, from the coast to a distance of five or six miles inland, scattered subsistence agriculture was evident, followed by a region of tall fern and bracken, flanked at higher elevations by a forest region between 10 and 20 miles wide, beyond which was an expanse of grass and lava (Ellis 1963:403). A map of Hilo Bay drawn by Malden in 1825 shows an area of agricultural fields inland of the bay (see Figure 4).

The American Missionary C.S. Stewart wrote in 1825, "the first four miles of the country is open and uneven, and beautifully sprinkled with clumps, groves, and single trees of the bread-fruit, pandanus, and candle tree" (Stewart 1970:361-363). The majority of inhabitants in 1825 lived within this coastal region.

Taro, plantains, bananas, coconuts, sweet potatoes, and breadfruit were grown individually or in small garden plots. Fish, pig, dog, and birds were also raised and captured for consumption. Wood, such as *ʻōhiʻa* and *koa* for house construction, canoe building, and fires was obtained from the upland agricultural zone (McEldowney 1979:18-19), and from the dense forests above (Ellis 1963:236).

THE MĀHELE OF 1848 AND LAND COMMISSION AWARDS

Article IV of the Board of Commissioners to Quiet Land Titles was passed in December 1845 and began the legal process of private land ownership. The Māhele (1848-1850) established a board of five commissioners to oversee land claims and to issue patents and leases for valid claims. Many scholars believe that Kauikeaouli (Kamehameha III) was forced to establish laws in order to protect Hawaiian sovereignty and crown lands from foreigners who had already begun claiming ownership of land they were granted permission to use for homes and business interests (Daws 1968:111; Kameʻeleihiwa 1992: 169-70, 176; Kelly 1983: 45; Kuykendall 1938(1): 145 footnote 47, 152, 165-6, 170). Among other things, the foreigners were demanding private ownership of land to secure their island investments (Kuykendall 1938(1): 138, 145, 178, 184, 202, 206, 271; Kameʻeleihiwa 1992: 178).

As legal statutes defining the Māhele continued to evolve (up to 1850), the lands of the kingdom of Hawaiʻi were divided among the king (crown lands), the *aliʻi* and *konohiki*, and the government. Once lands were thus divided and private ownership was instituted, the *maka`āinana* (commoners), if they had been made aware of the procedures, were able to claim the plots on which they had been cultivating and living as stipulated in the *Kuleana* Act (1849). These claims, however, could not include any previously cultivated or presently fallow land, *okipuʻu*, stream fisheries, or many other resources traditionally necessary for survival (Kameʻeleihiwa 1992:295; Kelly 1983:45-76; Kirch and Sahlins 1992 vol.1:3, 135-137, and vol. 2:2).

The right of claimants to land was based on the written testimony of at least two witnesses who could corroborate the claimant's long-standing occupation and use of the parcel(s) in question. The claimant was then awarded a patent for the property, subsequently called Land Commission Awards (LCAs) (Chinen 1961:16).

Prior to the Māhele, Waiākea Ahupua‘a belonged to King Kamehameha I, then Lihiliho, and was later held by the chiefess Ka-unu-o-hua, granddaughter of Keawe-mauhili (Kelly et al. 1981:40). Waiākea Ahupua‘a became Crown Lands during the Māhele of 1848 and was awarded to Victoria Kamāmalu (Princess Ka‘ahumanu IV), with the exception of *kuleana* awards made to others, and later became part of Bishop Estate lands. In the following years, at least twenty-five LCAs were awarded along the Wailoa River north and northwest of the current project area (Table 1 and Figure 9).

The largest LC award was LCA 7713, *Apana* 16 to Victoria Kamāmalu which was the *‘ili kūpono* of Pi‘opi‘o, with the exception of *kuleana* awards made to others, and totaled 44.15 acres. The remaining LCAs ranged in size from 0.80 to 13.40 acres and the average size was 5.25 acres. Many of the awards were for fenced/enclosed lands with houses, cultivated fields and small gardens.

For their part in aiding King Kamehameha, he gave John Young the *ahupua‘a* of Kūkūau 1 and he gave the *ahupua‘a* of Kūkūau 2 to Isaac Davis (Kelly et al. 1981:11). Twenty five small claims were awarded to native claimants in the coastal lands of both *ahupua‘a*.

The *ahupua‘a* of Ponahawai was given by King Kamehameha I to Keawe-a-Heulu, one of his trusted warriors (Kelly et al. 1981:40). At the start of the Māhele, Ponahawai was given up by Keawe-a-Heulu's nephew Kinimaka. The *ahupua‘a* became Crown Lands and then Government Lands during the Māhele. In the following years, 25 small Land Commission Awards (LCA) were awarded within the *ahupua‘a*.

Pi‘ihonua Ahupua‘a belong to King Kamehameha I prior to the Māhele. It was given to Ka-lae-oke-koi by Kamehameha III or Boki in 1828 (Kelly et al. 1981:40). Punahoa 2nd Ahupua‘a was given to the American Board of Commissioners for Foreign Missions (ABCFM) by Queen Ka‘ahumanu during the Māhele (Kelly et al. 1981:39). Numerous small LCAs were awarded in the coastal lands of both *ahupua‘a*. The project area parcels are not associated with any LCA.

The Hilo Bay area was the seat of government for Hawai‘i Island. Princess Ruth Ke‘elikōlani was the governor of Hawaii Island and had a house near the beach at Hilo Bay (See Figure 9, LCA 1279). She was a staunch defender of Hawaiian culture and Hilo.

Table 1: Inventory of Land Commission Awards Recorded in Waiākea Ahupua‘a.

LCA #	AWARDED TO	ACREAGE	‘APANA AWARDED	‘ILI	DESCRIPTION
1E	Mahoe	4.46	1	Keawe Kapu	cultivated
1F	Kapu	1.60	1		cultivated, partly fenced
1279	Halai	0.60	1	Kolea	fenced, garden
1333	Kololo	2.25	1	Alenoho	cultivated field
1738	Kahuhikaua	2.98	1	Kamakola	cultivated, 6 houses
2281	Kaiana	10.25	1	Alenoho	house lot
2327	Berenaba	12.25	1	Kalihi	enclosed, 5 houses
2402	Keoniho	5.00	1		2 gardens, hala grove
2603	Napeahi	1.30	1	Kiaola 1st	4 houses, ulu and kukui
2663	Kahue	3.75	1		
4004	Hale	4.25	1		4 gardens, 2 houses
4344	Kuaio	1.22	1	Kolea	
4737	Moealoha	1.03	1	Kalonoho	3 cultivated fields, 1 house
4737B	Wahine	1.01	1	Kalonoho	cultivated, 1 house
4785	Nakai	1.05	1	Kanahana	3 kalo lo‘i, 2 houses
5018	Keawe	0.24	1	Puahua	2 fields
5157	Kuahopu	13.14	2		8 gardens, 2 houses
7713	Kamāmalu	44.15	1	Pi‘opi‘o	
8803	Kamanohaka	1.02	1	Pi‘opi‘o	3 cultivated fields, houses
8854	Kalua	3.40	1	Pi‘opi‘o	partly fenced house lot, 5 fields
9982	Levi	0.80	1	Paiaahu 1st & 2nd	4 cultivated fields
10004	Lahoihilo	6.90	1	Paeaahu	3 cultivated fields, 1 house
11050B	Kaihenui	5.19	2	Kolea	3 fields, 5 houses, stone wall
11173	Wahinealua	2.50	1	Alenoho	
11174	Kealiko	1.00	1	Alenoho	

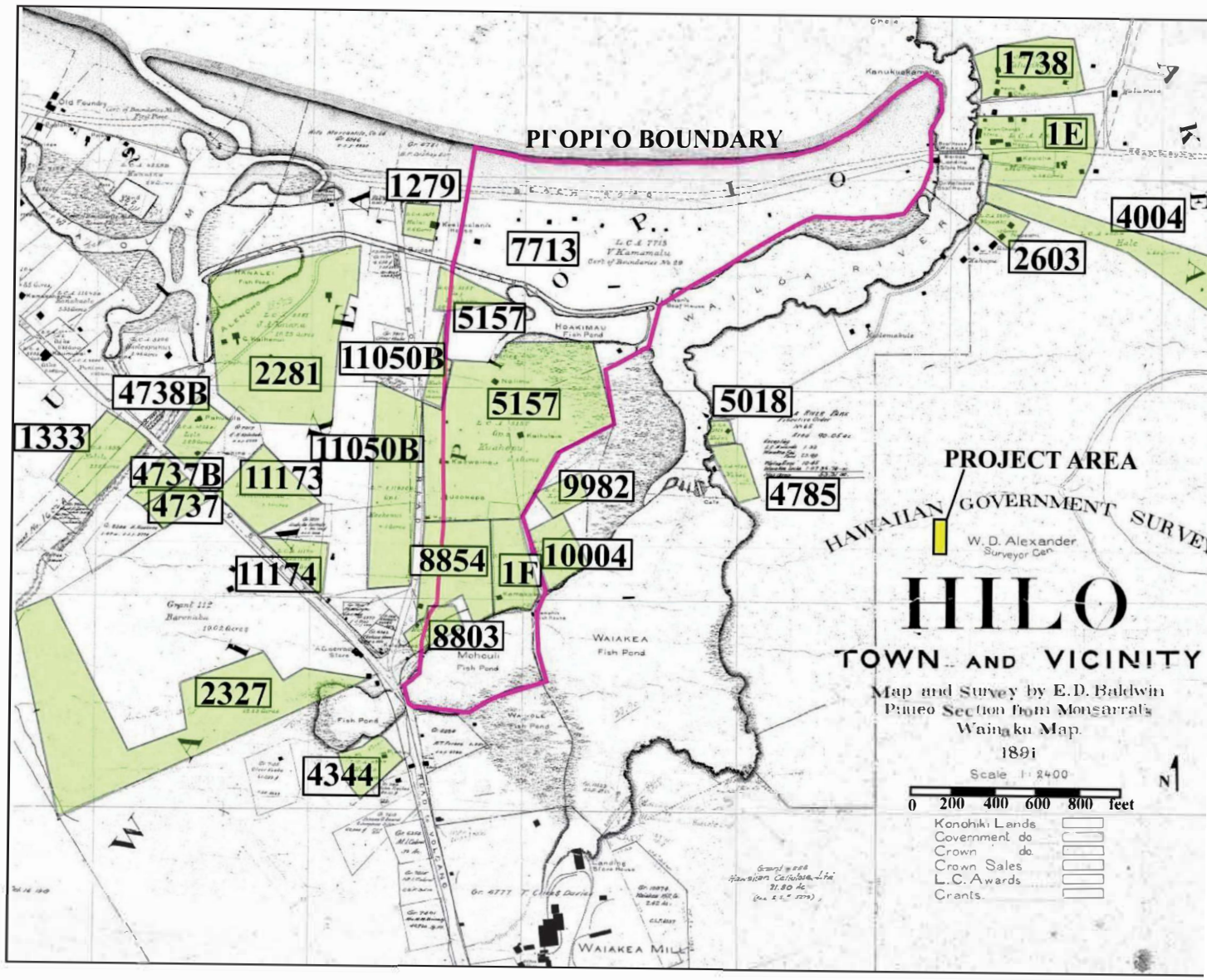


Figure 9: Portion of 1891 Hilo Property Title Map Showing Locations of Project Area and Land Commis Light Green (Baldwin 1891). LCA 2402 and 2663 are not Depicted on the Map Figure.

CHANGING RESIDENTIAL AND LAND-USE PATTERNS (1845-1865)

Between 1845 and 1865 traditional land-use and residential patterns underwent a gradual change. In particular, the regular use of Hilo Bay by foreign vessels, the whaling industry, the establishment of missions in the Hilo area, the introduction of the sandalwood trade, the legalization of private land ownership, the introduction of cattle ranching, and the introduction of sugar cane cultivation all brought about changes in settlement patterns and long-established land-use patterns (Kelly et al. 1981). Hilo became the center of population and settlements in outlying regions declined or disappeared.

The area of Hilo continued to develop as a commercial port throughout the twentieth century. Hilo Bay Front area became a store front venue, while the outlying regions were developed as industrial parks, shopping malls, and residential neighborhoods. The project area is in a dirt parking lot. There are no structures on the lot, though three large long commercial buildings once stood there (see below).

The historical events at Hilo have received significant attention and presentation elsewhere (Desha 2000; Kelly et al. 1981; George 1948; Leithead 1974). Those events and trends that do or may relate directly to the project area are synthesized below. A synthesis of research into relevant newspaper articles conducted by Kent Warshauer provides a chronology of historical events associated with the project area (Table 2).

Sandalwood was being shipped out of Hilo Bay in the first 20 years of the 19th century (Kelly et al. 1981:25). In April of 1822, the first missionary, Auna, a Tahitian, preached in Hilo. Many other missionaries soon followed. Whaling ships are documented as docking at Hilo by at least 1824. Whaling declined precipitously in the mid 1800s due to depredations by the U.S. Confederate fleet, increased use worldwide of kerosene, and increased cost of outfitting, among other things (George 1948:32). Whaling hobbled on in the islands, and the wreck of the Tamerlane in 1892 marks the end of commercial whaling in the area (Rogers 1999).

Due to economic, cultural and natural forces, the focus of habitation had fully shifted from the Wailoa River side of Hilo Bay to the Wailuku River side of the bay by 1885. "Hilo in 1885 was a small settlement with only a few hundred inhabitants. Waiākea had no frame buildings, just a few grass homes (after the tidal wave of 1877)" (Leithead 1974:59). Industrial and commercial concerns began to expand in the Wailoa River vicinity. Markets, landings, agriculture, and milling soon flourished along the Waiākea side of the bay (Kelly et al. 1981; Leithead 1974).

Table 2: Events Associated with the Project Area.

Date	Event	Warshauer Article
1986	200 foot rock groin built at Kanukuokamanu	2004:F2
1963	Mouth of Wailoa River configured to current way	2004:F2
1963	Mouth of Wailoa River dredged to 12 feet deep	2004:F2
1952	Mouth of Wailoa River dredged to 8 feet deep	2004:F2
1946	Tsunami April 1, destroyed Railroad (RR) bridge	2002c:23
1940	Seawalls built at mouth of Wailoa River	2004b:F2
1938	Fifth Wailoa Bridge built	2002a:18
1935	Current Hilo Iron Works current building built	2003:28
1923	RR swing bridge replaces temporary bridge there	2002c:23
1922	RR bridge damaged by tsunami	2002c:23
1922	Tsunami November 16	2002c:23
1918	Tsunami September 18	2002c:23
1916	RR wharf closed down due to conditions	2002d:35
1913	Hilo Iron Works starts up at current place	2003:28
1910	First Sampan	2004b:F2
1907	Suisan started	2004b:F2
1903	RR wharf open for business	2002d:35
1903	Fourth Wailoa Bridge built	2002a:18
1903	First RR rotating bridge built	2002c:21
1903	First seawall, Puna side	2004b:F2
1901	Jetty expanded into bay	2004b:F2
1897	First jetty built	2004b:F2
1892	Third Wailoa Bridge built	2002a:18
1885	First steam powered vessel	2004b:F2
1880	Second Wailoa Bridge built	2002a:17
1879	Waiākea Sugar Mill built	2004b:F2
1877	Tsunami destroys Spencer's wharf	2001:7
1877	Tsunami May 10	2001:7
1861	Spencer built his wharf in Waiākea	2001:7
1859	First Wailoa Bridge built	2002a:17

By 1901 sugar dominated the island's industry, and Hilo was the epicenter of production and export. Railroads connected sugar factors along the Hāmākua and Puna coasts to the mills and wharves at Hilo. An important spur of the railroad line connected the switch yard to the wharf. The first pier at Kūhiō Wharf was built between 1912 and 1916 (Kelly et al. 1981:194). A second was added in 1923.

The railroad began operation in the Hilo area in 1899, and was abandoned in 1946 (Kelly et al. 1981). The first railroad to wharf connection was at the mouth of the Wailoa River. Railroad and sugar expansion coincided with one another, although not always productively (Kelly et al. 1981:154). The tsunami of 1946 struck Hilo Bay just as one train was passing through the project area.

The Alenaio canal was created to facilitate the filling of the lowlands near the ocean that had once been fishponds and taro fields just to the west and beyond the project area. It was upgraded with stone walls in 1917 (Kelly et al. 1981:220). Black sand from the beach was pumped up into the Waiolama swamps to fill them (Kelly et al. 1981:223). Removing beach sand to Waiolama swamp partially undermined the railroad. When the sand dredging started for the nearby Ponahawai taro and pond filling, the railroad company complained, and the dredging stopped (Kelly et al. 1981:224). Dredging started up again in 1922, and 31,763 cubic yards of black sand was then taken from the shoreline and placed in the Ponahawai drainage (Kelly et al. 1981:225). "Altogether, between the years 1917 to 1923, a total or roughly 250,000 cubic yards of fine black-lava sand from the beach at Hilo Bay was pumped…" into the interior wetlands (Kelly et al. 1981:225).

Banyan Drive was built in the early 1930's, and soon thereafter banyan trees were planted in regular intervals on both sides of the drive (Warshauer 2003b, 2004). The first banyan tree was planted in 1933 (Warshauer 2003b) The last tree was planted in 1972 by Mrs. Richard Nixon to replace one that was planted previously in 1952, but that had been destroyed by "seismic sea wave" in 1952 (Warshauer 2004:D3). Some trees that have been destroyed have not been replanted.

During the Environmental Impact Statement process for the development of Reed's Bay small craft harbor, it was determined that there were "no Historic Resources in Reed's Bay" (USCOE 1983:19). The only historic resource in the entire larger bay study area that was eligible for listing on the National Register of Historic Places was the Hilo Breakwater (USCOE 1983:19).

WHARVES AND SHIPWRECKS

Before and after wharves were built, local folks launched and left their canoes all along the Hilo Bay shoreline (Kelly et al. 1981:263). The Pi'opi'o side of the bay (within the project area) was used by *ali'i* as they came and went from the royal center at Hilo. For instance, on his way to Hilo during the trip where he moved the famous Naha Stone, "Kamehameha's numerous

double canoes landed at Kanukuakamanu which was the mouth of the stream, Nāihe and Kalanimāloku, young men with the status of high chiefs went ashore in advance of Kamehameha to the house of Chiefess Ululani… (Desha 2000:76).

The first "wharf" in Hilo Bay was built sometime around the middle 1800s (Kelly et al. 1981:93), and was known as Reed's Landing, situated just north beyond the eastern project boundary (Figure 10). This wharf was run and financed by local businessman W. H. Reed.

A second wharf was built in 1861 just to the south, and was known as Spencer's Landing. Local merchant and plantation owner, Captain Thomas Spencer, created a stone pier, stone house, and bridge across Wailoa Stream. The wharf and bridge were destroyed in the 1877 tsunami (Kelly et al. 1981:97), and consequently, the wharf is not included on any maps. The wharf appears to have been situated within the east portion of the current project area.

A wharf for small boats was built at Isbell Point circa 1863 (Kelly et al. 1981:97). The wharf was upgraded with iron pilings in 1863, and was used frequently after that. This wharf was closest to the industrial and residential center of Hilo, and was preferred for such uses. Ship to shore transport would be diverted to the wharves at the Waiākea side of the bay during rough seas, because the waters were calmer over there.

With the growth in industry and population in the latter half of the 1800s, the Minister of the Interior of the Provisional Government focused attention on the Waiākea side of the bay for the development of a new wharf (Kelly et al. 1981:104).

While the Isbell Point wharf continued to be used in the 1890s, the government began building a "boat landing" just south of Kalauiiokukui in 1897 (Kelly et al. 1981:105). "Difficulties in obtaining a lease for this location, delayed the start of construction until October 1897, when a lease agreement was reached" (Kelly et al. 1981:105). It is likely this government action that accounts for the "Exec Order" label on the current TMK maps. This boat landing had a wooden shed extending into the bay on iron piles with its back resting on a concrete wall. A road was built to the boat landing. But this boat landing turned out to be inadequate, and was then leased to Hackfeld & Co. for use as warehouse and landing (Kelly et al. 1981:107). The "boat landing" is identified as being immediately adjacent and to the south of Kalauiiokukui point on a U.S. Engineer Office map dated July 16, 1920 (in Kelly et al. 1981:201, Figure 84).

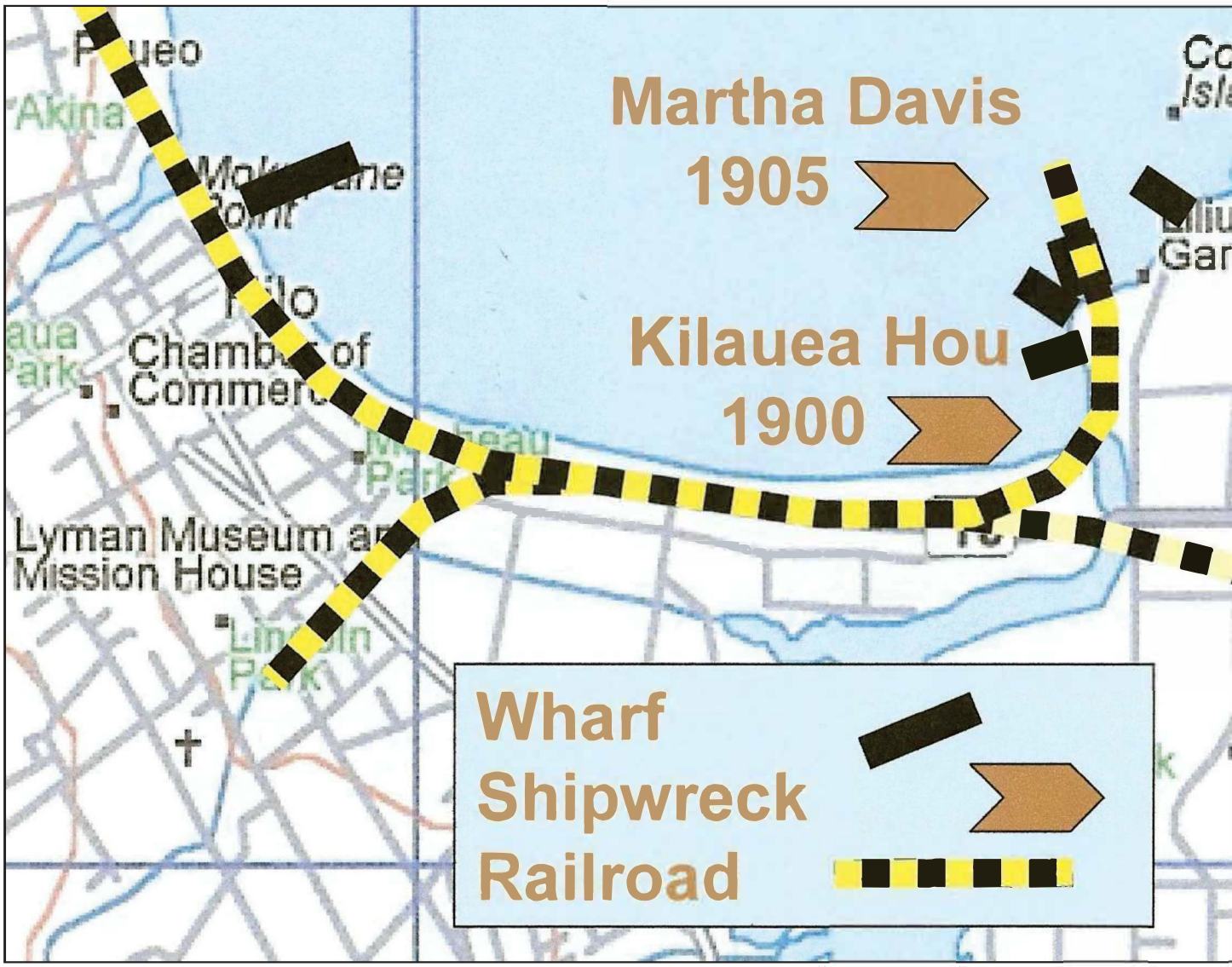


Figure 10: Map of Hilo Bay Area Showing Locations of Shipwrecks, Wharves, and Railroad Tracks.

The government initiated construction in 1897 of a larger wharf just north of Reed's Landing known as the Government Ship Wharf (Kelly et al. 1981:107). Soon thereafter plans were made to increase the size of the wharf (Kelly et al. 1981:178), but efforts quickly changed to construction of the "railroad wharf" just to the south (over old Reed's Landing). The railroad wharf was completed in 1893, and after that this "new railroad wharf accommodated all vessels coming into Hilo Harbor" (Kelly et al. 1981:178). During this period larger steam vessels with deeper drafts were rapidly replacing sailing ships. Many large steam ships could not be accommodated by the railroad wharf.

By 1909 the only workable wharves were the railroad wharf and the territorial wharf [the Government Wharf], which was in "a condition of decay and beyond repair" (Kelly et al. 1981:184). And by this time the breakwater at Hilo Bay was under construction. The old government wharf was finally removed in February, 1912 (Kelly et al. 1981:185). Simultaneously, a considerable effort was expended to building a new wharf that would eventually become known as Kūhiō Wharf. By 1916 Kuhio Wharf was busy to capacity.

A detailed map of the proposed developments at Kūhiō Wharf in 1926 indicates that the railroad landing near Ohele had been abandoned by that time (Figure 84 in Kelly et al. 1981:201). Based on available maps, the railroad landing was abandoned sometime between 1907 and 1921.

Sampans were a major water going vessel after their inauguration in 1910 (Warshauer 2004b). They were docked along the east boundary of the project area and beyond to the south along the Wailoa River. They were repaired, however, by bringing them out of the water along a short "rail line" just to the north of the project area (H. Yada interview). The sampan was hauled out of the water along this rail line using pulleys and winches, and repaired on the land just north of the eastern side of the project area.

Only one of the wharves at Hilo Bay was directly within the project area: Spencer's Landing. The precise location is for this landing is not provided on any maps, due to its early demise. There were various constructions at the landing: stone house, stone pier, bridge elements. A rather unique aspect of the stone structures there is that "the stone used for construction of Spencer's Landing were gathered from the Mokuola (Coconut Island) *heiau*" (Ecklund 1940, in Kelly et al. 1981:97). Stones presumed to have been taken from the *heiau* to build the tsunami-destroyed landing were photographed by Theo. Kelsey circa 1920 (see Kelly et al. 1981:98, Figure 32).

There were two shipwrecks along the coast north of the project area (Rogers 1999:115-116). The Martha Davis (Figure 11) caught fire in 1905 just offshore from Reed's Landing, just beyond the project area. The S.S. Kilauea Hou was forced onto the beach at Kanukuokamanu in 1900 (Figure 12). The 119 foot long vessel was left to rot there, and "In April of 1904, an attempt was made by R.T. guard, by means of a winch and giant powder, to loosen the boilers of the wrecked *Kilauea Hou*, which had been lying in the sand on the beach for three years" (Rogers 1999:115).

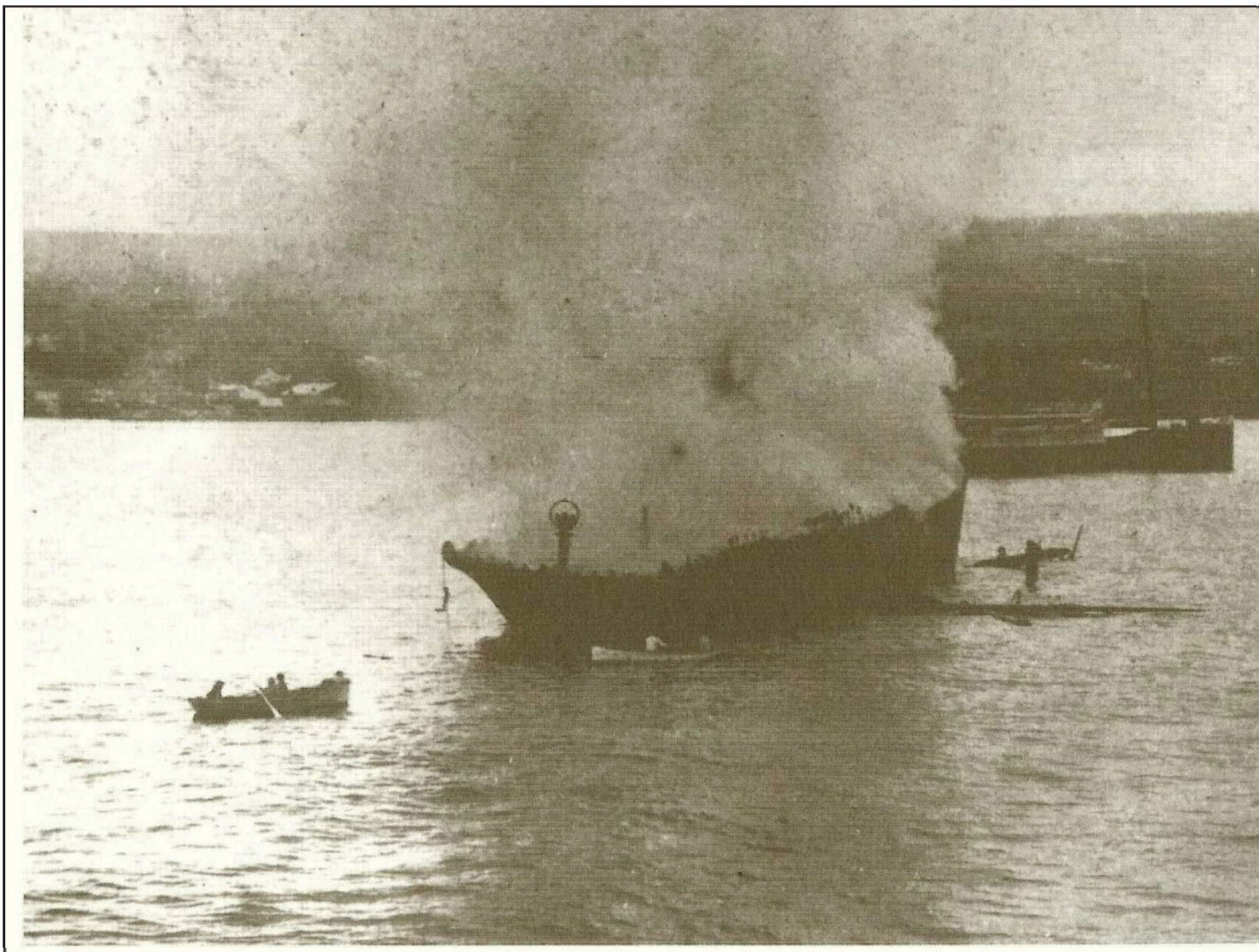
BUILDINGS

Hilo Iron Works building and railroad spur was built and began operations in 1913 (Warshauer 2003:28). Two acres of "swamp land" was sucked up from the Wailoa River into molds to pour concrete as foundations for expanding the Iron Works in 1919. The building that still stands today was built in 1935. The foundry at the Iron Works closed in 1958. Other fabrication continued there until finally closing completely in 1983.

Many buildings once existed just to the north of the project area. Residences and small businesses associated with the Japanese American enclave here situated along Kamehameha Avenue during much of the area in the first half of the 20th century (Figure 13). Those were destroyed in the tsunami of 1946. Subsequent to the 1946 tsunami, industrial buildings were erected in this area (Figure 14). Those buildings were destroyed in the 1960 tsunami (Figure 15).

Some of the area west of the project area was not built on during the "Shinmachi Era", or the subsequent "Industrial Era" of use here. The park-like setting of some of the eastern edge of the shoreline seems to have been maintained throughout these developments. However, much of that area was modified during the raising of the land for the railroad, and paving for the various roads and bridges that were built and destroyed there.

The project area (Parcel 011) is depicted on the 1932 TKM (3) 2-2-033 map as portions of former (canceled) Parcels 012, 019 and 020 (see Figure 3). The northern portion (Parcel 12) was Land Grant 13431 made to Hilo Electric Light Company, Ltd (Figure 16). The south and middle portions of Parcel 011 was Land Grant 11489 made to Ruddle Sales and Services Company, Ltd (Fukuya and Yonamine 1954). Parcel 013 was surveyed and recorded in 1953 (C.S.F 11633) and is labeled CSF 11633 on the Wailoa Park River Park map of 1954 (Fukuya and Yonamine 1954) and "Government Land" on the Wailoa Park River Park map of 1978 (Sakamoto and Kurosaki 1978). Aerial photographs of the project area taken in the 1950s and



The Martha Davis *Afire.* COURTESY HAWAII MARITIME CENTER

Figure 11: Photograph of the Martha Davis Burning Near Reed's Landing (adapted from Rogers 1999:11



The Wreck of the Kilauea Hou. COURTESY LYMAN HOUSE MUSEUM ARCHIVES

Figure 12: Photograph of the S.S. Kilauea Hou at Kanukuokamanu (adapted from Rogers 1999).

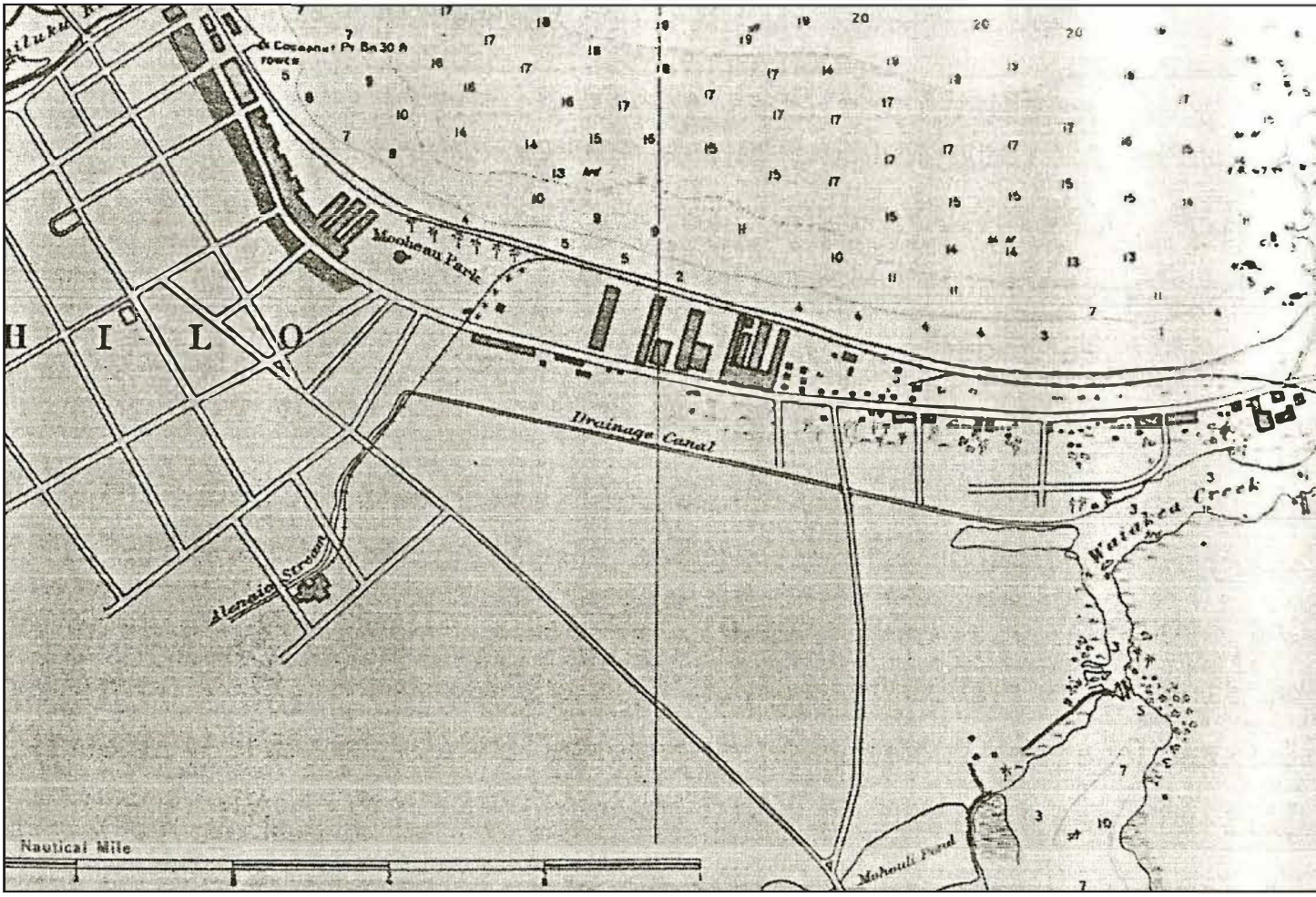


Figure 13: 1932 Map of Hilo Bay Showing Industrial Buildings Along Coast and Project Area Outlined R



Figure 14: Aerial Photograph of Hilo Bay and Project Area Outlined Yellow, Taken in 1954 (USGS No. 1441).

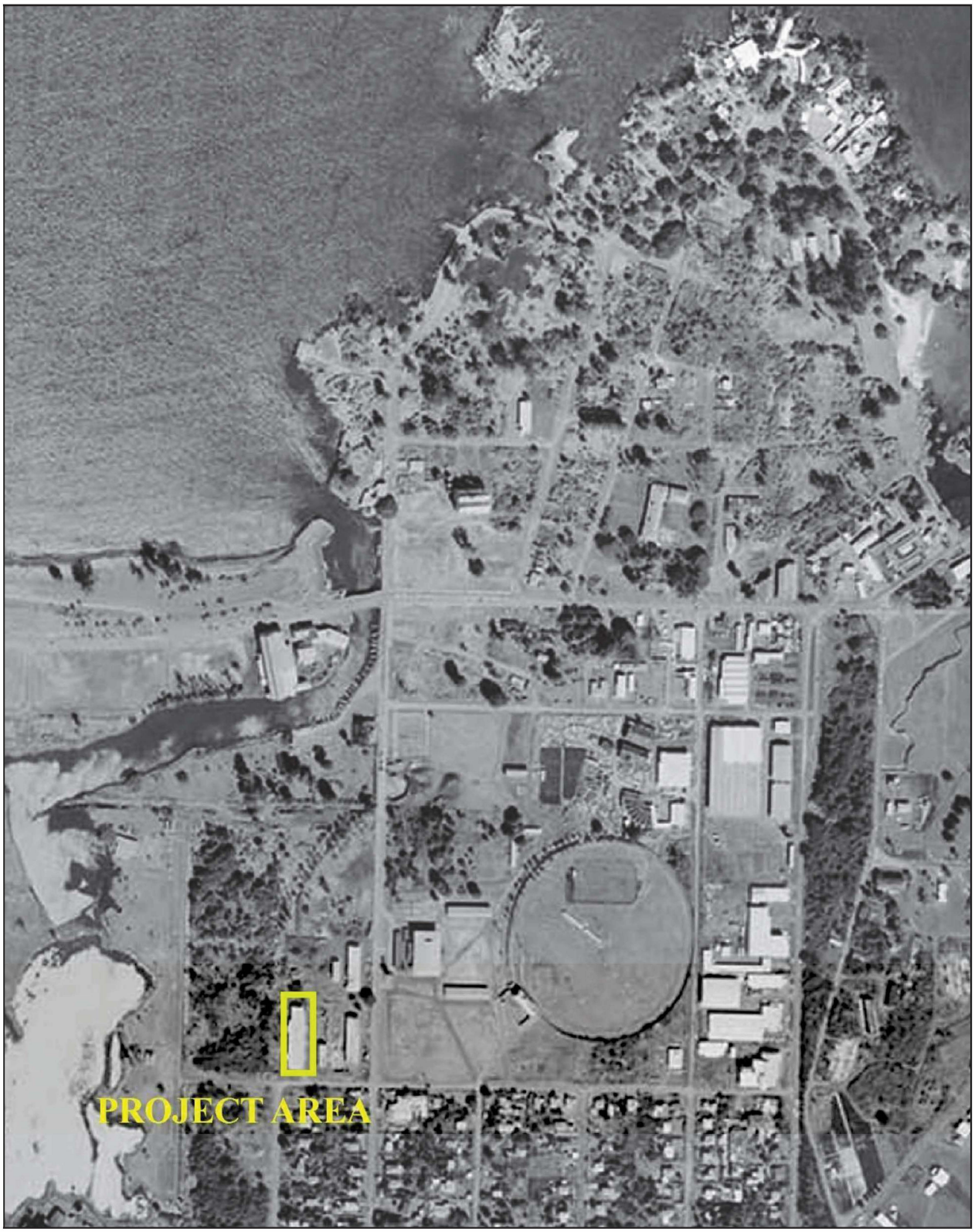


Figure 15: Aerial Photograph of Hilo Bay and Project Area Outlined Yellow, Taken in 1965 (USGS. No.5503).

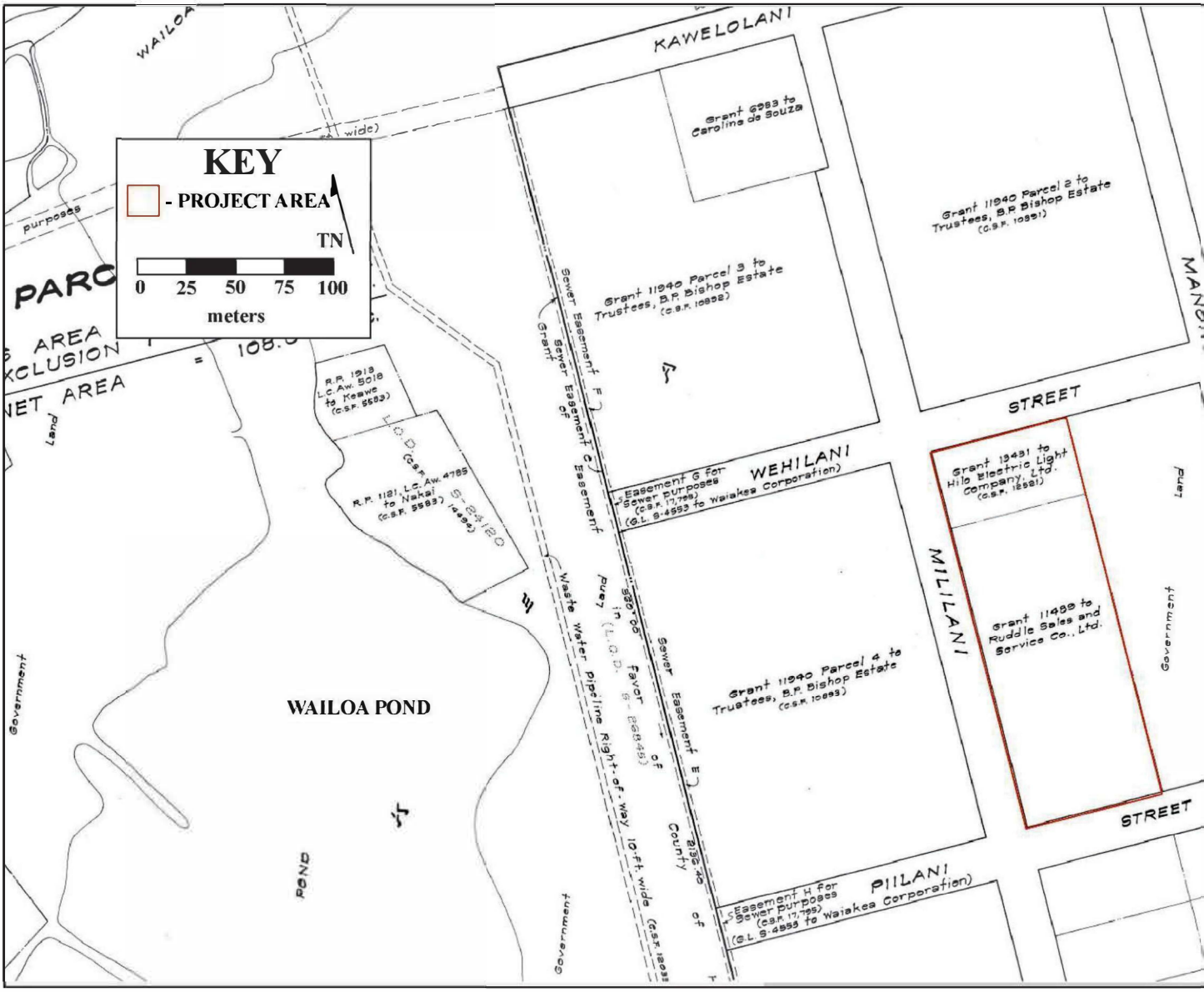


Figure 16: Portion of Wailoa Park River Park Map (Fukuya and Yonamine 1954).

1960s show industrial buildings, likely warehouses, constructed on the project area lot and on Parcel 013 (see Figure 14 and Figure 15). Ruddle Sales and Services Company, Ltd sold automobiles, automobile parts and tires (The Star of Hawaii October 19, 1938). The warehouses on Parcel 011 and Parcel 013 were removed in the early 1990s (Haun and Henry 2021:27).

CANOEING IN THE 20TH CENTURY

Canoe racing was "revived" in 1952 with the implementation of the "Julian R. Yates Hawaiian Canoe Racing Championships" in Kailua (Anonymous 2002). Prior to that Julian Yates had staged "regattas" along the Kona coast in the 1930's. Honolulu teams routinely were victorious in those regattas until Mr. Yates began more rigorous training and practicing with paddlers from Miloli'i to Kailua. Kona based teams began winning more often. Subsequent to that, regattas began to be conducted in Hilo Bay. Local, statewide, and international canoe regattas are now regularly held at Hilo Bay. The canoe houses at Hilo Bay are located near the eastern end of the project area.

THE CHANGING SHORELINE

Historical maps from 1825 to 1932 indicate that the shoreline of Hilo Bay stayed the same for that 100 year period. Sometime between 1932 and 1951, the shoreline in the eastern part of Hilo Bay began to advance into the bay. This initial encroachment occurred around the drainage ditch (Figure 16), so it is possible that the drainage ditch is responsible for this land migration outward into the ocean. By 1960, the shoreline has moved outward along a much wider area.

SURFING IN HILO BAY

Surfing is an ancient Hawaiian pastime conducted by *ali'i* and *maka'āinana* (Finney and Houston 1966). "Sometimes the greater part of the inhabitants of a village go out to this sport, when the wind blows fresh towards the shore, and spend the greater part of the day in the water. All ranks and ages appear equally fond of it" (Ellis 1969:371). Hilo Bay was a popular place to surf during ancient times.

There are several surf breaks at Hilo Bay. The documents that provide information on where those spots were located (Finney 1959; Finney and Houston 1966; Kelly et al. 1981) provide conflicting information on this matter. Finney marked six locations gathered from four different sources in his master's thesis (Finney 1959). Kelly (et al. 1981:276) shows three identified along the shoreline by A. Sinoto. Wolforth (2007) documented the surf breaks at Hilo Bay based on the previous authors' work (Table 3).

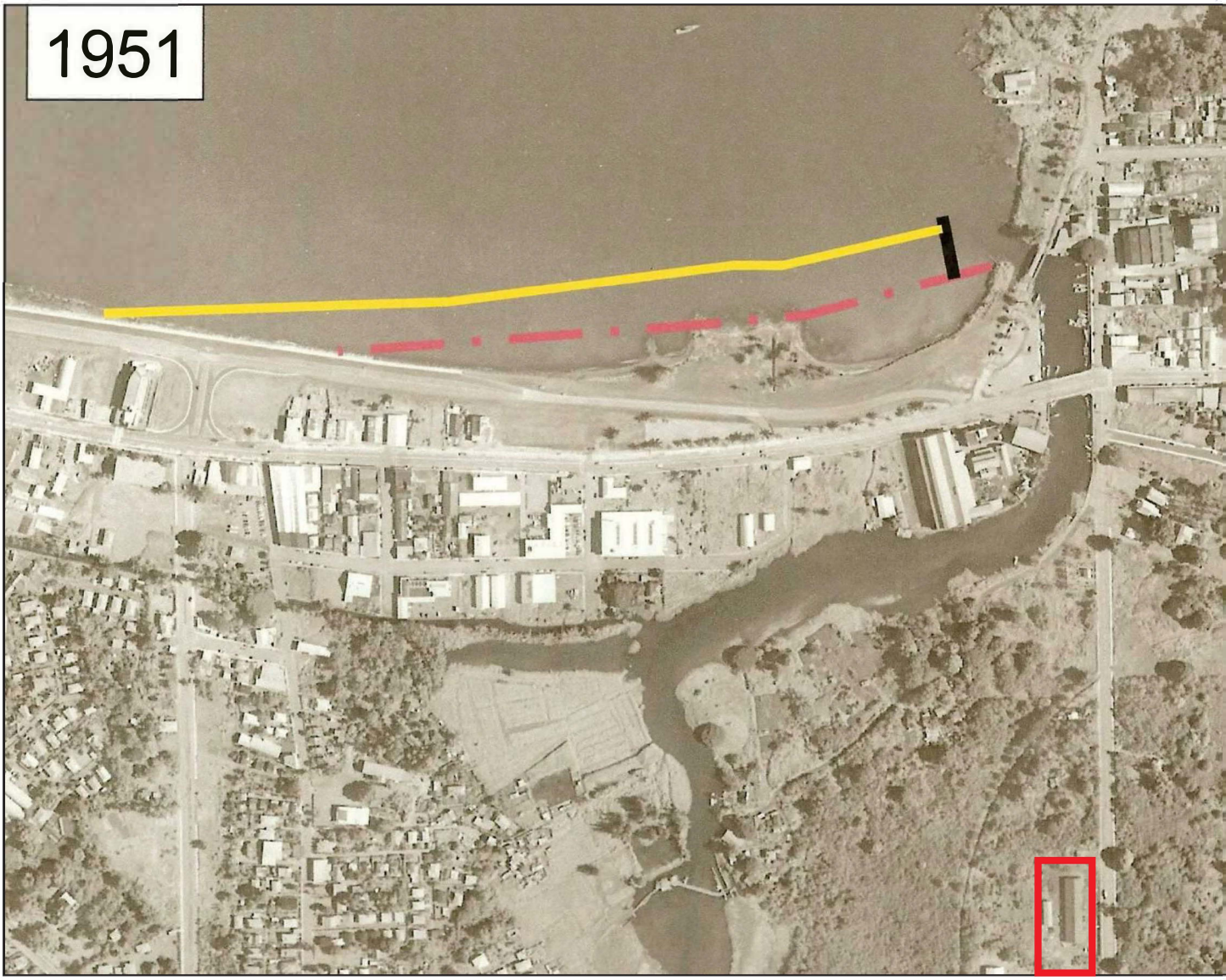


Figure 17: Aerial Photograph of Hilo Bay Showing the Modern Shoreline (Yellow Line), High Water Mar Project Area in Comparison to 1951 (RM Towill Co. No. 627-8).

Table 3: Surf Breaks at Hilo Bay.

From Finney (1959)		From Kelly et al. (1981)	Independent Assessment		
Surf name	**Reference**	**(from A. Sinoto)**	**Full Reference**	**Description**	**Same as**
Ahua (off Coconut Island)	Thrum (1896:113)	Ahua			
Huia	I'i		I'i (1959:134)	"Piihonua has one, named Huia"	Pi'ihonua
Kaipalaoa	Beckwith (1919:504)	Bay Front	I'i (1959:134)		Huia
Ka-nuku-o-ka-manu	I'i		I'i (1959:134)		
Pi'ihonua	I'i		I'i (1959:134)	"Pi'ihonua has one, named Huia"	Huia
Pua'o (near Wailuku River)	M. Pukui*	No known name	I'i (1959:134)	"There is also the surf at Paula at Puueo"**	
			I'i (1959:134)	"Punahoa has one"	

* Finney (1959) cites M. Pukui as a source for some surf locations, then Pukui et al. (1974) cites Finney and Houston (1966) as a source for those same surf locations. Consequently, the origin of this information is not clear.

** Pua'ō in Pukui, Elbert and Mookini (1974:191) is described as an, "Ancient surfing area, Ka-laupapa, north Moloka'i (Finney and Houston 1966: 30)". Indeed, Finney corrected this between the time of presenting it in his 1959 master's thesis, and publishing with Houston in 1966. However, there is a Paula at Pu'ueo (I'i 1959:134) that is not listed in Finney and Houston (1966:26).

Pi'ihonua is a very "thin" *ahupua'a*. It is approximately 170 meters wide (550 feet). Kaipalaoa is within Pi'ihonua. Consequently, it is very likely that there is only one surf place within Pi'ihonua, and this is the one referred to as Kaipalaoa by Beckwith (1970). I'i (1959:134) is clear that the one in Pi'ihonua is called Huia. Based on this, it appears that the three places identified by Finney (1959) as "Huia", "Kaipalaoa", and "Pi'ihonua", and that Kelly (et al. 1981:276) refers to as "Bay Front", are different names for one surfing location that is near the mouth of the Wailuku River, at Kaipalaoa Point in Pi'ihonua *ahupua'a*.

Next to Pi'ihonua to the east is the *ahupua'a* of Punahoa. It, too, is a thin *ahupua'a*, approximately 170 meters wide. It is conceivable that the surf at Huia rolls into Punahoa. In contrast, I'i (1959:134) clearly distinguishes Punahoa from Pi'ihonua in his list of surfing spots.

Further support for the distinction of the two places comes from one of the legends of Hilo: the story of the daughters of Hina and their bid to save the people from famine. There are several versions of this complex story that includes, among other things, places of springs in Hilo (Beckwith 1970; Kelsey 1926; Pukui 1995; Westervelt 1977), but one version includes a reference to surfing. The precise location of this spot is given in reference to one of the many springs that (daughter) Hina had created during her mythical movements underground.

Diving for the last time she came to the surface in the spring of Hina-au-au-wai at the foot of Haili street just above the present track (on John Kai's boundary) a little to the side toward Hāmākua from where water now flows into the sea. Below the tracks and a few yards to the north was an ancient place for hauling up canoes (kau lana waa) named Ka pali iki (the little cliff), a large rock now covered with sand where women of old gathered moss and shell-fish. It is said by one informant that this represents the surfboard of Hina who rode the waves in the early morning returning to the imu [Kelsey 1926].

This precisely described location is in Punahoa *ahupua'a*. This reference to a goddess surfing in Hilo Bay appears to support the notion that there is a surf in Punahoa that is separate from the surf in nearby Pi'ihonua.

The surfing spot called Pā'ula is interesting, because it is identified by I'i (1959:134) and Pukui et al. (1974:181), but not by Finney (1959). Nor do Pukui et al. (1974) provide a reference for their information, but they do add that, "Queen Lili'u-o-ka-lani planted seaweed here" (Pukui et al. 1974:181).

Based on the available information, it appears that the historical references identify five surfing spots in Hilo Bay between Pu'ueo and Coconut Island (others occur outside the breakwater, and just to the north of Hilo Bay) (Figure 17). These are (from west to east around the arc of Hilo Bay):

1. Pā'ula at Pu'ueo
2. Hiua, also known as Kaipalaoa, also known as Bay Front, at Pi'ihonua
3. "No name" at Punahoa at Ka pali iki
4. Kanukuokamanu at the mouth of the Wailoa River
5. Ahua at Coconut Island

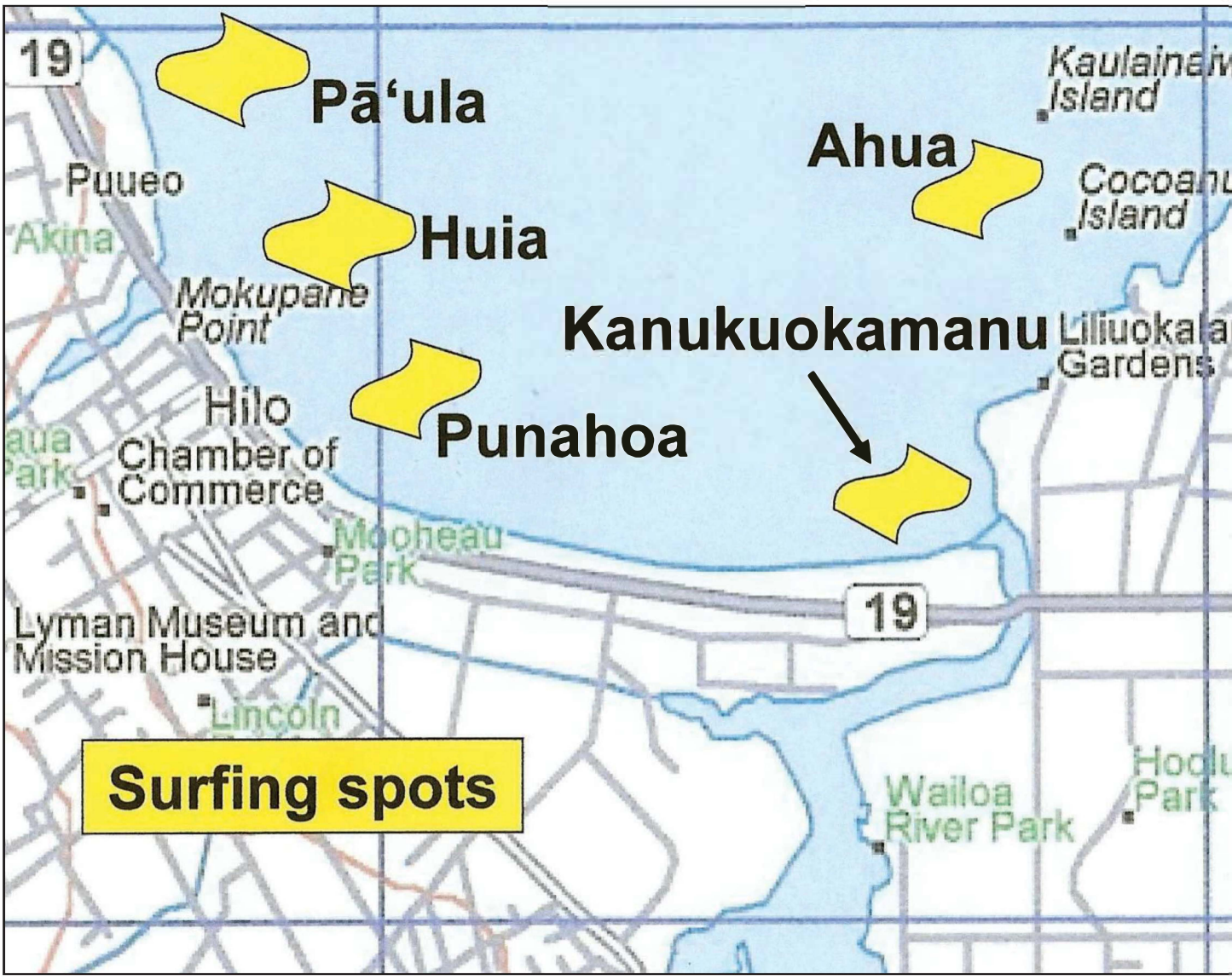


Figure 18: Map Showing Surf Breaks At Hilo Bay (Wolforth 2007:15).

Foreign visitors observed that surfing was taking place in Hilo Bay in 1855 (Cumming 1883:99), 1866 (Knox 1971), 1872 (Nordhoff 1974:50-51), and 1873 (Bird 1998:69). "At Hilo, perhaps the last stronghold of surfing on the island of Hawaii, in 1876 one could still observe the grand spectacle, but few of the younger generation had learned to surf, and those who learned lacked the proud skill of their predecessors" (Finney and Houston 1966:57).

FISHING PRACTICES

Ellis' descriptions of the people he met and the villages he travelled through along the Puna coast in 1823 illustrate the long and well developed Hawaiian traditions of fishing and collecting food from the ocean. This orientation to the coast and the traditional practices developed in Hawai'i are still passed down generation to generation and persist today (Maly and Maly 2004).

Many fishermen, whether they use a hand-line or rod and reel, use knowledge and techniques of past fishermen to select fishing locations, proper bait, and technique. Fishermen throw net, fish by rod and reel, or spear fish at different locations along the shoreline to catch specific fish such as *āholehole, ʻāweoweo, kala, kole, kūmū, manini, mamo, moana, moi, mū, palani, taʻape, uhu, ʻūʻū, uouoa, wekeʻā, and wekeʻula*. Many people still fish with rod and along the shore at Hilo Bay, or fish by boat offshore for *akule, kaweleʻā, mahimahi, ono, ʻōpakapaka, ʻulaʻula*, and other species. In addition, the traditional collection of *ʻōpihi, ʻaʻama, and limu* along the rocky shoreline is still practiced. Traditional Hawaiian fishing practices, shoreline gathering practices, and ocean access are protected by state law.

TRADITIONAL CULTURAL PRACTICE IN THE HILO BAY AREA

Religious practices, fishing, canoeing and the cultivation, collecting and gathering of plants are the principal past/ongoing activities conducted on lands surrounding the current project area. Considering all of the historical documentation, field inspection, previous archaeology, consultation with traditional cultural practitioners, and previous interviews conducted regarding Hilo Bay, fishing, canoeing and agriculture can be considered as cultural practices associated with lands nearby to the current project area. Other old style recreational activities conducted within the region include surfing, and the games of *kilu*, *pahenehene*, and others associated with *lōkū*. Those activities are documented to have been conducted in the Hilo Bay area for a long time prior to European contact. Although the latter traditional games are no longer practiced, and have

not been practiced here for some time, fishing, canoeing and agriculture are still conducted on lands near the project area.

HILO BAY AREA PLACE NAMES

A detailed collection of traditional Hawaiian place names associated with the Hilo Bay area was collected by photographer and ethnographer Theodore Kelsey (born 1891 in Seattle, Washington). Mr. Kelsey and his mother moved to Hanamalu, Kaua‘i when Theodore was four years old (State of Hawai‘i Department of Accounting and General Services 2022). While he was still a boy, he learned the Hawaiian language. He returned to the mainland from 1908 to 1917 and returned to Hawai‘i at the age of 25. From 1918 to 1927, Kelsey worked in a photography studio in Hilo.

At some pont in 1925, Kelsey documented *mo ‘ōlelo* and place names from long-time Hawaiian Hilo residents, Mrs. Mary Kaoulionalani Pahio and her brother Kahauolupua, and Henry B. Nalimu. The place names and descriptions are discussed in detail in Brandt (2017). Ms. Terri Napeahi also provided the transcripts/translations of the original Kelsey notes given to her by Halena Kapuni-Reynolds. The transcripts/translations are provided in Appendix A.

PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

Rechtman Consulting, LLC conducted an archaeological assessment (Rechtman 2009) of the project area as part of the larger Hilo Bayfront Trails Project (Figure 19). There were no archaeological sites identified in the current project area during that study.

Haun and Henry (2021 draft) conducted an AIS study of the Parcel 013. A single site (Site #50-10-35-1679.1), a concrete-lined pit associated with a Historic era building that formerly existed in the property. The site was assessed significant under criterion d, as having yielded, or likely to yield, information important for prehistoric or historic research. No further work was recommended at the site.

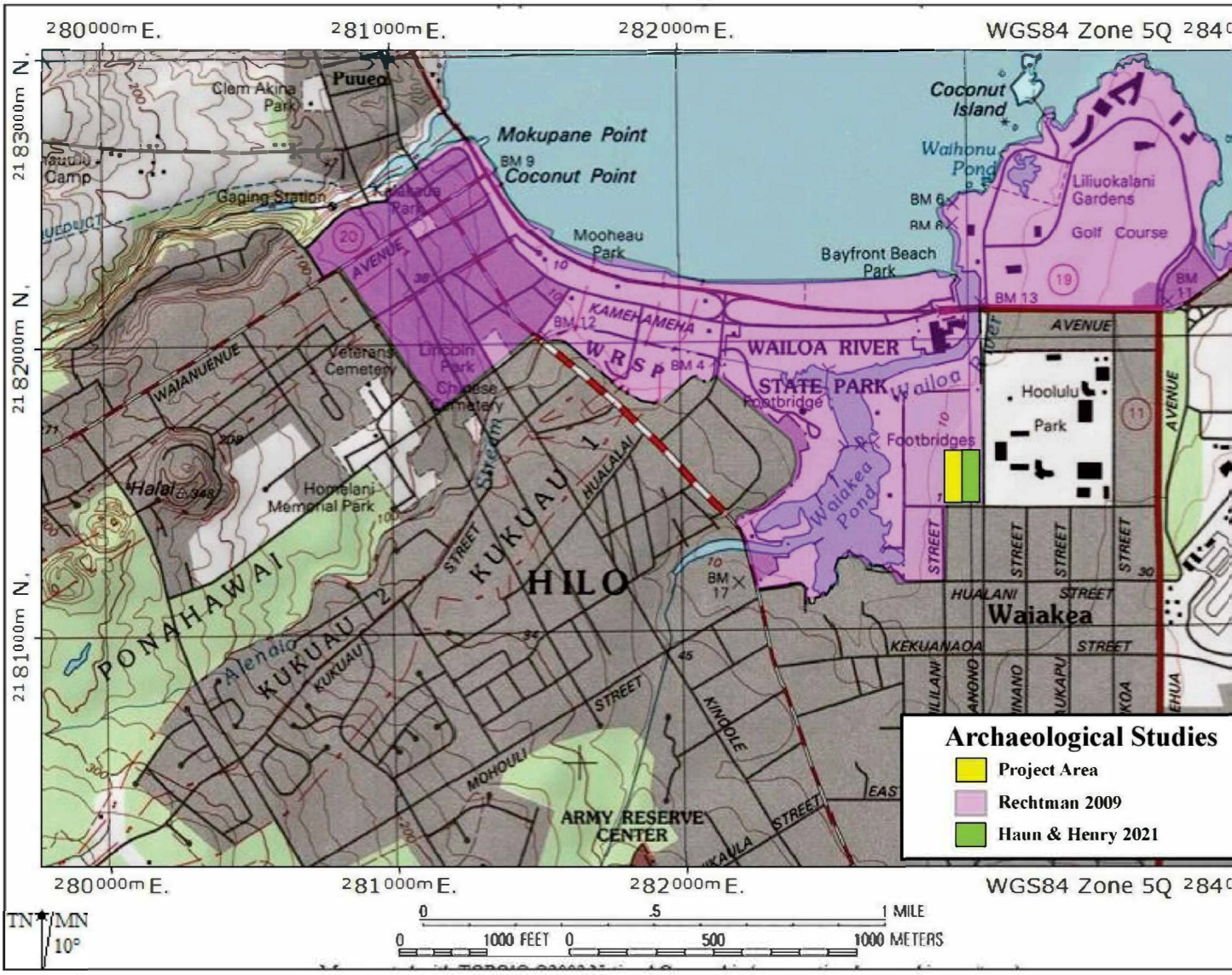


Figure 19: 7.5-Minute Series USGS Topographic Map Showing Location of Project Area and Previous Ar (National Geographic Topo!, 2003, USGS Hilo Quadrangle).

CULTURAL INFORMANT INTERVIEWS

Consultation was sought from Kai Markell, the Director of Native Rights, Land and Culture, Office of Hawaiian Affairs (OHA); Kamakana Ferreira, OHA Lead Compliance Specialist; Shane Palacat Nelsen, OHA West Hawai'i Representative; Lauren Morawski, OHA Archaeologist; Jordan Kea Calpito, SHPD Burial Sites Specialist; Sean Naleimaile, State Historic Preservation Division (SHPD) Hawai'i Island Lead Archaeologist Nicole Mello, SHPD Hawai'i Island Archaeologist; and Joshua Gastilo, SHPD Hawai'i Island Archaeologist; Terri Napeahi, Waiākea Ahupua'a Crown Land Heirs member; Lakea Trask, Waiākea Ahupua'a Crown Land Heirs member; and Iokepa Kaolulokaeo, Waiākea Ahupua'a Crown Land Heirs member.

Public notices were placed in the September 2021 and 2023 issue of the Office of Hawaiian Affairs (OHA) Ka Wai Ola Newspaper. Public notices were also published in the Honolulu Star-Advertiser, and the Hawai'i Tribune Herald (three days in September 2021 and 2023.

Sean Naleimaile, State Historic Preservation Division (SHPD) Hawai'i Island Archaeologist, recommended that consultation be conducted with Ms. Terri Napeahi, a descendant of Waiākea Ahupua'a and member of Waiākea Ahupua'a Crown Land Heirs. We met with Ms. Napeahi and Mr. Iokepa Kaolulo Kaeo and Mr. Lakea Trask, also members of Waiākea Ahupua'a Crown Land Heirs. A total of 12 agencies and individuals were contacted or responded to the public notices (Table 4).

Table 4: CIA Responses.

Last Name	First Name	Organization	Responded	Project Area Knowledge
Calpito	Jordan Kea	SHPD Burial Sites Specialist	No	
Gastilo	Joshua	SHPD Hawaii Island Archaeologist	No	
Ferreira	Kamakana	OHA Lead Compliance Specialist	No	
Kaeo	Iokepa Kaolulo	Waiākea Ahupua'a Crown Land Heirs	Yes	Yes
Markell	Kai	OHA Compliance Manager	No	
Mello	Nicole	SHPD Hawaii Island Archaeologist	Yes	Some Knowledge
Morawski	Lauren	OHA Archaeologist	No	
Naleimaile	Sean	SHPD Hawaii Island Archaeologist	Yes	Some Knowledge
Napeahi	Terri	Waiākea Ahupua'a Crown Land Heirs	Yes	Yes
Palicat	Shane	OHA West Hawai'i Representative	No	

Last Name	First Name	Organization	Responded	Project Area Knowledge
Nelsen				
Trask	Lakea	Waiākea Ahupua‘a Crown Land Heirs	Yes	Yes
Vicente	Dwight	Hawai‘i Resident	Yes	Some

In his telephone call, **Mr. Dwight Vicente** stated that the United States (U.S.) federal government and Hawai‘i State government lack legal jurisdiction to conduct property review processes due to the overthrow of the Hawaiian Kingdom in 1893. Hawai‘i was granted protectorate status only under the Northwest Ordinance of 1787, even though that ordinance only refers to lands of the continental United States of America. Furthermore, there are no articles in the U.S. Constitution annul the Hawaiian Kingdom and/or grant the U.S. governance over the lands of the Hawaiian Kingdom.

Mr. Vicente stated that the Hawaiian Kingdom still exists because the Reciprocity Treaty of 1875, as amended 1887, was never abrogated and it was affirmed several times, including in Article 94 of the Constitution of the Republic of Hawai‘i and in the 1898 Treaty of Annexation by the Republic of Hawai‘i and the U.S. Congress. Mr. Vicente stated that only the Hawaiian Kingdom has legal jurisdiction over land review.

Over the course of two meetings (January 14 and 31, 2022), **Waiākea Ahupua‘a Crown Land Heirs members Ms.Terri Napeahi, Mr. Iokepa Kaolulo Kaeo and Mr. Lakea Trask** provided *mana‘o* concerning the development of the current project and future projects in the wider region of Hilo. In general the members stated that their vision for Hilo is to see the restoration of pre-Contact era traditional Hawaiian cultural sites. In addition, development projects should strive to incorporate past cultural sites and cultural practices, including *heiau* and gardens, into their planning designs.

The Hilo Bay area was once an agricultural cornucopia with numerous agricultural *heiau* and gardens that sustained the people that lived there. These are the traditional cultural features that that make the Hilo Bay area historically and culturally unique. Historical and cultural sites and practices provide educational opportunities that residents can be proud of and that residents and visitors can be proud of, can learn from and can enjoy as well.

Ms. Napeahi’s *‘ohana* were awarded a *kuleana* property, LCA 2603, during the Māhele (see Table 1 and Figure 9). The property is located 300 meters north of the proposed skate park

project, near what is now the corner of Manono Street and Kuawa Street in Hilo. According to native testimony, the Napeahi *ʻohana* resided there from the time of Kamehameha I. Terri was instrumental in research that led to the designation of the location of Kūakaʻananuʻu Heiau which formerly existed in what is now known as Liliuokalani Park (see Figure 6), not far from the Napeahi *kuleana* property. Her family was also in possession of several stones which were removed from the *heiau* when it was dismantled in the 1860s.

Terri stressed the importance of Hilo as an important sociopolitical center with numerous *heiau* and other culturally important places. Liholiho was born at Wailoa, Princess Ruth Keʻelikōlani, Governor of Hawaiʻi Island and many *aliʻi* and *konohiki* resided in Hilo, implying that the area had great significance to the Hawaiian people. The importance of water, as referenced by local place names such as Wailoa, Waiolama, Wailuku, and Waiākea, emphasizes the importance of water source to the fertile agriculture of Hilo.

Ms. Napeahi also stressed the important work conducted in Hilo by Theodore Kelsey, a photographer born in Hilo who spoke Hawaiian and worked with Henry E.P. Kekahuna to map traditional Hawaiian sites. Kelsey spent many years documenting the Hawaiian culture throughout Hawaiʻi, both photographically and ethnographically. Terri has incorporated portions of his collection into her own research to reconstruct a rich, sustainable, pre-plantation era Hawaiian cultural history associated with native plants and pre-Contact era structures. Her research shows that Hilo was at one time a lively center with social and cultural importance. Prior to missionary contact there was more *kalo* grown in Hilo than in Waipiʻo Valley. Over time, much of what was associated with traditional Hawaiian culture was discouraged and eliminated by the powers that came to be. Many of the traditional cultural structures were dismantled after the kapu was ended in 1918 and more destroyed by the 1946 Tsunami.

The significance of the Hilo area is remarkable. Terri and other heirs are interested in restoring portions of it to that of a pre-sugarcane era Hawaiian community, creating rich sustainable walkways from one area of cultural significance to another. Their vision involves enhancing these areas with native plants such as *ʻulu* and *kukui* trees, *kalo* in an effort to restore the beauty and significance associated with what once was. In addition, Terri and the other heirs are interested in gardens that will provide food. This will uplift, not only the Hawaiian community, but will add value to the community at large.

The heirs are not opposed to development on Parcel 011 and Parcel 013 *per se* but believe that it should incorporate traditional gardens and/or native plantings. All proposed

developments should have a restoration component connecting them with the Hilo's past cultural and agricultural heritage, and should connect to a master plan for future are developments. This will reestablish a legacy for the Hawaiian community.

The project should try to incorporate agricultural gardens into its design. Waiākea Ahupua'a Crown Land Heirs members would like to consult with planners to develop an *ahupua'a* style master plan. All development should have a historic and cultural site restoration component wherever possible, and should be components of a wide area master plan. This will foster traditional Hawaiian cultural practices and will reestablish a legacy for the Hawaiian community.

SUMMARY

The "level of effort undertaken" to identify potential effect by a project to cultural resources, places or beliefs (OEQC 1997) has not been officially defined and is left up to the investigator. A good faith effort can mean contacting agencies by letter, interviewing people who may be affected by the project or who know its history, research identifying sensitive areas and previous land use, holding meetings in which the public is invited to testify, notifying the community through the media, and other appropriate strategies based on the type of project being proposed and its impact potential.

In the case of the present parcel, letters of inquiry were sent to organizations and individuals whose expertise would include the project area. Public notices were published in the Office of Hawaiian Affairs Ka Wai Ola Newspaper, and were published in the Honolulu Star-Advertiser and the Hawai'i Tribune Herald.

Historical and cultural source materials were extensively used and can be found listed in the References Cited portion of the report. Such scholars as I'i, Kamakau, Chinen, Kame'eleihiwa, Fornander, Kuykendall, Kelly, Handy and Handy, Puku'i and Elbert, Thrum, and Cordy have contributed, and continue to contribute to our knowledge and understanding of Hawai'i, past and present. The works of these and other authors were consulted and incorporated in the report where appropriate. Land use document research was supplied by the Waihona 'Aina 2007 Data Base.

CIA INQUIRY RESPONSE

As suggested in the "Guidelines for Accessing Cultural Impacts" (OEQC 1997), CIAs incorporating personal interviews should include ethnographic and oral history interview procedures, circumstances attending the interviews, as well as the results of this consultation. It is also permissible to include organizations with individuals familiar with cultural practices and features associated with the project area.

Analysis of the potential effect of the proposed skate board park on cultural resources, practices or beliefs, its potential to isolate cultural resources, practices or beliefs from their setting, and the potential of the project to introduce elements which may alter the setting in which cultural practices take place is a requirement of the OEQC (No. 10, 1997). To our knowledge, the project area was not used in the past for religious practices, activities associated with canoeing, or fishing and gathering of river or marine resources, or for culturally significant gathering, collecting, or other agricultural practices. While these significant cultural practices were conducted on lands north and west of the current project area, there is no evidence that they were practiced on the subject property. Based on historical research and the responses from the above listed individuals and organizations, it is reasonable to conclude that, as Hawaiian rights related to gathering, access or other customary activities are protected by law, and as the current project will not prevent access, traditional cultural practices will not be affected and there will be no direct adverse effect upon cultural practices or beliefs.

CULTURAL ASSESSMEMNT

Based on the results of CIA studies of the project area and greater Hilo area, the results of previous archaeological studies, as well as organizational response, individual cultural informant responses, and archival research, it is reasonable to conclude that, pursuant to Act 50, the exercise of native Hawaiian rights, or any ethnic group, related to gathering, access or other customary activities will not be affected by development activities on this parcel. The proposed project will not restrict shoreline access for fishing and gathering purposes, as is protected by law. The proposed undertaking will not produce adverse effects to any native Hawaiian cultural practices.

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APPENDIX A: THEODORE KELSEY HILO PLACE NAMES

Hawai'i State Archives
M86, Folder 487
Provided by Halena Kapuni-Reynolds

Hawaiian Land Names, from trip with Mrs. Ka-'ouli Kaai and her brother Ka-hau-olo-pua of Keaukaha, June 25, 1925.

Leaving the auto near the junction of Kalihiwai and Ka-nuku-o-ka-manu St., Waiakea, Ka-ouli and I went makai to two little coves where Ke One Wali o Ohele, where the noted sand of the stout chiefess Ohele is located (waliwali ke kino o Ohelea me na lii wahine e a'e). Every day after riding the breakers of Kawili—Ka Nalu Ha'i o Kawili -- that broke near the mouth of the Wailoa River and landing mauka, the chiefesses would lie on the sand of Ohele. Poo-nahoahoa (Mr. Spencer), Mgr. of Amauulu Plantation, had a wharf running out over Ka Lae o Ohele, from which he shipped whale-oil, boiled from the blubber where the third fish-market counting from the Coconut Is. side is located.

Ka Lau o Kukui is the next little point N., where Uapo Mahoe (double wharf) of the Inter Island Co. was located. When the sea was rough passengers were landed up the mouth of the river. This point was probably named because of the numerous (lau) lights of the whaleships in port. Women would put clothes in a container and swim to the ships. Hawaiians got whale-oil to burn in their lamps with wicks. Reed's Wharf ran out from where there is a square mile of concreted rock. The old Railroad wharf ran out at the end of Lau Kukui where the piles are now in the water. (*Makai aku o Ohele malaila Ka-lua-aha, he uapo no ka hui o Hackfield mamua. Nalimu).*[1]

Waipahu is a little spring and cove with young hau trees at the head of it. The Lae o Waipahu is there. The spring is at the head of the cove. (*Ka uapo o Waihonu makai aku o ka uapo o Ka Lau o Kukui. ka Huapala a inoa o ka uapo o Ka Lau-o-kukui).*

Waihonu, probably a pond for breeding turtles, had its outlet, now covered by the road, just beyond the lae of Waipahu, where there was a sluice-gate, or makaha'. Beyond is an old stone house known as Uapo Lei Lehua (*o ka uapo o Wa)*, which used to be a wharf but now a govt. oil warehouse. *O Kahiwa ka inoa kahiko.Nalimu*

We now started for the house of Ka-hau-olo-pua at Keaukaha. The place where he lives is Ka-iole-wai is so-called he says, because a rat got into a calabash of potato poi, which is left to sour for three days, and was drowned. This incident happened in the time of his father and other relatives. He says that Ke-au-kaha was so caled because only potato was raised there and that fish was exchanged for poi with Hilo Pali Ku. Ke-o-kea was named, he stated, because white hala (hala ke'oke'o---kea also means white) was made into leis and given by one sex to the other. These gifts were termed 'o', just as luncheon is called 'o'. The fruit of the hala ke'oke'o is light yellow. Maka-o-Ku was a chief. Wai opae, lake on C.I.
Ku-a-ka-ananuu (I received the name Kua-a-ka-ananuu from Kahaku, Kekaula, and some other kamaainas) was a hunch-backed chief. *Ku – aole. Kua. Nalimu.* This is the name of the heiau on

[1] Italicized texts are hand-written notes on the document that were possibly added by Henry Nālimu.

the land of Maka-o-Ku opp. C.I., also the name of the cove on the east. Some of the One o Ohele is under the R.R. Lokoaka should be Loko Waka, as I also heard from aged Nalimu and Ka-ouli---named for the grandmother of La-ie-i-ka-wai.

After taking some 'snaps' of the family the three of us set out in the auto for Loko Waka. Wai-ahole (nui na aholehole) was a lake in front of Ka-hau-olo-pua's.

Ka-hiwa (niu hiwa malaila i keia manawa) was a lowland on the right.

Ka-puu-pili (pili-grass hill) with a lake of the same name, out of sight, came next. A garage is at the further boundry.[2]

Puu o Kamalii (school-children played there), Princess Pauahi Bishop's land, low and rough. *Honohononui ka aina o Pihopa, aole o Puu o K. Nalimu. Makai aku o Kahiwa o Na Olaa. Makai aku o na Olaa o Ke One Kahakaha. Makai aku o K.O.K. o Honohononui. Makai aku oia wahi he wahi o Ka'ulekahe. O Ala-opuhi makai aku o Keonekahakaha o Makai aku o Ka-ule-kahe oia o Kaupo, he awa pae waa. Mauka a'e o ia awa o Haleolono, he loko.*

Wai-aka (shadow water), he ulu 'ulu malaila. O Wai-ahole he loko i'a malaila. A ditch is the boundry on the far side. *Aole waiaka malaila. Nalimu.*

Moku-'ulu, on the left of Wai-aka. Ka-ule-kahe (kahe ka ule o na keiki malaila) is makai by the beach. There is good swimming there. *Aia mauka aku o Kaulekahe aia malaila o Moku-'ulu, he aina kauhale.*

Kapa*a*-laho (malo), a lake ending land of Bishop.

Ki-'ona-o-Ka-pahu (place of excrement of chief), lake beyond.

Papa-kahakaha, stretch of pahoehoe, maked with names, where there used to be a school of a hundred or so pupils attended by Nalimu. The building was of cane-leaves. The rocks were covered with moenas. *O Loko Waka ka inoa nui o ia wahi aole o Ka papa kahakaha kahi o ka hale kula.*

Looking across Loko Waka we saw a coconut tree, near which in about two fathoms of water is a long broad stone called Waka in a hole named La-ie-i-ka-wai. If you don't touch this stone with your hand you don't know Loko Waka. *Aole lohe o Nalimu.*

When it rained we sat in the car. I as told that the shower, which Ka-hau-olo-pua though might be of considerable length, because there was no wind, I was told that this was the way the kupunas said 'Thankyou' for recording the place-names.

Mahaikea (perhaps so called because the white hinano-flower was used as an unuunu to kapu the place—mahai, kipaku). Beyond was a lake named Hau-a-ni'o (hahau a pāni'o ke kapa mamaki). *Hana ia ke kapa mamaki ma Olaa.* We saw a black lava point called Pohakea where

[2] Page 1

the surf broke (poha' ke kai a ke'oke'o). Looking toward the Seaside Club we saw the sand of ~~Kahai-po~~ mauka of the cove (?) *Kaupo' ili-ili, aole one –limu oolu o kela limu –iliili o Kaupo.* (lei ka i'a ma ka a-i' i ka po). (Kahai mai nei oe i ka pahu pa'i kii ma kou a-i!. O Kahai-po' ka lae a me ke one. Hele hee nalu iloko o ka nalu ~~o Lumi-lani (lumilumi ia ke lii i ka nalu)~~ *Kaulekahe* a uwa' na lii ma ka moku o Lumi-lani no ka lumilumi o ka po'e hee nalu.

Mā-hi'-kea (Nalimu) he loko kai e pili ana i ke kai. Makai aku o M. o Hauani'o, he awa pa waa, a makai aku o ia wahi o Kau māui, he kulanakauhale, he ulu niu. Makai aku oia wahi o Waiolena, he awa pae waa. Wai-'Uli makai aku oia wahi.

We now drove back to Kahauolopua's where we left him and I went on with Ka-ouli to Mokuola. See Mokuola Paper.

Ka-ouli took dinner with me and then we went to learn the names about the Waiakea Ponds, starting in on the E. side of the Wailoa River going up as far as the Filipino Strike Camp and finishing our names from there. Niu-ula is a cave in back of the mauka side of the rear of Hilo Iron Works, about the middle of the stream, in front of a small promentory. From here to the RR bridge the land is Niu-ula.

Ki'o-pua (pond for raising fish-fry (pua) till they are lau 'alo, 2 or 3 in. long), where Iron Works is. A little pond mauka of the I.W. is the boundry of Ki'opua and Kaholoina (ka holoi ana?) which extends to Pooke'oke'o (burial place) makai. *Aia mawaho o ka loko o Waiakea aia malaila na ki'o pua pake e hooholo ai i ka pua noe a nunui a hookomo i ka loko o Wai. O ko'u mau kaikuaana o Kuahopu a me Niihau o laua na konohiki o Waiakea. Nalimu.*

Niuula he ulu nui ~~makai aku o Niuula~~ makai aku o Kaoloina.
Kioloa (where people went ashore after wading Kaholoina, the crossing—some people were tall, loa, which perhaps explains the name) promentory and cove.
Mauka mai o Kaholoina Ka Lae Ku'i Hili

Hanakahi *Makai aku o Niu'ula oia o Hanakahi.* (name of chief for which Hilo is called Hilo Hanakahi) a little elevation on Waiakea side of Kioloa. Hanakahi lived there. *across road.*[3]

Kuahua, a stone in the river near the end of a sampan building shed. Kuahua was sometimes a woman and sometimes a shark. Her human body was buried between two coconut-trees on the opposite side of the sampan building shed. If anyone goes there with red clothes he faints and dreams of the woman. He will revive directly if someone chews up a bit of mau'u 'aki'aki, which may be obtained on the little promontory of Ku'ihili, just down stream. You mustn't bath in the river with red clothes until you are beyond Ku'ihili. At low tide when the top of the stone was above water the shark's food, awa, sugar-cane, bananas, etc. was set on top of the stone. This kupua shark woamn was killed by Pele as were other akuas.

Ka Lae Ku'ihili, the first promontory on Waiakea side below the sluice-gate (makaha') known as Umi, for King Umi a Liloa. Hili kukui for staining nets and kapa red was pounded there. There was a little pond there, now dug away. In the stream there are two unnamed holes

[3] Page 2.

filled with anae, aholehole, and other fish, on mauka side. *O ka makaha mua oia o Umi, (2) Piikea, (3) Hua-a', (4) Halauwai, (5) Ka 'Ohi'a.*

Ka nukuokamani *aole like o Nalimu* (the scolding of the woman? Same name as peninsula on Hilo side off mouth of river.) promontory across from Kuahua. The pond of Wai'eli, dug for raising fish-fry is on the land of Kanukuokamanu.

Laukapalili, *pili ka loko o Waiakea ma ka aoao ma Puna mai o ka loko, he aina mauka a he wahi moku pohaku iloko o ka wai, oia o Laikapapalili – kanakai aholehole i --illegible--*

Kālahu, promontory beyond Laukapalili. Stayed at Camp and got names.

Paepae (one meaning, to support as head with hand) long cove beyond.

Lae o Ka Ohe, pahoehoe promontory beyond.

Lae o Nanahu, rocky point--pahoehoe.

Ka-lima-alae (the five alae birds), spring by Waiakea Warehouse. The stupms (sic.) of ancient coconut trees may still be seen in the water there, showing how the land has sunk.

Ka-puna-kea, long pond of spring-water (also name of spring) by Waiakea Mill.

Wai-ahole, pond where we saw a little unpainted Chinese house from camp.

Moho-uli pond. Ulu o Namu, bread-fruit grove at lower end of Mohouli pond where not are fig and banana trees seen from Camp.

Kano-kapa (hapai i ke kapa o na lii), land by big red house and two mango trees. *Kahi e pili ana i ke ka'e kai oia o Kanokapa a maluna aku oia wahi oia o Kaipalaoa kahi hooluu kaaahi. Kano-kapa, he kanoa kahi i kapala i ai ke kapa.*

Ka-puka-wai, mouth of Waiakea Pond.

Hua'i-niu *aia ke pili la mawaho o ka loko o Waiakea. Kanokapa aia i Hilo kahi hoolulu Kaaahi.* (uncover cooked coconut?) a long lake that runs to Ka-ohi'a, the other mouth of Waiakea Pond. Ka-ohi'a (hoomoe i ka makaha' me ke kua ohi'a) is the fifth and last makaha', named for a wife of Umi as are the others, Piikea, the large second makaha', a lock, with a gate at each end, ~~Moho-a'~~ Hua (moho, bird; a, ua hoohalike ka u'i me ka a ana o ke ahi) 3d makaha', Halau-wai (hale no ka lokomaika'i) 4th makaha'. Men were summone dto cut the timbers for these makaha's. When the timbers were laid there was a feast.[4]

Makole (red-eyed, like old folks), where Umi and his son Maalo lived just on makai side of Piikea. There is a fish box there called Umi.

[4] Page 3.

Hau-maka-puu (strike (hahau) swollen eye) where red house by mango trees is a little below Dranga Camp on other side. The servants and lake guards (kia‘i loko) lived here. There are some stone piles (puu pohaku) here.

Lu-‘ae, a squid-stone near three coconut trees and red house across from Dranga Camp.

Piko o Wakea, spring in the middle of the upper part of Waiakea Pond.

Ka-imu-ki’, a fish-house made of a pile of stones in a deep place in the river by Puka-wai, now filled with mud perhaps. When you dive or fish here you see a rainbow in the water.

Moho-uli Names.

Ka-imu-ki’, *He pua‘i wai iloko o Mohouli,* a lua moo in front of La-La’-kea’s (formerly Wise’s) house.

Ka-lihi-wai, a hole in the land by Korean shoemaker’s, on opp. side, from La-la’-kea’s, now filled perhaps.

Opae-nui (opae, ma‘i o ke kani kekahi), a large hole between Waiahole and Mohouli ponds.

Waiahole Names.

Ki‘o-pua, pond on E. side of Waiahole where Chinese raises gold-fish.

Lua-ko‘ako‘a (ko‘ako‘a, change character ?), where the shark Ku-hai-moana came into the pond. He was reared in Ka-lepolepo Pond, from which he made his way to toehr (sic.) ponds through underground passages and went to the island of Ka-‘ula.

Wailoa Cont.

Ka-i‘a-nui, cave of a black shark of this name had hole on E. side of river across from Iron Works, perhaps about 50 yards from RR bridge beyond the landing. This shark was related to the Namau‘u family who lived where Matson house is, south of tracks on Waiakea side of street.
Aole lua mano’ ma Kalepolepo, he mau pua‘i wai wale no. Nalimu.
Aole paha hanai o Kuhaimoana malaila. Mai Keaau mai ka makuahine o Ka-ouli.[5]

[5] Page 4.

Hawai‘i State Archives
M86, Folder 487
Provided by Halena Kapuni-Reynolds

Hawaiian Place Names.
H.B.Nalimu. *Sent museum?*

Nā-ōlaa, that place *makai* of Keokea. Nā-ōlaa is *makai* of where I farmed ‘uala with my parents. *Makai* of Honohono-nui. I went to school at Loko-aka (Loko Waka, for grandmother of La-‘ie-i-ka-wai) with my younger brother. Waiwai was my kumu, he wheezed, he couldn’t speak very well.

Wai-ākea, from **Lele-‘iwi** all the way to Mauna Loa, from **Kalana-kāmaa** (ancient stream. H.E. Kelsey property located in bed. Cor. Hualalai and Kilauea Ave.) all the way to Mawae, that’s it’s breadth.

Hauna (**Hanauna**, says Mrs. Ka-‘ouli Pahi‘o. Hauna (bad air) was a fish-pond behind Hata Store by show place) a pond within Loko-aka.

Wai-ahole, *mauka* of the pond named Hauna.

Ki-‘ona o Ka-pahu, a pond *makai* of Wai-ahole.

Hale o Lono, a pond *makai* of Ki-‘ona o Ka-pahu, where the Japanese hotel is located.

Kapa a laho (the brim of the scrotum), a pond *mauka* of Ki-‘ona a Ka-pahu. Ki-‘ona o Ka-pahu is where Ka-haku died (old fisherman).

The place where canoes are filled called **Kau-me-li-eli** is in Pi‘opi‘o, as well as the mortar of the man named Kau-me-li-eli who also owns the canoes.

Moho-uli, pond *mauka* of the pond named Waiakea.

Waiahole, pond *mauka* of Moho-uli.

Ka-lepolepo, pond *mauka* of Moho-uli.

Lehia, a canoe landing for the folks living *mauka* of that place. *Makai* is Wai-uli. It is there where the pit of Kua is located, the shark of my ancestors and the chief Ka-lani-opuu.

Ka lae o Kihe, *mauka* of Lehia.

Wai-uli, *mauka* of Ka lae o Kihe.

Wai-olena, land and ocean *mauka* of Wai-uli.

Kau Māui, *mauka* of Wai-olena. There is a coconut grove there and a village in ancient days.

Hau-ā-ni‘o (possibly meaning mottled), a bay and canoe landing *mauka* of Kau-Māui.[6]

[6] Page 2.

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August 10, 2018

IN REPLY REFER TO:
LOG NO: 2018.01269
2018.01322
DOC NO: 1808SN02
Archaeology

Melissa Dacayanan
County of Hawaii, Planning Department
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Melissa.Dacayanan@hawaiicounty.com

Dear Ms. Dacayanan:

SUBJECT: **Chapter 6E-42 Historic Preservation Review –**
Request for Revocation of SMA Permit No. 334 (SMA 92-000003)
SMA Permit Application (SMA 18-000070)

Amendment to Change of Zone Ordinance No. 92 122 (REZ 727)
Request to Amend Condition C (Plan Approval) and Condition D (Complete Construction)
Archeological Inventory Survey of TMK: (3) 2-2-033:011
Applicant: Piilani Partners, LLC (Formerly Suisan Co., Ltd.)
Waiākea Ahupua'a, South Hilo District, Island of Hawai'i
TMK: (3) 2-2-033:011

This letter provides the State Historic Preservation Division's (SHPD's) review of the subject permit applications received on June 6, 2018 (Log No. 2018.01322), and review of the draft archaeological inventory survey (AIS) report prepared in support of the proposed project. The AIS was conducted to satisfy historic preservation review requirements prior to several HRS 6E permit issuances. The report is titled *Archaeological Inventory Survey TMK: (3) 2-2-033:011, Waiākea Ahupua'a, South Hilo District, Island of Hawai'i* (Haun and Henry, May 2018). We received the draft AIS report on June 7, 2018 (Log No. 01269). SHPD requested revisions via email on August 9, 2018 (Sean Nāleimaile [SHPD] to Alan Haun [Haun & Associates]) and received the revised draft report via email on August 10, 2018 (Alan Haun to Sean Nāleimaile).

The AIS was prepared at the request of the applicant, Ms. Fumiko Okuda of Columbus East, LLC. on behalf of the landowner, Matsuno Enterprises Ltd. The applicant proposes to construct a warehouse and adjacent office building on the 2.57-acre parcel. Ground disturbance will involve excavations for the building foundations or footings, utility lines, grading and grubbing activities and the installation of a well in the southern portion of the parcel. There are no immediate plans for additional development of the rest of the parcel.

The AIS report indicates that several previous archaeological studies have been completed for the surrounding vicinity (Hammatt and Bush 2000; Bush et al. 2001; and Haun and Henry 2001). These studies have identified traditional Hawaiian sites: an agricultural pit, the Puna trail, and five traditional ahu (Hammatt and Bush (2000); a sinkhole burial (Bush et al. 2001); and a terraced depression and low wall (Haun and Henry 2001). The current project area has been subject to ground disturbance associated with sugar cultivation and commercial and residential development. Historic era remains in the general vicinity consist of 38 sites with 357 features.

The AIS fieldwork involved a pedestrian survey of the project area and subsurface testing. The AIS identified one archaeological site (Site 50-10-35-30889), a concrete slab which was interpreted as a historic foundation or walkway and four displace isolated objects, metal gear (Object 1), a concrete post (Object 2), two concrete platforms (Objects 3 and 4). Objects 1 and 2 were determined to be a part of the historic use of the project area, while Object 3 and 4 were a part of more recent use of the project area. Site 30889 is described as a formed concrete slab measuring 10.05 meters long and 1.86 meters wide. A test pit (Test Pit 2) was excavated adjacent to Site 30889 which yielded no cultural material. Site 30889 is in fair condition and is recommended for no further work based on adequate mapping, documentation, and photography. It has been assessed as significant under Criterion d. No cultural materials were identified near Objects 1 and 2. A test pit (Test Pit 1) was excavated near Object 2 which consisted of a similar depositional composition as Test Pit 2, an intact section of asphalt paving was identified in a corner of the test pit. Cultural materials were found in Layer I which consisted of bottle glass fragments and a metal bolt. Layer II had no cultural material. Cultural material in Layer III consisted of a piece of wire and a metal rod with a copper disc.

The report indicates that based on subsurface testing, the project area appears to have been modified by the introduction of fill material. The AIS indicates that a warehouse was located within the project area and removed in the early 1990s.

Site 30889 retains integrity of location, design, materials, and workmanship and is assessed as significant under Criterion d; it has yielded information important for understanding the historic use of the area. Mapping, written description, and photography adequately document this site, which will likely be affected by the proposed grading and development. No further work or preservation is recommended for Site 30889.

SHPD concurs with the report's significance assessments and treatment recommendation. Pursuant to HAR §13-284-7, SHPD's project effect determination is **no historic properties affected** for the proposed project. Pursuant to HAR §13-284-7(e) "When the SHPD comments that the action shall not affect any significant historic properties, the historic preservation review ends". The historic preservation review process has ended. Permitting for the subject project may proceed.

Attach to permit: In the unlikely event that subsurface historic resources, including human skeletal remains, structural remains, cultural deposits, sand deposits, or sink holes are identified during the demolition and/or construction work, cease work in the immediate vicinity of the find, protect the find from additional disturbance, and contact the State Historic Preservation Division at (808) 933-7651.

The revisions adequately address the issues and concerns identified in our previous correspondence. The report meets the requirements specified in HAR §13-276-5. **The report is accepted**. Please send via US mail two hard copies of the document, clearly marked FINAL, along with a copy of this review letter and a text-searchable PDF version to the Kapolei SHPD office, attention SHPD Library.

Please contact Scan Nāleimaile at (808) 933-7651 or at Sean.P.Naleimaile@hawaii.gov if you have any questions or concerns regarding this letter.

Aloha,

Alan Downer

Alan S. Downer, PhD
Administrator, State Historic Preservation Division
Deputy State Historic Preservation Officer

cc: Christian Kay (Christian.Kay@hawaiicounty.gov)
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1481-081018

FINAL

ARCHAEOLOGICAL INVENTORY SURVEY

TMK: (3) 2-2-033:011



WAIĀKEA AHUPUA'A

SOUTH HILO DISTRICT

ISLAND OF HAWAI'I

HAUN & ASSOCIATES

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1481-081018

FINAL

ARCHAEOLOGICAL INVENTORY SURVEY

TMK: (3) 2-2-033:011

WAIĀKEA AHUPUA‘ A

SOUTH HILO DISTRICT

ISLAND OF HAWAI‘I

Prepared by:

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and
Dave Henry, B.S.

Prepared for:

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August 2018

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MANAGEMENT SUMMARY

Haun & Associates conducted an archaeological inventory survey (AIS) of the 2.57 acre TMK: (3) 2-2-033:011 located in Waiākea Ahupua'a, South Hilo District, Island of Hawai'i. The objective of the AIS is to satisfy current historic preservation regulatory review inventory requirements of the Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD), as contained within Hawai'i Administrative Rules, Title 13, DLNR, Subtitle 13, Chapters 276 and 284, State Historic Preservation Rules.

The survey identified one site in the project area consisting of a concrete slab interpreted as an historic foundation or walkway (Site 50-10-35-30889[1]). The site is assessed as significant solely for its information content. The site has yielded information important for understanding historic activity in the area. The mapping, written descriptions and photography of Site 30889 adequately document it and no further work or preservation is recommended.

Four displaced isolated objects were also identified during the project. These consist of a metal gear (Isolated Object 1), a concrete post (Isolated Object 2), and two concrete platforms (Isolated Object 3 and 4). The displaced gear and the concrete post are probably associated with the historic use of the project area; however, the two concrete platforms were brought to the project area in the 1990s and were used to support cooling towers.

The proposed project consists of the construction of a warehouse and adjacent office building with associated infrastructure to be located in the southern portion of the project area. There are no immediate plans for the development of the remainder of the parcel. The proposed project will consist of mechanically grading the project area in advance of the construction activity. Site 30889 will potentially be impacted during future development. This activity will have no effect on historic properties because Site 30889 requires no further work or preservation.

Cover photo: Vegetation in e*astern portion of project area (view to south)*

[1] All sites listed on the State Inventory of Historic Places (SIHP). Site numbers are 5 digit sequential numbers by island : 50 = State of Hawai'i, 10= Island of Hawai'i, 35= Hilo quadrangle, 30889=Site number

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INTRODUCTION

At the request of Ms. Fumiyo Okuda of COLUMBUS East, LLC, Haun & Associates conducted an archaeological inventory survey (AIS) of the 2.57 acre TMK:(3) 2-2-033:011 located in Waiākea Ahupua'a, South Hilo District, Island of Hawai'i (**Figure 1** and **Figure 2**). The objective of the AIS is to satisfy current historic preservation regulatory review inventory requirements of the Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD), as contained within Hawai'i Administrative Rules, Title 13, DLNR, Subtitle 13, Chapters 276 and 284, State Historic Preservation Rules (DLNR 2003).

The developer, COLUMBUS East, LLC plans to construct a warehouse and adjacent office building with associated infrastructure within the southern portion of the project area (**Figure 3**). There are no immediate plans for the development of the remainder of the parcel. The proposed project will consist of mechanically grading the project area in advance of the construction activity. One archaeological site was identified during the project consisting of an historic concrete slab (Site 30889). This site was recommended for no further work. The site is located outside the area of proposed development but may potentially be impacted during future development. This AIS is prepared in conjunction with a Special Management Area (SMA) permit application for the County of Hawai'i Planning Department.

The survey fieldwork was conducted between April 13 and April 18, 2018 by Haun & Associates Project Supervisor Solomon Kailihiwa, M.S and a crew of four archaeologists under the direction of Dr. Alan Haun. Approximately 16 person days of labor were required to complete the fieldwork portion of the project. Described in this final report are the project scope of work, field methods, background information, survey findings, and significance assessments of the sites with recommended treatments.

Scope of Work

Based on DLNR-SHPD rules for inventory surveys the following specific tasks were determined to constitute an appropriate scope of work for the project:

1. Conduct background review and research of existing archaeological and historical documentary literature relating to the project area and its immediate vicinity--including examination of Land Commission Awards, *ahupua'a* records, historic maps, archival materials, archaeological reports, and other historical sources;
2. Conduct a high intensity, 100% pedestrian survey coverage of the project area;
3. Conduct detailed recording of all potentially significant sites including scale plan drawings, written descriptions, and photographs, as appropriate;
4. Conduct limited subsurface testing (manual excavation) at selected sites to determine feature function;
5. Analyze background research and field data; and
6. Prepare and submit Final Report.

Project Area Description

The project area is a rectangular shaped 2.57 acre parcel located in Waiākea Ahupua'a between approximately 15 to 20 ft elevation. All elevations presented in this report are in feet above mean sea level (AMSL). The parcel is bordered to the south by Piilani Street and by vacant land to the north, west and east. The proposed extension of Mililani Street will extend along the west side of the parcel and the proposed Wehilani Street will extend along the north side (see **Figure 3**). **Figure 4** is an aerial view of the project area vicinity taken on January 21, 2013. The Waiākea Fish Pond is located to the west of the project area.



Figure 1. Portion of 1995 7.5' Hilo quadrangle showing project area parcels

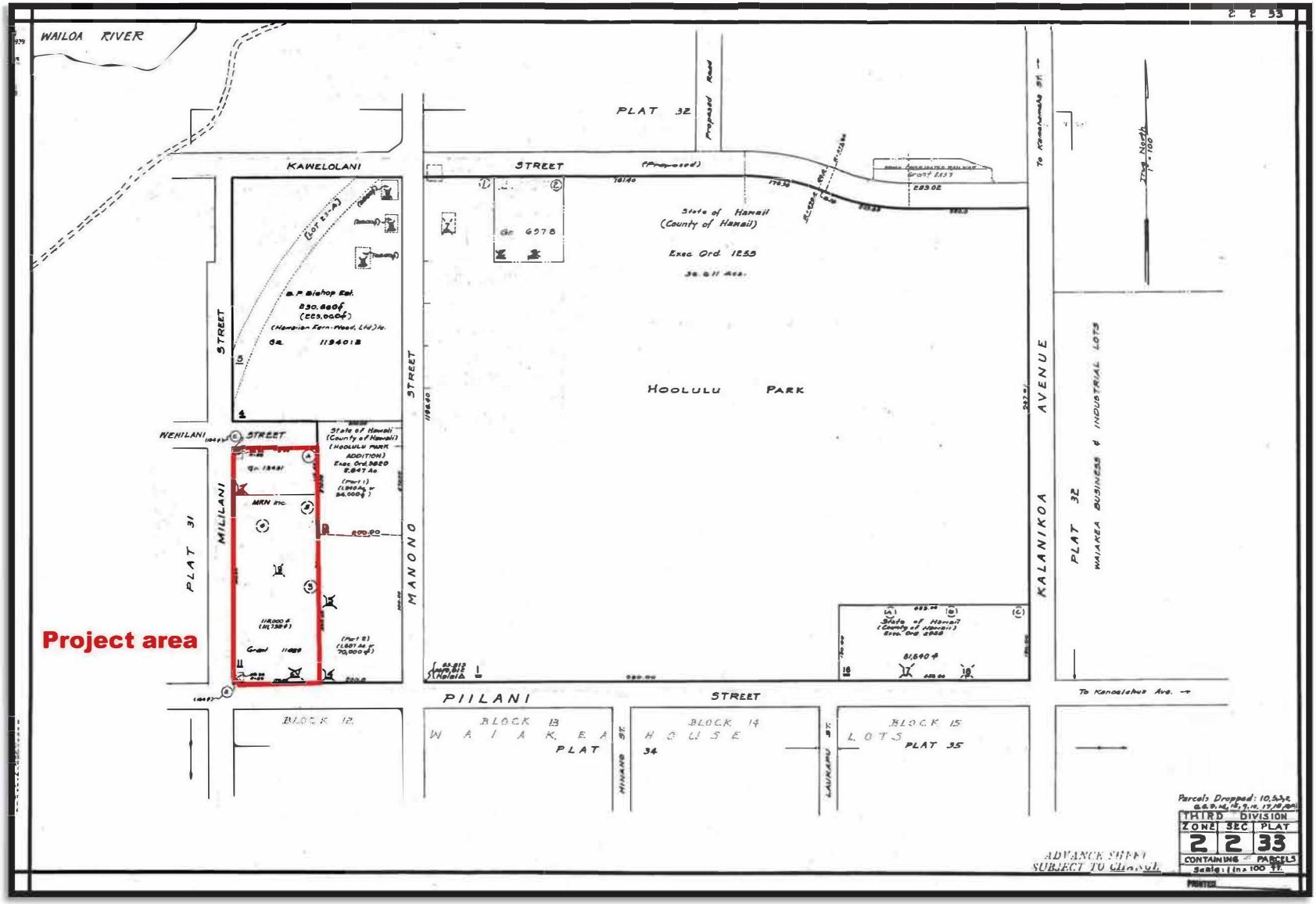


Figure 2. Tax Map Key 2-2-033 showing project area

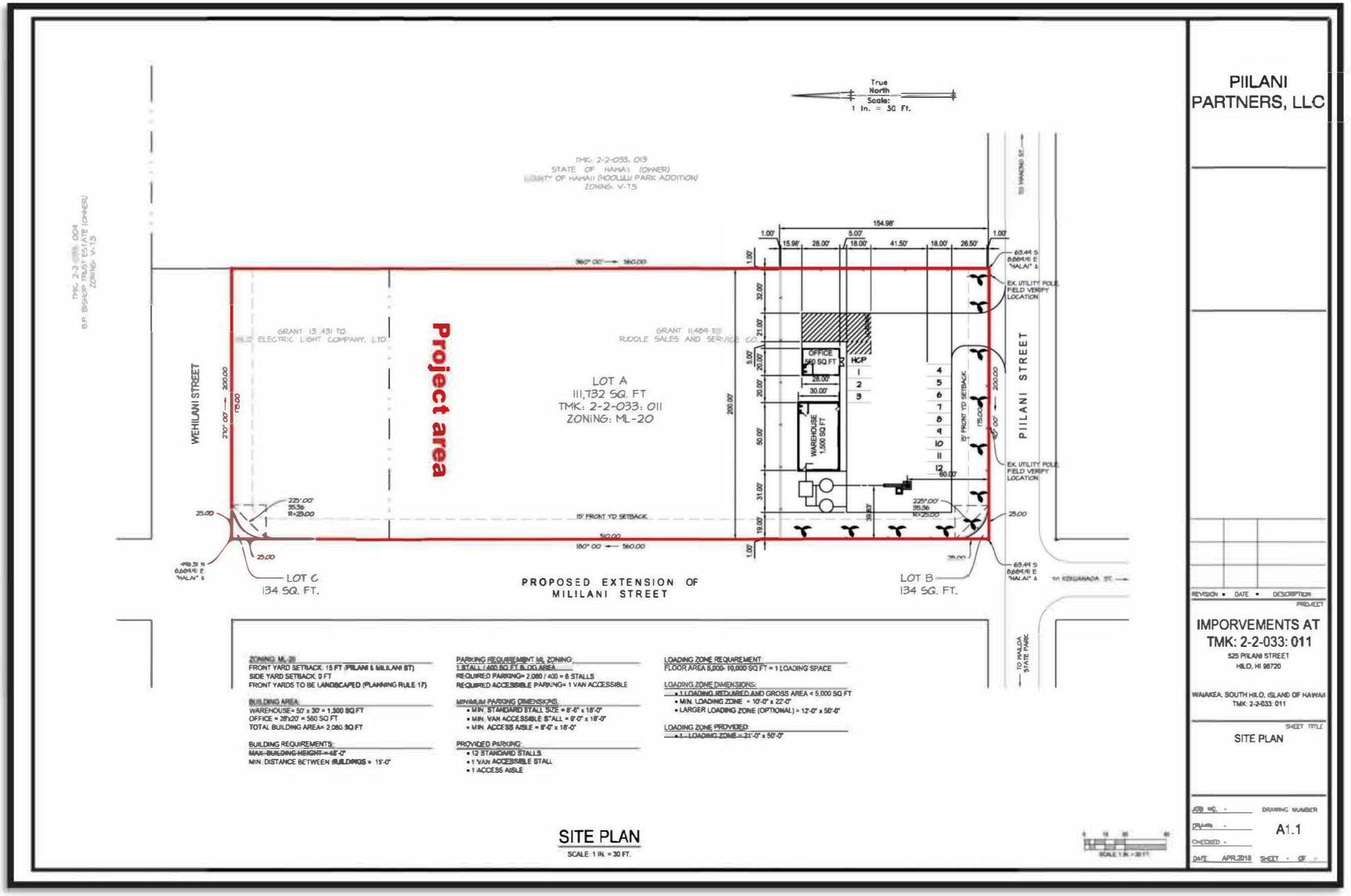


Figure 3. Proposed development within project area

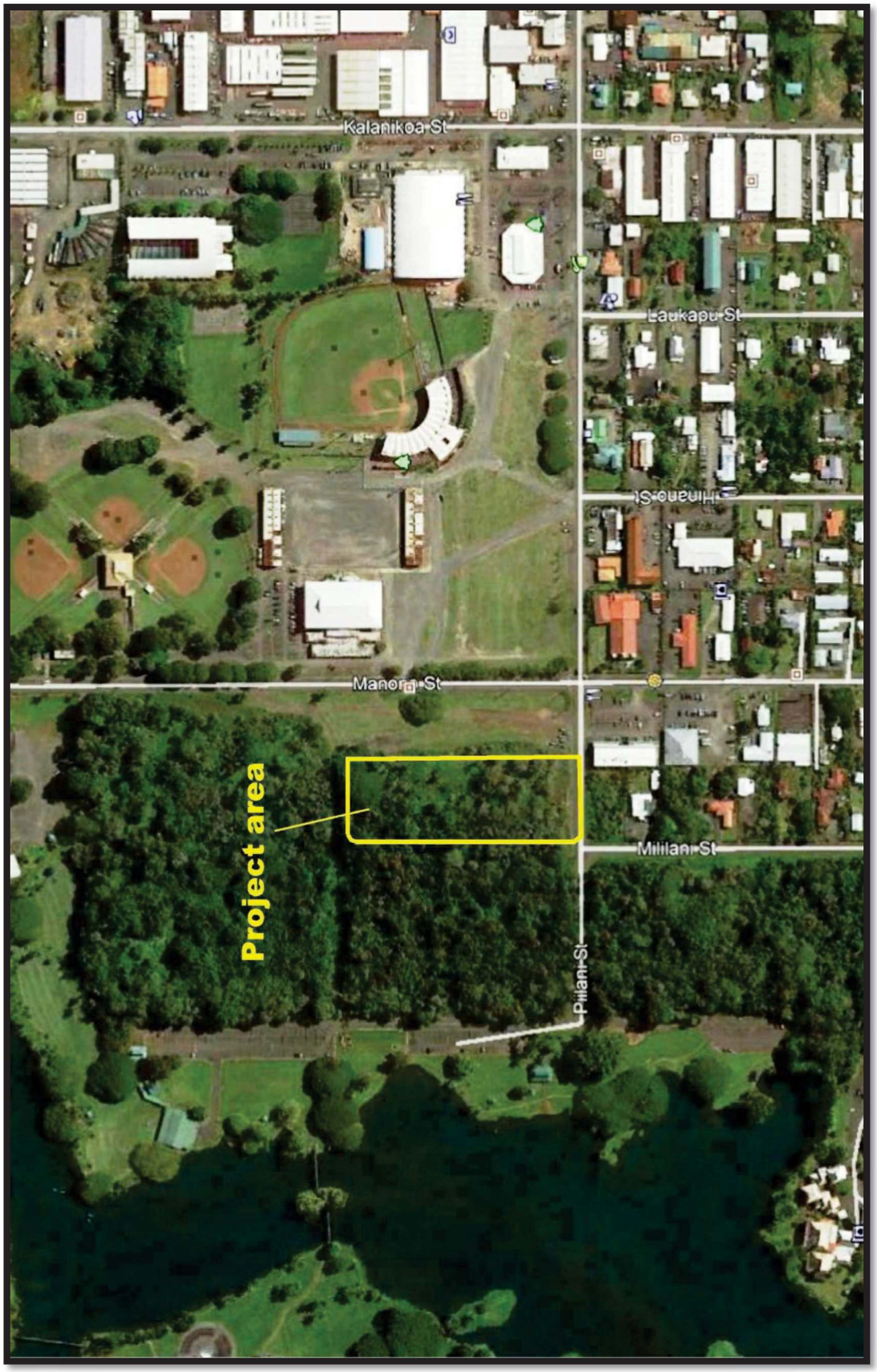


Figure 4. January 21, 2013 Aerial view of project area (from Google Earth)

The vegetation in the project area consists of bingabing (*Macaranga mappa*), tropical ash (*Fraxinus uhdei*) and banyan (*Ficus benghalensis*) trees, areca palms (*Areca catechu*), and various grasses and vines. The eastern half of the parcel is comprised of dense grass and trees that have been taken over by vines (see cover photo of this report). The western portion has a high canopy of trees with little grass (**Figure 5**). There is modern trash scattered throughout the parcel indicating the area has served as an informal dump for local residents (**Figure 6**).

The terrain throughout the project area is relatively level soil. The soil is Keaukaha extremely rocky muck on 6-20% slopes (rKFD). This soil consists of a surface layer of dark brown muck (8") over pahoehoe bedrock (Sato et al. 1973:27). The Keaukaha soil has rock outcrops over 25% of the surface, has a rapid permeability, a medium runoff and a slight erosion hazard. It also is primarily in native forest with cleared areas suitable for pasture. The underlying lava was deposited 750 to 1,500 years ago from Mauna Loa Volcano (Wolfe and Morris 2001:11 and Sheet 2).

Annual rainfall in the vicinity of the project area ranges from 3,550 to 4,400 mm (140 to 173 inches; Giambelluca et al. 2013). The mean average temperature in this general area is approximately 73.8 degrees F (usclimatedata.com). There are no surface water sources present in the project area. The project area is located approximately 600 meters inland from the shoreline at Hilo Bay and the mouth of the Wailea River (see **Figure 1**).

Methods

Archival research was conducted at the Hamilton Library Hawai'i and Pacific Collection at the University of Hawai'i at Manoa, the University of Hawai'i at Hilo Hawaiian Collection, the Land Survey Office and the Archives Division of the Hawai'i Department of Accounting and General Services, the Bishop Museum Archives, the State Historic Preservation Division library in Hilo, the State Survey Division, and the Hawai'i State Public Libraries in Honolulu and Hilo.

The field work portion of the project consisted of a 100% surface examination of the parcel with the surveyors walking transects at 10-meter intervals. Ground surface visibility throughout the parcel was fair to excellent. The features identified during the survey were flagged with pink and blue flagging tape and their locations were determined with the aid of a Garmin Global Positioning System (GPS) Model 60-series device using the North American Datum (NAD) 1983 datum. The accuracy of the GPS device for a single point is +/- 3-5 m. This accuracy was increased to approximately 2-3 meters by taking multiple points including property corners and overlying the plotted points on a scaled map using AutoCAD software.

The boundary for the sites documented during the project was defined based on proximity and probable age. Features that are likely of similar age (prehistoric, historic) and are less than 15 meters apart are considered to be one site. The sites in the project area were documented by preparing scaled plan maps, completing standardized site and feature forms, and photographic documentation.

A total of 2.0 sq meters of excavation was conducted during the project. Test Pit 1 was situated in the southern portion of the project area and Test Pit 2 was located adjacent to the Site 30889 concrete slab. The test pits were excavated in arbitrary levels within stratigraphic layers. Test Pit 1 was terminated on the bedrock substrate and Test Pit 2 was terminated in a culturally sterile deposit. The soil removed during excavation was screened through ¼ inch mesh hardware cloth. Following the excavation, a section drawing depicting the stratigraphy was prepared and post-excavation photographs were taken. The test pits were described using standard terminology, referencing USDA Soil Survey descriptions and Munsell Soil and Rock color notations. Texture and inclusion content were also noted. Cultural material recovered during the excavations was placed in paper bags labeled with the appropriate provenience information and transported to Haun & Associated laboratory for analysis.



Figure 5. Vegetation in western portion of the project area (view to east)



Figure 6. Modern debris within project area

ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

Historical Documentary Research

The project area is situated in the *ahupua'a* of Waiākea in South Hilo District. The *ahupua'a* is one of the largest in the district covering over 95,000 acres. The *ahupua'a* extends along the coast from the west side of Hilo Bay to the Puna District boundary and inland to approximately 6,000 ft elevation. Much of the following is summarized from *Hilo Bay: A Chronological History* (Kelly et al. 1981), an extensive and thorough compendium of historical information about Hilo including Waiākea.

Hawaiian traditional and legendary accounts attest to the longstanding importance of Waiākea. The chief of the Hilo region, Kulukulu'a, who resided in Waiākea, was the first conquest of 'Umi-a-Liloa in his campaign to unify the districts of Hawai'i Island. Hilo with its large bay, fishponds, wet taro fields, and abundant freshwater was a population center for commoners and royalty. Kamehameha I and his court resided in Hilo in the 1890s. In preparation for his planned invasion of Kauai in 1802, Kamehameha built a canoe fleet at Hilo, reportedly consisting of 800 vessels.

In 1824, a missionary station was established in Waiākea. Soon after, churches and schools were established. Whalers began stopping at Hilo in the mid-1820s. In the 1830s, a sawmill was built, and two stores were opened. By the end of the decade, a sugar cane plantation and mill were established on Ponahawai lands. By 1857, there were three sugar cane mills in the Hilo area. A sugar mill was established in Waiākea at the inland end of Waiākea Fishpond in the late 1870s. By 1880, 1,400 acres of sugar cane were in cultivation and by the end of the decade over 5,600 acres were cultivated. In the 1900s, the population of Hilo grew dramatically with the expansion of sugar cane cultivation, pineapple production, the timber industry, and other commercial developments.

Early historic accounts also document the importance of Hilo. In 1823, Ellis estimated the population to be 2,000 people in 400 houses. Ellis described the extensive use of *lauhala* thatch in house construction in Hilo. He described the land as intensively cultivated with plantains, bananas, sugar cane, taro, potatoes, melons, coconuts and breadfruit. Wet taro was grown in marshland mounds (*kipi*). Hilo was a center for trade among the people of Ka'u, Hamakua, and Hilo. Between the 1790s and 1820s, sandalwood was cut and brought to Hilo for export. *Pulu* from tree ferns and *pia* (arrowroot) were also exported. Ellis also describes coastal fishing.

In the 1840s, political acts of the Hawaiian Kingdom government would change the land tenure system in Hawai'i. All lands were segregated into one of three categories: "Crown Lands" owned by the occupant of the throne, "Government Lands" controlled by the state, and "*Konohiki* Lands" controlled by the chiefs; and "were all subject to the rights of native tenants" (Chinen 1958:29, Beamer 2014:143). In 1846, King Kamehameha III appointed a Board of Commissioners commonly known as the Land Commissioners, to "confirm or reject all claims to land arising previously to the 10th day of December, AD 1845." Notices were frequently posted in *The Polynesian* (Moffat and Kirkpatrick, 1995); however, the legislature did not acknowledge this act until June 7, 1848 (Chinen 1958:16; Moffat and Kirkpatrick 1995:48-49) and the act is known today as *The Great Māhele*. In 1850, the Kingdom government passed laws allowing foreigners to purchase fee simple lands (Speakman 2001:91). The Kuleana Act of 1850 allowed for fee simple land ownership by commoners.

The Waihona 'Aina (2000) Māhele Database; which is a compilation of data from the Indices of Awards (Indices 1929), Native Register (NR n.d.), Native Testimony (NT n.d.), Foreign Register (FR n.d.) and Foreign Testimony (FT n.d.) provides information on the Land Commission Awards (LCA) during the Māhele The Waihona 'Aina database (2000) lists 51 parcels claimed by 37 claimants within Waiākea in the mid-1800s (**Table 1**). All claims are for parcels

Table 1. Land commission Awards in Waiākea Ahupua'a

Apana awarded	Section	Ili	Land Use	Boundary North	Boundary East	Boundary South	Boundary West	Date Rec'd	Giver	Acre
1		Keawe Kapu	cultivated	Konohiki's waste land	Mikaeleiki	Kainea	Kainea		Konohiki Pea	4.4
1		N/D	cultivated, partly fenced	Kaulu	Kamanuhaku	Konohiki's waste land	Kalua		Parents	1.6
0		N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
0		Alenoho	house lot	N/D	N/D	N/D	N/D	N/D	N/D	N/D
0		Kolea	cultivated	N/D	N/D	N/D	N/D	N/D	N/D	
1		Kolea	planting plot	konohiki	ocean	Kekuanaoa	Kaihenui's house	1847	Kapuaakuni	0.6
1		Alenoho	cultivated field	Waiiani	Kahauai	Kaluahino	Kahue	1840	Kuiana	2.2
0		Alenoho	cultivated field	Kukuau	Manu	Kalana Stream	Kahue	1841	Kaiana	0
1		Kamakola	cultivated with 6 houses	Ili Ohelo	Pouoki's field	Mihaeleiki	road beside river	1843	Konhiki Pea	2.9
0		Puainako	house lot with 2 houses, grave	waste land	road to Volcano	waste land	waste land	1847	Kaunuohua	0
1		Alenoho	house lot	Kaapa	new road	waste land	waste land	1847	Kaunuohua	10.2
1		Kalihi	partly enclosed with 5 houses	Ili Alenoho	Ili Kolea	Ili Koloa	stone wall/gov't land	1841	Pea	12.2
0		Koleaiki	breadfruit tress, sweet potatoes, coffee	Kauhopu	Ili Koleanui	Ili Kalili	Ili Alenoho	1847	Konohiki	0
1		N/D	2 kihapais; hala grove	Kukuau Ahupua'a	konohiki	Kahue	konohiki	1844	Kahue	5
1		Kialoa 1	house lot with 4 houses; breafruit and kukui trees	konohiki	Ili Kinaauauwai	konohiki	Ili Kealou 2	Kam. 1 time	parents	1.3
1		N/D	N/D	Keaniho	konohiki	konohiki	konohiki	1844	Kaiana	3.7
0		Alenoho	2 cultivated fields	Aiko	stream	konohiki	main road	N/D	N/D	0
0		N/D	uncultivated	konohiki	konohiki	konohiki	konohiki	1847	Kamahiai	0
1		Hinaauauwai or Mahina auwai 5	4 kihapai; two houses	konohiki	Ili Haanaauauwai 1st	konohiki	Ili Kialoa/Kaiholena	Kam. 1 time	parents	4.2
1		Kolea						Kam. 1 time	parents	1.2
	1		house lot with 3 houses	Barenaba	Barenaba	Samuela	Keaonui			
	2		cultivated field	Barenaba	Samuela	Ili Waiuli	Kukaiholo			
	3		uncultivated with one house	Ili Walenoho	Pahulu	konohiki	Kupelea			
1		Kalonoho	cultivated with house	gov't land	gov't road	Moealoha	konohiki	Kam. 1 time	Makaimo	1.0
1		Kalonoho	3 field & 1 house	Kaiana	Alanui	Baranaba	konohiki	1839	Makaino	1.0
1		Kanahana	3 wet taro plots & 2 houses	fishpond	Ili Kuahua	konohiki	Ili Kaapea	1834	Kuahopu	1.0
1		Puahua	2 cultivated fields	konohiki	Ili Kialoa	Nakai	Ili Hanahaiau	1841	Konohiki Pea	0.2
2		Piopio								13.1
	1		4 cultivated kihapai & 2 houses	Kolea	Kaihenui	Niihau	Kalua			
	2		1 cultivated kihapai	Kekuaaoa's garden	Kaaiana	Kaihe	Kaihenui			
	3		1 kihapai taro mounds	Niihau	Kane	N/D	N/D			
	4		6 taro mounds	Kane	konohiki	Kauhi	Kaiamo			
	5		uncultivated	idle land	idle land	Samuela	Ili Alenoho			
	6		2 cultivated fields	Kahalelalu	idle land	Samuela	Kaihenui			
1		Piopio	N/D	N/D	N/D	N/D	N/D	N/D	Kamehamhea I	
0		Kalulunui	2 cultivated kihapai, road through lot	konohiki	konohiki	konohiki	konohiki	1847	Kamahiai	0
			pasture, cultivated plot, 2							

Table 1. Land Commission Awards in Waiākea ahupua'a (cont.)

Land Use	Boundary North	Boundary East	Boundary South
house lot	Kaulu	Kamanonaha	fishpond
cultivated	konohiki	konohiki	Kaehunui
3 cultivated fields	Kuahopu	Kauhi	Holeaniu
1 cultivated field	Heienui	Kuahope	konohiki
formerly cultivated	N/D	N/D	N/D
uncultivated	Kona	Nuihao	Kaniahiai
partly cultivated	Apua	Nuihao	Kaniahialio
partly cultivated	Aua	Nuiliae	Kaniahiai
uncultivated	Apua	konohiki	fishpond
3 fields & house	Kamaheii	konohiki	fishpond
house	Halai	sea	Barenaba
1 cultivated field & 1 house	Kuallaupu	konohiki	cart road
N/D	Kealiko	Beakey	konohiki
N/D	Wāhinealua	road	Barenaba

situated along the coast and immediately inland along the lower reaches of the Wailoa River less than 0.5 mi inland. No land commission awards are present within the project area.

Twenty-six parcels were awarded to 24 claimants. Chiefess Kamamalu was awarded the entire *ili* of Pi'opi'o under Land Commission Award (LCA) No. 7713. The remaining claims are for *kuleana* parcels ranging from 0.24 to 13.14 acres in area with an average of 3.6 acres. All, except five claims, were for single parcels. The testimonies for several awarded *kuleana* include claims for parcels that were not awarded.

The claim testimonies refer to 18 *ili* land divisions. Five *ili*; Kalonoho, Alenoho, Kolea, Pi'opi'o and Paeaahu; are mentioned two or more times and apparently were linear strips of land extending inland from the coast. *Ili* Kalonoho was situated next to the western *ahupua'a* boundary with Kukuau. Alenoho was the next *ili* to the east followed by Kolea, Pi'opi'o and Paeaahu. The latter two *ili* bordered the west bank of Wailoa River and Fishpond. Six *ili* for LCAs on the east side of the river, from the river mouth inland, consist of Kamakola, Keawe Kapu, Kialoa, Hinaauauwai, Puahua, and Kanahana. Kalihi was situated inland between Alenoho and Kolea. The geographic location of the remaining *ili* cannot be determined because they are mentioned in testimony for claims that were not awarded.

Land use described in the LCA claim testimony included agriculture, pasture, burial, and residence. Thirty-four houses are mentioned and LCA 2274 also describes the presence of a grave. Most of the claim testimony mentions cultivated fields. Crops include wet taro, sweet potatoes, breadfruit, coffee, and *kukui.* A *hala* (*Pandanus* spp.) grove and fishponds are also mentioned.

By 1857, there were three sugar cane mills in the Hilo area. Large tracts of land were put in cane cultivation and sugar cane was also grown by individuals around their houses. A sugar mill was established in Waiākea at the inland end of Waiākea Fishpond in the late 1870s. A railroad transport system was constructed for the Waiākea Mill between 1879 and 1880. **Figure 7** is a portions of Lyon's 1882 Register Map No. 892 obtained from the Archives Division of the Hawai'i Department of Accounting and General Services (http://ags.hawaii.gov/survey/map-search). This map shows the Waiākea Mill, located to the southwest of the project area, a wharf and the extent of an 1881 lava flow from Mauna Loa that threatened Hilo.

Between the 1860s and 1880s there were two wharf facilities on the west side of Waiākea Point, one on the Wailoa River, and on the west side of the bay at the foot of Waianuenue Street . By 1880, 1,400 acres of sugar cane were in cultivation and by the end of the decade over 5,600 acres were cultivated. In the 1900s, the population of

Hilo grew dramatically with the expansion of sugar cane cultivation, pineapple production, the timber industry, and other commercial developments.

Between 1900 and the 1930s, the population of Hilo grew dramatically with the expansion of sugar cane cultivation, pineapple production, timber industry and other commercial developments. In the 1910s, the Hilo Railroad Company expanded the rail system to Puna and Hilo Town. A railroad wharf was built north of the mouth of the Wailoa River. Between 1909 and 1913, the railroad was extended to the North Hilo and Hamakua Districts.

The opening of the Panama Canal and anticipated increase in trans-Pacific shipping lead to serious efforts to build a breakwater to protect shipping in Hilo Bay. Construction of the breakwater began in 1908. The breakwater was initially planned for a location just east of Coconut Island, but the plan was modified and the selected site was approximately 6,000 ft east of the island. The initial plans called for a 10,000-ft long breakwater along Blonde Reef. Stone for the structure was brought by railroad from quarries in Puna and Waiākea. The breakwater was completed in 1929.

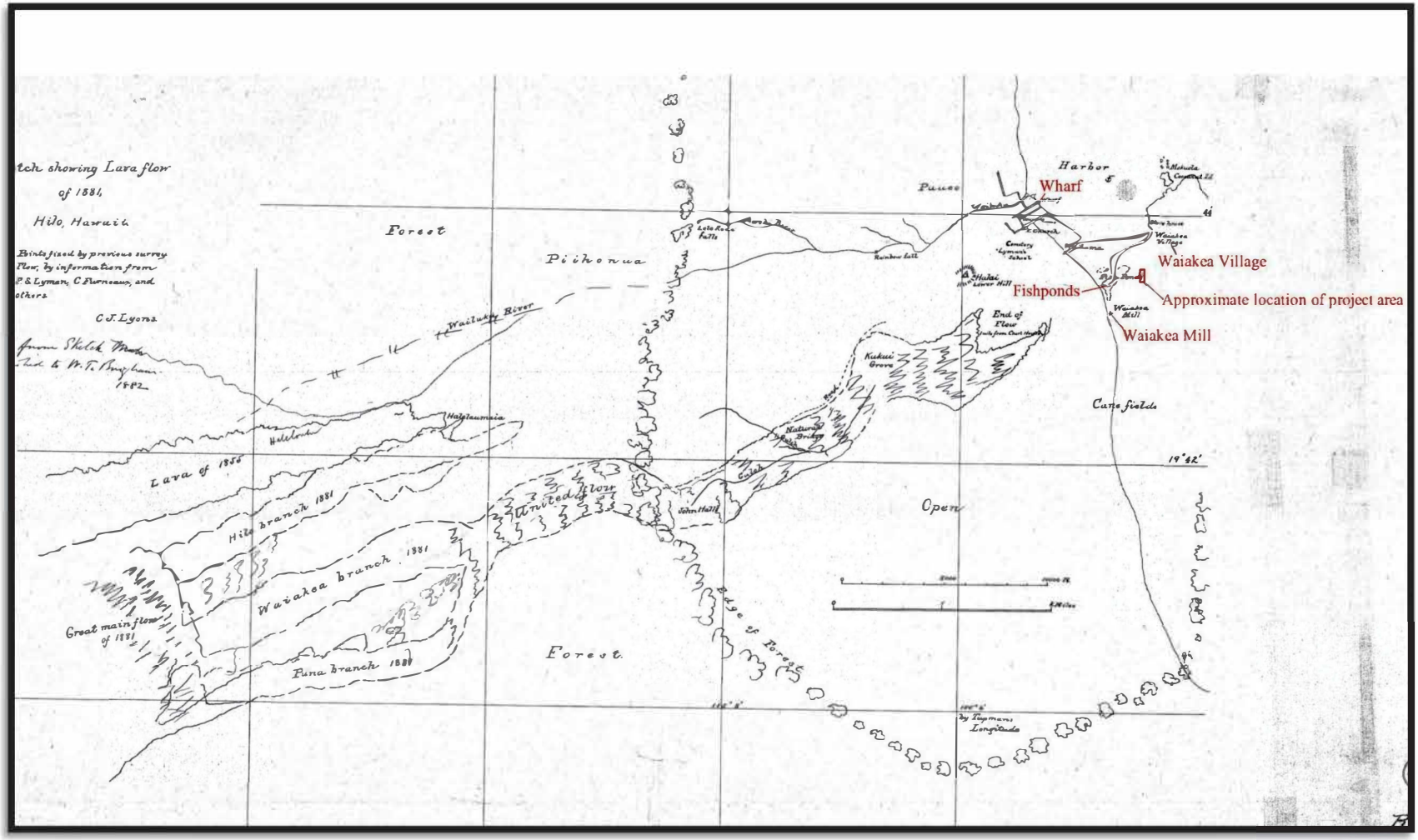


Figure 7. Portion of Lyon's 1882 Register Map No. 892 showing approximate locations of project area

By the 1910s, the existing railroad and government wharf facilities were inadequate to support shipping. In 1912, the Territorial Government contracted the construction of a new wharf approximately one mile east of Coconut Island and dredging of the adjacent portion of the bay. The new wharf, designated Kuhio Wharf, was completed in 1916. From the beginning, the wharf was congested and plans for a second wharf were made. Construction of the wharf began in 1921 and it was completed in 1923. A third wharf was completed in 1927.

In 1932 a Canec manufacturing plant was constructed along Waiākea Pond, located between the Waiākea Mill site and the project area. Canec was the brand name for a fiber board made from bagasse, the byproduct of sugarcane. **Figure 8** is a mid-20th Century map of the Hilo area prepared by the Work Projects Administration (WPA) showing the location of the Canec plant and the project area, obtained from the Archives Division of the Hawai'i Department of Accounting and General Services (http://ags.hawaii.gov/survey/map-search). The map also shows the railroad line extending past the project area to the west.

The following description of the Canec plant is provided by Peter Young as follows:

> Between 1879 and 1948, Waiākea Mill Company conducted mill operations at Waiākea Pond. Bagasse – a by-product of sugarcane – became a secondary industry, first as a fuel for the mills' boilers, then as the main ingredient for a wallboard product.
>
> As commercial fuel oils became increasingly available in the late 1920s, the use of bagasse as a fuel declined. This byproduct of production was then creatively used to manufacture a wallboard product for construction.
>
> In 1929, Hawaiian Cellulose Ltd, a subsidiary of the Waiākea Mill Company applied for a patent for the manufacture of it. (County of Hawai'i)
>
> On May 23, 1930, "The leading plantation agencies and a group of business men organize a $2,250,000 corporation for the manufacture of wallboard and other universally used bagasse fiber products. The name chosen was the Hawaiian Cane Products, Limited." (The Friend, June 1930)
>
> Later that year, the directors of the company "authorized the purchase of a one-hundred-ton daily capacity plant for the manufacture of insulating board from bagasse." (The Friend, October, 1930) (It ended up costing $2.5-million.)
>
> April 27, 1932, the company's Hilo plant (at Waiākea, adjoining Wailoa Pond) was opened; the company emphasized "the overseas distribution for which the industry aims." (The Friend, June 1, 1932) (By 1934, "five carloads were shipped ... to Manchuria." (Friend, July 1, 1934))
>
> Canec was originally the brand name for pressed fiber board made by Hawaiian Cane Products, Ltd., but it has become commonly used to refer to all pressed board of this type.
>
> It was formed into sheets similar in size to drywall, as well as other sizes for use as ceiling and wallboard. Canec was used for interior ceilings and walls in many residential and commercial structures throughout the state of Hawai'i. (DOH)
>
> Reportedly, Charles William Mason, a Scotsman who ended up in Ola'a on the Island of Hawai'i in 1919, was the inventor of Canec. Mason became the superintendent of Hawaiian Cane Products Company, Ltd., located in Hilo near the site of the Waiākea Mill Company. (Johnston)
>
> The use of Canec as a building material in Hawai'i gradually expanded during the 1930s, but greatly accelerated after World War II when construction volume rapidly increased.

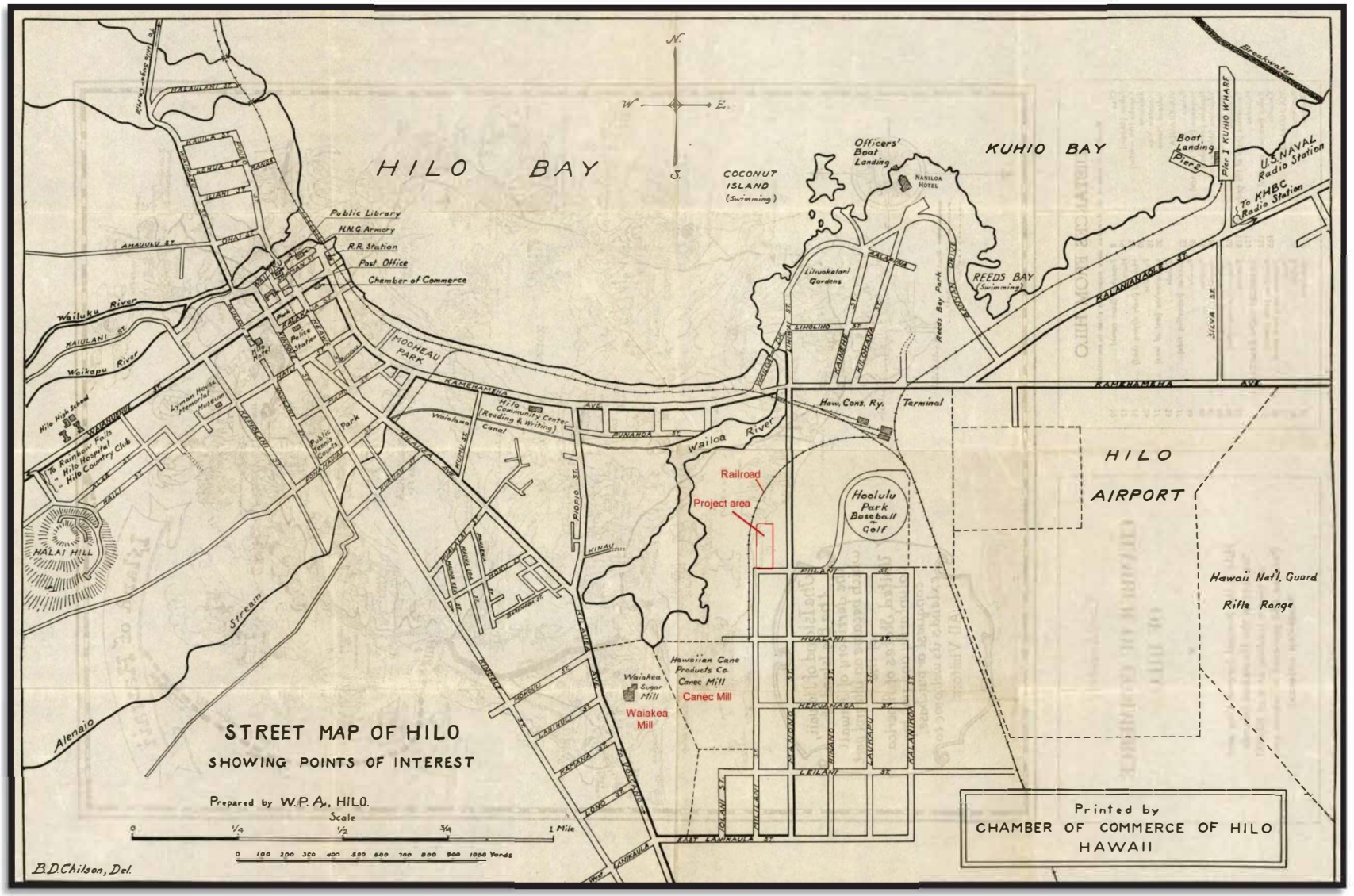


Figure 8. Mid-20th Century map of Hilo

> It was estimated that from the twelve plantations contributing bagasse to the canec plant, one million tons of bagasse would be available for the production of wallboard.
>
> Hawaiian Cane Products was sold to the Flintkote Company in 1948. That year, the Hilo plant manufactured 120,000,000-square feet of canec panels; from 1945 to 1955; the majority of the housing in the Islands featured cane walls and/or ceilings. (HHF) Some suggest the canec plant was destroyed by the May 23, 1960 tsunami that devastated Hilo; actually, a fire destroyed the canec plant a month earlier (April 3, 1960.)
>
> In 1971, the hotel complex known now as Waiākea Villas was built on the canec plant site (the adjacent Waiākea plant millpond was made part of Wailoa River State Park. (Young 2016 – imagesofolfhawaii.com)

Several devastating tsunamis have impacted the coastal Hilo area in the immediate vicinity of the project area. In 1877, a 16-ft high tsunami struck the coast of Waiākea destroying all houses within 100 yards of the shore along with a wharf, storehouse, a quarantine hospital on Coconut Island and a bridge. On April 1, 1946, a 7.1 magnitude earthquake occurred in the Aleutian Islands, generating a 50 ft high tsunami that struck Hilo, killing 159 people. (Hawaiimagazine.com)

Smaller tsunamis struck the area in 1952 and 1957, causing little damage to the Hilo area. Unfortunately, because of this many coastal Hilo residents refused to evacuate on May 23, 1960, when an 8.3 magnitude earthquake in Chile triggered a series of waves that struck the area (*ibid.*). Many that did leave returned when the first of the waves measured only 3 feet in height; however, subsequent waves would grow to a maximum height of 35 feet, resulting in the death of 61 people. Due to the devastation of the 1946 and 1960 tsunamis, much of Hilo's bayfront was not rebuilt and is now comprised of grassy park areas.

Figure 9 is an aerial photograph of the area taken in January 16, 1965 obtained from the University of Hawai'i at Manoa online library (http://magis.manoa.hawaii.edu). This photograph shows a large structure present within the project area. According to Suisan Company's property manager Mr. Harvey Taira, the properties manager for the Suisan Company has owned the property since the 1990s. He said that the parcel formerly contained a warehouse used for receiving fresh produce, and a dilapidated Quonset hut that was not used. Both of these structures were removed in the early 1990s. Potential remnants of this facility were identified during the present project, discussed in the Findings section of this report.

The northern portion of the project comprising approximately 23,000 sq feet (0.52 acres) was formerly designated as TMK: (3) 2-2-033:012 (see **Figure 2**) owned by the Hawaii Electric Light Company (HELCO) under Grant 13431. This areas was subsequently added to the adjacent Parcel 11, which was owned by Ruddle Sales and Service Company under Grant 11489 (see **Figure 2** and **Figure 3**).

In summary, historical documentary research indicates that the shoreline along Hilo Bay was intensively settled and cultivated. In the early 1800s, missionaries established a station at Hilo because of its large population, abundant freshwater and cultivation potential. Soon churches and schools were established. Whalers stopped at Hilo because of the protected anchorage and availability of freshwater and provisions. Sugar cane cultivation, cattle ranching, and trade rapidly changed the traditional subsistence economy during the early to mid-1800s. By the late 1800s, vast areas were producing sugar cane and large scale timber harvesting was underway. Transportation infrastructure included a railroad system and wharf facilities. The area underwent a dramatic increase in population as people came to the area to work for the plantations and other commercial enterprises. Despite the destructive effects of the multiple tsunamis that have impacted the area, Hilo continues to thrive as the largest community on the eastern coast of Hawai'i Island, due in large part to the resilience of the Hilo residents.



Figure 9. January 16, 1965 aerial photograph of project area

Previous Archaeological Research

A search of the DLNR-SHPD archaeological report database and other sources identified 29 archaeological projects in Waiākea; however, no previous archaeological work has been conducted in the project area. **Figure 10** shows the project locations and **Table 2** summarizes the projects. Not included in the figure or table are the studies by Stokes (Stokes and Dye 1991), which focused on major sites, primarily *heiau* throughout Hawai'i Island, a survey of east Hawai'i by Hudson (1932), the fishpond study of Kikuchi (1973), and the general, primarily archival, studies of McEldowney (1979) and Moniz (n.d.). None of the previous studies included the current project area. Stokes (Stokes and Dye 1991), relying in part on the earlier observations of Thrum, listed six *heiau* for the Hilo area; however, all were destroyed at the time of Stokes fieldwork in 1906. Ohele Heiau, a *luakini* temple, was reported for Waiākea.

The surveys in **Table 2** cover 1,800 acres of Waiākea between sea level and 5,100 ft elevation. The only traditional Hawaiian sites identified in the vicinity of the project area are an agricultural pit, the Puna Trail, and five *ahu* reported by Hammatt and Bush (2000), a sinkhole containing a human burial identified by Bush et al. (2000), and a terraced depression and associated low wall identified by Haun and Henry (2001). Hammatt and Bush attribute the absence of traditional sites to the massive ground disturbance of sugar cane cultivation and commercial and residential development of the Hilo area. Historic remains identified by the surveys consist of 38 sites with 357 features. Nearly all of the identified features are the result of stone clearing for sugar cane cultivation.

Table 2. Previous archaeological work in Waiākea

Author	Study Type*	Elevation (Ft AMSL)	Acreage	Historic Use	No of sites	No of Feas	Traditional Features	Historic Features
Kam (1983)	Archival research	0-5	1	None	1	1	*Heiau*	-
Haun and Henry (2000)	Inventory survey	0-15	20	Port	1	4	-	4
Walker and Rosendahl (1996)	Field inspection	0-460	130	Sugar cane/ developed	5	5	-	1
Haun and Henry (2001)	Inventory survey	35-40	66	Ranching/Air Field	4	5	Terraced depression and wall	3
Devereux, Borthwick, Hammatt and Orr (1997); Hammatt and Bush (2000); Wheeler, Bautista, Wilkinson and Hammatt (2014)	Reconnaissance, Inventory survey	40-80	504	Military	4	8	Pit, 5 *ahu*, and Puna Trail	3
Haun and Henry (2008)	Assessment	59-78	4.0	Sugar cane	0	-	-	-
McGerty and Spear (1999)	Inventory survey	70	3	Sugar cane	1	13	-	13
Maly, Walker and Rosendahl (1994); Spear (1995)	Inventory survey, Data recovery	70-80	5	Sugar cane	4	51	-	51
Kennedy and Ireland (1994)	Reconnaissance	70-80	8	?	0	-	-	-
Carson (1999)	Inventory survey	98-131	176	?	0	-	-	-
Haun and Henry (2016)	Assessment	100-105	5	Flood control	0	-	-	-
Borthwick and Hammatt (1993)	Inventory survey	120-140	11	Sugar cane	-	4	-	4
Rechtman and Henry (1998)	Inventory survey	120-205	40	Sugar cane	1	117	-	117
Borthwick, Collins, Folk and Hammatt (1993)	Inventory survey	140-330	163	Sugar cane	4	47	-	47
Haun and Henry (2007)	Assessment	151-183	1.4	Sugar cane	0	-	-	-
Hunt (1992); Hunt and McDermott (1993); Robins and Spear (1996); Elbe,Denham and Pantaleo (1997); Spear (1998); McGerty and Spear (1999); Dega (2000)	Reconnaissance, Inventory survey, Excavation	200-1500	106	Sugar cane	11	88	-	88
Robins, Fortinii and Spear (1996)	Inventory survey	200-1500	264	Sugar cane	3	18	-	18
Rosendahl (1994)	Field inspection	250-290	11	?	1	1	-	-
Escott (2004)	Inventory survey	300-380	258	Sugar cane	6	80	-	80
Bush, McDermott and Hammatt (2000); McDermott and Hammatt (2001)	Inventory survey	300-360	20	Sugar cane	1	1	Sinkhole w/burial	-
Rechtman (2001)	Inventory survey	5000-5100	5	Ranching	0	-	-	-
		Total	**1800**		**42**	**366**		**357**

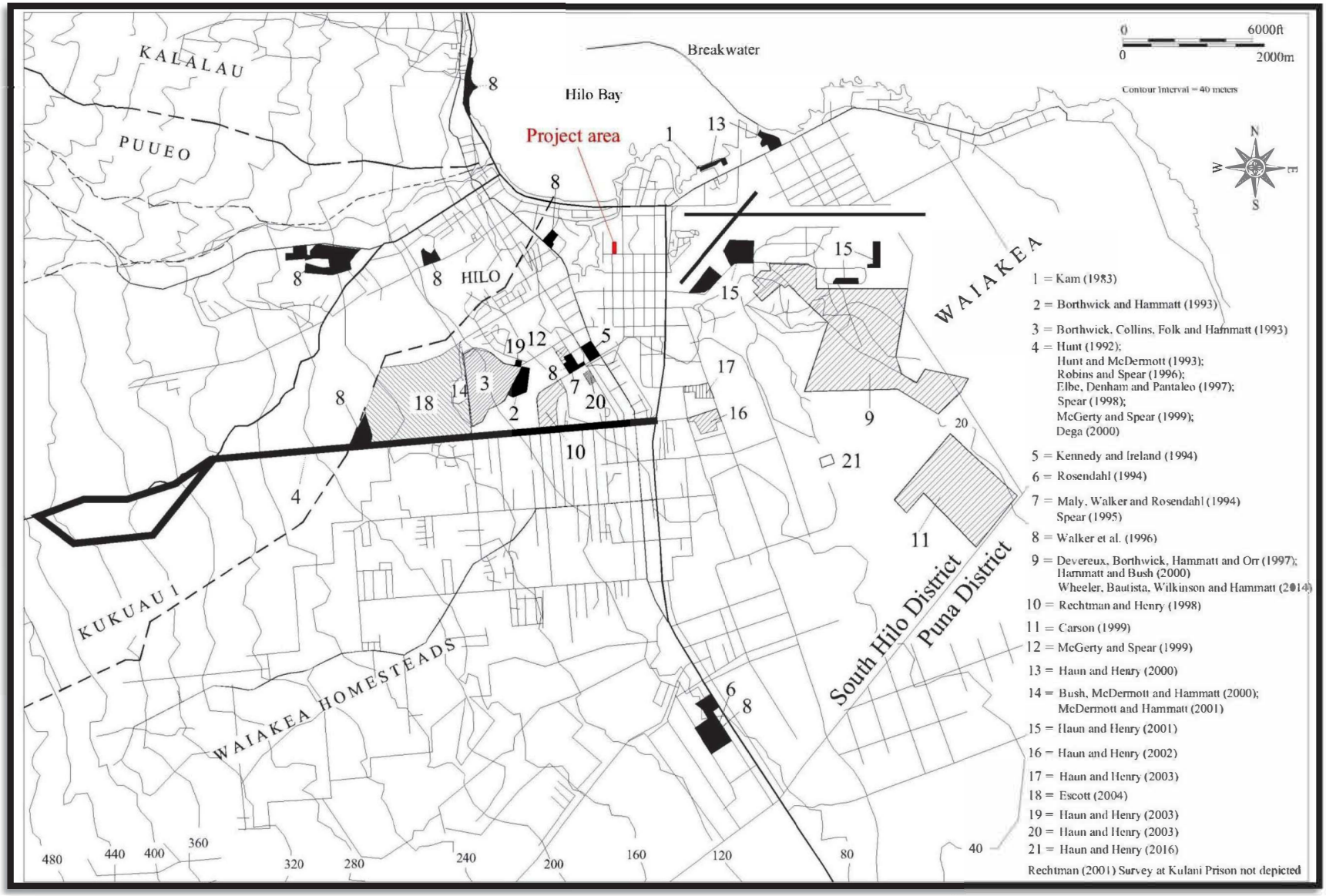


Figure 10. Previous archaeological work

McEldowney (1979) lists 53 traditional Hawaiian sites for Waiākea and 31 historic sites, primarily buildings. Most of the traditional sites were located by Hudson (1932) and Kikuchi (1973). The remaining six were identified during the Statewide Inventory Survey Nearly all were situated along the coast. The sites include 17 fishponds, seven burials, six platforms, five enclosures, three *heiau* including one previously identified by Stokes, three house foundations, three trail segments, two shrines, several miscellaneous features, and two complexes of platforms, enclosures, and terraces.

McEldowney used the limited site inventory and historic documentary evidence to develop a land use and settlement pattern model for the Hilo area. The model consists of five elevationally-defined zones: Coastal Settlement, Upland Agricultural, Lower Forest, Rainforest, and Sub-Alpine or Montane. The Coastal Settlement Zone extended approximately 0.5 miles inland from the shoreline between sea level and 50 ft elevation. The zone was the most densely populated with both permanent and temporary habitations, high status chiefly residences, and *heiau*. Settlements were concentrated at Hilo Bay and sheltered bays and coves. Also present were fishponds and gardens where breadfruit, coconut, *kukui*, banana, *wauke*, sugar cane, sweet potato, and wet and dryland taro were cultivated. The ocean provided fish and other marine resources.

The Upland Agricultural Zone was situated between approximately 50 ft and 1,500 ft elevation. Settlement in the zone consisted of scattered residences among economically beneficial trees and agricultural plots of dryland taro and bananas. Lava tubes were utilized for shelter. A pattern of shifting cultivation is believed to have converted the original forest cover to parkland of grass and scattered groves of trees. Wetland cultivation of taro occurred along streams.

The Lower Forest Zone ranged from 1,500 ft to 2,500 ft elevation. Timber and other forest resources such as medicinal plants, *olona*, and birds were gathered from the zone. Site types consisted of temporary habitations, trials, shrines, and minor agricultural features in forest clearings and along streams. Sites in the Rainforest Zone (2,500-5,000 ft elevation) and Subalpine or Montane Zone (5,000-9,000 ft) were limited to trails and associated temporary habitations. These zones were used for intra-island travel and gathering of valued resources including hardwoods, birds, and stone for tool making.

Project expectations

Based on previous archaeological research and historical documentary evidence, the project area is located in the McEldowney's densely populated Coastal Settlement Zone. The prehistoric use of this area may include permanent and temporary habitations, high status chiefly residences, and *heiau*. Due to the parcel within Hilo town proper and its proximity to the Waiākea Mill, historic structures may also be present.

CONSULTATION

The project area is currently owned by the Suisan Company. The project client, COLUMBUS East, LLC, is a developer who proposes to construct a warehouse and an office building on the property (see **Figure 3**). Consultation regarding the subject parcel was conducted by Dr. Alan Haun with Mr. Harvey Taira, the properties manager for Suisan Company on May 15, 2018. According to Mr. Taira, the project area was purchased by the Suisan Company in the early 1990s. Prior to the acquisition of the property contained a warehouse used for receiving fresh produce, and a dilapidated Quonset hut that was not in use. This warehouse is depicted in **Figure 9**. Soon after the Suisan Company purchased the land, the warehouse and Quonset hut were bulldozed.

Mr. Taira was shown photographs of two concrete platforms identified during the project, designated as Isolated Objects 3 and 4 (see **Figure 18**). According to Mr. Taira, these platforms, which were used as cooling tower supports for a cold storage facility elsewhere, were brought to the property by the Suisan Company on a forklift in the 1990s.

FINDINGS

The archaeological inventory survey identified one archaeological site and four displaced isolated objects in the project area. The site consists of a concrete slab (Site 30889). The isolated objects consist of a large metal gear and axle (Isolated Object 1), a displaced concrete post (Isolated Object 2) and two concrete platforms (Isolated Objects 3 and 4). The location of the site and isolated objects is presented in **Figure 11**.

Site 30889 is a formed concrete slab located in the northwestern portion of the project area. The slab is rectilinear in shape and is 32 feet, 9 inches (10.05 meters) long (west-northwest by east-southeast) and 6 feet, 1 inch (1.86 meters) wide. The southwestern corner of the slab is broken, with the remaining sides ranging in height from 0 to 6.25 inches (0.16 meters). A plan map and photographs of the site are presented in **Figure 12**.

The central and portions of the west end of the slab are covered in a thick root mat, with the remainder comprised of exposed concrete. The root from a tropical ash tree extends across the western side of the slab. An Areca palm and several bingabing trees are growing on or adjacent to the slab. Modern debris is scattered around the site.

A 1.0 by 1.0 meter test pit (Test Pit 2) was excavated adjacent to the Site 30089 slab (see **Figure 12**). This excavation revealed two deposits (**Figure 13**). Layer I consists of 0.3 to 0.36 meters of black (10YR 2/1) silty clay with 60% cobble and pebble inclusions with no cultural material. Layer II consists of 0.9 to 1.09 meters of boulder, cobble and pebble fill material with no cultural material.

Site 30889 is interpreted as an historic foundation or walkway based on its formal type and appearance. The site's integrity is altered and is in fair to good condition. The site is recommended for no further work as the mapping, written description and photography has adequately documented it. It is assessed as significant per HAR §13-284-6 under Criterion d (information content).

As stated, four isolated objects were also identified during the AIS (see **Figure 11**). Isolated object 1 is a large metal gear with an attached axle located in the northern portion of the project area. The gear is 0.67 meters in diameter with 0.04 meter cogs along the perimeter. "SR188" and "20T" are imprinted on the exterior side of the gear. The axle is 1.73 meters long and 0.065 meters in diameter and extends through the center of the gear. There is a 0.11 meter diameter wide metal hub at the other end with remnants of broken metal around its perimeter. Scattered modern trash is present in the area. Overviews of the object are presented in **Figure 14** and **Figure 15**.

Isolated object 2 is a displaced formed concrete post lying on the ground in the southern portion of the project area. The post is 13 feet, 2 inches (4.06 meters) long, 9.75 inches (0.25 meters) wide and 7.75 inches (0.2 meters) thick with beveled edges. There is a rectangular concrete base at one end that is 34.5 inches (0.88 meters) long, 31.75 inches (0.81 meters) wide and 11.25 inches (0.28 meter) thick. There is a projection off the main post that is 0.78 meters long, with identical widths and thickness. The end of this projection is broken and metal rebar reinforcing is visible within the concrete. No cultural material was found in association with the post. Overviews of this post are presented in **Figure 16 and Figure 17**.

Isolated Objects 3 and 4 consist of concrete platforms located in the north-central portion of the project area, 31.0 meters south of Site 30889. A plan map and photographs of these objects are presented in **Figure 18.**

Isolated Object 3 is a collapsed concrete platform located at the western end of the site. It consists of a rectangular concrete pad that is 10 feet, 5 inches (3.2 meters) long (east-west) and 6 feet, 1 inch (1.88 meters) wide and 3.5 inches (0.09 meters) thick. The top of the pad is 13 inches to 15.5 inches (0.34 to 0.4 meters) in height above the surrounding ground surface.

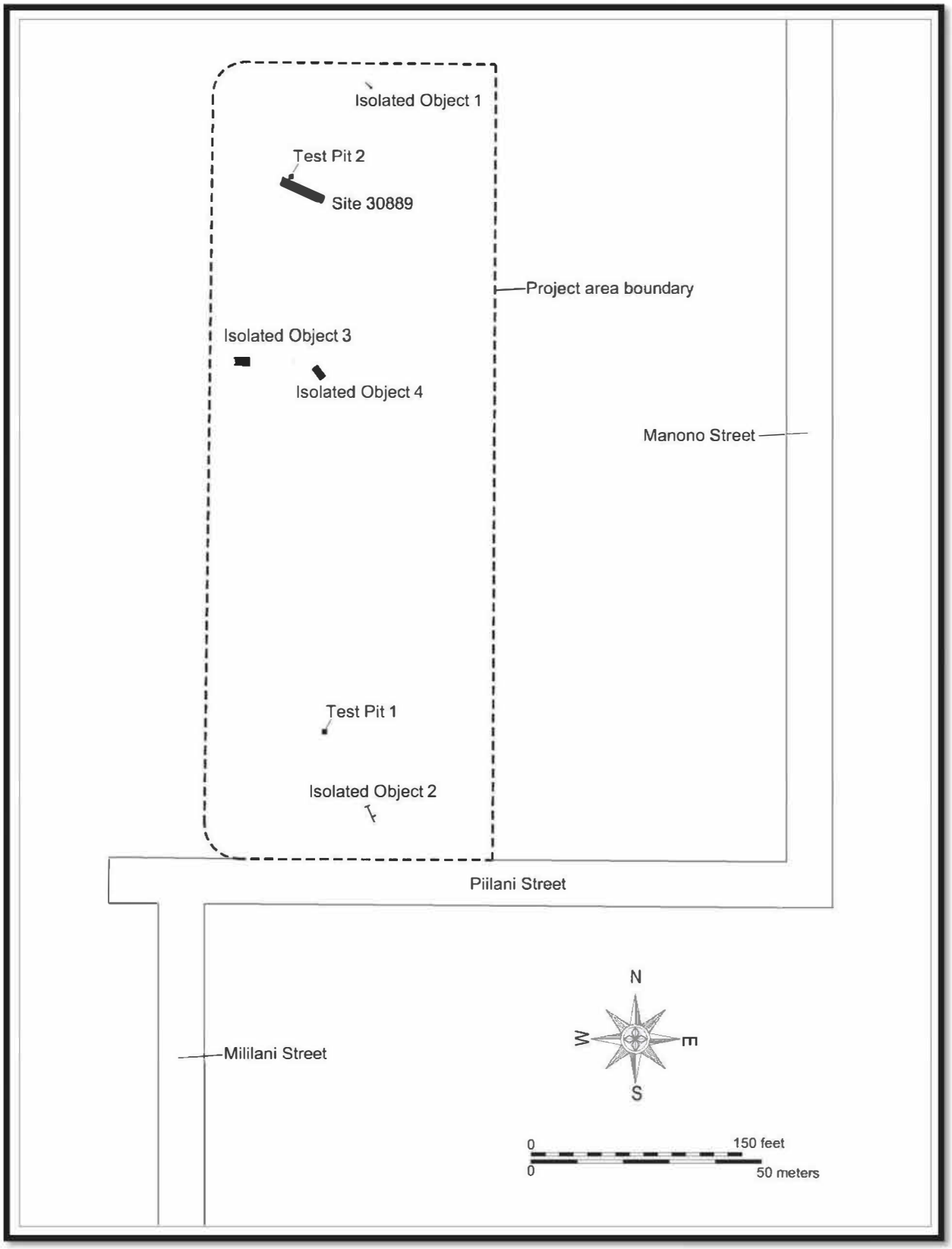


Figure 11. Site location map

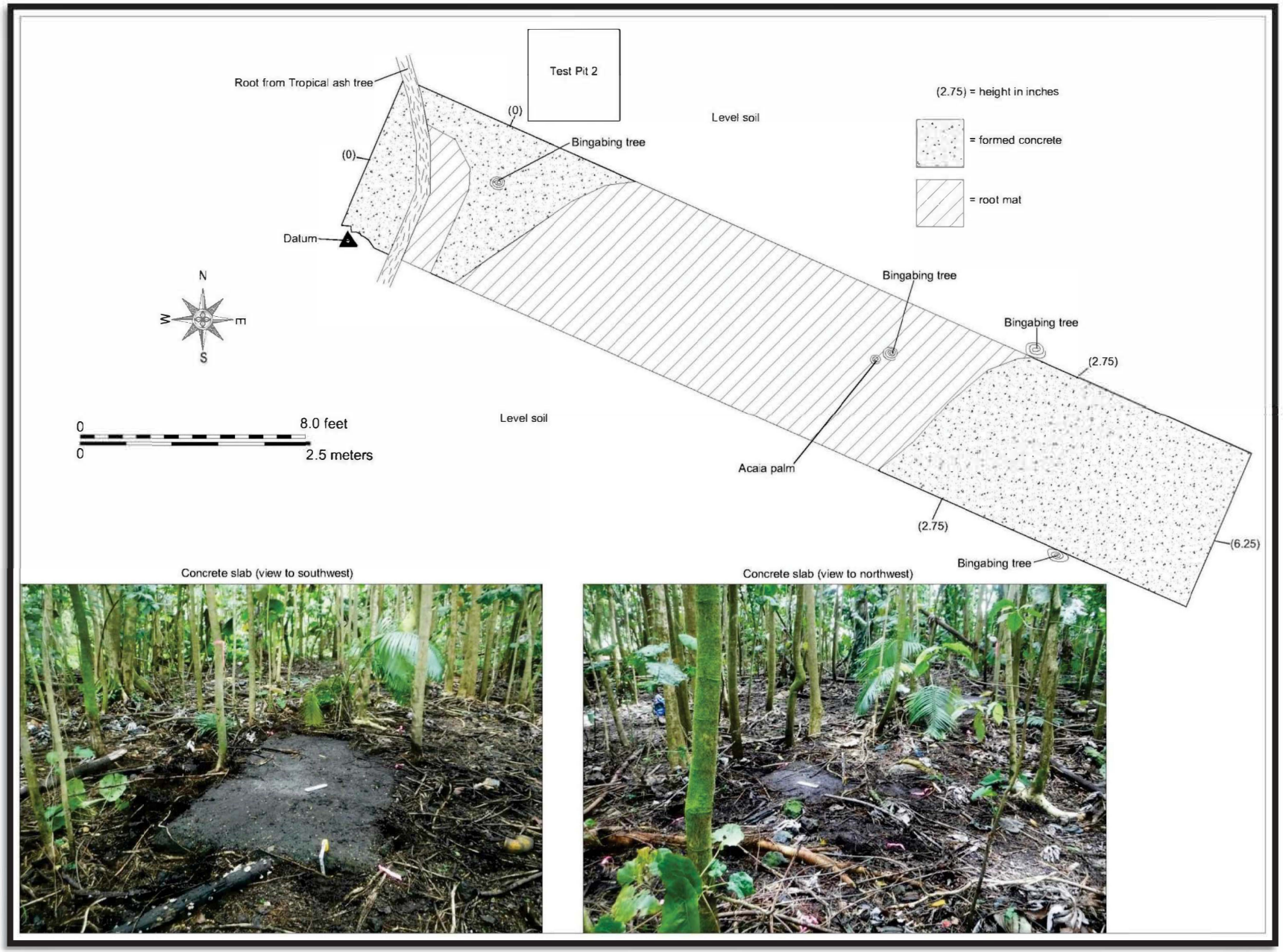


Figure 12. Site 30889 plan map and photographs

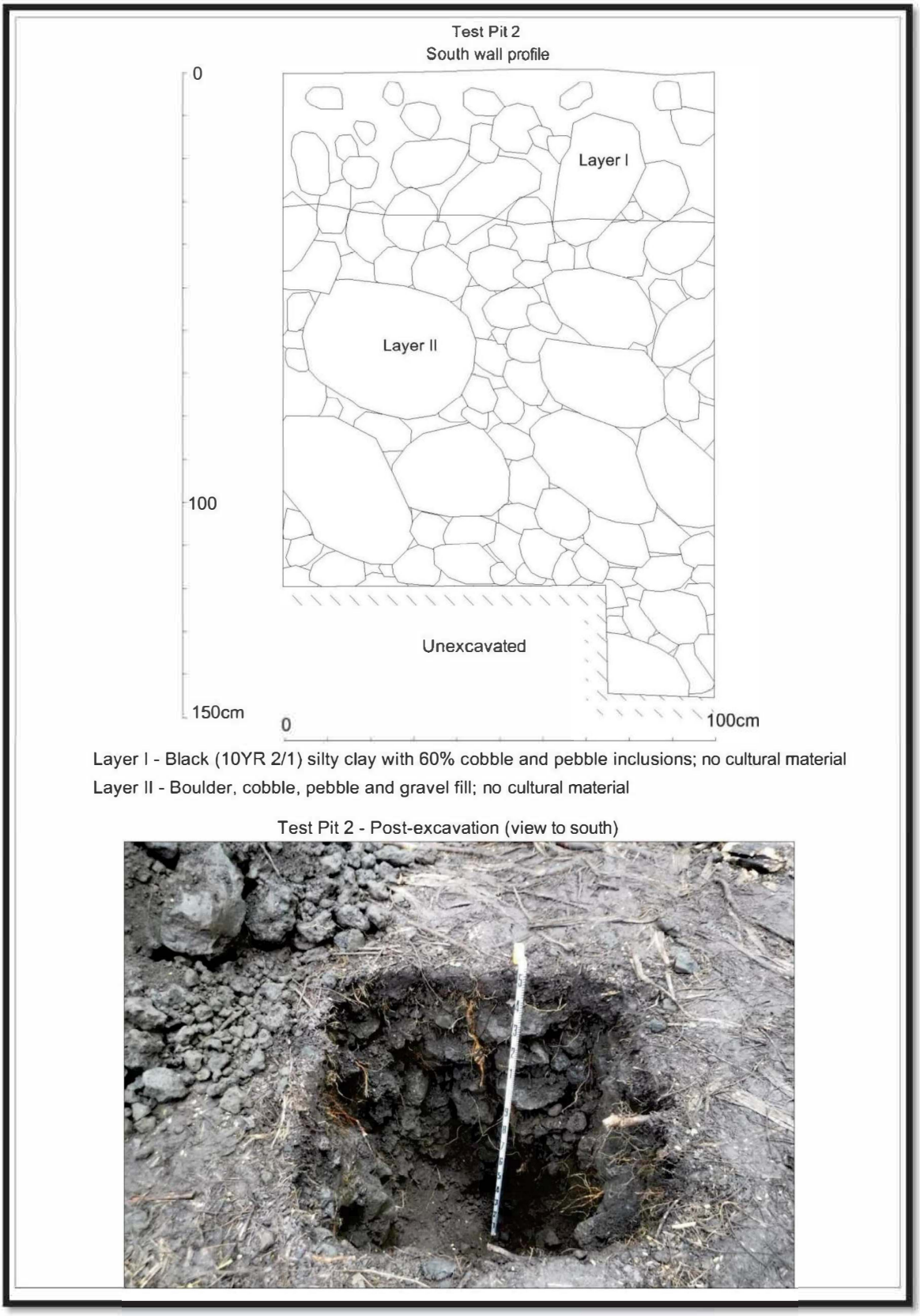


Figure 13. Test Pit 2 profile and photograph



Figure 14. Isolated object 1; metal gear (view to east)



Figure 15. Isolated object 1; metal gear (view to northwest)



Figure 16. Isolated object 2; concrete post (view to northeast)



Figure 17. Isolated object 2; concrete post (view to south)

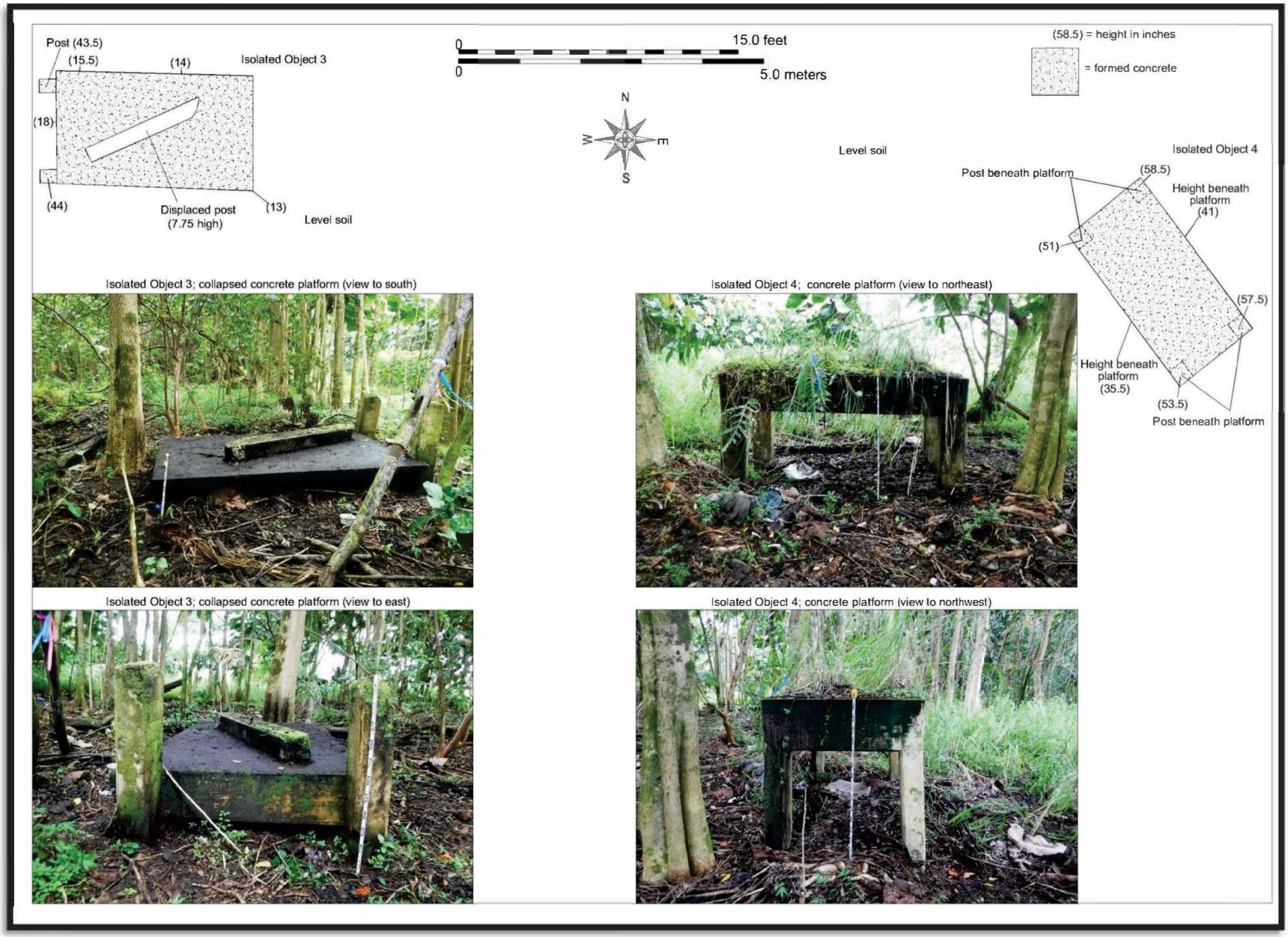


Figure 18. Isolated Objects 3 and 4 plan map and photographs

There are two vertical formed concrete posts set on the ground at the western end of the pad. These posts are 10.5 inches (0.26 meters) square with beveled edges, and are 43.5 to 44 inches (1.1 to 1.12 meters) tall. The top of each post is broken. There is a displaced post lying on the surface of the pad. Modern trash is scattered around the feature.

Isolated Object 4 is located 13.4 meters to the east-southeast of Isolated Object 3. This platform is intact and consists of four vertical posts that support a concrete pad. The feature is rectangular in shape and is 10 feet, 1 inch (3.08 meters) long (northwest by southeast) and 5 feet (1.55 meters) wide. The surface of the platform is a formed concrete pad that is 17.5 inches (0.45 meters) thick. The posts are 10.5 inches (0.26 meters) square with beveled edges. The surface of the platform is 51 to 58.5 inches (1.3 to 1.49 meters) in height above the ground surface. The bottom of the concrete pad is 35.5 to 41 inches (0.9 to 1.04 meters) above the ground. Modern trash is also present in the area surrounding this feature.

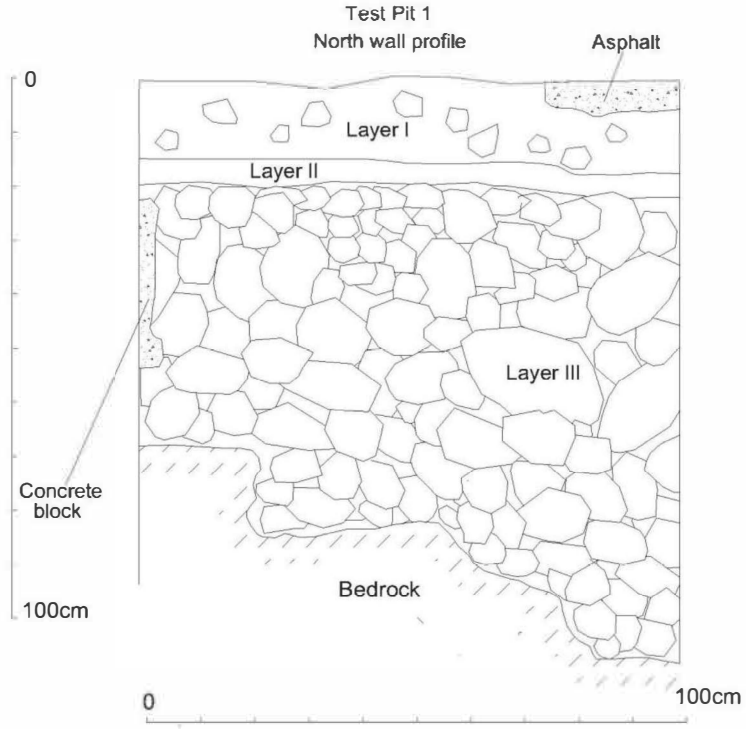
As stated in the Consultation section, according to Mr. Taira, these platforms which were used as cooling tower supports for a cold storage facility elsewhere and were brought to the property by the Suisan Company on a forklift in the 1990s.

A 1.0 by 1.0 meter test pit (Test Pit 1) was excavated in the southern portion of the project area, 25.0 meters north of Piilani Street (see **Figure 11**). This excavation revealed similar deposits to that observed in Test Pit 1 (**Figure 19**). Layer I consists of 0.14 to 0.18 meters of black (10YR 2/1) silty clay with 55% cobble and pebble inclusions. An intact section of asphalt paving is present in the northeast corner of the test pit. Cultural material from Layer I consists of amber, light green and colorless bottle glass fragments, and a threaded metal bolt (2.5 inches long with 3/4" square head).

Layer II consists of 0.04 to 0.08 meters of dark reddish brown (5YR 3/4) cinder gravel fill with no cultural material. Layer III consists of 0.48 to 0.86 meters of boulder, cobble and pebble fill. There is a 0.31 meter thick remnant of a concrete block located along the western side of the test pit. Cultural material from Layer III consists of a 2.25 inch piece of wire and a metal rod with a copper disk at one end.

The metal rod is 9 inches long and 1/2 inch in diameter (**Figure 20**). The copper disk is 1.5 inches in diameter and has "Lunkenheimer" and "Fig. 2129" embossed on one side (**Figure 21**). Lunkenheimer was a manufacturing company established in 1862 that produced bronze and iron valves (http://www.lunkenheimercvc.com). It is likely that this object is a portion of a valve designed to control the flow of water or other liquid.

The subsurface testing indicates that the project area has been modified by the introduction of fill material. Layer II and Layer III in Test Pit 1 and Layer II in Test Pit 2 are interpreted as imported fills based on their material composition and appearance. The presence of the surface sites in the project area, built on top of the Layer I soil deposit, suggest this soil was also an imported fill layer.



Layer I - Black (10YR 2/1) silty clay with 55% cobble and pebble inclusions; cultural material present

Layer II - Dark reddish brown (5YR 3/4) cinder gravel fill; no cultural material

Layer III - Very dark brown boulder, cobble, pebble and gravel fill; cultural material present

Test Pit 1 - Post-excavation (view to north)

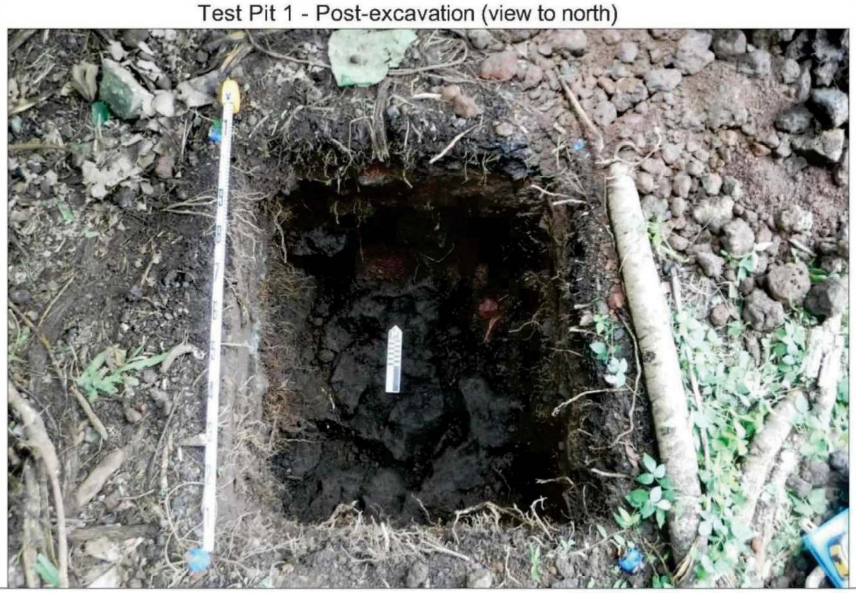


Figure 19. Test Pit 1 profile and photograph



Figure 20. Metal rod and copper disk from Test Pit 1



Figure 21. Metal rod and copper disk from Test Pit 1

CONCLUSION

Discussion

The results of historical and archaeological background research indicates that a warehouse was formerly located in the project area (see **Figure 9**). This facility was subsequently removed in the early 1990s. The potential remnants of this facility, represented by a concrete slab, a metal gear and a concrete post remain in the project area.

The project area is located in close proximity to the Waiākea Fish Pond and it is probable that the area was once extensively used prehistorically. However, subsurface testing during the project indicates that the subject parcel was significantly impacted by the historic introduction of fill material. No evidence of the pre-contact use of the project area was observed during the archaeological inventory survey.

Significance Assessments

The sites identified during the survey are assessed for significance based on Hawai'i Administrative Rules (HAR) §13-284-6. According to (HAR) §13-284-6 (b), a site must possess integrity of location, design, setting, materials, workmanship, feeling, and/or association and shall meet one or more of the following criteria:

1. **Criterion "a"**: Be associated with events that have made an important contribution to the broad patterns of our history;
2. **Criterion "b"**: Be associated with the lives of persons important in our past;
3. **Criterion "c"**: Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;
4. **Criterion "d"**: Have yielded, or is likely to yield, information important for research on prehistory or history; and
5. **Criterion "e":** Have an important traditional cultural value to the native Hawaiian people or to another ethnic group of the state due to associations with traditional cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group's history and cultural identity.

The site in the project area possesses integrity of location, design, materials, and workmanship. It is assessed as significant under Criterion "d". The site has yielded information important for understanding the historic use of the project area.

Treatment Recommendations

The mapping, written description and photography of the Site 30889 adequately document it and no further work or preservation is recommended. The developer plans to construct a warehouse and adjacent office building with associated infrastructure to be located in the southern portion of the project area. There are no immediate plans for the development of the remainder of the parcel. The proposed project will consist of mechanically grading the project area in advance of the construction activity. Site 30889 will likely be impacted during future development. This activity will have no effect on historic properties because Site 30889 requires no further work or preservation.

TRANSLATION OF HAWAIIAN WORDS[1]

ahupua'a - traditional Hawaiian land unit usually extending from the uplands to the sea

hala - The pandanus or screw pine (*Pandanus odoratissimus*)

heiau - Pre-Christian place of worship, shrine

'ili - next in importance to *ahupua'a* and usually a subdivision of an *ahupua'a*

konohiki - headman of an *ahupua'a* land division under the chief

kukui - Candlenut tree (*Aleurites moluccana*), a large tree in the spurge family bearing nuts containing oily kernels

kuleana - small piece of property, as within an *ahupua'a*

Māhele - land division of 1848

mauka -inland

olona - A native shrub (*Touchardia latifolia*), with large, ovate, fine-toothed leaves

pahoehoe - Smooth, unbroken type of lava, contrasting with *a'ā* lava

pia - General name for starch; starch made from arrowroot is called pia Hawai'i to distinguish from other starches

pulu - soft, glossy, yellow wool on the base of tree fern leaf stalks (*Cibotium* spp.).

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March 10, 2025

Re: Comments on Talon 1 Properties Self-Storage Warehouse Draft Environmental Assessment and Anticipated Finding of No Significant Impact.

The Draft Environmental Assessment is incomplete and the Anticipated Finding of No Significant Impact is wrong, in my opinion.

The DEA admits that "the site's proximity to Wailoa River/Waiakea Fishpond prompt an analysis of potentially adverse social, visual, and environmental impacts in the CZM area." [DEA digital page 121.]

In most instances, an action shall be determined to have a significant effect on the environment if it may:

> (2) Curtail the range of beneficial uses of the environment;
>
> (3) Conflict with the State's environmental policies or long-term environmental goals established by law;
>
> (6) Involve adverse secondary impacts, such as population changes or effects on public facilities;
>
> (12) Have a substantial adverse effect on scenic vistas and viewplanes, during day or night, identified in county or state plans or studies;

HAR §11-200.1-13(b) Significance criteria.

Since the above significance criteria apply to this project, *an environmental impact statement shall be required per HRS 343-5(e),* as follows:

A. HAR §11-200.1-18 Preparation and contents of a draft environmental assessment.

Under HAR §11-200.1-18(b), "analyses in a draft EA shall be commensurate with the importance of the impact," and (c) the level of detail in a draft EA "shall be more specific for components of the program for which site specific, project-level impacts are discernible."

The DEA is incomplete because it failed to provide adequate detail and analysis of the primary component—a 93,603 Sq. Ft. three story self-storage warehouse and its potentially adverse social, visual, and environmental impacts in the surrounding SMA and Wailoa River Area. "[I]n the design and review of any improvements, due consideration shall be given to the minimization of noise and adverse visual impacts through appropriate siting, height, bulk, color schemes, signage, and landscaping." Rezone Ordinance 1992-122, Section 2 (E).

The DEA unreasonably omits due consideration of appropriate siting, height, bulk, color schemes, signage, landscaping and all outside dimensions of the building in the narratives and figures. See, SUMMARY OF PROJECT, ENVIRONMENTAL IMPACTS, AND MITIGATION MEASURES (SUPPLEMENTAL CHANGE OF USE & SIZE) digital page 16; Self-storage Warehouse in Figure 7: Conceptual Site Plan Self-storage warehouse digital page 18, Figure 8: Conceptual Floor Plan of Self-storage warehouse digital page 19, Figure 9: Conceptual Elevations of Self-storage warehouse digital page 20. A member of the public has to add up minor dimensions to determine the outside measurements of the building.

The DEA unreasonably relies on screening provided by trees on the vacant lots across the street that *it has no control over* to claim: "[t]he proposed improvements should not have any adverse impact to the recreational resources of the area." DEA, digital page 118. "Wailoa River State Park is located roughly 625 feet to the west of the subject Property and is an open space resource. The park is not visible from the subject site as it is adjacent to an uncleared, vacant lot. The vegetation on the vacant

lot is mostly tall trees, which obstructs visual impacts to and from the park to the subject site." DEA, digital page 119.

B. Zoning.

The applicant unreasonably wants to resurrect previously abandoned Rezone Ordinance 1992-122, which changed the district classification from RESORT-HOTEL, SAFETY (V-5-.75) TO LIMITED INDUSTRIAL (ML-20).

Rezone Ordinance 1992-122 is a legislative anomaly. The rezoning was disfavored by the planning director and the County council decided to rezone the property anyway in order to allow Suisan Company Ltd. to build a new fish processing facility convenient to Suisan Fish Market and the mouth of the Wailoa River to expand the fishing industry to support local fishermen. Suisan Ltd. abandoned that location for its operations sometime after 1994.

This project is not the same thing. It offers few jobs once the warehouse is completed and little impact on the Hilo economy.

1. Feasibility Study – Suisan Limited.

The DEA's background section *is incomplete* without a discussion of the Feasibility Study requested by the county council by resolution in 1990, as follows:

Feasibility Study – Suisan Limited

> The Hawaii County Council adopted Resolution No. 151-90 on March 23, 1990 which requested the Planning Director to conduct a study to determine the feasibility of redesignating the land areas identified as Tax Map Key 2-2-33:4, 11, 19 and 20 from Medium Density Urban to Industrial Area on the General Plan Land Use Pattern Allocation Guide (LUPAG) Map. The lands involved are situated between the Hoolulu Park complex and Wailoa River state Recreation Area in Waiakea, City of Hilo, south Hilo, Hawaii.
>
> According to the County Real Property Tax Office, parcel 4 contains an area of approximately 5.29 acres and is owned by Bishop Estate. Parcels

11, 19 and 20, consisting a total area of approximately 2.04 acres, are owned by Toshiaki Shioda.

PROPOSED DEVELOPMENT

1. The adoption of Resolution No. 151-90 is in support of the request made by Suisan Company, Limited to the County Council to redesignate the subject lands for industrial use to enable the company to eventually relocate their fish processing operation and back-up storage facilities to these properties. In support of the requested Industrial Area, the resolution states the following rationale:

STATE AND COUNTY PLANNING DOCUMENTS

2. The subject properties are classified Urban by the State Land Use Commission.

3. The General Plan Land Use Pattern Allocation Guide (LUPAG) Map

designates the area as Medium Density Urban. This urban designation may include uses such as village and neighborhood commercial, residential and related functions (3 story commercial; residential--up to 35 units per acre).

4. The Hilo Community Development Plan which was adopted by the Planning Commission in 1975 recommends the area for Multiple Family Residential zoning at a density of four (4) units per acre. It recommends Industrial area expansion at the airport mauka areas, and in-filling at the harbor and Kanoelehua Industrial areas.

5. The County zoning designation is Resort-Hotel, Safety with 750 square feet of land area per unit (V-S-.75).

6. The subject area is situated within the Special Management Area (SMA) of the County of Hawaii. The objectives of the Coastal Zone Management (CZM) Program, as expressed through Chapter 205A, HRS, and Rule 9 of the Hawaii County Planning Commission relating to SMA, are the protection of coastal recreational resources, historical and cultural resources, scenic values, coastal ecosystems and coastal dependent economic uses. An SMA Use Permit would be necessary for the development of the subject area.

PREVIOUS LAND USE ACTIONS

7. In 1985, the landowners of the subject properties submitted suggestions on land use changes to the Planning Director for consideration during the recent General Plan comprehensive review.

8. The Kamehameha Schools/Bishop Estate submitted a suggestion for General Plan revision from Resort and Open Area to High Density Urban, Medium Density Urban and Industrial designations for the area along Mililani and Manono Streets; adjacent to the Waiakea Village complex, Wailoa River State Recreation Area and across from the Hoolulu Park complex. These properties were identified by Tax Map Key 2-2-31:10, 11, 12 and 14, and 2-2-33:4. The suggestion was submitted to allow for a mixed use of commercial, multi-family residential and light industrial activities on those properties.

The Planning Director had recommended that the area mauka of Piilani Street and adjacent to the Waiakea Village complex be redesignated to High Density Urban and the area makai of Piilani and along Manono Streets be redesignated to Medium Density Urban. The Planning Director determined that the Industrial designation was inappropriate due to the scenic and recreational resources of the adjacent Wailoa River State Recreation Area as well as the mix of residential and commercial uses of the surrounding area.

9. Jack Ujimori, on behalf of Toshiaki Shioda, submitted a suggestion for a change from Resort and Open to Medium Density Urban for the area on the northeast corner of the intersection of Mililani and Piilani Streets. The properties involved were identified by Tax Map Key 2-2-33:11, 19 and 20. The suggestion was submitted in order to establish commercial activities which would benefit users of the Wailoa River State Recreation Park and the events at the Hoolulu Park complex as well as the residents in the area. The Planning Director had recommended that this area be also redesignated to Medium Density Urban. Subsequently in 1989, the County Council had requested the Planning Director to reconsider designating this area for Industrial. While the subject area included some ongoing

non-conforming industrial uses, the Planning Director determined that the Industrial designation for the area would be inappropriate due to the scenic and recreational resources of the Wailoa River State Recreation Area as well as the mix of residential and commercial uses of the surrounding area.

10. In consideration of the foregoing, the present General Plan Medium Density Urban designation for the area makai of Piilani Street, along Manono Street and adjacent to the Wailoa River State Recreation

Area became effective on November 14, 1989 pursuant to the adoption of Ordinance No. 89-142, County of Hawaii General Plan, by the Hawaii County Council.

DESCRIPTION OF THE PROPERTY

11. The site is located adjacent to the Hoolulu Park complex and the Wailoa River State Recreation Area. More specifically, parcel 4 lies across the Hoolulu Park Complex fronting Manono Street and abuts portion of the Wailoa River State Recreation Area to the north, Bishop Estate lands on the west and State-owned lands on the south. The parcel is overgrown with vegetation and presently vacant of any uses.

12. The area of parcels 11, 19 and 20 lies approximately 176 feet south of parcel 4 at the northeast corner of the intersection of Mililani and Piilani Streets. It also abuts the Bishop Estate lands to the west and the State lands to the east. Parcel 11 contains an existing nonconforming warehouse which is partially utilized by Hawaiian Sun Products, Inc. for fruit processing. Parcel 19 is vacant of any structures or uses. Parcel 20 also contains an existing nonconforming warehouse but has collapsed and is vacant of any uses.

13. The two subject areas are separated by a proposed 60-foot wide road right-of-way (Wehilani Street) and a vacant 23,292 square foot parcel owned by Hawaii Electric Light Company, Inc.

14. The Soil Survey Report, prepared by the U.S. Department of Agriculture, Soil Conservation Service, classifies the land as Keaukaha Series (rKFD) extremely rocky muck, 6 to 20 percent slopes. The soils consist of well-drained, thin organic soils overlying pahoehoe lava bedrock. In a representative profile the surface layer is very dark brown muck about 8 inches thick. The soils above the lava is rapidly permeable. The pahoehoe lava is very slowly permeable, but water moves rapidly through the cracks. Runoff is medium and the erosion hazard is slight.

15. The Flood Insurance Rate Map (FIRM) classifies a major portion of the subject site as Zone X, areas determined to be outside 500-year flood plain. A small portion along the northwest corner of parcel 4 is within the Special Flood Hazard Zone AE with base flood elevations ranging from 11 to 17 feet. Any development on the site would have to conform with the design and structure requirements of the County of Hawaii flood control ordinances.

SURROUNDING LAND USE

16. The surrounding lands are also classified Urban by the State Land Use Commission.

17. Lands to the north and east of the subject site are designated by the LUPAG Map as Open Area, to the west and south are Medium Density Urban and lands to the southwest as High Density Urban.

18. General Plan Industrial designation is located along and extends eastward of Kanoelehua Avenue from Kalanianaole Avenue to Puainako Street. Industrial designation also parallels Kanoelehua Avenue on the west side along Kalanikoa Street, approximately 1,500 feet or three (3) blocks east of the subject site. Since 1970 there have been several industrial zone requests for lands in those areas which have being reviewed and approved by the County Council.

19. The Hilo Community Development Plan recommends that the area to the west of the subject site be developed for multi-family residences so as the recreational amenities can be enjoyed by residents. It also recommends that lands to the north and east be kept in open space for recreational purposes.

20. The Hoolulu Park complex and Wailoa River State Recreation Area, situated to the north and east, are zoned Open. The properties to the south and southeast of the site are zoned General Commercial-7,500 square feet (CG-7.5). Several retail stores, offices and restaurant establishments have been constructed in the area within the past ten years. Properties to the west and southwest are similarly zoned Resort-Hotel, Safety-.75 square feet (V-S-.75) and are presently vacant of any uses. The adjoining properties owned by the State and BELCO are also zoned Resort-Hotel, Safety-.75 square feet (V-S-.75). The state-owned parcel contains an existing dilapidated warehouse which is vacant of any uses. The HELCO parcel is vacant of any structures or uses. These zone designations have been in place since the adoption of the City of Hilo Zone Map in 1968.

21. The Waiakea Houselots which were created by the Territory of Hawaii in the early 1900's are generally zoned Single Family Residential and range from 10,000+ to 20,000+ square feet in size. The majority of the single family dwellings situated within this area are still habitable and are in airly good condition.

PUBLIC UTILITIES AND FACILITIES

22. Access to the site is from Manono and Piilani Streets. Manono Street has a right-of-way width of 50 feet with a 34-foot pavement. Piilani Street is 60 feet wide with a 22-foot wide pavement.

23. All essential utilities are available to the subject area.

[End][See attachment]

2. Rezone Ordinance 1992-122.

Rezone Ordinance 1992-122, changing the district classification from RESORT-HOTEL, SAFETY (V-5-.75) TO LIMITED INDUSTRIAL (ML-20), has long expired. The time to apply for a time extension to Rezone Ordinance 1992-122, Section 2, (C) plan approval started on October 24, 1995, one-year after October 24, 1994: Effective date of final approval for Consolidation 831-Revised, which consolidated TMKs 2-2-033: 011, 012, 019, and 020 into one lot identified by the current TMK: (3) 2-2-033: 011.

Rezone Ordinance 1992-122, section 2(N) mandates: "[s]hould any of the conditions not be met or substantially complied with in a timely fashion, the Director shall initiate rezoning of the area to its original or more appropriate designation. The DEA does not explain:

(1) Why the Director should not initiate rezoning of the area to its original or more appropriate designation?

(2) Why as an alternative, Talon 1 Properties, LLC should not initiate rezoning of the area to its original or more appropriate designation?

C. General plan:

The Talon 1 Properties Self-storage Warehouse project must be consistent with the framework of the General Plan. HRS §46-4(a) mandates in relevant part: "Zoning in all counties shall be accomplished within the framework of a long-range, comprehensive general plan prepared or being prepared to guide the overall future

development of the county." Moreover, HRS §205A-26(2)(C) mandates that "No development shall be approved unless the authority has first found that the development is consistent with the county general plan, community plan and zoning, provided that a finding of consistency shall not preclude concurrent processing where a general plan, community plan or zoning amendment may also be required.

The DEA fails to discuss and sufficiently explain:

> *(1) how reviving the industrial zoning*[1] *in this location provides "the most desirable use of land within the County that achieves an ecological balance providing residents and visitors the quality of life and an environment in which the natural resources of the island are viable and sustainable"?* [2005 GP, Environmental Quality Goals, §4.2(a).]
>
> *(2) how the "development and improvement shall be in balance with the physical, social, and cultural environments of the Island of Hawaii"?* [2005 GP, §14.4.2 Industrial, Goals: (a) Designate and allocate industrial areas in appropriate proportions and in keeping with the social, cultural, and physical environments of the County.
>
> *(3) exactly how the applicant intends to mitigate the project's adverse visual impacts on the view planes from nearby "extraordinary places of natural beauty"– the Wailoa River Area and Waiakea Fish Pond, (and the portion of the Hilo Bay trail system that is planned to pass through it), which are protected as a Place of Natural Beauty in the General Plan?* [2005 General Plan, §7.5.2: South Hilo and Table 7-3. Natural Beauty Sites, District of South Hilo. Digital page 116.

C. Hilo Community Development Plan

The Hilo Community Development Plan which was adopted by the Planning Commission in 1975 recommends the area for Multiple Family Residential zoning at

[1] 14.4.2 Industrial, Goals: (a)
Designate and allocate industrial areas in appropriate proportions and in keeping with the social, cultural, and physical environments of the County.

a density of four (4) units per acre. It recommends Industrial area expansion at the airport mauka areas, and in-filling at the harbor and Kanoelehua Industrial areas.

The DEA's statement that the reasons supporting the FONSI determination includes that the project is consistent with the Hilo Community Development *is wrong.*

The DEA fails to discuss and sufficiently explain:

(1) Why Multiple Family Residential zoning is not a more appropriate zone designation?

(2) Why a Multiple Family Residential project is not a more desirable alternative?

D. The state and county Special Management Area Program.

The DEA admits that site's proximity to Wailoa River Recreational Area and Waiakea Fishpond creates potentially adverse social, visual, and environmental impacts in the CZM area. [DEA digital page 121.]

1. HRS section 205A-26(2)

HRS §205A-26(2) mandates that "No development shall be approved unless the authority has first found:

> (A) That the development will not have any significant adverse environmental or ecological effect, except as any adverse effect is minimized to the extent practicable and clearly outweighed by public health, safety, or compelling public interests. Those adverse effects shall include but not be limited to the potential cumulative impact of individual developments, each of which taken by itself might not have a significant adverse effect, and the elimination of planning options;
>
> (B) That the development is consistent with the objectives, policies, and special management area guidelines of this chapter and any guidelines enacted by the legislature; and
>
> (C) That the development is consistent with the county general plan, community plan, and zoning; provided that a finding of

consistency shall not preclude concurrent processing where a general plan, community plan, or zoning amendment may also be required.

The warehouse project conflicts with HRS §205A-2 Coastal zone management program; objectives and policies:

(b) Objectives

(5) Economic uses;

(A) Provide public or private facilities and improvements important to the State's economy in suitable locations.

(10) Marine and coastal resources;

(A) Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

(c) Policies.

(1) Recreational resources;

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

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

(ii) Requiring restoration of coastal resources that have significant recreational and ecosystem value

(3) Scenic and open space resources;

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

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

(D) <u>Encourage those developments that are not coastal dependent to locate in inland areas</u>;

FEASIBILITY STUDY - SUISAN COMPANY, LIMITED

BACKGROUND

The Hawaii County Council adopted Resolution No. 151-90 on March 23, 1990 which requested the Planning Director to conduct a study to determine the feasibility of redesignating the land areas identified as Tax Map Key 2-2-33:4, 11, 19 and 20 from Medium Density Urban to Industrial Area on the General Plan Land Use Pattern Allocation Guide (LUPAG) Map. The lands involved are situated between the Hoolulu Park complex and Wailoa River State Recreation Area in Waiakea, City of Hilo, South Hilo, Hawaii.

According to the County Real Property Tax Office, parcel 4 contains an area of approximately 5.29 acres and is owned by Bishop Estate. Parcels 11, 19 and 20, consisting a total area of approximately 2.04 acres, are owned by Toshiaki Shioda.

PROPOSED DEVELOPMENT

1. The adoption of Resolution No. 151-90 is in support of the request made by Suisan Company, Limited to the County Council to redesignate the subject lands for industrial use to enable the company to eventually relocate their fish processing operation and back-up storage facilities to these properties. In support of the requested Industrial Area, the resolution states the following rationale:

(SEE ATTACHMENT RESOLUTION NO. 151-90)

STATE AND COUNTY PLANNING DOCUMENTS

2. The subject properties are classified Urban by the State Land Use Commission.

3. The General Plan Land Use Pattern Allocation Guide (LUPAG) Map designates the area as Medium Density Urban. This urban designation may include uses such as village and neighborhood commercial, residential and related functions (3 story commercial; residential--up to 35 units per acre).

4. The Hilo Community Development Plan which was adopted by the Planning Commission in 1975 recommends the area for Multiple Family Residential zoning at a density of four (4) units per acre. It recommends Industrial area expansion at the airport mauka areas, and in-filling at the harbor and Kanoelehua Industrial areas.

5. The County zoning designation is Resort-Hotel, Safety with 750 square feet of land area per unit (V-S-.75).

6. The subject area is situated within the Special Management Area (SMA) of the County of Hawaii. The objectives of the Coastal Zone Management (CZM) Program, as expressed through Chapter 205A, HRS, and Rule 9 of the Hawaii County Planning Commission relating to SMA, are the protection of coastal recreational resources, historical and cultural resources, scenic values, coastal ecosystems and coastal dependent economic uses. An SMA Use Permit would be necessary for the development of the subject area.

PREVIOUS LAND USE ACTIONS

7. In 1985, the landowners of the subject properties submitted suggestions on land use changes to the Planning Director for consideration during the recent General Plan comprehensive review.

8. The Kamehameha Schools/Bishop Estate submitted a suggestion for General Plan revision from Resort and Open Area to High Density Urban, Medium Density Urban and Industrial designations for the area along Mililani and Manono Streets; adjacent to the Waiakea Village complex, Wailoa River State Recreation Area and across from the Hoolulu Park complex. These properties were identified by Tax Map Key 2-2-31:10, 11, 12 and 14, and 2-2-33:4. The suggestion was submitted to allow for a mixed use of commercial, multi-family residential and light industrial activities on those properties. The Planning Director had recommended that the area mauka of Piilani Street and adjacent to the Waiakea Village complex be redesignated to High Density Urban and the area makai of Piilani and along Manono Streets be redesignated to Medium Density Urban. The Planning Director determined that the Industrial designation was inappropriate due to the scenic and recreational resources of the adjacent Wailoa River State Recreation Area as well as the mix of residential and commercial uses of the surrounding area.

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requested the Planning Director to reconsider designating this area for Industrial. While the subject area included some ongoing non-conforming industrial uses, the Planning Director determined that the Industrial designation for the area would be inappropriate due to the scenic and recreational resources of the Wailoa River State Recreation Area as well as the mix of residential and commercial uses of the surrounding area.

10. In consideration of the foregoing, the present General Plan Medium Density Urban designation for the area makai of Piilani Street, along Manono Street and adjacent to the Wailoa River State Recreation Area became effective on November 14, 1989 pursuant to the adoption of Ordinance No. 89-142, County of Hawaii General Plan, by the Hawaii County Council.

DESCRIPTION OF THE PROPERTY

11. The site is located adjacent to the Hoolulu Park complex and the Wailoa River State Recreation Area. More specifically, parcel 4 lies across the Hoolulu Park Complex fronting Manono Street and abuts portion of the Wailoa River State Recreation Area to the north, Bishop Estate lands on the west and State-owned lands on the south. The parcel is overgrown with vegetation and presently vacant of any uses.

12. The area of parcels 11, 19 and 20 lies approximately 176 feet south of parcel 4 at the northeast corner of the intersection of Mililani and Piilani Streets. It also abuts the Bishop Estate lands to the west and the State lands to the east. Parcel 11 contains an existing nonconforming warehouse which is partially utilized by Hawaiian Sun Products, Inc. for fruit processing. Parcel 19 is

vacant of any structures or uses. Parcel 20 also contains an existing nonconforming warehouse but has collapsed and is vacant of any uses.

13. The two subject areas are separated by a proposed 60-foot wide road right-of-way (Wehilani Street) and a vacant 23,292 square foot parcel owned by Hawaii Electric Light Company, Inc.

14. The Soil Survey Report, prepared by the U.S. Department of Agriculture, Soil Conservation Service, classifies the land as Keaukaha Series (rKFD) extremely rocky muck, 6 to 20 percent slopes. The soils consist of well-drained, thin organic soils overlying pahoehoe lava bedrock. In a representative profile the surface layer is very dark brown muck about 8 inches thick. The soils above the lava is rapidly permeable. The pahoehoe lava is very slowly permeable, but water moves rapidly through the cracks. Runoff is medium and the erosion hazard is slight.

15. The Flood Insurance Rate Map (FIRM) classifies a major portion of the subject site as Zone X, areas determined to be outside 500-year flood plain. A small portion along the northwest corner of parcel 4 is within the Special Flood Hazard Zone AE with base flood elevations ranging from 11 to 17 feet. Any development on the site would have to conform with the design and structure requirements of the County of Hawaii flood control ordinances.

SURROUNDING LAND USE

16. Surrounding lands are also classified Urban by the State Land Use Commission.

17. Lands to the north and east of the subject site are designated by the LUPAG Map as Open Area, to the west and south are Medium

Density Urban and lands to the southwest as High Density Urban.

18. General Plan Industrial designation is located along and extends eastward of Kanoelehua Avenue from Kalanianaole Avenue to Puainako Street. Industrial designation also parallels Kanoelehua Avenue on the west side along Kalanikoa Street, approximately 1,500 feet or three (3) blocks east of the subject site. Since 1970 there have been several industrial zone requests for lands in those areas which have being reviewed and approved by the County Council.

19. The Hilo Community Development Plan recommends that the area to the west of the subject site be developed for multi-family residences so as the recreational amenities can be enjoyed by residents. It also recommends that lands to the north and east be kept in open space for recreational purposes.

20. The Hoolulu Park complex and Wailoa River State Recreation Area, situated to the north and east, are zoned Open. The properties to the south and southeast of the site are zoned General Commercial-7,500 square feet (CG-7.5). Several retail stores, offices and restaurant establishments have been constructed in the area within the past ten years. Properties to the west and southwest are similarly zoned Resort-Hotel, Safety-.75 square feet (V-S-.75) and are presently vacant of any uses. The adjoining properties owned by the State and HELCO are also zoned Resort-Hotel, Safety-.75 square feet (V-S-.75). The state-owned parcel contains an existing dilapitated warehouse which is vacant of any uses. The HELCO parcel is vacant of any structures or uses. These zone designations have been in place since the adoption of the City of Hilo Zone Map in 1968.

21. The Waiakea Houselots which were created by the Territory of Hawaii in the early 1900's are generally zoned Single Family Residential and range from 10,000± to 20,000± square feet in size. The majority of the single family dwellings situated within this area are still habitable and are in fairly good condition.

PUBLIC UTILITIES AND FACILITIES

22. Access to the site is from Manono and Piilani Streets. Manono Street has a right-of-way width of 50 feet with a 34-foot pavement. Piilani Street is 60 feet wide with a 22-foot wide pavement.

23. All essential utilities are available to the subject area.

COUNTY OF HAWAII STATE OF HAWAII

BILL NO. 668

ORDINANCE NO. 92 122

AN ORDINANCE AMENDING SECTION 25-114 (CITY OF HILO ZONE MAP), ARTICLE 3, CHAPTER 25 (ZONING CODE) OF THE HAWAII COUNTY CODE, BY CHANGING THE DISTRICT CLASSIFICATION FROM RESORT-HOTEL, SAFETY (V-5-.75) TO LIMITED INDUSTRIAL (ML-20) AT WAIAKEA, SOUTH HILO, HAWAII, COVERED BY TAX MAP KEY 2-2-33:11, 12, 19 AND 20.

BE IT ORDAINED BY THE COUNCIL OF THE COUNTY OF HAWAII:

SECTION 1. Section 25-114, Article 3, Chapter 25 (Zoning Code) of the Hawaii County Code, is amended to change the district classification of property described hereinafter as follows:

The district classification of the following area situated at Waiakea, South Hilo, Hawaii, shall be Limited Industrial (ML-20):

Beginning at the Northwest corner of this piece of land and at the Southeast corner of the intersection of Wehilani and Mililani Streets, the coordinates of said point of beginning referred to Government Survey Triangulation Station "HALAI" being 496.51 feet North and 8,689.91 feet East, thence running by azimuths measured clockwise from True South:

1.	270°	00'	200.00 feet along the South side of Wehilani Street;
2.	0°	00'	560.00 feet along Government Land covered by General Lease 3419 and 3478 to Hawaiian Fern-Wood, Ltd.;

3.	90° 00'	200.00 feet along the North side of Piilani Street;
4.	180° 00'	560.00 feet along the East side of Mililani Street to the point of beginning and containing an area of 112,000 square feet.

All as shown on the map attached hereto, marked Exhibit "A" and by reference made a part hereof.

SECTION 2. This change in district classification is conditioned upon the following: (A) the applicant, its successors or assigns shall comply with all of the stated conditions of approval; (B) final consolidation approval of the subject properties shall be secured within one year from the effective date of the change of zone; (C) final plan approval for the proposed fish processing/ warehouse/office facility and related improvements shall be secured from the Planning Department within one year from the date of Final Consolidation Approval. To assure adequate time for plan approval review and in accordance with Chapter 25-244 (Zoning Code), plans shall be submitted a minimum of forty-five (45) days prior to the date for which plan approval must be secured. Plans shall indicate proposed structures, landscaping and parking associated with the proposed development; (D) construction shall commence within one year from the date of receipt of Final Plan Approval and be completed within two years thereafter; (E) in the design and review of any improvements, due consideration shall be given to the minimization of noise and adverse visual impacts through appropriate siting, height, bulk, color schemes,

signage, and landscaping; (F) access to the project site shall meet with the approval of the Department of Public Works; (G) the method of sewage and solid waste disposal shall meet with the approval of the appropriate governmental agencies; (H) that portion of Piilani Street fronting the project site shall be improved to commercial standards. This improvement shall be constructed in a manner meeting with the approval of the Department of Public Works, prior to the issuance of a certificate of occupancy for the proposed development; (I) upon the development of parcels along the unconstructed portion of Mililani Street in the immediate vicinity of the subject properties, the applicant shall either participate in the construction of Mililani Street or a fair share contribution of its construction (280 feet) at a time and in a manner meeting with the approval of the Department of Public Works; (J) a drainage system, if required, shall be installed meeting with the approval of the Department of Public Works; (K) comply with all applicable laws, rules, regulations and requirements, including those of the Departments of Public Works, Health and Fire; (L) should the Council adopt a Unified Impact Fees Ordinance setting forth criteria for the imposition of exactions or the assessment of impact fees, conditions included herein may, at the developer's election, be satisfied by performance in accordance with the requirements of the Unified Impact Fees Ordinance; (M) an annual progress report shall be submitted to the Planning Director prior to the anniversary date of the effective date of this Change of Zone. The report

shall address the status of the development and the compliance with the conditions of approval. This condition shall remain in effect until all of the conditions of approval have been complied with and the Planning Director acknowledges that further reports are not required; and, (N) an extension of time for the performance of conditions within the ordinance may be granted by the Planning Director upon the following circumstances: 1) the non-performance is the result of conditions that could not have been foreseen or are beyond the control of the applicant, successors or assigns, and that are not the result of their fault or negligence; 2) granting of the time extension would not be contrary to the general plan or zoning code; 3) granting of the time extension would not be contrary to the original reasons for the granting of the Change of Zone; 4) the time extension granted shall be for a period not to exceed the period originally granted for performance (i.e., a condition to be performed within one year may be extended for up to one additional year); and 5) if the applicant should require an additional extension of time, the Planning Director shall submit the applicant's request to the County Council for appropriate action. Further, should any of the conditions not be met or substantially complied with in a timely fashion, the Director shall initiate rezoning of the area to its original or more appropriate designation.

SECTION 3. In the event that any portion of the ordinance is declared invalid, such invalidity shall not affect the other parts of this ordinance.

SECTION 4. This ordinance shall take effect upon its approval.

INTRODUCED BY:

COUNCIL MEMBER, COUNTY OF HAWAII

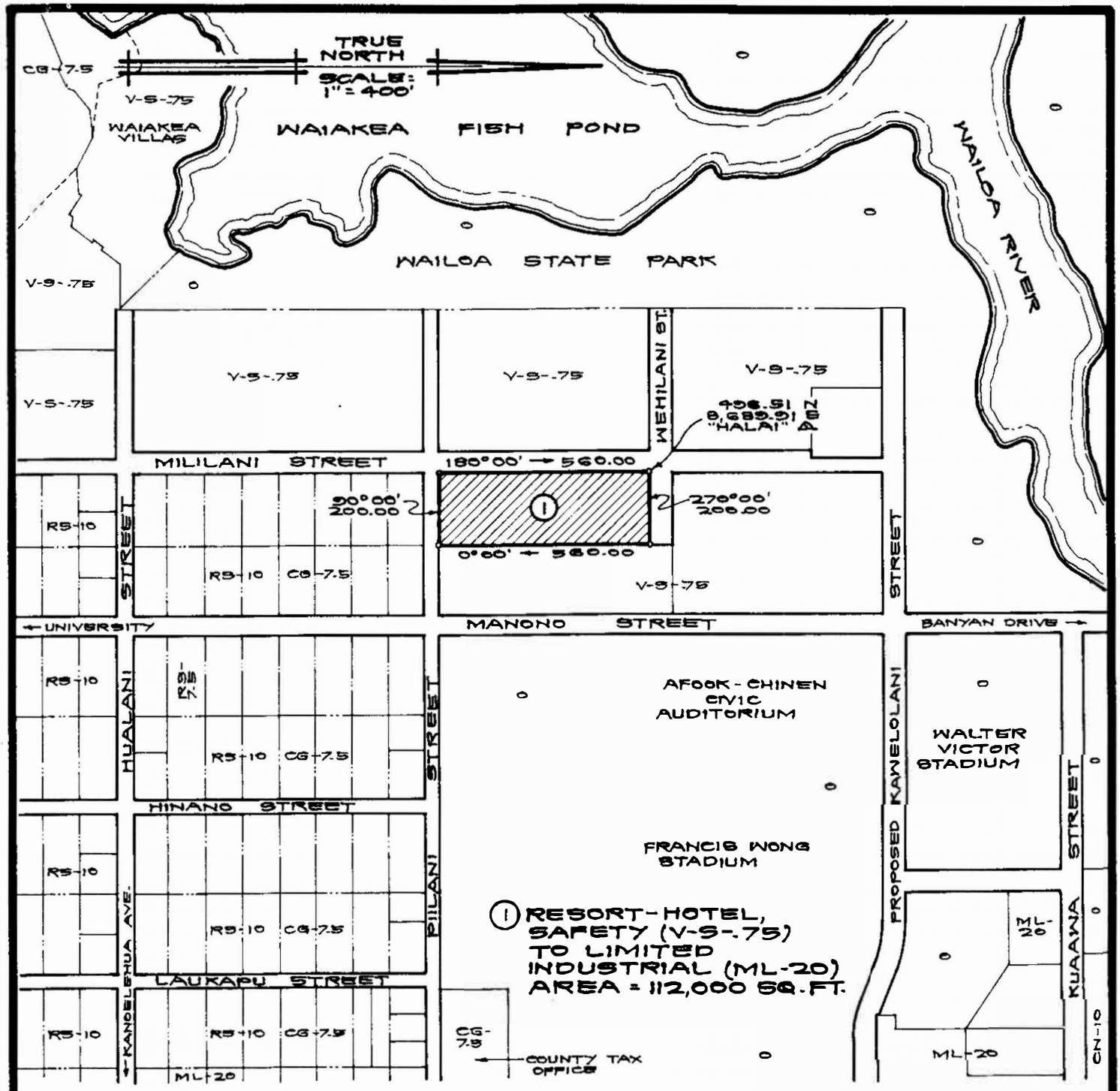
Hilo, Hawaii

Date of Introduction: October 21, 1992
Date of 1st Reading: October 21, 1992
Date of 2nd Reading: November 5, 1992
Effective Date: November 20, 1992

APPROVED AS TO FORM AND LEGALITY:

DEPUTY CORPORATION COUNSEL

DATED: SEP - 3 1992



AMENDMENT TO THE ZONING CODE

AMENDING SECTION 25-114 (CITY OF HILO ZONE MAP) ARTICLE 3, CHAPTER 25 (ZONING CODE) OF THE HAWAII COUNTY CODE BY CHANGING THE DISTRICT CLASSIFICATION FROM RESORT-HOTEL, SAFETY (V-S-.75) TO LIMITED INDUSTRIAL (ML-20) AT WAIAKEA, SOUTH HILO, HAWAII.

PREPARED BY : PLANNING DEPARTMENT
COUNTY OF HAWAII

TMK = 2-2-33 : 11, 12, 19 AND 20

AUG. 3, 1992

EXHIBIT "A"

(SUISAN COMPANY, LIMITED)

www.koaarchitects.com ● tel 808-217-6707
65-1285C Kawaihae Road Kamuela, HI 96743

DEA PUBLIC COMMENT RESPONSE

TO: CLAUDIA ROHR
369 Nene St.
Hilo, HI 96720
DATE: March 27, 2025
JOB NAME: Piilani Self Storage
TMK: (3) 2-2-033:011

Aloha,

Thank you for your time and consideration and your review of our DEA for the new self-storage building at the intersection of Piilani and Mililani Streets in Hilo.

We are striving to create a project that will be an attractive architectural element of this area and be of benefit to the local community and improve upon what has been the history of this parcel.

Our proposed project is intended to provide a much-needed storage service to our Hilo residents and also offer good paying jobs at this facility.

In response to your opinion of the adverse affects of our project, we respectfully note:

(2) Curtail the range of beneficial uses of the environment;
+our proposed project expounds upon this underutilized vacant parcel, which has been cleared of all dumping and rubbish

(3) Conflict with the State's environmental policies or long-term environmental goals established by law;
+our proposed project does not conflict with environmental policies. In fact, we intend to improve upon the previous environment at this parcel

(6) Involve adverse secondary impacts, such as population changes or effects on public facilities;
+we cannot find any adverse secondary impacts – i.e. no population changes or any effect on public facilities

(12) Have a substantial adverse effect on scenic vistas and viewplanes, during day or night, identified in county or state plans or studies;
+there are no existing scenic vistas or viewplanes that this proposed project would adversely affect.

Per your review comment: *The LUPAG designation for the subject property is medium density urban today and on the proposed 2045 General Plan maps. Therefore a general plan amendment will be required for consistency before development may be approved under HRS section 205A-26(2)(C).*

Our response: The General Plan (LUPAG) is only a reference. Furthermore, the new LUPAG has not been approved yet.

In **Resolution No. 151-90**, the Hawai‘i County Council previously stated that "the General Plan should not encourage residential developments to occur so close to the Wailoa River Estuary and tsunami safety zone," and further expressed that **light industrial activities were considered a more appropriate use of the property** at that time.

Zoning changes and associated entitlements typically remain with the property, regardless of ownership changes, unless explicitly stated otherwise in the ordinance, which is not the case. If the ordinance does not specify that the zoning is contingent solely upon Suisan's ownership or operations, the current zoning designation remains applicable.

The good thing about the proposed project is that it will become an asset to the area, is aesthetically beautiful, will produce low/no noise, will produce a much needed service to the community, will produce light traffic, and will provide jobs and economic value for the community, both during construction and thereafter.

To reiterate, In **Resolution No. 151-90**, the Hawai‘i County Council previously stated that "the General Plan should not encourage residential developments to occur so close to the Wailoa River Estuary and tsunami safety zone," and further expressed that **light industrial activities were considered a more appropriate use of the property** at that time.

We appreciate your concerns, and thank you for taking the time to address them to us.



Matthew Kilgore AIA NCARB
Koa Architects LLC