

MICHAEL P. VICTORINO  
Mayor

ROWENA M. DAGDAG-ANDAYA  
Director

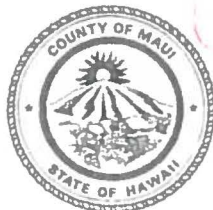
JORDAN MOLINA  
Deputy Director

GLEN A. UENO, P.E., L.S.  
Development Services Administration

RODRIGO "CHICO" RABARA, P.E.  
Engineering Division

JOHN R. SMITH, P.E.  
Highways Division

Telephone: (808) 270-7845  
Fax: (808) 270-7955



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COUNTY OF MAUI  
**DEPARTMENT OF PUBLIC WORKS**  
200 SOUTH HIGH STREET, ROOM 434  
WAILUKU, MAUI, HAWAII 96793

August 25, 2020

Mr. Keith Kawaoka, Acting Director  
State of Hawai'i  
Department of Health  
Office of Environmental Quality Control  
235 South Beretania Street, Suite 702  
Honolulu, Hawai'i 96813

Dear Mr. Kawaoka:

**SUBJECT: CHAPTER 343, HAWAII REVISD STATUTES, DRAFT ENVIRONMENTAL ASSESSMENT FOR PROPOSED WASTEWATER PRETREATMENT FACILITY AND WASTEWATER TREATMENT PLANT IMPROVEMENTS AT PULEHUNUI INDUSTRIAL PARK AT TMK NOS. (2) 3-8-104:017 (POR.) AND 030 (POR.), WAILUKU, MAUI, HAWAII**

With this letter, the County of Maui, Department of Public Works hereby transmits the Draft Environmental Assessment and Anticipated Finding of No Significant Impact (DEA-AFNSI) for the proposed Wastewater Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park at TMK Nos. (2) 3-8-104:017 (por.) and 130 (por.), in the Wailuku District, island of Maui, for publication in the next available edition of the Environmental Notice.

Enclosed is an Adobe Acrobat PDF file of the DEA-AFNSI and a zip file that contains the shapefile of the project's location map.

21 - 040

Mr. Keith Kawaoka, Acting Director  
August 25, 2020  
Page 2

If there are any questions, please contact our planning consultant, Gwendolyn Rivera of Munekiyo Hiraga at (808) 244-2015.

Sincerely,



FOR ROWENA M. DAGDAG-ANDAYA  
Director of Public Works

RDA:tn  
Enclosures

cc: Sal Marino, Valley Isle Pumping  
Gwendolyn Rivera, Munekiyo Hiraga

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**From:** [webmaster@hawaii.gov](mailto:webmaster@hawaii.gov)  
**To:** [HI Office of Environmental Quality Control](#)  
**Subject:** New online submission for The Environmental Notice  
**Date:** Friday, August 28, 2020 11:07:48 AM

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**Action Name**

Proposed Wastewater Pretreatment Facility And Wastewater Treatment Plant Improvements At Pulehunui

**Type of Document/Determination**

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

**HRS §343-5(a) Trigger(s)**

- (9)(A) Propose any wastewater treatment unit, except an individual wastewater system or a wastewater treatment unit serving fewer than fifty single-family dwellings or the equivalent

**Judicial district**

Wailuku, Maui

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

(2)3-8-104:017 (por.); (2)3-8-104:030 (por.)

**Action type**

Applicant

**Other required permits and approvals**

Department of Health, Hawaii Administrative Rules Title 11, Chapter 62 Compliance; Department of Health, Solid Waste Permit; County of Maui, Construction Permits

**Discretionary consent required**

None

**Approving agency**

County of Maui, Department of Public Works

**Agency contact name**

Rowena Dagdag-Andaya

**Agency contact email (for info about the action)**

[public.works@mauicounty.gov](mailto:public.works@mauicounty.gov)

**Email address or URL for receiving comments**

[public.works@mauicounty.gov](mailto:public.works@mauicounty.gov)

**Agency contact phone**

(808) 270-7845

**Agency address**

200 S. High Street, 4th Floor  
Wailuku, Hawaii 96793

United States  
[Map It](#)

#### **Applicant**

Valley Isle Pumping

#### **Applicant contact name**

Sal Marino

#### **Applicant contact email**

[sal@valleyislepumping.com](mailto:sal@valleyislepumping.com)

#### **Applicant contact phone**

(808) 280-5505

#### **Applicant address**

231-A Lower Kula Road  
Kula, Hawaii 96768  
United States  
[Map It](#)

#### **Was this submittal prepared by a consultant?**

Yes

#### **Consultant**

Munekiyo Hiraga

#### **Consultant contact name**

Gwendolyn Rivera

#### **Consultant contact email**

[planning@munekiyohiraga.com](mailto:planning@munekiyohiraga.com)

#### **Consultant contact phone**

(808) 244-2015

#### **Consultant address**

305 High Street, Suite 104  
Wailuku, Hawaii 96793  
United States  
[Map It](#)

#### **Action summary**

Valley Isle Pumping (VIP) is proposing the development of a new wastewater pretreatment facility on a private parcel of land owned by 2Q LLC, leased by VIP, and located in the Pulehunui Industrial Park (TMK No. (2)3-8-104-017). The pretreatment facility will process private domestic wastewater generated offsite prior to its treatment at the Pulehunui Industrial Park's wastewater treatment plant (WWTP) located on a private parcel owned by CMBY 2011 Investment, LLC (TMK No. (2)3-8-104:030). VIP also proposes improvements to the WWTP which will increase its capacity from its current maximum of 20,000 gallons per day (GPD) to approximately 40,000 GPD in order to accommodate the increased flow from the new pretreatment facility.

**Reasons supporting determination**

The Department of Public Works is providing an Anticipated Finding of No Significant Impact, based on the analysis of significance criteria provided in Chapter IV of the Draft Environmental Assessment.

**Attached documents (signed agency letter & EA/EIS)**

- [WW\\_Pretreatment\\_Facility\\_and\\_WW\\_TP\\_Pulehunui\\_Aug.2020.Draft-EA.pdf](#)
- [WW\\_Pretreatment\\_Facility\\_and\\_WW\\_TP\\_Pulehunui\\_FONSI-Letter-from-DPW-082020.pdf](#)

**Action location map**

- [WW\\_Pretreatment\\_Facility\\_and\\_WW\\_TP\\_Pulehunui\\_TMK-Shapefile.zip](#)

**Authorized individual**

Gwendolyn Rivera

**Authorization**

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



# **Draft Environmental Assessment**

## **PROPOSED WASTEWATER PRETREATMENT FACILITY AND WASTEWATER TREATMENT PLANT IMPROVEMENTS AT PULEHUNUI INDUSTRIAL PARK (TMK NOS.: (2)3-8-104:017(por.) and 030(por.))**

Prepared for:

**Valley Isle Pumping**

**August 2020**

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by Munekiyo Hiraga



**MUNEKIYO HIRAGA**

Planning. Project Management. Sustainable Solutions.



# **Draft Environmental Assessment**

## **PROPOSED WASTEWATER PRETREATMENT FACILITY AND WASTEWATER TREATMENT PLANT IMPROVEMENTS AT PULEHUNUI INDUSTRIAL PARK (TMK NOS.: (2)3-8-104:017(por.) and 030(por.))**

**Prepared for:**

**Valley Isle Pumping**

**August 2020**

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# CONTENTS

	<b>Page</b>
Executive Summary .....	iv
List of Acronyms .....	vi
I. PROJECT OVERVIEW .....	1
A. PROJECT LOCATION, EXISTING USE, AND LAND OWNERSHIP .....	1
B. BACKGROUND AND PROPOSED ACTION .....	1
C. LAND USE ENTITLEMENTS .....	5
D. CHAPTER 343, HAWAI'I REVISED STATUTES REQUIREMENT .....	5
E. PROJECT COST AND TIME SCHEDULE .....	8
II. DESCRIPTION OF THE EXISTING ENVIRONMENT, POTENTIAL IMPACTS, AND PROPOSED MITIGATION MEASURES.....	9
A. PHYSICAL SETTING .....	9
1. Surrounding Land Uses .....	9
2. Climate.....	10
3. Topography and Soil Characteristics.....	10
4. Agricultural Productivity Considerations .....	12
5. Sea Level Rise, Flood, and Tsunami Hazards .....	14
6. Coastal Resources .....	17
7. Flora and Fauna .....	17
8. Streams, Wetlands, and Reservoirs .....	19
9. Air Quality .....	19
10. Greenhouse Gas Considerations .....	20
11. Noise Characteristics.....	21
12. Water Quality .....	21
13. Pesticides and Hazardous Substances .....	22
14. Archaeological Resources .....	23
15. Cultural Resources .....	24
16. Scenic and Open Space Resources.....	27
B. SOCIO-ECONOMIC ENVIRONMENT .....	27
1. Land Use and Community Character .....	27
2. Population and Economy.....	28
C. PUBLIC SERVICES .....	30
1. Solid Waste Collection and Disposal.....	30
2. Medical Facilities, Police, and Fire Protection Services .....	31
3. Educational Facilities .....	31
4. Recreational Facilities.....	32
D. INFRASTRUCTURE .....	33
1. Roadway Infrastructure.....	33
2. Water .....	34
3. Wastewater Systems .....	35
4. Drainage .....	36



5.	Electrical, Telephone Systems, and Cable Television Services .....	37
E.	CUMULATIVE AND SECONDARY IMPACTS .....	38
III.	RELATIONSHIP TO GOVERNMENTAL PLANS, POLICIES, AND CONTROLS.....	41
A.	HAWAI'I STATE PLAN .....	41
B.	STATE FUNCTIONAL PLANS .....	68
C.	STATE LAND USE DISTRICTS .....	69
D.	MAUI COUNTY GENERAL PLAN.....	69
1.	Countywide Policy Plan .....	70
2.	Maui Island Plan .....	93
E.	KIHEI-MAKENA COMMUNITY PLAN .....	135
F.	COUNTY ZONING .....	137
G.	HAWAI'I COASTAL ZONE MANAGEMENT PROGRAM – OBJECTIVES AND ENFORCEABLE POLICIES .....	137
H.	MAUI PLANNING COMMISSION SPECIAL MANAGEMENT AREA RULES AND REGULATIONS .....	145
IV.	ALTERNATIVES TO THE PROPOSED ACTION .....	150
A.	PREFERRED ALTERNATIVE.....	150
B.	NO ACTION ALTERNATIVE .....	150
C.	DEFERRED ACTION ALTERNATIVE.....	151
D.	ONSITE WASTEWATER TREATMENT .....	151
E.	EFFLUENT DISPOSAL ALTERNATIVES .....	151
F.	SOLIDS TREATMENT ALTERNATIVES .....	152
V.	SUMMARY OF UNAVOIDABLE ENVIRONMENTAL IMPACTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES.....	153
VI.	SIGNIFICANCE CRITERIA ASSESSMENT .....	154
VII.	LIST OF PERMITS AND APPROVALS .....	158
VIII.	PARTIES CONSULTED DURING THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT; LETTERS RECEIVED AND RESPONSES TO SUBSTANTIVE COMMENTS .....	159
IX.	REFERENCES.....	i

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# List of Figures

	<u>Page</u>
<b>Figure 1.</b> Regional Location Map .....	2
<b>Figure 2.</b> Property Location Map.....	3
<b>Figure 3.</b> Conceptual Site Plan .....	4
<b>Figure 4.</b> Wastewater Pretreatment Process Flow Diagram .....	6
<b>Figure 5.</b> WWTP Process Flow Diagram .....	7
<b>Figure 6.</b> Soil Association Map.....	11
<b>Figure 7.</b> Soil Classification Map.....	13
<b>Figure 8.</b> Agricultural Lands of Importance to the State of Hawai'i Map .....	15
<b>Figure 9.</b> Land Study Bureau Classification .....	16
<b>Figure 10.</b> Maui Island Plan Urban Growth Boundary Map.....	29
<b>Figure 11.</b> Kihei-Makena Community Plan Map.....	136
<b>Figure 12.</b> Maui County Zoning.....	138

# List of Table

	<u>Page</u>
<b>Table 1.</b> Educational Facilities.....	32

# List of Appendices

<b>Appendix A-1.</b> Preliminary Engineering Report	
<b>Appendix A-2.</b> Drainage Report	
<b>Appendix B.</b> Letter from Department of Public Works Dated March 12, 2019	
<b>Appendix C.</b> Botanical Survey	
<b>Appendix D.</b> Avifaunal and Feral Mammal Survey	
<b>Appendix E.</b> Nene (Hawaiian Goose) Survey	
<b>Appendix F.</b> Arthropod Study	
<b>Appendix G.</b> Noise Study	
<b>Appendix H.</b> Department of Health, Solid and Hazardous Waste Branch Letter Dated January 9, 2012	
<b>Appendix I.</b> Archaeological Inventory Survey	
<b>Appendix J.</b> State Historic Preservation Division Letter Dated June 18, 2012	
<b>Appendix K.</b> Archaeological Monitoring Plan	
<b>Appendix L.</b> SHPD Letter Dated August 24, 2012	
<b>Appendix M.</b> Cultural Impact Assessment Report	
<b>Appendix N.</b> Traffic Impact Analysis Report	

## **Executive Summary**

<b>Project Name:</b>	Proposed Wastewater Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park
<b>Type of Document:</b>	Draft Environmental Assessment
<b>Legal Authority:</b>	Chapter 343, Hawai'i Revised Statutes Chapter 200.1, Hawai'i Administrative Rules
<b>Anticipated Determination:</b>	Anticipated Finding of No Significant Impact (AFNSI)
<b>Applicable Environmental Assessment review "Trigger":</b>	Proposal of a Wastewater Treatment Unit
<b>Location:</b>	TMK: (2)3-8-104:017 (por.) and 030 (por.) Wailuku District Pulehunui, Waikapū, Maui, Hawai'i
<b>Applicant:</b>	Valley Isle Pumping 291 Lower Kula Road Pukalani, Hawai'i 96768 Contact: Sal Marino Phone: (808) 878-8807
<b>Proposing and Determining Agency:</b>	County of Maui Department of Public Works 200 S. High Street, 4 <sup>th</sup> Floor Wailuku, Hawai'i 96793 Contact: Rowena Dagdag-Andaya, Director Phone: (808) 270-7845
<b>Consultant:</b>	Munekiyo Hiraga 305 High Street, Suite 104 Wailuku, Hawai'i 96793 Contact: Gwendolyn Rivera Phone: (808) 244-2015

**Project Summary:**

Valley Isle Pumping (“Applicant”) (VIP) is proposing the development of a new wastewater pretreatment facility on an approximately 1.3-acre portion of a 2.89-acre parcel of land located in the Pulehunui Industrial Park identified as Tax Map Key (TMK) No. (2)3-8-104-017 (Parcel 17). Parcel 17, also known as Lot 2Q, is owned by 2Q LLC and is leased by the Applicant. The pretreatment facility will process private domestic wastewater generated offsite prior to its processing at the Pulehunui Industrial Park’s wastewater treatment plant (WWTP) located on an approximately one (1) acre portion of the 9.68-acre parcel identified as TMK (2)3-8-104:030 (Parcel 30), owned by CMBY 2011 Investment, LLC. The Applicant also proposes improvements to the WWTP which will increase its capacity from its current maximum of 20,000 gallons per day (GPD) to approximately 40,000 GPD.

The need for the preparation of a Chapter 343, Hawai‘i Revised Statutes (HRS) Environmental Assessment (EA) is triggered by the proposal of a wastewater treatment unit. HRS §343-5 states that an Environmental Assessment (EA) shall be required for actions that *“propose any wastewater treatment unit, except for an individual wastewater system or a wastewater treatment unit serving fewer than fifty single-family dwellings or the equivalent”*. The State of Hawai‘i, Department of Health (DOH) has advised the Applicant that a WWTP with a capacity greater than 30,000 GPD (as the equivalent to fifty single-family dwellings) is a trigger for the environmental review process pursuant to HRS Chapter 343. As the proposed actions would increase the WWTP capacity above the 30,000 GPD threshold, this EA has been prepared to document the proposed project’s technical characteristics, environmental impacts, mitigation measures, and alternatives.

The Department of Public Works (DPW) will be processing construction permits following DOH Wastewater Branch’s approval of the facility’s design, and, as such, it has been determined through consultation that DPW will serve as the Approving Agency for the EA.

## List of Acronyms

A&B	Alexander & Baldwin
AFNSI	Anticipated Finding of No Significant Impact
AIS	Archaeological Inventory Survey
ALISH	Agricultural Lands of Importance to the State of Hawai'i
AMSL	Above Mean Sea Level
BMP	Best Management Practice
CAA	Civil Aeronautics Administration
CF	Cubic Feet
CFS	Cubic Feet Per Second
CGS	Customer Grid Supply
CIA	Cultural Impact Assessment
CZM	Coastal Zone Management
DEM	Department of Environmental Management
DHHL	Department of Hawaiian Home Lands
DLIR	Department of Labor and Industrial Relations
DLNR	Department of Land and Natural Resources
DOE	Department of Education
DOH	Department of Health
DOT	Department of Transportation
DPS	Department of Public Safety
DPW	Department of Public Works
DWS	Department of Water Supply
EA	Environmental Assessment
EAL	Environmental Action Level
EPA	United States Environmental Protection Agency
ESA	Environmental Site Assessment
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
GPD	Gallons per Day
HAC	Hawai'i Aeronautics Commission
HAR	Hawai'i Administrative Rules
HC&S	Hawai'i Commercial & Sugar Company
HCZMP	Hawai'i Coastal Zone Management Program
HRS	Hawai'i Revised Statutes
IAL	Important Agricultural Land
ISWMP	Integrated Solid Waste Management Plan
IWS	Individual Wastewater System
KHS	Kihei High School
LSB	Land Study Bureau
LUC	State Land Use Commission
MIP	Maui Island Plan
MPD	Maui Police Department
MRPSC	Maui Regional Public Safety Complex
NAS	Naval Air Station
OHA	Office of Hawaiian Affairs
PEDR	Preliminary Engineering and Drainage Report
PS	Pump Station
PSD	State Department of Public Safety

PV	Photovoltaic
RGB	Rural Growth Boundary
SHPD	State Historic Preservation Division
SHWB	Solid & Hazardous Waste Branch
SIHP	State Inventory of Historic Places
SMA	Special Management Area
TIAR	Traffic Impact Assessment Report
TPH-O	Total Petroleum Hydrocarbons as Oil
TMK	Tax Map Key
UGB	Urban Growth Boundary
VIP	Valley Isle Pumping
WID2	Waiakoa Extremely Stony Silty Clay Loam, 3 to 25 percent slopes, eroded
WWRF	Wastewater Reclamation Facility
WWTP	Wastewater Treatment Plant





# PROJECT OVERVIEW



# I. PROJECT OVERVIEW

## A. PROJECT LOCATION, EXISTING USE, AND LAND OWNERSHIP

Valley Isle Pumping (“Applicant”) is proposing the development of a new wastewater pretreatment facility, improvements to an existing wastewater treatment plant, and related improvements on privately owned land within the Pulehunui Industrial Park. The Pulehunui Industrial Park, a subdivision established in 2018 for heavy industrial uses, is located on the east side of Maui Veterans Highway approximately half way between Kahului and Kīhei in the vicinity of the former Pu‘unēnē Airport, Maui, Hawai‘i. See **Figure 1**. The proposed project involves an approximately 1.3-acre portion of the 2.889-acre parcel identified by TMK (2)3-8-104:017 (Parcel 17), owned by 2Q LLC and leased by the Applicant, and an approximately one (1) acre portion of the 9.68-acre parcel identified by TMK (2)3-8-104:030 (Parcel 30), owned by CMBY 2011 Investment LLC. See **Figure 2**. The project site is bounded by the Maui Raceway Park to the west, heavy industrial lots and the Haiku Ditch to the north, and agricultural land to the south and east. Vehicular access will be from Nopu Road within the Industrial Park. The Industrial Park is accessed from Maui Veterans Highway via Kama‘aina Road and South Firebreak Road.

## B. BACKGROUND AND PROPOSED ACTION

The Applicant provides pumping services for cesspools, septic systems, and other waste pumping applications around Maui. Currently, these wastes are transferred to County of Maui wastewater treatment facilities for disposal. The Applicant proposes to improve the efficiency of its operations by developing a wastewater pretreatment facility. The new pretreatment facility, located on Parcel 17, will process up to 20,000 GPD of wastewater. Pretreatment operations include screening and dewatering processes. Solid waste material generated at the pretreatment facility will be removed for disposal at a landfill or other appropriate disposal site, according to the classification of solids generated. Liquid effluent from the pretreatment facility will be transferred to the Pulehunui Industrial Park’s WWTP, located on Parcel 30 for further treatment and disposal. VIP proposes improvements to the WWTP to increase its capacity from the current maximum of 20,000 gallons per day (GPD) to approximately 40,000 GPD in order to accommodate the liquid effluent generated at the pretreatment facility. See **Figure 3**.

### New Wastewater Pretreatment Facility

The pretreatment facility, located on Parcel 17, will receive up to 20,000 GPD of waste collected by pump trucks. This waste includes residential septage, sewer sludge, and other domestic wastewater. The pretreatment facility processing equipment will consist of a 2,000-gallon grit chamber, a 29,500-gallon receiving and equalization tank, pumps,

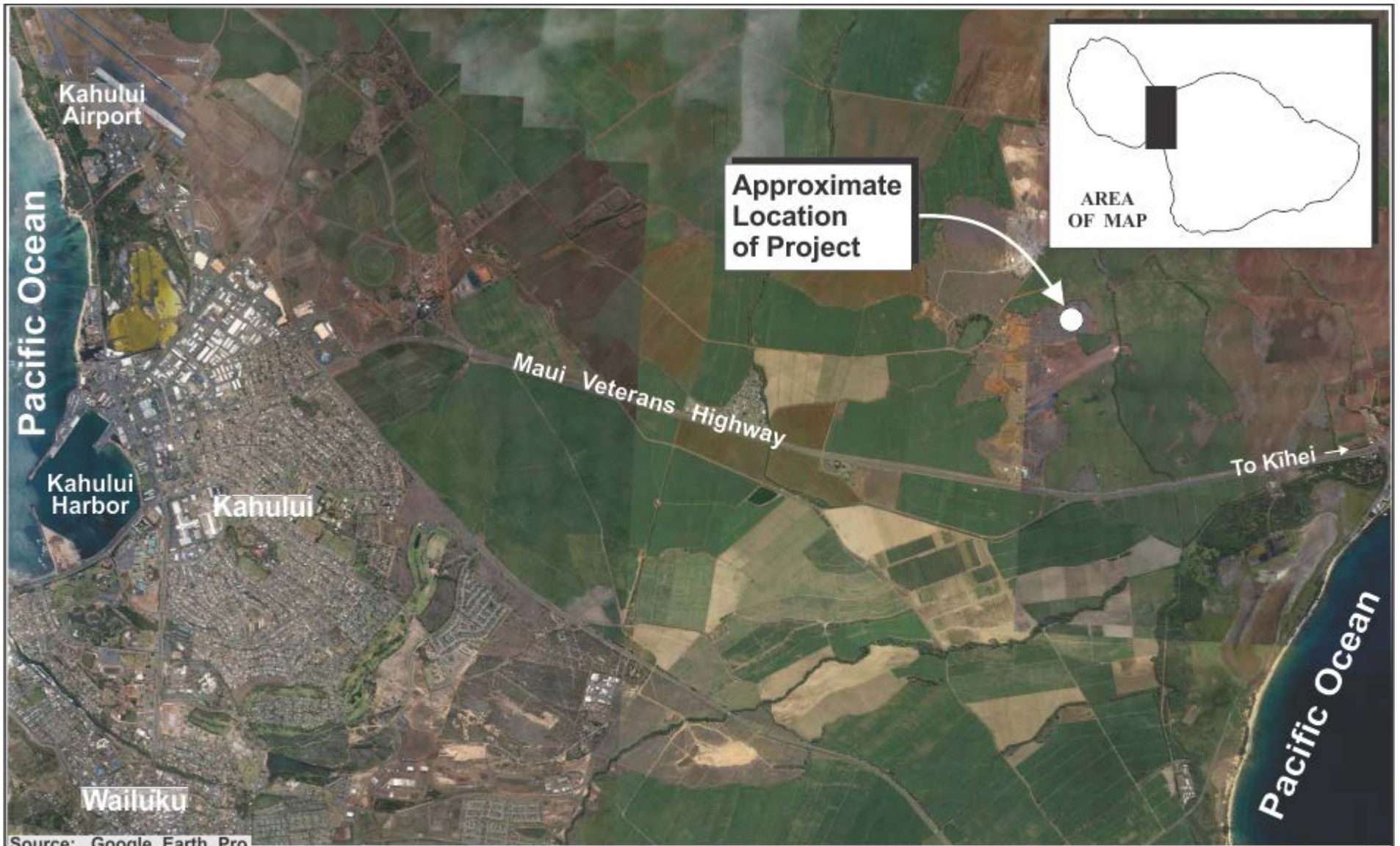


Figure 1

Wastewater Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park Regional Location Map

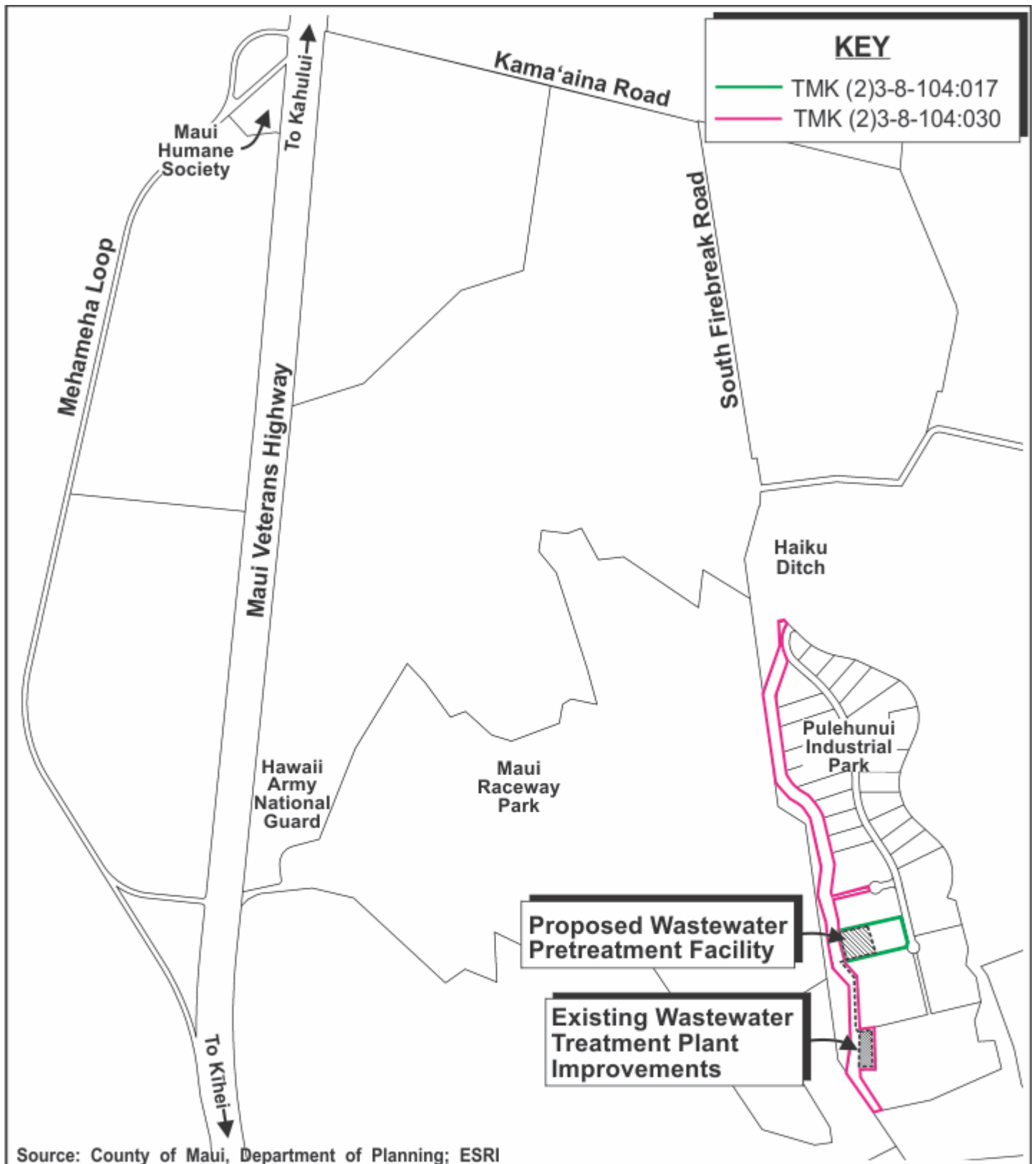
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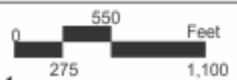
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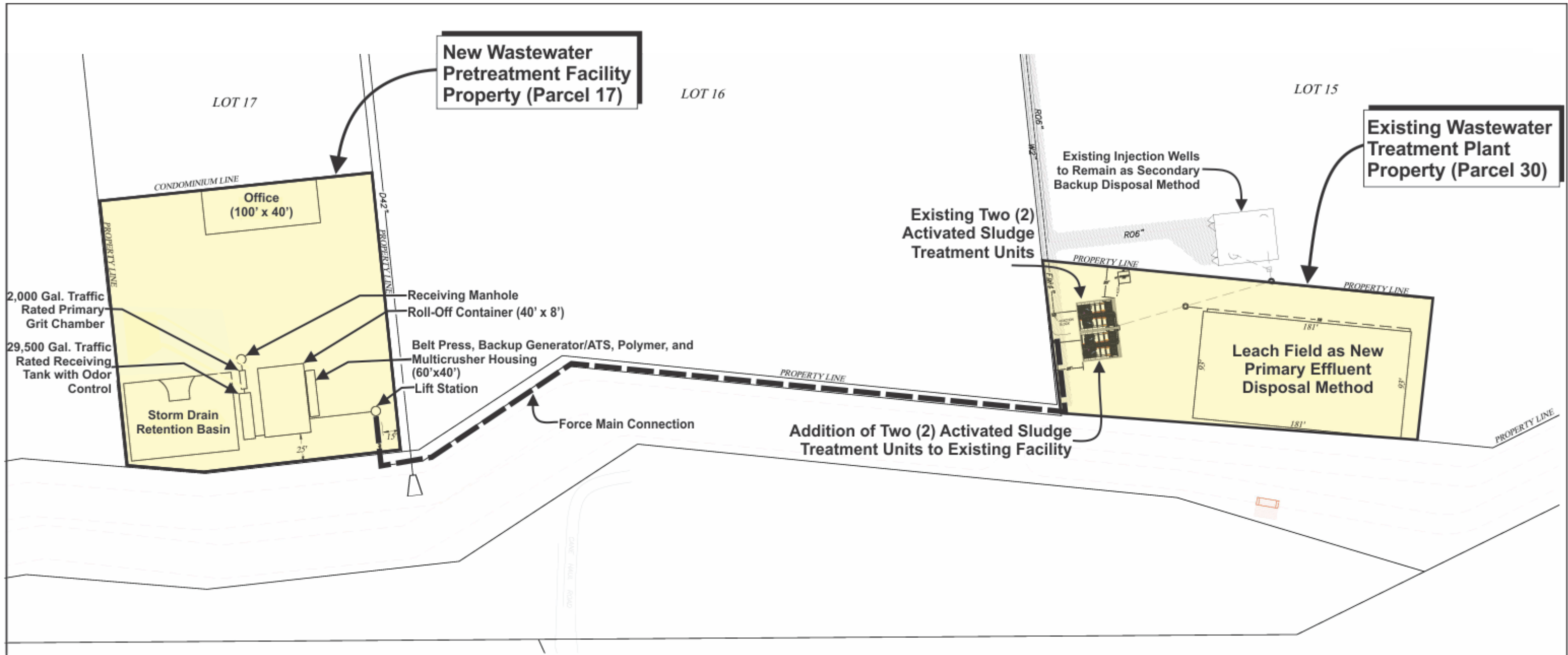
**Figure 2 Wastewater Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park**  
**Property Location Map**



Prepared for: Valley Isle Pumping







Source: CDF Engineering LLC

Figure 3

Wastewater Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park  
Conceptual Site Plan

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Prepared for: Valley Isle Pumping



grinders, a polymer mixing system, belt press, and associated control systems. See **Figure 4**. After pretreatment, a lift station located in the southwest corner of Parcel 17 will convey the liquid effluent approximately 650 feet through a new force main to the existing Wastewater Treatment Plant on Parcel 30. A Preliminary Engineering and Drainage Report has been prepared for the Pretreatment Facility and Wastewater Treatment Plant improvements. See **Appendix “A-1”** and **Appendix “A-2”**.

### **Improvements to Existing Wastewater Treatment Plant**

As there is no County wastewater infrastructure in the area of the Pulehunui Industrial Park, a private wastewater collection system and WWTP were constructed within the subdivision. The original WWTP was designed and built to process up to 20,000 GPD of domestic wastewater to accommodate the wastewater flow from the subdivision lots. The existing WWTP consists of two (2) 10,000 GPD activated sludge units operating in parallel. See **Figure 5**. After treatment in the WWTP, the liquid effluent currently flows to two (2) injection wells located in the vicinity of the WWTP on Parcel 30. Solids collected at the WWTP are disposed at the County-owned Wailuku-Kahului Wastewater Reclamation Facility (WWRF).

The proposed improvements to the existing WWTP include addition of two (2) 10,000 GPD activated sludge units to increase the WWTP’s capacity to 40,000 GPD, and installation of an absorption (leach) field to replace use of injection wells for primary effluent disposal. The two (2) existing injection wells will remain in service as a full backup. Refer to **Appendix “A-1”**.

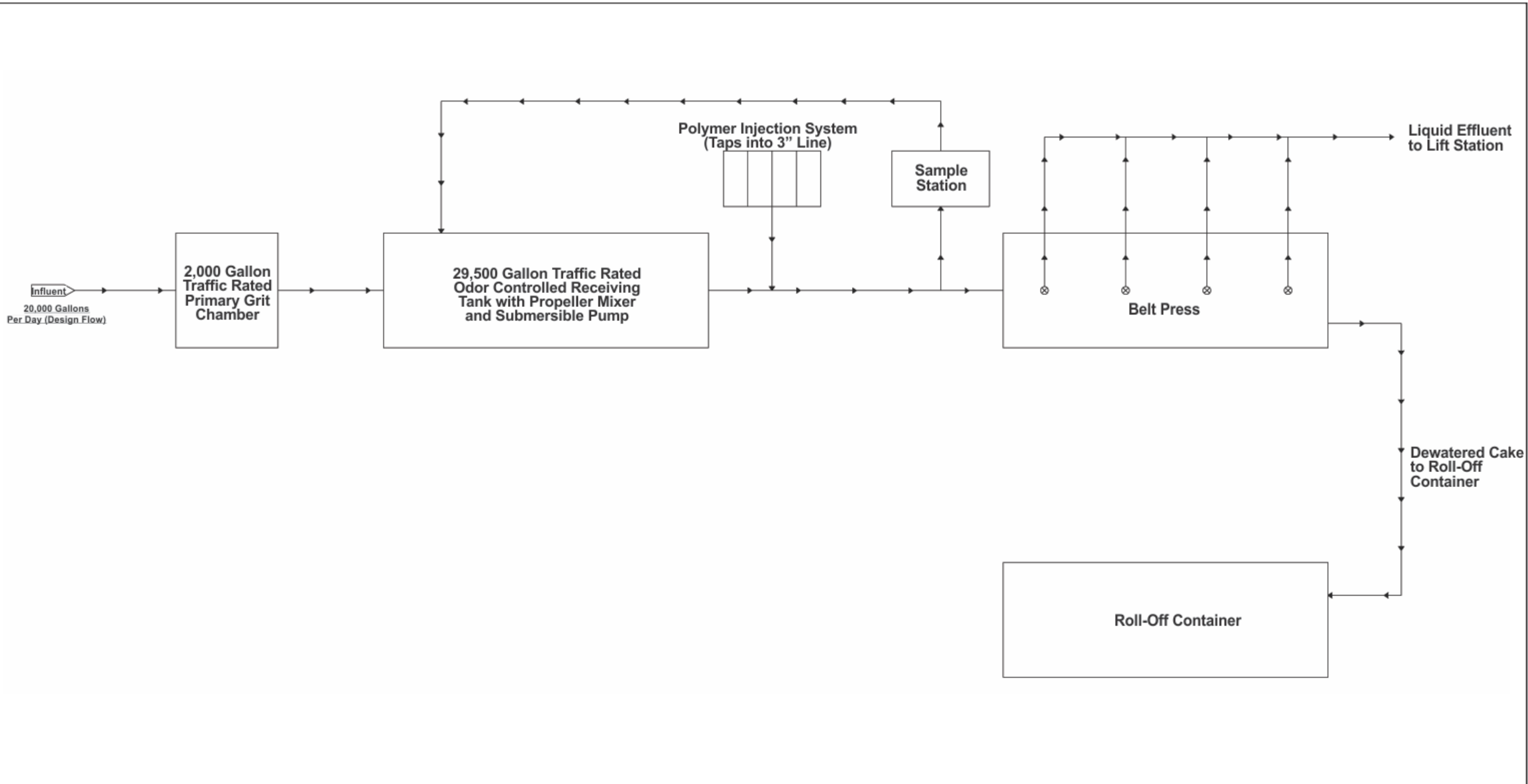
## **C. LAND USE ENTITLEMENTS**

The existing subdivision and project area is zoned “M-3, Restricted Industrial” district by the County of Maui, designated “Heavy Industrial” by the Kihei-Makena Community Plan, and is in the State Land Use “Urban” district. The project area is located within the Pulehunui Planned Growth Area identified in the Maui Island Plan to be developed primarily for “*heavy industrial, public/quasi-public, and recreational purposes.*” The proposed use discussed herein is consistent with these designations, and no land use entitlement amendments are required for the proposed project to proceed. The project area is not located within the County’s Special Management Area (SMA).

## **D. CHAPTER 343, HAWAII REVISÉD STATUTES REQUIREMENT**

The Chapter 343, Hawaii Revised Statutes (HRS) environmental review process for the Pulehunui Industrial Park subdivision was completed in 2013 with the publication of a Final Environmental Assessment (EA) and a Finding of No Significant Impact (FONSI) that was issued by the County of Maui, Department of Planning. Following receipt of its land use entitlements, the subdivision was developed by the landowner. Per HRS, Chapter 343-

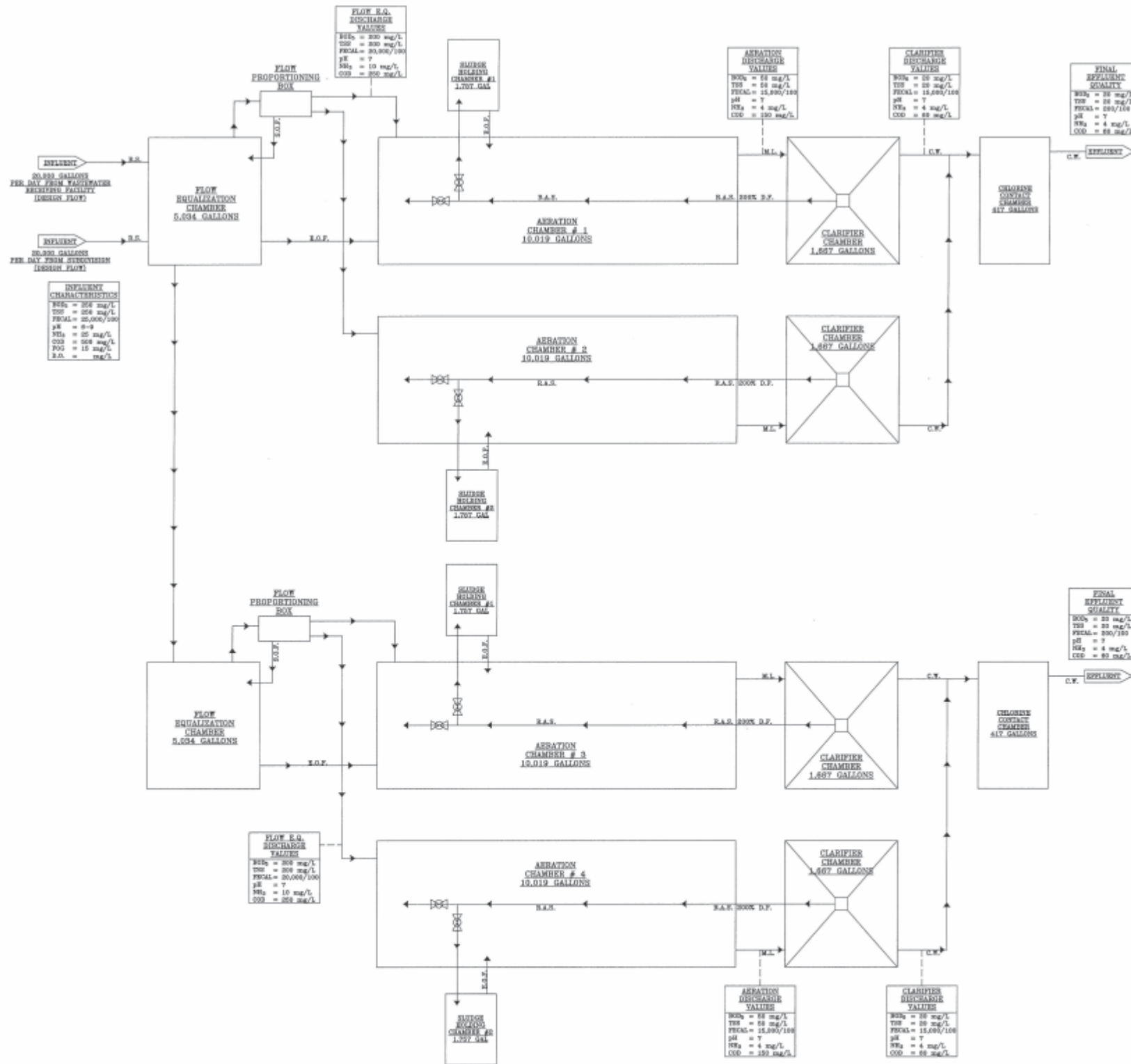




Source: CDF Engineering LLC

Figure 4 Wastewater Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park  
Wastewater Pretreatment Process Flow Diagram

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DESCRIPTION	DESIGN FLOW	FLOW EQUALIZATION CHAMBER	SLUDGE HOLDING CHAMBER	AERATION CHAMBERS	CLARIFIER CHAMBER	CHLORINE CONTACT CHAMBER
<b>TOTAL</b>	20,000 GPD	5,034 GAL	--	--	--	417 GAL
<b>TRAIN 1</b>	10,000 GPD	SHARED W/ TRAIN 2	1,757 GAL	10,019 GAL	1,667 GAL	SHARED W/ TRAIN 2
<b>TRAIN 2</b>	10,000 GPD	SHARED W/ TRAIN 1	1,757 GAL	10,019 GAL	1,667 GAL	SHARED W/ TRAIN 1
<b>TOTAL</b>	20,000 GPD	5,034 GAL	--	--	--	417 GAL
<b>TRAIN 3</b>	10,000 GPD	SHARED W/ TRAIN 4	1,757 GAL	10,019 GAL	1,667 GAL	SHARED W/ TRAIN 4
<b>TRAIN 4</b>	10,000 GPD	SHARED W/ TRAIN 3	1,757 GAL	10,019 GAL	1,667 GAL	SHARED W/ TRAIN 3
<b>WWTP TOTAL</b>	40,000 GPD	10,068 GAL	--	--	--	834 GAL

**KEY**

- Main Flow Through Wastewater Treatment System
- R.A.S. Sludge Return System
- Emergency Overflow
- Surge Overflow
- C.W. = Clear Water
- E.O.F. = Emergency Overflow
- M.L. = Mixed Liquor
- R.A.S. = Raw Activated Sludge
- S.O.F. = Surge Overflow Return

Source: CDF Engineering LLC

Figure 5 Wastewater Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park  
WWTP Process Flow Diagram

NOT TO SCALE


5(a), an EA shall be required for actions that “propose any wastewater treatment unit, except for an individual wastewater system or a wastewater treatment unit serving fewer than fifty single-family dwellings or the equivalent.” DOH has advised that a WWTP with a capacity greater than 30,000 GPD (as the equivalent of fifty single-family residences) is a trigger for the environmental review process pursuant to HRS Chapter 343. The existing WWTP began operations in 2018 to treat the wastewater from the lots within the Pulehunui Industrial Park subdivision. As its capacity was below 30,000 GPD when it was constructed, there was no statutory trigger for environmental review pursuant to HRS Chapter 343. The currently proposed actions will increase the WWTP capacity above the 30,000 GPD threshold. Accordingly, an EA is being prepared to document the subject project’s technical characteristics, environmental impacts, mitigation measures, and alternatives.

The State of Hawai‘i, Department of Health (DOH) will review the proposed pretreatment facility and WWTP improvement design plans with respect to compliance with applicable requirements of the Hawai‘i Administrative Rules (HAR), Title 11, Chapter 62, regarding wastewater systems. DOH will provide approval of the project plans prior to construction of the proposed improvements.

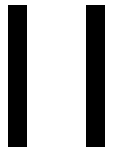

As the Department of Public Works (DPW) will be processing construction permits for the proposed improvements following DOH’s approval of the facility’s design, it has been determined through pre-consultation with the two (2) aforementioned agencies that DPW will serve as the Approving Agency for the EA. See **Appendix “B”**.

## **E. PROJECT COST AND TIME SCHEDULE**

Construction will begin after all required permits have been obtained. Construction duration is anticipated to take three (3) months. The estimated cost for the project is \$1.5 million.



DESCRIPTION OF THE  
EXISTING ENVIRONMENT,  
POTENTIAL IMPACTS, AND  
PROPOSED MITIGATION  
MEASURES



## II. DESCRIPTION OF THE EXISTING ENVIRONMENT, POTENTIAL IMPACTS, AND PROPOSED MITIGATION MEASURES

### A. PHYSICAL SETTING

#### 1. Surrounding Land Uses

##### a. Existing Conditions

The project site is located approximately midway between Kahului and Kīhei, and situated on the eastern side of Maui's isthmus, approximately two (2) miles northeast of Mā'alaea Bay. The project site consists of approximately 1.3 acres of Parcel 17 and approximately one (1) acre of Parcel 30, both located within the Pulehunui Industrial Park. The surrounding lots within the Pulehunui Industrial Park are in the process of development for heavy industrial uses, such as manufacturing, construction baseyards, and heavy equipment storage. The Hawaiian Cement facility is located approximately one (1) mile to the east. Lands to the west are in use by the Maui Motor Sports Park and the Hawaii Army National Guard Armory. Other lands in the area are active or fallow agricultural lands owned by various private landowners. It is noted that both the Department of Land and Natural Resources (DLNR) and the Department of Hawaiian Homelands (DHHL) both own land in the Pulehunui area and are currently in the process of developing plans and obtaining entitlements for these new projects.

The project site is located east of Maui Veterans Highway and is accessed via Nopu Street via Kama'aina Road, which intersects Maui Veterans Highway, and South Firebreak Road.

##### b. Potential Impacts and Proposed Mitigation Measures

Much of the surrounding land was formerly in agricultural uses and is transitioning to a mixture of private and public industrial uses. From a future land use perspective, this is consistent with the rationale of the Pulehunui planned growth area identified in the Maui Island Plan. The project area has appropriate land use designations for industrial use according to County zoning, the Kihei-Makena Community Plan, and State Land Use. The proposed use, involving a new wastewater pretreatment facility and expansion of the existing WWTP at the Pulehunui Industrial Park, is consistent with the existent, emergent, and planned uses of the

surrounding land and is not considered to have an adverse impact on the same.

## 2. **Climate**

### a. **Existing Conditions**

Like most areas of Hawai'i, Maui's climate is relatively uniform year-round. Maui is characterized by a semi-tropical climate containing a multitude of individual microclimates. Pulehunui (also referred to as Pu'unēnē) experiences mild and uniform temperatures, moderate humidity, and relatively consistent trade wind breezes from the north and northeast. The climate of Maui County is defined by average temperatures ranging from 88.0 degrees Fahrenheit in the warmest month, September, to 63.0 degrees in the coolest month of February, based on readings taken at the Kahului Airport. A high proportion of the rainfall that Maui receives each year falls on the northeast facing shores, leaving the central isthmus and southern coastal areas relatively dry. The annual average rainfall in the vicinity of the project site (based on readings taken at Kahului Airport) amounts to approximately 18.23 inches. In the Kahului region, January is historically the wettest month, while June is the driest. On average, there are 95 days per year with more than 0.01 inch of rain in Kahului (County of Maui, Office of Economic Development, 2017).

### b. **Potential Impacts and Proposed Mitigation Measures**

The proposed project is limited in scope to wastewater improvements within an existing heavy industrial subdivision and, as such, is not anticipated to have an adverse effect on climate.

## 3. **Topography and Soil Characteristics**

### a. **Existing Conditions**

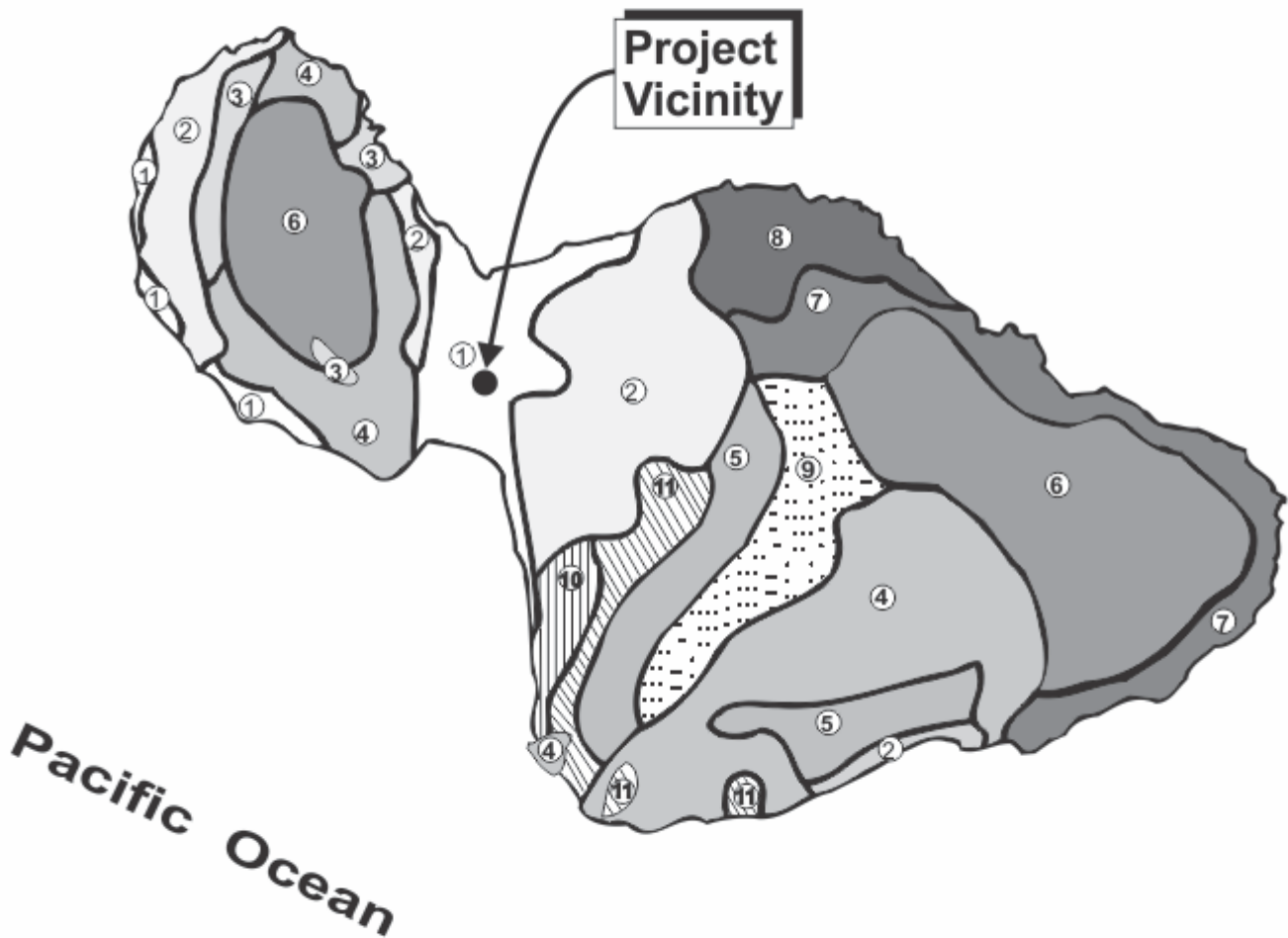
The project area is located on the eastern side of Maui's isthmus approximately two (2) miles northeast of Mā'alaea Bay at approximately 135 feet above mean sea level (AMSL) on the eastern edge, sloping to the west to approximately 120 feet AMSL, with an average slope of 2 percent. See **Appendix "A-1"**. The project area has been heavily disturbed from decades of sugar cane cultivation and is now an industrial subdivision.

Underlying the project site and surrounding lands are soils belonging to the Pulehu-Ewa-Jaucas association. See **Figure 6**. According to the Soil



# LEGEND

- |  |                                     |
|--|-------------------------------------|
| ① Pulehu-Ewa-Jaucas association                | ⑦ Hana-Makaalae-Kailua association  |
| ② Waiakoa-Keahua-Molokai association           | ⑧ Pauwela-Haiku association         |
| ③ Honolulu-Olelo association                   | ⑨ Laumaia-Kaipoi-Olinda association |
| ④ Rock land-Rough mountainous land association | ⑩ Keawakapu-Makena association      |
| ⑤ Puu Pa-Kula-Pane association                 | ⑪ Kamaole-Oanapuka association      |
| ⑥ Hydrandepts-Tropaquods association           |                                     |



Map Source: USDA Soil Conservation Service

**Figure 6 Wastewater Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park** NOT TO SCALE  
Soil Association Map



Prepared for: Valley Isle Pumping



Survey of the Islands of Kaua'i, O'ahu, Maui, Moloka'i, and Lāna'i, State of Hawai'i, the soils of this association are characterized as deep and well drained, nearly level to moderate slope and located on alluvial fans and in basins (Foote *et al*, 1972).

The soils underlying the project site are in the Waiakoa series which is characterized by moderately deep, well-drained soils which formed in material weathered from igneous rock. The project area is located on soils classified as Waiakoa extremely stony silty clay loam (WID2). See **Figure 7**. WID2 soil occurs on smooth, low uplands 3 to 25 percent. Runoff is medium and the erosion hazard is severe. This soil is used for pasture and wildlife habitat.

**b. Potential Impacts and Proposed Mitigation Measures**

The project site is located within a heavy industrial subdivision and has been graded and prepared for development. As such, minimal site work will be required prior to construction. Appropriate Best Management Practices (BMPs) will be implemented during construction to mitigate any impacts from soil erosion resulting from wind and water (e.g. dust fence, watering for dust control).

Given the foregoing, the proposed project is not anticipated to have any adverse impacts upon existing terrestrial conditions.

**4. Agricultural Productivity Considerations**

**a. Existing Conditions**

On the Island of Maui approximately 235,770 acres have been designated as "Agricultural" by the State Land Use Commission (LUC), representing just over 50 percent of the island.

In 1977, the State Department of Agriculture developed a classification system to identify Agricultural Lands of Importance to the State of Hawai'i (ALISH). The classification system is based primarily, though not exclusively, upon the soil characteristics of the lands. The three (3) classes of ALISH lands are: "Prime", "Unique", and "Other Important" agricultural land, with all remaining lands termed "Unclassified".

When utilized with modern farming methods, "Prime" agricultural lands have a soil quality, growing season, and moisture supply necessary to produce sustained crop yields economically. "Unique" agricultural lands possess a combination of soil quality, growing season, and moisture supply

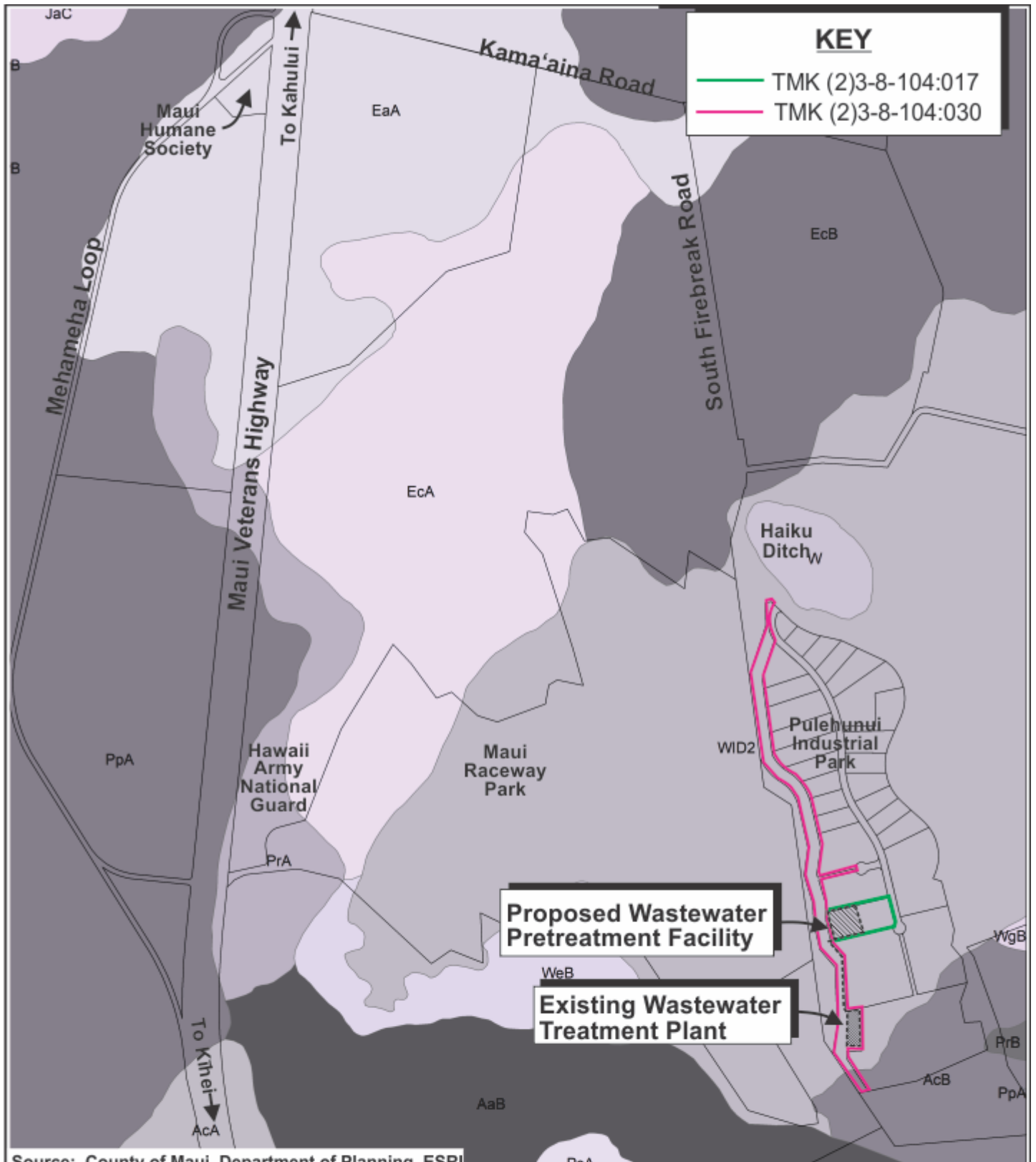
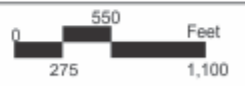


Figure 7 Wastewater Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park Soil Classification Map



Prepared for: Valley Isle Pumping

to produce sustained high yields of a specific crop. “Other Important” agricultural lands include those that have not been rated as “Prime” or “Unique” but are of state-wide or local importance for agricultural use.

Approximately 62,000 acres, or 26 percent, of Maui’s 235,770 acres of State LUC designated “Agricultural” lands are characterized as “Prime” lands by the ALISH system. The project site is designated as “Unclassified”. See **Figure 8**.

The University of Hawai‘i, Land Study Bureau (LSB) developed the Overall Productivity Rating, which classified soils according to five (5) levels, with “A” representing the class of highest productivity soils and “E” representing the lowest. These letters are followed by numbers which further classify the soil types by conveying such information as texture, drainage, and stoniness. The ratings are based on soil properties, topography, climate, and other factors.

On the island of Maui, “A” and “B” designated lands comprise approximately 21 percent of the island’s State Land Use “Agricultural” lands. The lands underlying the proposed project site are rated “E”, the lowest productivity level, by the LSB. See **Figure 9**. Surrounding lands are rated “E”, “A”, and Not Classified.

**b. Potential Impacts and Proposed Mitigation Measures**

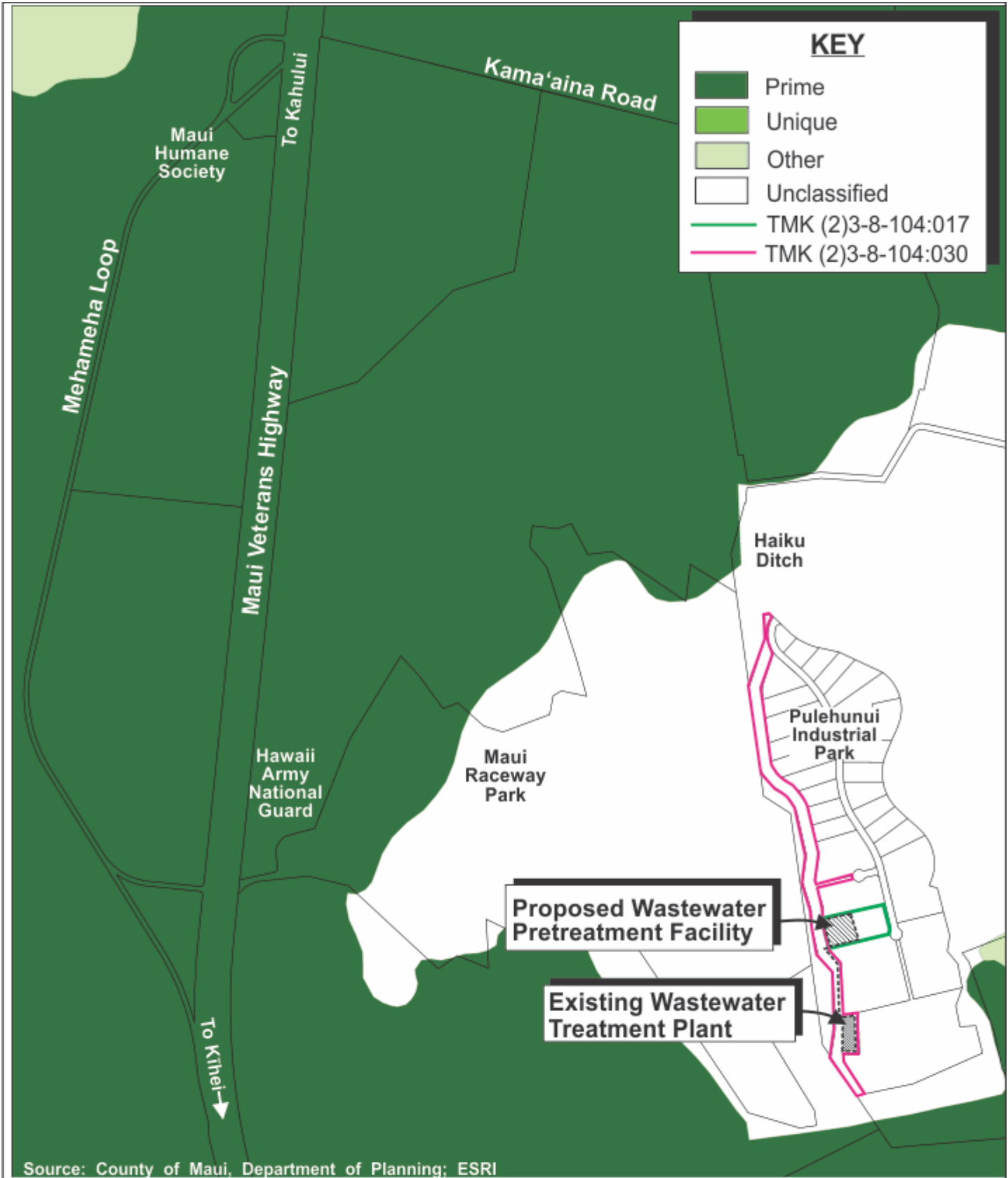
The existing Pulehunui Industrial Park has been planned and entitled for heavy industrial use. The soil onsite is not well suited for agriculture. Directly surrounding uses include non-agricultural uses such as the Maui Raceway Park and the Hawai‘i Cement Quarry. As such, no significant adverse agricultural impacts to the project area or surrounding lands are anticipated.

**5. Sea Level Rise, Flood, and Tsunami Hazards**

**a. Existing Conditions**

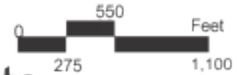
The Flood Insurance Rate Map (FIRM) indicates that the proposed project area is situated within Zone X (unshaded), an area outside the 0.2 percent annual chance flood plain.

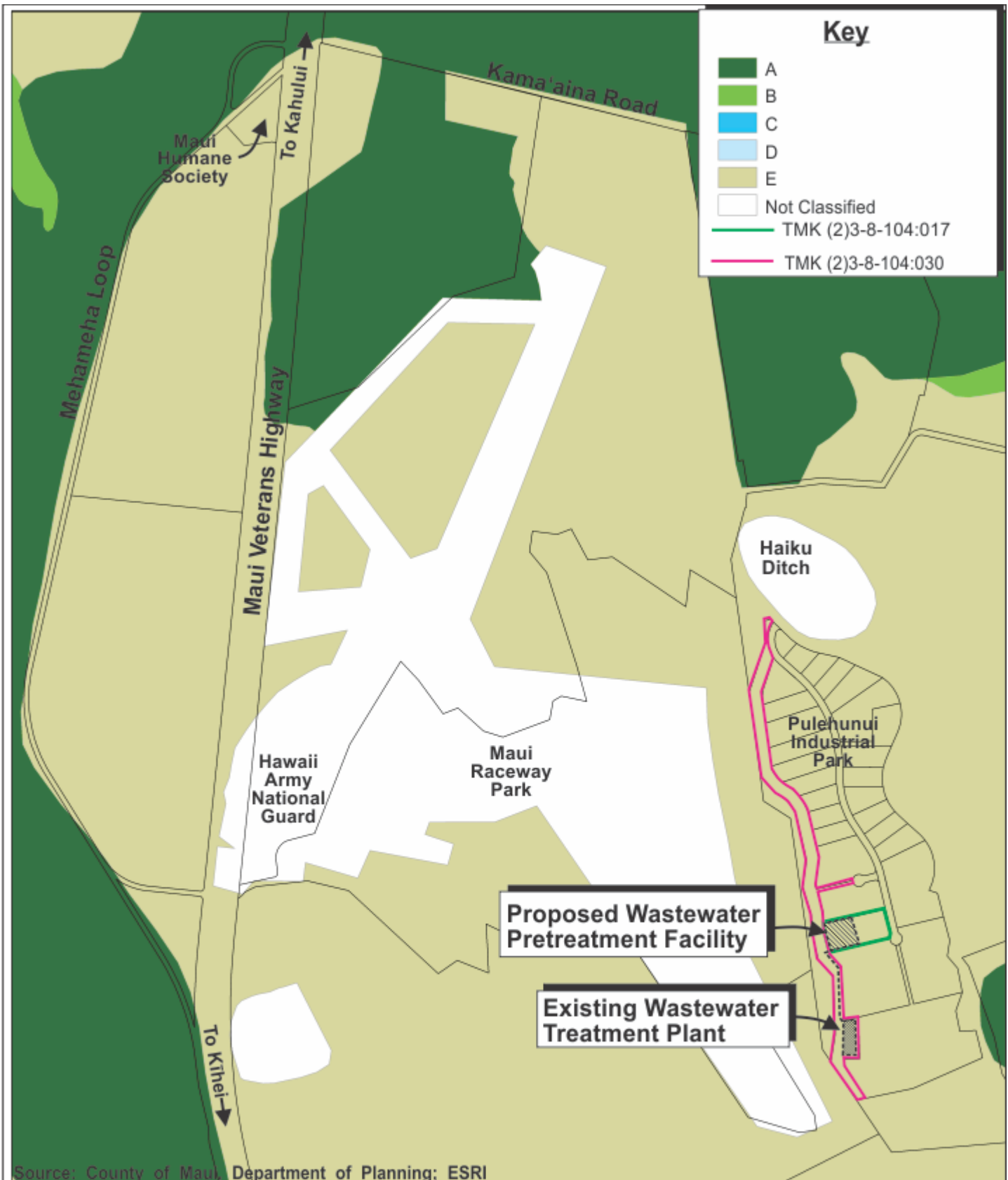
The subject project site is inland from the shoreline and outside of the tsunami inundation and evacuation zone.



Source: County of Maui, Department of Planning; ESRI

**Figure 8 Wastewater Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park**  
 Agricultural Lands of Importance to the State of Hawai'i Map





**Figure 9 Wastewater Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park**  
 Land Study Bureau Classification



**b. Potential Impacts and Proposed Mitigation Measures**

The project site is located outside of any flood hazard zone and outside of the tsunami hazard zone. Adverse impacts related to flood and tsunami hazards are not anticipated. The proposed project will not significantly impact nor be impacted by sea level rise.

**6. Coastal Resources**

**a. Existing Conditions**

The project site is located midway between Kahului and Kīhei, approximately two (2) miles inland from the shoreline.

**b. Potential Impacts and Proposed Mitigation Measures**

The project site is not located near the shoreline and implementation of the project will not adversely impact coastal resources.

**7. Flora and Fauna**

**a. Existing Conditions**

A Botanical Survey was conducted in August 2011 (LeGrande, 2011) in connection with an Environmental Assessment (EA) for the Heavy Industrial Subdivision. See **Appendix “C”**. The survey found the area (including the project site) was dominated by introduced species such as buffel grass, koa haole, and kiawe. Six (6) native indigenous species were identified. These included: ‘ilima (*Sida fallax*), ‘uhaloa (*Waltherica indica*), popolo (*Solanum americanum*), hala (*Pandanus tectorius*), milo (*Thespesia Populnea*), and ‘ae‘ae (*Lycium sandwicense*). None of the plants observed are of a threatened or endangered species or a species of concern to the U.S. Fish and Wildlife Service.

An Avifaunal and Feral Mammal was conducted for the subdivision (including the project site) in 2011 (Bruner, 2011). See **Appendix “D”**. The survey was conducted over two (2) consecutive days with data collected in the early morning and late afternoon hours, as well as evening hours dedicated to searching for the presence of the endangered Hawaiian Hoary Bat (*Lasiurus cinereus semotus*) using an ultrasound detector as well as visual observation. No Hawaiian Hoary Bats were detected. Observation of avian and terrestrial mammal species was limited to non-native, non-threatened species such as mongoose (*Herpestes javanicus*), cattle egret (*Bubulcus ibis*), Common Mynah (*Acridotheres tristis*), Zebra

Dove (*Geopelia striata*), and other typical alien (introduced) bird species. In addition, a survey for the Nēnē Goose (*Branta sandvicensis*) was carried out for the subdivision (including the project site) prior to development of the Pulehunui Industrial Park (Hobdy 2012). See **Appendix “E”**. No Nēnē were observed, and it was noted that the hot and dry conditions of the area do not support a preferred habitat for Nēnē. A number of water bird species were detected at the Haiku ditch irrigation reservoir, approximately half a mile to the north but not within the project area.

An Arthropod Study (Hobdy, 2012) was also carried out to identify arthropod species, including the endangered Blackburn’s sphinx moth in the project area for the Heavy Industrial Subdivision. See **Appendix “F”**. A total of 15 arthropod species were observed, including the indigenous globe skimmer (*Pantala flavescens*), a dragonfly common in Hawai’i. The remaining species were non-native. No Blackburn’s sphinx moth adults, eggs, or larvae were observed, and none of its preferred host plants (*Nicotiana glauca*) were identified in the project area.

**b. Potential Impacts and Proposed Mitigation Measures**

The vegetation throughout the project area is dominated by a variety of non-native plants. The only native species, the ‘uhaloa, is both widespread and common and of no particular environmental concern. No Federally listed endangered or threatened native plant species were encountered during the survey, nor were any species that are candidates for this status observed. No special habitats or rare plant communities were seen on the property. As a result, the Botanical Survey concluded that the proposed subdivision and its associated industrial uses are not expected to have a significant negative impact on the botanical resources in the area. As such, no recommendations were deemed necessary.

The fauna in the project area is strongly dominated by non-native species. The evening fauna survey did not detect the endangered Hawaiian hoary bat and noted that the bats are not known to inhabit the project area. The Department of Land and Natural Resources (DLNR), Division of Forestry and Wildlife has noted that cutting or clearing of trees during the bat birthing and preparing season, and use of barbed wire may adversely impact bats. No site clearing or barbed wire is proposed.

Night-time outdoor lighting for the proposed project, if used, will be shielded and downward directed to avoid adverse impacts to overflying seabirds, in accordance with applicable Maui County Code and subdivision regulations.



Due to the limited project scope, including wastewater improvements, existing site conditions, and proposed mitigation measures, the proposed project is not anticipated to adversely impact existing flora and fauna resources.

**8. Streams, Wetlands, and Reservoirs**

**a. Existing Conditions**

There is an existing concrete irrigation ditch, Hai'kū Ditch, located north of the project site. The ditch, owned by A&B, runs in a north-south direction. Hai'kū Ditch terminates at a reservoir located approximately 0.5 mile north of the project site, near the Pulehunui Industrial Park entrance. Refer to **Figure 2**.

There are no wetlands or reservoirs located within or in the immediate vicinity of the project site. The Department of the Army, in a letter dated May 21, 2019, confirmed that the project area contains no waters of the U.S., including wetlands, and as such, no DA permit is required.

**b. Potential Impacts and Proposed Mitigation Measures**

The project is not anticipated to have significant adverse effects on streams, wetlands, or reservoirs. Onsite drainage improvements, including open swales and retention basins will result in an overall net decrease in stormwater runoff. An absorption field will be utilized for treated effluent disposal, replacing injection wells as the primary disposal method. BMPs for facility construction and operation will be implemented. The treatment facilities have been designed to meet all applicable effluent requirements of Hawai'i Administrative Rules (HAR), Chapter 62, Sections 11-62.26 and 11-62.27. As such, the proposed project is not anticipated to adversely impact the surrounding environment.

**9. Air Quality**

**a. Existing Conditions**

The Pulehunui area in general does not experience adverse air quality conditions. Air contaminants in the local area can be attributed largely to vehicle exhaust along Maui Veterans Highway. The prevailing tradewinds disperse suspended particulates to maintain a relatively high level of air quality in and around the project area.

**b. Potential Impacts and Proposed Mitigation Measures**

The proposed action involves processing and treatment of domestic wastewater. The project will be developed in accordance with industry standards for wastewater receiving facilities. Odor control equipment will be installed on the receiving tank venting system, which has been identified as the major potential odor-producing component within the facility to mitigate release of nuisance odors. The facility is located within an area designated for heavy industrial use, and no residential areas are nearby. Due to the project's location and the proposed mitigation measures, no significant impacts to air quality are anticipated.

**10. Greenhouse Gas Considerations**

**a. Existing Conditions**

Greenhouse gases (GHG) (carbon dioxide, methane, nitrous oxide and fluorinated gases) trap heat in the earth's atmosphere. In the context of climate and ocean warming, increases in levels of atmospheric GHG have been attributed to human activity. Within the State of Hawai'i, the energy sector (including fossil fuel burning to produce electricity, transportation, waste incineration, and natural gas systems) is identified as the source of 89.7 percent of GHG emissions. Other sources of GHG emissions include industrial facilities, agriculture and forestry, and waste treatment such as landfills, composting, and wastewater treatment.

The Greenhouse Gas Reporting Program (40 CFR Part 98) requires mandatory reporting of GHG emissions from sources that emit 25,000 metric tons or more of carbon dioxide equivalent (CO<sub>2</sub> EQ) per year in the United States. Categories of use which are generally associated with this level of reporting include power plants, petroleum and natural gas systems, refineries and other heavy manufacturing processes. On Maui, the facilities operating at or above the 25,000 metric ton level include Maui Electric Company's Kahului Power Plant, Mā'alaea Power Plant, and the Central Maui Landfill.

**b. Potential Impacts and Proposed Mitigation Measures**

The proposed action involves a commitment of fuel for construction equipment, vehicles, and machinery during construction activities. This usage is not anticipated to be substantial or excessive within the context of the action's benefits over the lifetime of the project. Once completed, energy requirements at the wastewater pretreatment facility and the WWTP expansion are anticipated to be supplied by onsite PV facilities. As such,

the proposed action is not anticipated to require substantial additional energy consumption.

Wastewater treatment facilities are a source of greenhouse gas emissions. However, the proposed action does not generate additional wastewater to be treated, but represents a relocation of treatment of currently generated wastewater from County wastewater facilities to the Pulehunui location. As such, the proposed action is not anticipated to result in an increase in direct or indirect GHG emissions. The proposed facilities are not anticipated to fall within the threshold of mandatory GHG reporting.

## 11. **Noise Characteristics**

### a. **Existing Conditions**

Contributors to background noise in the vicinity of the project site include neighboring industrial operations within the Pulehunui Industrial Park. The noise from inter-island flight paths of arriving and departing aircraft at Kahului Airport, located further to the north of the project site, represents another occasional source of noise.

### b. **Potential Impacts and Proposed Mitigation Measures**

The proposed action involves operation of process equipment for waste material loading, transfer, and dewatering, which are not significant generators of noise compared to the noise of vehicle engines in use at the proposed facility and at other industrial facilities within the subdivision. An acoustic study was carried out in 2011 for the Pulehunui Industrial Subdivision (Ebisu, 2011). See **Appendix “G”**. This study considered the impacts of the subdivision upon full build-out, with the maximum sound level of 70 decibels emitted by each subdivision lot, as allowed for industrial properties by the State Department of Health. The proposed project can be considered a contributor to the projected sound levels considered in this study. The study projected some increase in traffic noise along Maui Veterans Highway, but there are no noise-sensitive developments along the road. The nearest residential areas are in Kihei, over two (2) miles away. As such, no adverse impacts are anticipated in these areas.

## 12. **Water Quality**

### a. **Existing Conditions**

The State water pollution control program is managed by the Department of Health, Clean Water Branch. Authority for the program is established

through statutes and rules such as Chapter 11-55 “Water Pollution Control” and Chapter 11-54 “Water Quality Standards”. It is the State’s general policy to protect and maintain the existing uses and the level of water quality necessary to protect existing uses.

There are no major drainageways, wetlands, or streams within the project area. As previously mentioned, the Hai’kū Ditch is located north of the project site and terminates at a reservoir located approximately 0.5 mile to the north.

**b. Potential Impacts and Proposed Mitigation Measures**

The proposed project involves the processing and treatment of domestic wastewater and includes improvements to the existing wastewater treatment plant that serves the subdivision’s lots and uses. As part of this project, existing injection wells will be replaced by an absorption field as the primary effluent disposal method. The proposed facility has been designed to meet all applicable effluent requirements of HAR, Chapter 62, Sections 11-62.26 and 11-62.27, and will be reviewed and approved by the State Department of Health prior to implementation and safeguards installed to prevent the release of untreated wastewater into the environment. As such, the proposed project is not anticipated to present significant impacts on water quality.

**13. Pesticides and Hazardous Substances**

**a. Existing Conditions**

The site of the proposed wastewater pretreatment facility is currently vacant, and the existing wastewater treatment plant began operations in 2018. The project site was used in the past for livestock cultivation. In addition, an area near the project site was used for military exercises as a machine gun range. Due to the site’s history, a Phase I Environmental Site Assessment (ESA) (ETC, 2011) was conducted as part of the EA for the Pulehunui Industrial Subdivision. The Phase I ESA identified the potential presence of residual contaminants associated with solid waste management activities and military uses formerly carried out in the area of the Pulehunui Industrial Park. Surface soil testing indicated the presence of total petroleum hydrocarbons as oil (TPH-O) which exceeded the State Department of Health (DOH) Environmental Action Level (EAL) of 500 mg/kg for unrestricted land use, and in some locations exceeded the DOH EAL of 1000 mg/kg pertaining to leaching. The DOH EAL of 2,300 mg/kg pertaining to direct exposure was not exceeded.

**b. Potential Impacts and Mitigation Measures**

The Pulehunui Industrial Park is zoned for heavy industrial use, and the property is subject to a land use limitations for commercial and industrial land use. Consequently, the presence of contaminants in excess of the EAL for unrestricted land use, but below the EAL for direct exposure, was not a consideration. The Phase I ESA report was submitted to DOH, Solid and Hazardous Waste Branch (SHWB) for review. The SHWB provided a determination on January 9, 2012 that no further action was required with respect to the findings of the Phase I ESA for the project area. See **Appendix “H”**. The proposed project does not involve handling or storage of hazardous materials. As such, potential adverse impacts from hazardous substances are not anticipated.

**14. Archaeological Resources**

**a. Existing Conditions**

A portion of the sugar cane fields adjacent to the project area was turned into a civil airfield in 1937 and in subsequent years was used by Inter-Island Airways and the Navy during World War II, and was expanded and used by the Territory of Hawai'i as an inter-island airport until about 1952. The landing strip was used by crop dusters and other smaller aircraft until abandoned sometime between 1961 and 1977. Abandoned military facilities remained on the property and the old air strip used for racing.

An Archaeological Inventory Survey (AIS) (Tome and Dega, 2012) was undertaken with fieldwork conducted in June, 2011 in connection with the Chapter 343, HRS environmental review process for the Pulehunui Industrial Park subdivision. See **Appendix “I”**. The State Historic Preservation Division (SHPD) approved the 2012 AIS by letter dated June 18, 2012. See **Appendix “J”**. In addition, an AIS for the area was carried out in 1999 (Tomonari-Tuggle, 2001). These investigations identified a number of features connected with the former Naval air station (SIHP site 50-50-09-4164) and a 20th century ranching site (SIHP site 4801). No pre-Contact archaeological resources were identified during these investigations.

Previous archaeological assessments suggest that traditional and early historic sites in this region of the island are fewer and more scattered than in the upland and coastal areas which were more suitable for habitation, cultivation, and gathering. Furthermore, it is likely that any pre-contact sites that may have existed would have been heavily impacted by the agricultural and military uses of the area during the previous century.

**b. Potential Impacts and Proposed Mitigation Measures**

The proposed project involves construction of a wastewater pretreatment facility and improvements to the existing wastewater treatment plant that serves the subdivision lots and its uses. Due to the fact that the project area has been extensively investigated and previously disturbed, it is anticipated that there is a minimal probability that subsurface discoveries will be made during implementation of this work. An Archaeological Monitoring Plan was prepared and approved by SHPD which specified full-time archaeological monitoring only in the event of construction of an alternative access road, which is not within the scope of the currently proposed project. See **Appendix “K”** and **Appendix “L”**. For the remainder of the project area, intermittent monitoring was recommended. In the event cultural or historical resources are encountered, work in the affected area will be stopped and SHPD will be contacted immediately.

**15. Cultural Resources**

**a. Existing Conditions**

The proposed project area is situated in the ahupua‘a, or traditional land district, of Pulehunui. Pulehunui encompasses roughly 16,700 acres of land stretching from the rim of Haleakalā crater to the shore of Mā‘alaea Bay. Literally translated, pūlehu means to broil while nui has such meanings as large, immense, or huge (Pukui & Elbert 1986). Thus, the name Pulehunui signifies this vast, arid expanse of land.

The historic Pu‘unēnē Sugar Mill and surrounding plantation village are located to the north of the project area. Pu‘unēnē was originally the name of a pu‘u, cinder cone that was situated to the north of the sugar mill site, overlooking Paia and Spreckelsville. Literally translated, pu‘u signifies a volcanic cinder cone, while nēnē is the name of the indigenous Hawaiian goose. Thus, Pu‘unēnē is interpreted as “nēnē hill” or “nēnē on the hill”, as nēnē once passed over this pu‘u when flying between Haleakalā and the Keālia Pond salt flats to the southwest.

The Pu‘unēnē Sugar Mill was established by Henry P. Baldwin who borrowed the Pu‘unēnē name. The Pu‘unēnē Sugar Mill began processing cane for the HC&S in 1902, and the community that grew around the sugar mill became known by the Pu‘unēnē name. By 1930, over 10,000 people resided in the plantation camps that surrounded the mill, making Pu‘unēnē one of the largest towns on the island at that time.

With such diverse names as McGerrow, Sam Sing, and Spanish Camp, the plantation camps reflected the multiracial work force of the plantation. Supporting the camp residents were a meat market, hospital, grade school, dairy, general store, and service station. Additional recreational facilities included a swimming pool, bowling alley, tennis courts, ball fields, and club houses (Bartholomew, 1994).

In 1939, a commercial airport was established at Pu'unēnē, and for a brief period of time, this facility served as the island's primary commuter airport. The location was chosen by representatives of Inter-Island Airways (now Hawaiian Airlines), the Civil Aeronautics Administration (CAA), HC&S, and Kahului Railroad Company for the favorable weather, terrain, and prevailing winds. Notably, the aforementioned Pu'unēnē cinder cone was mined to provide the base material for the airport runways and Pu'unēnē Road. Commercial flights continued into December 1941 when the facility was taken over by the U.S. Navy.

The Pu'unēnē Airport was identified as the most satisfactory airfield in the islands for military purposes, being regarded for superior meteorological conditions, proximity to Oahu, and convenience to fleet operation. Between 1940 and 1941, the Pu'unēnē Airport facility was enlarged and improved to become the Naval Air Station (NAS) Pu'unēnē. The NAS was initially utilized for training purposes and the advantages of the airfield became evident. Additional quarters were built, and runways were lengthened and paved. By mid-1942, the Navy had permission to control traffic on the section of the Pu'unēnē-Kīhei highway (now Maui Veterans Highway) that was located within the NAS. With respect to infrastructure, plans had been made for an adequate water supply, power supply, and sewage disposal, and material for 40,000 feet of fence to enclose the air station was requested. For the benefit of Navy personnel, a movie theater, picnic and recreation area, Navy Marketing Center, Shore Patrol, and chapel were built within the NAS. A dispensary, officers club, ship's service, laundry, bakery, photographic laboratory, supply department, and post office were also established within the NAS, and many of these provided services to personnel stationed in other parts of the island. As of December 12, 1941, approximately one (1) month prior to commissioning, on board personnel at the Pu'unēnē NAS numbered seven (7) officers and 150 enlisted men. By July 1, 1945, the station on board count numbered a total of 565 officers and 2,798 men, and total aircraft on board numbered 271.

After World War II ended, the Federal Government no longer needed the Pu'unēnē NAS and the Territory of Hawai'i was eventually granted control

of the facility. Commercial airline operations were relocated to Kahului Airport between 1951 and 1952. In 1952, the Hawai'i Aeronautics Commission (HAC) granted the Maui County Waterworks Board the use of the HAC's 500,000 gallon reservoir and waterlines at the Pu'unēnē facility in return for water service to users in the airport area. A few years thereafter, the Pu'unēnē Airport was closed to aeronautical activity in 1955 (Hawai'i DOT Airports Division 2011).

The Pu'unēnē Sugar Mill closed in 2016. Over the past few decades, however, the plantation camps dissipated as the need for human labor decreased and employees moved out to the growing town of Kahului and other parts of the island. Currently, there are almost no physical remnants of the old plantation camps that once bustled with life.

Similar to the plantation camps, there are few visual reminders of the Pu'unēnē Naval Air Station and commercial airport as the vast majority of airport facilities were abandoned, torn down, or re-purposed. The air station roadways County Boulevard and Central Avenue are now Mehomeha Loop and the regional roadway Maui Veterans Highway, respectively. The Maui Humane Society animal shelter is now situated on the northernmost portion of the old air station. Still standing in the vicinity of the animal shelter are the shells of a storehouse, telephone exchange building, and transformer building (Frey & Fredericksen, 2008).

The former airport runways and surrounding areas are now part of the 220-acre Maui Raceway Park and Drag Strip which is under the control and management of the County of Maui. The use of the former airport runways for drag races and time trials was approved in 1956 by the CAA and HAC. The park hosts drag races on a former runway, while go-kart races, moto-cross races, and races for radio-controlled models are held on adjacent tracks.

A Cultural Impact Assessment (CIA) for the Pulehunui Industrial Park area was prepared in 2011 (McGerty and Spear, 2011). See **Appendix "M"**. As part of the preparation of this CIA, letters of inquiry were sent to representatives of nine (9) organizations whose jurisdictions included knowledge of the area. In addition, a CIA Notice was published in the Honolulu Star Advertiser, The Maui News, and in the Office of Hawaiian Affairs (OHA) newspaper, Ka Wai Ola. These notices requested information of cultural resources or activities in the project area. No information was received regarding cultural resources or cultural practices in the project area, and no referrals for cultural interviews were received.



**b. Potential Impacts and Proposed Mitigation Measures**

From a recent historical perspective and cultural informant information, there are no indications of cultural practices, such as gathering, access, or religious traditions, known to be associated with the project site. As such, implementation of the proposed project within the Pulehunui Industrial Park subdivision is not anticipated to adversely impact cultural resources.

**16. Scenic and Open Space Resources**

**a. Existing Conditions**

The project site is located east of Maui Veterans Highway, an area between the Maui Raceway Park and the Hawaiian Cement Quarry. Scenic resources in the vicinity of the project site include views of the western slope of Haleakalā and the eastern slopes of the West Maui Mountains. Open space resources around the project site include the expansive agricultural lands of the Central Plain.

**b. Potential Impacts and Proposed Mitigation Measures**

The views of Haleakalā and of the West Maui Mountains are the principal visual resources of the project site. The project area is located away from Maui Veteran's Highway which serves as the main roadway connecting Kahului to Kīhei. The proposed structures are under 30 feet in height.

Due to the location of the project and height of the structures, significant adverse impacts to scenic or open space resources are not anticipated.

**B. SOCIO-ECONOMIC ENVIRONMENT**

**1. Land Use and Community Character**

**a. Existing Conditions**

The proposed project site is located within the Urban Growth Boundary (UGB) designated in the Maui Island Plan (MIP) and from a regional standpoint is in the Kīhei-Makena Community Plan region which encompasses the area from Mā'alaea to La Perouse Bay. The region includes a diverse range of physical and socio-economic environments. The proposed project is located away from urban developments located along the coastline from Mā'alaea to Makena. Land uses surrounding the Pulehunui Industrial Park include the Maui Humane Society Animal Shelter,

Hawai'i Army National Guard Pu'unēnē Armory, and Maui Motor Sports Park.

**b. Potential Impacts and Proposed Mitigation Measures**

From a future land use perspective, the Pulehunui Industrial Park subdivision (including the project site), is within the UGB as designated by the MIP. The long range objective of the UGB is to allow the development of urban uses (e.g., recreational, industrial, government uses). As the proposed project conforms with the growth policies of the County and is consistent with the other uses in the area, there is no significant adverse impact anticipated to the land use and community character in the region. See **Figure 10**.

**2. Population and Economy**

**a. Existing Conditions**

The population of the County of Maui has exhibited relatively strong growth over the past decade. Maui County's population increased from 148,117 residents in 2007 to 166,260 residents in 2017, an increase of 12.2 percent, compared to an increase in the State of Hawai'i of 8.5 percent during the same time period (County of Maui, 2017). Maui County's resident population is projected to rise to 181,600 people in 2025 and to 197,800 people in 2035 (DBEDT, State of Hawai'i, 2018).

As of January 2020, the non-seasonally adjusted unemployment rate for Maui County and for the island of Maui was 2.8 percent. This shows no increase from the figures for the same month in 2019 (DLIR, March 2020).

**b. Potential Impacts and Proposed Mitigation Measures**

The proposed project is not expected to generate significant new population growth as it is limited to wastewater improvements within an existing industrial subdivision. During the construction period, the proposed project will benefit the local economy by providing construction-related jobs in the area. However, the proposed project is not anticipated to have significant adverse long-term impact to the population and economy.

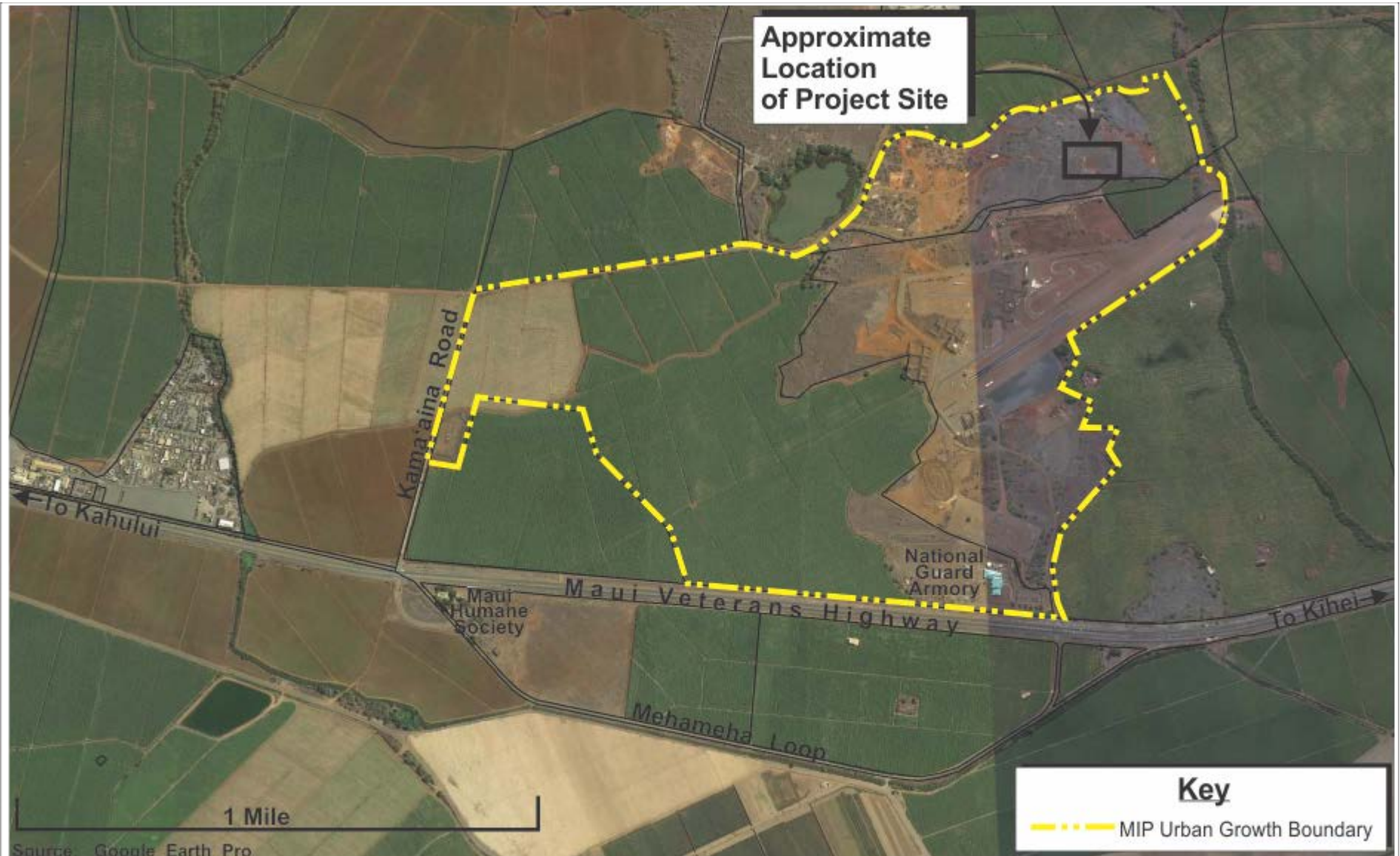


Figure 10

# Wastewater Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunii Industrial Park

Maui Island Plan Urban Growth Boundary Map

NOT TO SCALE



Prepared for: Valley Isle Pumping



K:\DATA\VI Pumping\Applications\Figures\MIP Boundary Map.DEA

**b. Potential Impacts and Proposed Mitigation Measures**

The proposed project is not expected to generate significant new population growth as it is limited to wastewater improvements within an existing industrial subdivision. During the construction period, the proposed project will benefit the local economy by providing construction-related jobs in the area. However, the proposed project is not anticipated to have significant adverse long-term impact to the population and economy.

**C. PUBLIC SERVICES**

**1. Solid Waste Collection and Disposal**

**a. Existing Conditions**

Solid waste generated via commercial activities in the existing Pulehunui Industrial Park is collected by private waste collectors and is disposed of at the County's 55-acre Central Maui Landfill facility, located 4.0 miles southeast of the Kahului Airport. In addition, the solids collected at the existing WWTP are privately collected and disposed at the Wailuku-Kahului WWRF.

**b. Potential Impacts and Proposed Mitigation Measures**

In 2007, the County of Maui's Integrated Solid Waste Management Plan (ISWMP) estimated the existing Central Maui Landfill (Phases IV-VI) had remaining capacity of 780,000 tons. According to the ISWMP, the existing landfill has adequate capacity to accommodate residential and commercial waste needs through the year 2026. In the ISWMP, the Department of Environmental Management (DEM) anticipates that additional land can be acquired for future capacity at the landfill (Integrated Solid Waste Management Plan, 2009).

Solid waste that may be generated during construction and operation of the proposed project will be disposed at appropriate DOH-approved facilities such as the Central Maui Landfill. Solids generated at the expanded WWTP will be handled by a licensed, registered, and permitted Sludge Hauler. Operation of the proposed new and expanded facilities will divert wastes which would otherwise be processed at County wastewater reclamation facilities, the solids from which would ultimately be disposed at the Central Maui landfill. As such, the proposed action does not represent a net increase in solid waste generation and is not anticipated to adversely impact solid waste collection and disposal services.

**2. Medical Facilities, Police, and Fire Protection Services**

**a. Existing Conditions**

Maui Memorial Medical Center, located in Kahului about eight (8) miles north of the project area, is the major medical facility on the island. The 213-licensed bed facility provides general, acute, and emergency care services. Clinics and offices throughout the Kīhei and Kahului areas offer medical services on a lesser scale.

The project site is within the Maui Police Department's (MPD) service area, the headquarters for which are located in Wailuku. The MPD consists of several patrol, investigative, and administrative divisions. The project area falls within the District VI, Kīhei, MPD service that covers the Kīhei-Makena Community Plan region. The Kīhei District station is located on the eastern side of Pi'ilani Highway across the signalized intersection of the highway and Kanani Street.

The Maui County Department of Fire and Public Safety provides fire prevention, suppression, protection, and emergency services to the islands of Maui, Lāna'i, and Moloka'i from 14 fire stations and a fire prevention office. The project site is located midway between Kahului and Kīhei. The Kahului area is served by the Kahului Fire Station located on Dairy Road. The Department's Kīhei station, which services the Mā'alaea and Kīhei areas, is situated on South Kīhei Road adjacent to Kalama Park.

**b. Potential Impacts and Proposed Mitigation Measures**

The proposed project is not anticipated to adversely impact the service capabilities for emergency, medical, police, and fire operations. The project is within the existing service area limits for these services.

**3. Educational Facilities**

**a. Existing Conditions**

The State Department of Education (DOE) operates several schools in the Kahului and Kīhei regions, as shown in the following **Table 1**.

**Table 1. Educational Facilities**

<b>Elementary Schools (Grades K through 5)</b>	
	<b>Location</b>
Kahului	Kahului
Kamali'i	Kīhei
Kīhei	Kīhei
Lihikai	Kahului
Pomaikai	Kahului
<b>Intermediate Schools (Grades 6 through 8)</b>	
Lokelani	Kīhei
Maui Waena	Kahului
<b>High School (Grades 9 through 12)</b>	
Maui High	Kahului
<b>Charter Schools (Grades K through 12)</b>	
Kīhei PC High School	Kīhei

The DOE is currently undertaking construction of the new Kīhei High School (KHS) which will be situated in North Kīhei, mauka of Pi'ilani Highway. The estimated build-out period for KHS is approximately five (5) years.

The University of Hawai'i-Maui College is the primary higher education institution serving the County with its main campus located in Kahului.

**b. Potential Impacts and Proposed Mitigation Measures**

The proposed project will not place additional demand upon educational facilities in the Kahului and Kīhei regions.

**4. Recreational Facilities**

**a. Existing Conditions**

The County of Maui obtained State-owned land south of the project site containing the former Pu'unēnē airport runway through an Executive Order. The land is used for recreational purposes, such as the Maui Motor Sports Park and motor bike racing and is located inland to the east of Maui Veterans Highway in proximity to the project site. Diverse recreational opportunities are available in the Kahului and Kīhei-Makena regions.

Shoreline activities, such as fishing, surfing, jogging, camping, picnicking, snorkeling, swimming, and windsurfing, are available in the Kahului and Kīhei regions.

There are several public park facilities in the Kahului and Kīhei regions. Kahului includes Kēopūolani Park, Kanaha Beach Park, and the War Memorial Complex, as well as smaller parks. The Kīhei region includes several beach parks, such as Kalama and Kama'ole I/II/III Beach Parks, located to the southeast along the Kīhei coastline. Additional recreational resources available in Kīhei include the Kīhei Community Center, South Maui Park, and various world-class golf courses and tennis centers.

**b. Potential Impacts and Proposed Mitigation Measures**

Significant adverse impacts on the recreational facilities in the Kahului and Kīhei regions are not anticipated as a result of implementation of the proposed project.

**D. INFRASTRUCTURE**

**1. Roadway Infrastructure**

**a. Existing Conditions**

The project site is located approximately one (1) mile to the east of Maui Veterans Highway on Nopu Street in the Pulehunui Industrial Park. Access to the project area is from Maui Veterans Highway via Kama'aina Road and South Firebreak Road to Nopu Street.

Maui Veterans Highway is a four-lane undivided highway which runs generally north to south and links the Kahului and Kīhei areas. The highway has a posted speed limit of 45 miles per hour.

Kama'aina Road connects to Maui Veterans Highway via a four-legged, signalized intersection. The northbound and southbound approaches of Maui Veterans Highway have separate left-turn and right-turn deceleration and turn storage lanes. Northbound and southbound left-turn lanes are protected. The eastbound and westbound approaches are both single lane.

The section of Kama'aina Road between its intersections with Maui Veterans Highway and South Firebreak Road is a paved road 24 feet in width. South Firebreak Road proceeds south from an unsignalized, stop-controlled intersection with Kama'aina Road to provide access to the

Hawaiian Cement Quarry, the Pulehunui Industrial Park, and surrounding agricultural fields. Nopu Street is a paved, gate-controlled private road which provides access to the Pulehunui Industrial Park.

**b. Potential Impacts and Proposed Mitigation Measures**

A Traffic Impact Analysis Report (TIAR) was prepared for the Pulehunui Industrial Park in 2011 (Phillip Rowell and Associates, 2011). See **Appendix “N”**.

This TIAR evaluated potential impacts to roadways from the development of the Pulehunui Industrial Park. Analysis of the projected level of service was based on trip generation equations for industrial parks, which indicated that development of the industrial park as a whole would generate approximately 472 vehicle trips during the morning peak hour and approximately 471 trips during the afternoon peak hour. Based on the TIAR, the Final EA for the Pulehunui Industrial Park subdivision recommended a number of roadway improvements in order to accommodate the projected increases in passenger vehicles and heavy vehicle traffic to the intersection of Kama’aina Road and Maui Veterans Highway, including addition of an acceleration lane for vehicles turning right from westbound Kama’aina Road to northbound Maui Veterans Highway.

The proposed wastewater pretreatment facility and associated WWTP improvements represent an industrial use which was anticipated by and consistent with the TIAR completed in 2011. No roadway improvements are proposed in connection with this project. The contribution of the proposed project to roadway traffic is anticipated to primarily be from hauler trucks delivering liquid wastes to the facility as well as a smaller number of trucks picking up solid waste being offloaded from the site. Based upon the capacity of the proposed facilities, the total number of truck trips to and from the facility is expected to be approximately 20 trips per day or less. This represents a small percentage of the overall traffic at the Pulehunui Industrial Park. As such, the proposed action is not anticipated to result in significant impacts to local roadway conditions.

**2. Water**

**a. Existing Conditions**

There is no County water supply system servicing the project area. Potable water and water for fire suppression is supplied from a private water system utilizing wells located within the Pulehunui Industrial Park as a source.



Reverse osmosis treatment is performed at the source for potable water use. The existing water system consists of the following improvements:

- Two (2) 300-gpm wells
- Two (2) 75-gpm reverse osmosis treatment systems
- One (1) 400,000-gallon potable water storage reservoir
- A potable and fire suppression water system with booster pump and a backup power generator

**b. Potential Impacts and Proposed Mitigation Measures**

The water demand for the Pulehunui Industrial Park industrial lots, landscaping, and roadways was estimated in the 2012 Final EA to include an average daily demand of 118,800 GPD potable water and 305,200 GPD non-potable water. This estimate assumed full build-out of the development with uses such as the currently proposed action. The existing water system provides sufficient supply for these uses.

The existing injection wells and the proposed new absorption field are located over 1,000 feet away from the subdivision's water wells. As such, the proposed action is not anticipated to create significant adverse impacts on the water supply quality or quantity.

**3. Wastewater Systems**

**a. Existing Conditions**

As there is no County wastewater infrastructure servicing the Pulehunui Industrial Park area, a private centralized WWTP was constructed in 2018 to service the subdivision. Each lot is connected to a sewer main via a lateral, and wastewater flows via gravity to the private WWTP. After treatment at the WWTP, the liquid effluent currently flows into two (2) previously permitted wastewater injection wells. Solids collected at the WWTP are transferred to the County-owned Central Maui Landfill. The WWTP operates in compliance with all applicable Federal, State, and County regulations.

The existing WWTP has the capacity to process 20,000 GPD of general domestic wastewater to accommodate a population of approximately 560 persons within the Industrial Park. Lot owners within the Industrial Park are responsible to determine if any other sources of wastewater will be

generated onsite. Should non-domestic wastewater be generated, separate treatment facilities are to be implemented at the individual lot specific to the use.

**b. Potential Impacts and Proposed Mitigation Measures**

The Applicant proposes to install a receiving facility within Parcel 17 consisting of a receiving and pretreatment process for private domestic wastewater collected by pump trucks. Refer to **Figure 3** and **Figure 4**. The proposed wastewater pretreatment facility will generate up to 20,000 GPD of wastewater for treatment at the WWTP. To accommodate this additional flow from Parcel 17 to the WWTP, the applicant proposes improvements to add an additional 20,000 GPD capacity to the centralized WWTP.

The improvements to the WWTP include addition of two (2) identical 10,000 GPD parallel treatment units, which when combined with the existing WWTP's 20,000 GPD capacity will result in an increased total capacity of 40,000 GPD. The parallel treatment units will be integrated into a common equalization basin and splitter box, as designed from the package WWTP supplier. Flow received from the common area collection system as well as the receiving station will enter the equalization basin from separate inlets and be separately metered. Refer to **Figure 3** and **Figure 5**. In addition, a new absorption field will be utilized for the WWTP effluent disposal. The existing injection wells will be maintained for use as a fully redundant backup disposal system.

The DOH will review the proposed pretreatment facility and WWTP improvement design plans with respect to compliance with applicable requirements of the Hawai'i Administrative Rules, Title 11, Chapter 62, regarding wastewater systems. DOH will provide approval of the project plans prior to construction of the proposed improvements.

**4. Drainage**

**a. Existing Conditions**

The project slopes from east to west with an average slope of approximately 2.0 percent. The existing pre-development 50-year storm runoff from Parcel 17 is estimated to be 4.09 cubic feet per second (CFS) and 4,172 cubic feet (CF) of runoff volume. Onsite runoff currently sheet flows across the site from east to west toward existing retention basins located in the Pulehunui Subdivision. See **Appendix "A-2"**.

**b. Potential Impacts and Proposed Mitigation Measures**

The total developed runoff volume is 4,983 CF, a net increase of 811 CF due to the development. Additional runoff will be conveyed via swale into a new onsite, above-ground retention basin located in the northwest corner of Parcel 17. This new retention basin has a capacity of 8,260 CF. With implementation of the proposed drainage improvements, adjacent properties will not be adversely impacted. No drainage improvements are required for Parcel 30. Refer to **Appendix “A-2”**.

**5. Electrical, Telephone Systems, and Cable Television Services**

**a. Existing Conditions**

Electrical power is provided to the project area by Maui Electric Company, Limited. The project area is within the cable television service and telephone service area of Spectrum. Existing utility poles and overhead lines run along Kama‘aina Road and South Firebreak Road within an electrical easement.

Within the subdivision, electrical and telephone systems are above ground in accordance with the utility companies’ rules and regulations. Each individual lot has transformers on the power pole fronting the lot to connect to electrical improvements on the lot.

**b. Potential Impacts and Proposed Mitigation Measures**

A preliminary electrical engineering assessment indicates that 200 Ampere, three-phase electrical service will be required for the proposed facilities, utilizing a three-inch conduit from the street to the main site service panel. VIP plans to install solar PV panels within Parcel 17 in order to provide sufficient power to operate the wastewater pretreatment facility. A Customer Grid Supply (CGS) application has been submitted to Maui Electric Company, Limited for this facility. Solar PV panels will also be installed to provide sufficient power to cover the expanded capacity for the WWTP.

The monitoring and alarm system will utilize a 4G data connection. Upon development of electrical plans, VIP will provide Maui Electric Company, Limited with the facility’s anticipated electrical demand requirements in order to ensure availability of the repaired service.

Significant adverse impacts to electrical, telephone, and cellular service systems are not anticipated.

## **E. CUMULATIVE AND SECONDARY IMPACTS**

Cumulative impacts are defined by Title 11, Chapter 200.1, HAR, Environmental Impact Statement Rules as:

*“the impact on the environment which results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.”*

A “secondary impact”, “secondary effect”, “indirect impact”, or “indirect effect” are defined by Title 11, Chapter 200.1, HAR as

*“... an effect that is caused by the action and is later in time or farther removed in distance, but is still reasonably foreseeable.”*

In this case, the context for analyzing secondary and cumulative impacts is defined by the time horizon within which “reasonably foreseeable” conditions may occur. From a local planning standpoint, the future context for development is established by the Maui County General Plan which defines parameters for growth. The Maui General Plan was updated in 2012 and plans for the horizon year 2030. Thus, “reasonably foreseeable” conditions may be considered within this future context.

The Maui County General Plan, as set forth in Chapter 2.80.B of the Maui County Code, provides for the update of the County General Plan. The General Plan is a long-term, comprehensive blueprint for the physical, economic, environmental development and cultural identity of the County through 2030. The components of the General Plan include the following:

- The Countywide Policy Plan provides broad policies and objectives which portrays the desired direction of the County’s future. It includes a countywide vision, statement of core principles, and objectives and policies for population, land use, the environment, the economy, and housing.
- The MIP provides a land use strategy, water assessment, nearshore ecosystem assessment, an implementation strategy, and milestone measurements. An essential element of the MIP is a Managed and Directed Growth Plan which identifies existing and future land use patterns and determines planned growth.
- The nine (9) Community Plans provide implementing actions based on consistency with the Countywide Policy Plan and MIP’s vision, goals, objectives, and policies.

A discussion of how the proposed project is consistent with specific goals, objectives, and policies of the Countywide Policy Plan, Maui Island Plan, and Kīhei-Makena Community Plan is presented in Chapter III of this EA document.

Whereas the Countywide Policy Plan covers planning goals and objectives at the broadest levels, and the regional Community Plans consider specific regional needs and opportunities, the MIP addresses functional elements of the General Plan, and address islandwide growth parameters.

The MIP is used by the County Council, Maui Planning Commission, County administration and the community as a policy foundation for day-to-day decision making by doing the following:

- Providing direction for the development of future policies and regulations (for example, zoning and other ordinances, guidelines and area-specific plans that describe what kind of development can occur where);
- Providing policies to help determine the appropriateness of development proposals; and
- Assigning resource for capital investments and programmatic initiatives.

The Directed Growth Plan, which is a key element of the MIP, provides a framework for managing outcomes of growth based on analysis of natural hazards, sensitive lands, cultural resources, scenic corridors, and related environmental and human community parameters. An important component of the Directed Growth Plan are maps that delineate urban and rural growth areas. Referred to as UGB and Rural Growth Boundaries (RGB), these maps set the boundaries for the physical limits of development. In so doing, the Directed Growth Plan seeks to manage the use of non-urban and non-rural resources important in sustaining the island to the year 2030. The project site is located within the existing Pulehunui Industrial Park subdivision, which is situated within the UGB. Development of the proposed wastewater pretreatment facility and WWTP improvements may be considered to be part of the larger action of development of the Pulehunui Industrial Park as a heavy industrial subdivision. The impacts of this type of development were evaluated in a Chapter 343, HRS Environmental Assessment for which a FONSI was issued in 2012. As such, the proposed action is not expected to have significant individual or cumulative adverse effects upon the environment.

It is noted that various State agencies are planning future development in the Pulehunui region, including a 285-acre DLNR Development at Pulehunui. In addition, the State Department of Public Safety (PSD) is proposing the Maui Regional Public Safety Complex (MRPSC) at Pulehunui adjacent to the DLNR development area. DLNR's 285-acre development, as well as the proposed MRPSC, are designated as areas within the UGB by the MIP. The Department of Hawaiian Home Lands (DHHL) also owns lands in the Pulehunui region that are proposed for commercial and light industrial development. Future urbanization of these lands at Pulehunui will require environmental review and appropriate land entitlement approvals from the State Land Use Commission and Maui County Council. Review of impacts in the context of land use policies includes standards which identify key indicators which, when exceeded, would require special study or

mitigation efforts. Through this process, long-term cumulative impacts will be identified and mitigated prior to land entitlement approvals for this project.

In sum, implementation of the proposed project, which is limited in scope to implementation of wastewater processing improvements within an existing industrial subdivision, is not expected to generate any significant secondary or cumulative impacts on the environment.

RELATIONSHIP TO  
GOVERNMENTAL PLANS,  
POLICIES, AND CONTROLS



### III. RELATIONSHIP TO GOVERNMENTAL PLANS, POLICIES, AND CONTROLS

#### A. HAWAI‘I STATE PLAN

Chapter 226, HRS, also known as the Hawai‘i State Plan, is a long-range comprehensive plan which serves as a guide for the future long-term development of the State by identifying goals, objectives, policies, and priorities, as well as implementation mechanisms. The Plan consists of three (3) parts. Part I includes the Overall Theme, Goals, Objectives, and Policies; Part II includes Planning, Coordination, and Implementation; and Part III establishes Priority Guidelines. Inasmuch as Part II of the State Plan covers its administrative structure and implementation process, discussion of the proposed project’s applicability to Part II is not appropriate. Below is an analysis of the project’s applicability to Part I and Part III of the Hawai‘i State Plan.

Hawai‘i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
<b>HRS 226-1: Findings and Purpose</b>			
<b>HRS 226-2: Definitions</b>			
<b>HRS 226-3: Overall Theme</b>			
<b>HRS 226-4: State Goals.</b> In order to guarantee, for the present and future generations, those elements of choice and mobility that insure that individuals and groups may approach their desired levels of self-reliance and self determination, it shall be the goal of the State to achieve: A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawaii’s present and future generations. (1) A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people. (2) Physical, social, and economic well-being, for individuals and families in Hawaii, that nourishes a sense of community responsibility, of caring, and of participation in community life.			
<b><i>Analysis:</i></b> The proposed <i>wastewater pretreatment facility and WWTP improvements provide wastewater processing capacity necessary for a clean and healthy environment. Its location within a dedicated heavy industrial area helps to preserve the beauty and natural characteristics of other areas of the island. As such, it supports the State goals of HRS 226.4.</i>			
<b>Chapter 226-5 Objective and Policies for Population</b>			
<b>Objective:</b> It shall be the objective in planning for the State’s population to guide population growth to be consistent with the achievement of physical, economic and social objectives contained in this chapter.			✓
<b>Policies:</b>			
(1) Manage population growth statewide in a manner that provides increased opportunities for Hawaii’s people to pursue their physical, social, and economic aspirations while recognizing the unique needs of each county.			✓



Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
(2) Encourage an increase in economic activities and employment opportunities on the neighbor islands consistent with community needs and desires.			✓
(3) Promote increased opportunities for Hawaii's people to pursue their socio-economic aspirations throughout the islands.			✓
(4) Encourage research activities and public awareness programs to foster an understanding of Hawaii's limited capacity to accommodate population needs and to address concerns resulting from an increase in Hawaii's population.			✓
(5) Encourage federal actions and coordination among major governmental agencies to promote a more balanced distribution of immigrants among the states, provided that such actions do not prevent the reunion of immediate family members.			✓
(6) Pursue an increase in federal assistance for states with a greater proportion of foreign immigrants relative to their state's population.			✓
(7) Plan the development and availability of land and water resources in a coordinated manner so as to provide for the desired levels of growth in each geographic area.			✓
<b>Analysis: Not Applicable</b>			
<b>Chapter 226-6 Objectives and policies for the economy – – in general</b>			
<b>Objectives:</b> Planning for the State's economy in general shall be directed toward achievement of the following objectives:			
(1) Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawaii's people, while at the same time stimulating the development and expansion of economic activities capitalizing on defense, dual-use, and science and technology assets, particularly on the neighbor islands where employment opportunities may be limited.			✓
(2) A steadily growing and diversified economic base that is not overly dependent on a few industries, and includes the development and expansion of industries on the neighbor islands.	✓		
<b>Policies:</b>			
(1) Promote and encourage entrepreneurship within Hawaii by residents and nonresidents of the State.			✓
(2) Expand Hawaii's national and international marketing, communication, and organizational ties, to increase the State's capacity to adjust to and capitalize upon economic changes and opportunities occurring outside the State.			✓
(3) Promote Hawaii as an attractive market for environmentally and socially sound investment activities that benefit Hawaii's people.			✓
(4) Transform and maintain Hawaii as a place that welcomes and facilitates innovative activity that may lead to commercial opportunities.			✓
(5) Promote innovative activity that may pose initial risks, but ultimately contribute to the economy of Hawaii.			✓

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(6) Seek broader outlets for new or expanded Hawaii business investments.			✓
(7) Expand existing markets and penetrate new markets for Hawaii's products and services.			✓
(8) Assure that the basic economic needs of Hawaii's people are maintained in the event of disruptions in overseas transportation.			✓
(9) Strive to achieve a level of construction activity responsive to, and consistent with, state growth objectives.			✓
(10) Encourage the formation of cooperatives and other favorable marketing arrangements at the local or regional level to assist Hawaii's small scale producers, manufacturers, and distributors.			✓
(11) Encourage labor-intensive activities that are economically satisfying and which offer opportunities for upward mobility.	✓		
(12) Encourage innovative activities that may not be labor-intensive, but may otherwise contribute to the economy of Hawaii.			✓
(13) Foster greater cooperation and coordination between the government and private sectors in developing Hawaii's employment and economic growth opportunities.			✓
(14) Stimulate the development and expansion of economic activities which will benefit areas with substantial or expected employment problems.			✓
(15) Maintain acceptable working conditions and standards for Hawaii's workers.			✓
(16) Provide equal employment opportunities for all segments of Hawaii's population through affirmative action and nondiscrimination measures.			✓
(17) Stimulate the development and expansion of economic activities capitalizing on defense, dual-use, and science and technology assets, particularly on the neighbor islands where employment opportunities may be limited.			✓
(18) Encourage businesses that have favorable financial multiplier effects within Hawaii's economy, particularly with respect to emerging industries in science and technology.			✓
(19) Promote and protect intangible resources in Hawaii, such as scenic beauty and the aloha spirit, which are vital to a healthy economy.			✓
(20) Increase effective communication between the educational community and the private sector to develop relevant curricula and training programs to meet future employment needs in general, and requirements of new or innovative potential growth industries in particular.			✓
(21) Foster a business climate in Hawaii--including attitudes, tax and regulatory policies, and financial and technical assistance programs-- that is conducive to the expansion of existing enterprises and the creation and attraction of new business and industry.			✓

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<b>Analysis:</b> The proposed action supports industrial development on Maui by providing wastewater treatment facilities at Pulehunui Industrial Park.			
<b>Chapter 226-7 Objectives and policies for the economy – – agriculture.</b>			
<b>Objectives:</b> Planning for the State's economy with regard to agriculture shall be directed towards achievement of the following objectives:			
(1) Viability of Hawaii's sugar and pineapple industries.			✓
(2) Growth and development of diversified agriculture throughout the State.			✓
(3) An agriculture industry that continues to constitute a dynamic and essential component of Hawaii's strategic, economic, and social well-being.			✓
<b>Policies:</b>			
(1) Establish a clear direction for Hawaii's agriculture through stakeholder commitment and advocacy.			✓
(2) Encourage agriculture by making the best use of natural resources.			✓
(3) Provide the governor and the legislature with information and options needed for prudent decision-making for the development of agriculture.			✓
(4) Establish strong relationships between the agricultural and visitor industries for mutual marketing benefits.			✓
(5) Foster increased public awareness and understanding of the contributions and benefits of agriculture as a major sector of Hawaii's economy.			✓
(6) Seek the enactment and retention of federal and state legislation that benefits Hawaii's agricultural industries.			✓
(7) Strengthen diversified agriculture by developing an effective promotion, marketing, and distribution system between Hawaii's food producers and consumers in the State, nation, and world.			✓
(8) Support research and development activities that strengthen economic productivity in agriculture, stimulate greater efficiency, and enhance the development of new products and agricultural by-products.			✓
(9) Enhance agricultural growth by providing public incentives and encouraging private initiatives.			✓
(10) Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs.			✓
(11) Increase the attractiveness and opportunities for an agricultural education and livelihood.			✓
(12) In addition to the State's priority on food, expand Hawaii's agricultural base by promoting growth and development of flowers, tropical fruits and plants, livestock, feed grains, forestry, food crops, aquaculture, and other potential enterprises.			✓

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(13) Promote economically competitive activities that increase Hawaii's agricultural self-sufficiency, including the increased purchase and use of Hawaii-grown food and food products by residents, businesses, and governmental bodies as defined under section 103D-104.			✓
(14) Promote and assist in the establishment of sound financial programs for diversified agriculture.			✓
(15) Institute and support programs and activities to assist the entry of displaced agricultural workers into alternative agricultural or other employment.			✓
(16) Facilitate the transition of agricultural lands in economically nonfeasible agricultural production to economically viable agricultural uses.			✓
(17) Perpetuate, promote, and increase use of traditional Hawaiian farming systems, such as the use of loko i'a, māla, and irrigated lo'i, and growth of traditional Hawaiian crops, such as kalo, 'uala, and 'ulu.			✓
(18) Increase and develop small-scale farms.			✓
<b>Analysis: Not Applicable</b>			
<b>Chapter 226-8 Objective and policies for the economy – – visitor industry.</b>			
<b>Objective:</b> Planning for the State's economy with regard to the visitor industry shall be directed towards the achievement of the objective of a visitor industry that constitutes a major component of steady growth for Hawaii's economy.			✓
<b>Policies:</b>			
(1) Support and assist in the promotion of Hawaii's visitor attractions and facilities.			✓
(2) Ensure that visitor industry activities are in keeping with the social, economic, and physical needs and aspirations of Hawaii's people.			✓
(3) Improve the quality of existing visitor destination areas by utilizing Hawaii's strengths in science and technology.			✓
(4) Encourage cooperation and coordination between the government and private sectors in developing and maintaining well-designed, adequately serviced visitor industry and related developments which are sensitive to neighboring communities and activities.			✓
(5) Develop the industry in a manner that will continue to provide new job opportunities and steady employment for Hawaii's people.			✓
(6) Provide opportunities for Hawaii's people to obtain job training and education that will allow for upward mobility within the visitor industry.			✓
(7) Foster a recognition of the contribution of the visitor industry to Hawaii's economy and the need to perpetuate the aloha spirit.			✓
(8) Foster an understanding by visitors of the aloha spirit and of the unique and sensitive character of Hawaii's cultures and values.			✓
<b>Analysis: Not Applicable</b>			

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<b>Chapter 226-9 Objective and policies for the economy – – federal expenditures.</b>			
<b>Objective:</b> Planning for the State's economy with regard to federal expenditures shall be directed towards achievement of the objective of a stable federal investment base as an integral component of Hawaii's economy.			✓
<b>Policies:</b>			
(1) Encourage the sustained flow of federal expenditures in Hawaii that generates long-term government civilian employment;			✓
(2) Promote Hawaii's supportive role in national defense, in a manner consistent with Hawaii's social, environmental, and cultural goals by building upon dual-use and defense applications to develop thriving ocean engineering, aerospace research and development, and related dual-use technology sectors in Hawaii's economy;			✓
(3) Promote the development of federally supported activities in Hawaii that respect statewide economic concerns, are sensitive to community needs, and minimize adverse impacts on Hawaii's environment;			✓
(4) Increase opportunities for entry and advancement of Hawaii's people into federal government service;			✓
(5) Promote federal use of local commodities, services, and facilities available in Hawaii;			✓
(6) Strengthen federal-state-county communication and coordination in all federal activities that affect Hawaii; and			✓
(7) Pursue the return of federally controlled lands in Hawaii that are not required for either the defense of the nation or for other purposes of national importance, and promote the mutually beneficial exchanges of land between federal agencies, the State, and the counties.			✓
<b>Analysis: Not Applicable</b>			
<b>Chapter 226-10 Objective and policies for the economy – – potential growth and innovative activities.</b>			
<b>Objective:</b> Planning for the State's economy with regard to potential growth and innovative activities shall be directed towards achievement of the objective of development and expansion of potential growth and innovative activities that serve to increase and diversify Hawaii's economic base.			✓
<b>Policies:</b>			
(1) Facilitate investment and employment growth in economic activities that have the potential to expand and diversify Hawaii's economy, including but not limited to diversified agriculture, aquaculture, renewable energy development, creative media, health care, and science and technology-based sectors;			✓
(2) Facilitate investment in innovative activity that may pose risks or be less labor-intensive than other traditional business activity, but if successful, will generate revenue in Hawaii through the export of services or products or substitution of imported services or products;			✓

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(3) Encourage entrepreneurship in innovative activity by academic researchers and instructors who may not have the background, skill, or initial inclination to commercially exploit their discoveries or achievements;			✓
(4) Recognize that innovative activity is not exclusively dependent upon individuals with advanced formal education, but that many self-taught, motivated individuals are able, willing, sufficiently knowledgeable, and equipped with the attitude necessary to undertake innovative activity;			✓
(5) Increase the opportunities for investors in innovative activity and talent engaged in innovative activity to personally meet and interact at cultural, art, entertainment, culinary, athletic, or visitor-oriented events without a business focus;			✓
(6) Expand Hawaii's capacity to attract and service international programs and activities that generate employment for Hawaii's people;			✓
(7) Enhance and promote Hawaii's role as a center for international relations, trade, finance, services, technology, education, culture, and the arts;			✓
(8) Accelerate research and development of new energy-related industries based on wind, solar, ocean, underground resources, and solid waste;			✓
(9) Promote Hawaii's geographic, environmental, social, and technological advantages to attract new or innovative economic activities into the State;			✓
(10) Provide public incentives and encourage private initiative to attract new or innovative industries that best support Hawaii's social, economic, physical, and environmental objectives;			✓
(11) Increase research and the development of ocean-related economic activities such as mining, food production, and scientific research;			✓
(12) Develop, promote, and support research and educational and training programs that will enhance Hawaii's ability to attract and develop economic activities of benefit to Hawaii;			✓
(13) Foster a broader public recognition and understanding of the potential benefits of new or innovative growth-oriented industry in Hawaii;			✓
(14) Encourage the development and implementation of joint federal and state initiatives to attract federal programs and projects that will support Hawaii's social, economic, physical, and environmental objectives;			✓
(15) Increase research and development of businesses and services in the telecommunications and information industries;			✓
(16) Foster the research and development of nonfossil fuel and energy efficient modes of transportation; and			✓
(17) Recognize and promote health care and health care information technology as growth industries.			✓
<b>Analysis: Not Applicable</b>			

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<b>Chapter 226-10.5 Objectives and policies for the economy – – information industry.</b>			
<b>Objective:</b> Planning for the State's economy with regard to telecommunications and information technology shall be directed toward recognizing that broadband and wireless communication capability and infrastructure are foundations for an innovative economy and positioning Hawaii as a leader in broadband and wireless communications and applications in the Pacific Region.			✓
<b>Policies:</b>			
(1) Promote efforts to attain the highest speeds of electronic and wireless communication within Hawaii and between Hawaii and the world, and make high speed communication available to all residents and businesses in Hawaii;			✓
(2) Encourage the continued development and expansion of the telecommunications infrastructure serving Hawaii to accommodate future growth and innovation in Hawaii's economy;			✓
(3) Facilitate the development of new or innovative business and service ventures in the information industry which will provide employment opportunities for the people of Hawaii;			✓
(4) Encourage mainland- and foreign-based companies of all sizes, whether information technology-focused or not, to allow their principals, employees, or contractors to live in and work from Hawaii, using technology to communicate with their headquarters, offices, or customers located out-of-state;			✓
(5) Encourage greater cooperation between the public and private sectors in developing and maintaining a well-designed information industry;			✓
(6) Ensure that the development of new businesses and services in the industry are in keeping with the social, economic, and physical needs and aspirations of Hawaii's people;			✓
(7) Provide opportunities for Hawaii's people to obtain job training and education that will allow for upward mobility within the information industry;			✓
(8) Foster a recognition of the contribution of the information industry to Hawaii's economy; and			✓
(9) Assist in the promotion of Hawaii as a broker, creator, and processor of information in the Pacific.			✓
<b>Analysis: Not Applicable</b>			
<b>Chapter 226-11 Objectives and policies for the physical environment – – land based, shoreline, and marine resources.</b>			
<b>Objectives:</b> Planning for the State's physical environment with regard to land-based, shoreline, and marine resources shall be directed towards achievement of the following objectives:			
(1) Prudent use of Hawaii's land-based, shoreline, and marine resources.	✓		
(2) Effective protection of Hawaii's unique and fragile environmental resources.			✓

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<b><u>Policies:</u></b>			
(1) Exercise an overall conservation ethic in the use of Hawaii's natural resources.			✓
(2) Ensure compatibility between land-based and water-based activities and natural resources and ecological systems.			✓
(3) Take into account the physical attributes of areas when planning and designing activities and facilities.	✓		
(4) Manage natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage.			✓
(5) Consider multiple uses in watershed areas, provided such uses do not detrimentally affect water quality and recharge functions.			✓
(6) Encourage the protection of rare or endangered plant and animal species and habitats native to Hawaii.			✓
(7) Provide public incentives that encourage private actions to protect significant natural resources from degradation or unnecessary depletion.			✓
(8) Pursue compatible relationships among activities, facilities, and natural resources.	✓		
(9) Promote increased accessibility and prudent use of inland and shoreline areas for public recreational, educational, and scientific purposes.			✓
<b><i>Analysis:</i></b> The proposed action will reduce the risk of adverse impacts to marine resources by providing a wastewater pretreatment facility located inland from the shoreline, versus pumping into manholes located close to the ocean at the County of Maui's Wailuku Pump Station. Furthermore, wastes processed at the proposed facility will be redirected from treatment at the Wailuku-Kahului Wastewater Reclamation Facility (WWRF), which currently utilizes injection wells for disposal of treated effluent.			
<b>Chapter 226-12 Objective and policies for the physical environment -- scenic, natural beauty, and historic resources.</b>			
<b><u>Objective:</u></b> Planning for the State's physical environment shall be directed towards achievement of the objective of enhancement of Hawaii's scenic assets, natural beauty, and multi-cultural/historical resources.			✓
<b><u>Policies:</u></b>			
(1) Promote the preservation and restoration of significant natural and historic resources.			✓
(2) Provide incentives to maintain and enhance historic, cultural, and scenic amenities.			✓
(3) Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.	✓		
(4) Protect those special areas, structures, and elements that are an integral and functional part of Hawaii's ethnic and cultural heritage.			✓



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(5) Encourage the design of developments and activities that complement the natural beauty of the islands.	✓		
<b>Analysis:</b> The Pulehunui Industrial Park has been developed away from the shoreline and scenic vistas, and specifically dedicated for heavy industrial uses. By locating the proposed facility there, views and natural features in other areas will be preserved.			
<b>Chapter 226-13 Objectives and policies for the physical environment – – land, air, and water quality.</b>			
<b>Objectives:</b> Planning for the State's physical environment with regard to land, air, and water quality shall be directed towards achievement of the following objectives.			
(1) Maintenance and pursuit of improved quality in Hawaii's land, air, and water resources.			✓
(2) Greater public awareness and appreciation of Hawaii's environmental resources.			✓
<b>Policies:</b>			
(1) Foster educational activities that promote a better understanding of Hawaii's limited environmental resources.			✓
(2) Promote the proper management of Hawaii's land and water resources.			✓
(3) Promote effective measures to achieve desired quality in Hawaii's surface, ground, and coastal waters.	✓		
(4) Encourage actions to maintain or improve aural and air quality levels to enhance the health and well-being of Hawaii's people.			✓
(5) Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters.			✓
(6) Encourage design and construction practices that enhance the physical qualities of Hawaii's communities.			✓
(7) Encourage urban developments in close proximity to existing services and facilities.			✓
(8) Foster recognition of the importance and value of the land, air, and water resources to Hawaii's people, their cultures and visitors.			✓
<b>Analysis:</b> The proposed action will result in a reduction of injection well use and will shift wastewater treatment and transfer activities away from sensitive shoreline areas.			
<b>Chapter 226-14 Objective and policies for facility systems – – in general.</b>			
<b>Objective:</b> Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives.	✓		

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<b><u>Policies:</u></b>			
(1) Accommodate the needs of Hawaii's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans.	✓		
(2) Encourage flexibility in the design and development of facility systems to promote prudent use of resources and accommodate changing public demands and priorities.	✓		
(3) Ensure that required facility systems can be supported within resource capacities and at reasonable cost to the user.	✓		
(4) Pursue alternative methods of financing programs and projects and cost-saving techniques in the planning, construction, and maintenance of facility systems.			✓
<b><i>Analysis:</i> The proposed actions will support wastewater treatment needs at Pulehunui Industrial Park and throughout the Island and are consistent with and not in conflict with applicable State and County plans.</b>			
<b>Chapter 226-15 Objectives and policies for facility systems – – solid and liquid waste.</b>			
<b><u>Objectives:</u></b> Planning for the State's facility systems with regard to solid and liquid wastes shall be directed towards the achievement of the following objectives:			
(1) Maintenance of basic public health and sanitation standards relating to treatment and disposal of solid and liquid wastes.	✓		
(2) Provision of adequate sewerage facilities for physical and economic activities that alleviate problems in housing, employment, mobility, and other areas.	✓		
<b><u>Policies:</u></b>			
(1) Encourage the adequate development of sewerage facilities that complement planned growth.	✓		
(2) Promote re-use and recycling to reduce solid and liquid wastes and employ a conservation ethic.			✓
(3) Promote research to develop more efficient and economical treatment and disposal of solid and liquid wastes.			✓
<b><i>Analysis:</i> The proposed actions will enhance liquid waste treatment and disposal capacity to support users of the Pulehunui Industrial Park and island-wide private waste generators, reducing the load on County wastewater facilities.</b>			
<b>Chapter 226-16 Objective and policies for facility systems – – water.</b>			
<b><u>Objective:</u></b> Planning for the State's facility systems with regard to water shall be directed towards achievement of the objective of the provision of water to adequately accommodate domestic, agricultural, commercial, industrial, recreational, and other needs within resource capacities.			✓
<b><u>Policies:</u></b>			
(1) Coordinate development of land use activities with existing and potential water supply.			✓

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(2) Support research and development of alternative methods to meet future water requirements well in advance of anticipated needs.			✓
(3) Reclaim and encourage the productive use of runoff water and wastewater discharges.			✓
(4) Assist in improving the quality, efficiency, service, and storage capabilities of water systems for domestic and agricultural use.			✓
(5) Support water supply services to areas experiencing critical water problems.			✓
(6) Promote water conservation programs and practices in government, private industry, and the general public to help ensure adequate water to meet long-term needs.			✓
<b>Analysis: Not Applicable</b>			
<b>Chapter 226-17 Objectives and policies for facility systems -- transportation.</b>			
<b>Objectives:</b> Planning for the State's facility systems with regard to transportation shall be directed towards the achievement of the following objectives:			
(1) An integrated multi-modal transportation system that services statewide needs and promotes the efficient, economical, safe, and convenient movement of people and goods.			✓
(2) A statewide transportation system that is consistent with and will accommodate planned growth objectives throughout the State.			✓
<b>Policies:</b>			
(1) Design, program, and develop a multi-modal system in conformance with desired growth and physical development as stated in this chapter;			✓
(2) Coordinate state, county, federal, and private transportation activities and programs toward the achievement of statewide objectives;			✓
(3) Encourage a reasonable distribution of financial responsibilities for transportation among participating governmental and private parties;			✓
(4) Provide for improved accessibility to shipping, docking, and storage facilities;			✓
(5) Promote a reasonable level and variety of mass transportation services that adequately meet statewide and community needs;			✓
(6) Encourage transportation systems that serve to accommodate present and future development needs of communities;			✓
(7) Encourage a variety of carriers to offer increased opportunities and advantages to interisland movement of people and goods;			✓
(8) Increase the capacities of airport and harbor systems and support facilities to effectively accommodate transshipment and storage needs;			✓
(9) Encourage the development of transportation systems and programs which would assist statewide economic growth and diversification;			✓

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(10) Encourage the design and development of transportation systems sensitive to the needs of affected communities and the quality of Hawaii's natural environment;			✓
(11) Encourage safe and convenient use of low-cost, energy-efficient, non-polluting means of transportation;			✓
(12) Coordinate intergovernmental land use and transportation planning activities to ensure the timely delivery of supporting transportation infrastructure in order to accommodate planned growth objectives; and			✓
(13) Encourage diversification of transportation modes and infrastructure to promote alternate fuels and energy efficiency.			✓
<b>Analysis: Not Applicable</b>			
<b>Chapter 226-18 Objectives and policies for facility systems -- energy.</b>			
<b>Objectives:</b> Planning for the State's facility systems with regard to energy shall be directed toward the achievement of the following objectives, giving due consideration to all:			
(1) Dependable, efficient, and economical statewide energy systems capable of supporting the needs of the people;			✓
(2) Increased energy security and self-sufficiency through the reduction and ultimate elimination of Hawaii's dependence on imported fuels for electrical generation and ground transportation.	✓		
(3) Greater diversification of energy generation in the face of threats to Hawaii's energy supplies and systems;	✓		
(4) Reduction, avoidance, or sequestration of greenhouse gas emissions from energy supply and use; and			✓
(5) Utility models that make the social and financial interests of Hawaii's utility customers a priority.			✓
(b) To achieve the energy objectives, it shall be the policy of this State to ensure the short- and long-term provision of adequate, reasonably prices, and dependable energy services to accommodate demand.			✓
<b>Policies:</b>			
(1) Support research and development as well as promote the use of renewable energy sources;			✓
(2) Ensure that the combination of energy supplies and energy-saving systems is sufficient to support the demands of growth;	✓		
(3) Base decisions of least-cost supply-side and demand-side energy resource options on a comparison of their total costs and benefits when a least-cost is determined by a reasonably comprehensive, quantitative, and qualitative accounting of their long-term, direct and indirect economic, environmental, social, cultural, and public health costs and benefits;			✓
(4) Promote all cost-effective conservation of power and fuel supplies through measures, including:			✓
(A) Development of cost-effective demand-side management programs;			✓

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(B) Education;			✓
(C) Adoption of energy-efficient practices and technologies; and	✓		
(D) Increasing energy efficiency and decreasing energy use in public infrastructure			✓
(5) Ensure, to the extent that new supply-side resources are needed, that the development or expansion of energy systems uses the least-cost energy supply option and maximizes efficient technologies; and			✓
(6) Support research, development, demonstration, and use of energy efficiency, load management, and other demand-side management programs, practices, and technologies;			✓
(7) Promote alternate fuels and transportation energy efficiency;			✓
(8) Support actions that reduce, avoid, or sequester greenhouse gases in utility, transportation, and industrial sector applications;			✓
(9) Support actions that reduce, avoid, or sequester Hawaii's greenhouse gas emissions through agriculture and forestry initiatives;			✓
(10) Provide priority handling and processing for all state and county permits required for renewable energy projects;			✓
(11) Ensure that liquefied natural gas is used only as a cost-effective transitional, limited-term replacement of petroleum for electricity generation and does not impede the development and use of other cost-effective renewable energy sources; and			✓
(12) Promote the development of indigenous geothermal energy resources that are located on public trust land as an affordable and reliable source of firm power for Hawaii.			✓
<b>Analysis:</b> VIP plans to install solar photovoltaic panels at the proposed facility to supply sufficient power to operate the new wastewater pretreatment facility and to provide the power needed for the WWTP's increased capacity.			
<b>Chapter 226-18.5 Objectives and policies for facility systems – telecommunications.</b>			
<b>Objectives:</b>			
(a) Planning for the State's telecommunications facility systems shall be directed towards the achievement of dependable, efficient, and economical statewide telecommunications systems capable of supporting the needs of the people.			✓
(b) To achieve the telecommunications objective, it shall be the policy of this State to ensure the provision of adequate, reasonably priced, and dependable telecommunications services to accommodate demand.			✓
<b>Policies:</b>			
(1) Facilitate research and development of telecommunications systems and resources;			✓

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(2) Encourage public and private sector efforts to develop means for adequate, ongoing telecommunications planning;			✓
(3) Promote efficient management and use of existing telecommunications systems and services; and			✓
(4) Facilitate the development of education and training of telecommunications personnel.			✓
<b>Analysis: Not Applicable</b>			
<b>Chapter 226-19 Objectives and policies for socio-cultural advancement – – housing.</b>			
<b>Objectives:</b> Planning for the State's socio-cultural advancement with regard to housing shall be directed toward the achievement of the following objectives:			✓
(1) Greater opportunities for Hawaii's people to secure reasonably priced, safe, sanitary, and livable homes, located in suitable environments that satisfactorily accommodate the needs and desires of families and individuals, through collaboration and cooperation between government and nonprofit and for-profit developers to ensure that more affordable housing is made available to very low-, low- and moderate-income segments of Hawaii's population.			✓
(2) The orderly development of residential areas sensitive to community needs and other land uses.			✓
(3) The development and provision of affordable rental housing by the State to meet the housing needs of Hawaii's people.			✓
<b>Policies:</b>			
(1) Effectively accommodate the housing needs of Hawaii's people.			✓
(2) Stimulate and promote feasible approaches that increase housing choices for low-income, moderate-income, and gap-group households.			✓
(3) Increase homeownership and rental opportunities and choices in terms of quality, location, cost, densities, style, and size of housing.			✓
(4) Promote appropriate improvement, rehabilitation, and maintenance of existing housing units and residential areas.			✓
(5) Promote design and location of housing developments taking into account the physical setting, accessibility to public facilities and services, and other concerns of existing communities and surrounding areas.			✓
(6) Facilitate the use of available vacant, developable, and underutilized urban lands for housing.			✓
(7) Foster a variety of lifestyles traditional to Hawaii through the design and maintenance of neighborhoods that reflect the culture and values of the community.			✓
(8) Promote research and development of methods to reduce the cost of housing construction in Hawaii.			✓
<b>Analysis: Not Applicable</b>			

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
<b>Chapter 226-20 Objectives and policies for socio-cultural advancement – – health.</b>			
<b>Objectives:</b> Planning for the State's socio-cultural advancement with regard to health shall be directed towards achievement of the following objectives:			
(1) Fulfillment of basic individual health needs of the general public.			✓
(2) Maintenance of sanitary and environmentally healthful conditions in Hawaii's communities.	✓		
(3) Elimination of health disparities by identifying and addressing social determinants of health.			✓
<b>Policies:</b>			
(1) Provide adequate and accessible services and facilities for prevention and treatment of physical and mental health problems, including substance abuse.			✓
(2) Encourage improved cooperation among public and private sectors in the provision of health care to accommodate the total health needs of individuals throughout the State.			✓
(3) Encourage public and private efforts to develop and promote statewide and local strategies to reduce health care and related insurance costs.			✓
(4) Foster an awareness of the need for personal health maintenance and preventive health care through education and other measures.			✓
(5) Provide programs, services, and activities that ensure environmentally healthful and sanitary conditions.	✓		
(6) Improve the State's capabilities in preventing contamination by pesticides and other potentially hazardous substances through increased coordination, education, monitoring, and enforcement.			✓
(7) Prioritize programs, services, interventions, and activities that address identified social determinants of health to improve native Hawaiian health and well-being consistent with the United States Congress' declaration of policy as codified in title 42 United States Code section 11702, and to reduce health disparities of disproportionately affected demographics, including native Hawaiians, other Pacific Islanders, and Filipinos. The prioritization of affected demographic groups other than native Hawaiians may be reviewed every ten years and revised based on the best available epidemiological and public health data.			✓
<b>Analysis:</b> The proposed action will promote a healthful and sanitary environment by providing capacity of treatment of septage and other liquid waste products.			
<b>Chapter 226-21 Objectives and policies for Socio-cultural advancement – – education.</b>			
<b>Objective:</b> Planning for the State's socio-cultural advancement with regard to education shall be directed towards achievement of the objective of the provision of a variety of educational opportunities to enable individuals to fulfill their needs, responsibilities, and aspirations.			✓

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<b><u>Policies:</u></b>			
(1) Support educational programs and activities that enhance personal development, physical fitness, recreation, and cultural pursuits of all groups.			✓
(2) Ensure the provision of adequate and accessible educational services and facilities that are designed to meet individual and community needs.			✓
(3) Provide appropriate educational opportunities for groups with special needs.			✓
(4) Promote educational programs which enhance understanding of Hawaii's cultural heritage.			✓
(5) Provide higher educational opportunities that enable Hawaii's people to adapt to changing employment demands.			✓
(6) Assist individuals, especially those experiencing critical employment problems or barriers, or undergoing employment transitions, by providing appropriate employment training programs and other related educational opportunities.			✓
(7) Promote programs and activities that facilitate the acquisition of basic skills, such as reading, writing, computing, listening, speaking, and reasoning.			✓
(8) Emphasize quality educational programs in Hawaii's institutions to promote academic excellence.			✓
(9) Support research programs and activities that enhance the education programs of the State.			✓
<b><i>Analysis:</i> Not Applicable</b>			
<b>Chapter 226-22 Objective and policies for socio-cultural advancement – – social services.</b>			
<b><u>Objective:</u></b> Planning for the State's socio-cultural advancement with regard to social services shall be directed towards the achievement of the objective of improved public and private social services and activities that enable individuals, families, and groups to become more self-reliant and confident to improve their well-being.			✓
<b><u>Policies:</u></b>			
(1) Assist individuals, especially those in need of attaining a minimally adequate standard of living and those confronted by social and economic hardship conditions, through social services and activities within the State's fiscal capacities.			✓
(2) Promote coordination and integrative approaches among public and private agencies and programs to jointly address social problems that will enable individuals, families, and groups to deal effectively with social problems and to enhance their participation in society.			✓
(3) Facilitate the adjustment of new residents, especially recently arrived immigrants, into Hawaii's communities.			✓
(4) Promote alternatives to institutional care in the provision of long-term care for elder and disabled populations.			✓



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(5) Support public and private efforts to prevent domestic abuse and child molestation, and assist victims of abuse and neglect.			✓
(6) Promote programs which assist people in need of family planning services to enable them to meet their needs.			✓
<b>Analysis: Not Applicable</b>			
<b>Chapter 226-23 Objective and policies for socio-cultural advancement – – leisure.</b>			
<b>Objective:</b> Planning for the State's socio-cultural advancement with regard to leisure shall be directed towards the achievement of the objective of the adequate provision of resources to accommodate diverse cultural, artistic, and recreational needs for present and future generations.			✓
<b>Policies:</b>			
(1) Foster and preserve Hawaii's multi-cultural heritage through supportive cultural, artistic, recreational, and humanities-oriented programs and activities.			✓
(2) Provide a wide range of activities and facilities to fulfill the cultural, artistic, and recreational needs of all diverse and special groups effectively and efficiently.			✓
(3) Enhance the enjoyment of recreational experiences through safety and security measures, educational opportunities, and improved facility design and maintenance.			✓
(4) Promote the recreational and educational potential of natural resources having scenic, open space, cultural, historical, geological, or biological values while ensuring that their inherent values are preserved.			✓
(5) Ensure opportunities for everyone to use and enjoy Hawaii's recreational resources.			✓
(6) Assure the availability of sufficient resources to provide for future cultural, artistic, and recreational needs.			✓
(7) Provide adequate and accessible physical fitness programs to promote the physical and mental well-being of Hawaii's people.			✓
(8) Increase opportunities for appreciation and participation in the creative arts, including the literary, theatrical, visual, musical, folk, and traditional art forms.			✓
(9) Encourage the development of creative expression in the artistic disciplines to enable all segments of Hawaii's population to participate in the creative arts.			✓
(10) Assure adequate access to significant natural and cultural resources in public ownership.			✓
<b>Analysis: Not Applicable</b>			
<b>Chapter 226-24 Objective and policies for socio-cultural advancement – – individual rights and personal well-being.</b>			
<b>Objective:</b> Planning for the State's socio-cultural advancement with regard to individual rights and personal well-being shall be directed towards achievement of the objective of increased opportunities and protection of			✓

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
individual rights to enable individuals to fulfill their socio-economic needs and aspirations.			
<b>Policies:</b>			
(1) Provide effective services and activities that protect individuals from criminal acts and unfair practices and that alleviate the consequences of criminal acts in order to foster a safe and secure environment.			✓
(2) Uphold and protect the national and state constitutional rights of every individual.			✓
(3) Assure access to, and availability of, legal assistance, consumer protection, and other public services which strive to attain social justice.			✓
(4) Ensure equal opportunities for individual participation in society.			✓
<b>Analysis: Not Applicable</b>			
<b>Chapter 226-25 Objective and policies for socio-cultural advancement – – culture.</b>			
<b>Objective:</b> Planning for the State's socio-cultural advancement with regard to culture shall be directed toward the achievement of the objective of enhancement of cultural identities, traditions, values, customs, and arts of Hawaii's people.			✓
<b>Policies:</b>			
(1) Foster increased knowledge and understanding of Hawaii's ethnic and cultural heritages and the history of Hawaii.			✓
(2) Support activities and conditions that promote cultural values, customs, and arts that enrich the lifestyles of Hawaii's people and which are sensitive and responsive to family and community needs.			✓
(3) Encourage increased awareness of the effects of proposed public and private actions on the integrity and quality of cultural and community lifestyles in Hawaii.			✓
(4) Encourage the essence of the aloha spirit in people's daily activities to promote harmonious relationships among Hawaii's people and visitors.			✓
<b>Analysis: Not Applicable</b>			
<b>Chapter 226-26 Objectives and policies for socio-cultural advancement – – public safety.</b>			
<b>Objective:</b> Planning for the State's socio-cultural advancement with regard to public safety shall be directed towards the achievement of the following objectives:			
(1) Assurance of public safety and adequate protection of life and property for all people.			✓
(2) Optimum organizational readiness and capability in all phases of emergency management to maintain the strength, resources, and social and economic well-being of the community in the event of civil disruptions, wars, natural disasters, and other major disturbances.			✓
(3) Promotion of a sense of community responsibility for the welfare and safety of Hawaii's people.			✓

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<b><u>Policies (Public Safety):</u></b>			
(1) Ensure that public safety programs are effective and responsive to community needs.			✓
(2) Encourage increased community awareness and participation in public safety programs.			✓
<b><u>Policies (Public Safety-Criminal Justice):</u></b>			
(1) Support criminal justice programs aimed at preventing and curtailing criminal activities.			✓
(2) Develop a coordinated, systematic approach to criminal justice administration among all criminal justice agencies.			✓
(3) Provide a range of correctional resources which may include facilities and alternatives to traditional incarceration in order to address the varied security needs of the community and successfully reintegrate offenders into the community.			✓
<b><u>Policies (Public Safety – Emergency Management):</u></b>			
(1) Ensure that responsible organizations are in a proper state of readiness to respond to major war-related, natural, or technological disasters and civil disturbances at all times.			✓
(2) Enhance the coordination between emergency management programs throughout the State.			✓
<b><i>Analysis:</i> Not Applicable</b>			
<b>Chapter 226-27 Objectives and policies for socio-cultural advancement – – government.</b>			
<b><u>Objectives:</u></b> Planning the State's socio-cultural advancement with regard to government shall be directed towards the achievement of the following objectives:			
(1) Efficient, effective, and responsive government services at all levels in the State.			✓
(2) Fiscal integrity, responsibility, and efficiency in the state government and county governments.			✓
<b><u>Policies:</u></b>			
(1) Provide for necessary public goods and services not assumed by the private sector.			✓
(2) Pursue an openness and responsiveness in government that permits the flow of public information, interaction, and response.			✓
(3) Minimize the size of government to that necessary to be effective.			✓
(4) Stimulate the responsibility in citizens to productively participate in government for a better Hawaii.			✓

Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
(5) Assure that government attitudes, actions, and services are sensitive to community needs and concerns.			✓
(6) Provide for a balanced fiscal budget.			✓
(7) Improve the fiscal budgeting and management system of the State.			✓
(8) Promote the consolidation of state and county governmental functions to increase the effective and efficient delivery of government programs and services and to eliminate duplicative services wherever feasible.			✓
<b>Analysis: Not Applicable</b>			

HAWAII STATE PLAN, CHAPTER 226, HRS – PART III. PRIORITY GUIDELINES	S	N/S	N/A
<b>Chapter 226-101: Purpose.</b> The purpose of this part is to establish overall priority guidelines to address areas of statewide concern.			
<b>Chapter 226-102: Overall direction.</b> The State shall strive to improve the quality of life for Hawaii's present and future population through the pursuit of desirable courses of action in seven major areas of statewide concern which merit priority attention: economic development, population growth and land resource management, affordable housing, crime and criminal justice, quality education, principles of sustainability, and climate change adaptation.			
<b>Chapter 226-103: Economic priority guidelines.</b>			
<b>(a) Priority guidelines to stimulate economic growth and encourage business expansion and development to provide needed jobs for Hawaii's people and achieve a stable and diversified economy:</b>			
(1) Seek a variety of means to increase the availability of investment capital for new and expanding enterprises.	✓		
(A) Encourage investments which:	✓		
(i) Reflect long term commitments to the State;	✓		
(ii) Rely on economic linkages within the local economy;	✓		
(iii) Diversify the economy;	✓		
(iv) Reinvest in the local economy;	✓		
(v) Are sensitive to community needs and priorities; and	✓		
(vi) Demonstrate a commitment to provide management opportunities to Hawaii residents; and	✓		
(B) Encourage investments in innovative activities that have a nexus to the State, such as:			✓
(i) Present or former residents acting as entrepreneurs or principals;	✓		
(ii) Academic support from an institution of higher education in Hawaii;			✓
(iii) Investment interest from Hawaii residents;	✓		
(iv) Resources unique to Hawaii that are required for innovative activity; and			✓

HAWAII STATE PLAN, CHAPTER 226, HRS – PART III. PRIORITY GUIDELINES	S	N/S	N/A
(v) Complementary or supportive industries or government programs or projects.			✓
(2) Encourage the expansion of technological research to assist industry development and support the development and commercialization of technological advancements.			✓
(3) Improve the quality, accessibility, and range of services provided by government to business, including data and reference services and assistance in complying with governmental regulations.			✓
(4) Seek to ensure that state business tax and labor laws and administrative policies are equitable, rational, and predictable.			✓
(5) Streamline the processes for building and development permit and review, and telecommunication infrastructure installation approval and eliminate or consolidate other burdensome or duplicative governmental requirements imposed on business, where scientific evidence indicates that public health, safety and welfare would not be adversely affected.			✓
(6) Encourage the formation of cooperatives and other favorable marketing or distribution arrangements at the regional or local level to assist Hawaii's small-scale producers, manufacturers, and distributors.			✓
(7) Continue to seek legislation to protect Hawaii from transportation interruptions between Hawaii and the continental United States.			✓
(8) Provide public incentives and encourage private initiative to develop and attract industries which promise long-term growth potentials and which have the following characteristics:			✓
(A) An industry that can take advantage of Hawaii's unique location and available physical and human resources.			✓
(B) A clean industry that would have minimal adverse effects on Hawaii's environment.			✓
(C) An industry that is willing to hire and train Hawaii's people to meet the industry's labor needs at all levels of employment.			✓
(D) An industry that would provide reasonable income and steady employment.			✓
(9) Support and encourage, through educational and technical assistance programs and other means, expanded opportunities for employee ownership and participation in Hawaii business.			✓
(10) Enhance the quality of Hawaii's labor force and develop and maintain career opportunities for Hawaii's people through the following actions:			✓
(A) Expand vocational training in diversified agriculture, aquaculture, information industry, and other areas where growth is desired and feasible.			✓
(B) Encourage more effective career counseling and guidance in high schools and post-secondary institutions to inform students of present and future career opportunities.			✓
(C) Allocate educational resources to career areas where high employment is expected and where growth of new industries is desired.			✓
(D) Promote career opportunities in all industries for Hawaii's people by encouraging firms doing business in the State to hire residents.			✓
(E) Promote greater public and private sector cooperation in determining industrial training needs and in developing relevant curricula and on-the-job training opportunities.			✓

HAWAII STATE PLAN, CHAPTER 226, HRS – PART III. PRIORITY GUIDELINES	S	N/S	N/A
(F) Provide retraining programs and other support services to assist entry of displaced workers into alternative employment.			✓
<b>(b) Priority guidelines to promote the economic health and quality of the visitor industry:</b>			
(1) Promote visitor satisfaction by fostering an environment which enhances the Aloha Spirit and minimizes inconveniences to Hawaii's residents and visitors.			✓
(2) Encourage the development and maintenance of well-designed, adequately serviced hotels and resort destination areas which are sensitive to neighboring communities and activities and which provide for adequate shoreline setbacks and beach access.			✓
(3) Support appropriate capital improvements to enhance the quality of existing resort destination areas and provide incentives to encourage investment in upgrading, repair, and maintenance of visitor facilities.			✓
(4) Encourage visitor industry practices and activities which respect, preserve, and enhance Hawaii's significant natural, scenic, historic, and cultural resources.			✓
(5) Develop and maintain career opportunities in the visitor industry for Hawaii's people, with emphasis on managerial positions.			✓
(6) Support and coordinate tourism promotion abroad to enhance Hawaii's share of existing and potential visitor markets.			✓
(7) Maintain and encourage a more favorable resort investment climate consistent with the objectives of this chapter.			✓
(8) Support law enforcement activities that provide a safer environment for both visitors and residents alike.			✓
(9) Coordinate visitor industry activities and promotions to business visitors through the state network of advanced data communication techniques.			✓
<b>(c) Priority guidelines to promote the continued viability of the sugar and pineapple industries:</b>			
(1) Provide adequate agricultural lands to support the economic viability of the sugar and pineapple industries.			✓
(2) Continue efforts to maintain federal support to provide stable sugar prices high enough to allow profitable operations in Hawaii.			✓
(3) Support research and development, as appropriate, to improve the quality and production of sugar and pineapple crops.			✓
<b>(d) Priority guidelines to promote the growth and development of diversified agriculture and aquaculture:</b>			
(1) Identify, conserve, and protect agricultural and aquacultural lands of importance and initiate affirmative and comprehensive programs to promote economically productive agricultural and aquacultural uses of such lands.			✓
(2) Assist in providing adequate, reasonably priced water for agricultural activities.			✓
(3) Encourage public and private investment to increase water supply and to improve transmission, storage, and irrigation facilities in support of diversified agriculture and aquaculture.			✓
(4) Assist in the formation and operation of production and marketing associations and cooperatives to reduce production and marketing costs.			✓
(5) Encourage and assist with the development of a waterborne and airborne freight and cargo system capable of meeting the needs of Hawaii's agricultural community.			✓
(6) Seek favorable freight rates for Hawaii's agricultural products from interisland and overseas transportation operators.			✓

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART III. PRIORITY GUIDELINES	S	N/S	N/A
(7) Encourage the development and expansion of agricultural and aquacultural activities which offer long-term economic growth potential and employment opportunities.			✓
(8) Continue the development of agricultural parks and other programs to assist small independent farmers in securing agricultural lands and loans.			✓
(9) Require agricultural uses in agricultural subdivisions and closely monitor the uses in these subdivisions.			✓
(10) Support the continuation of land currently in use for diversified agriculture.			✓
(11) Encourage residents and visitors to support Hawaii's farmers by purchasing locally grown food and food products.			✓
<b>(e) Priority guidelines for water use and development:</b>			
(1) Maintain and improve water conservation programs to reduce the overall water consumption rate.			✓
(2) Encourage the improvement of irrigation technology and promote the use of nonpotable water for agricultural and landscaping purposes.			✓
(3) Increase the support for research and development of economically feasible alternative water sources.			✓
(4) Explore alternative funding sources and approaches to support future water development programs and water system improvements.			✓
<b>(f) Priority guidelines for energy use and development:</b>			
(1) Encourage the development, demonstration, and commercialization of renewable energy sources.			✓
(2) Initiate, maintain, and improve energy conservation programs aimed at reducing energy waste and increasing public awareness of the need to conserve energy.			✓
(3) Provide incentives to encourage the use of energy conserving technology in residential, industrial, and other buildings.			✓
(4) Encourage the development and use of energy conserving and cost-efficient transportation systems.			✓
<b>(g) Priority guidelines to promote the development of the information industry:</b>			
(1) Establish an information network, with an emphasis on broadband and wireless infrastructure and capability that will serve as the foundation of and catalyst for overall economic growth and diversification in Hawaii.			✓
(2) Encourage the development of services such as financial data processing, a products and services exchange, foreign language translations, telemarketing, teleconferencing, a twenty-four-hour international stock exchange, international banking, and a Pacific Rim management center.			✓
(3) Encourage the development of small businesses in the information field such as software development; the development of new information systems, peripherals, and applications; data conversion and data entry services; and home or cottage services such as computer programming, secretarial, and accounting services.			✓
(4) Encourage the development or expansion of educational and training opportunities for residents in the information and telecommunications fields.			✓
(5) Encourage research activities, including legal research in the information and telecommunications fields.			✓
(6) Support promotional activities to market Hawaii's information industry services.			✓
(7) Encourage the location or co-location of telecommunication or wireless information relay facilities in the community, including public areas, where			✓

HAWAI'I STATE PLAN, CHAPTER 226, HRS – PART III. PRIORITY GUIDELINES	S	N/S	N/A
scientific evidence indicates that the public health, safety, and welfare would not be adversely affected.			
<b>Analysis: The proposed action will support the State's industrial and economic base.</b>			
<b>Chapter 226-104: Population growth and land resources priority guidelines.</b>			
<b>(a) Priority guidelines to effect desired statewide growth and distribution:</b>			
(1) Encourage planning and resource management to insure that population growth rates throughout the State are consistent with available and planned resource capacities and reflect the needs and desires of Hawaii's people.			✓
(2) Manage a growth rate for Hawaii's economy that will parallel future employment needs for Hawaii's people.			✓
(3) Ensure that adequate support services and facilities are provided to accommodate the desired distribution of future growth throughout the State.	✓		
(4) Encourage major state and federal investments and services to promote economic development and private investment to the neighbor islands, as appropriate.			✓
(5) Explore the possibility of making available urban land, low-interest loans, and housing subsidies to encourage the provision of housing to support selective economic and population growth on the neighbor islands.			✓
(6) Seek federal funds and other funding sources outside the State for research, program development, and training to provide future employment opportunities on the neighbor islands.			✓
(7) Support the development of high technology parks on the neighbor islands.			✓
<b>(b) Priority guidelines for regional growth distribution and land resource utilization:</b>			
(1) Encourage urban growth primarily to existing urban areas where adequate public facilities are already available or can be provided with reasonable public expenditures, and away from areas where other important benefits are present, such as protection of important agricultural land or preservation of lifestyles.			✓
(2) Make available marginal or nonessential agricultural lands for appropriate urban uses while maintaining agricultural lands of importance in the agricultural district.			✓
(3) Restrict development when drafting of water would result in exceeding the sustainable yield or in significantly diminishing the recharge capacity of any groundwater area.			✓
(4) Encourage restriction of new urban development in areas where water is insufficient from any source for both agricultural and domestic use.			✓
(5) In order to preserve green belts, give priority to state capital-improvement funds which encourage location of urban development within existing urban areas except where compelling public interest dictates development of a noncontiguous new urban core.			✓
(6) Seek participation from the private sector for the cost of building infrastructure and utilities, and maintaining open spaces.			✓
(7) Pursue rehabilitation of appropriate urban areas.			✓
(8) Support the redevelopment of Kakaako into a viable residential, industrial, and commercial community.			✓
(9) Direct future urban development away from critical environmental areas or impose mitigating measures so that negative impacts on the environment would be minimized.			✓



HAWAII STATE PLAN, CHAPTER 226, HRS – PART III. PRIORITY GUIDELINES	S	N/S	N/A
(10) Identify critical environmental areas in Hawaii to include but not be limited to the following: watershed and recharge areas; wildlife habitats (on land and in the ocean); areas with endangered species of plants and wildlife; natural streams and water bodies; scenic and recreational shoreline resources; open space and natural areas; historic and cultural sites; areas particularly sensitive to reduction in water and air quality; and scenic resources.			✓
(11) Identify all areas where priority should be given to preserving rural character and lifestyle.			✓
(12) Utilize Hawaii's limited land resources wisely, providing adequate land to accommodate projected population and economic growth needs while ensuring the protection of the environment and the availability of the shoreline, conservation lands, and other limited resources for future generations.			✓
(13) Protect and enhance Hawaii's shoreline, open spaces, and scenic resources.			✓
<b>Analysis: The proposed action provides wastewater treatment capacity to accommodate future growth and support industrial-related pursuits at the Pulehunui Industrial Park.</b>			
<b>Chapter 226-105: Crime and criminal justice.</b>			
<b>Priority guidelines in the area of crime and criminal justice:</b>			
(1) Support law enforcement activities and other criminal justice efforts that are directed to provide a safer environment.			✓
(2) Target state and local resources on efforts to reduce the incidence of violent crime and on programs relating to the apprehension and prosecution of repeat offenders.			✓
(3) Support community and neighborhood program initiatives that enable residents to assist law enforcement agencies in preventing criminal activities.			✓
(4) Reduce overcrowding or substandard conditions in correctional facilities through a comprehensive approach among all criminal justice agencies which may include sentencing law revisions and use of alternative sanctions other than incarceration for persons who pose no danger to their community.			✓
(5) Provide a range of appropriate sanctions for juvenile offenders, including community-based programs and other alternative sanctions.			✓
(6) Increase public and private efforts to assist witnesses and victims of crimes and to minimize the costs of victimization.			✓
<b>Analysis: Not Applicable</b>			
<b>Chapter 226-106: Affordable housing.</b>			
<b>Priority guidelines for the provision of affordable housing:</b>			
(1) Seek to use marginal or nonessential agricultural land and public land to meet housing needs of low- and moderate-income and gap-group households.			✓
(2) Encourage the use of alternative construction and development methods as a means of reducing production costs.			✓
(3) Improve information and analysis relative to land availability and suitability for housing.			✓
(4) Create incentives for development which would increase home ownership and rental opportunities for Hawaii's low- and moderate-income households, gap-group households, and residents with special needs.			✓

HAWAII STATE PLAN, CHAPTER 226, HRS – PART III. PRIORITY GUIDELINES	S	N/S	N/A
(5) Encourage continued support for government or private housing programs that provide low interest mortgages to Hawaii's people for the purchase of initial owner-occupied housing.			✓
(6) Encourage public and private sector cooperation in the development of rental housing alternatives.			✓
(7) Encourage improved coordination between various agencies and levels of government to deal with housing policies and regulations.			✓
(8) Give higher priority to the provision of quality housing that is affordable for Hawaii's residents and less priority to development of housing intended primarily for individuals outside of Hawaii.			✓
<b>Analysis: Not Applicable</b>			
<b>Chapter 226-107: Quality education.</b>			
<b>Priority guidelines to promote quality education:</b>			
(1) Pursue effective programs which reflect the varied district, school, and student needs to strengthen basic skills achievement;			✓
(2) Continue emphasis on general education "core" requirements to provide common background to students and essential support to other university programs;			✓
(3) Initiate efforts to improve the quality of education by improving the capabilities of the education work force;			✓
(4) Promote increased opportunities for greater autonomy and flexibility of educational institutions in their decision making responsibilities;			✓
(5) Increase and improve the use of information technology in education by the availability of telecommunications equipment for:			✓
(A) The electronic exchange of information;			✓
(B) Statewide electronic mail; and			✓
(C) Access to the Internet.			✓
(6) Encourage programs that increase the public's awareness and understanding of the impact of information technologies on our lives;			✓
(7) Pursue the establishment of Hawaii's public and private universities and colleges as research and training centers of the Pacific;			✓
(8) Develop resources and programs for early childhood education;			✓
(9) Explore alternatives for funding and delivery of educational services to improve the overall quality of education; and			✓
(10) Strengthen and expand educational programs and services for students with special needs.			✓
<b>Analysis: Not Applicable</b>			
<b>CHAPTER 226-108: Sustainability</b>			
<b>Priority guidelines and principles to promote sustainability shall include:</b>			
(1) Encouraging balanced economic, social, community, and environmental priorities;			✓
(2) Encouraging planning that respects and promotes living within the natural resources and limits of the State;			✓
(3) Promoting a diversified and dynamic economy;			✓
(4) Encouraging respect for the host culture;			✓
(5) Promoting decisions based on meeting the needs of the present without compromising the needs of future generations;			✓
(6) Considering the principles of the ahupuaa system; and			✓

HAWAII STATE PLAN, CHAPTER 226, HRS – PART III. PRIORITY GUIDELINES	S	N/S	N/A
(7) Emphasizing that everyone, including individuals, families, communities, businesses, and government, has the responsibility for achieving a sustainable Hawaii.			✓
<b>Analysis: Not Applicable</b>			
<b>CHAPTER 226-109: Climate change adaptation</b>			
<b>Priority guidelines and principles to promote climate change adaptation shall include:</b>			
(1) Ensure that Hawaii's people are educated, informed, and aware of the impacts climate change may have on their communities;			✓
(2) Encourage community stewardship groups and local stakeholders to participate in planning and implementation of climate change policies;			✓
(3) Invest in continued monitoring and research of Hawaii's climate and the impacts of climate change on the State;			✓
(4) Consider native Hawaiian traditional knowledge and practices in planning for the impacts of climate change;			✓
(5) Encourage the preservation and restoration of natural landscape features, such as coral reefs, beaches and dunes, forests, streams, floodplains, and wetlands, that have the inherent capacity to avoid, minimize, or mitigate the impacts of climate change;			✓
(6) Explore adaptation strategies that moderate harm or exploit beneficial opportunities in response to actual or expected climate change impacts to the natural and built environments;			✓
(7) Promote sector resilience in areas such as water, roads, airports, and public health, by encouraging the identification of climate change threats, assessment of potential consequences, and evaluation of adaptation options;			✓
(8) Foster cross-jurisdictional collaboration between county, state, and federal agencies and partnerships between government and private entities and other nongovernmental entities, including nonprofit entities;			✓
(9) Use management and implementation approaches that encourage the continual collection, evaluation, and integration of new information and strategies into new and existing practices, policies, and plans; and			✓
(10) Encourage planning and management of the natural and built environments that effectively integrate climate change policy.			✓
<b>Analysis: Not Applicable</b>			

## **B. STATE FUNCTIONAL PLANS**

A key element of the Statewide Planning System is the Functional Plans which set forth the policies, statewide guidelines, and priorities within a specific field of activity. There are 13 Functional Plans which have been developed by the State agency primarily responsible for a given functional area. Together with the County General Plans, the State Functional Plans establish more specific strategies for implementation. In particular, State Functional Plans provide for the following:

- Identify major Statewide priority concerns
- Define current strategies for each functional area
- Identify major relationships among functional areas

- Provide direction and strategies for departmental policies, programs, and priorities
- Provide a guide for the allocation of resources
- Coordinate State and County roles and responsibilities in the implementation of the Hawaii State Plan

As mentioned above, thirteen (13) Functional Plans have been prepared by State agencies. The proposed project has been evaluated with respect to the Agriculture State Function Plan, adopted in 1991. One of the objectives of the Agriculture Functional Plan is *“achievement of productive agricultural use of lands most suitable and needed for agriculture.”* Specifically, it is a policy of the Functional Plan to *“conserve and protect important agricultural lands in accordance with the Hawai‘i State Constitution”* (State of Hawai‘i, Department of Agriculture, 1991). The proposed project is not located on lands designated as Important Agricultural Lands (IAL). The proposed use is within the Pulehunui Industrial Park, which has been established for non-agricultural uses and will provide a benefit for the Industrial Park users. As such, it aligns with the theme of balanced growth and does not conflict with the objectives and policies of the Agriculture State Functional Plan. The proposed project has also been evaluated with respect to the Energy State Functional Plan, adopted in 1991. By utilizing solar energy, the proposed project supports the objective of the Energy Functional Plan to *“displace oil and fossil fuels through alternate and renewable energy sources”*.

### **C. STATE LAND USE DISTRICTS**

Chapter 205, Hawai‘i Revised Statutes (HRS), relating to the Land Use Commission (LUC), establishes four (4) major land use districts in which all lands in the state are placed. These districts are designated as “Urban”, “Rural”, “Agricultural”, and “Conservation”. Per LUC Docket No. A13-797, approved on November 22, 2013, the proposed project is located within the State Land Use “Urban” district. Utilities, including wastewater treatment plants, are permitted uses in the State “Urban” district.

### **D. MAUI COUNTY GENERAL PLAN**

As indicated by the Maui County Charter, the purpose of the general plan shall be to:

*... indicate desired population and physical development patterns for each island and region within the county; shall address the unique problems and needs of each island and region; shall explain opportunities and the social, economic, and environmental consequences related to potential developments; and shall set forth the desired sequence, patterns and characteristics of future developments. The general plan shall identify objectives to be achieved, and priorities, policies, and implementing actions to be pursued with respect to population density; land use maps, land use*

*regulations, transportation systems, public and community facility locations, water and sewage systems, visitor destinations, urban design, and other matters related to development.*

Chapter 2.80B of the Maui County Code, relating to the General Plan and Community Plans, implements the foregoing Charter provision through enabling legislation which calls for a Countywide Policy Plan and a MIP. The Countywide Policy Plan was adopted as Ordinance No. 3732 on March 24, 2010, while the MIP, which delineates areas for future urban and rural growth as part of a Directed Growth Strategy, was adopted as Ordinance No. 4004 on December 28, 2012.

The following sections identify pertinent objectives, policies, implementing actions and related provisions set forth in the Countywide Policy Plan and the MIP.

**1. Countywide Policy Plan**

The Countywide Policy Plan was adopted in March 2010 and is a comprehensive policy document for the islands of Maui County to the year 2030. The plan replaces the General Plan of the County of Maui 1990 Update and provides the policy framework for the development of the forthcoming Maui Island Plan as well as for updating the nine detailed Community Plans.

The Countywide Policy Plan provides broad goals, objectives, policies and implementing actions that portray the desired direction of the County’s future. Goals are intended to describe a desirable condition of the County by the year 2030 and are intentionally general. Objectives tend to be more specific and may be regarded as milestones to achieve the larger goals. Policies are not intended as regulations, but instead provide a general guideline for County decision makers, departments, and collaborating organizations toward the attainment of goals and objectives. Implementing actions are specific tasks, procedures, programs, or techniques that carry out policy.

Discussion of how the proposed project conforms to the relevant goals, objectives, policies, and implementing actions of the Countywide Policy Plan is provided below.

<b>COUNTYWIDE POLICY PLAN (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)</b>	<b>S</b>	<b>N/S</b>	<b>N/A</b>
<b>A. PROTECT THE NATURAL ENVIRONMENT</b>			
<b>Goal:</b> Maui County’s natural environment and distinctive open spaces will be preserved, managed, and cared for in perpetuity.	✓		
<b>Objective:</b>			
(1) Improve the opportunity to experience the natural beauty and native biodiversity of the islands for present and future generations.			✓

COUNTYWIDE POLICY PLAN (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	S	N/S	N/A
<b>Policies:</b>			
(a) Perpetuate native Hawaiian biodiversity by preventing the introduction of invasive species, containing or eliminating existing noxious pests, and protecting critical habitat areas.			✓
(b) Preserve and reestablish indigenous and endemic species' habitats and their connectivity.			✓
(c) Restore and protect forests, wetlands, watersheds, and stream flows, and guard against wildfires, flooding, and erosion.			✓
(d) Protect baseline stream flows for perennial streams, and support policies that ensure adequate stream flow to support Native Hawaiian aquatic species, traditional kalo cultivation, and self-sustaining ahupua'a.			✓
(e) Protect undeveloped beaches, dunes, and coastal ecosystems, and restore natural shoreline processes.			✓
(f) Protect the natural state and integrity of unique terrain, valued natural environments, and geological features.	✓		
(g) Preserve and provide ongoing care for important scenic vistas, view planes, landscapes, and open-space resources.	✓		
(h) Expand coordination with the State and nonprofit agencies and their volunteers to reduce invasive species, replant indigenous species, and identify critical habitat.			✓
<b>Implementing Actions:</b>			
(a) Develop island-wide networks of greenways, watercourses, and habitat corridors.			✓
<b>Analysis:</b> By locating the proposed use in a subdivision that has been dedicated to heavy industrial use, other unique or scenic areas may remain unaffected by the development.			
<b>Objective:</b>			
(2) Improve the quality of environmentally sensitive, locally valued natural resources and native ecology of each island.	✓		
<b>Policies:</b>			
(a) Protect and restore nearshore reef environments and water quality.	✓		
(b) Protect marine resources and valued wildlife.	✓		
(c) Improve the connection between urban environments and the natural landscape, and incorporate natural features of the land into urban design.			✓
(d) Utilize land-conservation tools to ensure the permanence of valued open spaces.			✓
(e) Mitigate the negative effects of upland uses on coastal wetlands, marine life, and coral reefs.			✓
(f) Strengthen coastal-zone management, re-naturalization of shorelines, where possible, and filtration or treatment of urban and agricultural runoff.			✓
(g) Regulate the use and maintenance of stormwater-treatment systems that incorporate the use of native vegetation and mimic natural systems.			✓
(h) Advocate for stronger regulation of fishing, boating, cruise ship, and ecotourism activities.			✓
(i) Restore watersheds and aquifer-recharge areas to healthy and productive status, and increase public knowledge about the importance of watershed stewardship, water conservation, and groundwater protection.			✓
<b>Implementing Actions:</b>			
(a) Develop regulations to minimize runoff of pollutants into nearshore waters and reduce nonpoint and point source pollution.			✓

COUNTYWIDE POLICY PLAN (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	S	N/S	N/A
<b>Analysis:</b> The proposed project involves development of inland wastewater processing and treatment improvements which will reduce the volume of septage being transferred and treated near the shoreline. Furthermore, it will reduce the use of injection wells for wastewater effluent disposal.			
<b>Objective:</b>			
(3) Improve the stewardship of the natural environment.			✓
<b>Policies:</b>			
(a) Preserve and protect natural resources with significant scenic, economic, cultural, environmental, or recreational value.			✓
(b) Improve communication, coordination, and collaboration among government agencies, nonprofit organizations, communities, individuals, and land owners that work for the protection of the natural environment.			✓
(c) Evaluate development to assess potential short-term and long-term impacts on land, air, aquatic, and marine environments.			✓
(d) Improve efforts to mitigate and plan for the impact of natural disasters, human influenced emergencies, and global warming.			✓
(e) Regulate access to sensitive ecological sites and landscapes.			✓
(f) Reduce air, noise, light, land, and water pollution, and reduce Maui County's contribution to global climate change.			✓
(g) Plan and prepare for and educate visitors and residents about the possible effects of global warming.			✓
(h) Provide public access to beaches and shorelines for recreational and cultural purposes where appropriate.			✓
(i) Educate the construction and landscape industries and property owners about the use of best management practices to prevent erosion and nonpoint source pollution.			✓
(j) Support the acquisition of resources with scenic, environmental, and recreational value, and encumber their use.			✓
(k) Improve enforcement activities relating to the natural environment.			✓
(l) For each shoreline community, identify and prioritize beach-conservation objectives, and develop action plans for their implementation.			✓
<b>Implementing Actions:</b>			
(a) Document, record, and monitor existing conditions, populations, and locations of flora and fauna communities.			✓
(b) Implement Federal and State policies that require a reduction of greenhouse-gas emissions.			✓
(c) Establish a baseline inventory of available natural resources and their respective carrying capacities.			✓
<b>Analysis: Not Applicable</b>			
<b>Objective:</b>			
(4) Educate residents and visitors about responsible stewardship practices and the interconnectedness of the natural environment and people.			✓
<b>Policies:</b>			
(a) Expand education about native flora, fauna, and ecosystems.			✓
(b) Align priorities to recognize that the health of the natural environment and the health of people are inextricably linked.			✓
(c) Promote programs and incentives that decrease greenhouse-gas emissions and improve environmental stewardship.			✓
<b>Analysis: Not Applicable</b>			

COUNTYWIDE POLICY PLAN (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	S	N/S	N/A
<b>B. PRESERVE LOCAL CULTURES AND TRADITIONS</b>			
<b>Goal:</b> Maui County will foster a spirit of pono and protect, perpetuate, and reinvigorate its residents' multi-cultural values and traditions to ensure that current and future generations will enjoy the benefits of their rich island			✓
<b>Objective:</b>			
(1) Perpetuate the Hawaiian culture as a vital force in the lives of residents.			✓
<b>Policies:</b>			
(a) Protect and preserve access to mountain, ocean, and island resources for traditional Hawaiian cultural practices.			✓
(b) Prohibit inappropriate development of cultural lands and sites that are important for traditional Hawaiian cultural practices, and establish mandates for the special protection of these lands in perpetuity.			✓
(c) Promote the use of ahupua'a and moku management practices.			✓
(d) Encourage the use of traditional Hawaiian architecture and craftsmanship.			✓
(e) Promote the use of the Hawaiian language.			✓
(f) Recognize and preserve the unique natural and cultural characteristics of each ahupua'a or district.			✓
(g) Encourage schools to promote broader incorporation of Hawaiian and other local cultures' history and values lessons into curriculum.			✓
(h) Ensure the protection of Native Hawaiian rights.			✓
(i) Promote, encourage, and require the correct use of traditional place names, particularly in government documents, signage, and the tourism industry.			✓
<b>Implementing Actions:</b>			
(a) Establish alternative land use and overlay zoning designations that recognize and preserve the unique natural and cultural characteristics of each ahupua'a or district.			✓
(b) Develop requirements for all County applicants to perpetuate and use proper traditional place names in all applications submitted.			✓
<b>Analysis: Not Applicable</b>			
<b>Objective:</b>			
(2) Emphasize respect for our island lifestyle and our unique local cultures, family, and natural environment.			✓
<b>Policies:</b>			
(a) Acknowledge the Hawaiian culture as the host culture, and foster respect and humility among residents and visitors toward the Hawaiian people and their practices.			✓
(b) Perpetuate a respect for diversity, and recognize the historic blending of cultures and ethnicities.			✓
(c) Encourage the perpetuation of each culture's unique cuisine, attire, dance, music, and folklore, and other unique island traditions and recreational activities.			✓
(d) Recognize the interconnectedness between the natural environment and the cultural heritage of the islands.			✓
(e) Protect and prioritize funding for recreational activities that support local cultural practices, such as surfing, fishing, and outrigger-canoe paddling.			✓
<b>Analysis: Not Applicable</b>			
<b>Objective:</b>			
(3) Preserve for present and future generations the opportunity to know and experience the arts, culture, and history of Maui County.			✓



<b>COUNTYWIDE POLICY PLAN</b> (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	<b>S</b>	<b>N/S</b>	<b>N/A</b>
<b>Policies:</b>			
(a) Foster teaching opportunities for cultural practitioners to share their knowledge and skills.			✓
(b) Support the development of cultural centers.			✓
(c) Broaden opportunities for public art and the display of local artwork.			✓
(d) Foster the Aloha Spirit by celebrating the Hawaiian host culture and other Maui County cultures through support of cultural-education programs, festivals, celebrations, and ceremonies.			✓
(e) Support the perpetuation of Hawaiian arts and culture.			✓
(f) Support programs and activities that record the oral and pictorial history of residents.			✓
(g) Support the development of repositories for culture, history, genealogy, oral history, film, and interactive learning.			✓
<b>Implementing Actions:</b>			
(a) Establish incentives for the display of public art.			✓
(b) Establish centers and programs of excellence for the perpetuation of Hawaiian arts and culture.			✓
<b>Analysis: Not Applicable</b>			
<b>Objective:</b>			
(4) Preserve and restore significant historic architecture, structures, cultural sites, cultural districts, and cultural landscapes.			✓
<b>Policies:</b>			
(a) Support the development of island-wide historic, archaeological, and cultural resources inventories.			✓
(b) Promote the rehabilitation and adaptive reuse of historic sites, buildings, and structures to perpetuate a traditional sense of place.			✓
(c) Identify a sustainable rate of use and set forth specific policies to protect cultural resources.			✓
(d) Protect and preserve lands that are culturally or historically significant.			✓
(e) Support programs that protect, record, restore, maintain, provide education about, and interpret cultural districts, landscapes, sites, and artifacts in both natural and museum settings.			✓
(f) Perpetuate the authentic character and historic integrity of rural communities and small towns.			✓
(g) Seek solutions that honor the traditions and practices of the host culture while recognizing the needs of the community.			✓
(h) Support the development of an Archaeological District Ordinance.			✓
(i) Protect summits, slopes, and ridgelines from inappropriate development.			✓
(j) Support the registering of important historic sites on the State and Federal historic registers.			✓
(k) Provide opportunities for public involvement with restoration and enhancement of all types of cultural resources.			✓
(l) Foster partnerships to identify and preserve or revitalize historic and cultural sites.			✓
<b>Implementing Actions:</b>			
(a) Identify, develop, map, and maintain an inventory of locally significant natural, cultural, and historical resources for protection.			✓
(b) Prepare, continually update, and implement a cultural-management plan for cultural sites, districts, and landscapes, where appropriate.			✓

COUNTYWIDE POLICY PLAN (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	S	N/S	N/A
(c) Enact an Archaeological District Ordinance.			✓
(d) Nominate important historic sites to the State and Federal historic registers.			✓
<b>Analysis: Not Applicable</b>			
<b>C. IMPROVE EDUCATION</b>			
<b>Goal:</b> Residents will have access to lifelong formal and informal educational options enabling them to realize their ambitions.			✓
<b>Objective:</b>			
(1) Encourage the State to attract and retain school administrators and educators of the highest quality.			✓
<b>Policies:</b>			
(a) Encourage the State to provide teachers with nationally competitive pay and benefit packages.			✓
(b) Encourage the State to ensure teachers will have the teaching tools and support staff needed to provide students with an excellent education.			✓
(c) Explore Maui County district- and school-based decision making in public education.			✓
<b>Analysis: Not Applicable</b>			
<b>Objective:</b>			
(2) Provide nurturing learning environments that build skills for the 21st century.			✓
<b>Policies:</b>			
(a) Expand professional-development opportunities in disciplines that support the economic-development goals of Maui County.			✓
(b) Plan for demographic, social, and technological changes in a timely manner.			✓
(c) Encourage collaborative partnerships to improve conditions of learning environments.			✓
(d) Promote development of neighborhood schools and educational centers.			✓
(e) Integrate schools, community parks, and playgrounds, and expand each community's use of these facilities.			✓
(f) Support coordination between land use and school-facility planning agencies.			✓
(g) Encourage the upgrade and ongoing maintenance of public-school facilities.			✓
(h) Encourage the State Department of Education to seek reliable, innovative, and alternative methods to support a level of per-pupil funding that places Hawai'i among the top tier of states nationally for its financial support of public schools.			✓
(i) Encourage the State to promote healthier, more productive learning environments, including by providing healthy meals, more physical activity, natural lighting, and passive cooling.			✓
(j) Encourage the State to support the development of benchmarks to measure the success of Hawai'i's public-education system and clarify lines of accountability.			✓
(k) Design school and park facilities in proximity to residential areas.			✓
(l) Support technology- and natural-environment-based learning.			✓
(m) Encourage the State to support lower student-teacher ratios in public schools.			✓
(n) Encourage alternative learning and educational opportunities.			✓
<b>Implementing Actions:</b>			
(a) Develop safe walking and bicycling programs for school children.			✓
<b>Analysis: Not Applicable</b>			

<b>COUNTYWIDE POLICY PLAN</b> (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)			S	N/S	N/A
<b>Objective:</b>					
(3) Provide all residents with educational opportunities that can help them better understand themselves and their surroundings and allow them to realize their ambitions.					✓
<b>Policies:</b>					
(a) Encourage the State to improve Maui Community College as a comprehensive community college that will serve each community.					✓
(b) Broaden the use of technology and telecommunications to improve educational opportunities throughout the County.					✓
(c) Attract graduate-level research programs and institutions.					✓
(d) Promote the teaching of traditional practices, including aquaculture; subsistence agriculture; Pacific Island, Asian, and other forms of alternative health practices; and indigenous Hawaiian architecture.					✓
(e) Integrate cultural and environmental values in education, including self-sufficiency and sustainability.					✓
(f) Foster a partnership and ongoing dialogue between business organizations, formal educational institutions, and vocational training centers to tailor learning and mentoring programs to County needs.					✓
(g) Ensure teaching of the arts to all ages.					✓
(h) Expand and develop vocational learning opportunities by establishing trade schools.					✓
(i) Encourage the State to integrate financial and economic literacy in elementary, secondary, and higher-education levels.					✓
<b>Implementing Actions:</b>					
(a) Encourage the State to establish a four-year university, and support the development of other higher-education institutions to enable residents to obtain bachelor degrees and postgraduate degrees in Maui County.					✓
<b>Analysis: Not Applicable</b>					
<b>Objective:</b>					
(4) Maximize community-based educational opportunities.					✓
<b>Policies:</b>					
(a) Encourage the State and others to expand pre-school, after-school, and homebased (parent-child) learning.					✓
(b) Support public-private partnerships to develop youth-internship, -apprenticeship, and -mentoring programs.					✓
(c) Support the development of a wide range of informal educational and cultural programs for all residents.					✓
(d) Improve partnerships that utilize the skills and talents at Hawai'i's colleges and universities to benefit the County.					✓
(e) Support career-development and job-recruitment programs and centers.					✓
(f) Attract learning institutions and specialty schools to diversify and enhance educational opportunities.					✓
(g) Expand education of important life skills for the general public.					✓
(h) Support community facilities such as museums, libraries, nature centers, and open spaces that provide interactive-learning opportunities for all ages.					✓
<b>Analysis: Not Applicable</b>					
<b>D. STRENGTHEN SOCIAL AND HEALTHCARE SERVICES</b>					
<b>Goal:</b> Health and social services in Maui County will fully and comprehensively serve all segments of the population.					✓

<b>COUNTYWIDE POLICY PLAN</b> (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)		S	N/S	N/A
<b>Objective:</b>				
(1) In cooperation with the Federal and State governments and nonprofit agencies, broaden access to social and healthcare services and expand options to improve the overall wellness of the people of Maui County.				✓
<b>Policies:</b>				
(a) Work with other levels of government and the nonprofit sector to expand services to address hunger, homelessness, and poverty.				✓
(b) Support the improvement of opportunities for disadvantaged youth, encourage the tradition of hanai relatives, and support expanded opportunities for foster care.				✓
(c) Support expanded long-term-care options, both in institutions and at home, for patients requiring ongoing assistance and medical attention.				✓
(d) Encourage the expansion and improvement of local hospitals, facilitate the establishment of new healthcare facilities, and facilitate prompt and high-quality emergency- and urgent-care services for all.				✓
(e) Support broadened access to affordable health insurance and health care, and recognize the unique economic challenges posed to families when healthcare services are provided off-island.				✓
(f) Encourage equal access to social and healthcare services through both technological and traditional means.				✓
<b>Analysis: Not Applicable</b>				
<b>Objective:</b>				
(2) Encourage the Federal and State governments and the private sector to improve the quality and delivery of social and healthcare services.				✓
<b>Policies:</b>				
(a) Strengthen partnerships with government, nonprofit, and private organizations to provide funding and to improve counseling and other assistance to address substance abuse, domestic violence, and other pressing social challenges.				✓
(b) Encourage the State to improve the quality of medical personnel, facilities, services, and equipment.				✓
(c) Encourage investment to improve the recruitment of medical professionals and the quality of medical facilities and equipment throughout Maui County.				✓
(d) Promote the development of continuum-of-care facilities that provide assisted living, hospice, home-care, and skilled-nursing options allowing the individual to be cared for in a manner congruent with his or her needs and desires.				✓
(e) Support improved social, healthcare, and governmental services for special needs populations.				✓
(f) Plan for the needs of an aging population and the resulting impacts on social services, housing, and healthcare delivery.				✓
(g) Improve coordination among the police, the courts, and the public in the administration of social and healthcare services.				✓
(h) Support programs that address needs of veterans.				✓
(i) Support programs that address the needs of immigrants.				✓
<b>Implementing Actions:</b>				
(a) Invest in programs designed to improve the general welfare and quality of life of Native Hawaiians.				✓
(b) Assist and facilitate the State Department of Public Safety and others in efforts to strengthen programs and facilities that will improve the mental and social health of incarcerated people and assist in prison inmates' successful transition back into Maui County communities.				✓

<b>COUNTYWIDE POLICY PLAN</b> (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)			
	S	N/S	N/A
(c) Develop and maintain a comprehensive index that will measure the health and wellness needs of families.			✓
(d) Provide heliports countywide for emergency health and safety purposes.			✓
<b>Analysis: Not Applicable</b>			
<b>Objective:</b>			
(3) Strengthen public-awareness programs related to healthy lifestyles and social and medical services.			✓
<b>Policies:</b>			
(a) Expand public awareness about personal safety and crime prevention.			✓
(b) Encourage residents to pursue education and training for careers in the healthcare, social services, and community-development fields.			✓
(c) Expand public awareness and promote programs to achieve healthy eating habits and drug-free lifestyles.			✓
<b>Analysis: Not Applicable</b>			
<b>E. EXPAND HOUSING OPPORTUNITIES FOR RESIDENTS</b>			
<b>Goal:</b> Quality, island-appropriate housing will be available to all residents.			✓
<b>Objective:</b>			
(1) Reduce the affordable housing deficit for residents.			✓
<b>Policies:</b>			
(a) Ensure that an adequate and permanent supply of affordable housing, both new and existing units, is made available for purchase or rental to our resident and/or workforce population, with special emphasis on providing housing for low- to moderate-income families, and ensure that all affordable housing remains affordable in perpetuity.			✓
(b) Seek innovative ways to lower housing costs without compromising the quality of our island lifestyle.			✓
(c) Seek innovative methods to secure land for the development of low- and moderate- income housing.			✓
(d) Provide the homeless population with emergency and transitional shelter and other supportive programs.			✓
(e) Provide for a range of senior-citizen and special needs housing choices on each island that affordably facilitates a continuum of care and services.			✓
(f) Support the Department of Hawaiian Home Lands' development of homestead lands.			✓
(g) Manage property-tax burdens to protect affordable resident homeownership.			✓
(h) Explore taxation mechanisms to increase and maintain access to affordable housing.			✓
(i) Improve awareness regarding available affordable homeowner's insurance.			✓
(j) Redevelop commercial areas with a mixture of affordable residential and business uses, where appropriate.			✓
(k) Ensure residents are given priority to obtain affordable housing units developed in their communities, consistent with all applicable regulations.			✓
(l) Establish pricing for affordable housing that is more reflective of Maui County's workforce than the United States Housing and Urban Development's median-income estimates for Maui County.			✓
(m) Develop neighborhoods with a mixture of accessible and integrated community facilities and services.			✓

<b>COUNTYWIDE POLICY PLAN</b> (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	<b>S</b>	<b>N/S</b>	<b>N/A</b>
(n) Provide alternative regulatory frameworks to facilitate the use of Kuleana lands by the descendants of Native Hawaiians who received those lands pursuant to the Kuleana Act of 1850.			✓
(o) Work with lending institutions to expand housing options and safeguard the financial security of homeowners.			✓
(p) Promote the use of the community land trust model and other land-lease and land- financing options.			✓
(q) Support the opportunity to age in place by providing accessible and appropriately designed residential units.			✓
<b>Analysis: Not Applicable</b>			
<b>Objective:</b>			
(2) Increase the mix of housing types in towns and neighborhoods to promote sustainable land use planning, expand consumer choice, and protect the County's rural and small town character.			✓
<b>Policies:</b>			
(a) Seek innovative ways to develop 'ohana cottages and accessory-dwelling units as affordable housing.			✓
(b) Design neighborhoods to foster interaction among neighbors.			✓
(c) Encourage a mix of social, economic, and age groups within neighborhoods.			✓
(d) Promote infill housing in urban areas at scales that capitalize on existing infrastructure, lower development costs, and are consistent with existing or desired patterns of development.			✓
(e) Encourage the building industry to use environmentally sustainable materials, technologies, and site planning.			✓
(f) Develop workforce housing in proximity to job centers and transit facilities.			✓
(g) Provide incentives to developers and owners who incorporate green building practices and energy-efficient technologies into their housing developments.			✓
<b>Implementing Actions:</b>			
(a) Revise laws to support neighborhood designs that incorporate a mix of housing types that are appropriate for island living.			✓
<b>Analysis: Not Applicable</b>			
<b>Objective:</b>			
(3) Increase and maintain the affordable housing inventory.			✓
<b>Policies:</b>			
(a) Recognize housing as a basic human need, and work to fulfill that need.			✓
(b) Prioritize available infrastructure capacity for affordable housing.			✓
(c) Improve communication, collaboration, and coordination among housing providers and social-service organizations.			✓
(d) Study future projected housing needs, monitor economic cycles, and prepare for future conditions on each island.			✓
(e) Develop public-private and nonprofit partnerships that facilitate the construction of quality affordable housing.			✓
(f) Streamline the review process for high-quality, affordable housing developments that implement the goals, objectives, and policies of the General Plan.			✓
(g) Minimize the intrusion of housing on prime, productive, and potentially productive agricultural lands and regionally valuable agricultural lands.			✓

<b>COUNTYWIDE POLICY PLAN</b> (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	<b>S</b>	<b>N/S</b>	<b>N/A</b>
(h) Encourage long-term residential use of existing and future housing to meet residential needs.			✓
<b>Implementing Actions:</b>			
(a) Develop policies to even out the peaks and valleys in Maui County's construction-demand cycles.			✓
<b>Analysis: Not Applicable</b>			
<b>Objective:</b>			
(4) Expand access to education related to housing options, homeownership, financing, and residential construction.			✓
<b>Policies:</b>			
(a) Broaden access to information about County, State, and Federal programs that provide financial assistance to renters and home buyers.			✓
(b) Expand access to information about opportunities for homeownership and self-help housing.			✓
(c) Educate residents about making housing choices that support their individual needs, the needs of their communities, and the health of the islands' natural systems.			✓
(d) Improve home buyers' education on all aspects of homeownership.			✓
<b>Analysis: Not Applicable</b>			
<b>F. STRENGTHEN THE LOCAL ECONOMY</b>			
<b>Goal:</b> Maui County's economy will be diverse, sustainable, and supportive of community values.	✓		
<b>Objective:</b>			
(1) Promote an economic climate that will encourage diversification of the County's economic base and a sustainable rate of economic growth.	✓		
<b>Policies:</b>			
(a) Support economic decisions that create long-term benefits.			✓
(b) Promote lifelong education, career development, and technical training for existing and emerging industries.			✓
(c) Invest in infrastructure, facilities, and programs that foster economic diversification.	✓		
(d) Support and promote locally produced products and locally owned operations and businesses that benefit local communities and meet local demand.	✓		
(e) Support programs that assist industries to retain and attract more local labor and facilitate the creation of jobs that offer a living wage.			✓
(f) Encourage work environments that are safe, rewarding, and fulfilling to employees.			✓
(g) Support home-based businesses that are appropriate for and in character with the community.			✓
(h) Encourage businesses that promote the health and well-being of the residents, produce value-added products, and support community values.			✓
(i) Foster an understanding of the role of all industries in our economy.			✓
(j) Support efforts to improve conditions that foster economic vitality in our historic small towns.			✓
(k) Support and encourage traditional host-culture businesses and indigenous agricultural practices.			✓
(l) Support public and private entities that assist entrepreneurs in establishing locally operated businesses.			✓

COUNTYWIDE POLICY PLAN (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	S	N/S	N/A
<b>Implementing Actions:</b>			
(a) Develop regulations and programs that support opportunities for local merchants, farmers, and small businesses to sell their goods and services directly to the public.			✓
(b) Monitor the carrying capacity of the islands' social, ecological, and infrastructure systems with respect to the economy.			✓
<b>Analysis: The proposed project will support local businesses and enhance the diversified economic base of Maui.</b>			
<b>Objective:</b>			
(2) Diversify and expand sustainable forms of agriculture and aquaculture.			✓
<b>Policies:</b>			
(a) Support programs that position Maui County's agricultural products as premium export products.			✓
(b) Prioritize the use of agricultural land to feed the local population, and promote the use of agricultural lands for sustainable and diversified agricultural activities.			✓
(c) Capitalize on Hawai'i's economic opportunities in the ecologically sensitive aquaculture industries.			✓
(d) Assist farmers to help make Maui County more self-sufficient in food production.			✓
(e) Support ordinances, programs, and policies that keep agricultural land and water available and affordable to farmers.			✓
(f) Support a tax structure that is conducive to the growth of the agricultural economy.			✓
(g) Enhance County efforts to monitor and regulate important agricultural issues.			✓
(h) Support education, research, and facilities that strengthen the agricultural industry.			✓
(i) Maintain the genetic integrity of existing food crops.			✓
(j) Encourage healthy and organic farm practices that contribute to land health and regeneration.			✓
(k) Support cooperatives and other types of nontraditional communal farming and efforts.			✓
(l) Encourage methods of monitoring and controlling genetically modified crops to prevent adverse effects.			✓
(m) Work with the State to ease the permitting process for the revitalization of traditional fish ponds.			✓
<b>Implementing Actions:</b>			
(a) Redirect efforts in the Office of Economic Development to further facilitate the development of the agricultural section and to monitor agricultural legislation and issues.			✓
(b) Publicly identify, with signage and other means, the field locations of all genetically modified crops.			✓
(c) Create agricultural parks in areas distant from genetically modified crops.			✓
<b>Analysis: Not Applicable</b>			
<b>Objective:</b>			
(3) Support a visitor industry that respects the resident culture and the environment.			✓
<b>Policies:</b>			
(a) Promote traditional Hawaiian practices in visitor-related facilities and activities.			✓
(b) Encourage and educate the visitor industry to be sensitive to island lifestyles and cultural values.			✓



<b>COUNTYWIDE POLICY PLAN</b> (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)			S	N/S	N/A
(c) Encourage a spirit of welcome for residents at visitor facilities, such as by offering kama'aina incentives and discount programs.					✓
(d) Support the renovation and enhancement of existing visitor facilities.					✓
(e) Support policies, programs, and a tax structure that redirect the benefits of the visitor industry back into the local community.					✓
(f) Encourage resident ownership of visitor-related businesses and facilities.					✓
(g) Develop partnerships to provide educational and training facilities to residents employed in the visitor industry.					✓
(h) Foster an understanding of local cultures, customs, and etiquette, and emphasize the importance of the Aloha Spirit as a common good for all.					✓
(i) Support the diversification, development, evolution, and integration of the visitor industry in a way that is compatible with the traditional, social, economic, spiritual, and environmental values of island residents					✓
(j) Improve collaboration between the visitor industry and the other sectors of Maui County's economy.					✓
(k) Perpetuate an authentic image of the Hawaiian culture and history and an appropriate recognition of the host culture.					✓
(l) Support the programs and initiatives outlined in the Maui County Tourism Strategic Plan 2006-2015.					✓
(m) Promote water conservation, beach conservation, and open-space conservation in areas providing services for visitors.					✓
(n) Recognize the important contributions that the visitor industry makes to the County's economy, and support a healthy and vibrant visitor industry.					✓
<b>Analysis: Not Applicable</b>					
<b>Objective:</b>					
(4) Expand economic sectors that increase living-wage job choices and are compatible with community values.	✓				
<b>Policies:</b>					
(a) Support emerging industries, including the following: <ul style="list-style-type: none"> <li>• Health and wellness industry;</li> <li>• Sports and recreation industry;</li> <li>• Film and entertainment industry;</li> <li>• Arts and culture industry;</li> <li>• Renewable-energy industry;</li> </ul>	<ul style="list-style-type: none"> <li>• Research and development industry;</li> <li>• High-technology and knowledge-based industries;</li> <li>• Education and training industry;</li> <li>• Ecotourism industry; and</li> <li>• Agritourism industry.</li> </ul>				✓
<b>Analysis: The proposed facilities will be located at the Pulehunui Industrial Park, supporting local industry and employment.</b>					
<b>G. IMPROVE PARKS AND PUBLIC FACILITIES</b>					
<b>Goal:</b> A full range of island-appropriate public facilities and recreational opportunities will be provided to improve the quality of life for residents and visitors.					
					✓
<b>Objective:</b>					
(1) Expand access to recreational opportunities and community facilities to meet the present and future needs of residents of all ages and physical abilities.					✓
<b>Policies:</b>					
(a) Protect, enhance, and expand access to public shoreline and mountain resources.					✓
(b) Expand and enhance the network of parks, multi-use paths, and bikeways.					✓
(c) Assist communities in developing recreational facilities that promote physical fitness.					✓

<b>COUNTYWIDE POLICY PLAN</b> (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	<b>S</b>	<b>N/S</b>	<b>N/A</b>
(d) Expand venue options for recreation and performances that enrich the lifestyles of Maui County's people.			✓
(e) Expand affordable recreational and after-school programs for youth.			✓
(f) Encourage and invest in recreational, social, and leisure activities that bring people together and build community pride.			✓
(g) Promote the development and enhancement of community centers, civic spaces, and gathering places throughout our communities.			✓
(h) Expand affordable access to recreational opportunities that support the local lifestyle.			✓
<b>Implementing Actions:</b>			
(a) Identify and reserve lands for cemeteries, and preserve existing cemeteries on all islands, appropriately accommodating varying cultural and, faith-based traditions.			✓
<b>Analysis: Not Applicable</b>			
<b>Objective:</b>			
(2) Improve the quality and adequacy of community facilities.			✓
<b>Policies:</b>			
(a) Provide an adequate supply of dedicated shelters and facilities for disaster relief.			✓
(b) Provide and maintain community facilities that are appropriately designed to reflect the traditions and customs of local cultures.			✓
(c) Ensure that parks and public facilities are safe and adequately equipped for the needs of all ages and physical abilities to the extent reasonable.			✓
(d) Maintain, enhance, expand, and provide new active and passive recreational facilities in ways that preserve the natural beauty of their locations.			✓
(e) Redesign or retrofit public facilities to adapt to major shifts in environmental or urban conditions to the extent reasonable.			✓
<b>Analysis: Not Applicable</b>			
<b>Objective:</b>			
(3) Enhance the funding, management, and planning of public facilities and park lands.			✓
<b>Policies:</b>			
(a) Identify and encourage the establishment of regulated and environmentally sound campgrounds.			✓
(b) Manage park use and control access to natural resources in order to rest sensitive places and utilize the resources in a sustainable manner.			✓
(c) Provide public-recreational facilities that are clean and well-maintained.			✓
(d) Develop partnerships to ensure proper stewardship of the islands' trails, public lands, and access systems.			✓
(e) Ensure that there is an adequate supply of public restrooms in convenient locations.			✓
<b>Implementing Actions:</b>			
(a) Encourage the State to allow for overnight fishing along the shoreline in accordance with management plans and regulations.			✓
(b) Develop and regularly update functional plans, including those relating to public facilities, parks, and campgrounds.			✓
(c) Develop and adopt local level-of-service standards for public facilities and parks.			✓
(d) Identify, acquire, and develop lands for parks, civic spaces, and public uses.			✓
<b>Analysis: Not Applicable</b>			

COUNTYWIDE POLICY PLAN (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	S	N/S	N/A
<b>H. DIVERSIFY TRANSPORTATION OPTIONS</b>			
<b>Goal:</b> Maui County will have an efficient, economical, and environmentally sensitive means of moving people and goods.			✓
<b>Objective:</b>			
(1) Provide an effective, affordable, and convenient ground-transportation system that is environmentally sustainable.			✓
<b>Policies:</b>			
(a) Execute planning strategies to reduce traffic congestion.			✓
(b) Plan for the efficient relocation of roadways for the public benefit.			✓
(c) Support the use of alternative roadway designs, such as traffic-calming techniques and modern roundabouts.			✓
(d) Increase route and mode options in the ground-transportation network.			✓
(e) Ensure that roadway systems are safe, efficient, and maintained in good condition.			✓
(f) Preserve roadway corridors that have historic, scenic, or unique physical attributes that enhance the character and scenic resources of communities.			✓
(g) Design new roads and roadway improvements to retain and enhance the existing character and scenic resources of the communities through which they pass.			✓
(h) Promote a variety of affordable and convenient transportation services that meet countywide and community needs and expand ridership of transit systems.			✓
(i) Collaborate with transit agencies, government agencies, employers, and operators to provide planning strategies that reduce peak-hour traffic.			✓
(j) Develop and expand an attractive, island-appropriate, and efficient public transportation system.			✓
(k) Provide and encourage the development of specialized transportation options for the young, the elderly, and persons with disabilities.			✓
(l) Evaluate all alternatives to preserve quality of life before widening roads.			✓
(m) Encourage businesses in the promotion of alternative transportation options for resident and visitor use.			✓
(n) Support the development of carbon-emission standards and an incentive program aimed at achieving County carbon-emission goals.			✓
<b>Implementing Actions:</b>			
(a) Create incentives and implement strategies to reduce visitor dependence on rental cars.			✓
(b) Establish efficient public-transit routes between employment centers and primary workforce residential areas.			✓
(c) Create attractive, island-appropriate, conveniently located park-and-ride and ride-share facilities.			✓
<b>Analysis: Not Applicable</b>			
<b>Objective:</b>			
(2) Reduce the reliance on the automobile and fossil fuels by encouraging walking, bicycling, and other energy-efficient and safe alternative modes of transportation.			✓
<b>Policies:</b>			
(a) Make walking and bicycling transportation safe and easy between and within communities.			✓
(b) Require development to be designed with the pedestrian in mind.			✓

<b>COUNTYWIDE POLICY PLAN</b> (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	<b>S</b>	<b>N/S</b>	<b>N/A</b>
(c) Design new and retrofit existing rights-of-way with adequate sidewalks, bicycle lanes, or separated multi-use transit corridors.			✓
(d) Support the development of a countywide network of bikeways, equestrian trails, and pedestrian paths.			✓
(e) Support the reestablishment of traditional trails between communities, to the ocean, and through the mountains for public use.			✓
(f) Encourage educational programs to increase safety for pedestrians and bicyclists.			✓
<b>Implementing Actions:</b>			
(a) Design, build, and modify existing bikeways to improve safety and separation from automobiles.			✓
(b) Increase enforcement to reduce abuse of bicycle and pedestrian lanes by motorized vehicles.			✓
(c) Identify non-motorized transportation options as a priority for new sources of funding.			✓
<b>Analysis: Not Applicable</b>			
<b>Objective:</b>			
(3) Improve opportunities for affordable, efficient, safe, and reliable air transportation.			✓
<b>Policies:</b>			
(a) Discourage private helicopter and fixed-wing landing sites to mitigate environmental and social impacts.			✓
(b) Encourage the use of quieter aircraft and noise-abatement procedures for arrivals and departures.			✓
(c) Encourage the modernization and maintenance of air-transportation facilities for general-aviation activities.			✓
(d) Encourage a viable and competitive atmosphere for air carriers to expand service and ensure sufficient intra-County flights and affordable fares for consumers.			✓
(e) Continue to support secondary airports, and encourage the State to provide them with adequate funding.			✓
(f) During Community Plan updates, explore the use of the smaller airports.			✓
(g) Encourage the State to provide efficient, adequate, and affordable parking and transit connections within and around airports.			✓
<b>Analysis: Not Applicable</b>			
<b>Objective:</b>			
(4) Improve opportunities for affordable, efficient, safe, and reliable ocean transportation.			✓
<b>Policies:</b>			
(a) Support programs and regulations that reduce the disposal of maritime waste and prevent spills into the ocean.			✓
(b) Encourage the upgrading of harbors to resist damage from natural hazards and disasters.			✓
(c) Encourage the State to study the use of existing harbors and set priorities for future use.			✓
(d) Explore all options to protect the traditional recreational uses of harbors, and mitigate harbor-upgrade impacts to recreational uses where feasible.			✓
(e) Encourage the upgrading of harbors and the separation of cargo and bulk materials from passenger and recreational uses.			✓

<b>COUNTYWIDE POLICY PLAN</b> (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)			S	N/S	N/A
(f)	Encourage the State to provide for improved capacity at shipping, docking, and storage facilities.			✓	
(g)	Encourage the State to provide adequate parking facilities and transit connections within and around harbor areas.			✓	
(h)	Encourage the redevelopment and revitalization of harbors while preserving historic and cultural assets in harbor districts.			✓	
(i)	Encourage the State to provide adequate facilities for small-boat operations, including small-boat launch ramps, according to community needs.			✓	
(j)	Support the maintenance and cleanliness of harbor facilities.			✓	
(k)	Support the redevelopment of harbors as pedestrian-oriented gathering places.			✓	
<b>Analysis: Not Applicable</b>					
<b>Objective:</b>					
(5)	Improve and expand the planning and management of transportation systems.			✓	
<b>Policies:</b>					
(a)	Encourage progressive community design and development that will reduce transportation trips.			✓	
(b)	Require new developments to contribute their pro rata share of local and regional infrastructure costs.			✓	
(c)	Establish appropriate user fees for private enterprises that utilize public transportation facilities for recreational purposes.			✓	
(d)	Support the revision of roadway-design criteria and standards so that roads are compatible with surrounding neighborhoods and the character of rural areas.			✓	
(e)	Plan for multi-modal transportation and utility corridors on each island.			✓	
(f)	Support designing all transportation facilities, including airport, harbor, and mass- transit stations, to reflect Hawaiian architecture.			✓	
(g)	Utilize transportation-demand management as an integral part of transportation planning.			✓	
(h)	Accommodate the planting of street trees and other appropriate landscaping in all public rights-of-way.			✓	
<b>Analysis: Not Applicable</b>					
<b>I. IMPROVE PHYSICAL INFRASTRUCTURE</b>					
<b>Goal:</b> Maui County's physical infrastructure will be maintained in optimum condition and will provide for and effectively serve the needs of the County through clean and sustainable technologies.				✓	
<b>Objective:</b>					
(1)	Improve water systems to assure access to sustainable, clean, reliable, and affordable sources of water.			✓	
<b>Policies:</b>					
(a)	Ensure that adequate supplies of water are available prior to approval of subdivision or construction documents.			✓	
(b)	Develop and fund improved water-delivery systems.			✓	
(c)	Ensure a reliable and affordable supply of water for productive agricultural uses.			✓	
(d)	Promote the reclamation of gray water, and enable the use of reclaimed, gray, and brackish water for activities that do not require potable water.			✓	
(e)	Retain and expand public control and ownership of water resources and delivery systems.			✓	
(f)	Improve the management of water systems so that surface-water and groundwater resources are not degraded by overuse or pollution.			✓	

<b>COUNTYWIDE POLICY PLAN</b> (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	<b>S</b>	<b>N/S</b>	<b>N/A</b>
(g) Explore and promote alternative water-source-development methods.			✓
(h) Seek reliable long-term sources of water to serve developments that achieve consistency with the appropriate Community Plans.			✓
<b>Implementing Actions:</b>			
(a) Develop a process to review all applications for desalination.			✓
<b>Analysis: Not Applicable</b>			
<b>Objective:</b>			
(2) Improve waste-disposal practices and systems to be efficient, safe, and as environmentally sound as possible.	✓		
<b>Policies:</b>			
(a) Provide sustainable waste-disposal systems and comprehensive, convenient recycling programs to reduce the flow of waste into landfills.	✓		
(b) Support innovative and alternative practices in recycling solid waste and wastewater and disposing of hazardous waste.	✓		
(c) Encourage vendors and owners of automobile, appliance, and white goods to participate in the safe disposal and recycling of such goods, and ensure greater accountability for large waste producers.			✓
(d) Develop strategies to promote public awareness to reduce pollution and litter, and encourage residents to reduce, reuse, recycle, and compost waste materials.			✓
(e) Pursue improvements and upgrades to existing wastewater and solid-waste systems consistent with current and future plans and the County's Capital Improvement Program.	✓		
<b>Implementing Actions:</b>			
(a) Establish recycling, trash-separation, and materials recovery programs and facilities to reduce the flow of waste into landfills.			✓
(b) Study the feasibility of developing environmentally safe waste-to-energy facilities.			✓
(c) Utilize taxes and fees as means to encourage conservation and recycling.			✓
(d) Implement and regularly update the Integrated Solid Waste Management Plan.			✓
(e) Phase out the use of injection wells.	✓		
<b>Analysis: The project provides capacity for wastewater treatment and diverts wastewater from County facilities utilizing injection wells and also serves to phase out use of injection wells as a primary method of effluent disposal at the existing Pulehunui Industrial Park WWTP. As such, the proposed action represents a cleaner and more sustainable solution than current practice.</b>			
<b>Objective:</b>			
(3) Significantly increase the use of renewable and green technologies to promote energy efficiency and energy self-sufficiency.			✓
<b>Policies:</b>			
(a) Promote the use of locally renewable energy sources, and reward energy efficiency.			✓
(b) Consider tax incentives and credits for the development of sustainable- and renewable-energy sources.			✓
(c) Expand education about energy conservation and self-sufficiency.			✓
(d) Encourage small-scale energy generation that utilizes wind, sun, water, biowaste, and other renewable sources of energy.	✓		
(e) Expand renewable-energy production.	✓		

<b>COUNTYWIDE POLICY PLAN</b> (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	<b>S</b>	<b>N/S</b>	<b>N/A</b>
(f) Develop public-private partnerships to ensure the use of renewable energy and increase energy efficiency.			✓
(g) Require the incorporation of locally appropriate energy-saving and green building design concepts in all new developments by providing energy efficient urban design guidelines and amendments to the Building Code.			✓
(h) Encourage the use of sustainable energy to power vehicles.			✓
(i) Promote the retrofitting of existing buildings and new development to incorporate energy-saving design concepts and devices.			✓
(j) Encourage green footprint practices.			✓
(k) Reduce Maui County's dependence on fossil fuels and energy imports.	✓		
(l) Support green building practices such as the construction of buildings that aim to minimize carbon dioxide production, produce renewable energy, and recycle water.			✓
(m) Promote and support environmentally friendly practices in all energy sectors.			✓
<b>Implementing Actions:</b>			
(a) Adopt an energy-efficiency policy for Maui County government as a model for other jurisdictions.			✓
(b) Adopt a Green Building Code, and support green building practices.			✓
<b>Analysis: The proposed project will include a solar PV component to provide sufficient power to operate the new and expanded facilities.</b>			
<b>Objective:</b>			
(4) Direct growth in a way that makes efficient use of existing infrastructure and to areas where there is available infrastructure capacity.			✓
<b>Policies:</b>			
(a) Capitalize on existing infrastructure capacity as a priority over infrastructure expansion.			✓
(b) Planning for new towns should only be considered if a region's growth is too large to be directed into infill and adjacent growth areas.			✓
(c) Utilize appropriate infrastructure technologies in the appropriate locations.	✓		
(d) Promote land use patterns that can be provided with infrastructure and public facilities in a cost-effective manner.			✓
(e) Support catchment systems and on-site wastewater treatment in rural areas and aggregated water and wastewater systems in urban areas if they are appropriately located.	✓		
<b>Implementing Actions:</b>			
(a) Develop a streamlining system for urban infill projects.			✓
(b) Identify appropriate areas for urban expansion of existing towns where infrastructure and public facilities can be provided in a cost-effective manner.			✓
<b>Analysis: The proposed project supports localized waste treatment at the Pulehunui Industrial Park and reduces dependence on centralized County wastewater facilities.</b>			
<b>Objective:</b>			
(5) Improve the planning and management of infrastructure systems.			✓
<b>Policies:</b>			
(a) Provide a reliable and sufficient level of funding to enhance and maintain infrastructure systems.			✓
(b) Require new developments to contribute their pro rata share of local and regional infrastructure costs.			✓

<b>COUNTYWIDE POLICY PLAN</b> (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	<b>S</b>	<b>N/S</b>	<b>N/A</b>
(c) Improve coordination among infrastructure providers and planning agencies to minimize construction impacts.			✓
(d) Maintain inventories of infrastructure capacity, and project future infrastructure needs.			✓
(e) Require social-justice and -equity issues to be considered during the infrastructure-planning process.			✓
(f) Discourage the development of critical infrastructure systems within hazard zones and the tsunami-inundation zone to the extent practical.			✓
(g) Ensure that infrastructure is built concurrent with or prior to development.	✓		
(h) Ensure that basic infrastructure needs can be met during a disaster.			✓
(i) Locate public facilities and emergency services in appropriate locations that support the health, safety, and welfare of each community and that minimize delivery inefficiencies.			✓
(j) Promote the undergrounding of utility and other distribution lines for health safety, and aesthetic reasons.			✓
<b>Implementing Actions:</b>			
(a) Develop and regularly update functional plans for infrastructure systems.			✓
(b) Develop, adopt, and regularly update local or community-sensitive level-of-service standards for infrastructure systems.			✓
<b>Analysis: The proposed action provides wastewater treatment capacity to serve the Pulehunui Industrial Park and other island-wide users.</b>			
<b>J. PROMOTE SUSTAINABLE LAND USE AND GROWTH MANAGEMENT</b>			
<b>Goal:</b> Community character, lifestyles, economies, and natural assets will be preserved by managing growth and using land in a sustainable manner.			✓
<b>Objective:</b>			
(1) Improve land use management and implement a directed-growth strategy.			✓
<b>Policies:</b>			
(a) Establish, map, and enforce urban- and rural-growth limits.			✓
(b) Direct urban and rural growth to designated areas.			✓
(c) Limit the number of visitor-accommodation units and facilities in Community Plan Areas.			✓
(d) Maintain a sustainable balance between the resident, part-time resident, and visitor populations.			✓
(e) Encourage redevelopment and infill in existing communities on lands intended for urban use to protect productive farm land and open-space resources.			✓
(f) Discourage new entitlements for residential, resort, or commercial development along the shoreline.			✓
(g) Restrict development in areas that are prone to natural hazards, disasters, or sea-level rise.			✓
(h) Direct new development in and around communities with existing infrastructure and service capacity, and protect natural, scenic, shoreline, and cultural resources.			✓
(i) Establish and maintain permanent open space between communities to protect each community's identity.			✓
(j) Support the dedication of land for public uses.			✓
(k) Preserve the public's rights of access to and continuous lateral access along all shorelines.			✓
(l) Enable existing and future communities to be self-sufficient through sustainable land use planning and management practices.			✓



<b>COUNTYWIDE POLICY PLAN</b> (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	<b>S</b>	<b>N/S</b>	<b>N/A</b>
(m) Protect summits, slopes, and ridgelines from inappropriate development.			✓
<b>Implementing Actions:</b>			
(a) Regularly update urban- and rural-growth boundaries and their maps.			✓
(b) Establish transfer and purchase of development rights programs.			✓
(c) Develop and adopt a green infrastructure plan.			✓
(d) Develop studies to help determine a sustainable social, environmental, and economic carrying capacity for each island.			✓
(e) Identify and define resort-destination areas.			✓
<b>Analysis: Not Applicable</b>			
<b>Objective:</b>			
(2) Improve planning for and management of agricultural lands and rural areas.			✓
<b>Policies:</b>			
(a) Protect prime, productive, and potentially productive agricultural lands to maintain the islands' agricultural and rural identities and economies.			✓
(b) Provide opportunities and incentives for self-sufficient and subsistence homesteads and farms.			✓
(c) Discourage developing or subdividing agriculturally designated lands when non-agricultural activities would be primary uses.			✓
(d) Conduct agricultural-development planning to facilitate robust and sustainable agricultural activities.			✓
<b>Implementing Actions:</b>			
(a) Inventory and protect prime, productive, and potentially productive agricultural lands from competing non-agricultural land uses.			✓
<b>Analysis: Not Applicable</b>			
<b>Objective:</b>			
(3) Design all developments to be in harmony with the environment and to protect each community's sense of place.			✓
<b>Policies:</b>			
(a) Support and provide incentives for green building practices.			✓
(b) Encourage the incorporation of green building practices and technologies into all government facilities to the extent practicable.			✓
(c) Protect and enhance the unique architectural and landscape characteristics of each Community Plan Area, small town, and neighborhood.			✓
(d) Ensure that adequate recreational areas, open spaces, and public-gathering places are provided and maintained in all urban centers and neighborhoods.			✓
(e) Ensure business districts are distinctive, attractive, and pedestrian-friendly destinations.			✓
(f) Use trees and other forms of landscaping along rights-of-way and within parking lots to provide shade, beauty, urban-heat reduction, and separation of pedestrians from automobile traffic in accordance with community desires.			✓
(g) Where appropriate, integrate public-transit, equestrian, pedestrian, and bicycle facilities, and public rights-of-way as design elements in new and existing communities.			✓
(h) Ensure better connectivity and linkages between land uses.			✓
(i) Adequately buffer and mitigate noise and air pollution in mixed-use areas to maintain residential quality of life.			✓
(j) Protect rural communities and traditional small towns by regulating the footprint, locations, site planning, and design of structures.			✓

<b>COUNTYWIDE POLICY PLAN</b> (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	<b>S</b>	<b>N/S</b>	<b>N/A</b>
(k) Support small-town revitalization and preservation.			✓
(l) Facilitate safe pedestrian access, and create linkages between destinations and within parking areas.			✓
<b>Implementing Actions:</b>			
(a) Establish design guidelines and standards to enhance urban and rural environments.			✓
(b) Provide funding for civic-center and civic-space developments.			✓
(c) Establish and enhance urban forests in neighborhoods and business districts.			✓
<b>Analysis: Not Applicable</b>			
<b>Objective:</b>			
(4) Improve and increase efficiency in land use planning and management.			✓
<b>Policies:</b>			
(a) Assess the cumulative impact of developments on natural ecosystems, natural resources, wildlife habitat, and surrounding uses.			✓
(b) Ensure that new development projects requiring discretionary permits demonstrate a community need, show consistency with the General Plan, and provide an analysis of impacts.			✓
(c) Encourage public and private partnerships to preserve lands of importance, develop housing, and meet the needs of residents.			✓
(d) Promote creative subdivision designs that implement best practices in land development, sustainable management of natural and physical resources, increased pedestrian and bicycle functionality and safety, and the principles of livable communities.			✓
(e) Coordinate with Federal, State, and County officials in order to ensure that land use decisions are consistent with County plans and the vision local populations have for their communities.			✓
(f) Enable greater public participation in the review of subdivisions.			✓
(g) Improve land use decision making through the use of land- and geographic information systems.			✓
<b>Implementing Actions:</b>			
(a) Institute a time limit and sunseting stipulations on development entitlements and their implementation.			✓
<b>Analysis: Not Applicable</b>			
<b>K. STRIVE FOR GOOD GOVERNANCE</b>			
<b>Objective:</b>			
(1) Strengthen governmental planning, coordination, consensus building, and decision making.			✓
<b>Policies:</b>			
(a) Plan and prepare for the effects of social, demographic, economic, and environmental shifts.			✓
(b) Plan for and address the possible implications of Hawaiian sovereignty.			✓
(c) Encourage collaboration among government agencies to reduce duplication of efforts and promote information availability and exchange.			✓
(d) Expand opportunities for the County to be involved in and affect State and Federal decision making.			✓
(e) Plan and prepare for large-scale emergencies and contingencies.			✓
(f) Improve public awareness about preparing for natural hazards, disasters, and evacuation plans.			✓
(g) Improve coordination among Federal, State, and County agencies.			✓

COUNTYWIDE POLICY PLAN (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	S	N/S	N/A
<b>Implementing Actions:</b>			
(a) Develop policies, regulations, and programs to protect and enhance the unique character and needs of the County's various communities.			✓
(b) Evaluate and if necessary, recommend modifications to the County Charter that could result in a possible change to the form of governance for Maui County.			✓
(c) Study and evaluate the feasibility and implications of voting in Maui County Council elections.			✓
(d) Study and evaluate the feasibility of authorizing town governments in Maui County.			✓
<b>Analysis: Not Applicable</b>			
<b>Objective:</b>			
(2) Promote civic engagement.			✓
<b>Policies:</b>			
(a) Foster consensus building through in-depth, innovative, and accessible public participatory processes.			✓
(b) Promote and ensure public participation and equal access to government among all citizens.			✓
(c) Encourage a broad cross-section of residents to volunteer on boards and commissions.			✓
(d) Encourage the State to improve its community-involvement processes.			✓
(e) Support community-based decision making.			✓
(f) Expand advisory functions at the community level.			✓
(g) Expand opportunities for all members of the public to participate in public meetings and forums.			✓
(h) Facilitate the community's ability to obtain relevant documentation.			✓
(i) Increase voter registration and turnout.			✓
<b>Implementing Actions:</b>			
(a) Implement two-way communication using audio-visual technology that allows residents to participate in the County's planning processes.			✓
(b) Ensure and expand the use of online notification of County business and public meetings, and ensure the posting of all County board and commission meeting minutes.			✓
(c) Explore funding mechanisms to improve participation by volunteers on boards and commissions.			✓
(d) Develop a project-review process that mandates early and ongoing consultation in and with communities affected by planning and land use activities.			✓
<b>Analysis: Not Applicable</b>			
<b>Objective:</b>			
(3) Improve the efficiency, reliability, and transparency of County government's internal processes and decision making.			✓
<b>Policies:</b>			
(a) Use advanced technology to improve efficiency.			✓
(b) Simplify and clarify the permitting process to provide uniformity, reliability, efficiency, and transparency.			✓
(c) Improve communication with Lana'i and Moloka'i through the expanded use of information technologies, expanded staffing, and the creation and expansion of government-service centers.			✓
(d) Ensure that laws, policies, and regulations are internally consistent and effectuate the intent of the General Plan.			✓

<b>COUNTYWIDE POLICY PLAN</b> (Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable)	<b>S</b>	<b>N/S</b>	<b>N/A</b>
<b>Implementing Actions:</b>			
(a) Update the County Code to be consistent with the General Plan.			✓
(b) Identify and update County regulations and procedures to increase the productivity and efficiency of County government.			✓
(c) Develop local level-of-service standards for infrastructure, public facilities, and services.			✓
(d) Implement plans through programs, regulations, and capital improvements in a timely manner.			✓
(e) Expand government online services.			✓
<b>Analysis: Not Applicable</b>			
<b>Objective:</b>			
(4) Adequately fund in order to effectively administer, implement, and enforce the General Plan.			✓
<b>Policies:</b>			
(a) Adequately fund, staff, and support the timely update and implementation of planning policy, programs, functional plans, and enforcement activities.			✓
(b) Ensure that the County's General Plan process provides for efficient planning at the County, island, town, and neighborhood level.			✓
(c) Encourage ongoing professional development, education, and training of County employees.			✓
(d) Encourage competitive compensation packages for County employees to attract and retain County personnel.			✓
(e) Enable the County government to be more responsive in implementing our General Plan and Community Plans.			✓
(f) Review discretionary permits for compliance with the Countywide Policy Plan.			✓
(g) Strengthen the enforcement of County, State, and Federal land use laws.			✓
<b>Implementing Actions:</b>			
(a) Establish penalties to ensure compliance with County, State, and Federal land use laws.			✓
<b>Analysis: Not Applicable</b>			
<b>Objective:</b>			
(5) Strive for County government to be a role model for implementing cultural and environmental policies and practices.			✓
<b>Policies:</b>			
(a) Educate residents on the benefits of sustainable practices.			✓
(b) Encourage the retention and hiring of qualified professionals who can improve cultural and environmental practices.			✓
(c) Incorporate environmentally sound and culturally appropriate practices in government operations and services.			✓
(d) Encourage all vendors with County contracts to incorporate environmentally sound and culturally appropriate practices.			✓
<b>Analysis: Not Applicable</b>			

## 2. Maui Island Plan

The Maui Island Plan (MIP) is applicable to the island of Maui only, providing more specific policy-based strategies for population, land use, transportation, public and

community facilities, water and wastewater systems, visitor destinations, urban design, and other matters related to future growth.

As provided by Chapter 2.80B, the MIP shall include the following components:

1. *An island-wide land use strategy, including a managed and directed growth plan*
2. *A water element assessing supply, demand and quality parameters*
3. *A nearshore ecosystem element assessing nearshore waters and requirements for preservation and restoration*
4. *An implementation program which addresses the County's 20-year capital improvement requirements, financial program for implementation, and action implementation schedule*
5. *Milestone indicators designed to measure implementation progress of the MIP*

It is noted that Ordinance No. 4004 does not address the component relating to the implementation program. Chapter 2.80B of the Maui County Code, relating to the General Plan, was amended via Ordinance No. 3979, October 5, 2012, to provide that the implementation program component be adopted no later than one (1) year following the effective date of Ordinance No. 4004. In December 2013 and March 2014, the Council approved time extensions for approval and adoption of the implementation chapter of the MIP. The implementation program component of the MIP was adopted as Ordinance No. 4126 on May 29, 2014.

The MIP addresses a number of planning categories with detailed policy analysis and recommendations which are framed in terms of goals, objectives, policies and implementing actions. These planning categories address the following areas:

1. *Population*
2. *Heritage Resources*
3. *Natural Hazards*
4. *Economic Development*
5. *Housing*
6. *Infrastructure and Public Facilities*

## 7. Land Use

Additionally, an essential element of the MIP is its directed growth plan which provides a management framework for future growth in a manner that is fiscally, environmentally, and culturally prudent. Among the directed growth management tools developed through the MIP process are maps delineating urban growth boundaries (UGB), small town boundaries and rural growth boundaries. The respective boundaries identify areas appropriate for future growth and their corresponding intent with respect to development character.

The proposed project is located within the Pulehunui Planned Growth area, an area identified to be developed for heavy industrial use. In this regard, it is consistent with the directed growth strategy defined via growth maps adopted in the MIP.

In addition, the proposed project has been reviewed with respect to pertinent goals, objectives, policies and implementing actions of the MIP. The analysis is presented in the table below.

Maui Island Plan Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable		S	N/S	N/A
<b>CHAPTER 1 – POPULATION</b>				
<b><u>Goal:</u></b>				
1.1	Maui's people, values, and lifestyles thrive through strong, healthy, and vibrant island communities.			✓
<b><u>Objective:</u></b>				
1.1.1	Greater retention and return of island residents by providing viable work, education, and lifestyle options.			✓
<b><u>Policies:</u></b>				
1.1.1.a	Expand programs that enable the community to meet the education, employment, housing, and social goals of youth and young adults.			✓
1.1.1.b	Expand housing, transportation, employment, and social opportunities to ensure residents are able to comfortably age within their communities.			✓
1.1.1.c	Measure and track resident satisfaction through surveys and community indicators.			✓
1.1.1.d	Support funding for transportation, housing, health care, recreation, and social service programs that help those with special needs (including the elderly and disabled).			✓
<b><i>Analysis:</i> Not Applicable</b>				
<b>CHAPTER 2 – HERITAGE RESOURCES</b>				
<b><u>CULTURAL, HISTORICAL, AND ARCHAEOLOGICAL RESOURCES ISSUES</u></b>				
<b><u>Goal:</u></b>				
2.1	Our community respects and protects archaeological and cultural resources while perpetuating diverse cultural identities and traditions.			✓

Maui Island Plan Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
<b>Objective:</b>			
2.1.1 An island culture and lifestyle that is healthy and vibrant as measured by the ability of residents to live on Maui, access and enjoy the natural environment, and practice Hawaiian customs and traditions in accordance with Article XII, Section 7, Hawai'i State Constitution, and Section 7-1, Hawai'i Revised Statutes (HRS).			✓
<b>Policies:</b>			
2.1.1.a Perpetuate the spirit of aloha and celebrate the host Hawaiian culture and other ethnic cultures.			✓
2.1.1.b Perpetuate a respect for diversity and recognize the broad blending of cultures and ethnicities as vital to the quality of life on Maui.			✓
2.1.1.c Ensure traditional public access routes, including native Hawaiian trails, are maintained for public use.			✓
2.1.1.d Support the education of visitors and new residents about the customs and etiquette of the Hawaiian culture, as well as other cultures.			✓
<b>Objective:</b>			
2.2 A more effective and efficient planning and review process that incorporates the best available cultural resources inventory, protection techniques, and preservation strategies.			✓
<b>Policies:</b>			
2.1.2.a Ensure that the island has a comprehensive and up-to-date inventory of historic and archaeological resources, and their cultural significance.			✓
2.1.2.b Require the update of existing planning and regulatory mechanisms to protect the natural, cultural, scenic, and historic resources within designated Heritage Areas (see Cultural Resources Overlay/Scenic Corridor Protection Technical Reference Map).			✓
2.1.2.c Ensure that cultural, historic, and archaeological resources are protected for the benefit of present and future generations.			✓
<b>Objective:</b>			
2.3 Enhance the island's historic, archaeological, and cultural resources.			✓
<b>Policies:</b>			
2.1.3.a Identify and pursue a listing of the properties and sites on the State and National Register of Historic Places.			✓
2.1.3.b Support the use of easements, dedications, and other mechanisms to acquire, maintain, and protect lands with cultural, archaeological, and historic significance.			✓
2.1.3.c Support regulations to require developers, when appropriate, to prepare an Archaeological Inventory Survey, Cultural Impact Assessment, and Ethnographic Inventories that are reviewed and commented upon by the Office of Hawaiian Affairs, Native Hawaiian advisory bodies, the State Historic Preservation Division (SHPD), and the Office of Environmental Quality Control, and systematically comply with the steps listed in SHPD's administrative rules, including consultation and monitoring during construction phases of projects.			✓
2.1.3.d Promote the rehabilitation and adaptive reuse of historic sites, buildings, and structures.			✓

<b>Maui Island Plan Goals, Objectives and Policies</b>			
<b>Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable</b>			
	<b>S</b>	<b>N/S</b>	<b>N/A</b>
2.1.3.e Encourage property owners to register historic and archaeological sites on the State and National Register.			✓
2.1.3.f Support opportunities for public involvement with the intent to facilitate the protection and restoration of historic and archeological sites, including consultation with stakeholders.			✓
2.1.3.g Encourage the resolution of land title questions relating to Land Commission Awards and Royal patents.			✓
2.1.3.h Ensure compliance with historic preservation laws, and discourage demolition of properties that are determined to be eligible for listing on the National or State Register of Historic Places.			✓
<b>Analysis: Not Applicable</b>			
<b><u>SHORELINE, REEFS, AND NEARSHORE WATERS</u></b>			
<b><u>Goal:</u></b>			
2.2 An intact, ecologically functional system of reef, shoreline, and nearshore waters that are protected in perpetuity.	✓		
<b><u>Objective:</u></b>			
2.2.1 A more comprehensive and community-based ICZM program.			✓
<b><u>Policies:</u></b>			
2.2.1.a Encourage a management system that protects and temporarily rests the reef ecosystems from overuse.			✓
2.2.1.b Support the establishment of additional MMAs and reef replenishment areas.			✓
2.2.1.c Work with appropriate agencies and community members to protect any special managed conservation areas from overuse and ensure that surrounding land uses do not contribute to the degradation of the natural resources, such as 'Ahihi-Kina'u Natural Area Reserve, Honolua-Mokulē'ia Bay Marine Life Conservation District, and Mākena State Park.			✓
2.2.1.d Incorporate the following into the MIP, where consistent with the MIP:			✓
(1) Beach Management Plan for Maui;			✓
(2) Coastal Nonpoint Pollution Control Program Management Plan;			✓
(3) Implementation Plan for Polluted Runoff Control; and			✓
(4) Ocean Resource Management Plan.			✓
2.2.1.e Support greater coordination among governmental agencies involved with the protection of the island's marine resources.			✓
<b><u>Objective:</u></b>			
2.2.2 Improved reef health, coastal water quality, and marine life.	✓		
<b><u>Policies:</u></b>			
2.2.2.a Create additional mechanisms where needed to contain and control runoff and pollution.			✓



Maui Island Plan Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable		S	N/S	N/A
2.2.2.b	Allow extraction of high quality, Class A, low silt sands only when they will be used to protect or restore Maui's shorelines and beaches.			✓
2.2.2.c	Carefully manage beach nourishment activities to protect the coastal and marine ecosystem.			✓
2.2.2.d	Require, where appropriate, a buffer between landscaped areas and the shoreline, gulches, and streams to reduce the runoff of fertilizers, pesticides, herbicides, and other pollutants into coastal waters.			✓
2.2.2.e	Strictly regulate shoreline armoring in accordance with adopted Shoreline Rules, with an intent to protect the coastal and marine ecosystem.			✓
2.2.2.f	Support greater protection of Keālia Pond National Wildlife Refuge through the following:			✓
	(1) Enhancement of marine ecosystems;			✓
	(2) Beach and sand dune restoration; and			✓
	(3) Expansion of habitat for Maui's threatened or endangered sea turtles, birds, and other species.			✓
2.2.2.g	Support the development of regulations to prevent the excessive depletion of fish stocks due to non-sustainable practices and gear such as SCUBA spear-fishing and lay nets, within the context of nearshore ecosystems.			✓
2.2.2.h	Encourage the State to conduct a regular census of fish populations and monitor coral health.			✓
2.2.2.i	Encourage the State to significantly increase the number of park rangers, enforcement officers, and marine biologists to protect coastal resources.			✓
2.2.2.j	Encourage the State to prohibit the collection and exportation of fish, coral, algae, and other marine species for the ornamental and aquarium trade.			✓
<b>Objective:</b>				
2.2.3	Water quality that meets or exceeds State Clean Water Act standards.			✓
<b>Policies:</b>				
2.2.3.a	Reduce the amount of impervious surface and devise site plan standards that aim to minimize storm runoff and NPS pollution.			✓
2.2.3.b	Support the revision of existing regulations to require an Erosion and Sedimentation Control Plan (ESCP) for development activities that may pose a threat to water quality.			✓
2.2.3.c	Require an on-site monitoring program, where applicable, when grading may pose a threat to water quality or when recommended in the ESCP.			✓
2.2.3.d	Avoid development actions that impair Maui's reef systems and remove identified stressors.	✓		
2.2.3.e	Phase out cesspools and restrict the use of septic systems in ecologically sensitive coastal areas by converting to environmentally-friendly alternative sewage treatment systems, and connecting to central sewerage systems when and where feasible.			✓
2.2.3.f	Prohibit the development of new wastewater injection wells, except when unavoidable for public health and safety purposes.	✓		

Maui Island Plan Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable		S	N/S	N/A
2.2.3.g	Ensure that the County upholds its affirmative duty under the Clean Water Act by monitoring and reducing point and NPS pollution to help safeguard coastal waters.			✓
<b>Objective:</b>				
2.2.4	Acquire additional shoreline lands and shoreline access rights.			✓
<b>Policies:</b>				
2.2.4.a	Promote the use of conservation easements, land trusts, transfer and purchase of development rights, and mitigation banking.			✓
2.2.4.b	Require the dedication of public beach and rocky shoreline access ways to and along the shoreline where it serves a practical public interest as a condition of development or subdivision approval; future subdivisions and developments shall be consistent with and effectuate, to the extent practicable, the <i>Shoreline Access Inventory Update - Final Report</i> (March 2005), and its updates.			✓
2.2.4.c	Incorporate the <i>Shoreline Access Inventory Update - Final Report</i> (March 2005), and its regular updates, into this plan.			✓
2.2.4.d	Identify access points while further acquiring key shoreline parcels and easement rights to enhance and protect beach access and shoreline recreation.			✓
<b>Analysis:</b> The proposed action does not involve the development of new injection wells, and will reduce use of injection wells by diverting effluent currently being disposed via injection wells to an alternate disposal method (i.e. absorption field). Establishment of an inland facility to receive and treat septage will reduce transfer volumes of septage being handled at County facilities near the shoreline.				
<b><u>WATERSHEDS, STREAMS, AND WETLANDS ISSUES</u></b>				
<b>Goal:</b>				
2.3	Healthy watersheds, streams, and riparian environments.			✓
<b>Objective:</b>				
2.3.1	Greater protection and enhancement of watersheds, streams, and riparian environments.			✓
<b>Policies:</b>				
2.3.1.a	All present and future watershed management plans shall incorporate concepts of ahupua'a management based on the interconnectedness of upland and coastal ecosystems/species.			✓
2.3.1.b	Continue to support and be an active member of watershed partnerships.			✓
2.3.1.c	Support the establishment of regional water trusts, composed of public and private members, to manage water resources.			✓
2.3.1.d	Support regulations to require developments to utilize ahupua'a management practices.			✓
2.3.1.e	Work with private and non-profit entities to educate the public about the connection between upland activities within the watershed and the impacts on nearshore ecosystems and coral reefs.			✓

Maui Island Plan Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
2.3.1.f Provide adequate funding and staff to develop and implement watershed protection plans and policies, including acquisition and management of watershed resources and land.			✓
2.3.1.g Encourage the State to mandate instream assessment to provide adequate water for native species.			✓
2.3.1.h Maui will protect all watersheds and streams in a manner that guarantees a healthy, sustainable riparian environment.			✓
<b>Objective:</b>			
2.3.2 Decreased NPS and point source pollution.			✓
<b>Policies:</b>			
2.3.2.a Enforce water pollution related standards and codes.			✓
2.3.2.b Support the use of LID Techniques such as those described in the State of Hawai'i LID Practitioner's Guide (June 2006), as amended.			✓
2.3.2.c Encourage farmers and ranchers to use agricultural BMPs to address NPS pollution.			✓
<b>Objective:</b>			
2.3.3 Preserve existing wetlands and improve and restore degraded wetlands.			✓
<b>Policies:</b>			
2.3.3.a Prohibit the destruction and degradation of existing upland, mid-elevation, and coastal wetlands.			✓
2.3.3.b Support and fund wetland protection and improvement, and restoration of degraded wetlands.			✓
2.3.3.c Where applicable, require developers to provide a wetland protection buffer and/or other protective measures around and between development and wetland resources.			✓
<b>Objective:</b>			
2.3.4 Greater preservation of native flora and fauna biodiversity to protect native species.			✓
<b>Policies:</b>			
2.3.4.a Work with appropriate agencies to eliminate feral ungulate populations and invasive species.			✓
2.3.4.b Encourage the State to provide adequate funding to preserve biodiversity, protect native species, and contain or eliminate invasive species.			✓
2.3.4.c Support the work of conservation groups and organizations that protect, reestablish, manage, and nurture sensitive ecological areas and threatened indigenous ecosystems.			✓
<b>Objective:</b>			
2.3.5 Limited development in critical watershed areas.			✓
<b>Policies:</b>			
2.3.5.a Discourage development and subdivision of land within critical watersheds and in areas susceptible to high erosion and sediment loss.			✓

Maui Island Plan Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
2.3.5.b Designate critical watershed areas as conservation lands.			✓
2.3.5.c Strongly encourage new subdivisions and developments that are proximate to environmentally sensitive watershed resources to prepare and implement CSD plans.			✓
<b>Objective:</b>			
2.3.6 Enhance the vitality and functioning of streams, while balancing the multiple needs of the community.			✓
<b>Policies:</b>			
2.3.6.a Protect and enhance natural streambeds and discourage stream alteration.			✓
2.3.6.b Work with appropriate agencies to establish minimum stream flow levels and ensure adequate stream flow to sustain riparian ecosystems, traditional kalo cultivation, and self-sustaining ahupua'a.			✓
2.3.6.c Respect and participate in the resolution of native Hawaiian residual land and water rights issues (kuleana lands, ceded lands, and historic agricultural and gathering rights).			✓
2.3.6.d Ensure that stream flows implement laws and policies found in the State Constitution and Water Code.			✓
2.3.6.e Work with appropriate agencies and stakeholders to establish minimum stream flow levels, promote actions to support riparian habitat and the use of available lo'i, and maintain adequate flows for the production of healthy kalo crops.			✓
<b>Analysis: Not Applicable</b>			
<b><u>WILDLIFE AND NATURAL AREAS</u></b>			
<b>Goal:</b>			
2.4 Maui's natural areas and indigenous flora and fauna will be protected.			✓
<b>Objective:</b>			
2.4.1 A comprehensive management strategy that includes further identification, protection, and restoration of indigenous wildlife habitats.			✓
<b>Policies:</b>			
2.4.1.a Identify and inventory the following:			
(1) Natural, recreational, and open space resources;			✓
(2) Flora and fauna with medium, high, and very high concentrations of threatened or endangered species; and			✓
(3) Location and extent of invasive species.			✓
2.4.1.b Require flora and fauna assessment and protection plans for development in areas with concentrations of indigenous flora and fauna; development shall comply with the assessment and protection plan and shall use the avoidance, minimization, and mitigation approach respectively, with an emphasis on avoidance.			✓
2.4.1.c Support the implementation of Hawai'i's Comprehensive Wildlife Conservation Strategy (October 2005).			✓

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<b>Objective:</b>					
2.4.2	A decrease in invasive species through programs and partnerships that eradicate undesirable species and protect native habitat.				✓
<b>Policies:</b>					
2.4.2.a	Prevent the introduction of invasive species at all of Maui's airports and harbors.				✓
2.4.2.b	Encourage the State to increase funding in support of invasive species interception, control, and eradication.				✓
2.4.2.c	Encourage the State to develop programs that allow students to participate in invasive species eradication projects.				✓
<b>Objective:</b>					
2.4.3	Greater protection of sensitive lands, indigenous habitat, and native flora and fauna.				✓
<b>Policies:</b>					
2.4.3.a	Secure an interconnected network of sensitive lands, greenways, watercourses, and habitats.				✓
2.4.3.b	Protect Maui's sensitive lands (see Sensitive Lands on Protected Areas Diagrams).				✓
2.4.3.c	Promote innovative environmental-planning methods and site-planning standards that preserve and re-establish indigenous flora and fauna habitat, to preserve and restore connected habitat corridors and open space.				✓
2.4.3.d	Utilize protection tools such as conservation easements, land trusts, land banks, Purchase of Developments Rights (PDRs), Transfer of Development Rights (TDRs), and other stewardship tools to acquire natural areas				✓
2.4.3.e	Encourage discussions with communities to designate heritage areas that protect recreational and cultural lifestyles and resources.				✓
2.4.3.f	Support the expansion of Haleakalā National Park, and the creation of new national parks, where appropriate and supported by local communities.				✓
2.4.3.g	Encourage reforestation efforts that increase native species' habitat.				✓
2.4.3.h	Utilize the Natural Area Partnership Program (NAPP) and other programs to protect natural lands.				✓
2.4.3.i	Support increased dedicated funding for the acquisition, protection, restoration, or preservation of important natural areas or open space through the following: grants from the Land and Water Conservation Fund; dedicated funding from real property taxes or other appropriate revenues; bond issues; real estate transfer tax; revenues from the Transient Accommodations Tax; development mitigation fees; and other appropriate funding sources.				✓
<b>Analysis: Not Applicable</b>					
<b>SCENIC RESOURCES</b>					
<b>Goal:</b>					
2.5	Maui will continue to be a beautiful island steeped in coastal, mountain, open space, and historically significant views that are preserved to enrich the residents' quality of life, attract visitors, provide a connection to the past, and promote a sense of place.				✓

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<b>Objective:</b>			
2.5.1 A greater level of protection for scenic resources.			✓
<b>Policies:</b>			
2.5.1.a Protect views to include, but not be limited to, Haleakalā, ʻĪao Valley, the Mauna Kahalawai (West Maui Mountains), Puʻu Ōʻlaʻi, Kahoʻolawe, Molokini, Molokaʻi, and Lānaʻi, Mauna Kea, Mauna Loa, sea stacks, the Pacific Ocean, and significant water features, ridgelines, and landforms.			✓
2.5.1.b Identify, preserve, and provide ongoing management of important scenic vistas and open space resources, including mauka-to-makai and makai-to-mauka view planes.			✓
2.5.1.c Protect “night sky” resources by encouraging the implementation of ambient light ordinances and encouraging conversion of all sources that create excessive light pollution, affecting our ability to view the stars.			✓
2.5.1.d Protect ridgelines from development where practicable to facilitate the protection of public views.			✓
2.5.1.e Protect scenic resources along Maui’s scenic roadway corridors.			✓
<b>Objective:</b>			
2.5.2. Reduce impacts of development projects and public-utility improvements on scenic resources.	✓		
<b>Policies:</b>			
2.5.2.a Enforce the policies and guidelines of the SMA regarding the protection of views.			✓
2.5.2.b Require any new subdivision of land, development, or redevelopment adjacent to a “high” or “exceptional” scenic corridor to submit an impact assessment of the project’s scenic impacts; this assessment shall use the avoidance, minimization, and mitigation steps respectively, with an emphasis on avoidance.			✓
2.5.2.c Require appropriate building setbacks and limits on wall heights to protect views along scenic corridors.			✓
2.5.2.d Encourage the State of Hawaiʻi Board of Land and Natural Resources to deny any development within the State Conservation District that interferes with a scenic landscape or disrupts important open space resources.			✓
2.5.2.e Require Urban Design and Review Board (UDRB) review and approval of utility poles, facilities, and other visible infrastructure improvements along scenic corridors.			✓
2.5.2.f Ensure little or no effect on scenic resources from utility improvements, primarily power poles.	✓		
2.5.2.g Protect scenic vistas from intrusion by power poles.			✓
<b>Objective:</b>			
2.5.3 Greater protection of and access to scenic vistas, access points, and scenic lookout points.			✓
<b>Policy:</b>			
2.5.3.a Protect, enhance, and acquire access to Maui’s scenic vistas and resources.			✓

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<b>Analysis:</b> The proposed facilities are located in the existing Pulehunui Industrial Park, located approximately one (1) mile to the east of Maui Veterans Highway. The proposed improvements will conform with the development standards of the County's "M-3, Restricted Industrial" district and are not anticipated to significantly impact scenic resources.					
<b>CHAPTER 3 – NATURAL HAZARDS</b>					
<b>Goal:</b>					
3.1	Maui will be disaster resilient.				✓
<b>Objective:</b>					
3.1.1	Increased inter-agency coordination.				✓
<b>Policy:</b>					
3.1.1.a	Reinforce the island's preparedness capacity by:				✓
	(1) Applying the latest data-gathering techniques/technology;				✓
	(2) Pursuing funding opportunities;				✓
	(3) Improving monitoring and advance warning systems;				✓
	(4) Fostering public awareness; and				✓
	(5) Working with external agencies to coordinate disaster mitigation and response.				✓
<b>Objective:</b>					
3.1.2	Greater protection of life and property.				✓
<b>Policies:</b>					
3.1.2.a	Identify critical infrastructure, lifelines, roads, and populations that are vulnerable to coastal hazards, and encourage strategic retreat and relocation to safer areas.				✓
3.1.2.b	Consider the location of dams, reservoirs, holding ponds, and other water-containing entities that are upstream of inhabited areas to anticipate, avoid, and mitigate inundation risks, and discourage new development in areas where possible inundation hazards may exist.				✓
3.1.2.c	Strengthen current development standards to minimize destruction of land and property.				✓
3.1.2.d	Encourage the use of construction techniques that reduce the potential for damage from natural hazards.				✓
3.1.2.e	Increase the County's resilience to drought.				✓
3.1.2.f	Increase food and energy security through local production and storage.				✓
<b>Objective:</b>					
3.1.3	A more coordinated emergency response system that includes clearly defined and mapped evacuation routes.				✓

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<b>Policy:</b>						
3.1.3.a Identify and expand shelter facilities and evacuation routes away from areas susceptible to natural hazards.						✓
<b>Objective:</b>						
3.1.4 A more educated and involved public that is aware of and prepared for natural hazards.						✓
<b>Policies:</b>						
3.1.4.a Promote public education and involvement related to natural hazards awareness and preparedness.						✓
3.1.4.b Coordinate a multi-agency effort to establish and promote a comprehensive public education program that will focus on practical approaches to preparedness, damage prevention, and hazard mitigation.						✓
<b>Analysis: Not Applicable</b>						
<b>CHAPTER 4 – ECONOMIC DEVELOPMENT</b>						
<b><u>ECONOMIC DIVERSIFICATION</u></b>						
<b>Goal:</b>						
4.1 Maui will have a balanced economy composed of a variety of industries that offer employment opportunities and well-paying jobs and a business environment that is sensitive to resident needs and the island's unique natural and cultural resources.				✓		
<b>Objective:</b>						
4.1.1 A more diversified economy.				✓		
<b>Policies:</b>						
4.1.1.a Encourage an economy that is driven by innovation, research and development, and human resource development, including but not limited to, increasing technology- and knowledge-based sectors to be a major component in Maui County's economic base.						✓
4.1.1.b Support the creation of new jobs and industries that provide a living wage.				✓		
4.1.1.c Facilitate and expedite permits and approvals.						✓
4.1.1.d Develop linkages and partnerships among international research and development activities and Maui businesses.						✓
<b>Objective:</b>						
4.1.2 Increase activities that support principles of sustainability.						✓
<b>Policies:</b>						
4.1.2.a Support industries that are sustainable, and culturally and environmentally sensitive.						✓
4.1.2.b Encourage and support local businesses.				✓		
4.1.2.c Substitute imports with locally-produced services and products where practicable.						✓



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4.1.2.d Support the development of economic development clusters in targeted industry sectors.	✓		
4.1.2.e Encourage all businesses to save energy, water, and other resources.			✓
<b><u>Objective:</u></b>			
4.1.3 Improve the island's business climate.			✓
<b><u>Policies:</u></b>			
4.1.3.a Upgrade, maintain the quality of, and improve access to telecommunications infrastructure.			✓
4.1.3.b Ensure an adequate supply of affordable workforce housing.			✓
4.1.3.c Develop neighborhoods and communities that are attractive to the workforce of a diversified economy.			✓
4.1.3.d Encourage, nurture, and reward entrepreneurship and innovation.			✓
4.1.3.e Encourage employers to establish incentive programs. Support flexibility in workforce policies compatible with business and quality of life goals.			✓
4.1.3.f Assist community development organizations with revitalization and development of neighborhoods and communities that are attractive to the workforce of a diversified economy.			✓
<b><i>Analysis:</i> The proposed action contributes to the economy, supports local businesses and creates local jobs.</b>			
<b><u>TOURISM</u></b>			
<b><u>Goal:</u></b>			
4.2 A healthy visitor industry that provides economic well-being with stable and diverse employment opportunities.			✓
<b><u>Objective:</u></b>			
4.2.1 Increase the economic contribution of the visitor industry to the island's environmental well-being for the island's residents' quality of life.			✓
<b><u>Policies:</u></b>			
4.2.1.a Engage the visitor industry in the growth of emerging sectors where practicable.			✓
4.2.1.b Support the implementation of the Maui County TSP, when consistent with the MIP.			✓
4.2.1.c Focus economic growth in the visitor industry through enhanced visitor experiences and an emphasis on attracting higher-spending.			✓
4.2.1.d Provide a rich visitor experience, while protecting the island's natural beauty, culture, lifestyles, and aloha spirit.			✓
4.2.1.e Diversify the tourism industry by supporting appropriate niche activities such as ecotourism, cultural tourism, voluntourism, ag-tourism, health and wellness tourism, educational tourism, medical tourism, and other viable tourism-related businesses in appropriate locations.			✓
4.2.1.f Recognize the important economic contributions that the visitor industry makes and support a healthy and vibrant visitor industry.			✓

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4.2.1.g Support the increased availability of kama'āina discount programs.					✓
<b>Objective:</b>					
4.2.2 Comprehensively manage future visitor-unit expansion.					✓
<b>Policies:</b>					
4.2.2.a Mitigate the impact of tourism on the host culture, natural environment, and resident lifestyles.					✓
4.2.2.b Allow, where permitted by the community plan, the development of business hotels and small, sensitively-designed inns.					✓
4.2.2.c Manage impacts from transient vacation rentals, hotels, bed and breakfast units, timeshares, and resort condominiums on residential communities, public infrastructure, and community facilities.					✓
4.2.2.d Discourage supplanting of existing island housing to visitor accommodations that may have a negative impact on long-term rental housing, price of housing, and price of land.					✓
4.2.2.e Allow the designation of retreat/mini-conference centers in appropriate locations through the community plan process.					✓
4.2.2.f Community plans should consider establishing standards such as limits on building size, room count, and the number of inns, if any, that will be allowed in small towns.					✓
<b>Objective:</b>					
4.2.3 Maximize residents' benefits from the visitor industry.					✓
<b>Policies:</b>					
4.2.3.a Promote a desirable island population by striving to not exceed an island-wide visitor population of roughly 33 percent of the resident population.					✓
4.2.3.b Use the required General Plan Annual Status Report to monitor trends related to residents and visitors.					✓
<b>Analysis: Not Applicable</b>					
<b>AGRICULTURE</b>					
<b>Goal:</b>					
4.3 Maui will have a diversified agricultural industry contributing to greater economic, food, and energy security and prosperity.					✓
<b>Objective:</b>					
4.3.1 Strive for at least 85 percent of locally-consumed fruits and vegetables and 30 percent of all other locally-consumed foods to be grown in-State.					✓
<b>Policies:</b>					
4.3.1.a Strive to substitute food/agricultural product imports with a reliable supply of locally produced food and agricultural products.					✓
4.3.1.b Facilitate and support the direct marketing/sale of the island's agricultural products to local consumers, through farmers markets and similar venues.					✓
4.3.1.c Encourage growing a diverse variety of crops and livestock to ensure the stewardship of our land while safeguarding consumer safety.					✓

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4.3.1.d Work with the State to regulate and monitor genetically-modified-organism (GMO) crops to ensure the safety of all crops and label all GMO products.			✓
<b>Objective:</b>			
4.3.2 Maintain or increase agriculture's share of the total island economy.			✓
<b>Policies:</b>			
4.3.2.a Encourage the export of the island's agricultural products to offshore markets.			✓
4.3.2.b Support infrastructure investments at harbors, such as ferry service, airports, and other facilities for the rapid and cost-effective export of island-grown products.			✓
4.3.2.c Encourage the continued viability of sugar cane production, or other agricultural crops, in central Maui and all of Maui Island.			✓
4.3.2.d Work with the State to reduce excise taxes for commercial agricultural products produced within the State.			✓
4.3.2.e Coordinate with appropriate State and Federal Departments and agencies, private shipping companies, and farmers associations to assist in the rapid and cost-effective export of Maui's agricultural products to off-island markets.			✓
<b>Objective:</b>			
4.3.3 Expand diversified agriculture production at an average annual rate of 4 percent.			✓
<b>Policies:</b>			
4.3.3.a Promote the development of locally-grown and ecologically-sound biofuels, aquaculture, and forest products.			✓
4.3.3.b Support the development of farming associations/cooperatives.			✓
4.3.3.c Work with educational institutions and appropriate agencies to provide education and training for farm owners and entrepreneurs.			✓
<b>Analysis: Not Applicable</b>			
<b>EMERGING SECTORS</b>			
<b>Goal:</b>			
4.4 A diverse array of emerging economic sectors.			✓
<b>Objective:</b>			
4.4.1 Support increased investment and expanded activity in emerging industries.			✓
<b>Policies:</b>			
4.4.1.a Support the development of and access to state-of-the-art voice, video, and data telecommunications systems and high-speed Internet.			✓
4.4.1.b Attract and assist industries to compete in high technology activities such as those related to renewable energy, green technologies, diversified agriculture, ocean sciences, health sciences, space technologies, and other knowledge-based industries.			✓
4.4.1.c Support new industries that are environmentally and culturally sensitive such as health and wellness, sports and outdoor activities, cultural activities, the arts, film-making, entertainment, and digital media.			✓

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4.4.1.d Support a sustainable, culturally sensitive, astronomy industry.			✓
4.4.1.e Support the continued development of the Maui Research and Technology Park in Kihei, as a center for research and development, education, and diversified economic development, as provided by the Maui County Code.			✓
4.4.1.f Work with appropriate organizations to support the development of high technology clusters around renewable energy, diversified agriculture, ocean sciences, health sciences, and other knowledge-based industries.			✓
<b>Objective:</b>			
4.4.2 Increase the development of renewable energy technologies that are supported by the local community.			✓
<b>Policies:</b>			
4.4.2.a Support the expansion of the renewable energy sector and the use of solar, wind, wave, and biofuel technologies.			✓
4.4.2.b Provide incentives to encourage renewable energy development, the use of green energy technologies, and energy conservation.			✓
4.4.2.c Ensure an adequate supply of land and facilitate permitting to meet the needs for renewable energy technologies such as solar, wind, wave, biofuel, and other technologies, provided that environmental, view plane, and cultural impacts are addressed.			✓
4.4.2.d Support the Maui County Energy Alliance Plan where consistent with the MIP.			✓
<b>Analysis: Not Applicable</b>			
<b><u>SMALL BUSINESS DEVELOPMENT</u></b>			
<b>Goal:</b>			
4.5 Small businesses will play a key role in Maui's economy.	✓		
<b>Objective:</b>			
4.5.1 Increase the number of and revenue generated by small businesses and decrease the percentage of small business failures.	✓		
<b>Policies:</b>			
4.5.1.a Provide incentives and support for small businesses and entrepreneurs that incorporate sustainable technologies and practices into their operations, utilize local materials, or produce and sell locally-made goods or services.			✓
4.5.1.b Assist traditional "mom and pop" business establishments.	✓		
4.5.1.c Reduce barriers to small business development.	✓		
4.5.1.d Require, where feasible, the government procurement of goods and services from locally-owned, small businesses.			✓
4.5.1.e Support community markets and venues that sell locally-made produce, goods, and services.			✓
<b>Analysis: The proposed action benefits small local businesses as it will serve users located at Pulehunui Industrial Park and other island-wide users.</b>			

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<b><u>HEALTH CARE SECTOR</u></b>					
<b><u>Goal:</u></b>					
4.6	Maui will have a health care industry and options that broaden career opportunities that are reliable, efficient, and provide social well-being.				✓
<b><u>Objective:</u></b>					
4.6.1	Expand the economic benefits of the health care sector.				✓
<b><u>Policies:</u></b>					
4.6.1.a	Encourage expanded services at MMMC and at other medical facilities.				✓
4.6.1.b	Support expansion of federally qualified health centers with the direct involvement of the residents of the communities served.				✓
4.6.1.c	Support the use of multimedia as a means to provide healthcare information.				✓
4.6.1.d	Encourage digitalization of all diagnostic equipment at all facilities on Maui to enable sharing of data and more efficient use of limited provider workforce, consistent with data protection and patient privacy.				✓
4.6.1.e	Support the expansion of telemedicine.				✓
4.6.1.f	Encourage expansion and improved access to emergency care in all communities.				✓
<b><u>Objective:</u></b>					
4.6.2	Be more efficient in the delivery of health care services and in minimizing health care costs.				✓
<b><u>Policies:</u></b>					
4.6.2.a	Support expansion of health care providers and facilities to improve access to quality care throughout the island.				✓
4.6.2.b	Encourage the expansion of veteran health care services.				✓
4.6.2.c	Allow home-based out-patient medical care that does not interfere with surrounding neighborhoods.				✓
<b><u>Objective:</u></b>					
4.6.3.	Expand Maui's alternative health care services, including spiritual practices.				✓
<b><u>Policies:</u></b>					
4.6.3.a	Support efforts to promote alternative medicine.				✓
4.6.3.b	Allow small-scale home-alternative medicine businesses such as massage, chiropractic care, traditional Hawaiian healing, and acupuncture that do not interfere with surrounding neighborhoods.				✓
<b><i>Analysis:</i> Not Applicable</b>					
<b><u>EDUCATION AND WORKFORCE DEVELOPMENT</u></b>					
<b><u>Goal:</u></b>					
4.7	Maui will have effective education and workforce development programs and initiatives that are aligned with economic development goals.				✓

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<b>Objective:</b>				
4.7.1	Improve preschool and K-12 education to allow our youth to develop the skills needed to successfully navigate the 21st century.			✓
<b>Policies:</b>				
4.7.1.a	Encourage the State to implement programs such as:			✓
	(1) Universally available preschool for children between the ages of one and five;			✓
	(2) Mandatory kindergarten;			✓
	(3) Mandatory K-5th grade classroom size limits of 1 teacher to 20 students;			✓
	(4) Mandatory nutrition programs; and			✓
	(5) Mandatory Native Hawaiian programs at all grade levels.			✓
4.7.1.b	Encourage the DOE to extend the school day by at least an hour.			✓
4.7.1.c	Encourage the State to increase funding for public education so that Hawai'i is among the top 10 states nationally as measured by investment per pupil.			✓
4.7.1.d	Encourage the State to ensure teacher certifications relate to effective delivery and improved student performances, and develop an industry experience/equivalency certification to assure our DOE students have access to career technical education and training.			✓
4.7.1.e	Encourage the UHMC to provide dormitory space for high school students.			✓
4.7.1.f	Encourage the development and implementation of curriculum on native Hawaiian history, culture, and practices, in consultation with native Hawaiian groups and associations.			✓
<b>Objective:</b>				
4.7.2	Encourage an increase in the number of certificate recipients and associate, bachelors, and graduate degrees conferred.			✓
<b>Policies:</b>				
4.7.2.a	Encourage the State to increase the number of articulation agreements between the UHMC and four-year universities, particularly the University of Hawai'i at Manoa.			✓
4.7.2.b	Encourage the State to expand accredited 2-year, 4-year, and graduate programs through the UHMC.			✓
4.7.2.c	Encourage the education and training of our residents to meet the needs of a diversified economy.			✓
4.7.2.d	Support education and training programs such as student internships, vocational training, and career development opportunities to ensure a highly skilled workforce			✓
4.7.2.e	Work with educational institutions to improve and expand access to education and training through multiple modes, including distance learning.			✓

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<b>Objective:</b>					
4.7.3	Strive to ensure that more of Maui's jobs are developed in STEM-related sectors by 2030.				✓
<b>Policies:</b>					
4.7.3.a	Support the development of STEM-related certificates and degrees at the two- and four year levels.				✓
4.7.3.b	Support the education initiatives of the Maui Agricultural Development Plan.				✓
4.7.3.c	Expand and seek funding for internships, mentoring, job shadowing, etc. to foster interest in health and green workforce careers.				✓
4.7.3.d	Work with MEDB, UHMC, and other similar organizations to expand internship/education programs to support STEM careers.				✓
4.7.3.e	Continue to partner with the MEDB and other similar organizations to recruit, assist, and retain emerging industries, research and development activities, and educational/workforce opportunities.				✓
<b>Analysis: Not Applicable</b>					
<b>CHAPTER 5 – HOUSING</b>					
<b>Goal:</b>					
5.1	Maui will have safe, decent, appropriate, and affordable housing for all residents developed in a way that contributes to strong neighborhoods and a thriving island community.				✓
<b>Objective:</b>					
5.1.1	More livable communities that provide for a mix of housing types, land uses, income levels, and age.				✓
<b>Policies:</b>					
5.1.1.a	Promote livable communities (compact/walkable/bikeable, access to transit) that provide for a mix of housing types and land uses, including parks, open space, and recreational areas.				✓
5.1.1.b	Promote planning approaches that provide a mix of multifamily and single-family housing units to expand housing choices.				✓
5.1.1.c	Discourage gated communities.				✓
5.1.1.d	Provide incentives for the rehabilitation or adaptive reuse of historic structures to facilitate more housing choices.				✓
5.1.1.e	Use planning and regulatory approaches to provide higher housing densities.				✓
<b>Objective:</b>					
5.1.2	Better monitoring, evaluation, and refinement of affordable housing policy in conjunction with the economic cycle.				✓
<b>Policies:</b>					
5.1.2.a	Improve data on resident and nonresident housing.				✓
5.1.2.b	Utilize the following approaches to promote resident housing and to minimize offshore market impacts:				✓

Maui Island Plan Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable		S	N/S	N/A
(1)	Ensure that the future housing stock is composed of a mix of housing types (multifamily, small lots, ohana units, co-housing, cottage houses, etc.);			✓
(2)	Encourage new housing in proximity to jobs and services, in places that are conducive/affordable to island residents; and			✓
(3)	Explore taxation alternatives and building fee structures.			✓
<b>Objective:</b>				
5.1.3	Provide affordable housing, rental or in fee, to the broad spectrum of our island community.			✓
<b>Policies:</b>				
5.1.3.a	Consider regulations that can help keep affordable housing available at affordable rents.			✓
5.1.3.b	Seek to have ownership of affordable for-sale and rental housing vested in a non-profit community land trust, or other qualified housing provider, committed to keeping such housing affordable in perpetuity.			✓
5.1.3.c	Facilitate the use of public lands in urban areas that are suitable for affordable housing.			✓
5.1.3.d	Develop or support partnerships and initiatives that provide housing-related education/outreach.			✓
5.1.3.e	Support the continuing efforts of the County and its community partners to:			✓
(1)	Disseminate information on different housing/financial assistance programs (loans, grants, etc.) including information on housing rehabilitation/restoration/adaptive reuse;			✓
(2)	Provide housing-related counseling including budget, credit, and financial planning assistance; and			✓
(3)	Create and maintain a comprehensive/master list of available affordable housing to help residents secure a unit that satisfies their need.			✓
<b>Objective:</b>				
5.1.4	Provide infrastructure in a more timely manner to support the development of affordable housing.			✓
<b>Policies:</b>				
5.1.4.a	Prioritize the development of infrastructure that supports the development of affordable housing.			✓
5.1.4.b	Utilize appropriate financing approaches and assistance tools to encourage the development of infrastructure and public facilities.			✓
5.1.4.c	Tailor infrastructure requirements to correspond with appropriate level-of-service standards to help control housing costs and to maintain safety.			✓
<b>Objective:</b>				
5.1.5	A wider range of affordable housing options and programs for those with special needs.			✓



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<b><u>Policies:</u></b>					
5.1.5.a	Ensure that residents with special needs have access to appropriate housing.				✓
5.1.5.b	Encourage housing to be built or rehabilitated to allow the elderly and those with special needs to live in their homes.				✓
5.1.5.c	Ensure and facilitate programs to assist those with special needs from becoming homeless.				✓
5.1.5.d	Promote programs that stimulate the production of sustainable homeless shelters and alternative housing technologies.				✓
5.1.5.e	Support programs that offer home modification counseling on low-interest retrofit loans and grants to those with special needs.				✓
<b><u>Objective:</u></b>					
5.1.6	Reduce the cost to developers of providing housing that is affordable to families with household incomes 160 percent and below of annual median income.				✓
<b><u>Policies:</u></b>					
5.1.6.a	Support fast-track processing procedures for the following housing-related entitlements: affordable housing projects/units; indigenous Hawaiian housing/units; and special-needs housing units (seniors, disabled, homeless, etc.).				✓
5.1.6.b	Require the construction of affordable for-sale and rental housing units as part of the construction of new housing developments.				✓
5.1.6.c	Offer extra incentives in boom periods and withdraw incentives during slack periods.				✓
<b><u>Objective:</u></b>					
5.1.7	Increased preservation and promotion of indigenous Hawaiian housing and architecture.				✓
<b><u>Policies:</u></b>					
5.1.7.a	Preserve, promote, and give priority to Hawaiian housing/architecture forms to preserve Hawaiian culture.				✓
5.1.7.b	Provide for indigenous architecture as an allowable structure for native Hawaiian uses to include hula and lā'au lapa'au.				✓
<b><i>Analysis:</i> Not Applicable</b>					
<b>CHAPTER 6 – INFRASTRUCTURE AND PUBLIC FACILITIES</b>					
<b><u>SOLID WASTE</u></b>					
<b><u>Goal:</u></b>					
6.1	Maui will have implemented the ISWMP thereby diverting waste from its landfills, extending their capacities.				✓
<b><u>Objective:</u></b>					
6.1.1	Meet our future solid waste needs with a more comprehensive planning and management strategy.				✓

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<b><u>Policies:</u></b>				
6.1.1.a	Update and publicize the ISWMP every ten years.			✓
6.1.1.b	Strengthen inter-agency coordination including Planning and Environmental Management departments.			✓
6.1.1.c	Divert waste from the landfills and educate the public about the recommendations of the ISWMP.			✓
6.1.1.d	Minimize future active, unlined landfill cells to the extent feasible.			✓
<b><u>Objective:</u></b>				
6.1.2	Divert at least 60 percent of solid waste from the island's landfills.			✓
<b><u>Policies:</u></b>				
6.1.2.a	Require residents and commercial enterprises that generate waste to pay a fair proportion of disposal costs.			✓
6.1.2.b	Encourage environmentally safe waste-to-energy solutions.			✓
6.1.2.c	Facilitate the reduction of solid waste generated by packaging, food service products, construction waste, etc.			✓
6.1.2.d	Educate residents and visitors about the impacts of and methods to reduce, reuse, and recycle.			✓
6.1.2.e	Discourage the disposal of landfill leachate by diversion to wastewater treatment plants, where practicable.			✓
<b><i>Analysis:</i> Not Applicable.</b>				
<b><u>WASTEWATER</u></b>				
<b><u>Goal:</u></b>				
6.2	Maui will have wastewater systems that comply with or exceed State and Federal regulations; meet levels-of-service needs; provide adequate capacity to accommodate projected demand; ensure efficient, effective, and environmentally sensitive operation; and maximize wastewater reuse where feasible.	✓		
<b><u>Objective:</u></b>				
6.2.1	A wastewater planning program capable of efficiently providing timely and adequate capacity to service projected demand where economically feasible and practicable.	✓		
<b><u>Policies:</u></b>				
6.2.1.a	Encourage the use of renewable energy in support of wastewater treatment facilities.	✓		
6.2.1.b	Focus the expansion of wastewater systems to accommodate planned growth consistent with the MIP Directed Growth Strategy.	✓		
6.2.1.c	Establish new wastewater treatment plant(s) outside the tsunami zone.	✓		

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<b>Objective:</b>			
6.2.2 Adequate levels of wastewater service with minimal environmental impacts.	✓		
<b>Policies:</b>			
6.2.2.a Meet or exceed all State and Federal standards regulating wastewater disposal or reuse.	✓		
6.2.2.b Encourage tertiary treatment for all municipal wastewater that is disposed through deep injection wells. Phase out all municipal and private injection wells in coordination with water reuse programs, where feasible, by 2020.	✓		
6.2.2.c Improve and upgrade the County's existing wastewater collection, treatment, and reuse facilities consistent with current and future plans and the County's CIP.			✓
6.2.2.d Maintain an ongoing sewer inspection program for public and private multi-user systems to identify potential problems and forecast each system's residual life.			✓
6.2.2.e Require all new developments to fund system improvements in proportion to the development impact and in accordance with the County's wastewater functional plan.	✓		
6.2.2.f Require appropriate funding mechanisms, such as a sinking fund, to adequately maintain or replace aging water-system components.			✓
6.2.2.g Strongly encourage the phase out of cesspools.			✓
<b>Objective:</b>			
6.2.3 Increase the reuse of wastewater.			✓
<b>Policies:</b>			
6.2.3.a Strengthen coordination between the Department of Water Supply (DWS) and the WWRD to promote reuse/recycling of wastewater.			✓
6.2.3.b Expand the reuse of wastewater from the Central Maui, Kīhei, Lahaina, and other wastewater systems.			✓
<b>Analysis:</b> The proposed project supports the MIP Wastewater goals, objectives, and policies in multiple ways. It utilizes renewable (solar) energy for wastewater treatment, supports development in an Urban Growth area, reduces environmental impacts associated with current treatment methods, and reduces use of injection wells for both County and private wastewater treatment facilities.			
<b>WATER</b>			
<b>Goal:</b>			
6.3 Maui will have an environmentally sustainable, reliable, safe, and efficient water system.			✓
<b>Objective:</b>			
6.3.1 More comprehensive approach to water resources planning to effectively protect, recharge, and manage water resources including watersheds, groundwater, streams, and aquifers.			✓

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<b><u>Policies:</u></b>					
6.3.1.a	Ensure that DWS actions reflect its public trust responsibilities toward water.				✓
6.3.1.b	Ensure the WUDP implements the State Water Code and MIP's goals, objectives, and policies.				✓
6.3.1.c	Regularly update the WUDP, to maintain compliance with the General Plan.				✓
6.3.1.d	Ensure that the County's CIP for water-source development is consistent with the WUDP and the MIP.				✓
6.3.1.e	Where desirable, retain and expand public ownership and management of watersheds and fresh-water systems.				✓
6.3.1.f	Encourage and improve data exchange and coordination among Federal, State, County, and private land use planning and water resource management agencies.				✓
<b><u>Objective:</u></b>					
6.3.2	Increase the efficiency and capacity of the water systems in striving to meet the needs and balance the island's water needs.				✓
<b><u>Policies:</u></b>					
6.3.2.a	Ensure the efficiency of all water system elements including well and stream intakes, water catchment, transmission lines, reservoirs, and all other system infrastructure.				✓
6.3.2.b	Encourage increased education about and use of private catchment systems where practicable for nonpotable uses.				✓
6.3.2.c	Maximize the efficient use of reclaimed wastewater to serve nonpotable needs.				✓
6.3.2.d	Work with appropriate State and County agencies to achieve a balance in resolving the needs of water users in keeping with the water allocation priorities of the MIP.				✓
6.3.2.e	Ensure water conservation through education, incentives, and regulations.				✓
6.3.2.f	Acquire and develop additional sources of potable water.				✓
<b><u>Objective:</u></b>					
6.3	Improve water quality and the monitoring of public and private water systems.				✓
<b><u>Policy:</u></b>					
6.3.3.a	Protect and maintain water delivery systems.				✓
<b><i>Analysis: Not Applicable</i></b>					
<b><u>TRANSPORTATION</u></b>					
<b><u>Goal:</u></b>					
6.4	An interconnected, efficient, and well-maintained, multimodal transportation system.				✓

Maui Island Plan Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable	S	N/S	N/A
<b>Objective:</b>			
6.4.1 Provide for a more integrated island-wide transportation and land use planning program that reduces congestion and promotes more efficient (transit-friendly) land use patterns.			✓
<b>Policies:</b>			
6.4.1.a Plan for an integrated multi-modal transportation system comprised of public transit, bicycle, pedestrian, automobile, and other transportation modes.			✓
6.4.1.b Refocus transportation investment from the construction of additional roadways only for the automobile to the expansion of a multimodal transportation system.			✓
6.4.1.c Encourage the use of “complete streets” design methods.			✓
6.4.1.d Encourage employers to implement TDM strategies.			✓
<b>Objective:</b>			
6.4.2 Safe, interconnected transit, roadway, bicycle, equestrian, and pedestrian network.			✓
<b>Policies:</b>			
6.4.2.a Ensure transit-, roadway-, and pedestrian-facilities design and level-of-service standards respect the unique character of our communities.			✓
6.4.2.b Prioritize transportation improvements list to cost-effectively meet existing and future needs consistent with the MIP.			✓
6.4.2.c Require new development, where appropriate, to integrate sidewalks, pathways, bikeways, and transit infrastructure into new commercial and residential projects while enhancing community character.			✓
6.4.2.d Identify and improve hazardous and substandard sections of roadways, drainage infrastructure, and bridges, provided that the historical integrity of the roads and bridges are protected.			✓
6.4.2.e Consider identification, acquisition where appropriate, and utilization of abandoned right of-ways for bikeways, pedestrian pathways, and open-space networks.			✓
6.4.2.f Support the implementation of the <i>Central Maui Pedestrian &amp; Bicycle Master Plan</i> (March 2012), when consistent with the MIP.			✓
<b>Objective:</b>			
6.4.3 An island-wide, multimodal transportation system that respects and enhances the natural environment, scenic views, and each community’s character.			✓
<b>Policies:</b>			
6.4.3.a Ensure that the roadway and transit alignments respect the natural environment and scenic views.			✓
6.4.3.b Ensure that roadways and transit systems in rural areas and small towns enhance community character.			✓
6.4.3.c Design all transit systems to respect visual corridors and Maui’s character.			✓
<b>Analysis: Not Applicable</b>			

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<b>TRANSIT</b>					
<b>Goal:</b>					
6.5	An island-wide transit system that addresses the needs of residents and visitors and contributes to healthy and livable communities.				✓
<b>Objective:</b>					
6.5.1	An integrated transit system that better serves all mobility needs of Maui's residents and visitors.				✓
<b>Policies:</b>					
6.5.1.a	Maximize access to public transit in town centers, commercial districts, and employment centers.				✓
6.5.1.b	Expand regional and inter-regional transit services, where appropriate, in heavily traveled corridors and within communities				✓
6.5.1.c	Increase the frequency of current service, add additional bus routes as demand requires, and transition to nonpolluting transit vehicles, as funding permits.				✓
6.5.1.d	Provide adequate transit infrastructure (e.g., bus pullouts, waiting benches and shelters, signs) along existing and future transit right-of-ways.				✓
6.5.1.e	Require new development where appropriate, to provide right-of-ways (ROWs) to accommodate transit circulation and support facilities.				✓
6.5.1.f	Identify, protect, and preserve, or acquire corridors for future inter-community transit use, including but not limited to, rail and also multimodal use corridors.				✓
6.5.1.g	Establish transit corridors by planning for and securing right-of-way when appropriate for alternative modes of transportation (such as rail and water ferry service).				✓
6.5.1.h	Pursue improvements and upgrades to the existing transit system consistent with updated MDOT planning studies/transit plans (within the framework of comprehensive island-wide multimodal transportation plans).				✓
6.5.1.i	Increase inter-agency coordination between the Department of Planning, State Department of Transportation, County Department of Public Works, and other applicable agencies.				✓
<b>Objective:</b>					
6.5.2	Plan for a more diversified and stable funding base to support transportation goals.				✓
<b>Policies:</b>					
6.5.2.a	Support alternative methods and sources of funding transportation improvements (including impact fees, higher taxes, fare adjustments, dedicated sources of funding, and assessments).				✓
6.5.2.b	Collaborate with public-private entities or nonprofit organizations to reduce public transit operational expenses.				✓
6.5.2.c	Coordinate with appropriate Federal, State, and County agencies to fund transportation projects in areas where growth is anticipated.				✓
<b>Analysis: Not Applicable</b>					

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<b><u>PARKS</u></b>					
<b><u>Goal:</u></b>					
6.6	Maui will have a diverse range of active and passive recreational parks, wilderness areas, and other natural-resource areas linked, where feasible, by a network of greenways, bikeways, pathways, and roads that are accessible to all.				✓
<b><u>Objective:</u></b>					
6.6.1	More effective, long-range planning of parks and recreation programs able to meet community needs.				✓
<b><u>Policies:</u></b>					
6.6.1.a	Support, consistent with the MIP, the implementation of open-space and recreational plans, such as the <i>Pali to Puamana Parkway Master Plan</i> and the <i>Upcountry Greenways Master Plan</i> .				✓
6.6.1.b	Utilize the ahupua'a approach by integrating mauka-to-makai natural landscapes into an island-wide parks and recreation functional plan.				✓
6.6.1.c	Provide a balanced mix of passive and active parks, including neighborhood, community, and regional parks, in each community plan area.				✓
6.6.1.d	Support the expansion of Haleakala National Park, where supported by affected communities.				✓
6.6.1.e	Support lo'i and dryland taro restoration in County, State, and Federal parks.				✓
6.6.1.f	Encourage private landowners to dedicate land to Federal, State, or County governments, or nonprofit land trusts, for parks and open-space protection consistent with the MIP.				✓
6.6.1.g	Strengthen inter-agency coordination including State and County departments, such as resolving joint use of facilities and properties.				✓
6.6.1.h	Work with the State to prepare and implement a master management plan for 'Āhihi-Kīna'u and La Perouse-Keone'ō'io Bay to Kanaloa Point region.				✓
<b><u>Objective:</u></b>					
6.6.2	Achieve parks and recreation opportunities to meet the diverse needs of our community.				✓
<b><u>Policies:</u></b>					
6.6.2.a	Establish appropriate level-of-service standards at the neighborhood, community, and regional levels.				✓
6.6.2.b	Identify and acquire parks and recreational facilities that address existing park inadequacies and complement and enhance neighborhoods, communities, and natural land features.				✓
6.6.2.c	Design park facilities to preserve and enhance natural site characteristics, maximize views, protect environmental and cultural sites, and minimize water demands.				✓
6.6.2.d	Acquire lands along the shoreline, between coastal roadways and the ocean.				✓
6.6.2.e	Encourage the development of regional parks, district parks, and greenways in a manner that helps to contain sprawl, provide separation between distinct communities, or offer open space within urban communities.				✓

<b>Maui Island Plan Goals, Objectives and Policies</b> <b>Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable</b>	<b>S</b>	<b>N/S</b>	<b>N/A</b>
6.6.2.f Require large master-planned communities that incorporate a mixture of park facilities pursuant to parks standards and functional plans.			✓
6.6.2.g Support appropriate areas for cultural parks (e.g., Kepaniwai) in each community plan area.			✓
6.6.2.h Incorporate community input to determine the appropriate location, design, and long-term stewardship of parks and recreation facilities.			✓
6.6.2.i Manage commercial activities at public parks to minimize impacts to residents.			✓
6.6.2.j Support public-private partnerships to implement the acquisition and development of parks when consistent with the General Plan.			✓
6.6.2.k Support a coordinated program to improve, operate, and maintain joint-use facilities and grounds.			✓
<b><u>Objective:</u></b>			
6.6.3 An expanded network of greenways, trails, pathways, and bikeways.			✓
<b><u>Policies:</u></b>			
6.6.3.a Link existing and future park sites, natural areas, the shoreline, and residential areas with a network of bikeways, pedestrian paths, trails, and greenways.			✓
6.6.3.b Support the implementation of plans and programs that facilitate pedestrian mobility and access to active and passive recreation areas and sites.			✓
6.6.3.c Collaborate with the State and private land owners to ensure perpetual access and proper stewardship of traditional trails and access systems.			✓
6.6.3.d Facilitate the development of well-managed noncommercial campgrounds throughout the island.			✓
6.6.3.e Consider requiring commercial bike rental businesses to provide funding that supports a mauka-to-makai Haleakalā bikeway improvement program.			✓
6.6.3.f Ensure ADA compliance and seek opportunities to make all parks and recreational facilities accessible to people with disabilities.			✓
<b><i>Analysis:</i> Not Applicable</b>			
<b><u>PUBLIC FACILITIES</u></b>			
<b><u>Goal:</u></b>			
6.7 Maui will have adequate public facilities that meet the diverse needs of residents.			✓
<b><u>Objective:</u></b>			
6.7.1 More effective planning for public facilities to meet community needs.			✓
<b><u>Policies:</u></b>			
6.7.1.a Ensure the development and update of island-wide public facilities functional plans that incorporate prioritized facilities, programs, and a financial component.			✓
6.7.1.b Establish appropriate level-of-service standards for public facilities provided by the County.			✓
6.7.1.c Pursue improvements and upgrades of County public facilities consistent with the public facilities functional plan.			✓



<b>Maui Island Plan Goals, Objectives and Policies</b> <b>Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable</b>	<b>S</b>	<b>N/S</b>	<b>N/A</b>
6.7.1.d Recognize Wailuku Town as Maui's Civic Center and support the revitalization of the Civic Center District by consolidating government office spaces, enhancing landscape beautification, and providing adequate public parking.			✓
6.7.1.e Support, with community input, the relocation of the Maui Community Correctional Center from Wailuku to an appropriate location in Pu'unēnē.			✓
6.7.1.f Adequately plan and fund public safety facilities (fire, police, ambulance, civil defense) to meet community needs.			✓
6.7.1.g Increase joint facilities utilization and program coordination between State and County agencies such as baseyards, communication centers, recreational facilities, etc., where feasible.			✓
6.7.1.h Focus future expenditures for additional government office space, parking, and related facilities in Wailuku's Civic Center District.			✓
6.7.1.i Encourage continuous and safe walkways for children within one mile of each school.			✓
6.7.1.j Encourage public-private partnerships to identify and resolve public facility plan shortcomings when consistent with the General Plan.			✓
6.7.1.k Incorporate community/area residents' input to determine the appropriate location and design of public facilities.			✓
<b>Analysis: Not Applicable</b>			
<b><u>SCHOOLS AND LIBRARIES</u></b>			
<b><u>Goal:</u></b>			
6.8 Maui will have school and library facilities that meet residents' needs and goals.			✓
<b><u>Objective:</u></b>			
6.8.1 Assist in providing appropriate school and library facilities in a timely manner and in strategic locations.			✓
<b><u>Policies:</u></b>			
6.8.1.a Work in partnership with all educational institutions to meet current and future needs including appropriate location, timing, and design of future facilities.			✓
6.8.1.b Allow for the expansion and intensification of uses at the UHMC including satellite campuses operating in remote areas.			✓
6.8.1.c Encourage the DOE to build and maintain smaller, community-oriented schools.			✓
6.8.1.d Encourage better cooperation by the State and County for use of State and County facilities.			✓
6.8.1.e Encourage the State to upgrade, modernize, and expand school facilities, including those in remote communities.			✓
6.8.1.f Work with the State to develop a master plan for the expansion of UHMC in accordance with the MIP.			✓
6.8.1.g Support partnerships (public/private/nonprofit) to build and staff new schools and improve existing facilities.			✓
6.8.1.h Work with the BOE HSPLS to provide centralized library services (including telecommunications) to all areas of Maui.			✓

Maui Island Plan Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable		S	N/S	N/A
6.8.1.i	Work with the State to expedite planning and construction of Kīhei High School, including the integration of the high school with the Maui Research and Technology Park.			✓
6.8.1.j	Work with the State to identify intermediate school sites in Central Maui and other areas where needed.			✓
<b>Objective:</b>				
6.8.2	Provide a more expansive network of safe and convenient pedestrian-friendly streets, trails, pathways, and bikeways between neighborhoods and schools where appropriate.			✓
<b>Policies:</b>				
6.8.2.a	Encourage the State to build new school facilities in appropriate locations that minimize time and distance for students to travel to and from school.			✓
6.8.2.b	Encourage the State to implement the Safe Routes to School initiative with funding commitments to help the County plan and fund projects that ensure safe access routes to school.			✓
<b>Analysis: Not Applicable</b>				
<b>HEALTH CARE</b>				
<b>Goal:</b>				
6.9	All of Maui residents will have the best possible health care to include healthy living, disease prevention, as well as acute and long-term care.			✓
<b>Objective:</b>				
6.9.1	Greater autonomy to the Maui region in their efforts to improve medical care on the island.			✓
<b>Policies:</b>				
6.9.1.a	Encourage the State to give greater autonomy to the Maui region in their efforts to improve medical care on the island.			✓
6.9.1.b	Support innovative financial solutions, such as capital partnerships, joint ventures, and consolidations for MMMC and other health institutions.			✓
6.9.1.c	Support MMMC as a major core medical center that provides a greater range of services.			✓
6.9.1.d	Support the immediate development of a critical access hospital in West Maui.			✓
6.9.1.e	Support the expansion of regional critical-access facilities, where allowed by Federal regulations.			✓
6.9.1.f	Improve medical service to remote and outlying regions.			✓
6.9.1.g	Support transportation services for dialysis patients and community dialysis programs.			✓
6.9.1.h	Work with the State to determine the feasibility of appropriate medical facilities in South Maui and Hāna, including the possible reestablishment of a small community hospital in Hāna, the establishment of a hospital in South Maui, and assist the State in securing funding to meet Maui's health care needs.			✓

Maui Island Plan Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable		S	N/S	N/A
<b>Objective:</b>				
6.9.2	An expansion of long-term care facilities and long-term care alternatives to meet the needs of our aging population.			✓
<b>Policies:</b>				
6.9.2.a	Support efforts to increase Maui's long-term care bed capacity to cover current and future needs, close to large population centers.			✓
6.9.2.b	Recognize that facilities for low-income elders who need long-term care are a needed form of affordable and subsidized housing.			✓
6.9.2.c	Evaluate the needs of the long-term disabled and provide planning support for their care, if there is a need for long-term care facilities.			✓
6.9.2.d	Consider long-term care facilities as a major potential employment base and encourage the recruitment and training of potential employees.			✓
<b>Objective:</b>				
6.9.3	More support to home-care and community-based programs so they become alternatives to traditional nursing homes.			✓
<b>Policies:</b>				
6.9.3.a	Support the establishment of a program to assist the elderly and people with disabilities to remain in their homes or in a home-like setting.			✓
6.9.3.b	Support the establishment of senior and adult-day-care centers and senior housing.			✓
6.9.3.c	Continue to support existing senior centers (e.g. Kaunoa), and establish new senior centers that will provide day-care sites and programs for the disabled and elderly.			✓
6.9.3.d	Support funding alternatives for community-based services that assist home-care efforts.			✓
6.9.3.e	Encourage the State to adopt the recommendations contained within the Legislative Reference Bureau's report entitled "Gimme a Break: Respite Care Services in Other States," (December 2007) where appropriate, feasible, and consistent with the MIP.			✓
<b>Objective:</b>				
6.9.4	Improved preventative medicine and primary health care.			✓
<b>Policies:</b>				
6.9.4.a	Develop and utilize health-status benchmarks to measure prevention and primary health care service delivery.			✓
6.9.4.b	Support programs that provide family planning assistance.			✓
<b>Analysis: Not Applicable</b>				
<b>ENERGY</b>				
<b>Goal:</b>				
6.10	Maui will meet its energy needs through local sources of clean, renewable energy, and through conservation.			✓

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<b>Objective:</b>			
6.10.1 Reduce fossil fuel consumption. Using the 2005 electricity consumption as a baseline, reduce by 15 percent in 2015; 20 percent by 2020; and 30 percent by 2030.			✓
<b>Policies:</b>			
6.10.1.a Support energy efficient systems, processes, and methods in public and private operations, buildings, and facilities.			✓
6.10.1.b Support the Maui Solar Rooftop initiative.			✓
6.10.1.c Support Hawai'i Energy and other Public Utility Commission (PUC) approved energy efficiency programs.			✓
<b>Objective:</b>			
6.10.2 Increase the minimum percentage of electricity obtained from clean, renewable energy sources. By 2015, more than 15 percent of Maui's electricity will be produced from locally-produced, clean, renewable energy sources, 25 percent by 2020, and 40 percent by 2030.			✓
<b>Policies:</b>			
6.10.2.a Evaluate available renewable energy resource sites and applicable technologies.			✓
6.10.2.b Encourage the installation of renewable energy systems, where appropriate.	✓		
6.10.2.c Support the establishment of new renewable energy facilities at appropriate locations provided that environmental, view plane, and cultural impacts are addressed.	✓		
6.10.2.d Encourage all new County facilities completed after January 1, 2015, to produce at least 15 percent of their projected electricity needs with onsite renewable energy.			✓
<b>Objective:</b>			
6.10.3 Increased use of clean, renewable energy.	✓		
<b>Policies:</b>			
6.10.3.a Support efforts in the PUC to upgrade Maui's power grid to integrate renewable energy from multiple sources and wheeling of electricity.			✓
6.10.3.b Encourage the PUC to work with the County to implement and expedite community supported renewable energy projects.			✓
6.10.3.c Encourage efforts to produce more renewable energy using distributed generation.			✓
6.10.3.d Encourage import substitution by MECO and the broader community to become more self-sufficient in energy production.			✓
6.10.3.e Educate the public on the economic and environmental benefits from the increased use of renewable energy.			✓
6.10.3.f Encourage support from the Federal government, State, and the private sector for Maui's renewable energy objectives.			✓
6.10.3.g Encourage incentives to support the development and use of renewable energy.			✓

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<b>Objective:</b>				
6.10.4	More efficient distribution of power throughout the island while preserving island beauty.			✓
<b>Analysis:</b> The proposed project will utilize photo voltaic panels to offset energy use associated with the wastewater treatment processes.				
<b>HARBORS AND AIRPORT</b>				
<b>Goal:</b>				
6.11	Maui will have harbors and airports that will efficiently, dependably, and safely facilitate the movement of passengers and cargo.			✓
<b>Objective:</b>				
6.11.1	Upgraded harbor facilities to handle larger volumes of freight and passengers and additional small boat harbors.			✓
<b>Policies:</b>				
6.11.1.a	Support the expansion and upgrade of Kahului Harbor through the following, provided that any expansion is respectful of cultural practices and existing recreational uses and supports improved water quality:			✓
	(4) Accommodate increasing volumes of cargo;			✓
	(5) Provide deeper pier depths and greater fuel-receiving and storing capacities; and			✓
	(6) Ensure safe and efficient work areas, including separating passenger operations from fuel and cargo operations.			✓
6.11.1.b	Work with public and private entities to provide adequate pier slips, utilities, repair facilities, and waste-disposal capabilities.			✓
6.11.1.c	Encourage the State to safely separate passenger (cruise and ferry) operations from hazardous bulk fuels and heavy cargo transporting operations, while not decreasing harbor's capacity to safely support various recreational uses.			✓
6.11.1.d	Encourage the State to develop cargo inspecting sites and facilities for efficient cargo and container processing and transportation and to prevent alien species entry.			✓
6.11.1.e	Support a State and County task force to study the feasibility of a second commercial harbor on Maui.			✓
<b>Objective:</b>				
6.11.2	Establish more economically thriving and environmentally sensitive small boat harbors accommodating resident and business activity, including fishing, recreation, and tour boats.			✓
<b>Policy:</b>				
6.11.2.a	Provide for needed shore-side facilities and capabilities to support small boat harbor users (e.g. repair facilities, parking, cold storage, and mass-transit connections).			✓

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<b>Objective:</b>					
6.11.3 Upgraded airport facilities and navigation aids to serve the needs of passengers, freight movements, and general aviation.					✓
<b>Policies:</b>					
6.11.3.a Protect the island's airports from encroaching urbanization that may negatively impact the airport operations.					✓
6.11.3.b Support State efforts to improve Kahului Airport operations to better serve passenger and cargo needs.					✓
6.11.3.c Support State efforts to identify sites and plan to relocate and accommodate small and rotary wing aircraft.					✓
6.11.3.d Encourage the State to improve airport safety including lighting, fuel transmission, fuel safety, etc.					✓
6.11.3.e Consider expansion of rental car facilities in West and South Maui.					✓
6.11.3.f Consider expansion of mass transit (bus, fixed-rail, shuttle, and taxis, bicycle, and pedestrian facilities) to and from Kahului Airport and not limited to passenger movements (allowing for luggage and cargo).					✓
6.11.3.g Encourage the State to maintain airport capacity and to encourage more responsive air services to Hāna and Kapalua.					✓
<b>Analysis: Not Applicable</b>					
<b>CHAPTER 7 – LAND USE</b>					
<b>AGRICULTURAL LANDS</b>					
<b>Goal:</b>					
7.1 Maui will have a prosperous agricultural industry and will protect agricultural lands.					✓
<b>Objective:</b>					
7.1.1 Significantly reduce the loss of productive agricultural lands.					✓
<b>Policies:</b>					
7.1.1.a Allow, where appropriate, the clustering of development on agricultural lands when approved as a CSD plan or similar approval mechanism.					✓
7.1.1.b Require, where appropriate, the review and approval of CSD plans prior to the subdivision of agricultural land.					✓
7.1.1.c Discourage developing or subdividing productive agricultural lands for residential uses in which the residence would be the primary use and any agricultural activities would be secondary uses.					✓
7.1.1.d Consider requirements for public notification and review of the subdivision of agricultural land into four or more lots.					✓
7.1.1.e Focus urban growth, to the extent practicable, away from productive and important agricultural lands.					✓
7.1.1.f Strongly discourage the conversion of productive and important agricultural lands (such as sugar, pineapple, and other produce lands) to rural or urban use, unless justified during the General Plan update, or when other overriding factors are present.					✓

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7.1.1.g Further develop the requirements for agricultural assessments found under Section 19.510, MCC.			✓
7.1.1.h Provide incentives for landowners to preserve and protect agricultural lands from development through the use of TDR/PDR, tax credits, easement programs, or similar means.			✓
7.1.1.i Promote the use of U.S.D.A. Farm and Ranch Lands Protection Program grants to fund the acquisition of conservation easements on eligible agricultural lands.			✓
7.1.1.j Require all major developments adjacent to agricultural lands to provide an appropriate and site-specific agricultural protection buffer as part of a required site plan.			✓
7.1.1.k Support and promote the viability of Maui's agricultural businesses through property tax incentives and other programs and subsidies.			✓
7.1.1.l Encourage future community plan efforts to identify lands within the County Agricultural zoning district that are primarily being used for large-lot residential or rural use and consider such lands for reclassification to an appropriate County Rural zone.			✓
<b>Objective:</b>			
7.1.2 Reduction of the island's dependence on off-island agricultural products and expansion of export capacity.			✓
<b>Policies:</b>			
7.1.2.a Coordinate with the agricultural community, associations/community groups, agricultural landowners, and the State to designate IALs.			✓
7.1.2.b Support an incentive package for productive Agricultural Lands which aims to ensure agricultural viability for small- and commercial-scale agricultural producers.			✓
7.1.2.c Actively look to acquire land and provide infrastructure to expand the agricultural park and establish new agricultural parks.			✓
7.1.2.d Support the designation of a research and development area within agricultural parks to help farmers stay attuned to new technology and research.			✓
7.1.2.e Support local cooperative extension services to facilitate timely technology transfer opportunities.			✓
7.1.2.f Support plans and programs to develop additional sources of water for irrigation purposes.			✓
7.1.2.g Consider appropriate subdivision requirements (gravel roads, above-ground utilities, etc.) in those subdivisions creating Agricultural Parks where lots are limited to agricultural production with no dwellings.			✓
7.1.2.h Support the recommendations, policies, and actions contained within the Maui Agricultural Development Plan, July 2009, when consistent with the MIP.			✓
7.1.2.i Allow water and tax discounts for legitimate farming operations on rural and agricultural land.			✓
7.1.2.j Give priority in delivery and use of agricultural water and agricultural land within County agricultural parks to cultivation of food crops for local consumption.			✓
7.1.2.k Support programs that control pests and diseases that affect agriculture.			✓

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7.1.2.l Support the development of training and apprenticeship programs to encourage an adequate supply of agricultural workers.			✓
<b>Objective:</b>			
7.1.3 Support and facilitate connectivity between communities.			✓
<b>Policies:</b>			
7.1.3.a Evaluate the impact of gated communities on interconnectivity.			✓
7.1.3.b Discourage land use and urban design that impedes interconnectivity between adjacent communities.			✓
<b>Analysis: Not Applicable</b>			
<b><u>RURAL AREAS</u></b>			
<b>Goal:</b>			
7.2 Maui will have a rural landscape and lifestyle where natural systems, cultural resources and farm lands are protected and development enhances and compliments the viability and character of rural communities.			✓
<b>Objective:</b>			
7.2.1 Reduce the proliferation and impact of residential development outside of urban, small town, and rural growth boundaries.			✓
<b>Policies:</b>			
7.2.1.a Focus development to areas inside urban, small town, and rural growth boundaries to preserve natural, cultural, and agricultural resources.			✓
7.2.1.b Encourage cluster development with a mandatory buffer requirement/clear edge at the interface of country towns, agricultural uses, and surrounding rural landscapes.			✓
7.2.1.c Encourage or require, where appropriate, CSDs and the use of green spaces/natural separations to protect the character of rural landscapes.			✓
7.2.1.d Encourage basic goods/services in business country towns.			✓
7.2.1.e Allow for mixed uses, including residential uses, within Business Country Town Districts.			✓
7.2.1.f Encourage the use of alternative stormwater management techniques that minimize land disturbance and preserve natural drainage features.			✓
7.2.1.g Encourage green belts, open space buffers, and riparian zones to minimize conflicts between agriculture and residential uses.			✓
7.2.1.h Evaluate the impact of gated communities on inter-connectivity.			✓
<b>Objective:</b>			
7.2.2 More appropriate service/infrastructure standards to enhance and protect the island's rural character and natural systems.			✓
<b>Policies:</b>			
7.2.2.a Minimize impermeable surfaces within rural areas.			✓



<b>Maui Island Plan Goals, Objectives and Policies</b> <b>Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable</b>	<b>S</b>	<b>N/S</b>	<b>N/A</b>
7.2.2.b Protect and support the character, economic viability, and historic integrity of Maui's small towns.			✓
7.2.2.c Use infrastructure, public service, and design standards that are appropriate to rural areas.			✓
7.2.2.d Discourage land use and urban design that impede interconnectivity between adjacent communities.			✓
<b>Analysis: Not Applicable</b>			
<b><u>URBAN AREAS</u></b>			
<b><u>Goal:</u></b>			
7.3 Maui will have livable human-scale urban communities, an efficient and sustainable land use pattern, and sufficient housing and services for Maui residents.			✓
<b><u>Objective:</u></b>			
7.3.1 Facilitate and support a more compact, efficient, human-scale urban development pattern.			✓
<b><u>Policies:</u></b>			
7.3.1.a Ensure higher-density compact urban communities, infill, and redevelopment of underutilized urban lots within Urban Growth Boundaries.			✓
7.3.1.b Maintain a distinct separation between communities, such as but not limited to, Wailuku and Waikapū; Wailuku and Waihe'e; Pukalani and Makawao; Pukalani and Kula; Makawao and Hāli'imaile; Lahaina and Kā'anapali; Kīhei and Mā'alaea; and Mā'alaea and Waikapū, to protect the character and identity of Maui's communities.			✓
7.3.1.c Strengthen evaluation requirements for new urban expansion, new towns, and major urban infill projects within urban growth areas. Tailor submittal requirements to reflect the impact or scale of different projects.			✓
7.3.1.d Ensure future amendments to urban growth boundaries achieve the following: (1) provide a beneficial extension of the existing community; (2) are in areas where it is cost-effective to provide and operate infrastructure/public service facilities; and (3) do not promote automobile-oriented land use patterns.			✓
7.3.1.e Evaluate the impact of gated communities on inter-connectivity.			✓
7.3.1.f Encourage the development and implementation of neighborhood design standards that are environmentally friendly, such as LEED for Neighborhood Development (LEED – ND) standards.			✓
7.3.1.g Discourage future pyramid zoning within the industrial zoning districts, while allowing accessory commercial uses and grandfathering existing uses.			✓
7.3.1.h Promote agriculture by encouraging community gardening, community-supported agricultural programs, and farmers markets within and adjacent to urban areas.			✓
7.3.1.i Discourage land use and urban design that impedes inter-connectivity between adjacent communities.			✓
<b><u>Objective:</u></b>			
7.3.2 Facilitate more self-sufficient and sustainable communities.			✓

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<b><u>Policies:</u></b>			
7.3.2.a When developing new communities, provide sufficient lands for commercial, appropriate industrial, educational, spiritual, and non-profit uses to serve the daily needs of community residents.			✓
7.3.2.b Site community facilities such as schools, parks, libraries, and community centers within walking and biking distance of residences.			✓
7.3.2.c Facilitate self-sufficient communities and shorten commutes by:			✓
(1) Directing residential development to job-rich areas;			✓
(2) Allowing for appropriate commercial development and community services to shorten commutes; and			✓
(3) Allowing home occupations or home-based businesses that are compatible with surrounding neighborhoods and lifestyles.			✓
7.3.2.d Ensure, where appropriate, that affordable employee housing and multi-modal transportation opportunities are located near major employment centers.			✓
7.3.2.e Discourage the establishment of bedroom communities where long commutes are required to employment centers.			✓
7.3.2.f Facilitate the development of housing by focusing projects in locations where land and infrastructure costs facilitate the development of affordably-priced housing.			✓
7.3.2.g Provide incentives to facilitate the development of multifamily housing.			✓
7.3.2.h Encourage the placement of rental housing projects in the same areas as for-sale housing to facilitate mixed-income communities.			✓
7.3.2.i Develop communities that provide sufficient parks, schools, libraries, and other essential public facilities and services to serve resident needs.			✓
7.3.2.j Promote agriculture by encouraging community gardening, edible landscaping, community-supported agricultural programs, and farmers markets within and adjacent to urban areas.			✓
<b><u>Objective:</u></b>			
7.3.3 Strengthen the island's sense of place.			✓
<b><u>Policies:</u></b>			
7.3.3.a Protect and enhance the unique architectural and landscape characteristics of each community.			✓
7.3.3.b Encourage Hawaiian architecture and tropical building designs.			✓
7.3.3.c Support the continued revitalization of historic country towns, Wailuku Town, and Kahului's commercial core and harbor-front without displacing traditional, cultural, recreational and customary uses.			✓
7.3.3.d Strongly encourage the preservation of buildings, structures, and sites of historic significance.			✓
7.3.3.e Require community input through Design Workshops for major new urban expansion, new towns, and major urban infill projects.			✓

<b>Maui Island Plan Goals, Objectives and Policies</b>			
<b>Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable</b>			
	<b>S</b>	<b>N/S</b>	<b>N/A</b>
7.3.3.f Require design enhancement, landscaping, and integration of park and rides, bicycle parking areas, and mass-transit infrastructure to mitigate the effect of parking lots and structured parking on the urban landscape.			✓
7.3.3.g Ensure that safe and attractive public spaces (e.g., plazas, parks, town/village squares) are provided throughout the island's urban areas.			✓
<b><u>Objective:</u></b>			
7.3.4 Strengthen planning and management for the visitor industry to protect resident quality of life and enhance the visitor experience.			✓
<b><u>Policies:</u></b>			
7.3.4.a Discourage the conversion of hotel units to timeshares and fractional ownership.			✓
7.3.4.b Monitor and manage the amount of, and impacts from, timeshares and fractional ownership.			✓
7.3.4.c Manage short-term rentals and bed-and-breakfast homes through a permitting and regulatory process in accordance with adopted ordinances and community plan policies.			✓
7.3.4.d Limit large-scale resort development to the four existing resort destination areas of Wailea, Mākena, Kapalua and Kā'anapali. "Large Scale Resort" is defined as complexes that include multiple accommodation facilities, activity businesses, retail complexes, and other amenities.			✓
<b><u>Objective:</u></b>			
7.3.5 Ensure that Maui's planning and development review process becomes more transparent, efficient, and innovative.			✓
<b><u>Policies:</u></b>			
7.3.5.a Encourage greater community involvement in land use planning and decision making.			✓
7.3.5.b Establish a predictable and timely development review process that facilitates the approval of projects that meet planning and regulatory requirements.			✓
7.3.5.c Increase inter-agency coordination between the Department of Planning and all State and County agencies responsible for infrastructure and public facilities provision, particularly as it relates to the mitigation of long-term cumulative impacts resulting from development projects.			✓
7.3.5.d Provide greater certainty and transparency in the development review process.			✓
7.3.5.e Expand and maintain land use and geographic information system databases for improved decisions, and make data and products available to the public.			✓
<b><i>Analysis:</i> Not Applicable</b>			
<b>CHAPTER 8 – DIRECTED GROWTH PLAN</b>			
<b><u>URBAN AND SMALL TOWN GROWTH AREA</u></b>			
<b><u>Goal:</u></b>			
8.1 Maui will have well-serviced, complete, and vibrant urban communities and traditional small towns through sound planning and clearly defined development expectations.	✓		

Maui Island Plan Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable		S	N/S	N/A
<b><u>Policies:</u></b>				
8.1.a	The County, with public input, will be responsible for designating new growth areas where infrastructure and public facilities will be provided, consistent with the policies of the MIP and in accordance with State and County infrastructure plans.			✓
8.1.b	Amendments to a UGB or STB shall be reviewed as a MIP amendment. A UGB or STB shall only be expanded if the island-wide inventory (maintained by the Department of Planning) of existing land uses (residential, commercial, industrial) indicates that additional urban density land is necessary to provide for the needs of the projected population growth within ten years of that inventory; or, during the decennial update of the MIP.			✓
8.1.c	Community plans shall provide for urban density land use designations only within UGBs and Small Towns. The County may only support and approve State Urban Land Use Designations for areas within UGBs, STBs, and Rural Villages.			✓
8.1.d	The unique character and function of existing small towns shall be protected to retain and preserve their sense of place.			✓
8.1.e	New development shall be consistent with the UGBs, STBs, and all other applicable policies of the MIP. New urban-density development shall not be allowed outside of a UGB or STB.	✓		
8.1.f	The County, as a condition of development approval, shall require developers of privately owned infrastructure systems to provide financial insurance (bonding, etc.) for the operation and maintenance of these systems.			✓
8.1.g	The County shall implement a zoning program to comprehensively redistrict and rezone lands within UGBs according to updated community plan policies and map designations.			✓
8.1.h	The County will seek to focus capital improvements (schools, libraries, roads, and other infrastructure and public facilities) within the UGBs and STBs in accordance with the MIP.	✓		
8.1.i	The County will promote (through incentives, financial participation, expedited project review, infrastructure/public facilities support, etc.) appropriate urban infill, redevelopment and the efficient use of buildable land within UGBs to avoid the need to expand the UGBs.			✓
8.1.j	The MIP's UGBs and STBs shall not be construed or implemented to prohibit the construction of a single-family dwelling on any existing parcel where otherwise permitted by law.			✓
<b><i>Analysis:</i></b> The project area is located within the Urban Growth Boundary (UGB) established in the MIP and is consistent with the MIP's goals, objectives, and policies for Urban areas.				
<b><u>RURAL GROWTH AREA</u></b>				
<b><u>Goal:</u></b>				
8.2	Maui will maintain opportunities for agriculture and rural communities through sound planning and clearly defined development expectations.			✓

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<b><u>Policies:</u></b>				
8.2.a	Amendments to a RGB shall be reviewed as an MIP amendment. A RGB shall only be expanded if an island-wide inventory of existing land uses (residential, commercial, industrial) indicates that additional lands are necessary to provide for the needs of the projected population growth within ten years of that inventory; or, during the decennial update of the MIP.			✓
8.2.b	New development shall be consistent with RGB and all other applicable policies and requirements of the MIP. Public, quasi-public, civic, and limited commercial or industrial uses may be allowed in the RGB when the proposed uses demonstrate a public need and are consistent with the Community Plan and zoning.			✓
8.2.c	Environmental protection and compatibility will be a top priority in rural growth areas.			✓
8.2.d	All development within rural growth areas should avoid encroachment upon prime agricultural land.			✓
8.2.e	Rural growth areas include Rural Residential Areas and Rural Villages. Rural residential areas may be designated when they are located in association with or on the border of urban growth areas or Small Towns; and/or when they provide for complete, self-sufficient rural communities with a range of uses to be developed at densities that do not require urban infrastructure.			✓
8.2.f	Community plans shall provide for rural density land use designations only within RGBs; provided that limited community plan urban designations may be allowed within Rural Villages. New rural growth areas shall not be located where urban expansion may ultimately become necessary or desirable. New rural-density development shall not be allowed outside of a RGB.			✓
8.2.g	New rural growth areas intended to be complete, self-sufficient rural communities must be located a significant distance from existing urban areas, distinctly separated by agricultural or open lands.			✓
8.2.h	Urban-scale infrastructure and public facilities shall not be provided in rural areas except as described in the defined Level-of-Service (LOS) standards. There should be no expectations of urban services in rural areas.			✓
8.2.i	Urban development standards shall not be required within RGBs except in fulfillment of Federal law.			✓
8.2.j	The unique character and function of existing small towns and rural communities shall be protected to retain and preserve their sense of place.			✓
8.2.k	Preserve rural landscapes in which natural systems, cultural resources, and agricultural lands are protected and development compliments rural character and contributes to the viability of communities and small towns.			✓
8.2.l	The MIP's RGBs shall not be construed or implemented to prohibit the construction of a single family dwelling on any existing parcel where otherwise permitted by law.			✓
8.2.m	The County shall implement a zoning program to comprehensively redistrict and rezone lands within RGBs, and to implement community plan policies and map designations.			✓
8.2.n	At the time of zoning from agricultural to rural, Council will consider prohibiting restrictions on agricultural activity.			✓

Maui Island Plan Goals, Objectives and Policies Key: S = Supportive, N/S = Not Supportive, N/A = Not Applicable			S	N/S	N/A
<b>Analysis:</b> Not Applicable					
<b><u>PROTECTED AREA POLICY</u></b>					
8.3.a The Protected Areas in Diagrams E-1, NW-1, N-1, NE-1, S-1, SE-1, and WC-1 should be concurrently reviewed with Table 8-2 and with any proposed land uses that may result in an adverse impact on a Protected Area. The County Council and the Administration should be notified if a Protected Area may be compromised by a development proposal.					✓
<b>Analysis:</b> Not Applicable					

**E. KIHEI-MAKENA COMMUNITY PLAN**

Within Maui County, there are nine (9) community plan regions. From a General Plan implementation standpoint, each region is governed by a community plan which sets forth desired land use patterns, as well as goals, objectives, policies, and implementing actions for a number of functional areas including infrastructure-related parameters.

The project site is located within the Kihei-Makena Community Plan region and is designated for “Heavy Industrial” use, which is consistent with the zoning designation of the Pulehunui Industrial Park. The proposed improvements are, therefore, appropriate and allowed for under this community plan designation. See **Figure 11**.

The proposed project is in compliance with the following Kihei-Makena Community Plan goals, objectives, and policies:

**ECONOMIC ACTIVITY**

**Goal:**

*A diversified and stable economic base which serves resident and visitor needs while providing long-term resident employment.*

**Objectives and Policies:**

- a. *Establish a sustainable rate of economic development consistent with concurrent provision of needed transportation, utilities, and public facilities improvements.*

\* \* \*

- d. *Establish balance between visitor industry employment and non-visitor industry employment.*

\* \* \*

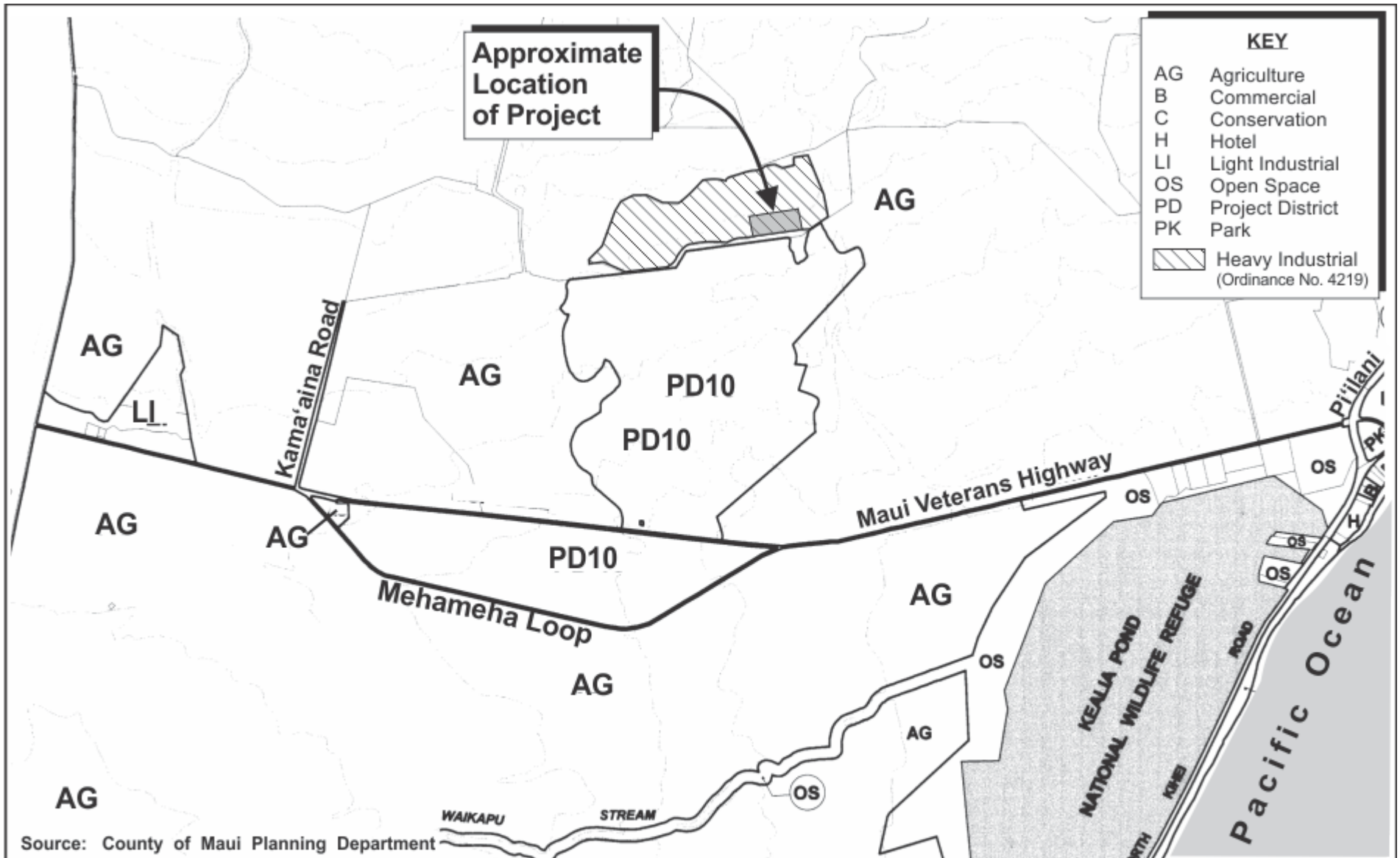


Figure 11 Wastewater Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park  
 Kihei-Makena Community Plan Map

NOT TO SCALE

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MUNEKIYO HIRAGA

- f. *Increase the availability and variety of commercial services to provide for regional needs and strategically establish small scale commercial uses within, or in close proximity to, residential areas.*

## **PHYSICAL AND SOCIAL INFRASTRUCTURE**

### **Goal:**

*Provision of facility systems, public services and capital improvement projects in an efficient, reliable, cost effective, and environmentally sensitive manner which accommodates the needs of the Kihei-Makena community, and fully support present and planned land uses, especially in the case of project district implementation.*

*Allow no development for which infrastructure may not be available concurrent with the development's impacts.*

## **LIQUID AND SOLID WASTE**

### **Objectives and Policies:**

- a. *Coordinate improvements to sewer transmission lines and wastewater reclamation facilities to meet the needs of future population growth. Require that the Wailea Resort Company and the Wailea Makena Alliance work toward a solution that would enable the Wailea sewerage system to be dedicated to the County.*
- b. *Provide efficient, safe and environmentally sound systems for the reuse, recycling, and disposal of liquid and solid wastes.*

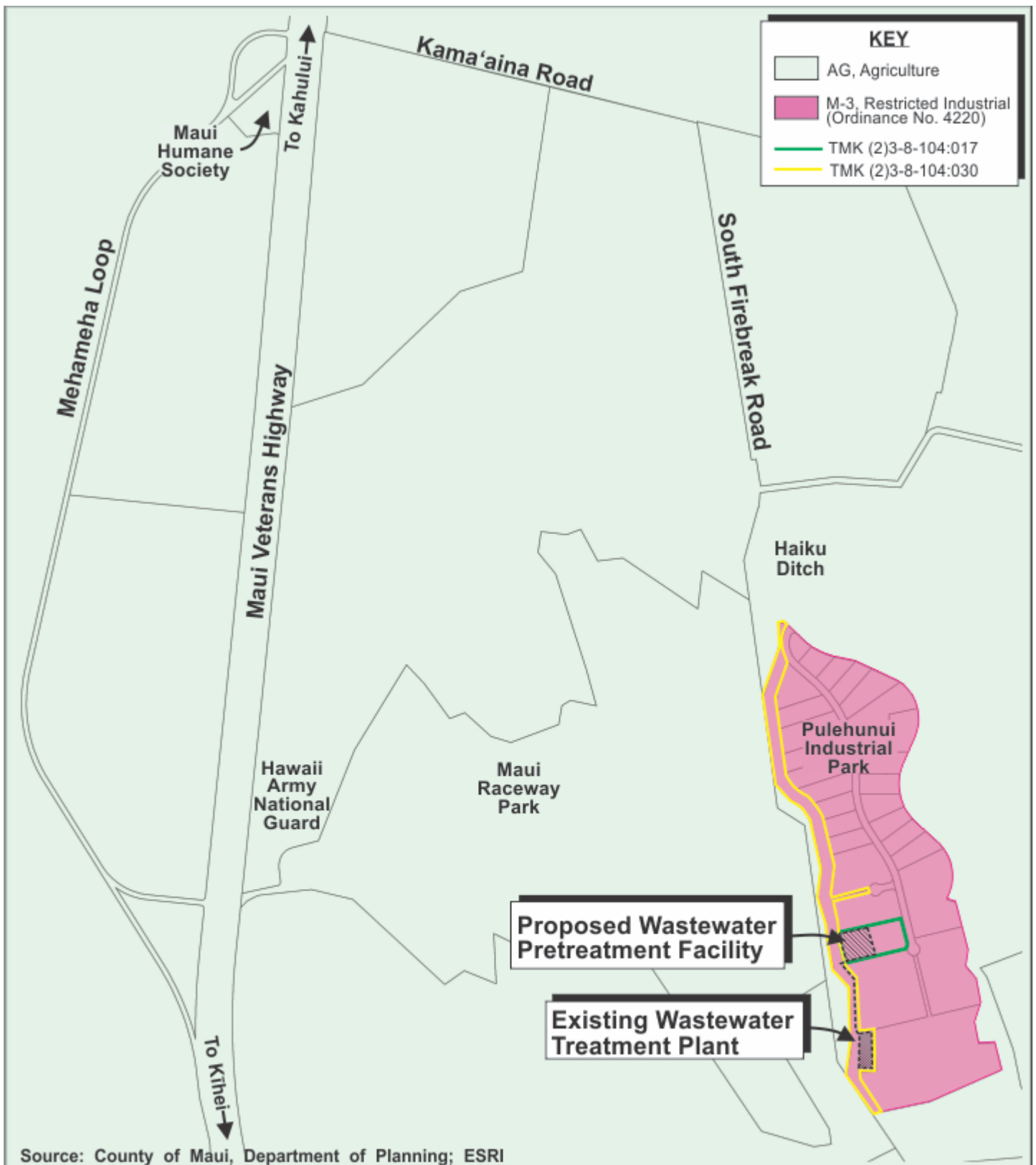
## **F. COUNTY ZONING**

The proposed project area is zoned "M-3, Restricted Industrial" District by the County of Maui (via Ordinance No. 4220). See **Figure 12**. The proposed action is consistent with existing County zoning. Major utility facilities are a permitted use within the "M-3" district.

## **G. HAWAI'I COASTAL ZONE MANAGEMENT PROGRAM – OBJECTIVES AND ENFORCEABLE POLICIES**

The project site is not within the County of Maui's Special Management Area (SMA). Nevertheless, an assessment of the development plan pursuant to the Hawai'i Coastal Zone Management Program (HCZMP) is provided as follows:





**Figure 12 Wastewater Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park Maui County Zoning**



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(1) **Recreational Resources**

**Objective:**

*Provide coastal recreational opportunities accessible to the public.*

**Policies:**

- a. *Improve coordination and funding of coastal recreational planning and management; and*
- 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 replacement of coastal resources having significant recreational value including, but not limited to, surfing sites, fishponds, and sand beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the state for recreation when replacement is not feasible or desirable;*
  - iii. *Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;*
  - iv. *Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;*
  - v. *Ensuring public recreational uses of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;*
  - i. *Adopting water quality standards and regulating point and nonpoint sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;*
  - vii. *Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and*
  - viii. *Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, and county authorities; and crediting such dedication against the requirements of Section 46-6, HRS.*

**Response:** The proposed action is located on the Central Maui isthmus inland of the ocean and is not anticipated to affect existing coastal recreational resources. Access to the shoreline areas will remain unaffected by the proposed project.

(2) **Historic Resources**

**Objective:**

*Protect, preserve and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.*

**Policies:**

- a. *Identify and analyze significant archeological resources;*
- b. *Maximize information retention through preservation of remains and artifacts or salvage operations; and*
- c. *Support state goals for protection, restoration, interpretation, and display of historic resources.*

**Response:** Based on the negative findings of the Archaeological Assessment Report, no further archaeological work is recommended for the project area. Interviews with individuals knowledgeable with the area indicated no cultural practices are carried out at or near the project site. As such, it is anticipated the proposed project will not affect historic resources. Nevertheless, if cultural resources are uncovered during ground altering activities, all work will stop in the affected area and the State Historic Preservation Division (SHPD) will be contacted for appropriate protocols and evaluation for potential impact.

(3) **Scenic and Open Space Resources**

**Objective:**

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

**Policies:**

- a. *Identify valued scenic resources in the coastal zone management area;*
- b. *Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;*

- c. *Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and*
- d. *Encourage those developments that are not coastal dependent to locate in inland areas.*

**Response:** As an inland action within an existing industrial subdivision, the proposed project is not anticipated to adversely impact coastal and scenic open space resources.

**(4) Coastal Ecosystems**

**Objective:**

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

**Policies:**

- a. *Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;*
- b. *Improve the technical basis for natural resource management;*
- c. *Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;*
- d. *Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and*
- e. *Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.*

**Response:** As an inland action within an existing industrial subdivision, the proposed project is not anticipated to adversely impact coastal ecosystems. The proposed project includes drainage improvements to avoid significant adverse impacts to surrounding properties. Best Management Practices (BMPs) to mitigate urban runoff as set forth in the Hawai'i Watershed Guidance will be reviewed and, as appropriate, included in the implementation of the project.

(5) **Economic Uses**

**Objective:**

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

**Policies:**

- a. *Concentrate coastal dependent development in appropriate areas;*
- b. *Ensure that coastal dependent development such as harbors and ports, and coastal related development such as visitor facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and*
- c. *Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:*
  - i. *Use of presently designated locations is not feasible;*
  - ii. *Adverse environmental effects are minimized; and*
  - iii. *The development is important to the State's economy.*

**Response:** The proposed project will support short-term construction and construction-related jobs while in the long term provide support to benefit users of the Pulehunui Industrial Park.

(6) **Coastal Hazards**

**Objective:**

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

**Policies:**

- a. *Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards;*
- b. *Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint pollution hazards;*

- c. *Ensure that developments comply with requirements of the Federal Flood Insurance Program; and*
- d. *Prevent coastal flooding from inland projects.*

**Response:** The project site is located within Zone “X”, areas determined to be outside the 0.2 percent annual chance floodplain of minimal flooding and is outside the tsunami evacuation zone. The proposed project includes drainage improvements to avoid significant adverse impacts to surrounding properties.

**(7) Managing Development**

**Objective:**

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

**Policies:**

- a. *Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;*
- b. *Facilitate timely processing of applications for development permits and resolve overlapping of conflicting permit requirements; and*
- c. *Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life cycle and in terms understandable to the public to facilitate public participation in the planning and review process.*

**Response:** The proposed project shall be reviewed and processed pursuant to Chapter 343, HRS. Public review will be coordinated through this process.

**(8) Public Participation**

**Objective:**

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

**Policies:**

- a. *Promote public involvement in coastal zone management processes;*
- b. *Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal issues, developments, and government activities; and*

- c. *Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.*

**Response:** As noted above, opportunity for public awareness, education and participation pertaining to significant resource attributes of the coastal zone is provided through Chapter 343, HRS procedures.

**(9) Beach Protection**

**Objective:**

*Protect beaches for public use and recreation.*

**Policies:**

- a. *Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion;*
- b. *Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities; and*
- c. *Minimize the construction of public erosion-protection structures seaward of the shoreline.*

**Response:** As an inland action within an existing industrial subdivision, the proposed project will not impact shoreline activities, and as such adverse impact to beach processes are not expected.

**(10) Marine Resources**

**Objective:**

*Promote the protection, use, and development of marine and coastal resources to assure their sustainability.*

**Policies:**

- a. *Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;*
- b. *Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency;*
- c. *Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;*

- d. *Promote research, study, and understanding of ocean processes, marine life, and other ocean resources in order to acquire and inventory information necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and*
- e. *Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.*

**Response:** As an inland action within an existing industrial subdivision, the proposed project will not impact marine resources. In fact, use of the proposed inland wastewater pretreatment facility (rather than the currently used County transfer facilities located near the shoreline) will serve to protect marine resources.

In addition to the foregoing objectives and policies and pursuant to Act 224 (2005):

*No special management area use permit or special management area minor permit shall be granted for structures that allow artificial light from floodlights, uplights, or spotlights used for decorative or aesthetic purposes when the light:*

- (1) *Directly illuminates the shoreline and ocean waters; or*
- (2) *Is directed to travel across property boundaries toward the shoreline and ocean waters.*

*Further, this prohibition shall not apply to authorized users for government operations, security, public safety, or navigational needs; provided that a government agency or its authorized users shall make reasonable efforts to properly position or shield lights to minimize adverse impacts.*

**Response:** The proposed project is located inland of the shoreline. The preliminary plans for the project will be designed to ensure that light fixtures comply with applicable requirements and are not directed across property boundaries.

## **H. MAUI PLANNING COMMISSION SPECIAL MANAGEMENT AREA RULES AND REGULATIONS**

The Rules and Regulations of the Maui Planning Commission, Chapter 202 were established in order to implement Hawai'i Revised Statutes, Chapter 205A relating to Coastal Zone Management and Special Management Areas. In addition to establishing procedures for processing of SMA applications and procurement of related permits, the rules assist the Commission in giving consideration to state policy regarding coastal zones.

As mentioned previously, the project site is not located within the County of Maui's Special Management Area. Nevertheless, this section addresses the project's relationship to



applicable coastal zone management considerations as set forth in the Maui Planning Commission Rules and Regulations, Chapter 202, "Special Management Area Permit Procedures," which are provided for considering the significance of potential environmental and ecological effects of a proposed action.

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

The proposed project commits approximately 1.5 acres of land designated for "Urban" use for a wastewater pretreatment facility and WWTP expansion. There are no endangered species or critical habitats in the project area. Given the prior archaeological investigations at the project site and the developed nature of the surroundings, it is unlikely that significant archaeological and cultural remains will be uncovered. As such, no adverse impacts to archaeological, natural, or cultural resources are anticipated as a result of the proposed project. In addition, there are no streams or wetlands which will be impacted, and there are no rare, threatened, or endangered species of plants or wildlife which will be affected by the proposed project.

2. **Significantly curtails the range of beneficial uses of the environment.**

The proposed project will not curtail the range of beneficial uses of the environment. The proposed project involves development of a wastewater pretreatment facility and improvements to an existing WWTP within an existing development designated as a heavy industrial park. BMPs will be implemented to minimize any construction-related impacts.

3. **Conflicts with the county's or the state's long-term environmental policies or goals.**

The proposed project does not conflict with the State's Environmental Policy and Guidelines as set forth in HRS Chapter 344. The proposed project is consistent with the underlying land use designations of the project sites.

4. **Substantially affects the economic or social welfare and activities of the community, county, or state.**

On a short-term basis, the project will support construction and construction-related employment and have a beneficial impact on the local economy during the period of construction. The project represents a shift in the location of current VIP operations to a more desirable location at the Pulehunui Industrial Park. Thus, the proposed project is not anticipated to have an adverse impact on the social welfare of residents and visitors to the island.

5. **Involves substantial secondary impacts, such as population changes and increased effects on public facilities, streets, drainage, sewage, and water systems, and pedestrian walkways.**

The proposed project will allow VIP to process wastewater at privately owned facilities instead of County facilities. As such, it represents a reduction in impacts to public facilities. Because the proposed project involves the shift of existing services from one location to another, there is no population growth anticipated.

Substantial secondary impacts are not anticipated as a result of the proposed project.

6. **In itself has no significant adverse effects but cumulatively has considerable effect upon the environment or involves a commitment for larger actions.**

Development of the proposed wastewater pretreatment facility and WWTP improvements may be considered to be part of the larger action of development of the Pulehunui Industrial Park as a heavy industrial subdivision. The impacts of this type of development were evaluated in a Chapter 343, HRS Environmental Assessment for which a FONSI was issued in 2012. As such, the proposed action is not expected to have significant individual or cumulative adverse effects upon the environment.

7. **Substantially affects a rare, threatened, or endangered species of animal or plant, or its habitat.**

There are no rare, threatened, or endangered species of fauna, flora, or their habitats at or adjacent to the project sites. Adverse impacts to these species and habitats are not anticipated. Refer to **Appendix “C”**, **Appendix “D”**, **Appendix “E”**, and **Appendix “F”**.

8. **Is contrary to the state plan, county’s general plan, appropriate community plans, zoning and subdivision ordinances.**

The proposed project is in accordance with applicable State, County, and the Kīhei-Makena Community Plan land use policies and plans. Please refer to Sections B-F of this chapter for more detailed assessments of the project’s consistency with the Hawai’i State Plan, Maui County General Plan, Kīhei-Makena Community Plan, and Maui County zoning. No subdivision is being proposed for the project.

9. **Detrimentially affects air or water quality or ambient noise levels.**

The Department of Health will review and approve the facility plans with respect to compliance with applicable requirements of HAR, Title 11, Chapter 62 regarding wastewater systems. Per HAR 11-62, the Department of Health, *“seeks to ensure that the use and disposal of wastewater and wastewater sludge does not contaminate or pollute any valuable water resource, does not give rise to public nuisance, and does not become a hazard or potential hazard to the public health, safety, and welfare.”* As such, detrimental effects to air and water quality as a result of operation of the proposed facilities is not anticipated.

Construction activities will result in short-term air quality and noise impacts. Dust control measures, such as regular watering and sprinkling, and installation of dust screens will be implemented to minimize wind-blown emissions. Construction noise impacts will be mitigated through compliance with the provisions of the State of Hawai‘i, Department of Health Administrative Rules Title 11, Chapter 46, “Community Noise Control”. These rules require a noise permit if the noise levels from construction activities are expected to exceed the allowable levels set forth in the Chapter 46 rules.

From a long-term perspective, noise impacts associated with routine operations of the facilities are not anticipated to be significant.

10. **Affects an environmentally sensitive area, such as flood plains, shoreline, tsunami zone, erosion-prone area, geologically hazardous land, estuary, fresh waters, or coastal waters.**

The project site is located in Flood X. This designation denotes an area of low flood risk and minimal flooding with no development restrictions. The project site is not located within the tsunami evacuation zone, near the shoreline, or other environmentally sensitive area.

11. **Substantially alters natural land forms and existing public views to and along the shoreline.**

The proposed project is not located within a designated scenic corridor and is surrounded by existing and proposed development within the Pulehunui Industrial Subdivision. As such, the proposed project is not anticipated to impact any scenic vistas or view planes.

12. **Is contrary to the objectives and policies of chapter 205A, HRS.**


Although the project site is not within the SMA, a review of the objectives and policies of Chapter 205A, HRS, is provided in its entirety in the previous part of this

section. Therein, it addresses the project's relationship to the Coastal Zone Management considerations. There are no anticipated significant environmental and ecological effects attributed to the proposed project.



ALTERNATIVES TO THE  
PROPOSED ACTION

IV



## IV. ALTERNATIVES TO THE PROPOSED ACTION

The Applicant has evaluated a number of alternatives in consideration of the proposed action, as discussed below:

### A. PREFERRED ALTERNATIVE

VIP currently hauls waste from various locations on the island of Maui and transfers the waste to the County wastewater system for treatment and disposal at the Wailuku-Kahului Wastewater Reclamation Facility (WWRF). Currently, waste loads are transferred at the County's Wailuku Pump Station (PS) located off Kahului Beach Road adjacent to Kahului Harbor.

VIP's preferred alternative includes development of a pretreatment facility on Parcel 17 of the Pulehunui Industrial Park which will process the liquid wastes collected offsite. Pretreatment processing will include screening out of grit and dewatering via a belt process. The solids fraction will be deposited to a roll-off container for landfill or other disposal, depending on the class of solids generated.

Liquid effluent from the pretreatment facility will go to the private WWTP in the area for further processing. The private WWTP will be expanded to increase its capacity from 20,000 gallons per day to 40,000 gallons per day. As part of the proposed improvements, a absorption field system will be developed as the primary disposal method for treated effluent, and the currently used injection well will be reserved for backup operations.

### B. NO ACTION ALTERNATIVE

If no action is taken, VIP will continue to dispose of the wastes collected via its hauling operations to the County of Maui's Kahului WWRF, via the Wailuku PS. Wailuku PS is not designed to operate as a septage receiving facility, and its use as a truck discharge site results in reliability and operational issues for the County. During rainfall events, the discharge site can become flooded by rain and ocean water, making the area inaccessible and potentially introducing contaminated water to the marine environment. Failure of the Wailuku PS discharge site, either due to maintenance issues or inundation of the wastewater collection system in this area during rain events, can prevent trucks from being able to discharge their wastes.

The No Action alternative will result in a continuation of treatment of VIP's collected waste via the Wailuku-Kahului WWRF, placing a demand on the WWRF's limited capacity. The Wailuku-Kahului WWRF is located in an oceanfront location and is vulnerable to the impacts of sea level rise and coastal storm events. Effluent from the WWRF is disposed using the facility's eight (8) injection wells, and there is growing public concern regarding

the potential environmental impacts associated with use of these wells. These considerations make it prudent for VIP to seek an alternative disposal method for its operations, which is built inland to national standards. As such, the No Action alternative was dismissed from further review.

**C. DEFERRED ACTION ALTERNATIVE**

A deferral of the proposed project means that the action would be pursued at a later point in time, thus deferring the benefits of the project to VIP's operations as well as the benefits to the County, environment, and community associated with shifting the waste treatment activities from the County wastewater facilities in Kahului to the Pulehunui Industrial Park. Additionally, deferring the project to a later point in time will likely result in higher development costs due to inflationary pressure. Uncertainty as it relates to future cost scenarios places the project at risk from a financial feasibility standpoint. Thus, the deferral of action alternative is not considered to be viable.

**D. ONSITE WASTEWATER TREATMENT**

The design initially investigated by VIP involved installation of a WWTP within Parcel 17 to treat the effluent generated by the wastewater pretreatment facility onsite. VIP consulted with the Department of Health, Wastewater Branch regarding this design alternative. The DOH Wastewater Branch advised VIP not to install an additional WWTP, but instead to connect the wastewater pretreatment facility to the existing private WWTP and expand the existing WWTP to provide the necessary treatment capacity. Expanding and utilizing the existing WWTP was determined by the project engineering team to be preferable from a practical and operational standpoint to installing a new and separate WWTP. As such, the alternative of onsite wastewater treatment was not pursued.

**E. EFFLUENT DISPOSAL ALTERNATIVES**

As alternatives to disposal of treated effluent from the WWTP via absorption field, as proposed in the preferred alternative, VIP investigated water reuse options and disposal by injection well.


When investigating water reuse, VIP was not able to find interested, consistent, and reliable users for the quantity produced. Also, a reuse system would require more frequent use of injection wells during rain events or periods of low use. Lastly, reused effluent irrigation systems, if not properly maintained or if drip lines fail, have the potential to create ponding and tall grassy areas which VIP seeks to avoid in this area. Due to these constraints, water reuse has not been incorporated into the preferred alternative at this time, but may be re-evaluated in the future.

The existing privately owned WWTP utilizes onsite injection wells for effluent disposal. The decision was made to eliminate or reduce the injection well use as much as possible as part of this project, which is consistent with the policies of the Countywide Island Plan and the Maui Island Plan to phase out use of injection wells. Absorption field disposal provides the ability to reliably receive 100 percent of the treated effluent from the WWTP as the primary disposal method, with the injection wells relegated to secondary back-up status only. Therefore, continued use of the existing injection wells as a primary effluent disposal method was eliminated from consideration as an alternative.

## **F. SOLIDS TREATMENT ALTERNATIVES**

An alternative solids-processing design to create Class A Biosolids was considered. "Class A Biosolids" is a designation applied to dewatered sewage sludge that has been treated for land application with no restrictions, meeting U.S. EPA guidelines to protect both human health and the environment. Thus, Class A Biosolids can be used in farms and gardens. At this time, however, the local supply of Class A Biosolids exceeds user demand, resulting in a lack of available disposal sites. Ultimately, Class A Biosolids processing capacity was not pursued as a part of the current design, but may be considered at a later date if the demand for Class A Biosolids makes this a viable alternative.





SUMMARY OF  
UNAVOIDABLE  
ENVIRONMENTAL IMPACTS  
AND IRREVERSIBLE AND  
IRRETRIEVABLE  
COMMITMENT OF  
RESOURCES



## **V. SUMMARY OF UNAVOIDABLE ENVIRONMENTAL IMPACTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES**

The development of the proposed Wastewater Pretreatment Facility and Wastewater Treatment Plan Improvements will result in certain unavoidable construction-related impacts as outlined in Chapter II.

Impacts such as noise and nuisance odors may be generated by the project. The facility is located in a suitable area from a land use planning perspective, which has been specifically set aside for industrial uses of this type which may create certain impacts which are not desirable in residential, scenic, or resort areas.


Unavoidable air and water quality impacts will also arise as a result of construction activities, such as the generation of dust and other airborne pollutants, and, an increase in the turbidity of drainage flows. To mitigate adverse impacts, appropriate BMPs and erosion control measures will be implemented during the construction period to minimize construction-related impacts.

Development of the proposed project will use existing land, energy, and fiscal resources. The commitment of land, energy, and fuel resources is justified by the benefits that will be provided by the project.



SIGNIFICANCE CRITERIA  
ASSESSMENT

VI



## VI. SIGNIFICANCE CRITERIA ASSESSMENT

The “Significance Criteria”, Section 13 of the Hawai‘i Administrative Rules (HAR), Title 11, Chapter 200.1, “Environmental Impact Statement Rules”, was reviewed and analyzed to determine whether the proposed project will have significant impacts on the environment. The following criteria and analysis are provided.

### 1. Irrevocably commit a natural or cultural resource.

A portion of the sugar cane fields adjacent to the project area was turned into a civil airfield for the Territory of Hawai‘i in 1937. Two (2) years later, Inter-Island Airways began service to Maui, landing at Pu‘unēnē Airport. With the onset of World War II, the Navy began using the old airport along with a small Army Air Corps support base at the airfield and the land, including the project area, was later condemned. The airport was expanded and commissioned as the Naval Air Station (NAS), lengthened and widened and renamed to NAS Pu‘unēnē. In 1947, the Navy released the airfield to the Territory of Hawai‘i and the facility was used as an inter-island airport until 1952. The landing strip was used by crop-dusters and other smaller aircraft until abandoned sometime between 1961 and 1977. Abandoned military facilities (e.g. bunkers, revetments) remained on the property and the old airstrip was used for racing. Due to ground altering activities in the project site and surrounding areas from government and military uses in this general area, significant adverse impact to known rare, endangered, or threatened species of flora, fauna, or avifauna are not anticipated.

Scientific Consultant Services, Inc. conducted an archaeological inventory survey of the project area, which was accepted by SHPD. Based on the negative findings of the survey, the report states that it is unlikely that new information would be gleaned from additional archaeological work in the project area and that no further archaeological work is recommended for the current project area. Refer to **Appendix “I”**, **Appendix “J”**, **Appendix “K”**, and **Appendix “L”**.

Should any cultural artifacts or human remains be encountered during construction, work will stop in the immediate vicinity of the find, and the SHPD will be notified immediately to establish an appropriate mitigation strategy.

As such, the proposed project will not result in any adverse environmental impacts, and no natural, cultural, or archaeological resources will be adversely impacted by the proposed action.

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

The proposed project is located in an area developed and designated for industrial uses such as that proposed. As such, the project will not 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.**

The proposed project conforms with the State's Environmental Policy and Guidelines as set forth in Chapter 344, Hawai'i Revised Statutes (HRS) and supports the local economy with needed jobs and services, and provides wastewater treatment capacity to benefit the community.

4. **Have a substantial adverse effect on the economic welfare, social welfare, and cultural practices of the community and State.**

The proposed project will directly benefit the local economy by providing construction-related employment and supporting the local economy with its operations.

5. **Have a substantially adverse effect on public health.**

No adverse impacts to public health and welfare are anticipated as a result of the proposed project.

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

The proposed project is not a population generator and is not expected to significantly expand the service limits or requirements of public services such as police, fire, medical, educational, recreational, or solid waste collection services.

No substantial adverse secondary impacts are anticipated with the implementation of the proposed project.

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

Aside from the short-term impacts related to dust and noise generated during the construction phase, there will not be a substantial degradation of environmental quality. Potential dust, noise, and erosion impacts associated with construction activities will be mitigated through implementation of appropriate Best Management Practices (BMPs).

As previously noted, the proposed project essentially involves the relocation of a waste treatment function that is currently being provided at County facilities. The implementation of this project will facilitate a decrease in use of injection wells and provide a wastewater

treatment facility for septage at an appropriate location within an existing industrial subdivision located inland of the shoreline.

**8. Is individually limited but cumulatively have substantial adverse effect upon the environment or involves a commitment for larger actions.**

Development of the proposed wastewater pretreatment facility and WWTP improvements may be considered to be part of the larger action of development of the Pulehunui Industrial Park as a heavy industrial subdivision. The impacts of this type of development were evaluated in a Chapter 343, HRS Environmental Assessment for which a FONSI was issued in 2012. As such, the proposed action is not expected to have significant individual or cumulative adverse effects upon the environment.

**9. Have a substantially adverse effect on a rare, threatened, or endangered species, or its habitat.**

The project site has been altered by years of sugar cane cultivation, and use by government and military interests. There are no known rare, threatened, or endangered species of flora, fauna, or avifauna found at or around the project site and the project site contains no critical habitat for such species. Given these conditions, significant adverse impacts to rare, threatened, or endangered species are not anticipated as a result of the proposed action.

**10. Have a substantial adverse effect on air or water quality or ambient noise levels.**

Construction activities will result in short-term air quality and noise impacts. Dust control measures will be implemented to minimize wind-blown emissions as applicable. Noise impacts will occur primarily from the operation of construction equipment. Construction noise impacts will be mitigated through compliance with applicable provisions of the State of Hawai'i, Department of Health Administrative Rules (HAR) Title 11, Chapter 46, "Community Noise Control". These rules require a noise permit if the noise levels from construction activities are expected to exceed the allowable levels set forth in Chapter 46 HAR. The project location is not situated near residential areas or other areas sensitive to noise. In addition, no long-term air or water quality impacts are anticipated.

**11. 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.**

Soils underlying the project site are not erosion-prone and there are no geologically hazardous lands or estuaries within or adjacent to the project site. The project site is located within Flood Zone X (shaded), an area with a 0.2 percent chance of annual flooding and is outside the tsunami zone.

The proposed project includes a drainage system, to mitigate runoff and impacts to surrounding properties. During construction, mitigation measures will be implemented as BMPs to avoid adverse impact to nearby areas.

Significant adverse environmental effects are not anticipated in conjunction with the proposed project.

**12. Have a substantial adverse effect on scenic vistas and viewplanes, during day or night, identified in county or state plans or studies.**

The project site is located within an existing heavy industrial subdivision and has not been identified as a scenic vista or viewplane. As the proposed project is limited in scope to elements not exceeding 30 feet in height, scenic vistas and viewplanes are not expected to be substantially adversely affected by the proposed project.

**13. Requires substantial energy consumption or emit substantial greenhouse gases.**

The proposed project will involve a commitment of fuel for construction equipment, vehicles, and machinery during construction and maintenance activities. Once completed, energy requirements at the wastewater pretreatment facility and the WWTP expansion are anticipated to be supplied by onsite solar PV facilities. Wastewater treatment facilities are a source of greenhouse gas emissions. However, the proposed action does not represent an increase in greenhouse gas emitting processes, but a shift in location to process wastes that are currently discharged to County wastewater facilities. As such, implementation of the proposed project is not expected to require substantial energy consumption or emit substantial greenhouse gases.

Based on the foregoing analysis, it is anticipated that the proposed action will result in a Finding of No Significant Impact (FONSI).



LIST OF PERMITS AND  
APPROVALS

VII





## VII. LIST OF PERMITS AND APPROVALS


The following Federal, State, and County permits and approvals are anticipated to be required for project implementation:

### **State of Hawai'i**

1. Chapter 343, Hawai'i Revised Statutes, Compliance
2. Department of Health, Hawai'i Administrative Rules Title 11, Chapter 62 Compliance
3. Department of Health, Solid Waste Permit
4. Noise Permit (as applicable for construction activities)

### **County of Maui**

1. Building Permits
2. Construction Permits (i.e., grading, electrical, plumbing)



PARTIES CONSULTED  
DURING THE  
PREPARATION OF THE  
DRAFT ENVIRONMENTAL  
ASSESSMENT; LETTERS  
RECEIVED AND  
RESPONSES TO  
SUBSTANTIVE  
COMMENTS

VIII



# VIII. PARTIES CONSULTED DURING THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT; LETTERS RECEIVED AND RESPONSES TO SUBSTANTIVE COMMENTS

The following agencies were consulted during preparation of the Draft Environmental Assessment (EA). Agency comments and responses to substantive comments are included herein.

## FEDERAL AGENCIES

1. Kahana Stone, Soil Conservationist  
**U.S. Department of Agriculture**  
Natural Resources Conservation Service  
77 Ho'okele Street, Suite 202  
Kahului, Hawai'i 96732
2. Tunis W. McElwain, Chief  
**U.S. Department of the Army**  
U.S. Army Engineer District, Honolulu  
Regulatory Branch, Building 230  
Fort Shafter, Hawai'i 96858-5440
3. Michelle Bogardus, Island Team Leader  
**U.S. Fish and Wildlife Service**  
300 Ala Moana Blvd., Rm. 3-122  
Honolulu, Hawai'i 96850
7. Bruce Anderson, Director  
State of Hawai'i  
**Department of Health**  
1250 Punchbowl Street, Room 325  
Honolulu, Hawai'i 96813
8. Lene Ichinotsubo, Chief  
State of Hawai'i  
**Department of Health**  
Solid & Hazardous Waste Branch  
2827 Waimano Home Road #100  
Pearl City, Hawai'i 96782
9. State of Hawaii  
**Department of Health**  
Environmental Health Administration  
P.O. Box 3378  
Honolulu, Hawai'i 96801

## STATE AGENCIES

4. Curt T. Otaguro, Comptroller  
State of Hawai'i  
**Department of Accounting and General Services**  
1151 Punchbowl Street, #426  
Honolulu, Hawai'i 96813
5. Scott Enright, Chair  
State of Hawai'i  
**Department of Agriculture**  
1428 South King Street  
Honolulu, Hawai'i 96814-2512
6. Luis P. Salaveria, Director  
State of Hawai'i  
**Department of Business, Economic Development & Tourism**  
P.O. Box 2359  
Honolulu, Hawai'i 96804
10. Sina Pruder, P.E., Chief  
State of Hawaii  
**Department of Health**  
Environmental Mangement Division  
Wastewater Branch  
2827 Waimano Home Road, #207  
Pearl City, Hawai'i 96782
11. Patti Kitkowski  
State of Hawai'i  
**Department of Health**  
Maui Sanitation Branch  
54 South High Street, Room 300  
Wailuku, Hawai'i 96793
12. Suzanne Case, Chairperson  
State of Hawai'i  
**Department of Land and Natural Resources**  
P. O. Box 621  
Honolulu, Hawai'i 96809

13. Alan Downer, Administrator  
State of Hawai'i  
**Department of Land and Natural Resources**  
State Historic Preservation Division  
601 Kamokila Blvd., Room 555  
Kapolei, Hawai'i 96707

14. State of Hawai'i  
**Department of Land and Natural Resources**  
State Historic Preservation Division  
101 Maalaea Boat Harbor Road  
Wailuku, Hawai'i 96793

15. Jade Butay, Director  
State of Hawai'i  
**Department of Transportation**  
869 Punchbowl Street  
Honolulu, Hawai'i 96813

16. Major General Arthur "Joe" Logan,  
Adjutant General  
**Hawai'i State Civil Defense**  
3949 Diamond Head Road  
Honolulu, Hawai'i 96816

17. Jobie Masagatani, Chair  
State of Hawai'i  
**Department of Hawaiian Home Lands**  
P.O. Box 1879  
Honolulu, Hawai'i 96805

18. Scott Glenn, Director  
State of Hawai'i  
**Office of Environmental Quality Control**  
235 S. Beretania Street, Suite 702  
Honolulu, Hawai'i 96813

19. Dr. Kamana'opono Crabbe, Chief  
Executive Officer  
State of Hawai'i  
**Office of Hawaiian Affairs**  
560 N. Nimitz Highway, Suite 200  
Honolulu, Hawai'i 96817

20. Mary Alice Evans, Director  
State of Hawai'i  
**Office of Planning**  
P. O. Box 2359  
Honolulu, Hawai'i 96804

21. Dan Orodener, Executive Officer  
State of Hawai'i  
**State Land Use Commission**  
P.O. Box 2359  
Honolulu, Hawai'i 96804

#### **COUNTY AGENCIES**

22. Eric Nakagawa, Acting Director  
County of Maui  
**Department of Environmental Management**  
2050 Main Street, Suite 2B  
Wailuku, Hawai'i 96793

23. David Thyne, Chief  
County of Maui  
**Department of Fire and Public Safety**  
200 Dairy Road  
Kahului, Hawai'i 96732

24. Karla Peters, Director  
County of Maui  
**Department of Parks and Recreation**  
700 Hali'a Nakoia Street, Unit 2F  
Wailuku, Hawai'i 96793

25. Michele Chouteau McLean, Director  
County of Maui  
**Department of Planning**  
2200 Main Street, Suite 315  
Wailuku, Hawai'i 96793

26. Tivoli Faaumu, Chief  
County of Maui  
**Department of Police**  
55 Mahalani Street  
Wailuku, Hawai'i 96793

27. Rowena Dagdag-Andaya, Acting  
Director  
County of Maui  
**Department of Public Works**  
200 South High Street, 4th Floor  
Wailuku, Hawai'i 96793

28. Marc Takamori, Director  
County of Maui  
**Department of Transportation**  
2145 Kaohu Street  
David Trask Building, Suite 102  
Wailuku, Hawai'i 96793

29. Jeff Pearson, Director  
County of Maui  
**Department of Water Supply**  
200 South High Street, 5th Floor  
Wailuku, Hawai'i 96793
  
30. Kay Fukumoto  
County of Maui  
**Office of Economic Development**  
2200 Main Street, Suite 305  
Wailuku, Hawai'i 96793

**ORGANIZATIONS**

31. **Hawaiian Telcom**  
60 South Church Street  
Wailuku, Hawai'i 96793
  
32. Michael Grider, Manager, Engineering  
**Maui Electric Company, Ltd.**  
P.O. Box 398  
Kahului, Hawai'i 96733



**DEPARTMENT OF THE ARMY**  
HONOLULU DISTRICT, U.S. ARMY CORPS OF ENGINEERS  
FORT SHAFTER, HAWAII 96858-5440

May 21, 2019

**SUBJECT:** Determination of No Permit Required, Pulehunui Industrial Park Waste Water Treatment Plant (WWTP), Maui, Hawaii, Department of the Army File No. POH-2019-00096

Munekiyo Hiraga  
Attention: Ms. Gwendolyn Rivera  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Rivera:

The Honolulu District, U.S. Army Corps of Engineers (Corps), Regulatory Branch has received your request for comments concerning the Pulehunui Industrial Park Waste Water Treatment Plant (WWTP) located East of Mokulele Highway in the Pulehunui Industrial Park at 20.8130°, -156.4529°, Kihei, Island of Maui, Hawaii. Your request has been assigned DA file number POH-2019-00096. Please reference this number in all future correspondence with our office relating to this action.

Based on our review of the information you provided and the enclosed approved jurisdictional determination (AJD), dated May 14, 2019, the construction site for the new Septage Pretreatment Facility (TMK 38104017) does not contain waters of the U.S., including wetlands or navigable waters of the U.S., as defined by 33 CFR Parts 328 and 329, respectively. Therefore, a DA permit under Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act of 1899 is not required. The basis for our jurisdictional determination is on the enclosed AJD Form.

Concerning the improvements to the existing WWTP (TMK 38104030), based on the information you provided we have determined that your proposed project would not involve an activity subject to the regulatory jurisdiction of the Corps and therefore, a DA permit is not required.

While a DA permit is not required for your proposed project, you are responsible for obtaining all other applicable Federal, state, or local authorizations required by law.

Thank you for your cooperation with the Honolulu District Regulatory Program. Should you have any questions related to this determination, please contact me at (808) 835-4056 or via e-mail at [albert.p.williams@usace.army.mil](mailto:albert.p.williams@usace.army.mil). You are encouraged to provide comments on your experience with the Honolulu District Regulatory Branch

- 2 -

by accessing our web-based customer survey form at  
[http://corpsmapu.usace.army.mil/cm\\_apex/f?p=regulatory\\_survey](http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey). For additional  
information about our Regulatory Program, please visit our web site at  
<http://www.poh.usace.army.mil/Missions/Regulatory.aspx>.

Sincerely,

Albert Williams  
Regulatory Specialist

Enclosure





®

## Regulatory Program



®

### **INTERIM APPROVED JURISDICTIONAL DETERMINATION FORM U.S. Army Corps of Engineers**

This form should be completed by following the instructions provided in the Interim Approved Jurisdictional Determination Form User Manual.

#### **SECTION I: BACKGROUND INFORMATION**

**A. COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (AJD):** May 14, 2019

**B. ORM NUMBER IN APPROPRIATE FORMAT (e.g., HQ-2015-00001-SMJ):** POH-2019-00096

#### **C. PROJECT LOCATION AND BACKGROUND INFORMATION:**

State: Hawaii County/parish/borough: Island of Maui City: Kihei

Center coordinates of site (lat/long in degree decimal format): Lat. 20.8130, Long. -156.4529.

Map(s)/diagram(s) of review area (including map identifying single point of entry (SPOE) watershed and/or potential jurisdictional areas where applicable) is/are:  attached  in report/map titled

Other sites (e.g., offsite mitigation sites, disposal sites, etc.) are associated with this action and are recorded on a different jurisdictional determination (JD) form. List JD form ID numbers (e.g., HQ-2015-00001-SMJ-1):

#### **D. REVIEW PERFORMED FOR SITE EVALUATION:**

Office (Desk) Determination Only. Date: May 14, 2019.

Office (Desk) and Field Determination. Office/Desk Dates: Field Date(s):

#### **SECTION II: DATA SOURCES**

Check all that were used to aid in the determination and attach data/maps to this AJD form and/or references/citations in the administrative record, as appropriate.

Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant. Title/Date: Regional Location Map (Figure 1, Munekiyo Hiraga, May 1, 2019), Property Location Map (Figure 2, Munekiyo Hiraga, May 1, 2019), and Site Plan (Figure 3, Munekiyo Hiraga, May 1, 2019).

Data sheets prepared/submitted by or on behalf of the applicant/consultant.

Data sheets/delineation report are sufficient for purposes of AJD form. Title/Date:

Data sheets/delineation report are not sufficient for purposes of AJD form. Summarize rationale and include information on revised data sheets/delineation report that this AJD form has relied upon:

Revised Title/Date:

Data sheets prepared by the Corps. Title/Date:

Corps navigable waters study. Title/Date:

CorpsMap ORM map layers. Title/Date:

USGS Hydrologic Atlas. Title/Date:

USGS, NHD, or WBD data/maps. Title/Date:

USGS 8, 10 and/or 12 digit HUC maps. HUC number:

USGS maps. Scale & quad name and date: Earth Point Topo Layer for Google Earth Pro (USGS, 2019).

USDA NRCS Soil Survey. Citation: SoilWeb Layer for Google Earth Pro (USDA, 2019).

USFWS National Wetlands Inventory maps. Citation: FWS Wetlands and Riparian Layer for Google Earth Pro (USFWS, 2019).

State/Local wetland inventory maps. Citation:

FEMA/FIRM maps. Citation:

Photographs:  Aerial. Citation: Google Earth Pro (04/02/2013). or  Other. Citation:

LiDAR data/maps. Citation:

Previous JDs. File no. and date of JD letter:

Applicable/supporting case law:



- Applicable/supporting scientific literature:
- Other information (please specify):

**SECTION III: SUMMARY OF FINDINGS**

Complete ORM "Aquatic Resource Upload Sheet" or Export and Print the Aquatic Resource Screen from ORM for All Waters and Features, Regardless of Jurisdictional Status – Required

**A. RIVERS AND HARBORS ACT (RHA) SECTION 10 DETERMINATION OF JURISDICTION:**

- "navigable waters of the U.S." within RHA jurisdiction (as defined by 33 CFR part 329) in the review area.

- **Complete Table 1 - Required**

NOTE: If the navigable water is not subject to the ebb and flow of the tide or included on the District's list of Section 10 navigable waters list, DO NOT USE THIS FORM TO MAKE THE DETERMINATION. The District must continue to follow the procedure outlined in 33 CFR part 329.14 to make a Section 10 RHA navigability determination.

**B. CLEAN WATER ACT (CWA) SECTION 404 DETERMINATION OF JURISDICTION: "waters of the U.S." within CWA jurisdiction (as defined by 33 CFR part 328.3) in the review area. Check all that apply.**

- (a)(1): All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide. (Traditional Navigable Waters (TNWs))

- **Complete Table 1 - Required**

- This AJD includes a case-specific (a)(1) TNW (Section 404 navigable-in-fact) determination on a water that has not previously been designated as such. Documentation required for this case-specific (a)(1) TNW determination is attached.

- (a)(2): All interstate waters, including interstate wetlands.

- **Complete Table 2 - Required**

- (a)(3): The territorial seas.

- **Complete Table 3 - Required**

- (a)(4): All impoundments of waters otherwise identified as waters of the U.S. under 33 CFR part 328.3.

- **Complete Table 4 - Required**

- (a)(5): All tributaries, as defined in 33 CFR part 328.3, of waters identified in paragraphs (a)(1)-(a)(3) of 33 CFR part 328.3.

- **Complete Table 5 - Required**

- (a)(6): All waters adjacent to a water identified in paragraphs (a)(1)-(a)(5) of 33 CFR part 328.3, including wetlands, ponds, lakes, oxbows, impoundments, and similar waters.

- **Complete Table 6 - Required**

- Bordering/Contiguous.  
Neighboring:

- (c)(2)(i): All waters located within 100 feet of the ordinary high water mark (OHWM) of a water identified in paragraphs (a)(1)-(a)(5) of 33 CFR part 328.3.

- (c)(2)(ii): All waters located within the 100-year floodplain of a water identified in paragraphs (a)(1)-(a)(5) of 33 CFR part 328.3 and not more than 1,500 feet of the OHWM of such water.

- (c)(2)(iii): All waters located within 1,500 feet of the high tide line of a water identified in paragraphs (a)(1) or (a)(3) of 33 CFR part 328.3, and all waters within 1,500 feet of the OHWM of the Great Lakes.

- (a)(7): All waters identified in 33 CFR 328.3(a)(7)(i)-(v) where they are determined, on a case-specific basis, to have a significant nexus to a water identified in paragraphs (a)(1)-(a)(3) of 33 CFR part 328.3.

- **Complete Table 7 for the significant nexus determination. Attach a map delineating the SPOE watershed boundary with (a)(7) waters identified in the similarly situated analysis. - Required**

- Includes water(s) that are geographically and physically adjacent per (a)(6), but are being used for established, normal farming, silviculture, and ranching activities (33 USC Section 1344(f)(1)) and therefore are not adjacent and require a case-specific significant nexus determination.

- (a)(8): All waters located within the 100-year floodplain of a water identified in paragraphs (a)(1)-(a)(3) of 33 CFR part 328.3 not covered by (c)(2)(ii) above and all waters located within 4,000 feet of the high tide line or OHWM of a water identified in paragraphs (a)(1)-(a)(5) of 33 CFR part 328.3 where they are determined on a case-specific basis to have a significant nexus to a water identified in paragraphs (a)(1)-(a)(3) of 33 CFR part 328.3.

- **Complete Table 8 for the significant nexus determination. Attach a map delineating the SPOE watershed boundary with (a)(8) waters identified in the similarly situated analysis. - Required**



Includes water(s) that are geographically and physically adjacent per (a)(6), but are being used for established, normal farming, silviculture, and ranching activities (33 USC Section 1344(f)(1)) and therefore are not adjacent and require a case-specific significant nexus determination.

**C. NON-WATERS OF THE U.S. FINDINGS:**

**Check all that apply.**

- The review area is comprised entirely of dry land.
- Potential-(a)(7) Waters: Waters that DO NOT have a significant nexus to a water identified in paragraphs (a)(1)-(a)(3) of 33 CFR part 328.3.
- **Complete Table 9 and attach a map delineating the SPOE watershed boundary with potential (a)(7) waters identified in the similarly situated analysis. - Required**
- Includes water(s) that are geographically and physically adjacent per (a)(6), but are being used for established, normal farming, silviculture, and ranching activities (33 USC Section 1344(f)(1)) and therefore are not adjacent and require a case-specific significant nexus determination.
- Potential-(a)(8) Waters: Waters that DO NOT have a significant nexus to a water identified in paragraphs (a)(1)-(a)(3) of 33 CFR part 328.3.
- **Complete Table 9 and attach a map delineating the SPOE watershed boundary with potential (a)(8) waters identified in the similarly situated analysis. - Required**
- Includes water(s) that are geographically and physically adjacent per (a)(6), but are being used for established, normal farming, silviculture, and ranching activities (33 USC Section 1344(f)(1)) and therefore are not adjacent and require a case-specific significant nexus determination.
- Excluded Waters (Non-Waters of U.S.), even where they otherwise meet the terms of paragraphs (a)(4)-(a)(8):
- **Complete Table 10 - Required**
- (b)(1): Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the CWA.
- (b)(2): Prior converted cropland.
- (b)(3)(i): Ditches with ephemeral flow that are not a relocated tributary or excavated in a tributary.
- (b)(3)(ii): Ditches with intermittent flow that are not a relocated tributary, excavated in a tributary, or drain wetlands.
- (b)(3)(iii): Ditches that do not flow, either directly or through another water, into a water identified in paragraphs (a)(1)-(a)(3).
- (b)(4)(i): Artificially irrigated areas that would revert to dry land should application of water to that area cease.
- (b)(4)(ii): Artificial, constructed lakes and ponds created in dry land such as farm and stock watering ponds, irrigation ponds, settling basins, fields flooded for rice growing, log cleaning ponds, or cooling ponds.
- (b)(4)(iii): Artificial reflecting pools or swimming pools created in dry land.<sup>1</sup>
- (b)(4)(iv): Small ornamental waters created in dry land.<sup>1</sup>
- (b)(4)(v): Water-filled depressions created in dry land incidental to mining or construction activity, including pits excavated for obtaining fill, sand, or gravel that fill with water.
- (b)(4)(vi): Erosional features, including gullies, rills, and other ephemeral features that do not meet the definition of tributary, non-wetland swales, and lawfully constructed grassed waterways.<sup>1</sup>
- (b)(4)(vii): Puddles.<sup>1</sup>
- (b)(5): Groundwater, including groundwater drained through subsurface drainage systems.<sup>1</sup>
- (b)(6): Stormwater control features constructed to convey, treat, or store stormwater that are created in dry land.<sup>1</sup>
- (b)(7): Wastewater recycling structures created in dry land; detention and retention basins built for wastewater recycling; groundwater recharge basins; percolation ponds built for wastewater recycling; and water distributary structures built for wastewater recycling.
- Other non-jurisdictional waters/features within review area that do not meet the definitions in 33 CFR 328.3 of (a)(1)-(a)(8) waters and are not excluded waters identified in (b)(1)-(b)(7).
- **Complete Table 11 - Required.**

**D. ADDITIONAL COMMENTS TO SUPPORT AJD:** The project area is entirely within uplands.

<sup>1</sup> In many cases these excluded features will not be specifically identified on the AJD form, unless specifically requested. Corps Districts may, in case-by-case instances, choose to identify some or all of these features within the review area.





Google Earth

© 2018 Google

Imagery Date: 4/2/2013 lat 20.813179° lon -156.451026° elev 133 ft eye alt 4712 ft

1082 ft

2000



Jurisdictional Waters of the U.S.

Default field entry is "N/A". Delete "N/A" and fill out all fields in the table where applicable for waters/features present in the review area.

Table 1. (a)(1) Traditional Navigable Waters

(a)(1) Waters Name	(a)(1) Criteria	Rationale to Support (a)(1) Designation Include High Tide Line or Ordinary High Water Mark indicators, when applicable.
N/A	Choose an item.	N/A

Table 2. (a)(2) Interstate Waters

(a)(2) Waters Name	Rationale to Support (a)(2) Designation
N/A	

Table 3. (a)(3) Territorial Seas

(a)(3) Waters Name	Rationale to Support (a)(3) Designation
N/A	

Table 4. (a)(4) Impoundments

(a)(4) Waters Name	Rationale to Support (a)(4) Designation
N/A	
N/A	

**Table 5. (a)(5) Tributaries**

(a)(5) Waters Name	Flow Regime	(a)(1)-(a)(3) Water Name to which this (a)(5) Tributary Flows	Tributary Breaks	Rationale for (a)(5) Designation and Additional Discussion. Identify flowpath to (a)(1)-(a)(3) water or attach map identifying the flowpath; explain any breaks or flow through excluded/non-jurisdictional features, etc.
N/A	Choose an item.	N/A	Choose an item.	N/A
N/A	Choose an item.	N/A	Choose an item.	N/A
N/A	Choose an item.	N/A	Choose an item.	N/A
N/A	Choose an item.	N/A	Choose an item.	N/A

**Table 6. (a)(6) Adjacent Waters**

(a)(6) Waters Name	(a)(1)-(a)(5) Water Name to which this Water is Adjacent	Rationale for (a)(6) Designation and Additional Discussion. Identify the type of water and how the limits of jurisdiction were established (e.g., wetland, 87 Manual/Regional Supplement); explain how the 100-year floodplain and/or the distance threshold was determined; whether this water extends beyond a threshold; explain if the water is part of a mosaic, etc.
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

**Table 7. (a)(7) Waters**

SPOE Name	(a)(7) Waters Name	(a)(1)-(a)(3) Water Name to which this Water has a Significant Nexus	Significant Nexus Determination Identify SPOE watershed; discuss whether any similarly situated waters were present and aggregated for SND; discuss data, provide analysis, and summarize how the waters have more than speculative or insubstantial effect on the physical, chemical, or biological integrity of the (a)(1)-(a)(3) water, etc.
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A

**Table 8. (a)(8) Waters**

SPOE Name	(a)(8) Waters Name	(a)(1)-(a)(3) Water Name to which this Water has a Significant Nexus	Significant Nexus Determination Identify SPOE watershed; explain how 100-yr floodplain and/or the distance threshold was determined; discuss whether waters were determined to be similarly situated to subject water and aggregated for SND; discuss data, provide analysis, and then summarize how the waters have more than speculative or insubstantial effect the on the physical, chemical, or biological integrity of the (a)(1)-(a)(3) water, etc.
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A

Non-Jurisdictional Waters

Default field entry is "N/A". Delete "N/A" and fill out all fields in the table where applicable for waters/features present in the review area.

Table 9. Non-Waters/No Significant Nexus

SPOE Name	Non-(a)(7)/(a)(8) Waters Name	(a)(1)-(a)(3) Water Name to which this Water DOES NOT have a Significant Nexus	Basis for Determination that the Functions DO NOT Contribute Significantly to the Chemical, Physical, or Biological Integrity of the (a)(1)-(a)(3) Water. Identify SPOE watershed; explain how 100-yr floodplain and/or the distance threshold was determined; discuss whether waters were determined to be similarly situated to the subject water; discuss data, provide analysis, and summarize how the waters did not have more than a speculative or insubstantial effect on the physical, chemical, or biological integrity of the (a)(1)-(a)(3) water.
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A

Table 10. Non-Waters/Excluded Waters and Features

Paragraph (b) Excluded Feature/Water Name	Rationale for Paragraph (b) Excluded Feature/Water and Additional Discussion.
N/A	N/A
N/A	N/A

Table 11. Non-Waters/Other

Other Non-Waters of U.S. Feature/Water Name	Rationale for Non-Waters of U.S. Feature/Water and Additional Discussion.
N/A	N/A



August 18, 2020

Albert Williams, Regulatory Specialist  
Regulatory Branch  
U.S. Department of the Army  
U.S. Army Engineer District, Honolulu  
Regulatory Branch, Building 230  
Fort Shafter, Hawai'i 96858-5440

**SUBJECT:** Response to Early Consultation Comments Regarding Proposed Septage Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park, TMKs (2)3-8-104:017 and 030, Maui, Hawai'i (POH-2019-00096)

---

Dear Mr. Williams:

Thank you for your letter dated May 21, 2019, providing early consultation comments on the proposed septage pretreatment facility and improvements to the existing privately owned wastewater treatment plant located at Pulehunui Industrial Park. On behalf of Valley Isle Pumping (VIP), we offer the following responses in the order of your comments.

***Comment:*** Based on our review of the information you provided and the enclosed approved jurisdictional determination (AJD), dated May 14, 2019, the construction site for the new Septage Pretreatment Facility (TMK 38104017) does not contain waters of the U.S., including wetlands or navigable waters of the U.S., as defined by 33 CFR Parts 328 and 329, respectively. Therefore, a DA permit under Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act of 1899 is not required. The basis for our jurisdictional determination is on the enclosed AJD Form.

***Response:*** VIP acknowledges the Corps' determination that the proposed project involves neither waters of the U.S. nor navigable waters as defined by 33 CFR Parts 328 and 329 and, as such, no DA permit is required.

***Comment:*** Concerning the improvements to the existing WWTP (TMK 38104030), based on the information you provided we have determined that your proposed project would not involve an activity subject to the regulatory jurisdiction of the Corps and therefore, a DA permit is not required.



Albert Williams, Regulatory Specialist  
August 18, 2020  
Page 2

**Response:** VIP acknowledges the Corps' determination that the proposed improvements do not require a DA permit, as they do not involve an activity subject to the Corps' regulatory jurisdiction.

**Comment:** *While a DA permit is not required for your proposed project, you are responsible for obtaining all other applicable Federal, state, or local authorizations required by law.*

**Response:** VIP acknowledges this comment and will comply with Federal, State, and County laws to obtain all permits required for this project.

We appreciate your input, and will include a copy of your comment letter along with this response letter in the Draft Environmental Assessment for the proposed project. In the meantime, should you have any questions or require additional information, please feel free to contact me at (808) 244-2015.

Very truly yours,



Gwendolyn Leialoha Cheney Rivera  
Senior Associate

GLCR:lh

cc: Sal Marino, Valley Isle Pumping

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DAVID Y. IGE  
GOVERNOR OF HAWAII



MAY 24 2019

BRUCE S. ANDERSON, Ph.D.  
DIRECTOR OF HEALTH

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

In reply, please refer to:  
File:

May 20, 2019

S0511LI

Ms. Gwendolyn Rivera  
Munekiyo Hiraga  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Rivera:

**SUBJECT:** Early Consultation Request for Draft Environmental Assessment  
Valley Isle Pumping, Proposed Wastewater Pretreatment Facility  
Pulehunui Industrial Park, Puunene, Hawaii  
TMK: (2) 3-8-104:017 and 030

The Department of Health (DOH), Solid and Hazardous Waste Branch (SHWB) received your letter dated May 1, 2019. Your letter requested comments on the proposed project.

Based on your May 1, 2019 letter, we understand that the proposed facility will not only accept septage, but also solid waste as defined in Chapter 11-58.1, Hawaii Administrative Rules (HAR). Therefore, Valley Isle Pumping is proposing to operate a solid waste management facility. In accordance with Chapter 342H Hawaii Revised Statutes and Chapter 11-58.1, HAR, Valley Isle Pumping will be required to have a solid waste management permit for the proposed facility. As part of the permitting process, the DOH-SHWB will require the completion of a permit application, which requires full description of the type of waste to be accepted; proposed storage and processing methods of incoming materials, additives, and related by-products; proposed environmental controls; proposed monitoring programs (may be inclusive of related sampling and testing protocols); final disposition of the resultant materials from the process; and other requested information. We will be asking the applicant to address our regulatory requirements and our concerns during the solid waste permitting process.

Ms. Gwendolyn Rivera  
May 20, 2019  
Page 2

Given the brief description in the letter, we are unable to provide much additional comment. The very basic questions we have to start are the same questions we mentioned in the early paragraph.

If you have any questions regarding this letter, please contact me at (808) 586-4226.

Sincerely,



LENE ICHINOTSUBO, P.E., ACTING CHIEF  
Solid and Hazardous Waste Branch

c: DOH-Safe Drinking Water Branch,  
DOH-Wastewater Branch



August 18, 2020

Lene Ichinotsubo, P.E., Acting Chief  
State of Hawaii  
Department of Health  
Solid and Hazardous Waste Branch  
2827 Waimano Home Road  
Pearl City, Hawaii 96782

**SUBJECT:** Response to Early Consultation Comments Regarding Proposed  
Septage Pretreatment Facility and Wastewater Treatment Plant  
Improvements at Pulehunui Industrial Park, TMKs (2)3-8-104:017  
and 030, Maui, Hawai'i (S0511LI)

---

Dear Ms. Ichinotsubo:

Thank you for your letter dated May 20, 2019, providing early consultation comments on the proposed septage pretreatment facility and improvements to the existing privately owned wastewater treatment plant located at Pulehunui Industrial Park. On behalf of Valley Isle Pumping (VIP), we offer the following responses to your comments:

***Comment:*** Based on your May 1, 2019 letter, we understand that the proposed facility will not only accept septage, but also solid waste as defined in Chapter 11-58.1, Hawaii Administrative Rules (HAR). Therefore, Valley Isle Pumping is proposing to operate a solid waste management facility. In accordance with Chapter 342H Hawaii Revised Statutes and Chapter 11-58.1, HAR, Valley Isle Pumping will be required to have a solid waste management permit for the proposed facility. As part of the permitting process, the DOH-SHWB will require the completion of a permit application, which requires full description of the type of waste to be accepted; proposed storage and processing methods of incoming materials, additives, and related by-products; proposed environmental controls; proposed monitoring programs (may be inclusive of related sampling and testing protocols); final disposition of the resultant materials from the process; and other requested information. We will be asking the applicant to address our regulatory requirements and our concerns during the solid waste permitting process.

***Response:*** Through consultation with the DOH-SHWB on June 6, 2019, VIP understands that in addition to processing septage, the facility is proposed to process other non-hazardous liquid wastes which may be characterized as solid waste as defined by HAR Chapter 11-58.1. VIP is coordinating with the DOH-SHWB to provide the required information regarding the proposed facility and will comply with solid waste

Lene Ichinotsubo, P.E., Acting Chief  
August 18, 2020  
Page 2

permitting requirements as applicable to the project.

We appreciate your input, and will include a copy of your comment letter along with this response letter in the Draft Environmental Assessment for the proposed project. In the meantime, should you have any questions or require additional information, please feel free to contact me at (808) 244-2015.

Very truly yours,



Gwendolyn Leialoha Cheney Rivera  
Senior Associate

GLCR:lh

cc: Sal Marino, Valley Isle Pumping

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DAVID Y. IGE  
GOVERNOR OF HAWAII



BRUCE S. ANDERSON, Ph.D.  
DIRECTOR OF HEALTH

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

In reply, please refer to:  
File:

LUD – 2 3 8 104 017 & 030 Early Cons Req  
WWTP Imprv Pulehunui Ind Park-ID4649

May 29, 2019

Munekiyo Hiraga  
Attn: Gwendolyn Rivera  
305 High Street Suite 104  
Wailuku, Hawaii 96793  
Email: [gwendolyn@munekiyohiraga.com](mailto:gwendolyn@munekiyohiraga.com)

Dear Ms. Rivera:

**Subject:** Chapter 343, Hawaii Revised Statutes, Early Consultation Request for Proposed Septage Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park TMK Nos. (2) 3-8-104: 017 and 030, Maui, Hawaii

Thank you for allowing us the opportunity to provide comments for the subject project. The proposed design flow and characterization of the septage to be treated at the proposed facility should be described in the environmental assessment. The design flow of the proposed facility should be based on the anticipated number of hauler trucks and associated tank capacities that is planned to be accommodated at the facility. The proposed septage facility should be designed to only accept domestic wastewater, and not receive any oily wastewater from oil and grease traps nor porta-potty septage. Domestic septage pumped out from an individual wastewater system (IWS) is typically of much higher strength in comparison to the domestic wastewater quality that flows into the IWS. For example, concentrations in septage are expected to be thirty-two (32) times higher in BOD<sub>5</sub> or 7,000 mg/l and seventeen (17) times higher in total nitrogen or 6,800 mg/l. Additional comments for the proposed septage pretreatment facility are attached.

Please ensure that the existing Pulehunui Industrial Park Wastewater Treatment Plant (WWTP) has the adequate design capacity and treatment capabilities to handle any future and/or additional wastewater flows generated from the proposed septage pre-treatment facility. The effluent from the proposed septage pretreatment facility may be directed to the existing Pulehunui WWTP only if it has adequate capacity and capabilities to treat and dispose of effluent generated from the proposed septage pretreatment facility.

In addition, the proposed septage pretreatment facility should only accept domestic septage unless it is clearly demonstrated in the basis of design for the Pulehunui Industrial Park WWTP that it is adequately designed to accommodate non-domestic wastewater influent.



Ms. Gwendolyn Rivera  
May 29, 2019  
Page 2

Solids material generated from the proposed pretreatment facility that is not landfilled shall be required to be regulated under the Hawaii Administrative Rules, Chapter 11-62, Subchapter 5, Wastewater Management Permits and Registration and Code of Federal Regulation (CFR), Title 40, Section 503, Standards for the Use or Disposal of Sewage Sludge.

Please be informed that the proposed wastewater systems for the development may have to include design considerations to address any effects associated with the construction of and/or discharges from the wastewater systems to any public trust, Native Hawaiian resources or the exercise of traditional cultural practices. All wastewater plans must conform to applicable provisions of the Hawaii Administrative Rules, Chapter 11-62, "Wastewater Systems."

Should you have any questions, please call Mr. Michael Cummings of my staff at (808) 586-4294.

Sincerely,



SINA PRUDER, P.E., CHIEF  
Wastewater Branch

Attachment

LM/MST:sp

c: Mr. Roland Tejano, via email  
Mr. Mark Tomomitsu, via email  
Mr. Michael Cummings, via email  
SHWB

### Comments for the Pulehunui Septage Pretreatment Facility

- What are the proposed operating hours/days for this facility?
- Property should have enough room for vehicles to safely turn, maneuver, ingress and egress without compromising safety.
- Provide the number of loads on a typical day that can be accommodated at this treatment plant.
  - Wastewater volume should be based on equivalent truck loads.
  - Equivalent truck load = 1,000 gallons. For example, a 500-gallon tanker truck = 0.5 equivalent truck loads and a 2,000-gallon tank = 2.0 equivalent loads
- Studies have shown that household septage contains a much-higher-strength waste stream than typical domestic wastewater treatment plant effluent. For example, septage has 80 times the concentration of grease, 17 times the concentration of total-N, and 32 times the concentration of BOD<sub>5</sub>. Two independent studies indicated BOD<sub>5</sub> results of 6,480 mg/L and 7,000 mg/L, respectively.
  - Design of this facility should use at a minimum an influent BOD<sub>5</sub> concentration of 6,800 mg/L.
  - Measures should be taken to avoid plant upsets and pass throughs. If possible introduction of slug loads should be avoided.
  - Plant should be designed for operating hours. For example, if septage receiving facility is only open for 12-hours/day then treatment should be designed for a mass loading over that period.
- Determine time that it takes for:
  1. Assessment and screening of loads.
  2. Hookup and dump.
  3. Wash down if required.
- Develop dewatering and disposal plan for screenings. Provide authorization to dispose from entity accepting this material.
  - Will a bagging system be included for this?
- Develop dewatering and disposal plan for grit removal. Provide authorization to dispose from entity accepting this material.
- Develop dewatering and disposal plan for sludge. Provide authorization to dispose from entity accepting this material.
  - Sludge that is treated to either Class A or B bio-solids must have an individual wastewater management permit from Department of Health-Wastewater Branch.
- Septage that is accepted at this facility should only be characterized as domestic wastewater from single family homes or other similar types of uses. Non-domestic (commercial) or industrial wastewater should not be allowed in this facility. This includes waste from porta potties, grease traps, restaurants, or facilities that generate a high strength waste stream that may upset the treatment plant.
- Potable water should be protected with appropriate backflow prevention devices on hose bibs and supply lines.
- How will quality of loads be screened for contamination? Will a manifest system be implemented for cradle-to-grave wastewater management? Will lab test be conducted on-site or are pumpers required for to do their own testing



August 18, 2020

Sina Pruder, P.E., Chief  
State of Hawai'i  
Department of Health  
Environmental Management Division  
Wastewater Branch  
2827 Waimano Home Road #207  
Pearl City, Hawai'i 96782

**SUBJECT:** Response to Early Consultation Comments Regarding Proposed Septage Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park, TMKs (2)3-8-104:017 and 030, Maui, Hawai'i

Dear Chief Pruder:

Thank you for your letter dated May 29, 2019, providing early consultation comments on the proposed septage pretreatment facility and improvements to the existing privately owned wastewater treatment plant located at Pulehunui Industrial Park. On behalf of Valley Isle Pumping (VIP), we offer the following responses in the order of your comments:

**Comment No. 1:** *The proposed design flow and characterization of the septage to be treated at the proposed facility should be described in the environmental assessment. The design flow of the proposed facility should be based on the anticipated number of hauler trucks and associated tank capacities that is planned to be accommodated at the facility.*

**Response:** Design information for the proposed septage pretreatment facility, including characterization and quantification of the process streams will be provided in the Draft Environmental Assessment (EA). The design flow capacity of the pretreatment facility is based on an anticipated maximum of 20,000 gallons per day.

**Comment No. 2:** *The proposed septage facility should be designed to only accept domestic wastewater, and not receive any oily wastewater from oil and grease traps nor porta-potty septage. Domestic septage pumped out from an individual wastewater system (IWS) is typically of much higher strength in comparison to the domestic*

wastewater quality that flows into the IWS. For example, concentrations in septage are expected to be thirty-two (32) times higher in BODs or 7,000 mg/l and seventeen (17) times higher in total nitrogen or 6,800 mg/l.

**Response:** We note your comment regarding wastewater types and concentrations. A Preliminary Engineering and Drainage Report (PEDR), providing information on the types of wastewater to be accepted at the proposed facilities, will be included in the Draft EA.

**Comment No. 3:** *Additional comments for the proposed septage pretreatment facility are attached.*

**Response:** Please see the Response Matrix (**Attachment A**) for responses to your attached comments.

**Comment No. 4:** *Please ensure that the existing Pulehunui Industrial Park Wastewater Treatment Plant (WWTP) has the adequate design capacity and treatment capabilities to handle any future and/or additional wastewater flows generated from the proposed septage pre-treatment facility. The effluent from the proposed septage pretreatment facility may be directed to the existing Pulehunui WWTP only if it has adequate capacity and capabilities to treat and dispose of effluent generated from the proposed septage pretreatment facility.*

**Response:** The proposed improvements to the WWTP are designed to increase the capacity of the facility to accommodate the proposed and anticipated future wastewater flows generated by the septage pretreatment facility, in addition to the wastewater flows from other Pulehunui Industrial Park facilities.

**Comment No. 5:** *In addition, the proposed septage pretreatment facility should only accept domestic septage unless it is clearly demonstrated in the basis of design for the Pulehunui Industrial Park WWTP that it is adequately designed to accommodate non-domestic wastewater influent.*

**Response:** We note your comment regarding the types of influent. The PEDR, which will be included in the Draft EA, will address the facility's capacity to accommodate the proposed influent streams.

***Comment No. 6:*** *Solids material generated from the proposed pretreatment facility that is not landfilled shall be required to be regulated under the Hawaii Administrative Rules, Chapter 11-62, Subchapter 5, Wastewater Management Permits and Registration and Code of Federal Regulation (CFR), Title 40, Section 503, Standards for the Use or Disposal of Sewage Sludge.*

***Response:*** Any solids generated which are not landfilled will comply with the applicable regulations of the Hawai'i Administrative Rules, Chapter 11-62, Subchapter 5 Wastewater Management Permit and Registration and Code of Federal Regulation (CFR), Title 40, Section 503, Standards for the Use or Disposal of Sewage Sludge.

***Comment No. 7:*** *Please be informed that the proposed wastewater systems for the development may have to include design considerations to address any effects associated with the construction of and/or discharges from the wastewater systems to any public trust, Native Hawaiian resources or the exercise of traditional cultural practices. All wastewater plans must conform to applicable provisions of the Hawaii Administrative Rules, Chapter 11-62, "Wastewater Systems."*

***Response:*** The proposed project will conform to applicable provisions of the Hawai'i Administrative Rules, Chapter 11-62, "Wastewater Systems". We acknowledge that design considerations may be required for effects associated with the construction or operation of the proposed facility to any public trust, Native Hawaiian resources or the exercise of cultural practice. We note that a Cultural Impact Assessment (CIA) prepared prior to the development of the Pulehunui Industrial Park (McGerty and Spear, 2011) indicated an absence of cultural activities and impacts to cultural resources or practices in the project area from the proposed industrial development. An update (Spear, 2017) to the 2011 CIA provided an assessment that the WWTP would not negatively impact cultural resources or practices.



Sina Pruder, P.E., Chief  
August 19, 2020  
Page 4

We appreciate your input, and will include a copy of your comment letter along with this response letter in the Draft Environmental Assessment for the proposed project. In the meantime, should you have any questions or require additional information, please feel free to contact me at (808) 244-2015.

Very truly yours,



Gwendolyn Leialoha Cheney Rivera  
Senior Associate

GLCR:lh

Attachment

cc: Sal Marino, Valley Isle Pumping (w/attachment)

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**ATTACHMENT A**  
**Response Matrix for Comments for the Pulehunui Septage Pretreatment Facility**

	<i>Comment</i>	<i>Response</i>
A	<ul style="list-style-type: none"> <li>• What are the proposed operating hours/days for this facility?</li> </ul>	<p>The proposed operating schedule is 6 a.m. to 6 p.m., seven (7) days per week.</p>
B	<ul style="list-style-type: none"> <li>• Property should have enough room for vehicles to safely turn, maneuver, ingress and egress without compromising safety.</li> </ul>	<p>The site has been planned with a one-way circular route to allow for large vacuum trucks to enter, dump, and exit with minimal to no reversing. A site plan will be included in the Draft EA.</p>
C	<ul style="list-style-type: none"> <li>• Provide the number of loads on a typical day that can be accommodated at this treatment plant.               <ul style="list-style-type: none"> <li>○ Wastewater volume should be based on equivalent truck loads.</li> <li>○ Equivalent truck load = 1,000 gallons. For example, a 500-gallon tanker truck = 0.5 equivalent truck loads and a 2,000-gallon tank = 2.0 equivalent loads</li> </ul> </li> </ul>	<p>20,000 gallons per day or an average of ten (10) 2,000-gallon truckloads (20 equivalent truck loads).</p>
D	<ul style="list-style-type: none"> <li>• Studies have shown that household septage contains a much-higher-strength waste stream than typical domestic wastewater treatment plant effluent. For example, septage has 80 times the concentration of grease, 17 times the concentration of total-N, and 32 times the concentration of BODs. Two independent studies indicated BODs results of 6,480 mg/L and 7,000 mg/L, respectively.               <ul style="list-style-type: none"> <li>○ Design of this facility should use at a minimum an influent BODs concentration of 6,800 mg/L.</li> <li>○ Measures should be taken to avoid plant upsets and pass throughs. If possible introduction of slug loads should be avoided.</li> <li>○ Plant should be designed for operating hours. For example, if septage receiving facility is only open for 12-hours/day then treatment should be designed for a mass loading over that period.</li> </ul> </li> </ul>	<p>Design of facility is using a minimum influent BOD5 of 6800 mg/L. With the components in place at this receiving facility, effluent quality leaving the facility heading to the plant will have similar characteristics to municipal wastewater. Mass-balance calculations for the receiving facility will be provided in the Engineering Design Report.</p> <p>Measures taken to avoid plant upset include multiple receiving and equalization tanks both at receiving facility and WWTP. Receiving facility will include a 29,500 gallon receiving tank from which batches will be put through the dewatering skid. Effluent from the dewatering process will gravity flow to a lift station which will pump to the WWTP equalization basin. The WWTP equalization basin has been increased in size from typical and is designed to distribute incoming batch flows evenly over a 24 hour period.</p> <p>The receiving facility is open for 12 hours, but with the receiving tank and equalization basin mentioned above, flow to WWTP will be equalized over a 24-hour period in order to provide consistent wastewater treatment and effluent disposal.</p>

	<b>Comment</b>	<b>Response</b>
E	<ul style="list-style-type: none"> <li>• Determine time that it takes for:               <ul style="list-style-type: none"> <li>○ Assessment and screening of loads.</li> <li>○ Hookup and dump.</li> <li>○ Wash down if required.</li> </ul> </li> </ul>	<p>Assessment and pre-screening done at the proposed facility are similar to current process for loads to County of Maui facility.</p> <p>Hookup and dump time is 15 minutes to empty truck load into receiving tank.</p> <p>Wash down time is approximately ten minutes. Minimal cleanup should be required. Dump hoses are equipped with valves in order to minimize spillage.</p>
F	<ul style="list-style-type: none"> <li>• Develop dewatering and disposal plan for screenings. Provide authorization to dispose from entity accepting this material.               <ul style="list-style-type: none"> <li>○ Will a bagging system be included for this?</li> </ul> </li> </ul>	<p>A screen will be integrated into first chamber of grit tank. Grit and screenings will be periodically removed with a vacuum truck and taken to the County of Maui landfill, an approved DOH solid waste facility.</p> <p>No bagging system is included; waste will be pumped.</p>
G	<ul style="list-style-type: none"> <li>• Develop dewatering and disposal plan for grit removal. Provide authorization to dispose from entity accepting this material.</li> </ul>	<p>A screen will be integrated into first chamber of grit tank. Grit and screenings will be periodically removed with a vacuum truck and taken to the County of Maui landfill, an approved DOH solid waste facility.</p>
H	<ul style="list-style-type: none"> <li>• Develop dewatering and disposal plan for sludge. Provide authorization to dispose from entity accepting this material.               <ul style="list-style-type: none"> <li>○ Sludge that is treated to either Class A or B bio-solids must have an individual wastewater management permit from Department of Health-Wastewater Branch</li> </ul> </li> </ul>	<p>Sludge will be brought to COM landfill. Belt press will deposit sludge cake into a third-party roll-off container via a conveyor. VIP will contract with third-party hauler to remove and empty at an anticipated rate of two per week.</p> <p>Production of Class A or B Biosolids is not proposed at this time. Should Class A or B bio-solids be produced, wastewater management permit from Department of Health-Wastewater Branch will be obtained.</p>
I	<ul style="list-style-type: none"> <li>• Septage that is accepted at this facility should only be characterized as domestic wastewater from single family homes or other similar types of uses. Non-domestic (commercial) or industrial wastewater should not be allowed in this facility. This includes waste from porta potties, grease traps, restaurants, or facilities that generate a high strength waste stream that may upset the treatment plant.</li> </ul>	<p>Septage accepted at this facility is characterized only as domestic wastewater.</p>

	<b>Comment</b>	<b>Response</b>
J	<ul style="list-style-type: none"> <li>Potable water should be protected with appropriate backflow prevention devices on hose bibs and supply lines.</li> </ul>	<p>Separate backflow prevention devices will be provided for the potable water supply to receiving facility.</p>
K	<ul style="list-style-type: none"> <li>How will quality of loads be screened for contamination? Will a manifest system be implemented for cradle-to-grave wastewater management? Will lab test be conducted on-site or are pumpers required for to do their own testing</li> </ul>	<p>VIP anticipates accepting loads from VIP operators or qualified County of Maui operators. Loads will be screened using the procedures currently in place for disposal at the County of Maui wastewater facility. Visual site checks will be made to detect the presence of petroleum or other contaminants. If detected, the load will not be pumped and brought to receiving facility until further screened with a site lab test for contaminants.</p> <p>All loads brought to the receiving facility will be logged by the driver and include Driver Name, Date, Time, Quantity, and Type. Daily operation and maintenance tasks will be performed by VIP licensed personnel at the receiving facility and WWTP.</p>



DAVID Y. IGE  
GOVERNOR OF HAWAII



MAY 20 2019

BRUCE S. ANDERSON, Ph.D.  
DIRECTOR OF HEALTH

LORRIN W. PANG, M.D., M.P.H.  
DISTRICT HEALTH OFFICER

STATE OF HAWAII  
DEPARTMENT OF HEALTH  
MAUI DISTRICT HEALTH OFFICE  
54 HIGH STREET  
WAILUKU, HAWAII 96793-3378

May 16, 2019

Ms. Gwendolyn Rivera  
Senior Associate  
Munekiyo Hiraga  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Rivera:

**Subject: Chapter 343, Hawai'i Revised Statutes, Early Consultation Request for Proposed Septage Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park, Maui Hawaii  
TMK: (2) 3-8-104:017 and 030,**

Thank you for the opportunity to review this project. We have the following comments to offer:

The proposed project will discharge to a private wastewater treatment plant. If you have any questions, please call Roland Tejano, Environmental Engineer, at 808 984-8232.

It is strongly recommended that you review the department's website at <https://health.hawaii.gov/epo/files/2018/05/DOHEHA.LandUseContactList.20180502.pdf> and contact the appropriate program that concerns your project.

Should you have any questions, please contact me at 808 984-8230 or email me at [patricia.kitkowski@doh.hawaii.gov](mailto:patricia.kitkowski@doh.hawaii.gov).

Sincerely,

Patti Kitkowski  
District Environmental Health Program Chief

c Marianne Rossio (Via Email)



August 18, 2020

Patti Kitkowski, District Environmental  
Health Program Chief  
State of Hawai'i  
Department of Health  
Maui District Health Office  
54 High Street  
Wailuku, Hawai'i 96793-3378

**SUBJECT:** Response to Early Consultation Comments Regarding Proposed  
Septage Pretreatment Facility and Wastewater Treatment Plant  
Improvements at Pulehunui Industrial Park, TMKs (2)3-8-104:017  
and 030, Maui, Hawai'i

---

Dear Ms. Kitkowski:

Thank you for your letter dated May 16, 2019, providing early consultation comments on the proposed septage pretreatment facility and improvements to the existing privately owned wastewater treatment plant located at Pulehunui Industrial Park. On behalf of Valley Isle Pumping (VIP), we offer the following responses to your comments:

**Comment:** *The proposed project will discharge to a private wastewater treatment plant. If you have any questions, please call Roland Tejano, Environmental Engineer, at 808 984-8232.*

**Response:** Thank you for providing Mr. Tejano's contact information. We confirm that the pretreatment facility will discharge to the privately owned Pulehunui Industrial Park Wastewater Treatment Plant.

We appreciate your input and the resources provided at the Department's website. We will include a copy of your comment letter along with this response letter in the Draft

Patti Kitkowski, District Environmental  
Health Program Chief  
August 18, 2020  
Page 2

Environmental Assessment for the proposed project. In the meantime, should you have any questions or require additional information, please feel free to contact me at 244-2015.

Very truly yours,



Gwendolyn Leialoha Cheney Rivera  
Senior Associate

GLCR:lh

cc: Sal Marino, Valley Isle Pumping

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STATE OF HAWAII  
DEPARTMENT OF HEALTH  
SAFE DRINKING WATER BRANCH  
ULUAKUPU BLDG. 4  
2385 WAIMANO HOME ROAD, SUITE 110  
PEARL CITY, HI 96782-1400

In reply, please refer to:  
File: SDWB  
PulehunuiIndustrialPark.docx

June 26, 2019

Ms. Gwendolyn Rivera  
Munekiyo Hiraga  
305 South High Street, Suite 104  
Wailuku, Hawaii 96793  
[via [gwendolyn@munekiyohiraga.com](mailto:gwendolyn@munekiyohiraga.com) only]

Dear Ms. Rivera:

SUBJECT: CHAPTER 343, HAWAII REVISED STATUTES, EARLY CONSULTATION REQUEST FOR PROPOSED SEPAGE PRETREATMENT FACILITY AND WASTEWATER TREATMENT PLANT IMPROVEMENTS AT PULEHUNUI INDUSTRIAL PARK, TMK (2) 3-8-104: 017 & 030, MAUI, HAWAII

Thank you for the opportunity to provide early consultation comments for the proposed project. We apologize for our delayed comments. The Department of Health (DOH), Safe Drinking Water Branch (SDWB) has regulatory jurisdiction over the Pulehunui Water Association, Inc.'s water system infrastructure (Public Water System 264) and the water quality being served within the Pulehunui Industrial Park, including the drinking water well located between Lots 6 and 7, approximately 1,700 feet away from the proposed septage facility on Lot 17. Our comments below relate to this well's current and future ability to provide a safe and regulatory compliant source of drinking water to park customers:

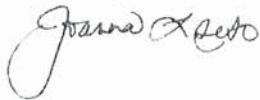
1. This project doubles the wastewater treatment plant (WWTP) capacity, and therefore final discharge, of treated effluent into the leach field which is near drinking water source. Please ensure that the DOH Wastewater Branch reviews and approves this facility's improvements and operations.
2. The proposed increase is due to "septage, storm drain waste, and other non-hazardous liquid wastes generated offsite." How will the WWTP operators know exactly what quality of offsite wastewater is being put through their WWTP and therefore, back into this very shallow aquifer that provides drinking water for the park?

Ms. Gwendolyn Rivera  
June 26, 2019  
Page 2

3. Waste solids will be discharged "at a landfill or other appropriate disposal site." Such discharge is prohibited without an appropriate design, review and approval by a jurisdictional agency like the DOH, Solid and Hazardous Waste Branch.
4. "A portion" of the pretreatment facility's liquid effluent will be treated in the Pulehunui Industrial Park's WWTP. Please clarify where the other remaining portion of the effluent stream will go.

If there are any questions, please call Mr. Michael Miyahira, SDWB Engineering Section Supervisor at (808) 586-4258.

Sincerely,



JOANNA L. SETO, P.E., CHIEF  
Safe Drinking Water Branch

MM:cw

- c: Ms. Sina Pruder, P.E., Chief Wastewater Branch [via email only]  
Ms. Lene Ichinotsubo, P.E., Acting Chief, Solid and Hazardous Waste Branch  
[via email only]  
Ms. Blanca Lafolette, Pacific Rim Land, Inc. [via [blanca@pacificrimland.com](mailto:blanca@pacificrimland.com) only]



August 18, 2020

Joanna L. Seto, P.E., Chief  
State of Hawai'i  
Department of Health  
Safe Drinking Water Branch  
Uluakupu Building 4  
2385 Waimano Home Road, Suite 110  
Pearl City, Hawai'i 96782-1400

**SUBJECT:** Response to Early Consultation Comments Regarding Proposed Septage Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park, TMKs (2)3-8-104:017 and 030, Maui, Hawai'i (SDWB PulehunuiIndustrialPark.docx)

Dear Ms. Seto:

Thank you for your letter dated June 26, 2019, providing early consultation comments on the proposed septage pretreatment facility and improvements to the existing privately owned wastewater treatment plant located at Pulehunui Industrial Park. On behalf of Valley Isle Pumping (VIP), we offer the following responses in the order of your comments.

***Comment:*** This project doubles the wastewater treatment plant (WWTP) capacity, and therefore final discharge, of treated effluent into the leach field which is near drinking water source. Please ensure that the DOH Wastewater Branch reviews and approves this facility's improvements and operations.

***Response:*** A Preliminary Engineering Report (PER) and Drainage Report will be included in the Draft EA for the project. Further, an Engineering Design Report (EDR) will be submitted to the Department of Health (DOH) Wastewater Branch (WWB) for review and approval prior to any improvements being made to the WWTP.

***Comment:*** The proposed increase is due to "septage, storm drain waste, and other non-hazardous liquid wastes generated offsite." How will the WWTP operators know exactly what quality of offsite wastewater is being put through their WWTP and therefore, back into this very shallow aquifer that provides drinking water for the park?

***Response:*** VIP will be operating both the WWTP and the Receiving Facility. Licensed VIP operators will be performing effluent tests and maintaining logs of all materials

received and disposed of, as required by the conditions of Solid and Hazardous Waste Branch (SHWB) and WWB permits.

The storm drain waste processing component of the project consists of a retention basin where material will be deposited and manually sorted. This is a separate process, and no effluent from this process will go to the WWTP. The design of this process will be subject to review and permitting by SHWB.

The septage and other non-hazardous liquid wastes will be received, screened, and then dewatered utilizing a belt press system. This receiving facility is based on proven designs of existing permitted facilities around the US. This portion of the facility will also be subject to review and approval/permitting of the SHWB. The liquid effluent from this process flowing to the WWTP is projected to be 250 mg/L TSS and BOD, essentially the same waste profile as raw domestic wastewater, based on lab results from similar facilities in operation. The WWTP is being designed with appropriate equalization basins and treatment capacity for this additional waste stream, all of which will be contained in the EDR and subject to WWB review, approval, and ongoing operating conditions.

A leach field will be installed as part of these improvements, and the injection wells currently in use as the primary effluent disposal method for the WWTP will be relegated to a secondary back-up system only.

**Comment:** *Waste solids will be discharged “at a landfill or other appropriate disposal site.” Such discharge is prohibited without an appropriate design, review and approval by a jurisdictional agency like the DOH, Solid and Hazardous Waste Branch.*

**Response:** Operation of all applicable equipment and processes within this facility will be subject to the conditions of a SHWB permit.

**Comment:** *“A portion” of the pretreatment facility’s liquid effluent will be treated in the Pulehunui Industrial Park’s WWTP. Please clarify where the other remaining portion of the effluent stream will go.*

**Response:** VIP is proposing to develop a storm drain waste processing site to receive and process waste from VIP trucks and County vehicles servicing both private and public storm drain systems. Maui currently has no such permitted site. This site is to be located within Pulehunui Heavy Industrial Subdivision - which is zoned “M-3” and was specifically created to accommodate this type of use. It is noted that all of the material being processed at the storm drain waste processing site will have been removed from existing storm drain systems located around the island. If storm drain systems are not properly serviced, then this material will make its way to receiving waters. Stormwater runoff from

Joanna L. Seto, P.E., Chief  
August 18, 2020  
Page 3

private systems which are not regularly cleaned has been shown to be detrimental to near-shore waters and can cause back-ups or other failures of the drainage system and lead to property damage. Public systems also must be regularly maintained for the same reasons. In addition, Central Maui was recently required to obtain and comply with an MS4 NPDES permit for the storm drain collection system, which involves regular cleaning and inspections. As time goes on, more areas of Maui will be subject to the same regulations and require a safe, permitted processing site for the material removed.

The storm drain receiving/retention basin is not connected to the WWTP. Water present that was used in the cleaning process will undergo evapotranspiration and percolation. Only potable water is used for the flushing of storm drain lines - no reclaimed water is used because many of these systems around the island are connected to receiving waters such as the Pacific Ocean.

We appreciate your input, and will include a copy of your comment letter along with this response letter in the Draft Environmental Assessment for the proposed project. In the meantime, should you have any questions or require additional information, please feel free to contact me at (808) 244-2015.

Very truly yours,



Gwendolyn Leialoha Cheney Rivera  
Senior Associate

GLCR:lh

cc: Sal Marino, Valley Isle Pumping

K:\DATA\WI Pumping\Applications\ECL\Response Letters\ECL Response letter.DOH-SDWB.docx



DAVID Y. IGE  
GOVERNOR OF HAWAII



SUZANNE D. CASE  
CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE  
MANAGEMENT

STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
LAND DIVISION

POST OFFICE BOX 621  
HONOLULU, HAWAII 96809

May 29, 2019

Munekiyo Hiraga  
Attn: Ms. Gwendolyn Rivera, Senior Associate  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

via email: [planning@munekiyohiraga.com](mailto:planning@munekiyohiraga.com)

Dear Ms. Rivera:

SUBJECT: Early Consultation Request for Proposed Septage Pretreatment Facility and **Wastewater Treatment Plant Improvements at Pulehunui Industrial Park** located at Pulehunui, Island of Maui; TMK: (2) 3-8-104:017 and 030 on behalf of Valley Isle Pumping

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

At this time, enclosed are comments from the (a) Engineering Division and (b) Division of Forestry & Wildlife on the subject matter. Should you have any questions, please feel free to contact Darlene Nakamura at (808) 587-0417 or email: [darlene.k.nakamura@hawaii.gov](mailto:darlene.k.nakamura@hawaii.gov). Thank you.

Sincerely,

A handwritten signature in black ink, appearing to read "Russell Y. Tsuji".

Russell Y. Tsuji  
Land Administrator

Enclosures  
cc: Central Files



DAVID Y. IGE  
GOVERNOR OF HAWAII



19741  
SUZANNE D. CASE  
CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE  
MANAGEMENT

STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
LAND DIVISION

POST OFFICE BOX 621  
HONOLULU, HAWAII 96809

May 17, 2019

MEMORANDUM

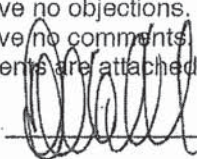
TO: **DLNR Agencies:**  
 Div. of Aquatic Resources  
 Div. of Boating & Ocean Recreation  
 Engineering Division  
 Div. of Forestry & Wildlife  
 Div. of State Parks  
 Commission on Water Resource Management  
 Office of Conservation & Coastal Lands  
 Land Division – Maui District  
 Historic Preservation

FROM: Russell Y. Tsuji, Land Administrator  
SUBJECT: Early Consultation Request for Proposed Septage Pretreatment Facility and **Wastewater Treatment Plant** Improvements at **Pulehunui Industrial Park**  
LOCATION: Pulehunui, Island of Maui; TMK: (2) 3-8-104:017 and 030  
APPLICANT: Munekiyo Hiraga on behalf of Valley Isle Pumping

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit any comments by **May 24, 2019**.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417 or by email at [darlene.k.nakamura@hawaii.gov](mailto:darlene.k.nakamura@hawaii.gov). Thank you.

- We have no objections.
- We have no comments.
- Comments are attached.

Signed: 

Print Name: **DAVID G. SMITH, Administrator**

Date: \_\_\_\_\_

Attachments  
cc: Central Files

DAVID Y. IGE  
GOVERNOR OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
DIVISION OF FORESTRY AND WILDLIFE  
1151 PUNCHBOWL STREET, ROOM 325  
HONOLULU, HAWAII 96813

MAY 24 2019

SUZANNE D. CASE  
CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA  
FIRST DEPUTY

M. KALEO MANUEL  
DEPUTY DIRECTOR - WATER

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

## MEMORANDUM

**TO:** RUSSELL Y. TSUJI, Administrator  
Land Division

**FROM:** DAVID G. SMITH, Administrator *DGS*

**SUBJECT:** Division of Forestry and Wildlife Comments on the Early Consultation Request for Proposed Septage Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park

The Department of Land and Natural Resources, Division of Forestry and Wildlife (DOFAW) has received your inquiry regarding the early consultation request for the proposed Septage Pretreatment Facility and Wastewater Treatment Plant improvements at Pulehunui Industrial Park in Pulehunui on the island of Maui, TMKs: (2) 3-8-104:017 and (2) 3-8-104:030. Proposed work would include construction of a new septage pretreatment facility including a 2,000 gallon preloader, a receiving tank with odor control equipment, and process equipment for screening, dewatering, and materials transfer on a 2.89 acre parcel of land. Proposed improvements to the existing wastewater treatment plant would increase its capacity from the current daily maximum of 20,000 gallons to approximately 40,000 gallons.

The State listed Hawaiian Hoary Bat or 'Ōpe'ape'a (*Lasiurus cinereus semotus*) has the potential to occur in the vicinity of the project area and may roost in nearby trees. If any site clearing is required this should be timed to avoid disturbance during the bat birthing and pup rearing season (June 1 through September 15). If this cannot be avoided, woody plants greater than 15 feet (4.6 meters) tall should not be disturbed, removed, or trimmed without consulting DOFAW. Barbed wire should be avoided for any construction because bat mortalities have been documented as a result of becoming ensnared by barbed wire during flight.

We note that artificial lighting can adversely impact seabirds that may pass through the area at night by causing disorientation. This 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 15 through December 15. This is the period when young seabirds take their maiden voyage to the open sea.

For illustrations and guidance related to seabird-friendly light styles that also protect the dark, starry skies of Hawai'i please visit: <https://dlnr.hawaii.gov/wildlife/files/2016/03/DOC439.pdf>.



The State listed Blackburn's Sphinx Moth (BSM; *Manduca blackburni*) has a historic range that encompasses the project area. Larvae of BSM feed on many nonnative hostplants that include tree tobacco (*Nicotiana glauca*) which grows in disturbed soil. We recommend contacting our Maui DOFAW office at (808) 984-8100 for further information about where BSM may be present and whether a vegetation survey should be conducted to determine the presence of plants preferred by BSM.

DOFAW is concerned about attracting vulnerable birds to areas that may host nonnative predators such as cats, rodents, and mongoose. We recommend taking action to minimize predator presence; remove cats, place bait stations for rodents and mongoose, and provide covered trash receptacles. State listed waterbirds such as the Hawaiian Duck (*Anas wyvilliana*), Hawaiian Stilt (*Himantopus mexicanus knudseni*), Hawaiian Coot (*Fulica alai*), and Hawaiian Goose or Nēnē (*Branta sandvicensis*) have the potential to enter the proposed project site. It is against State law to harm or harass these species. If any of these species are present during construction activities, then all activities within 100 feet (30 meters) should cease, and the bird should not be approached. Work may continue after the bird leaves the area of its own accord.

We appreciate your efforts to work with our office for the conservation of our native species. Should the scope of the project change significantly, or should it become apparent that threatened or endangered species may be impacted, please contact our staff as soon as possible. If you have any questions, please contact Jim Cogswell, Wildlife Program Manager at (808) 587-4187 or [James.M.Cogswell@hawaii.gov](mailto:James.M.Cogswell@hawaii.gov).

DEPARTMENT OF LAND AND NATURAL RESOURCES  
ENGINEERING DIVISION

LD/Russell Y. Tsuji

Ref: Early Consultation Request for Proposed Septage Pretreatment Facility and  
Wastewater Treatment Plant Improvements at Pulehunui Industrial Park

Location: Pulehunui, Island of Maui

TMK(s): (2) 3-8-104:017 and 030

Applicant: Munekiyo Hiraga on behalf of Valley Isle Pumping

COMMENTS

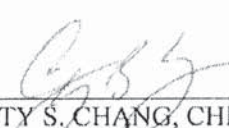
The rules and regulations of the National Flood Insurance Program (NFIP), Title 44 of the Code of Federal Regulations (44CFR), are in effect when development falls within a Special Flood Hazard Area (high risk areas). State projects are required to comply with 44CFR regulations as stipulated in Section 60.12. Be advised that 44CFR reflects the minimum standards as set forth by the NFIP. Local community flood ordinances may stipulate higher standards that can be more restrictive and would take precedence over the minimum NFIP standards.

The owner of the project property and/or their representative is responsible to research the Flood Hazard Zone designation for the project. Flood Hazard Zones are designated on FEMA's Flood Insurance Rate Maps (FIRM), which can be viewed on our Flood Hazard Assessment Tool (FHAT) (<http://gis.hawaiiinfip.org/FHAT>).

If there are questions regarding the local flood ordinances, please contact the applicable County NFIP coordinating agency below:

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

Signed: \_\_\_\_\_

  
CARTY S. CHANG, CHIEF ENGINEER

Date: \_\_\_\_\_

5/25/19

DAVID Y. IGE  
GOVERNOR OF HAWAII



SUZANNE D. CASE  
CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE  
MANAGEMENT

STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
LAND DIVISION

POST OFFICE BOX 621  
HONOLULU, HAWAII 96809

May 30, 2019

Munekiyo Hiraga  
Attn: Ms. Gwendolyn Rivera, Senior Associate  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

via email: [planning@munekiyohiraga.com](mailto:planning@munekiyohiraga.com)

Dear Ms. Rivera:

SUBJECT: Early Consultation Request for Proposed Septage Pretreatment Facility and **Wastewater Treatment Plant Improvements at Pulehunui Industrial Park** located at Pulehunui, Island of Maui; TMK: (2) 3-8-104:017 and 030 on behalf of Valley Isle Pumping

Thank you for the opportunity to review and comment on the subject matter. In addition to our previous comments dated May 29, 2019, enclosed are comments from the Commission on Water Resource Management on the subject matter. Should you have any questions, please feel free to contact Darlene Nakamura at (808) 587-0417 or email: [darlene.k.nakamura@hawaii.gov](mailto:darlene.k.nakamura@hawaii.gov). Thank you.

Sincerely,

A handwritten signature in black ink, appearing to read "Russell Y. Tsuji".

Russell Y. Tsuji  
Land Administrator

Enclosure  
cc: Central Files



DAVID Y. IGE  
GOVERNOR OF HAWAII



SUZANNE D. CASE  
CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE  
MANAGEMENT

STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
LAND DIVISION

POST OFFICE BOX 621  
HONOLULU, HAWAII 96809

May 17, 2019

MEMORANDUM

RECEIVED  
COMMISSION ON WATER  
RESOURCE MANAGEMENT  
2019 MAY 17 AM 10: 58

TO:

**DLNR Agencies:**

- Div. of Aquatic Resources
- Div. of Boating & Ocean Recreation
- Engineering Division
- Div. of Forestry & Wildlife
- Div. of State Parks
- ~~Commission on Water Resource Management~~
- Office of Conservation & Coastal Lands
- Land Division – Maui District
- Historic Preservation

FR:

TD:

FROM:

Russell Y. Tsuji, Land Administrator

SUBJECT:

Early Consultation Request for Proposed Septage Pretreatment Facility and  
**Wastewater Treatment Plant Improvements at Pulehunui Industrial Park**

LOCATION:

Pulehunui, Island of Maui; TMK: (2) 3-8-104:017 and 030

APPLICANT:

Munekiyo Hiraga on behalf of Valley Isle Pumping

RECEIVED  
LAND DIVISION  
2019 MAY 28 PM 4: 30  
DEPT. OF LAND  
AND NATURAL RESOURCES  
STATE OF HAWAII

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit any comments by **May 24, 2019**.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Darlene Nakamura at 587-0417 or by email at [darlene.k.nakamura@hawaii.gov](mailto:darlene.k.nakamura@hawaii.gov). Thank you.

- We have no objections.
- We have no comments.
- Comments are attached.

Signed:           /s/ M. Kaleo Manuel          

Print Name:           Deputy Director          

Date:           May 28, 2019          

Attachments

cc: Central Files

DAVID Y. IGE  
GOVERNOR OF HAWAII



SUZANNE D. CASE  
CHAIRPERSON

BRUCE S. ANDERSON, PH.D.  
KAMANA BEAMER, PH.D.  
NEIL J. HANNAHS  
WAYNE K. KATAYAMA  
PAUL J. MEYER

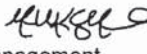
M. KALEO MANUEL  
DEPUTY DIRECTOR

STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
**COMMISSION ON WATER RESOURCE MANAGEMENT**  
P.O. BOX 621  
HONOLULU, HAWAII 96809

May 28, 2019

REF: RFD.5113.6

TO: Mr. Russell Tsuji, Administrator  
Land Division

FROM: M. Kaleo Manuel, Deputy Director   
Commission on Water Resource Management

SUBJECT: Early Consultation Request for Proposed Septage Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park

FILE NO.: RFD.5113.6  
TMK NO.: (2) 3-8-104:017 and 030

Thank you for the opportunity to review the subject document. The Commission on Water Resource Management (CWRM) is the agency responsible for administering the State Water Code (Code). Under the Code, all waters of the State are held in trust for the benefit of the citizens of the State, therefore all water use is subject to legally protected water rights. CWRM strongly promotes the efficient use of Hawaii's water resources through conservation measures and appropriate resource management. For more information, please refer to the State Water Code, Chapter 174C, Hawaii Revised Statutes, and Hawaii Administrative Rules, Chapters 13-167 to 13-171. These documents are available via the Internet at <http://dlnr.hawaii.gov/cwrn>.

Our comments related to water resources are checked off below.

- 1. We recommend coordination with the county to incorporate this project into the county's Water Use and Development Plan. Please contact the respective Planning Department and/or Department of Water Supply for further information.
- 2. We recommend coordination with the Engineering Division of the State Department of Land and Natural Resources to incorporate this project into the State Water Projects Plan.
- 3. We recommend coordination with the Hawaii Department of Agriculture (HDOA) to incorporate the reclassification of agricultural zoned land and the redistribution of agricultural resources into the State's Agricultural Water Use and Development Plan (AWUDP). Please contact the HDOA for more information.
- 4. We recommend that water efficient fixtures be installed and water efficient practices implemented throughout the development to reduce the increased demand on the area's freshwater resources. Reducing the water usage of a home or building may earn credit towards Leadership in Energy and Environmental Design (LEED) certification. More information on LEED certification is available at <http://www.usgbc.org/leed>. A listing of fixtures certified by the EAP as having high water efficiency can be found at <http://www.epa.gov/watersense>.
- 5. We recommend the use of best management practices (BMP) for stormwater management to minimize the impact of the project to the existing area's hydrology while maintaining on-site infiltration and preventing polluted runoff from storm events. Stormwater management BMPs may earn credit toward LEED certification. More information on stormwater BMPs can be found at <http://planning.hawaii.gov/czm/initiatives/low-impact-development/>
- 6. We recommend the use of alternative water sources, wherever practicable.
- 7. We recommend participating in the Hawaii Green Business Program, that assists and recognizes businesses that strive to operate in an environmentally and socially responsible manner. The program description can be found online at <http://energy.hawaii.gov/green-business-program>.
- 8. We recommend adopting landscape irrigation conservation best management practices endorsed by the Landscape Industry Council of Hawaii. These practices can be found online at



- [http://www.hawaiiscape.com/wp-content/uploads/2013/04/LICH\\_Irrigation\\_Conservation\\_BMPs.pdf](http://www.hawaiiscape.com/wp-content/uploads/2013/04/LICH_Irrigation_Conservation_BMPs.pdf).
- 9. There may be the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality.
  - 10. The proposed water supply source for the project is located in a designated water management area, and a Water Use Permit is required prior to use of water. The Water Use Permit may be conditioned on the requirement to use dual line water supply systems for new industrial and commercial developments.
  - 11. A Well Construction Permit(s) is (are) are required before the commencement of any well construction work.
  - 12. A Pump Installation Permit(s) is (are) required before ground water is developed as a source of supply for the project.
  - 13. There is (are) well(s) located on or adjacent to this project. If wells are not planned to be used and will be affected by any new construction, they must be properly abandoned and sealed. A permit for well abandonment must be obtained.
  - 14. Ground-water withdrawals from this project may affect streamflows, which may require an instream flow standard amendment.
  - 15. A Stream Channel Alteration Permit(s) is (are) required before any alteration can be made to the bed and/or banks of a steam channel.
  - 16. A Stream Diversion Works Permit(s) is (are) required before any stream diversion works is constructed or altered.
  - 17. A Petition to Amend the Interim Instream Flow Standard is required for any new or expanded diversion(s) of surface water.
  - 18. The planned source of water for this project has not been identified in this report. Therefore, we cannot determine what permits or petitions are required from our office, or whether there are potential impacts to water resources.
- OTHER: The request letter notes that the solid waste material generated at the pretreatment plant will be removed for disposal at a landfill or other appropriate site, according to the classification of solids generated. The letter also states that a portion of the pretreatments liquid effluent will be treated in the Pulehunui Industrial Park's WWTP and that improvements are planned to increase the capacity of the WWTP from the current maximum of 20,000 gallons per day to 40,000 gallons per day. The Draft Environmental Assessment should discuss the level of treatment planned for liquid effluent, the current disposal method, and whether this effluent may be beneficially reused to meet area non-potable water needs.

If you have any questions, please contact Lenore Ohye of the Commission staff at 587-0216.



August 18, 2020

Russell Y. Tsuji, Land Administrator  
State of Hawai'i  
Department of Land and Natural Resources  
P. O. Box 621  
Honolulu, Hawai'i 96809

**SUBJECT:** Response to Early Consultation Comments Regarding Proposed  
Septage Pretreatment Facility and Wastewater Treatment Plant  
Improvements at Pulehunui Industrial Park, TMKs (2)3-8-104:017  
and 030, Maui, Hawai'i

---

Dear Mr. Tsuji:

Thank you for your letters dated May 29, 2019 and May 30, 2019, providing early consultation comments from the Engineering Division, the Division of Forestry and Wildlife, and the Commission on Water Resource Management on the proposed septage pretreatment facility and improvements to the existing privately owned wastewater treatment plant located at Pulehunui Industrial Park. On behalf of Valley Isle Pumping (VIP), we offer the following responses in the order of your comments.

1. **Engineering Division Comments**

- a. *The rules and regulations of the National Flood Insurance Program (NFIP), Title 44 of the Code of Federal Regulations (44CFR), are in effect when development falls within a Special Flood Hazard Area (high risk areas). State projects are required to comply with 44CFR regulations as stipulated in Section 60.12. Be advised that 44CFR reflects the minimum standards as set forth by the NFIP. Local community flood ordinances may stipulate higher standards that can be more restrictive and would take precedence over the minimum NFIP standards.*

*The owner of the project property and/or their representative is responsible to research the Flood Hazard Zone designation for the project. Flood Hazard Zones are designated on FEMA's Flood Insurance Rate Maps (FIRM), which can be viewed on our Flood Hazard Assessment Tool (FHAT) (<http://gis.hawaiiifip.org/FHAT>).*

**Response:** VIP recognizes its responsibility to comply with the requirements of the National Flood Insurance Program and associated State and Local regulations as applicable to the project area. The project area is located within Zone X, defined by FEMA as an area of minimal flood hazard which is outside the Special Flood Hazard Area.

2. **Division of Forestry and Wildlife (DOFAW) Comments**

- a. *The State listed Hawaiian Hoary Bat or 'Ope'ape'a (*Lasiurus cinereus semotus*) has the potential to occur in the vicinity of the project area and may roost in nearby trees. If any site clearing is required this should be timed to avoid disturbance during the bat birthing and pup rearing season (June 1 through September 15). If this cannot be avoided, woody plants greater than 15 feet (4.6 meters) tall should not be disturbed, removed, or trimmed without consulting DOFAW. Barbed wire should be avoided for any construction because bat mortalities have been documented as a result of becoming ensnared by barbed wire during flight.*

**Response:** A fauna survey (Bruner, 2011) carried out in the project area prior to the development of the Pulehunui Industrial Park looked for, but did not detect the Hawaiian Hoary Bat. Since that time, the area has been cleared and developed into industrial lots. No site clearing of large, woody plants is proposed, and no barbed wire will be used.

- b. *We note that artificial lighting can adversely impact seabirds that may pass through the area at night by causing disorientation. This 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 15 through December 15. This is the period when young seabirds take their maiden voyage to the open sea.*

*For illustrations and guidance related to seabird-friendly light styles that also protect the dark, starry skies of Hawai'i please visit: <https://dlnr.hawaii.gov/wildlife/files/2016/03/7DOC439.pdf>.*

**Response:** Exterior lighting will be appropriately shielded in compliance with Maui County Code, Chapter 20.35.090 as well as the Pulehunui Industrial Park subdivision regulations to minimize impacts to migratory seabirds.



- c. *The State listed Blackburn's Sphinx Moth (BSM; Manduca blackburni) has a historic range that encompasses the project area. Larvae of BSM feed on many nonnative hostplants that include tree tobacco (Nicotiana glauca) which grows in disturbed soil. We recommend contacting our Maui DOFAW office at (808) 9848100 for further information about where BSM may be present and whether a vegetation survey should be conducted to determine the presence of plants preferred by BSM.*

**Response:** A survey was carried out for arthropod species in the Pulehunui Industrial Park (including the project site) by Robert Hobdy in 2012, including the endangered Blackburn's Sphinx Moth (BSM). No BSM adults, eggs, or larvae were seen, and no tree tobacco plants were observed in the survey.

- d. *DOFAW is concerned about attracting vulnerable birds to areas that may host nonnative predators such as cats, rodents, and mongoose. We recommend taking action to minimize predator presence; remove cats, place bait stations for rodents and mongoose, and provide covered trash receptacles. State listed waterbirds such as the Hawaiian Duck (Anas wyvilliana), Hawaiian Stilt (Himantopus mexicanus knudseni), Hawaiian Coot (Fulica alai), and Hawaiian Goose or Nene (Branta sandvicensis) have the potential to enter the proposed project site. It is against State law to harm or harass these species. If any of these species are present during construction activities, then all activities within 100 feet (30 meters) should cease, and the bird should not be approached. Work may continue after the bird leaves the area of its own accord.*

**Response:** The 2011 fauna survey identified a number of waterbird species in the area of the Haiku Ditch irrigation reservoir to the north of the Pulehunui Industrial Park, including the Hawaiian Duck and the Hawaiian Coot, and identified conditions suitable for the Hawaiian Stilt. A separate survey carried out, specifically for Nene (Hobdy, 2011), did not detect any Nene in the area of the subdivision, and noted that the hot and dry conditions in the project area did not provide an ideal habitat for the Nene. The project area is approximately half a mile south of the irrigation reservoir in an area that has been developed for industrial uses. While the presence of vulnerable birds within the project site is not anticipated as likely, all applicable State and Federal laws will be followed in the event that one of these species is present during construction activities. Action will be taken to minimize the presence of feral predators, as needed.

3. **Commission on Water Resource Management (CWRM) Comments**

*The request letter notes that the solid waste material generated at the pretreatment plant will be removed for disposal at a landfill or other appropriate site, according to the classification of solids generated: The letter also states that a portion of the pretreatments liquid effluent will be treated in the Pulehunui Industrial Park's WWTP and that improvements are planned to increase the capacity of the WWTP from the current maximum of 20,000 gallons per day to 40,000 gallons per day. The Draft Environmental Assessment should discuss the level of treatment planned for liquid effluent, the current disposal method, and whether this effluent may be beneficially reused to meet area non-potable water needs.*

**Response:** The Draft Environmental Assessment (EA) will include a Preliminary Engineering and Drainage Report and will discuss the influent and effluent waste streams for the project as well as the treatment planned for the liquid effluent. Effluent reuse was considered as a process alternative and will also be discussed in the Alternatives chapter of the Draft EA. The preferred alternative utilizes a leach field as the primary method of effluent disposal for the WWTP.

We appreciate your input, and will include a copy of your comment letter along with this response letter in the Draft EA for the proposed project. In the meantime, should you have any questions or require additional information, please feel free to contact me at (808) 244-2015.

Very truly yours,



Gwendolyn Leialoha Cheney Rivera  
Senior Associate

GLCR:lh

cc: Sal Marino, Valley Isle Pumping

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MAY 24 2019

DAVID Y. IGE  
GOVERNOR



STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
869 PUNCHBOWL STREET  
HONOLULU, HAWAII 96813-5097

JADE T. BUTAY  
DIRECTOR  
  
Deputy Directors  
LYNN A.S. ARAKI-REGAN  
DEREK J. CHOW  
ROSS M. HIGASHI  
EDWIN H. SNIFFEN

IN REPLY REFER TO:  
DIR 0457  
STP 8.2666

May 22, 2019

Ms. Gwendolyn Rivera  
Senior Associate  
Munekiyo Hiraga  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Rivera:

Subject: Septage Pretreatment Facility and Wastewater Treatment Plant Improvements at  
Pulehunui Industrial Park  
Early Consultation for Draft Environmental Assessment  
Pulehunui, Maui, Hawaii  
TMK: (2) 3-8-104:017 and 030

The State Department of Transportation (DOT) understands Valley Isle Pumping (VIP) proposes the development of a new septage pretreatment facility at the Pulehunui Industrial Park as well as related improvements to the Wastewater Treatment Plant. DOT's comments on the subject project are as follows:

Highways Division

Due to the scope and location of the project, it appears that there will be no significant impacts to State highway facilities near the project locations; therefore, the Highways Division does not have any comments at this time.

Airports Division (DOT-AIR)

The project site is approximately five miles from Kahului Airport (OGG) and lies just outside the imaginary transitional airspace surface for OGG. DOT-AIR requests that project design and landscaping do not create conditions to attract wildlife.

For example, project features such as standing water creates a potential wildlife attractant and therefore, creates a bird-strike risk to aircraft flying over the property. If wildlife is attracted to the project site and poses a potential hazard to aircraft, VIP shall take appropriate measures to ensure proper mitigation of the potential wildlife hazard. FAA Advisory Circular 150/5200-33B



Ms. Gwendolyn River  
May 22, 2019  
Page 2

STP 8.2666

Hazardous Wildlife Attractants on or Near Airports provides guidance for developments and wildlife management near airports.

If there are any questions, please contact Mr. Blayne Nikaido of the DOT Statewide Transportation Planning Office at (808) 831-7979 or via email at [blayne.h.nikaido@hawaii.gov](mailto:blayne.h.nikaido@hawaii.gov).

Sincerely,



for JADE T. BUTAY  
Director of Transportation

August 18, 2020

Jade Butay, Director  
State of Hawai'i  
Department of Transportation  
869 Punchbowl Street  
Honolulu, Hawai'i 96813

**SUBJECT:** Response to Early Consultation Comments Regarding Proposed Septage Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park, TMKs (2)3-8-104:017 and 030, Maui, Hawai'i (DIR 0457 STP 8.2666)

---

Dear Mr. Butay:

Thank you for your letter dated May 22, 2019, providing early consultation comments on the proposed septage pretreatment facility and improvements to the existing privately owned wastewater treatment plant located at Pulehunui Industrial Park. On behalf of Valley Isle Pumping (VIP), we offer the following responses in the order of your comments.

**1. Highways Division (DOT-H) Comments:**

*Due to the scope and location of the project, it appears that there will be no significant impacts to State highway facilities near the project locations; therefore, the Highways Division does not have any comments at this time.*

**Response:** VIP notes that DOT-H does not anticipate significant impacts to State highways as a result of the proposed action and DOT-H does not have any comments to make at this time.

**2. Airports Division (DOT-Air) Comments:**

*The project site is approximately five miles from Kahului Airport (OGG) and lies just outside the imaginary transitional airspace surface for OGG. DOT-AIR requests that project design and landscaping do not create conditions to attract wildlife.*

*For example, project features such as standing water creates a potential wildlife attractant and therefore, creates a bird-strike risk to aircraft flying over the*

Jade Butay, Director  
August 18, 2020  
Page 2

*property. If wildlife is attracted to the project site and poses a potential hazard to aircraft, VIP shall take appropriate measures to ensure proper mitigation of the potential wildlife hazard. FAA Advisory Circular 150/5200-33B Hazardous Wildlife Attractants on or Near Airports provides guidance for developments and wildlife management near airports.*

**Response:** The proposed improvements within the Pulehunui Industrial Park subdivision are located at a minimum of 5.2 miles as the crow flies from the nearest air operations area of OGG. The proposed project does not involve any facilities, such as open standing water which may create conditions to attract wildlife. Due to the location and scope of improvements, the proposed action is not anticipated to adversely impact air operations at OGG.

We appreciate your input, and will include a copy of your comment letter along with this response letter in the Draft Environmental Assessment for the proposed project. In the meantime, should you have any questions or require additional information, please feel free to contact me at (808) 244-2015.

Very truly yours,



Gwendolyn Leialoha Cheney Rivera  
Senior Associate

GLCR:lh

cc: Sal Marino, Valley Isle Pumping

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MAY 31 2019

DAVID Y. IGE  
GOVERNOR

MARY ALICE EVANS  
DIRECTOR  
OFFICE OF PLANNING



## OFFICE OF PLANNING STATE OF HAWAII

235 South Beretania Street, 6th Floor, Honolulu, Hawaii 96813  
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Telephone: (808) 587-2846  
Fax: (808) 587-2824  
Web: <http://planning.hawaii.gov/>

DTS20195230951NA

May 24, 2019

Ms. Gwendolyn Rivera  
Senior Associate  
Munekiyo Hiraga  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Rivera:

Subject: Chapter 343, Hawaii Revised Statutes, Early Consultation for Proposed Septage Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park, Maui, Hawaii  
TMK: (2) 3-8-104: 017 and 030,

Thank you for the opportunity to provide comments on the early consultation request for the preparation of a Draft Environmental Assessment (Draft EA) on the pretreatment facility and wastewater treatment plant (WWTP) improvements project at the Pulehunui Industrial Park.

It is our understanding that Valley Isle Pumping (VIP) proposes the development of a septage pretreatment facility. The pretreatment facility will process septage, storm drain waste, and other non-hazardous liquid wastes generated offsite. The facility will include a 2,000-gallon pre-loader, a receiving tank with odor control equipment, and process equipment for dewatering, screening, and material transfer. VIP also proposes improvements to the a nearby privately-owned WWTP to increase its wastewater treatment capacity from the current 20,000 gallons per day (GPD) to 40,000 GPD. Solid waste material generated at the pretreatment facility will be removed for disposal at a landfill or other appropriate disposal site.

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

1. Hawaii State Planning Act

Hawaii Administrative Rules (HAR) § 11-200-10(4) requires an Environmental Assessment to provide a general description of the action's technical, economic, social, and environmental characteristics. The Draft EA should provide a discussion on the project and its ability to meet State goals and priorities as detailed in HRS Chapter 226.

The analysis on the Hawaii State Planning Act should examine the project's consistency with all three parts of HRS Chapter 226 or clarify where the project conflicts with them. If any of

these statutes are not applicable to the project, the analysis should affirmatively state such determination, along with discussion paragraphs.

2. Hawaii Coastal Zone Management Program

The Hawaii Coastal Zone Management (CZM) area is defined as “all lands of the State and the area extending seaward from the shoreline to the limit of the State’s police power and management authority, including the U.S. territorial sea” (HRS § 205A-1).

Pursuant to HRS § 205A-4, in implementing the objectives of the CZM program, approving agencies shall consider ecological, cultural, historic, esthetic, recreational, scenic, open space values, coastal hazards, and economic development. As the pretreatment facility and WWTP upgrades require agency approval, the Draft EA should include analysis on the project’s consistency with the objectives and supporting policies of the Hawaii CZM Program, as listed in HRS § 205A-2.

3. Drainage / Stormwater Runoff Mitigation / Erosion Control

Pursuant to HAR § 11-200-10(6) – identification and summary of impacts and alternatives considered; to ensure that the water and marine resources on the Island of Maui remain protected, the effects of stormwater inundation, resulting from this development, should be evaluated in the Draft EA.

Issues that may be examined include, but are not limited to, project site characteristics in relation to flood and erosion prone areas, open spaces, the potential vulnerability of surface water resources, drainage infrastructure currently in place, and comparing the level of impervious versus permeable in the project area. These items should be considered when developing mitigation measures for the protection of nearby water resources and the coastal ecosystem, pursuant to HAR § 11-200-10(7).

We note that the one of the functions of the proposed pretreatment facility is to process storm drain waste from the Pulehunui Industrial Park and areas offsite. OP has developed guidance documents on stormwater runoff controls and mitigation strategies. We recommend consulting these evaluative tools when developing mitigation approaches for polluted runoff. They offer useful techniques to keep land-based pollutants and sediment in place, while considering the management practices best suited for the area and the types of contaminants affecting the surrounding environment. The evaluative tools that should be considered during the design process include:

- Hawaii Watershed Guidance provides direction on mitigation strategies for urban development activities that will safeguard watersheds and implement watershed plans. [http://files.hawaii.gov/dbedt/op/czm/initiative/nonpoint/HI Watershed](http://files.hawaii.gov/dbedt/op/czm/initiative/nonpoint/HI%20Watershed)



Ms. Gwendolyn Rivera  
May 24, 2019  
Page 3

Guidance Final.pdf.

- Stormwater Impact Assessments can be used to identify and analyze information on hydrology, sensitivity of coastal and riparian resources, and management measures to control runoff, as well as consider secondary and cumulative impacts to the area. [http://files.hawaii.gov/dbedt/op/czm/initiative/stomwater\\_impact/final\\_stormwater\\_impact\\_assessments\\_guidance.pdf](http://files.hawaii.gov/dbedt/op/czm/initiative/stomwater_impact/final_stormwater_impact_assessments_guidance.pdf); and
- Low Impact Development (LID), A Practitioners Guide covers a range of structural systems and best management practices that mimic or utilize the natural processes of infiltration and evapotranspiration of polluted runoff. LID features promote onsite storm water management, urban layouts that minimize environmental impacts, and can lead to improved water quality. [http://files.hawaii.gov/dbedt/op/czm/initiative/lid/lid\\_guide\\_2006.pdf](http://files.hawaii.gov/dbedt/op/czm/initiative/lid/lid_guide_2006.pdf)

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

Mahalo,



Mary Alice Evans  
Director

August 19, 2020

Mary Alice Evans, Director  
State of Hawai'i  
Office of Planning  
P.O. Box 2359  
Honolulu, Hawai'i 96804

**SUBJECT:** Response to Early Consultation Comments Regarding Proposed Septage Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park, TMKs (2)3-8-104:017 and 030, Maui, Hawai'i (DTS20195230951NA)

---

Dear Ms. Evans:

Thank you for your letter dated May 24, 2019, providing early consultation comments on the proposed septage pretreatment facility and improvements to the existing privately owned wastewater treatment plant located at Pulehunui Industrial Park. On behalf of Valley Isle Pumping (VIP), we offer the following responses in the order of your comments.

**Comment No. 1:**

*Hawaii State Planning Act*

*Hawaii Administrative Rules (HAR) § 11-200-10(4) requires an Environmental Assessment to provide a general description of the action's technical, economic, social, and environmental characteristics. The Draft EA should provide a discussion on the project and its ability to meet State goals and priorities as detailed in HRS Chapter 226.*

*The analysis on the Hawaii State Planning Act should examine the project's consistency with all three parts of HRS Chapter 226 or clarify where the project conflicts with them. If any of these statutes are not applicable to the project, the analysis should affirmatively state such determination, along with discussion paragraphs.*

**Response:** Chapter III of the Draft Environmental Assessment (EA) will include an analysis of the project's applicability to Part I and Part III of the Hawai'i State Plan. Inasmuch as Part II of the State Plan covers its administrative structure and implementation process, discussion of Part II is not applicable to the proposed project.

**Comment No. 2:**

Hawaii Coastal Zone Management Program

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

*Pursuant to HRS § 205A-4, in implementing the objectives of the CZM program, approving agencies shall consider ecological, cultural, historic, esthetic, recreational, scenic, open space values, coastal hazards, and economic development. As the pretreatment facility and WWTP upgrades require agency approval, the Draft EA should include analysis on the project's consistency with the objectives and supporting policies of the Hawaii CZM Program, as listed in HRS § 205A-2.*

**Response:** Chapter III of the Draft EA will include an assessment of the proposed action pursuant to the Hawai'i Coastal Zone Management Program.

**Comment No. 3:**

Drainage/Stormwater Runoff Mitigation / Erosion Control

*Pursuant to HAR § 11-200-10(6) - identification and summary of impacts and alternatives considered; to ensure that the water and marine resources on the Island of Maui remain protected, the effects of stormwater inundation, resulting from this development, should be evaluated in the Draft EA.*

*Issues that may be examined include, but are not limited to, project site characteristics in relation to flood and erosion prone areas, open spaces, the potential vulnerability of surface water resources, drainage infrastructure currently in place, and comparing the level of impervious versus permeable in the project area. These items should be considered when developing mitigation measures for the protection of nearby water resources and the coastal ecosystem, pursuant to HAR § 11-200-10(7).*

*We note that the one of the functions of the proposed pretreatment facility is to process storm drain waste from the Pulehunui Industrial Park and areas offsite. OP has developed guidance documents on stormwater runoff controls and mitigation strategies. We recommend consulting these evaluative tools when developing mitigation approaches for polluted runoff. They offer useful techniques to keep land-based pollutants and sediment in place, while considering the management practices best suited for the area and the types of contaminants affecting the surrounding environment.*



*The evaluative tools that should be considered during the design process include:*

- *Hawaii Watershed Guidance provides direction on mitigation strategies for urban development activities that will safeguard watersheds and implement watershed plans.  
[http://files.hawaii.gov/dbedt/op/czm/initiative/nonpoint/HI\\_Watershed\\_Guidance\\_Final.pdf](http://files.hawaii.gov/dbedt/op/czm/initiative/nonpoint/HI_Watershed_Guidance_Final.pdf)*
- *Stormwater Impact Assessments can be used to identify and analyze information on hydrology, sensitivity of coastal and riparian resources, and management measures to control runoff, as well as consider secondary and cumulative impacts to the area.  
[http://files.hawaii.gov/dbedt/op/czm/initiative/stomwater\\_impact/final\\_stormwater\\_impact\\_assessments\\_guidance.pdf](http://files.hawaii.gov/dbedt/op/czm/initiative/stomwater_impact/final_stormwater_impact_assessments_guidance.pdf); and*
- *Low Impact Development (LID), A Practitioners Guide covers a range of structural systems and best management practices that mimic or utilize the natural processes of infiltration and evapotranspiration of polluted runoff. LID features promote onsite storm water management, urban layouts that minimize environmental impacts, and can lead to improved water quality.  
[http://files.hawaii.gov/dbedt/op/czm/initiative/lid/lid\\_guide\\_2006.pdf](http://files.hawaii.gov/dbedt/op/czm/initiative/lid/lid_guide_2006.pdf)*

**Response:** Thank you for providing guidance documents on stormwater runoff controls and mitigation strategies for use in the design process. Chapter II of the Draft EA will include a discussion of existing and proposed drainage conditions and proposed mitigation strategies. A Preliminary Engineering Report and a Drainage Report will be incorporated into the Draft EA as an appendix.

Mary Alice Evans, Director  
August 18, 2020  
Page 4

We appreciate your input, and will include a copy of your comment letter along with this response letter in the Draft EA for the proposed project. In the meantime, should you have any questions or require additional information, please feel free to contact me at (808) 244-2015.

Very truly yours,



Gwendolyn Leialoha Cheney Rivera  
Senior Associate

GLCR:lh

cc: Sal Marino, Valley Isle Pumping

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MAY 28 2019

MICHAEL P. VICTORINO  
Mayor

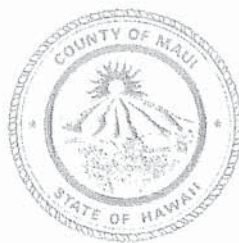
ERIC A. NAKAGAWA, P.E.  
Director

SHAYNE R. AGAWA, P.E.  
Deputy Director

MICHAEL P. RATTE  
Solid Waste Division

SCOTT R. ROLLINS, P.E.  
Wastewater Reclamation Division

TAMARA FARNSWORTH  
Environmental Protection &  
Sustainability Division



**COUNTY OF MAUI  
DEPARTMENT OF  
ENVIRONMENTAL MANAGEMENT**

2050 MAIN STREET, SUITE 2B  
WAILUKU, MAUI, HAWAII 96793

May 22, 2019

Munekiyo Hiraga  
Attn: Ms. Gwendolyn Leialoha Cheney Rivera  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

**SUBJECT: PULEHUNUI INDUSTRIAL PARK –  
SEPTAGE PRETREATMENT FACILITY AND  
WASTEWATER TREATMENT PLANT IMPROVEMENTS  
AT PULEHUNUI INDUSTRIAL PARK  
TMK (2) 3-8-104:017 AND 030, PUUNENE**

We reviewed the subject application and have the following comments:

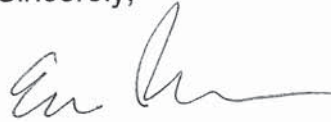
1. Solid Waste Division comments:
  - a. None.
2. Wastewater Reclamation Division (WWRD) comments:
  - a. The WWRD notes that this is a private facility and that no discharge is planned to be introduced into the County of Maui sewer collection system or treatment facilities.
  - b. The owners/operators of the proposed facility would need to submit a formal written request and any required laboratory or other analysis (as determined by WWRD) in order to obtain a special approval for any one time or intermittent discharge to County facilities.



Ms. Gwendolyn Leialoha Cheney Rivera  
May 22, 2019  
Page 2

If you have any questions regarding this letter, please contact Michael Miyamoto at 270-8230.

Sincerely,

A handwritten signature in black ink, appearing to read "Eric A. Nakagawa". The signature is fluid and cursive, with a long horizontal stroke at the end.

ERIC A. NAKAGAWA  
Director of Environmental Management

August 18, 2020

Eric Nakagawa, Director  
County of Maui  
Department of Environmental Management  
2050 Main Street, Suite 2B  
Wailuku, Hawai'i 96793

**SUBJECT:** Response to Early Consultation Comments Regarding Proposed Septage Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park, TMKs (2)3-8-104:017 and 030, Maui, Hawai'i

---

Dear Mr. Nakagawa:

Thank you for your letter dated May 22, 2019, providing early consultation comments on the proposed septage pretreatment facility and improvements to the existing privately owned wastewater treatment plant located at Pulehunui Industrial Park. On behalf of Valley Isle Pumping (VIP), we offer the following responses in the order of your comments:

**Comment No. 1:**

*Solid Waste Division comments:*

- a. None.

**Response:** VIP acknowledges that the Solid Waste Division has no comments.

**Comment No. 2.a:**

*Wastewater Reclamation Division (WWRD) comments:*

*The WWRD notes that this is a private facility and that no discharge is planned to be introduced into the County of Maui sewer collection system or treatment facilities.*

**Response:** VIP confirms that the proposed facilities will be privately owned and no discharges are planned to be introduced into the County wastewater system.

**Comment No. 2.b.:**

*The owners/operators of the proposed facility would need to submit a formal written request and any required laboratory or other analysis (as determined by WWRD) in order to obtain a special approval for any one time or intermittent discharge to County facilities.*

**Response:** VIP recognizes that discharges to the County wastewater system would require a written request to obtain WWRD's approval and may be subject to analysis as determined by WWRD.

We appreciate your input, and will include a copy of your comment letter along with this response letter in the Draft Environmental Assessment for the proposed project. In the meantime, should you have any questions or require additional information, please feel free to contact me at 244-2015.

Very truly yours,



Gwendolyn Leialoha Cheney Rivera  
Senior Associate

GLCR:lh

cc: Sal Marino, Valley Isle Pumping

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MAY 20 2019

MICHAEL P. VICTORINO  
Mayor

KARLA H. PETERS  
Director

JOHN L. BUCK III  
Deputy Director



**DEPARTMENT OF PARKS AND RECREATION**

700 Hali'a Nako Street, Unit 2, Wailuku, Hawaii 96793  
Main Line (808) 270-7230 / Facsimile (808) 270-7942

May 13, 2019

Ms. Gwendolyn Rivera  
Munekiyo Hiraga  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Rivera:

**SUBJECT: CHAPTER 343, HAWAII REVISED STATUTES, EARLY CONSULTATION REQUEST FOR PROPOSED SEPTAGE PRETREATMENT FACILITY AND WASTEWATER TREATMENT PLANT IMPROVEMENTS AT PULEHUNUI INDUSTRIAL PARK, TMK NOS. (2)3-8-104:017 AND 030, MAUI, HAWAII**

Thank you for the opportunity to review and comment on the Proposed Septage Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park, TMK Nos. (2)3-8-104:017 and 030, Maui, Hawaii. We have no comments to offer at this time.

Should you have any further questions, please contact me or Robert Halvorson, Chief of Planning & Development at (808)270-7387 or [Robert.Halvorson@co.maui.hi.us](mailto:Robert.Halvorson@co.maui.hi.us).

Sincerely,

A handwritten signature in black ink, appearing to read "Karla H. Peters".

KARLA H. PETERS  
Director of Parks and Recreation

KHP:RH:IT

August 19, 2020

Karla H. Peters, Director  
County of Maui  
Department of Parks and Recreation  
700 Hali'a Nakoia Street, Unit 2  
Wailuku, Hawai'i 96793

**SUBJECT:** Response to Early Consultation Comments Regarding Proposed Septage Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park, TMKs (2)3-8-104:017 and 030, Maui, Hawai'i

---

Dear Ms. Peters:

Thank you for your letter dated May 13, 2019 in response to the request for early consultation comments on the proposed septage pretreatment facility and improvements to the existing privately owned wastewater treatment plant located at Pulehunui Industrial Park. On behalf of Valley Isle Pumping (VIP), we acknowledge that your Department has no comments on the proposed project at this time.

We appreciate your review of the project, and will include a copy of your letter along with this response in the Draft Environmental Assessment for the proposed project. In the meantime, should you have any questions or require additional information, please feel free to contact me at 244-2015.

Very truly yours,



Gwendolyn Leialoha Cheney Rivera  
Senior Associate

GLCR:Ih

cc: Sal Marino, Valley Isle Pumping

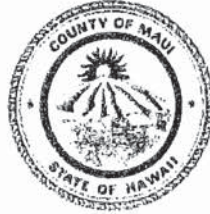
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MICHAEL P. VICTORINO  
Mayor

MICHELE CHOUTEAU MCLEAN, AICP  
Director

JORDAN E. HART  
Deputy Director



MAY 28 2019

**DEPARTMENT OF PLANNING**  
COUNTY OF MAUI  
ONE MAIN PLAZA  
2200 MAIN STREET, SUITE 315  
WAILUKU, MAUI, HAWAII 96793

May 24, 2019

Ms. Gwendolyn Rivera  
Senior Associate  
Munekiyo Hiraga  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Rivera:

**SUBJECT: EARLY CONSULTATION REQUEST FOR THE PREPARATION OF AN ENVIRONMENT ASSESSMENT (EA) FOR THE PROPOSED SEPTAGE PRETREATMENT FACILITY AND WASTEWATER TREATMENT PLANT IMPROVEMENTS AT PULEHUNUI INDUSTRIAL PARK, PULEHUNUI, MAUI, HAWAII; TMK: (2) 3-8-104:017 AND 030 (EAC 2019/0006)**

The Department of Planning (Department) is in receipt of an early consultation request by Valley Isle Pumping (Applicant) from Ms. Rivera at Munekiyo Hiraga (Consultant) regarding the proposed development of a new septage pretreatment facility on a portion of a 2.89-acre parcel located in the newly developed Pulehunui Heavy Industrial Park (Parcel 17) as well as related improvements to the existing privately owned Wastewater Treatment Plant (WWTP) located on a portion of Parcel 30. The purpose of developing an industrial park with county zoning of "M-3, Restricted Industrial" in the Kihei-Makena Community Plan area of "Heavy Industrial" was to locate heavy industrial uses in areas of lesser impact to the community while recognizing the importance of such industries.

The Department concurs that the State of Hawaii, Department of Health (DOH) will review the proposed pretreatment facility and WWTP improvement designs with respect to compliance with applicable requirements of HAR, Title 11, Chapter 62.

The Department further understands that the DOH has advised that the WWTP with a capacity greater than 30,000 gallons per day (GPD) is a trigger for the environmental review process pursuant to HRS Chapter 343. Accordingly an EA will be prepared to document the project's technical characteristics, environmental impacts, mitigation measures, and alternatives. The Department understands that an agreement has been made during early consultation with involved parties that the Maui County Department of Public Works will act as the Approving Agency for the EA.

Ms. Gwendolyn Rivera  
Munekiyo Hiraga  
May 23, 2019  
Page 2

The Pulehunui Heavy Industrial Site was developed and approved through a rigorous process recognizing that heavy industrial actions need a secure and appropriate place to be carried out. The Department looks forward to reviewing the Draft EA upon publication. Thank you for the opportunity to comment on this project. Should you have any questions about the comments in this letter, please contact the Department by email at [planning@mauicounty.gov](mailto:planning@mauicounty.gov) or by phone at (808) 270-8205.

Sincerely,



MICHELE MCLEAN, AICP  
Planning Director

xc: Clayton I. Yoshida, Planning Program Administrator, AICP (PDF)  
Danny Dias, Acting Planning Program Administrator (PDF)  
Kurt F. Wollenhaupt, Staff Planner (PDF)  
John Smith, PE, County of Maui Department of Public Works (PDF)  
State of Hawaii Department of Health (PDF)  
Gwendolyn Rivera, Munekiyo Hiraga (PDF)  
Project File

MCM:CIY:KFW:rma  
K:\WP\_DOCS\Planning\EAC\2019\0006\_SeptagePretreatmentFacility\AX\Pulehunui Septage Facility Early Consultation  
EA\_Comments.doc



August 18, 2020

Michele Chouteau McLean, Director  
County of Maui  
Department of Planning  
2200 Main Street, Suite 315  
Wailuku, Hawai'i 96793

**SUBJECT:** Response to Early Consultation Comments Regarding Proposed  
Septage Pretreatment Facility and Wastewater Treatment Plant  
Improvements at Pulehunui Industrial Park, TMKs (2)3-8-104:017  
and 030, Maui, Hawai'i

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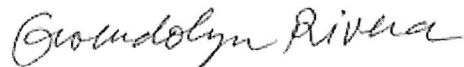
Dear Ms. McLean:

Thank you for your letter dated May 24, 2019 in response to the request for early consultation comments on the proposed septage pretreatment facility and improvements to the existing privately owned wastewater treatment plant located at Pulehunui Industrial Park.

On behalf of Valley Isle Pumping, we appreciate your review of the project and your concurrence that the State of Hawai'i, Department of Health will review the proposed improvements with respect to Hawai'i Administrative Rules, Title 11, Chapter 62. We acknowledge your comments that the Pulehunui Industrial Park was approved and developed to provide a location for heavy industrial uses with lesser impact to the community.

A copy of your comment letter, along with this response letter, will be included in the Draft Environmental Assessment for the proposed project. Should you have any questions or require additional information, please feel free to contact me at 244-2015.

Very truly yours,



Gwendolyn Leialoha Cheney Rivera  
Senior Associate

GLCR:lh

cc: Sal Marino, Valley Isle Pumping

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MICHAEL P. VICTORINO  
MAYOR

OUR REFERENCE

YOUR REFERENCE

# POLICE DEPARTMENT

## COUNTY OF MAUI

55 MAHALANI STREET  
WAILUKU, HAWAII 96793  
(808) 244-6400  
FAX (808) 244-6411

May 23, 2019



TIVOLI S. FAAUMU  
CHIEF OF POLICE

DEAN M. RICKARD  
DEPUTY CHIEF OF POLICE

Ms. Gwendolyn Rivera, Senior Associate  
Munekiyo Hiraga  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

**Re: Chapter 343, Hawaii Revised Statutes, Early Consultation Request  
for Proposed Septage Pretreatment Facility and Wastewater  
Treatment Plant Improvements at Pulehunui Industrial Park,  
TMK: (2) 3-8-104:017 and 030, Maui, Hawaii**


Dear Ms. Rivera:

This is in response to your letter dated May 1, 2019 requesting comments on the proposed Septage Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park.

In review of the submitted documents, we have no comments or recommendations to offer at this time.

Thank you for giving us the opportunity to comment on this project.

Sincerely,

  
Assistant Chief John Jakubczak  
for: TIVOLI S. FAAUMU  
Chief of Police

August 18, 2020

Tivoli Faaumu, Chief  
County of Maui  
Police Department  
55 Mahalani Street  
Wailuku, Hawai'i 96793

**SUBJECT:** Response to Early Consultation Comments Regarding Proposed Septage Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park, TMKs (2)3-8-104:017 and 030, Maui, Hawai'i

Dear Chief Faaumu:

Thank you for your letter dated May 23, 2019, in response to the request for early consultation comments on the proposed septage pretreatment facility and improvements to the existing privately owned wastewater treatment plant located at Pulehunui Industrial Park. On behalf of Valley Isle Pumping (VIP), we acknowledge that the Police Department has no comments or recommendations to make at this time.

We appreciate your input, and will include a copy of your comment letter along with this response letter in the Draft Environmental Assessment for the proposed project. In the meantime, should you have any questions or require additional information, please feel free to contact me at 244-2015.

Very truly yours,



Gwendolyn Leialoha Cheney Rivera  
Senior Associate

GLCR:lh

cc: Sal Marino, Valley Isle Pumping

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JUN 27 2019

MICHAEL P. VICTORINO  
Mayor

ROWENA M. DAGDAG-ANDAYA  
Director

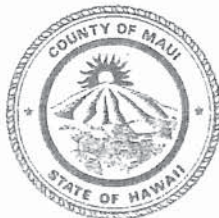
STEPHEN M. WELLING, P.E.  
Deputy Director

GLEN A. UENO, P.E., L.S.  
Development Services Administration

RODRIGO "CHICO" RABARA, P.E.  
Engineering Division

JOHN R. SMITH, P.E.  
Highways Division

Telephone: (808) 270-7845  
Fax: (808) 270-7955



COUNTY OF MAUI  
**DEPARTMENT OF PUBLIC WORKS**  
200 SOUTH HIGH STREET, ROOM 434  
WAILUKU, MAUI, HAWAII 96793

June 19, 2019

Ms. Gwendolyn Rivera  
MUNEKIYO HIRAGA  
305 High Street, Suite 104  
Wailuku, Maui, Hawaii 96793

Dear Ms. Rivera:

**SUBJECT: EARLY CONSULTATION REQUEST FOR PROPOSED SEPTAGE  
PRETREATMENT FACILITY AND WASTEWATER TREATMENT PLANT  
IMPROVEMENTS AT PULEHUNUI INDUSTRIAL PARK; TMK: (2)  
3-8-104:017 AND 030**

We reviewed your early consultation request and have the following comments:

Comment from the Engineering Division:

1. Any drainage improvements will need to comply with the following references:
  - Title MC-15, Chapter 4, "Rules for the Design of Storm Drainage Facilities in the County of Maui";
  - Title MC-15, Chapter 111, "Rules for the Design of Storm Water Treatment Best Management Practices"; and
  - Maui County Code, Title 20, Chapter 20.08, "Soil Erosion and Sedimentation Control".

Please call Deputy Director of Public Works Stephen M. Welling at 270-7845 if you have any questions regarding this letter.

Sincerely,

ROWENA M. DAGDAG-ANDAYA  
Director of Public Works

RMDA:SW:da

xc: Highways Division  
Engineering Division

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August 18, 2020

Rowena Dagdag-Andaya, Director  
County of Maui  
Department of Public Works  
200 South High Street, Room 434  
Wailuku, Hawai'i 96793

**SUBJECT:** Response to Early Consultation Comments Regarding Proposed Septage Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park, TMKs (2)3-8-104:017 and 030, Maui, Hawai'i

---

Dear Ms. Dagdag-Andaya:

Thank you for your letter dated June 19, 2019, providing early consultation comments on the proposed septage pretreatment facility and improvements to the existing privately owned wastewater treatment plant located at Pulehunui Industrial Park. On behalf of Valley Isle Pumping (VIP), we offer the following response:

**Comment:**

1. Any drainage improvements will need to comply with the following references:
  - Title MC-15, Chapter 4, "Rules for the Design of Storm Drainage Facilities in the County of Maui";
  - Title MC-15, Chapter 111, "Rules for the Design of Storm Water Treatment Best Management Practices"; and
  - Maui County Code, Title 20, Chapter 20.08, "Soil Erosion and Sedimentation Control".

**Response:** VIP acknowledges and will comply with applicable requirements relating to these references for any drainage improvements associated with the project.

Rowena Dagdag-Andaya, Director  
August 18, 2020  
Page 2

We appreciate your input, and will include a copy of your comment letter along with this response letter in the Draft Environmental Assessment for the proposed project. In the meantime, should you have any questions or require additional information, please feel free to contact me at 244-2015.

Very truly yours,



Gwendolyn Leialoha Cheney Rivera  
Senior Associate

GLCR:Ih

cc: Sal Marino, Valley Isle Pumping

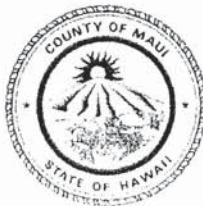
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MAY 24 2019

**MICHAEL P. VICTORINO**  
Mayor

**MARC I. TAKAMORI**  
Director

**MICHAEL B. DU PONT**  
Deputy Director



**DEPARTMENT OF TRANSPORTATION**  
COUNTY OF MAUI  
200 SOUTH HIGH STREET  
WAILUKU, MAUI, HAWAII 96793

TELEPHONE: (808) 270-7511  
FAX: (808) 270-7505

May 21, 2019

Munekiyo Hiraga  
Attn: Gwendolyn Rivera  
305 High Street, Suite 104  
Wailuku, HI 96732

**SUBJECT:** Chapter 343, Hawai'i Revised Statutes, Early Consultation Request for Proposed Septage Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park, TMK Nos. (2)3-8-104:017 and 030, Maui, Hawai'i

Dear Ms. Rivera,

Thank you for the opportunity to review and comment on this project. We have no comments to make at this time.

Sincerely,

A handwritten signature in black ink, appearing to be "Marc Takamori". The signature is fluid and cursive, written over a white background.

Marc Takamori  
Director



August 18, 2020

Marc Takamori, Director  
County of Maui  
Department of Transportation  
David Trask Building, Suite 102  
2145 Kaohu Street  
Wailuku, Hawai'i 96793

**SUBJECT:** Response to Early Consultation Comments Regarding Proposed Septage Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park, TMKs (2)3-8-104:017 and 030, Maui, Hawai'i

Dear Mr. Takamori:

Thank you for your letter dated May 21, 2019 in response to the request for comments on the proposed septage pretreatment facility and improvements to the existing privately owned wastewater treatment plant located at Pulehunui Industrial Park. On behalf of Valley Isle Pumping (VIP), we appreciate your review of the project and acknowledge that the County Department of Transportation has no comments to make at this time.

We will include a copy of your comment letter along with this response letter in the Draft Environmental Assessment for the proposed project. In the meantime, should you have any questions or require additional information, please feel free to contact me at 244-2015.

Very truly yours,



Gwendolyn Leialoha Cheney Rivera  
Senior Associate

GLCR:Ih

cc: Sal Marino, Valley Isle Pumping

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MAY 28 2019

May 14, 2019

Munekiyo Hiraga  
305 High Street, Suite 104  
Wailuku, HI 96793

ATTN: Gwendolyn Rivera

SUBJECT: CHAPTER 343, HAWAII REVISIED STATUTES, EARLY CONSULTATION  
REQUEST FOR PROPOSED SEPTAGE PRETREATMENT FACILITY AND  
WASTEWATER TREATMENT PLANT IMPROVEMENTS AT PULEHUNUI  
INDUSTRIAL PARK, MAUI, HAWAII  
TMK: (2) 3-8-104:017 and 030  
State of Hawaii, Department of Public Works (applicant)

Dear Ms. Riverai:

Thank you for providing Hawaiian Telcom Incorporated, the opportunity to comment on the Early Consultation Request for the proposed septage pretreatment facility and wastewater treatment plant improvements for the Department of Public Works at the Pulehunui Industrial Park on the Island of Maui.

Hawaiian Telcom will need to add facilities to the area in order to service this new facility which may require extensive construction timeframes. Please submit a construction schedule as soon as one is available and please keep in mind that some of our materials have ninety (90) day lead times.

If there are any questions, please call me at (808) 242-5258.

Sincerely,



Sheri-Ann Tihada  
Network Development, Strategic Planning Sr. Engineer

C: File (3030 1905-021)

August 18, 2020

Ms. Sheri-Ann Tihada  
Network Development, Strategic  
Planning Senior Engineer  
Hawaiian Telcom  
1177 Bishop Street, Suite 10  
Honolulu, Hawai'i 96813

**SUBJECT:** Response to Early Consultation Comments Regarding Proposed Septage Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park, TMKs (2)3-8-104:017 and 030, Maui, Hawai'i

---

Dear Ms. Tihada:

Thank you for your letter dated May 14, 2019, providing early consultation comments on the proposed septage pretreatment facility and improvements to the existing privately owned wastewater treatment plant located at Pulehunui Industrial Park. On behalf of Valley Isle Pumping (VIP), we offer the following responses to your comments:

**Comment:** *Hawaiian Telcom will need to add facilities to the area in order to service this new facility which may require extensive construction timeframes. Please submit a construction schedule as soon as one is available and please keep in mind that some of our materials have ninety (90) day lead times.*

**Response:** We acknowledge that Hawaiian Telcom will need to add facilities to the area, which may involve lead times for construction and materials procurement. VIP will submit a construction schedule to Hawaiian Telcom when it is available.

We appreciate your input, and will include a copy of your comment letter along with this response letter in the Draft Environmental Assessment for the proposed project. In the

Ms. Sheri-Ann Tihada  
Network Development, Strategic  
Planning Senior Engineer  
August 18, 2020  
Page 2

meantime, should you have any questions or require additional information, please feel free to contact me at (808) 244-2015.

Very truly yours,



Gwendolyn Leialoha Cheney Rivera  
Senior Associate

GLCR:lh

cc: Sal Marino, Valley Isle Pumping

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MAY 23 2019



May 20, 2019

Munekiyo Hiraga  
Attn: Ms. Gwendolyn Rivera, Senior Associate  
305 High Street, Suite 104  
Wailuku, Hawaii 96793

Dear Ms. Rivera,

Subject: Valley Isle Pumping (VIP) – Early Consultation Request for Proposed Septage Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park  
Puunene, Maui, Hawaii  
Tax Map Key: (2) 3-8-104:017 and 030

Thank you for allowing us to comment on the subject project.

In reviewing our records and the information received, Maui Electric Company, Limited has no objection to the project at this time. We highly encourage the customer's electrical consultant to submit the electrical demand requirements and project time schedule as soon as practical. We are anticipating large motor loads for this project, thus request that these loads and motor starting characteristics be submitted early as well.

Should you have any questions or concerns, please feel free to call me at 871-2340.

Sincerely,

Ray Okazaki  
Engineer II, Engineering

August 18, 2020

Mr. Ray Okazaki  
Engineer II-Engineering  
Maui Electric Company, Limited  
P.O. Box 398  
Kahului, Hawai'i 96733-6898

**SUBJECT:** Response to Early Consultation Comments Regarding Proposed Septage Pretreatment Facility and Wastewater Treatment Plant Improvements at Pulehunui Industrial Park, TMKs (2)3-8-104:017 and 030, Maui, Hawai'i

---

Dear Mr. Okazaki:

Thank you for your letter dated May 20, 2019, providing early consultation comments on the proposed septage pretreatment facility and improvements to the existing privately owned wastewater treatment plant located at Pulehunui Industrial Park. On behalf of Valley Isle Pumping (VIP), we offer the following responses to your comments:

***Comment:*** In reviewing our records and the information received, Maui Electric Company, Limited has no objection to the project at this time. We highly encourage the customer's electrical consultant to submit the electrical demand requirements and project time schedule as soon as practical. We are anticipating large motor loads for this project, thus request that these loads and motor starting characteristics be submitted early as well.

***Response:*** Thank you for your review of the project and for advising that Maui Electric Company, Limited has no objection at this time to the project. VIP's electrical consultant will provide Maui Electric Company, Limited with information regarding the electrical demand requirements, project schedule, motor loads and motor starting characteristics when this information becomes available. A preliminary review indicates that the project's electrical demand can be met with 200 ampere, three-phase service via a three-inch conduit from the street to the main service panel at the site. We note that a solar PV system will also be installed, and a Customer Grid Supply application has been filed with Maui Electric Company, Limited.

Mr. Ray Okazaki  
August 18, 2020  
Page 2

We appreciate your input, and will include a copy of your comment letter along with this response letter in the Draft Environmental Assessment for the proposed project. In the meantime, should you have any questions or require additional information, please feel free to contact me at 244-2015.

Very truly yours,



Gwendolyn Leialoha Cheney Rivera  
Senior Associate

GLCR:lh

cc: Sal Marino, Valley Isle Pumping

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REFERENCES

IX



## IX. REFERENCES

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PRELIMINARY  
ENGINEERING REPORT

APPENDIX

A-1



PRELIMINARY ENGINEERING REPORT  
FOR  
PULEHUNUI HEAVY INDUSTRIAL  
SUBDIVISION WASTEWATER TREATMENT  
FACILITY EXPANSION  
&  
VALLEY ISLE PUMPING LLC WASTEWATER  
RECEIVING FACILITY

Puunene, Maui, Hawaii

T.M.K.: (2) 3-8-104:030 & 017

Prepared for:

Pulehunui Heavy Industrial  
Area AOA  
1300 N. Holopono Street, Suite 201  
Kihei, Maui, Hawaii 96753

&

Valley Isle Pumping LLC  
291 Lower Kula Road  
Pukalani, HI 96768

Prepared by:



CDF Engineering LLC  
270 Ho'okahi Street, Unit 301  
Wailuku, HI 96793

July 2019

## TABLE OF CONTENTS

- 1.0 INTRODUCTION
- 2.0 EXISTING INFRASTRUCTURE
  - 2.1 ROADWAYS
  - 2.2 DRAINAGE
  - 2.3 SEWER
  - 2.4 WATER
  - 2.5 ELECTRIC AND TELEPHONE
- 3.0 ANTICIPATED INFRASTRUCTURE IMPROVEMENTS
  - 3.1 ROADWAYS
  - 3.2 DRAINAGE
  - 3.3 SEWER
  - 3.4 WATER
  - 3.5 ELECTRIC AND TELEPHONE

### EXHIBITS

- 1 LOCATION MAP
- 2 VICINITY MAP
- 3 SOIL SURVEY MAP
- 4 FLOOD INSURANCE RATE MAP
- 5 PRELIMINARY SITE PLAN
- 6 PRELIMINARY GRADING AND DRAINAGE PLAN

### APPENDICES

- A HYDROLOGIC CALCULATIONS
- B WATER DEMAND CALCULATIONS
- C WASTEWATER DEMAND CALCULATIONS
- D PULEHUNUI HEAVY INDUSTRIAL SUBDIVISION WASTEWATER TREATMENT FACILITY ENGINEERING DESIGN REPORT
- E VALLEY ISLE PUMPING INC. RECEIVING FACILITY ENGINEERING DESIGN REPORT

### REFERENCES

PRELIMINARY ENGINEERING REPORT  
FOR  
PULEHUNUI HEAVY INDUSTRIAL  
SUBDIVISION WASTEWATER TREATMENT  
FACILITY EXPANSION & VALLEY ISLE  
PUMPING LLC WASTEWATER RECEIVING  
FACILITY  
T.M.K.: (2) 3-8-104:030 & 017

## 1.0 INTRODUCTION

The purpose of this report is to provide information on the existing infrastructure which will be servicing the proposed project. It will also evaluate the adequacy of the existing infrastructure and anticipated improvements which may be required for the proposed project.

The subject parcels are identified as T.M.K.s: (2) 3-8-104: 030 & 017, and encompass an area of approximately 9.68-acres and 2.8888-acres, respectively. Parcel 030 currently houses the Pulehunui subdivision private wastewater treatment plant (WWTP) and is otherwise used for drainage collection and other utilities appurtenant to the subdivision. Parcel 017 is also known as Lot 2-Q of the original Puaa Subdivision and is privately owned. The subdivision is bordered by undeveloped land, an irrigation reservoir and sugar cane fields to the north; sugar cane fields and a quarry to the east, sugar cane fields to the south, and the old Puunene Airport to the west.

Access to the project site is from Kama'aina Road, South Firebreak Road, and Lower Kihei Road. There is an existing traffic signal at the Maui Veteran's Parkway – Kama'aina Road intersection with a left turn storage lane and a right turn deceleration lane.

The heavy industrial zoning district within the subdivision provides for a minimum lot size of 10,000 square feet. Currently, there are ten (10) lots ranging in size from one-half to one acre; five (5) lots ranging in size from over one acre to two acres and the balance of the lots ranging in size from over two acres to twenty acres for a total of twenty-eight (28) saleable lots. Improvements include paved private roadways, private water system, and landscaping. Underground water, sewer, drainage, electrical, and telephone systems are also installed.



## 2.0 EXISTING INFRASTRUCTURE

### 2.1 ROADWAYS

All traffic will access and egress from the project site at the Maui Veteran's Parkway-Kama'aina Road-Mehameha Loop intersection. Maui Veteran's Parkway (originally Mokulele Highway) runs in the north-south direction with Kama'aina Road at the east approach and Mehameha Loop at the west approach. Kama'aina Road intersects with South Firebreak Road which provides access to the Hawaiian Cement Quarry and the project site. Mehameha Loop provides access to the Maui Humane Society to the west (Otomo, 2012).

Maui Veteran's Parkway is a four-lane undivided State Highway which runs in the north-south direction which connects Kahului and Kihei. The speed limit is 45 miles per hour (mph) in the vicinity of Kama'aina Road. There is a separate bike path along the east side of Maui Veteran's Parkway (Otomo, 2012).

The intersection of Maui Veteran's Parkway at Kama'aina Road is a four-legged, signalized intersection. The northbound and southbound approaches of Maui Veteran's Parkway have separate left turn and right turn deceleration and storage lanes. The eastbound (Mehameha Loop) and westbound (Kama'aina Road) approaches are one lane (Otomo, 2012).

Kamaaina Road has a 24-foot wide concrete pavement for approximately 1,500 feet from Maui Veteran's Parkway and transitions to an asphalt pavement up to South Firebreak Road. South Firebreak Road has a 24-foot wide asphalt pavement up to the project site (Otomo, 2012).

Access to the Pulehunui Heavy Industrial Subdivision is from Kama'aina Road. The culdesac road into the subdivision is Nopu St. This road has a 56-foot Right-of-Way with two 18-foot wide travel lanes and 10-foot wide shoulders on each side. These larger traffic lanes accommodate larger fire trucks in the Central and South Maui district, as well as anticipated heavier large truck traffic in the subdivision. Flexible design standards were utilized in the design of the subdivision's internal and external roadway system as provided for by Section 18.32.030 of the Maui County Code pertaining to General Criteria for Flexible Design Standards. Appropriate striping and signage are installed in accordance with the County of Maui Department of Public Works. From Maui Veteran's Parkway, there will be access to Kihei to the south and Kahului to the north. Easements from Alexander & Baldwin and/or the State of Hawaii provide access to the project area from Maui Veteran's Parkway (see Exhibit 5).

A Traffic Impact Analysis Report (TIAR), dated January 24, 2012 was prepared by Phillip Rowell and Associates. The recommended improvements were made and have been previously described above.

## 2.2 DRAINAGE

The parcels generally slope down in the east to west direction ranging in elevation from approximately 135 feet to 120 feet above mean sea level, with an average slope of approximately 2%. It is estimated that the existing 50-year storm runoff from the project site is 4.09 cfs and 4,172 cf of runoff volume. Presently, onsite runoff sheet flows across the project site in an east to west direction into the downstream parcels and towards Maui Veteran's Parkway. The stormwater is captured in the retention basins installed with the original development.

According to the "Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii (August, 1972)," prepared by the United States Department of Agriculture Soil Conservation Service, a majority of the soil within the project site is classified as Waiakoa extremely stony silty clay loam (WID2).

Waiakoa extremely stony silty clay loam is characterized as having medium runoff, and a severe erosion hazard. A portion of the soils within the southern end of the property is classified as Alae Sandy Loam (AaB). Alae Sandy Loam is characterized as having slow runoff with a slight erosion hazard (See Exhibit 3).

According to Panel Number 1500030580E of the Flood Insurance Rate Map, dated September 25, 2009, prepared by the United States Federal Emergency Management Agency, the project site is situated in Flood Zone X. Flood Zone X represents areas outside of the 0.2% annual chance flood plain (See Exhibit 4).

## 2.3 SEWER

There are no County sewer facilities within or adjacent to the project site. The nearest County sewerline is approximately 10,000 feet to the south of the project site in Kihei.

A private centralized wastewater collection system complete with a 20,000 GPD wastewater treatment plant (WWTP) is currently servicing the heavy industrial subdivision. A sewer lateral is provided at each lot. The lateral connects to the sewer main and ultimately flows into the private WWTP. After treatment in the WWTP, the liquid effluent currently flows to two (2) previously

permitted wastewater injection wells. Solids collected at the WWTP are periodically taken to the County of Maui landfill for disposal.

## 2.4 WATER

There is no County water system currently servicing the project site. There is an 8" water line from the County water system extending up Kama'aina Road to service some of the surrounding properties. The source for this water system is the Mokuhau wells located in Happy Valley. The 36-inch Central Maui transmission line runs along Maui Veteran's Parkway from Wailuku to service the Kihei area (Otomo, 2012).

Water for the project site is from a private water system providing the required potable water, as well as adequate fire flow, for the subdivision. Groundwater supplied by onsite wells provide the source. Reverse osmosis (RO) treatment is performed onsite for potable water use.

In accordance with the County of Maui Department of Water Supply Water System Standards (2002), the fire flow demand for a heavy industrial zoning is 2,500 gallons per minute for a 2-hour duration. The maximum spacing for fire hydrants is 250 feet. The fire flow demand is currently met by the in-place non-potable system.

The water system currently in-place consists of the following improvements:

1. Two (2) 300-gpm wells with one (1) providing standby capacity.
2. Two (2) 75-gpm reverse osmosis (RO) treatment trains with one providing standby capacity.
3. A 400,000-gallon storage reservoir for potable use.
4. A potable and fire suppression water system with booster pump and a backup generator power for the fire suppression booster station to ensure fire protection during a power outage.

## 2.5 ELECTRIC AND TELEPHONE

The electrical and telephone distribution systems for the subdivision are installed from the existing overhead facilities located along the north side of the subdivision. Within the subdivision, the electric and telephone systems are above ground in accordance with the utility companies rules and regulations. Each lot has transformers on the respective power poles to connect to for individual lot improvements. Street lights are installed along the subdivision streets at intervals meeting current standards.

### 3.0 ANTICIPATED INFRASTRUCTURE IMPROVEMENTS

#### 3.1 ROADWAYS

Access to the existing WWTP, and subsequently, the expanded WWTP, on Parcel 030, will be maintained from Nopu Street and an internal easement road within TMK: (2) 3-8-104:015. This roadway will not be further upgraded with this project.

Access to the private wastewater receiving facility will be directly off of Nopu Street. The driveway will be 24 feet wide and will be installed as shown in Exhibit 6.

#### 3.2 DRAINAGE

The parcel 017 project's drainage system will be designed to accommodate the increase in runoff generated by the development of the project site. It is estimated that the post development runoff will be approximately 7.91 cfs and generate 4,983 cf of surface runoff volume. This would be an increase of approximately 3.82 cfs of runoff and 811 cf of runoff volume. The proposed retention basins to be constructed along the northwestern portion of the property will have a capacity to accommodate at least the increase in surface runoff from a fully developed project site.

The existing WWTP expansion will not change the drainage in this area as the grading was previously completed with the installation of the original WWTP infrastructure. Drainage will continue to flow from this site to the subdivision retention basins.

There will be no increase in runoff sheet flowing from the project sites after completion of the development and the drainage design will also be to minimize any alterations to the natural pattern of the existing onsite surface runoff. This will be completed in accordance with Chapter 4, Rules for the Design of Storm Drainage Facilities in the County of Maui.

#### 3.3 SEWER

The receiving facility to be installed on Parcel 017 will have a full pre-treatment capabilities to receive up to 20,000 GPD worth of septage and wastewater. Upon treatment at the receiving facility, the liquid effluent will be pumped, via new lift station, to the newly expanded WWTP (See Exhibit 5). The Engineering Design Report for the receiving facility is attached in

## Appendix E.

The existing 20,000 GPD WWTP will be expanded to 40,000 GPD to accommodate the receiving facility wastewater (See Appendix C – Wastewater Calculations). After treatment, the liquid effluent will be conveyed into a community absorption field which is required to be at least 1,000 feet away from the wells providing water to the subdivision. The existing injection wells will be converted to backup to meet the requirement of 100% redundancy for the liquid effluent. The Engineering Design Report for the expanded private WWTP is attached in Appendix D.

As the subdivision progresses and building permits are applied for, the building permit applicant will be required to submit the design of their improvements. It is the responsibility of the SDOH to review and approve the building permit and usage on the parcels within the subdivision. Should improvements be made that require wastewater disposal that is not domestic, further pre-treatment may be required on the individual parcel.

### 3.4 WATER

Groundwater supplied by onsite wells will continue to provide the source for non-potable water use as well as reverse osmosis (RO) treatment for potable water use. The existing water laterals servicing Parcel 017 will provide domestic water for use with the receiving facility and associated offices and landscaping.

The existing water laterals servicing Parcel 030 will provide domestic water for use with the WWTP and associated offices, and landscaping.

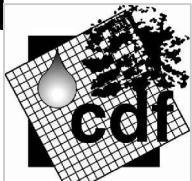
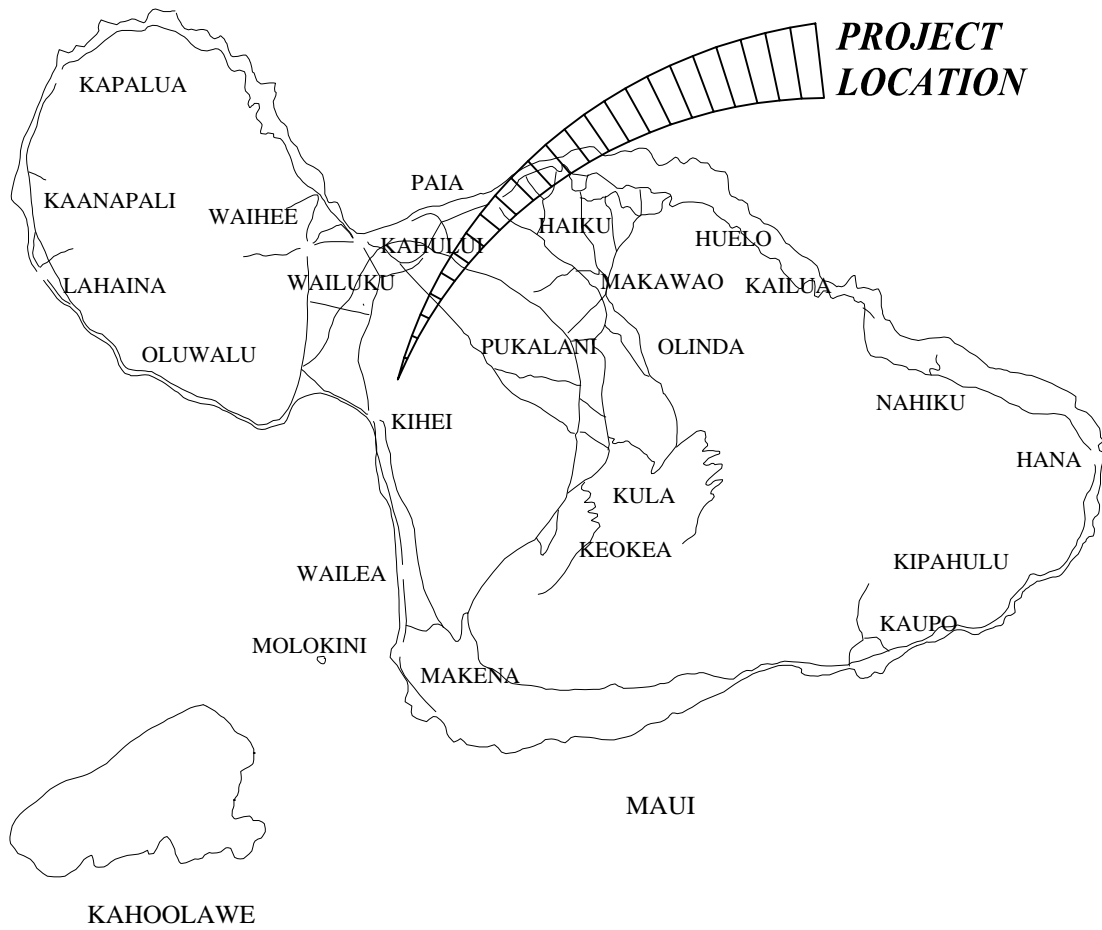
Fire protection will continue to be provided by the subdivision fire suppression system with fire hydrants spaced every 250 feet along the subdivision roadway.

### 3.5 ELECTRIC AND TELEPHONE

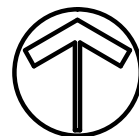
The proposed electrical and telephone systems for the subject project will be installed from the existing above ground facilities located within the subdivision Right-of-Way for Parcel 017. The proposed electrical and telephone system for the WWTP expansion will be installed from the existing WWTP power and telecom supply.

## EXHIBITS

- 1 Location Map
- 2 Vicinity Map
- 3 Soil Survey Map
- 4 Flood Insurance Rate Map
- 5 Preliminary Site Plan
- 6 Preliminary Site Plan Inset



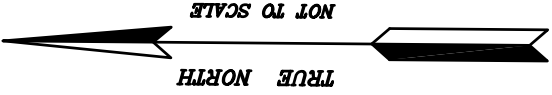
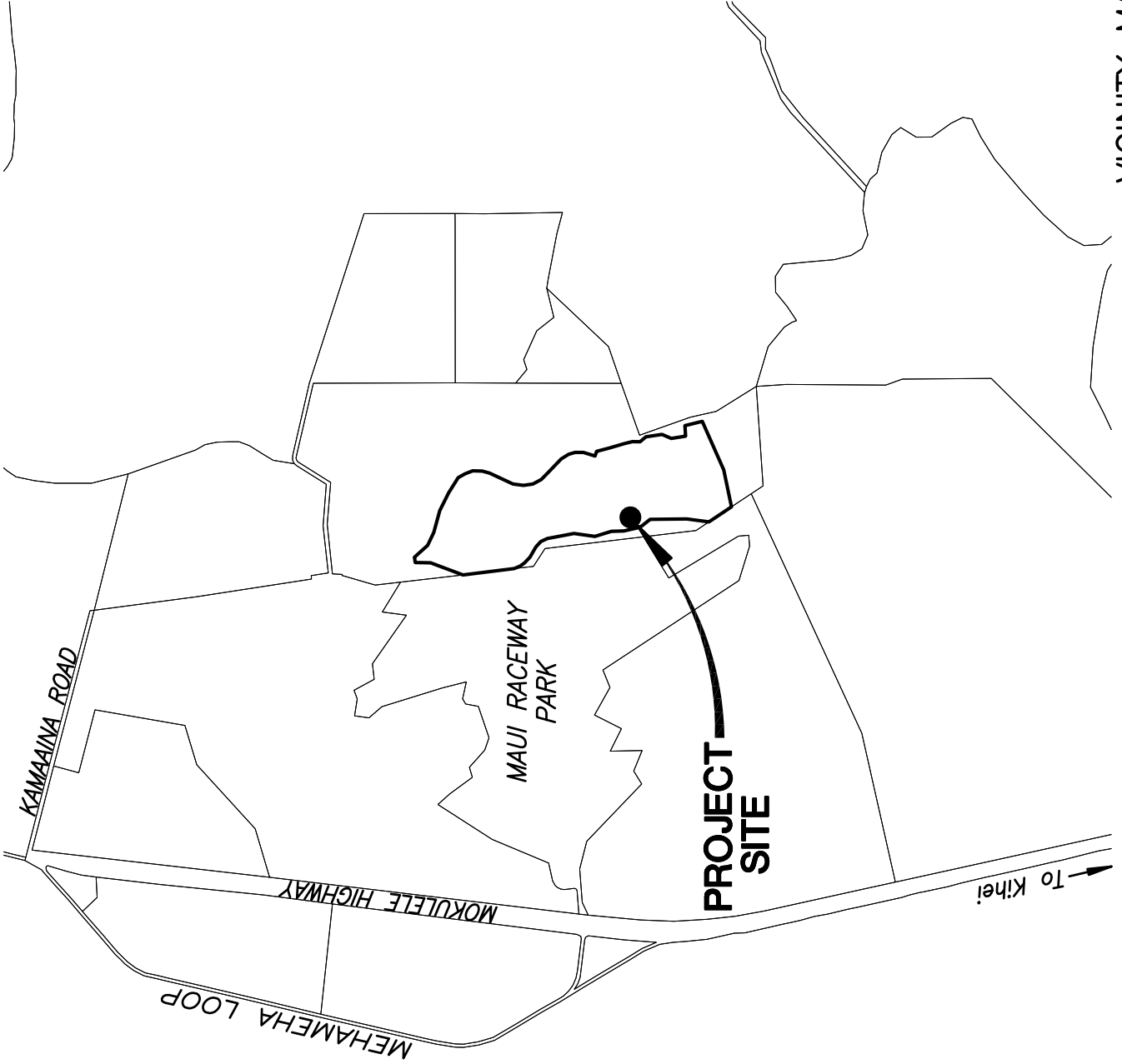
PULEHUNUI VIP

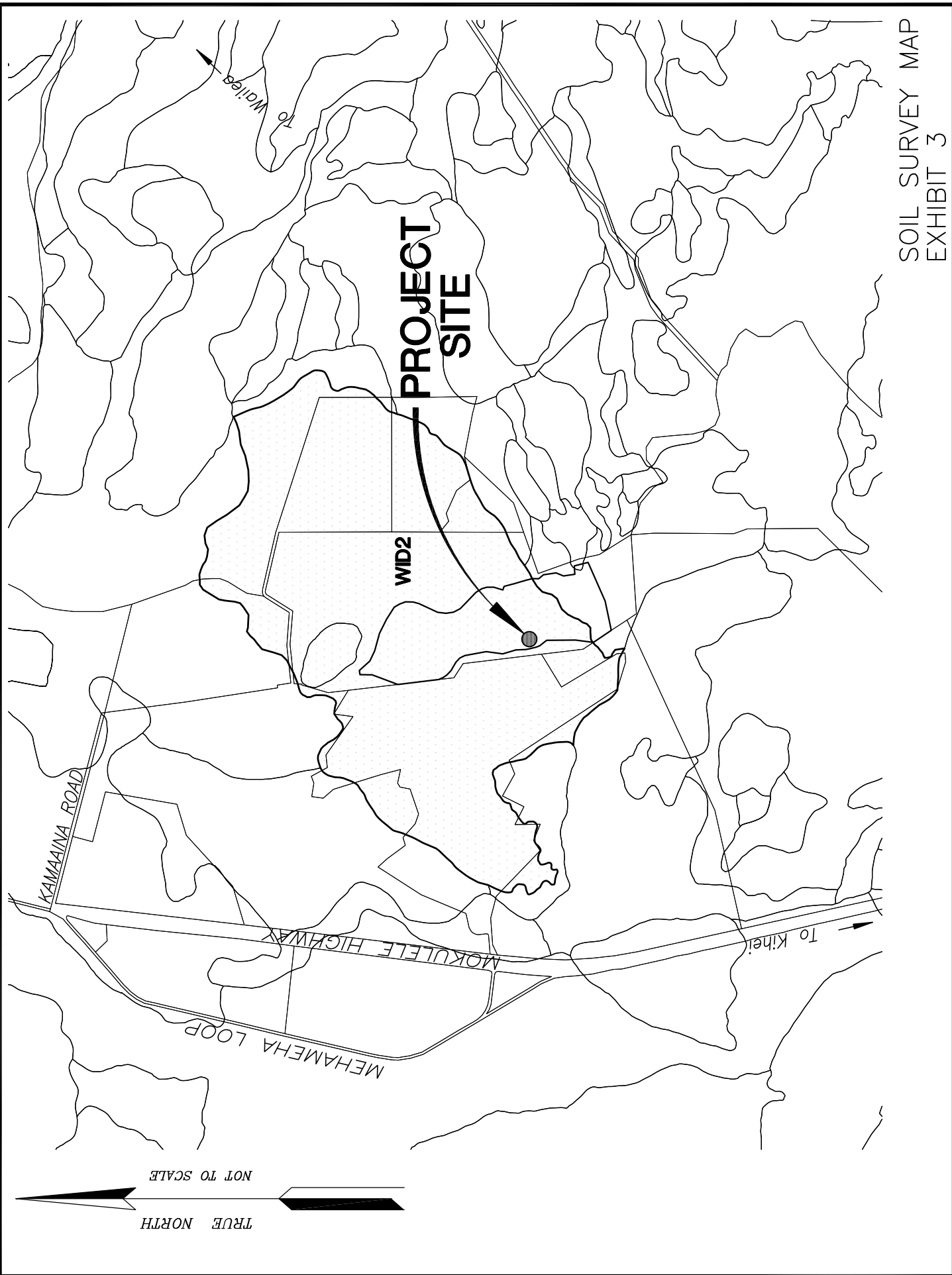


**EXHIBIT 1**  
ISLAND LOCATION MAP



VICINITY MAP  
EXHIBIT 2










Insurance Program at 1-800-8



MAP SCALE 1" = 1000'

500 0 1000 2000  
 FEET METERS

**NFIP** PANEL 0580E

**FIRM**  
 FLOOD INSURANCE RATE MAP


MAUI COUNTY,  
 HAWAII

PANEL 580 OF 825  
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MAUI COUNTY	150003	0580	

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used for insurance solicitation.



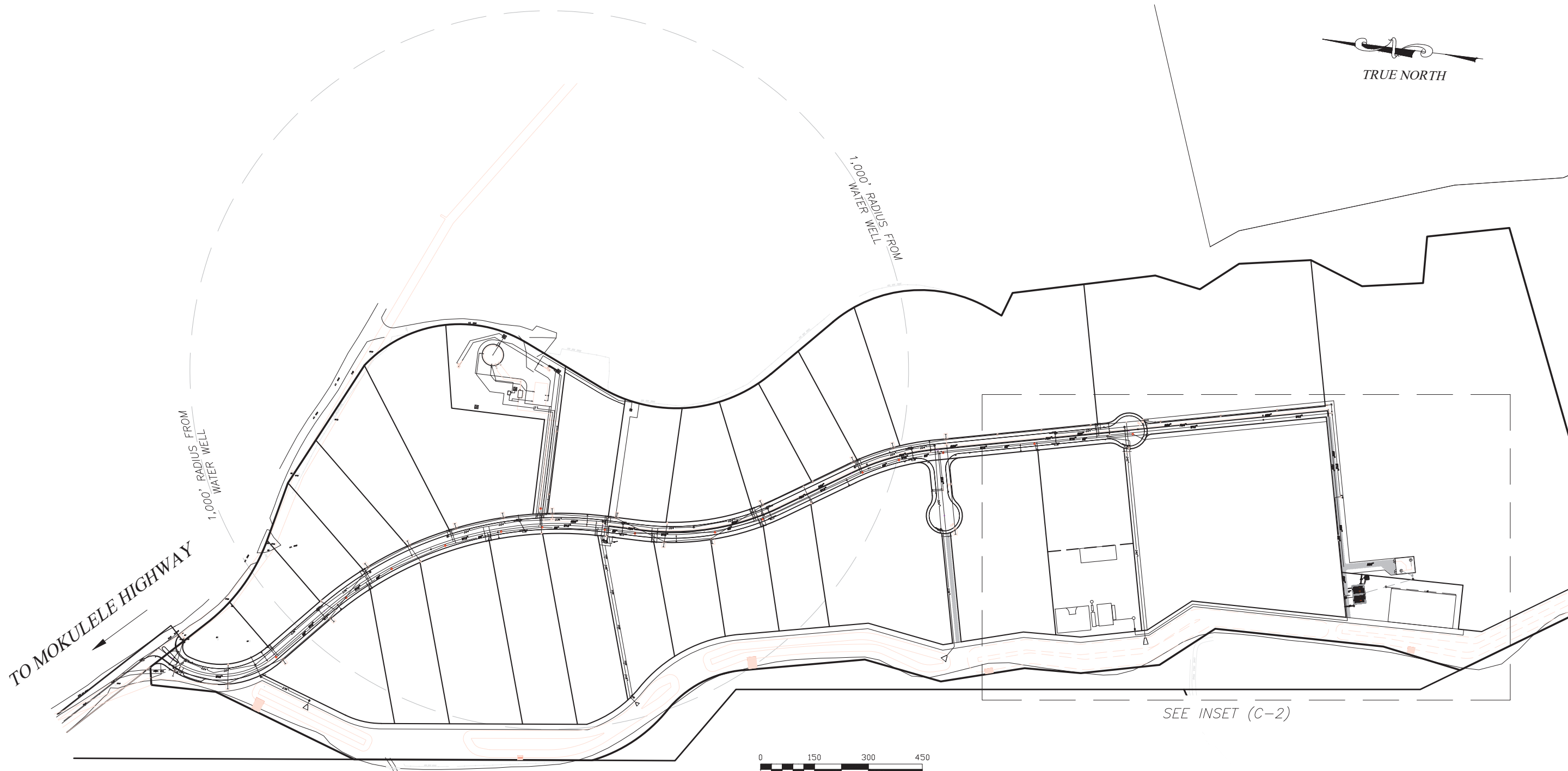
MAP NUMBER  
 1500030580E

MAP REVISED  
 SEPTEMBER 25, 2009

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)





TO MOKULELE HIGHWAY

1,000' RADIUS FROM WATER WELL

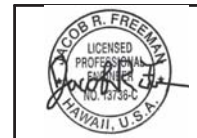
1,000' RADIUS FROM WATER WELL

SEE INSET (C-2)



SCALE: 1" = 150'

EXHIBIT 5 SITE PLAN



This work was prepared by me or under my supervision and construction will be under my observation. (Observation of construction as defined in Section 1.2 (7) in the rules and regulations of the Board of Professional Engineers, Architects, and Surveyors of the State of Hawaii.)



CIVIL ENGINEERING & LANDSCAPE ARCHITECTURE CONSULTANTS

**CDF Engineering LLC**

PO BOX 2985  
WAILUKU, HI 96793  
PHONE: (808) 891-2400

**PAAA SUBDIVISION WWTP**  
OFF MOKULELE HIGHWAY  
PU'UNENE, MAUI, HAWAII

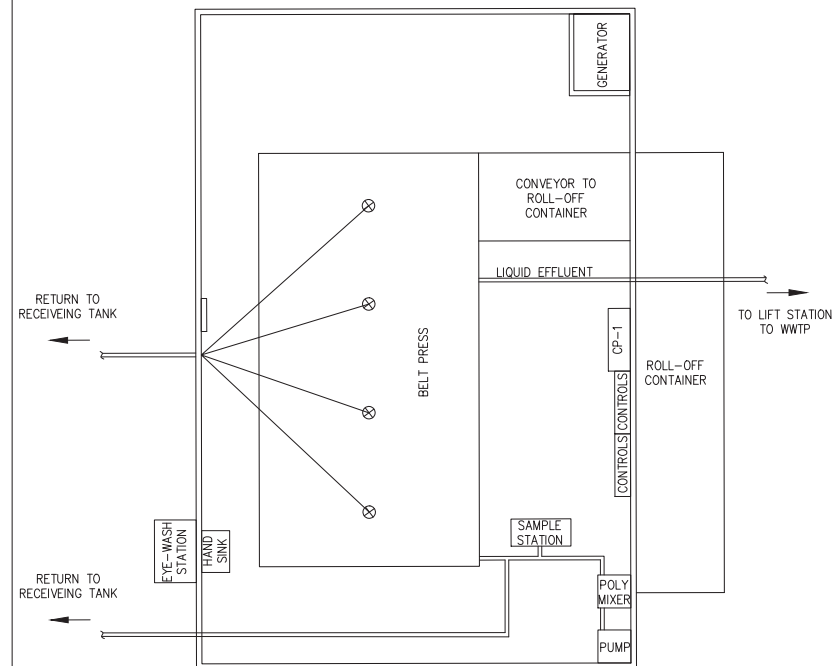
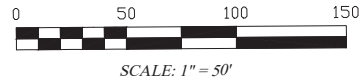
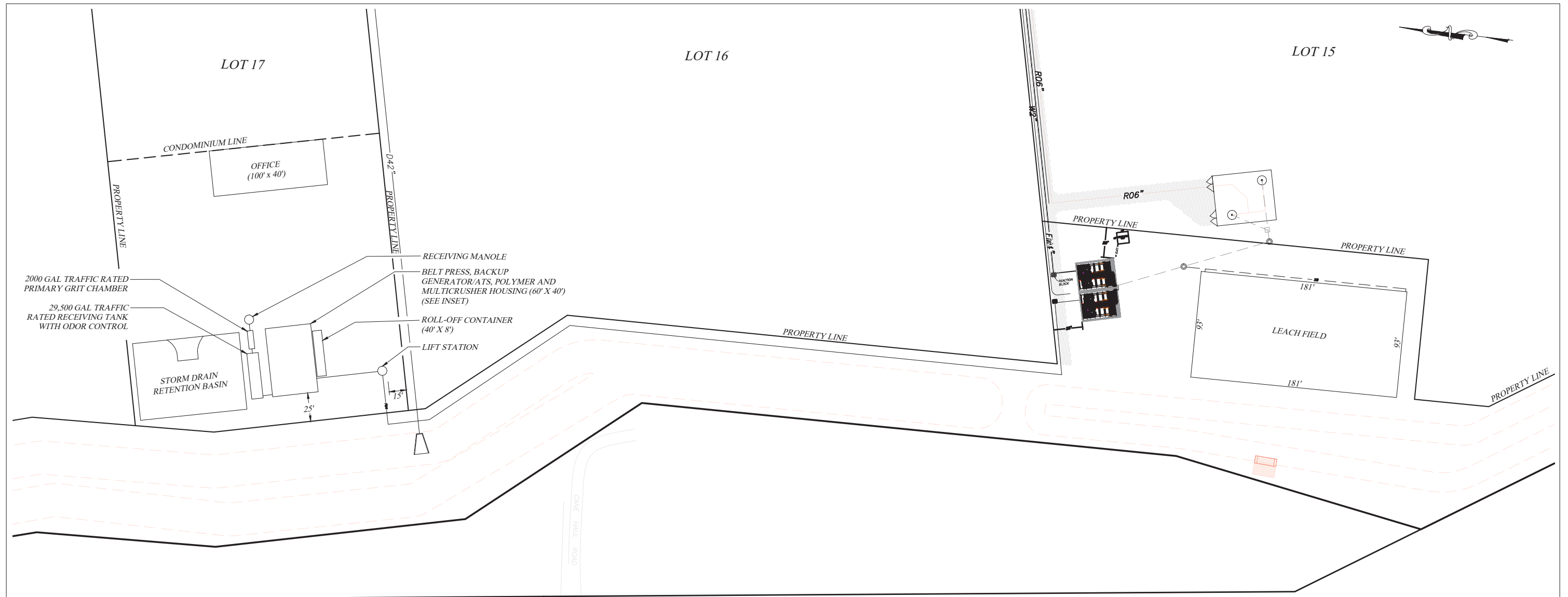
Scale:  
SCALE: 1" = 150'

**SITE PLAN**

DWG No:  
C-1

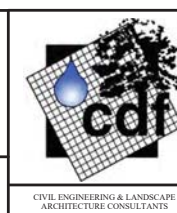
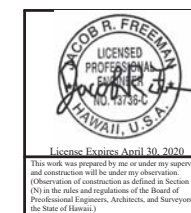
06-20-2019

TMK: (2) 3-8-104-030



HOUSING INSET  
SCALE: 1"=8'

EXHIBIT 6 SITE PLAN INSET



<b>CDF Engineering LLC</b> PO BOX 2985 WAILUKU, HI 96793 PHONE: (808) 891-2400	
<b>PUAA SUBDIVISION WWTP</b> OFF MOKULELE HIGHWAY PU'UNENE, MAUI, HAWAII	
Scale: <b>SCALE: 1" = 40'</b>	<b>SITE PLAN INSET</b>
06-20-2019	TMK: (2) 3-8-104-030
DWG No: <b>C-2</b>	

APPENDIX A  
HYDROLOGIC CALCULATIONS  
(Parcel 017 only)

## Hydrologic Calculations

Purpose: Determine the increase in onsite surface runoff from the undeveloped portion of the project site based on a 50-year, 1-hour storm.

A. Determine the Runoff Coefficient (C):

### EXISTING AREAS:

Infiltration (Medium)	= 0.07
Relief (Flat)	= 0.00
Vegetal Cover (Good)	= 0.03
Development Type (Open)	= <u>0.15</u>
	C= 0.25

### DEVELOPED AREAS:

Infiltration (Negligible)	= 0.07
Relief (Flat)	= 0.00
Vegetal Cover (Poor)	= 0.05
Development Type (Industrial)	= <u>0.15</u>
	C= 0.27

B. Determine the 50-year 1-hour rainfall:

$$i_{50} = 2.3 \text{ inches}$$

Adjust for time of concentration to compute Rainfall Intensity (I):

### Existing Condition:

$$T_c = 17 \text{ minutes}$$
$$I = 4.7 \text{ inches/hour}$$

### Developed Condition:

$$T_c = 10.5 \text{ minutes}$$
$$I = 4.72 \text{ inches/hour}$$

C. Drainage Area (A) = 2.89 acres

D. Compute the 50-year storm runoff volume (Q):

$$Q = CIA$$



Existing Condition:

$$\begin{aligned} Q &= (0.25)(4.7)(2.89) \\ &= 4.09 \text{ cfs} \end{aligned}$$

Developed Condition:

$$\begin{aligned} Q &= (0.27)(4.72)(2.89) \\ &= 7.91 \text{ cfs} \end{aligned}$$

There is 3.82 cfs of additional runoff created due to the development. All of this will be captured in an onsite retention pond.

**EXISTING CONDITION - DRAIN AREA 1**

**Reference:** Title MC-15, Department of Public Works and Waste Management, County of Maui, Chapter 4, Rules for the Design of Storm Drainage Facilities in the County of Maui. Unified Rational Calculations are used to determine the increase in volume of runoff.

**I. Project Parameters:**

**50-Yr. - 1-Hr. Rainfall:**

From "Rainfall Frequency Atlas of the Hawaiian Islands", for Pulehunui, Maui  
 R(50 Yr. - 1 Hr.) = 2.30 inches

**Total Area:**

Area (Ac.): 125,838 SF = **2.89**

**II. Determine Pre-Development Runoff:**

**Pre-Development Runoff Coefficients:**

Infiltration:	Medium	0.07
Relief:	Flat (0-5%)	0.00
Vegetal Cover:	Good (10-50%)	0.03
Development Type:	Agricultural	0.15

Runoff Coeff.,  $C_{undeveloped}$ : **0.25**

$$C_{weighted} = \frac{A_{impervious}C_{impervious} + A_{landscaped}C_{landscaped} + A_{unimproved}C_{unimproved}}{A_{total}}$$

$$\frac{0 \text{ SF} \times 0.95 + 0 \text{ SF} \times 0.25 + 125,838 \text{ SF} \times 0.25 + 0 \text{ SF} \times 0.85}{125,838 \text{ SF}} = \mathbf{0.25}$$

**Pre-Development Time of Concentration:**

Approx. Elev. Diff'l (ft):		10
Higher Elev. (ft):	130	
Lower Elev. (ft):	120	
Approx. Runoff Length (ft):		580
Average Slope:		1.7%
Time of Concentration (min.):		17.0

**Pre-Development Intensity:**

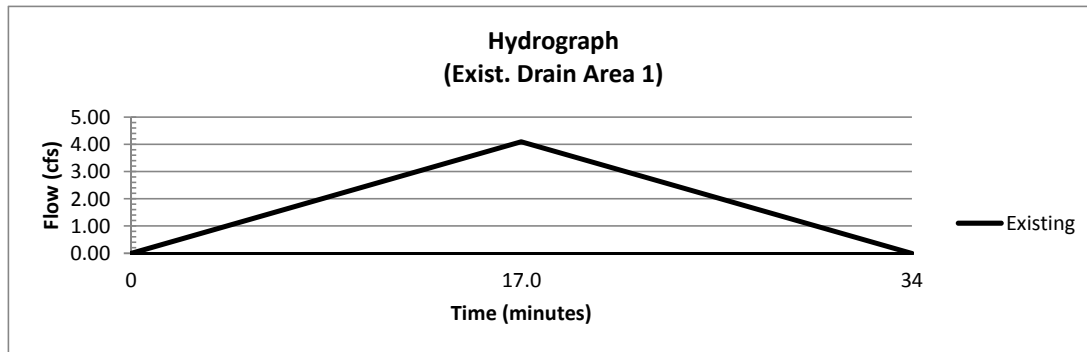
Intensity (in/hr.): **4.7**

**Pre-Development Runoff:**

$Q = C_{weighted} \times I \times A$  (cfs): **4.09**

**Existing Runoff for Drain Area 1 - Q (cfs):**

**4.09**



Exist. Runoff Volume (area under hydrograph) =  $Q_{peak} \times T_{conc} \times 60 \text{ seconds/minute} = 4.09 \text{ cfs} \times 17.0 \text{ min.} \times 60 \text{ sec./min.}$

**Total Pre-Development Runoff Volume: 4,172 cubic feet**

**PROPOSED CONDITION - DRAIN AREA 1A**

**Reference:** Title MC-15, Department of Public Works and Waste Management, County of Maui, Chapter 4, Rules for the Design of Storm Drainage Facilities in the County of Maui. Unified Rational Calculations are used to determine the increase in volume of runoff.

**I. Project Parameters:**

**50-Yr. - 1-Hr. Rainfall:**

From "Rainfall Frequency Atlas of the Hawaiian Islands", for Pulehunui, Maui  
 R(50 Yr. - 1 Hr.) = 2.30 inches

**Total Area:**

Area (Ac.): 125,838 SF = **2.89**

**II. Determine Post-Development Runoff:**

**Post-Development Runoff Coefficients:**

Infiltration:	Medium	0.07
Relief:	Flat (0-5%)	0.00
Vegetal Cover:	Poor (<10%)	0.05
Development Type:	Agricultural	0.15

Runoff Coeff.,  $C_{undeveloped}$ : 0.27

$$C_{weighted} = \frac{A_{impervious}C_{impervious} + A_{landscaped}C_{landscaped} + A_{unimproved}C_{unimproved}}{A_{total}}$$

$$\frac{58,000 \text{ SF} \times 0.95 + 0 \text{ SF} \times 0.25 + 67,838 \text{ SF} \times 0.27 + 0 \text{ SF} \times 0.85}{125,838 \text{ SF}} = \mathbf{0.58}$$

= **0.58**

**Post-Development Time of Concentration:**

Approx. Elev. Diff'l (ft):		10
Higher Elev. (ft):	130	
Lower Elev. (ft):	120	
Approx. Runoff Length (ft):		580
Average Slope:		1.7%
Time of Concentration (min.):		10.5

**Post-Development Intensity:**

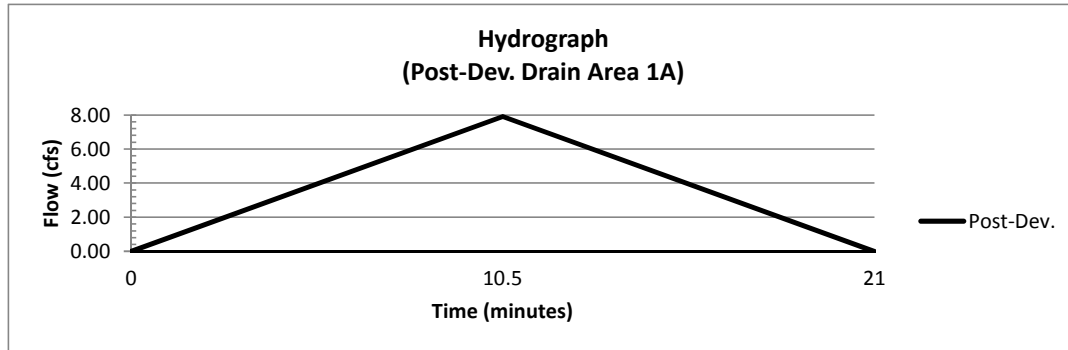
Intensity (in/hr.): **4.72**

**Post-Development Runoff:**

$Q = C_{weighted} \times I \times A$  (cfs): 7.91

**Proposed Runoff for Drain Area 1A - Q (cfs):**

**7.91**



Prop. Runoff Volume (area under hydrograph) =  $Q_{peak} \times T_{conc} \times 60 \text{ seconds/minute} = 7.91 \text{ cfs} \times 10.5 \text{ min.} \times 60 \text{ sec.}$

**Total Post-Development Runoff Volume: 4,983 cubic feet**

APPENDIX B  
WATER DEMAND CALCULATIONS

WATER DEMAND CALCULATIONS  
(From Otomo 2012 previously approved PER for existing  
subdivision)

Proposed subdivision area uses:

Industrial lots = 65.9 acres

Common area landscaping = 9.1 acres

Roadways = 11.0 acres

Water demand for Industrial lots (6,000 gallons per acre per day):

$$\text{Average Daily Demand (ADD)} = (6,000)(65.9) = 395,400 \text{ gpd}$$

Based on 30/70, potable/non-potable split:

$$\text{ADD (potable)} = 395,400 \text{ gpd} \times 30\% = 118,620 \text{ gpd}$$

$$\text{ADD (non-potable)} = 395,400 \text{ gpd} \times 70\% = 276,780 \text{ gpd}$$

Water demand for Common area landscaping (2,500 gallons per acre per day):

$$\text{ADD (non-potable)} = (2,500)(9.1) = 22,750 \text{ gpd}$$

Water demand for Roadways (2,500 gallons per acre per day):

Based on 20% of ROW to be irrigated

$$\text{ADD (non-potable)} = (2,500)(2.2) = 5,500 \text{ gpd}$$

$$\text{Total ADD (non-potable)} = 276,780 + 22,750 + 5,500 = 305,030 \text{ gpd}$$

APPENDIX C  
WASTEWATER DEMAND CALCULATIONS

## WASTEWATER DEMAND CALCULATIONS

### ESTIMATED WASTEWATER FLOW CALCULATIONS

Average Flow	19,600 GPD*
<u>VIP Wastewater Receiving Facility</u>	<u>20,000 GPD</u>
<b>TOTAL AVG. DAILY FLOW</b>	<b>39,600 GPD</b>

Population (Employees)                      560 persons

\*28 lots with projected 10,000 square feet floor area/lot yields 280,000 square feet of floor area. State of Hawaii Wastewater Flow Standards from HAR 11-62-08(c) and 11-62-24(b) state that for factories that do not produce industrial waste, the contribution to the wastewater system is 35 Gallons/Employee/shift. Additionally, the Wastewater Flow Standards state that one (1) Industrial Employee should be accounted for in every 500 square feet of floor area. Therefore:

280,000 square feet x 1 Employee/500 square feet = 560 Employees

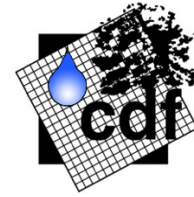
35 Gallons/Employee/day x 560 Employees = 19,600 GPD Average Flow



## APPENDIX D

# PULEHUNUI HEAVY INDUSTRIAL SUBDIVISION WASTEWATER TREATMENT FACILITY ENGINEERING DESIGN REPORT

CDF Engineering LLC  
Civil Engineering & Land Surveying Consultants  
P.O. Box 2985 Wailuku, HI 96793  
Phone: (808) 891-2400 - Fax: (808) 879-2402  
[www.cdfengineers.com](http://www.cdfengineers.com) - Lic. No. ABC-33139



ENGINEERING DESIGN REPORT  
FOR  
PULEHUNUI HEAVY INDUSTRIAL SUBDIVISION  
WASTEWATER TREATMENT FACILITY

Puunene, Maui, Hawaii

T.M.K.: (2) 3-8-104:030

Prepared for:

Pulehunui Heavy Industrial Area  
AOAO  
1300 N. Holocono Street, Suite 201  
Kihei, Maui, Hawaii 96753

&

Valley Isle Pumping LLC  
291 Lower Kula Road  
Pukalani, HI 96768

July 2019

TABLE OF CONTENTS

1.0	INTRODUCTION	3
2.0	EXISTING INFRASTRUCTURE	3
2.1	SEWER	3
3.0	PROPOSED INFRASTRUCTURE	4
3.1	SEWER	4
3.2	ESTIMATED WASTEWATER FLOW CALCULATIONS	4
3.3	MASS/HYDRAULIC BALANCE CALCULATIONS	5
3.4	EFFLUENT DISPOSAL SYSTEM	5
3.5	SLUDGE DISPOSAL PLAN	5
4.0	REFERENCES	6
5.0	EXHIBITS	7
A.	TITLE SHEET WITH LOCATION & VICINITY MAP	8
B.	PRELIMINARY SITE PLAN	10
C.	CONSTRUCTION DRAWINGS FOR WASTEWATER TREATMENT PLANT & PROCESS FLOW DIAGRAM	11
D.	LIFT STATION DETAILS	24
6.0	APPENDICES	25
A.	ENGINEER'S CERTIFICATION	26
B.	OWNER'S CERTIFICATION	28
C.	SPECIFICATIONS	30
D.	OPERATIONS AND MAINTENANCE MANUAL WASTEWATER TREATMENT PLANT	42
E.	GEOTECHNICAL ENGINEERING REPORT	79
F.	OPERATIONS AND MAINTENANCE MANUAL FOR ABSORPTION FIELD	87
G.	OPERATIONS AND MAINTENANCE MANUAL FOR INJECTION WELLS	92
F.	SLUDGE DISPOSAL PLAN	94

## 1.0 INTRODUCTION

The purpose of this report is to evaluate the adequacy of the proposed wastewater infrastructure and anticipated improvements which may be required for the proposed project.

The subject parcel is identified as T.M.K.: (2) 3-8-104: 030, and encompasses an area of approximately 9.68-acres. It is also known as the utility lot of the Pua'a Subdivision which incorporates retention basins and other utility corridors. The entire subdivision is 86.030-acres. The subdivision is bordered by undeveloped land, an irrigation reservoir and sugar cane fields to the north; sugar cane fields and a quarry to the east, sugar cane fields to the south, and the old Puunene Airport to the west (Otomo, 2012).

Access to the project site is from Kama'aina Road, South Firebreak Road, and Lower Kihei Road. There is an existing traffic signal at the Mokulele Highway – Kama'aina Road intersection with a left turn storage lane and a right turn deceleration lane (Otomo, 2012).

The subdivision is zoned heavy industrial. The heavy industrial zoning district provides for a minimum lot size of 10,000 square feet. Currently, the subdivision provides ten (10) lots ranging in size from one-half to one acre; five (5) lots ranging in size from over one acre to two acres and the balance of the lots ranging in size from over two acres to twenty acres for a total of twenty-eight (28) lots. Other improvements include paved private roadways, private water system, and landscaping. Underground water, sewer, drainage, electrical, and telephone systems are also installed. For purposes of this report, we are focusing on the wastewater system upgrade only. The original 20,000 GPD plant was installed in 2018 and previously approved for use to cover the domestic wastewater potential for the subdivision. With the improvements covered in this Engineering Design Report, the operating capacity will be increased to 40,000 GPD.

## 2.0 EXISTING INFRASTRUCTURE

### 2.1 SEWER

There are no County sewer facilities within or adjacent to the project site. The nearest County sewerline is approximately 10,000 feet to the south of the project site in Kihei (Otomo, 2012). Therefore, the subdivision uses a

centralized wastewater collection system along with the privately owned and operated 20,000 GPD previously approved wastewater treatment plant for purposes of domestic wastewater treatment only. Each lot is required to connect to the sewer lateral provided. Wastewater is conveyed from each lot into the WWTP. The treated effluent is then conveyed into a community battery of previously approved injection wells. The injection wells are required to be at least 500 feet away from the wells providing water to the subdivision. The WWTP adheres strictly to the requirements set forth by the SDOH.

### 3.0 PROPOSED INFRASTRUCTURE

#### 3.1 SEWER

The nearest County sewer system is located approximately 10,000 feet from the project site, therefore a master private sewer system is installed within the subdivision roadways and a sewer lateral is provided to each lot. The master sewer system will now outlet into a new absorption field for primary effluent disposal. The existing Injection wells within the project site will be utilized as a full backup.

As the project progresses and building permits are applied for, the building permit applicant will be required to submit their projected use on the property. Subsequently, the expected source and characterization of wastewater from the subdivision is general domestic wastewater from office building type complexes. Therefore, the original 20,000 GPD WWTP was designed and built to accommodate domestic wastewater only. It will be the responsibility of the individual lot Owner to determine if any other sources of wastewater will be generated from the site. Should non-domestic wastewater be generated, a separate treatment facility will be constructed on the individual lot specific to the use. With the need to accommodate the anticipated flow from Lot 2-Q, an additional 20,000 GPD is being added to the WWTP for a total flow of 40,000 GPD.

#### 3.2 ESTIMATED WASTEWATER FLOW CALCULATIONS

Maximum Flow from Lot 2-Q	20,000 GPD
Average Flow (From Subdivision)	19,600 GPD*

<u>Population (Employees)</u>	<u>560 persons</u>
TOTAL FLOW	39,600 GPD

\*28 lots with projected 10,000 square feet floor area/lot yields 280,000 square feet of floor area. State of Hawaii Wastewater Flow Standards from HAR 11-62-08(c) and 11-62-24(b) state that for factories that do not produce industrial waste, the contribution to the wastewater system is 35 Gallons/Employee/shift. Additionally, the Wastewater Flow Standards state that one (1) Industrial Employee should be accounted for in every 500 square feet of floor area. Therefore:

280,000 square feet x 1 Employee/500 square feet = 560 Employees  
35 Gallons/Employee/day x 560 Employees = 19,600 GPD Average Flow

### 3.3 MASS/HYDRAULIC BALANCE CALCULATIONS

There is provided a total sludge holding volume of 6,800 gallons for the system. There are four (4) independently operating 1,700 gallon sludge holding chambers. As discussed, each chamber includes a supernatant decant airlift assembly for concentrating the solids. The sludge retention under normal operating conditions at the average system design flow is as defined below:

System Data = 40,000 GPD @ 250 mg/L BOD5

#### **Total pounds of BOD5 for the system:**

$0.04 \times 250 \times 8.34 = 83.4$  lbs BOD per day

Sludge concentration = 10,000 to 20,000 mg/L; use 15,000 for calculation purposes: Estimate 90% treatment at effluent.

For every pound of influent BOD, the plant produces 0.15 pounds of waste sludge:  $83.4 \times .9 \times .15 = 11.3$  pounds of waste sludge

Number of days of retention (when concentrated)

6,800 gal. = .0068 x 40,000 x 8.34 divided by 11.3 = 200 days

The specifications and Operations and Maintenance Manual are attached to this Engineering Design Report in the Appendix. Additionally, this calculation is based on a theoretical worst case scenario where the effluent from Lot 2-Q is equal to the domestic wastewater currently directly entering the WWTP.

3.4 EFFLUENT DISPOSAL SYSTEM

An absorption field will be utilized for the effluent disposal system. The existing injection wells will be utilized as the full backup for the effluent disposal system. Calculations for the absorption field and injection wells, along with details, are provided in Exhibit D.

3.5 SLUDGE DISPOSAL PLAN

A licensed, registered, and permitted Sludge Hauler through the County of Maui and the State of Hawaii Department of Health will be contracted as a requirement of the approval to operate the wastewater treatment facility. Scheduled inspections and pumping will be as required by the system and as per the maintenance agreement. Presently, the anticipated quantities to be removed are two (2) 3,000-gallon truckloads of 0.2% solids content will be removed each month, or as determined necessary by the operator.

4.0 REFERENCES

- A. Soil Survey of Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii, prepared by U.S. Department of Agriculture, Soil Conservation Service, August, 1972.
- B. Water System Standards, Department of Water Supply, County of Maui, 2002.



- C. Groundwater Resource and Water System Assessment for the Proposed Puunene Industrial Subdivision, prepared by Tom Nance Water Resource Engineering, June 2011.
- D. Field Percolation Test Report #1 and Test Pit WWTP and Percolation Testing at Puunene Heavy Industrial Subd., prepared by Charles K. Biegel, Island Geotechnical Engineering, Inc., October 2015.
- E. Preliminary Engineering Report for Puunene Heavy Industrial Subdivision., prepared by Otomo Engineering, Inc., February 2012.

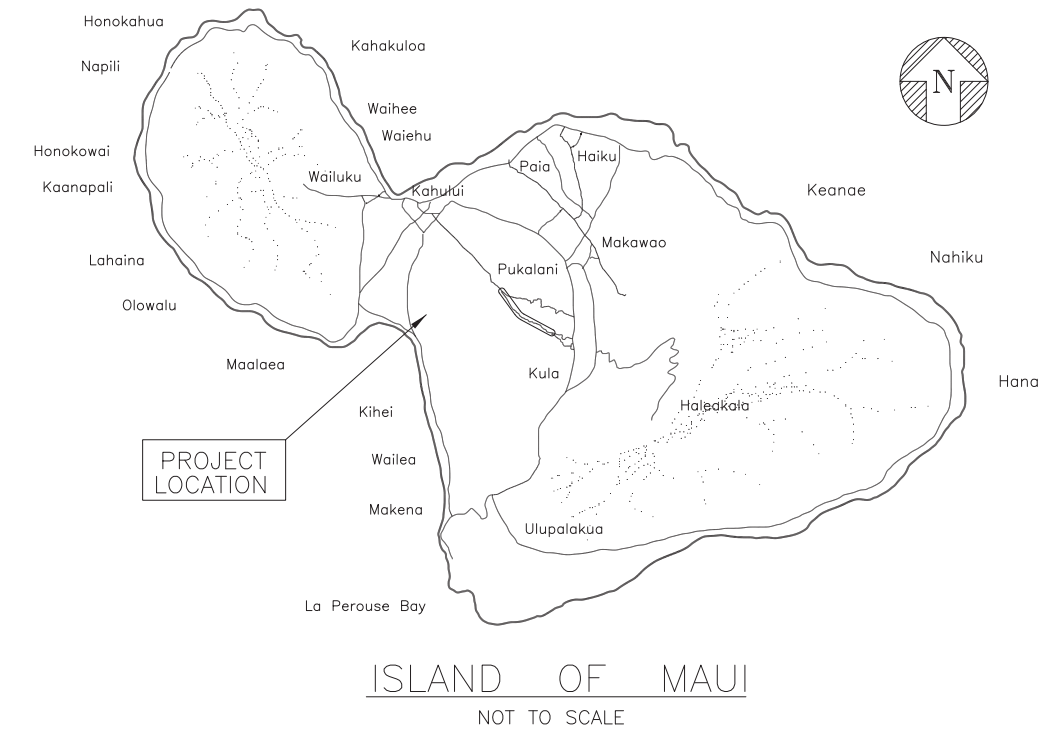
## 5.0 EXHIBITS

- A. TITLE SHEET WITH LOCATION AND VICINITY MAP
- B. PRELIMINARY SITE PLAN
- C. CONSTRUCTION DRAWINGS FOR WASTEWATER TREATMENT PLANT
- D. LIFT STATIONS DETAILS

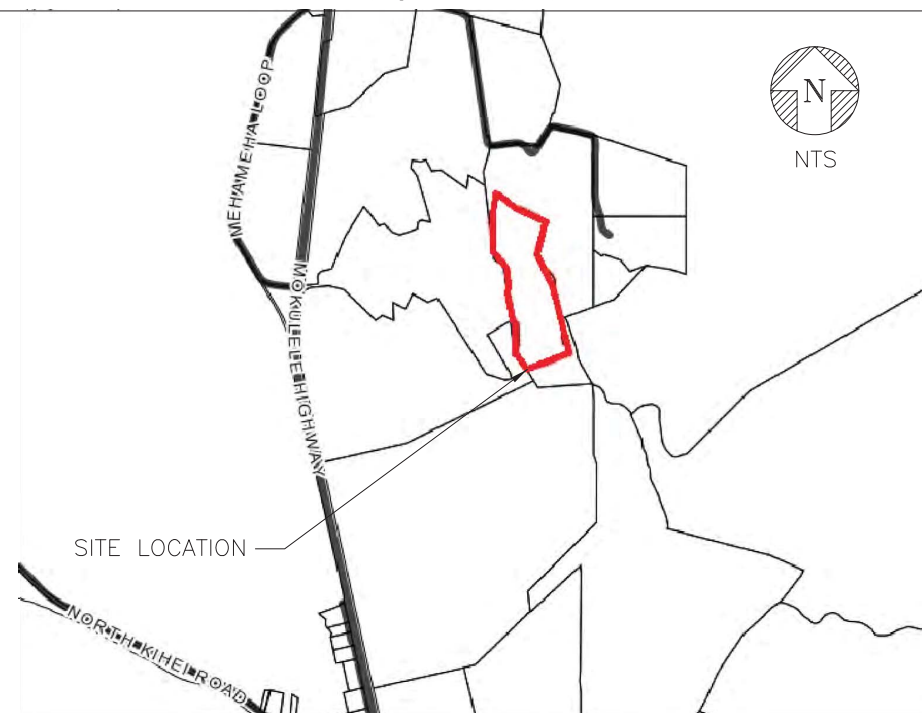
# CONSTRUCTION PLANS FOR: VALLEY ISLE PUMPING WWTP OFF MOKULELE HWY PU'UNENE, MAUI, HAWAII TMK: (2) 3-8-104:017

PREPARED FOR: Valley Isle Pumping  
291 Lower Kula Rd., Pukalani, HI 96768  
(808) 878-8807

PREPARED BY: CDF Engineering, LLC  
P.O. Box 2985, Wailuku, HI 96793  
Phone: (808) 891-2400  
Email: info@cdfengineers.com

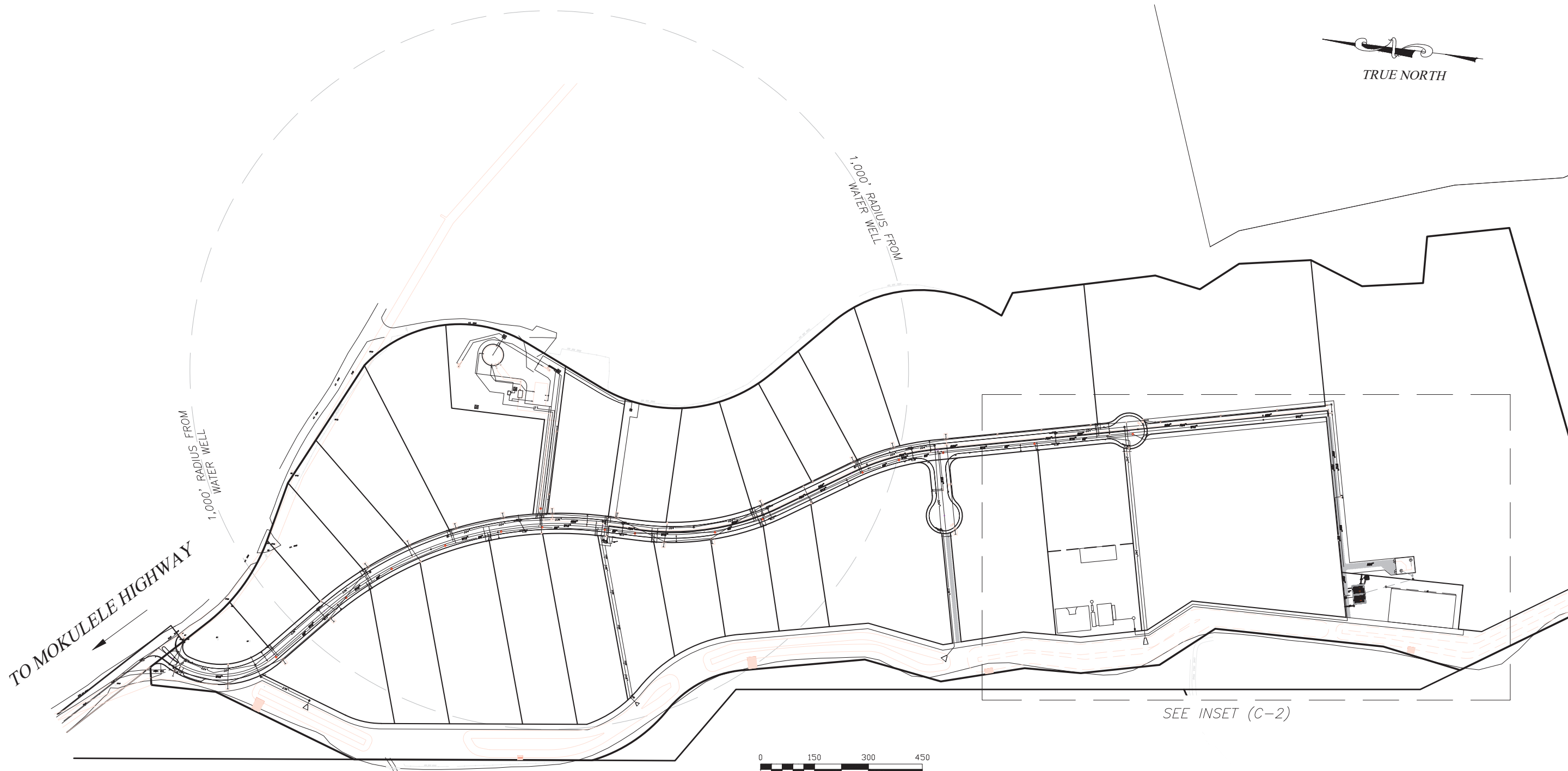


VICINITY MAP




INDEX OF DRAWING

SHEET	DESCRIPTION
T-1	TITLE SHEET
C-1	SITE PLAN
C-2	SITE PLAN INSET
C-3	PLAN LAYOUT
C-4	ELEVATION LAYOUT
C-5	ELEVATION VIEW A2-A4
C-6	SECTION VIEW B2-B5
C-7	SECTION VIEW C2-C6
C-8	SECTION VIEW D2-D7
C-9	SECTION VIEW E2-E8
C-10	FOUNDATION PAD DETAIL
C-11	HANDRAIL LAYOUT
C-12	GRATING LAYOUT
C-13	PROCESS FLOW DIAGRAM
C-14	LEACH FIELD DETAILS
C-15	LIFT STATION DETAILS

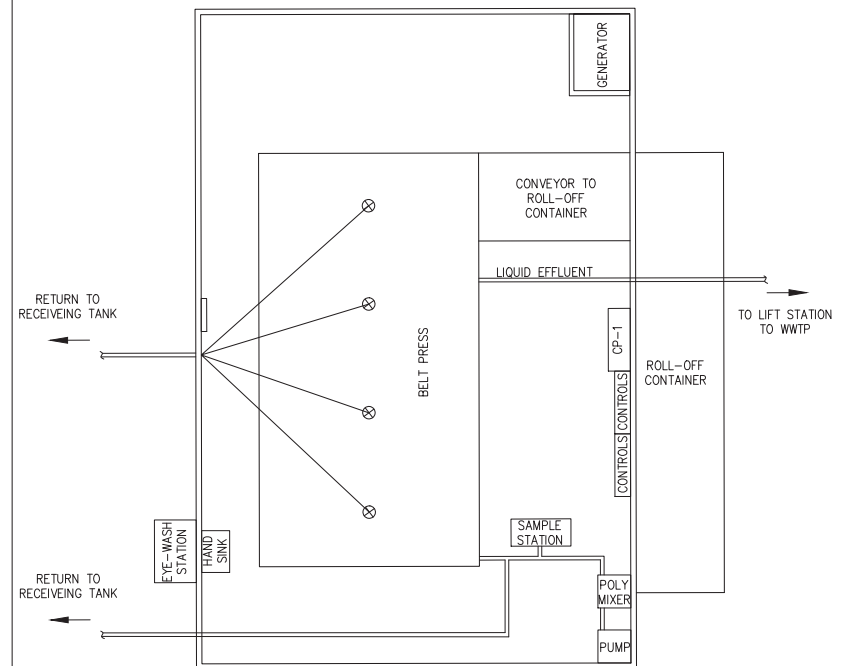
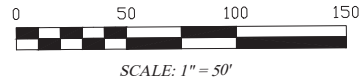
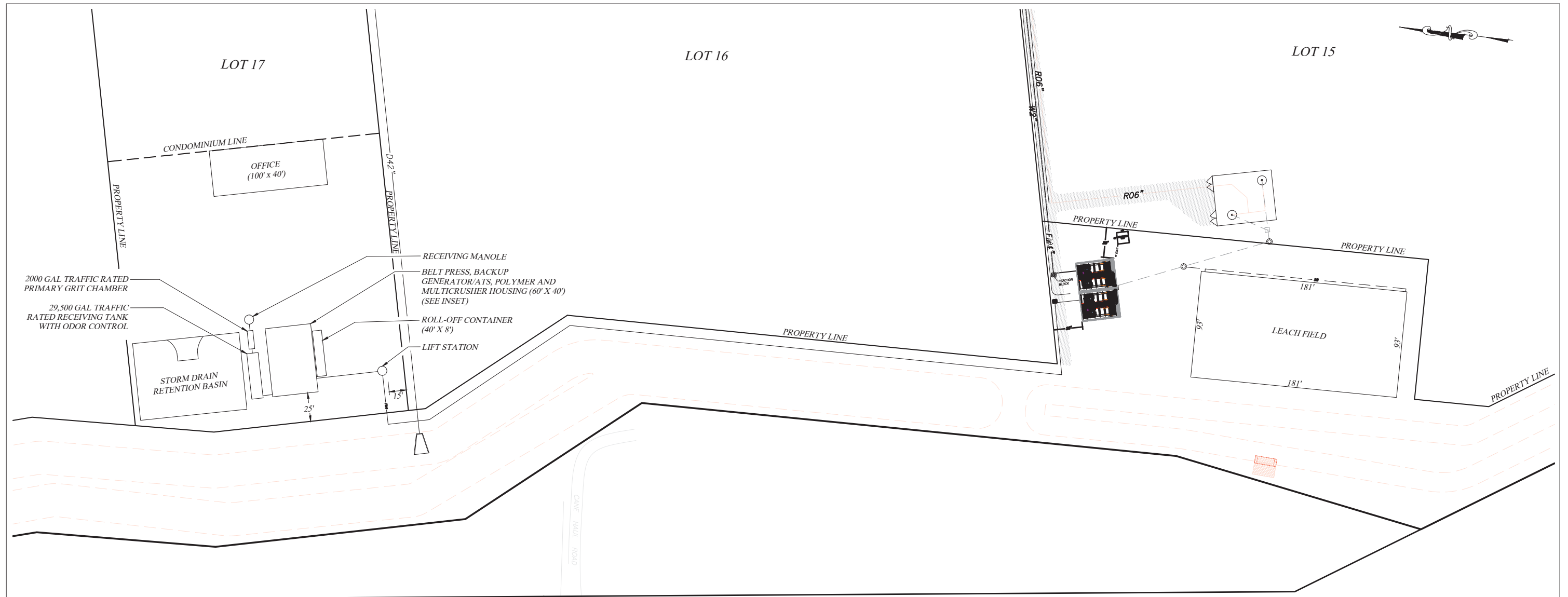


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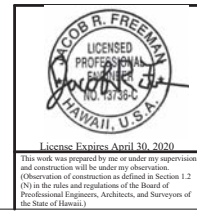
  
 JACOB R. FREEMAN  
 LICENSED PROFESSIONAL ENGINEER  
 No. 43749-C  
 HAWAII, U.S.A.  
License Expires April 30, 2020  
 This work was prepared by me or under my supervision and construction will be under my observation.  
 (Observation of construction as defined in Section 1.2 (7)) in the rules and regulations of the Board of Professional Engineers, Architects, and Surveyors of the State of Hawaii.

  
 CIVIL ENGINEERING & LANDSCAPE ARCHITECTURE CONSULTANTS

**CDF Engineering LLC**  
 PO BOX 2985  
 WAILUKU, HI 96793  
 PHONE: (808) 891-2400  
**PAAA SUBDIVISION WWTP**  
 OFF MOKULELE HIGHWAY  
 PU'UNENE, MAUI, HAWAII  
 SCALE: 1" = 150'  
 06-20-2019  
 TMK: (2) 3-8-104-030  
 DWG No: C-1



HOUSING INSET  
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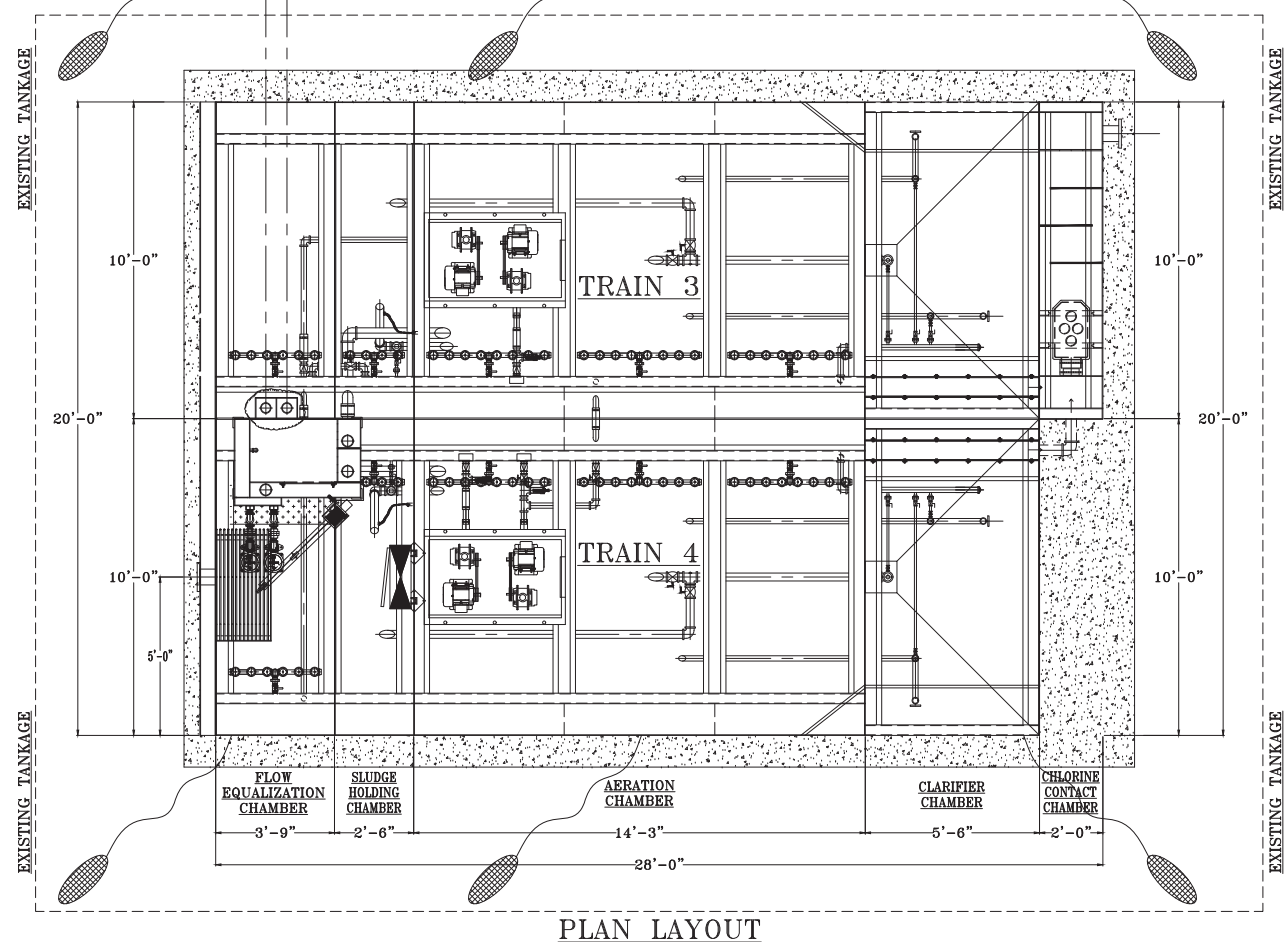
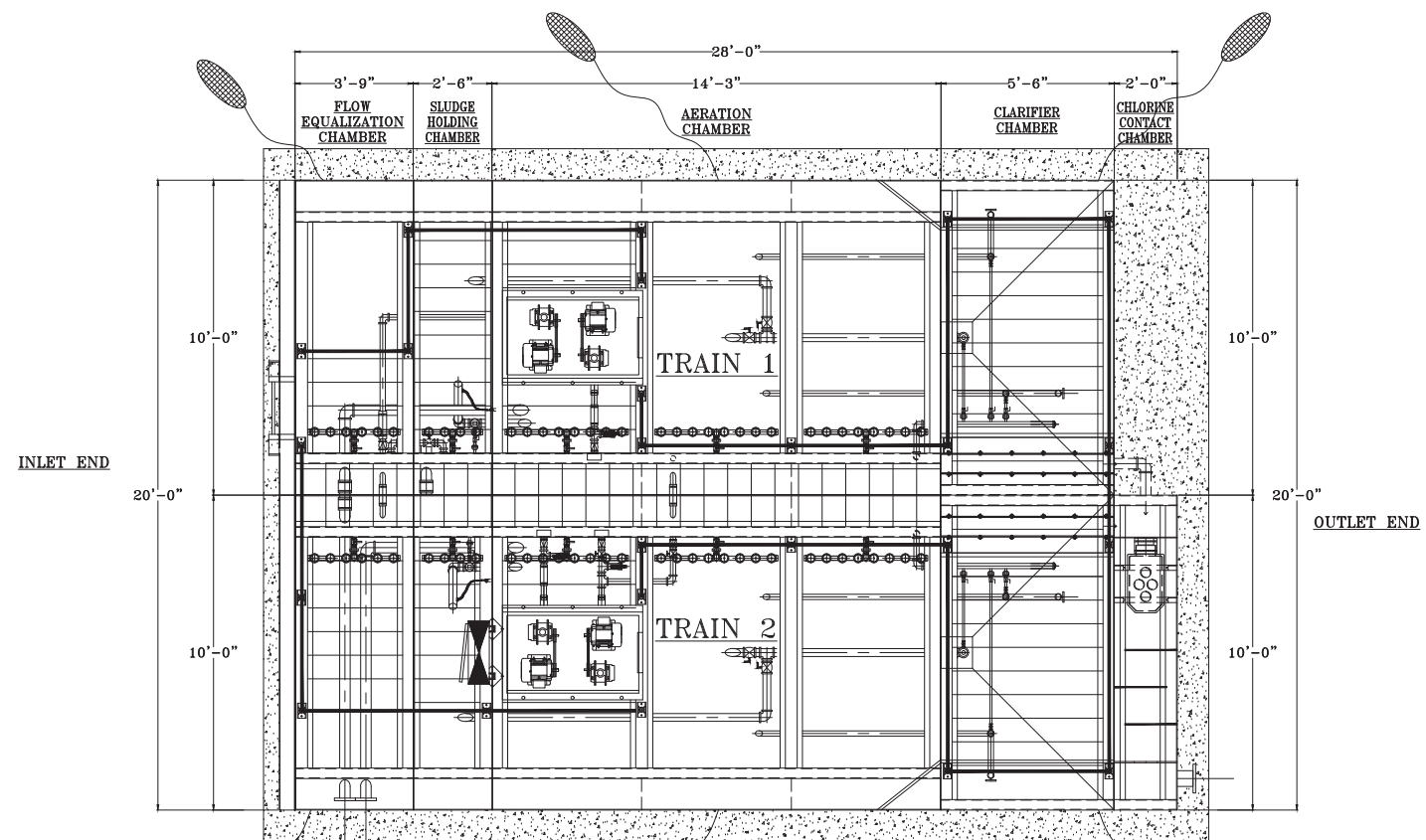


**CDF Engineering LLC**  
 PO BOX 2985  
 WAILUKU, HI 96793  
 PHONE: (808) 891-2400

**PAAA SUBDIVISION WWTP**  
 OFF MOKULELE HIGHWAY  
 PU'UNENE, MAUI, HAWAII

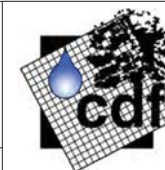
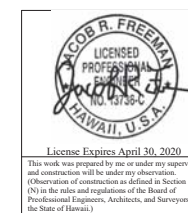
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 06-20-2019  
 TMK: (2) 3-8-104-030

**SITE PLAN INSET**  
 DWG No: C-2



PLAN LAYOUT

DESCRIPTION	DESIGN FLOW	FLOW EQUALIZATION CHAMBER	SLUDGE HOLDING CHAMBER	AERATION CHAMBERS	CLARIFIER CHAMBER	CHLORINE CONTACT CHAMBER
TOTAL	20,000 GPD	5,034 GAL	--	--	--	417 GAL
TRAIN 1	10,000 GPD	SHARED W/ TRAIN 2	1,757 GAL	10,019 GAL	1,667 GAL	SHARED W/ TRAIN 2
TRAIN 2	10,000 GPD	SHARED W/ TRAIN 1	1,757 GAL	10,019 GAL	1,667 GAL	SHARED W/ TRAIN 1
TOTAL	20,000 GPD	5,034 GAL	--	--	--	417 GAL
TRAIN 3	10,000 GPD	SHARED W/ TRAIN 4	1,757 GAL	10,019 GAL	1,667 GAL	SHARED W/ TRAIN 4
TRAIN 4	10,000 GPD	SHARED W/ TRAIN 3	1,757 GAL	10,019 GAL	1,667 GAL	SHARED W/ TRAIN 3
WWTP TOTAL	40,000 GPD	10,068 GAL	--	--	--	834 GAL



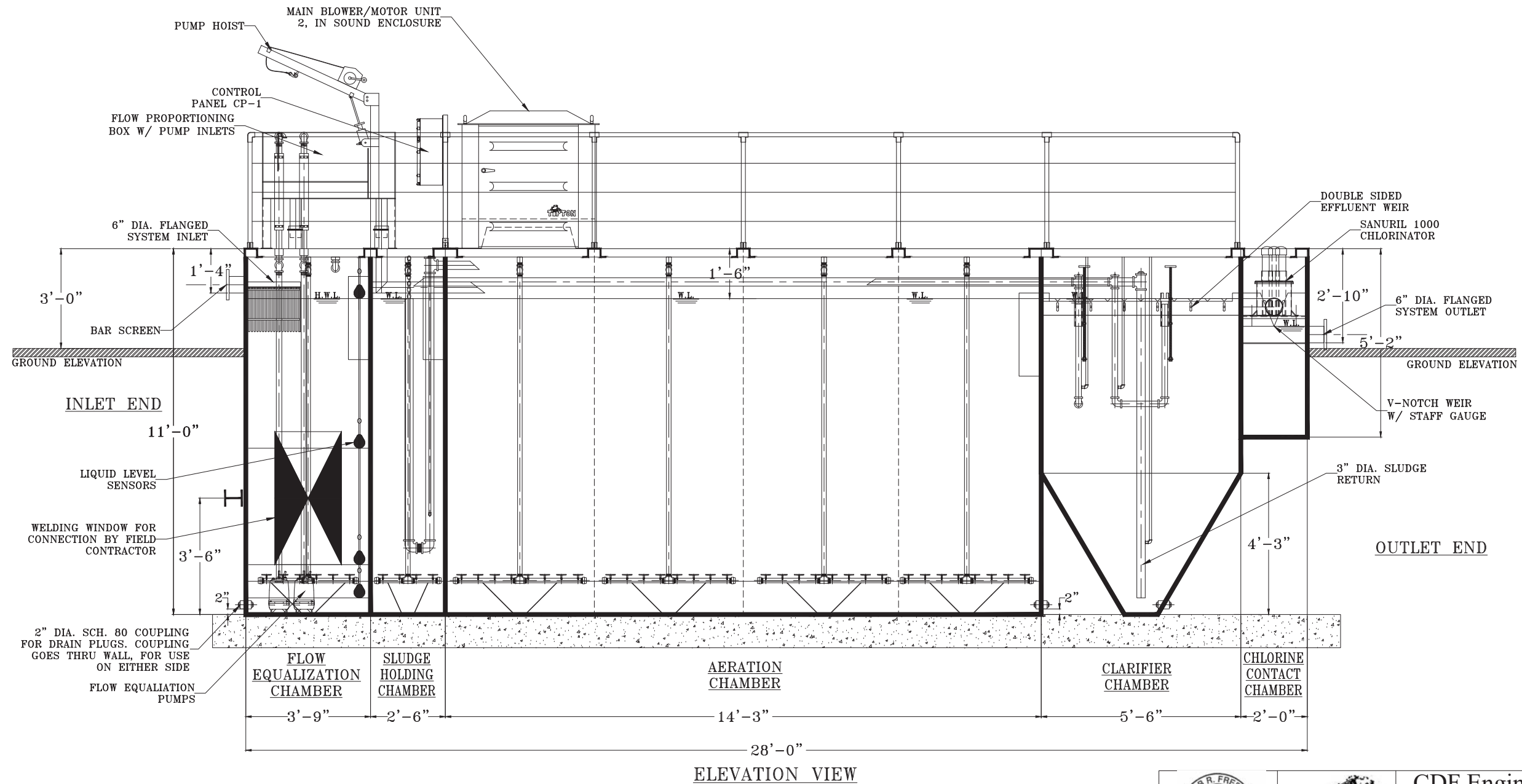
**CDF Engineering LLC**  
 PO BOX 2985  
 WAILUKU, HI 96793  
 PHONE: (808) 891-2400

**PUAA SUBDIVISION WWTP**  
 OFF MOKULELE HIGHWAY  
 PU'UNENE, MAUI, HAWAII

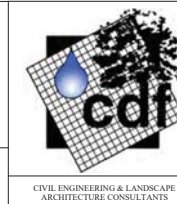
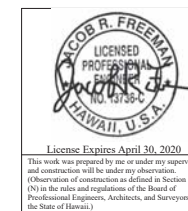
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 06-20-2019 TMK: (2) 3-8-104-030

DWG No.: C-3

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TOTAL	20,000 GPD	5,034 GAL	--	--	--	417 GAL
TRAIN 1	10,000 GPD	SHARED W/ TRAIN 2	1,757 GAL	10,019 GAL	1,667 GAL	SHARED W/ TRAIN 2
TRAIN 2	10,000 GPD	SHARED W/ TRAIN 1	1,757 GAL	10,019 GAL	1,667 GAL	SHARED W/ TRAIN 1
TOTAL	20,000 GPD	5,034 GAL	--	--	--	417 GAL
TRAIN 3	10,000 GPD	SHARED W/ TRAIN 4	1,757 GAL	10,019 GAL	1,667 GAL	SHARED W/ TRAIN 4
TRAIN 4	10,000 GPD	SHARED W/ TRAIN 3	1,757 GAL	10,019 GAL	1,667 GAL	SHARED W/ TRAIN 3
WWTP TOTAL	40,000 GPD	10,068 GAL	--	--	--	834 GAL



ELEVATION VIEW



CDF Engineering LLC

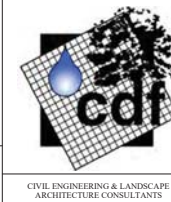
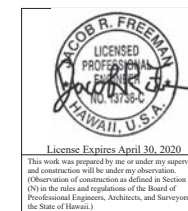
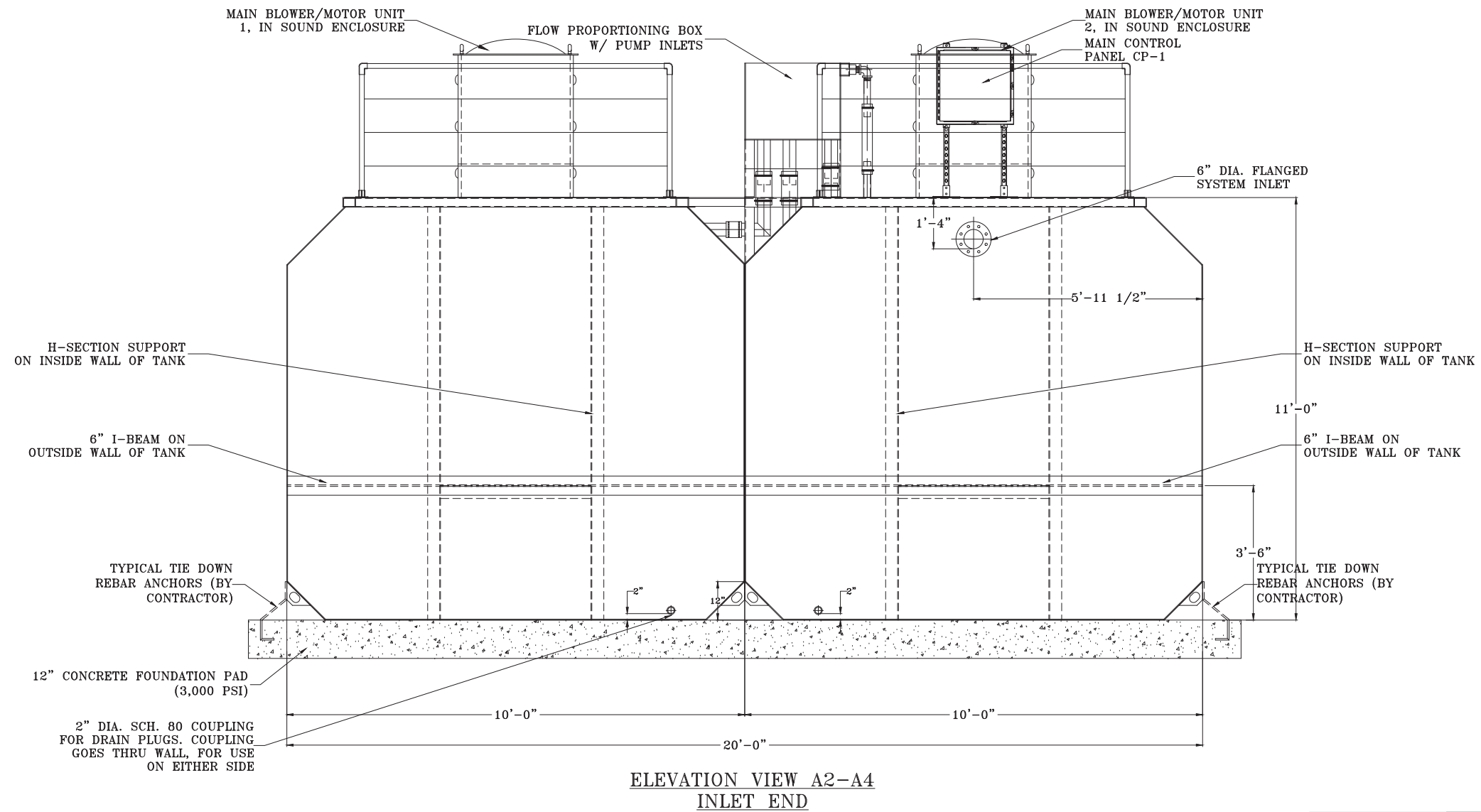
PO BOX 2985  
WAILUKU, HI 96793  
PHONE: (808) 891-2400

PUAA SUBDIVISION WWTP  
OFF MOKULELE HIGHWAY  
PU'UNENE, MAUI, HAWAII

Scale:	NTS	ELEVATION LAYOUT	DWG No.:
			C-4
06-20-2019		TMK: (2) 3-8-104-030	



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TOTAL	20,000 GPD	5,034 GAL	--	--	--	417 GAL
TRAIN 1	10,000 GPD	SHARED W/ TRAIN 2	1,757 GAL	10,019 GAL	1,667 GAL	SHARED W/ TRAIN 2
TRAIN 2	10,000 GPD	SHARED W/ TRAIN 1	1,757 GAL	10,019 GAL	1,667 GAL	SHARED W/ TRAIN 1
TOTAL	20,000 GPD	5,034 GAL	--	--	--	417 GAL
TRAIN 3	10,000 GPD	SHARED W/ TRAIN 4	1,757 GAL	10,019 GAL	1,667 GAL	SHARED W/ TRAIN 4
TRAIN 4	10,000 GPD	SHARED W/ TRAIN 3	1,757 GAL	10,019 GAL	1,667 GAL	SHARED W/ TRAIN 3
WWTP TOTAL	40,000 GPD	10,068 GAL	--	--	--	834 GAL



**CDF Engineering LLC**

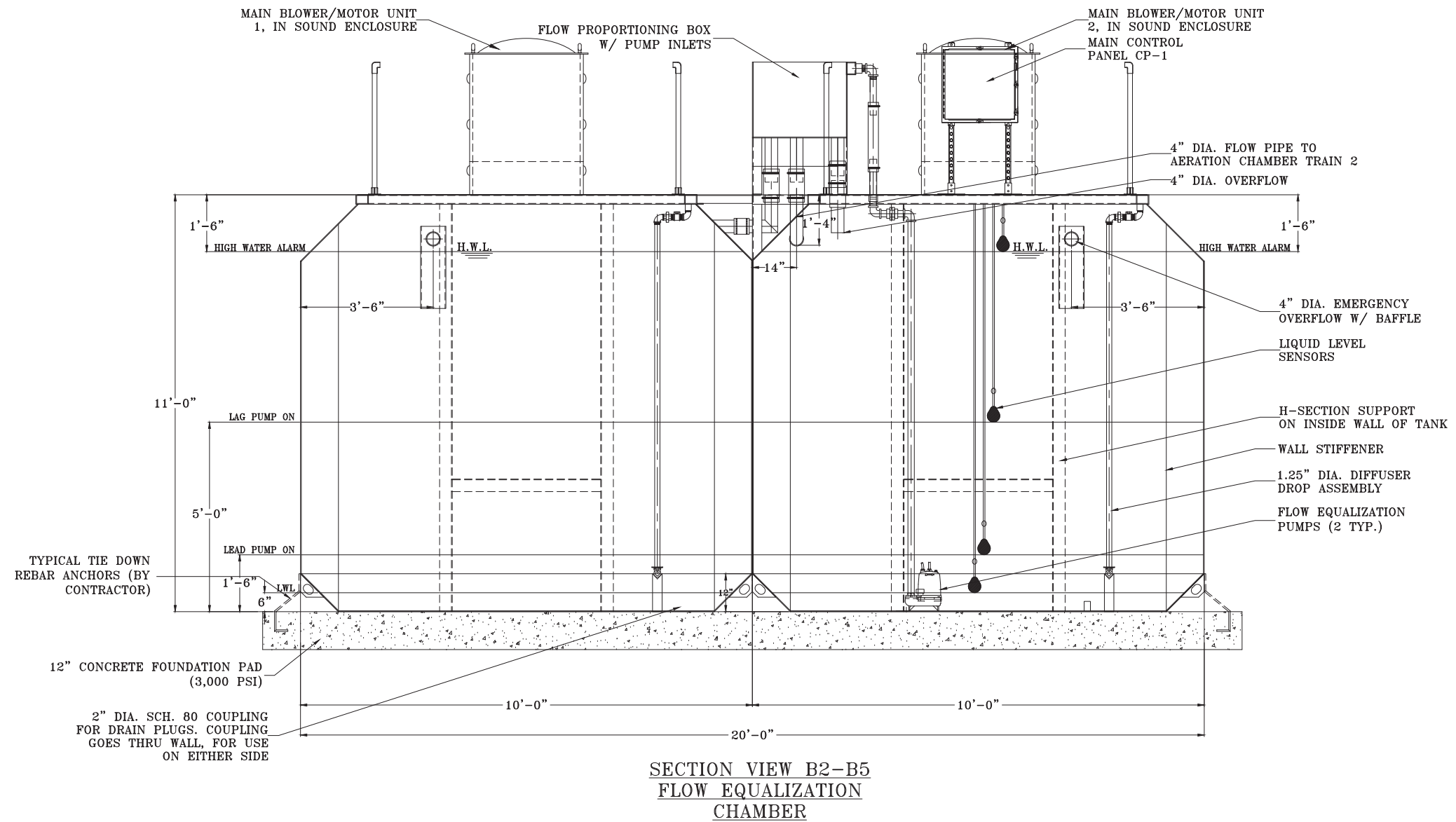
PO BOX 2985  
WAILUKU, HI 96793  
PHONE: (808) 891-2400

**PUAA SUBDIVISION WWTP**  
OFF MOKULELE HIGHWAY  
PU'UNENE, MAUI, HAWAII

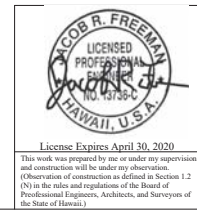
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TOTAL	20,000 GPD	5,034 GAL	--	--	--	417 GAL
TRAIN 1	10,000 GPD	SHARED W/ TRAIN 2	1,757 GAL	10,019 GAL	1,667 GAL	SHARED W/ TRAIN 2
TRAIN 2	10,000 GPD	SHARED W/ TRAIN 1	1,757 GAL	10,019 GAL	1,667 GAL	SHARED W/ TRAIN 1
TOTAL	20,000 GPD	5,034 GAL	--	--	--	417 GAL
TRAIN 3	10,000 GPD	SHARED W/ TRAIN 4	1,757 GAL	10,019 GAL	1,667 GAL	SHARED W/ TRAIN 4
TRAIN 4	10,000 GPD	SHARED W/ TRAIN 3	1,757 GAL	10,019 GAL	1,667 GAL	SHARED W/ TRAIN 3
WWTP TOTAL	40,000 GPD	10,068 GAL	--	--	--	834 GAL



SECTION VIEW B2-B5  
FLOW EQUALIZATION  
CHAMBER



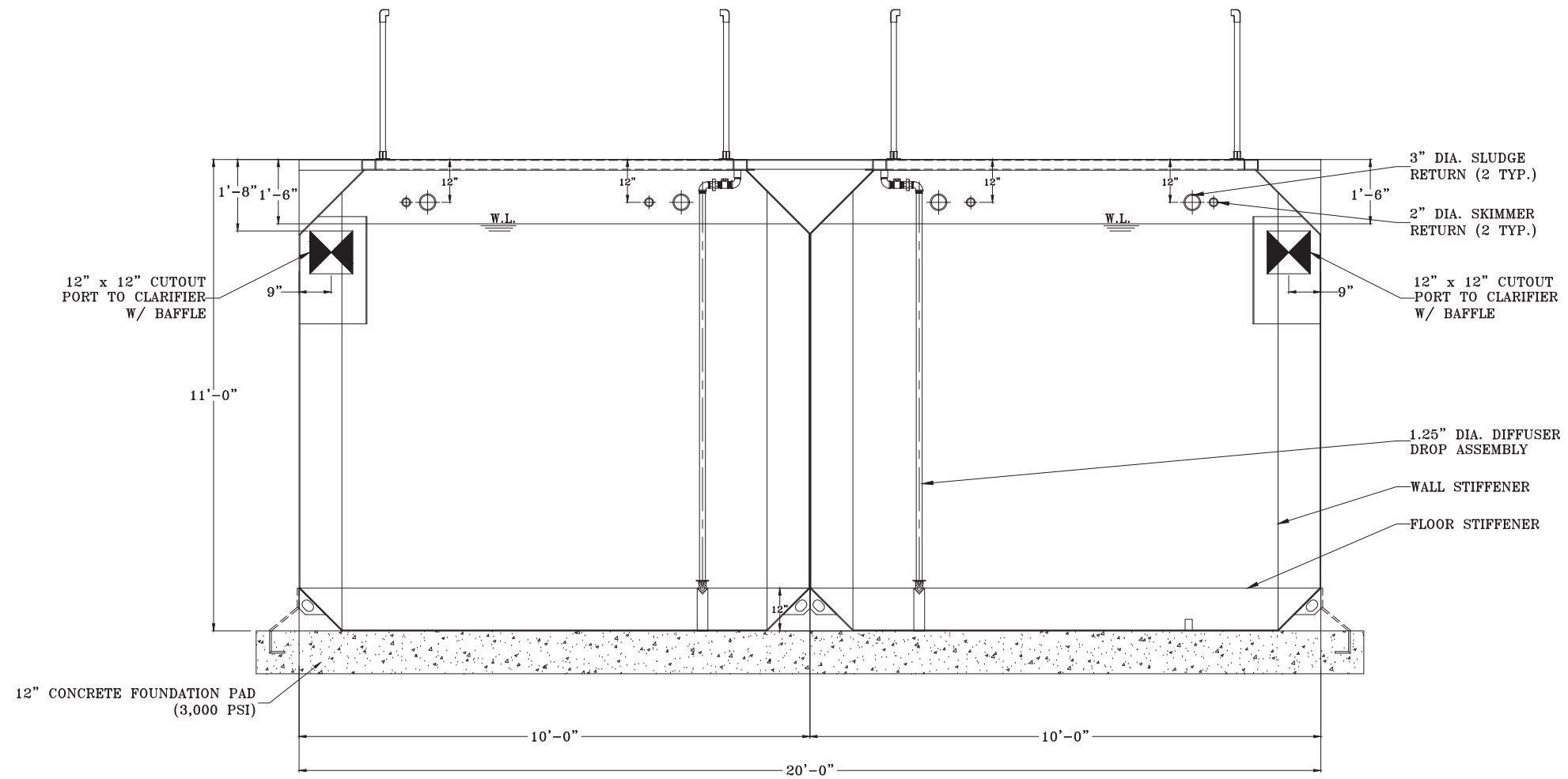
**CDF Engineering LLC**  
 PO BOX 2985  
 WAILUKU, HI 96793  
 PHONE: (808) 891-2400

**PUA SUBDIVISION WWTP**  
 OFF MOKULELE HIGHWAY  
 PU'UNENE, MAUI, HAWAII

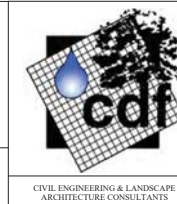
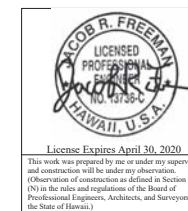
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TOTAL	20,000 GPD	5,034 GAL	--	--	--	417 GAL
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TRAIN 4	10,000 GPD	SHARED W/ TRAIN 3	1,757 GAL	10,019 GAL	1,667 GAL	SHARED W/ TRAIN 3
WWTP TOTAL	40,000 GPD	10,068 GAL	--	--	--	834 GAL



SECTION VIEW C2-C6  
AERATION  
CHAMBER



CDF Engineering LLC

PO BOX 2985  
WAILUKU, HI 96793  
PHONE: (808) 891-2400

PUAA SUBDIVISION WWTP  
OFF MOKULELE HIGHWAY  
PU'UNENE, MAUI, HAWAII

Scale: NTS

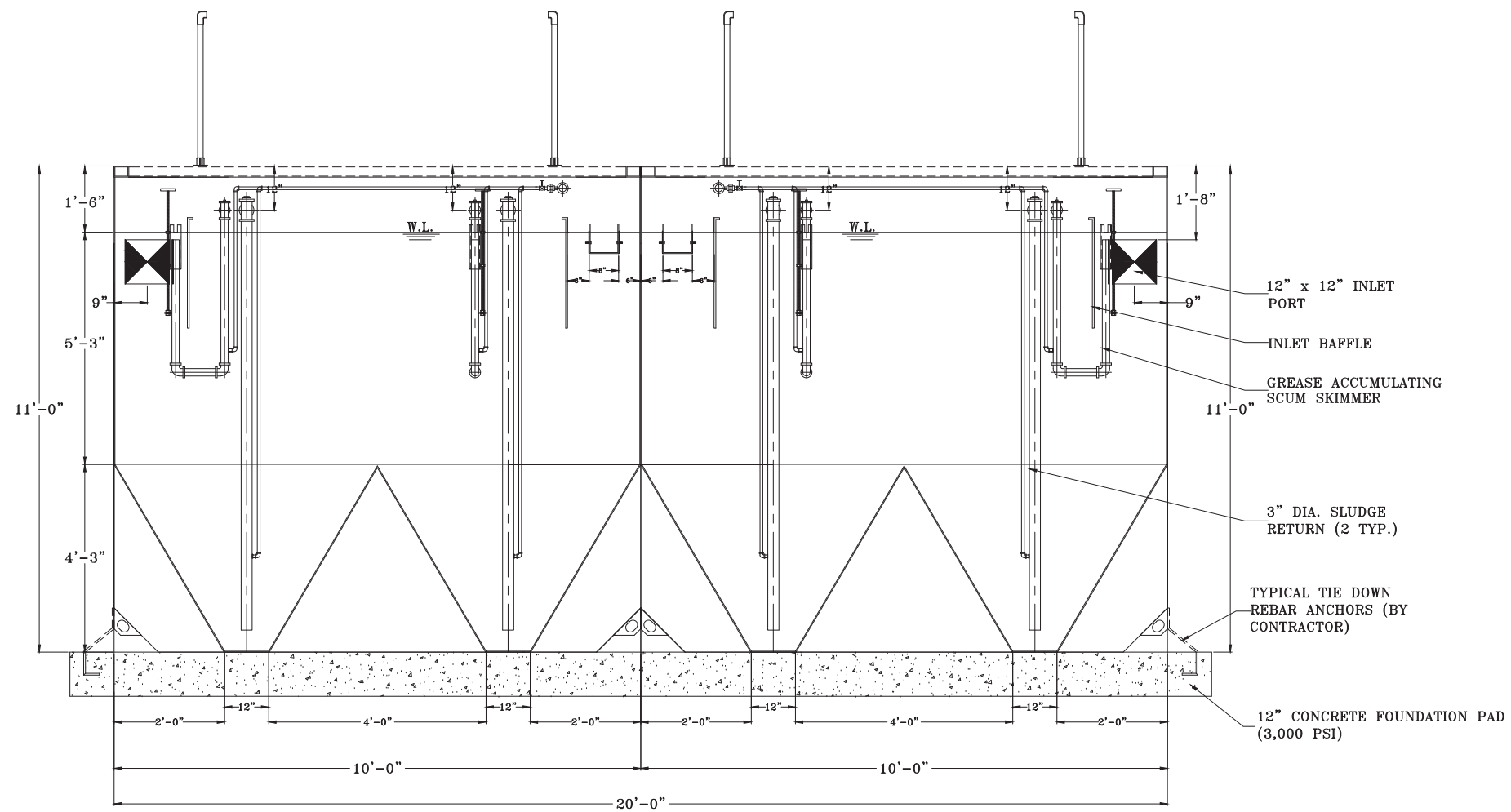
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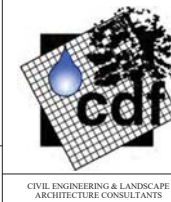
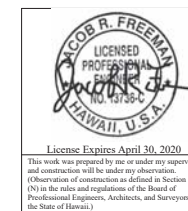
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TMK: (2) 3-8-104-030

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TOTAL	20,000 GPD	5,034 GAL	--	--	--	417 GAL
TRAIN 1	10,000 GPD	SHARED W/ TRAIN 2	1,757 GAL	10,019 GAL	1,667 GAL	SHARED W/ TRAIN 2
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TRAIN 4	10,000 GPD	SHARED W/ TRAIN 3	1,757 GAL	10,019 GAL	1,667 GAL	SHARED W/ TRAIN 3
WWTP TOTAL	40,000 GPD	10,068 GAL	--	--	--	834 GAL



SECTION VIEW D2-D7  
CLARIFIER  
CHAMBER



CDF Engineering LLC

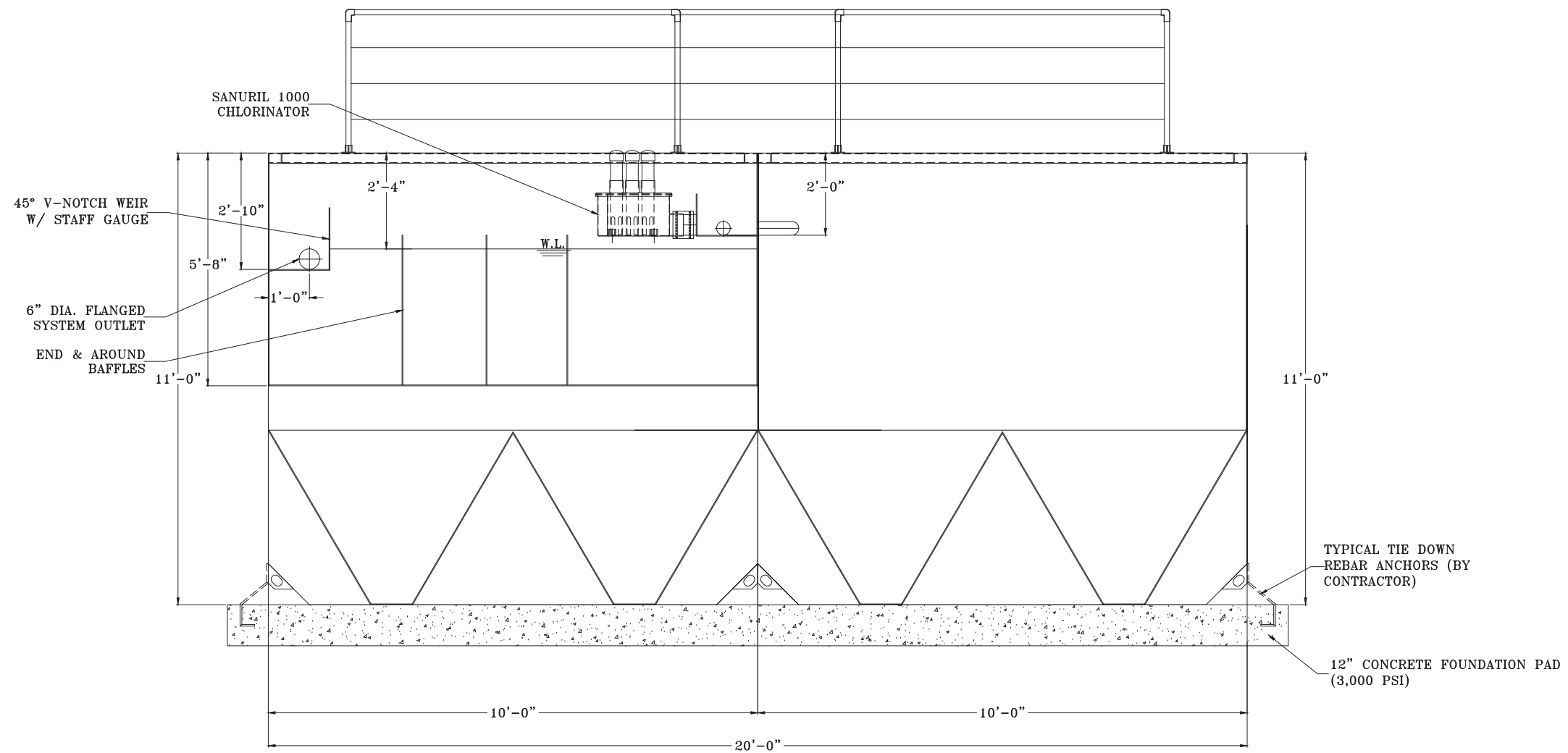
PO BOX 2985  
WAILUKU, HI 96793  
PHONE: (808) 891-2400

PUAA SUBDIVISION WWTP  
OFF MOKULELE HIGHWAY  
PU'UNENE, MAUI, HAWAII

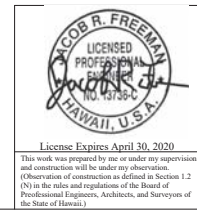
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06-20-2019 TMK: (2) 3-8-104-030

DESCRIPTION	DESIGN FLOW	FLOW EQUALIZATION CHAMBER	SLUDGE HOLDING CHAMBER	AERATION CHAMBERS	CLARIFIER CHAMBER	CHLORINE CONTACT CHAMBER
TOTAL	20,000 GPD	5,034 GAL	--	--	--	417 GAL
TRAIN 1	10,000 GPD	SHARED W/ TRAIN 2	1,757 GAL	10,019 GAL	1,667 GAL	SHARED W/ TRAIN 2
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TRAIN 4	10,000 GPD	SHARED W/ TRAIN 3	1,757 GAL	10,019 GAL	1,667 GAL	SHARED W/ TRAIN 3
WWTP TOTAL	40,000 GPD	10,068 GAL	--	--	--	834 GAL



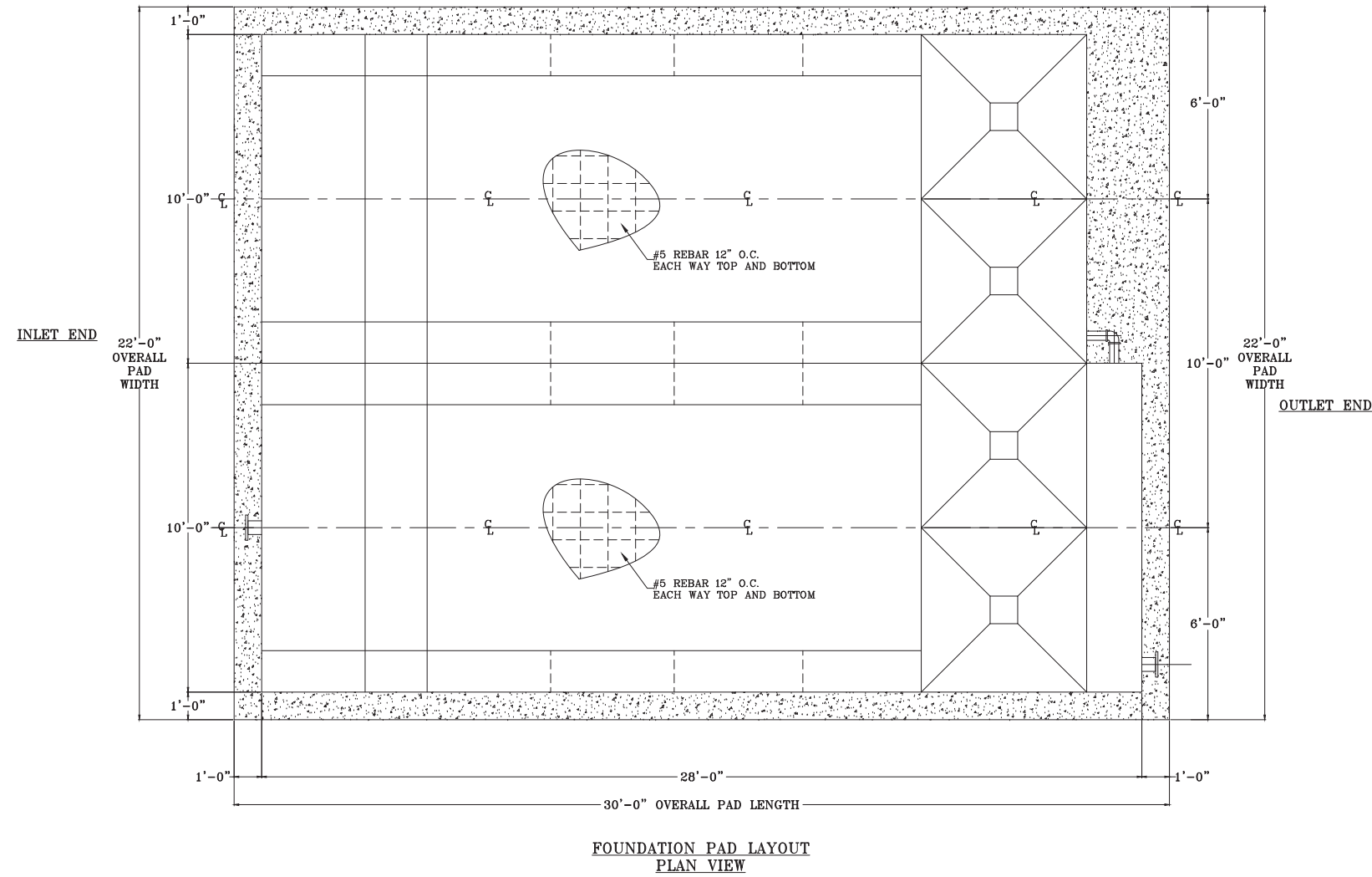
SECTION VIEW E2-E8  
CHLORINE CONTACT  
CHAMBER



**CDF Engineering LLC**  
 PO BOX 2985  
 WAILUKU, HI 96793  
 PHONE: (808) 891-2400  
**PUAA SUBDIVISION WWTP**  
 OFF MOKULELE HIGHWAY  
 PU'UNENE, MAUI, HAWAII

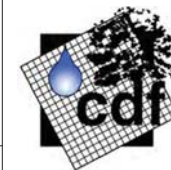
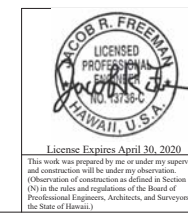
Scale: NTS SECTION VIEW E2-E8 DWG No: C-9  
 06-20-2019 TMK: (2) 3-8-104-030

DESCRIPTION	DESIGN FLOW	FLOW EQUALIZATION CHAMBER	SLUDGE HOLDING CHAMBER	AERATION CHAMBERS	CLARIFIER CHAMBER	CHLORINE CONTACT CHAMBER
TOTAL	20,000 GPD	5,034 GAL	--	--	--	417 GAL
TRAIN 1	10,000 GPD	SHARED W/ TRAIN 2	1,757 GAL	10,019 GAL	1,667 GAL	SHARED W/ TRAIN 2
TRAIN 2	10,000 GPD	SHARED W/ TRAIN 1	1,757 GAL	10,019 GAL	1,667 GAL	SHARED W/ TRAIN 1
TOTAL	20,000 GPD	5,034 GAL	--	--	--	417 GAL
TRAIN 3	10,000 GPD	SHARED W/ TRAIN 4	1,757 GAL	10,019 GAL	1,667 GAL	SHARED W/ TRAIN 4
TRAIN 4	10,000 GPD	SHARED W/ TRAIN 3	1,757 GAL	10,019 GAL	1,667 GAL	SHARED W/ TRAIN 3
WWTP TOTAL	40,000 GPD	10,068 GAL	--	--	--	834 GAL



NOTES:

1. THICKNESS OF CONCRETE PAD TO BE 12".
2. MINIMUM 3,500 PSI CONCRETE TO BE USED.



**CDF Engineering LLC**

PO BOX 2985  
WAILUKU, HI 96793  
PHONE: (808) 891-2400

**PUAA SUBDIVISION WWTP**  
OFF MOKULELE HIGHWAY  
PU'UNENE, MAUI, HAWAII

Scale: NTS

FOUNDATION PAD DETAIL

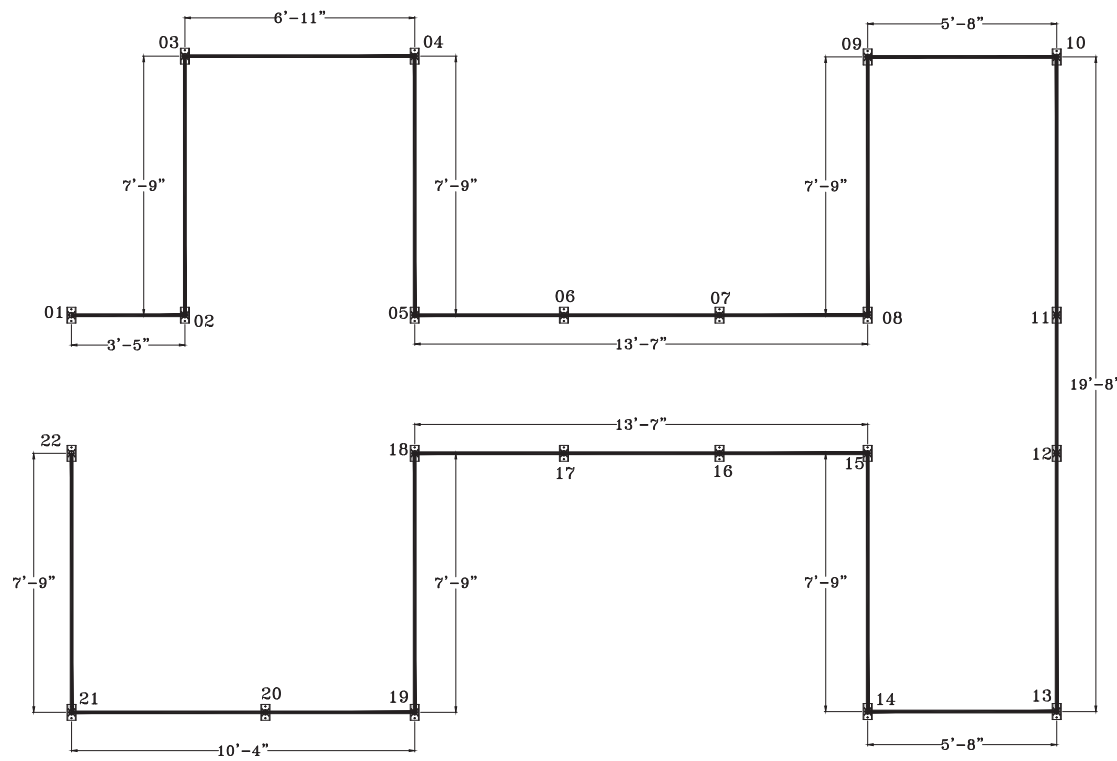
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06-20-2019

TMK: (2) 3-8-104-030

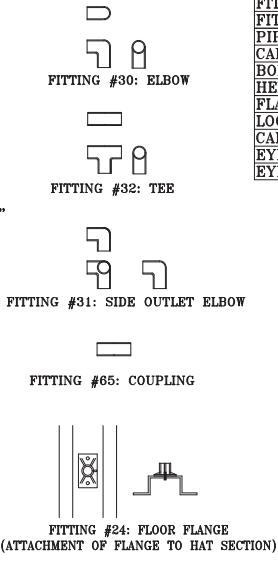
CIVIL ENGINEERING & LANDSCAPE ARCHITECTURE CONSULTANTS

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WWTP TOTAL	40,000 GPD	10,068 GAL	--	--	--	834 GAL



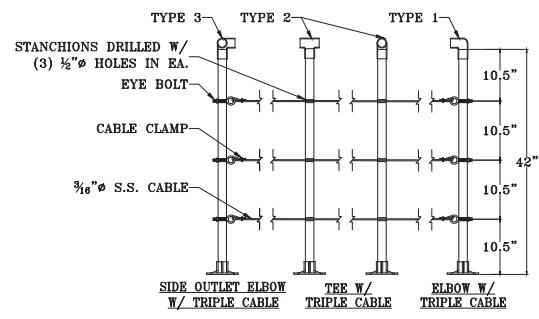
**HANDRAIL LAYOUT**  
 140' OF TOPRAIL  
 100' OF UPRIGHTS  
 240' TOTAL PIPE NEEDED

**FITTINGS CHART**

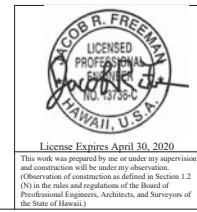


ITEM	QTY.	DESCRIPTION
FIT. 24	22	FLOOR FLANGE, 1.25"Ø, ALUMINUM
FIT. 30	2	90° ELBOW, 1.25"Ø, ALUMINUM
FIT. 31	13	SIDE OUTLET ELBOW, 1.25"Ø, ALUMINUM
FIT. 32	7	TEE, 1.25"Ø, ALUMINUM
FIT. 65	3	COUPLING, 1.25"Ø, ALUMINUM
PIPE	240'	1.25"Ø (1.625" O.D.), ALUMINUM
CABLE	420'	3/16"Ø, STAINLESS STEEL CABLE
BOLT	44	3/8"Ø, STAINLESS STEEL, FULLY THREADED
HEX NUT	44	3/8"Ø, STAINLESS STEEL
FLAT WASHER	88	3/8"Ø, STAINLESS STEEL
LOCK WASHER	44	3/8"Ø, STAINLESS STEEL
CABLE CLAMP	6	3/16"Ø, STAINLESS STEEL CABLE CLAMP
EYE BOLT	6	3/8" x 2.5" LONG, S.S. EYE BOLT
EYE BOLT NUT	6	3/8"Ø, STAINLESS STEEL, HEX NUT

HR #	FITTINGS	HEIGHT	TYPE
01	24, 30	42"	1
02	24, 31	42"	3
03	24, 31	42"	3
04	24, 31	42"	3
05	24, 31	42"	3
06	24, 32	42"	2
07	24, 32	42"	2
08	24, 31	42"	3
09	24, 31	42"	3
10	24, 31	42"	3
11	24, 32	42"	2
12	24, 32	42"	2
13	24, 31	42"	3
14	24, 31	42"	3
15	24, 31	42"	3
16	24, 32	42"	2
17	24, 32	42"	2
18	24, 31	42"	3
19	24, 31	42"	3
20	24, 32	42"	2
21	24, 31	42"	3
22	24, 30	42"	1



**STANDARD SERVICE HANDRAIL TYPES**



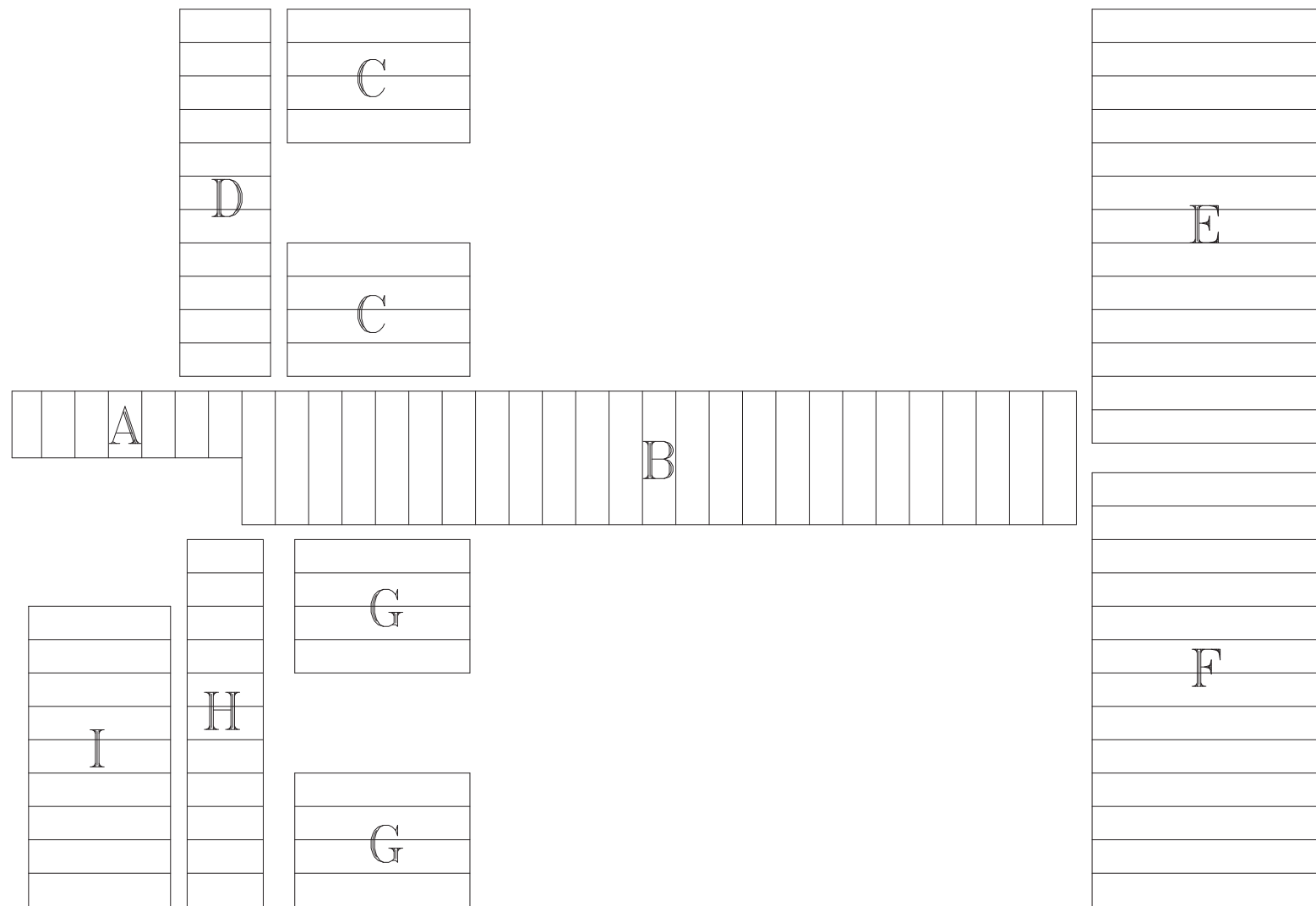
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 PO BOX 2985  
 WAILUKU, HI 96793  
 PHONE: (808) 891-2400

**PUA SUBDIVISION WWTP**  
 OFF MOKULELE HIGHWAY  
 PU'UNENE, MAUI, HAWAII

Scale: NTS HANDRAIL LAYOUT DWG No.: C-11

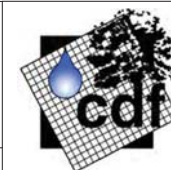
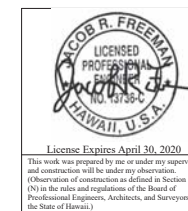
06-20-2019 TMK: (2) 3-8-104-030

DESCRIPTION	DESIGN FLOW	FLOW EQUALIZATION CHAMBER	SLUDGE HOLDING CHAMBER	AERATION CHAMBERS	CLARIFIER CHAMBER	CHLORINE CONTACT CHAMBER
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TRAIN 4	10,000 GPD	SHARED W/ TRAIN 3	1,757 GAL	10,019 GAL	1,667 GAL	SHARED W/ TRAIN 3
WWTP TOTAL	40,000 GPD	10,068 GAL	--	--	--	834 GAL



**GRATING LAYOUT**  
**380' LINEAL FEET NEEDED**

BILL OF MATERIALS		
AREA	QUANTITY	LENGTH
A	7	18.00"
B	25	34.50"
C	8	49.25"
D	11	24.25"
E	13	63.25"
F	13	63.25"
G	8	49.25"
H	11	24.25"
I	9	38.25"
H	7	47.50"
I	11	29.00"



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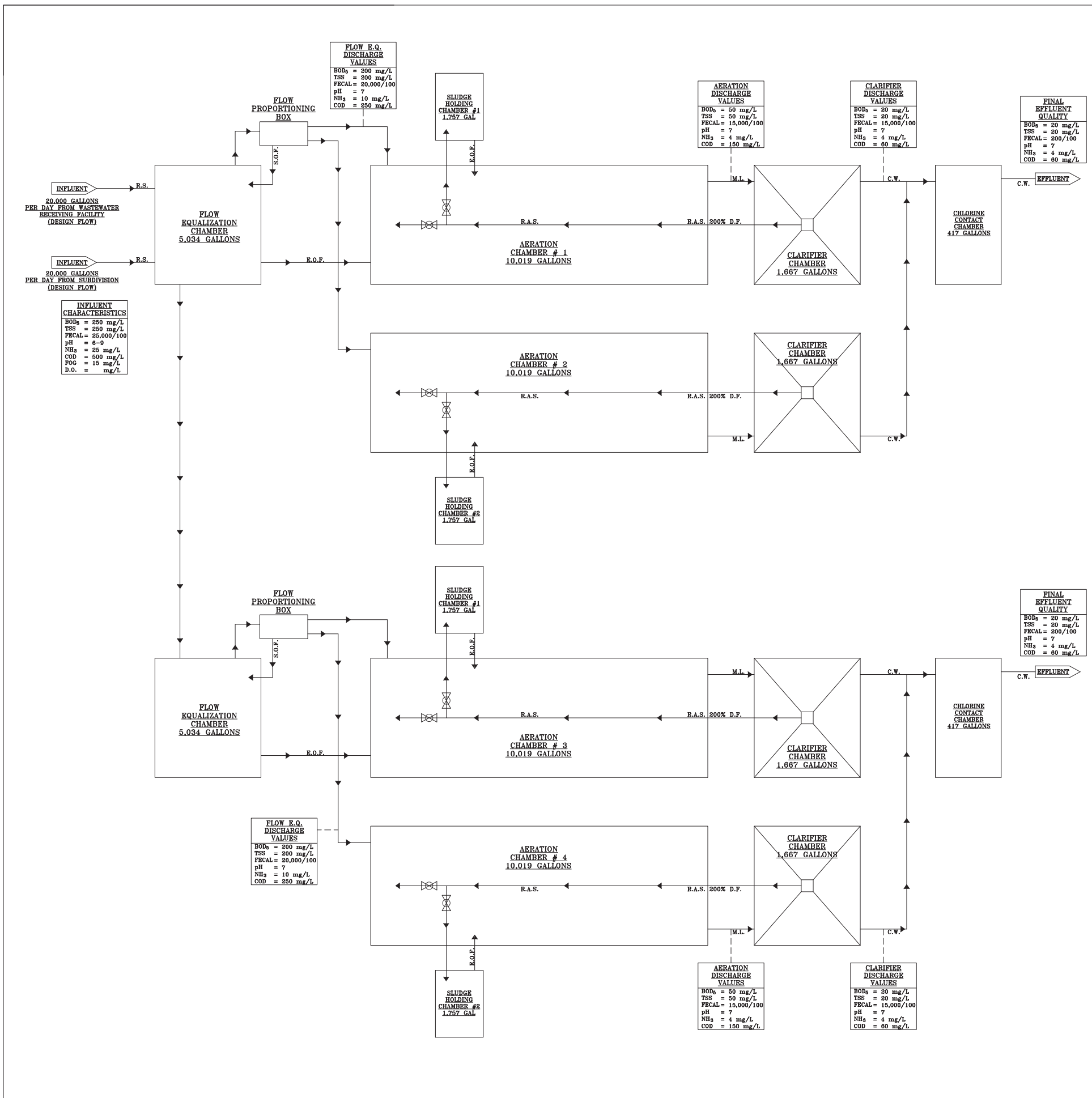
Scale:	NTS	GRATING LAYOUT	DWG No:
			C-12

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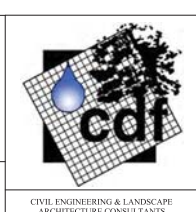
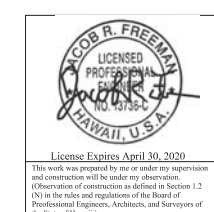


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WWTP TOTAL	40,000 GPD	10,068 GAL	--	--	--	834 GAL

**LEGEND**

MAIN FLOW THROUGH WASTE WATER TREATMENT SYSTEM  
 R.A.S. SLUDGE RETURN SYSTEM  
 EMERGENCY OVERFLOW  
 SURGE OVERFLOW

R.A.S. = RAW ACTIVATED SLUDGE  
 M.L. = MIXED LIQUOR  
 C.W. = CLEAR WATER  
 E.O.F. = EMERGENCY OVERFLOW  
 S.O.F. = SURGE OVERFLOW RETURN

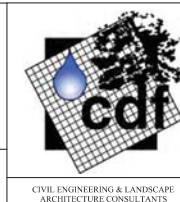
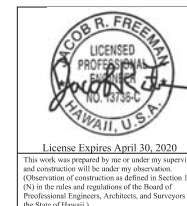
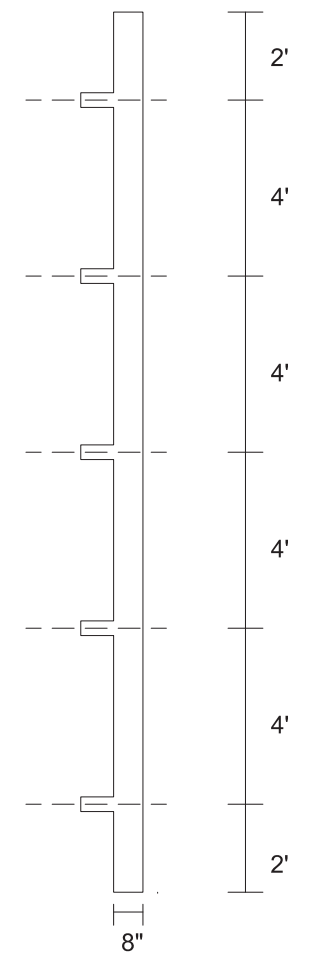
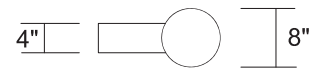
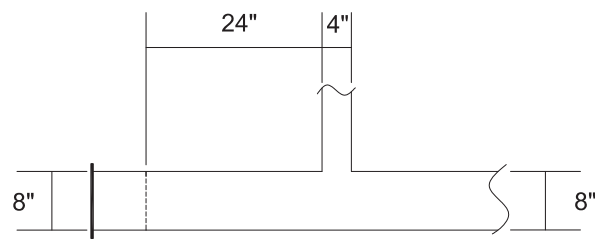
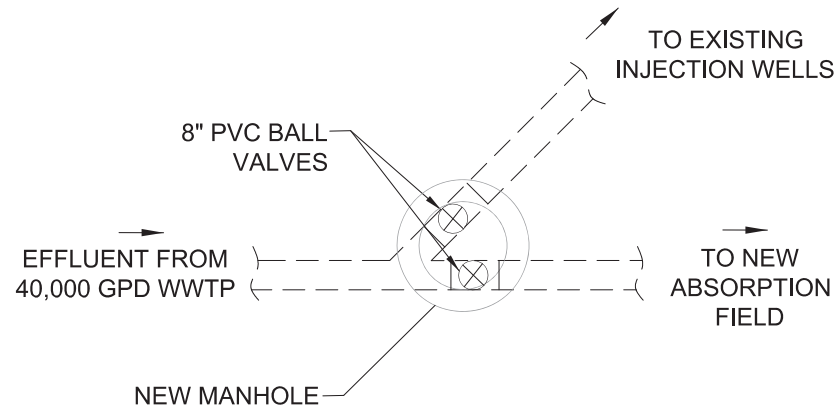
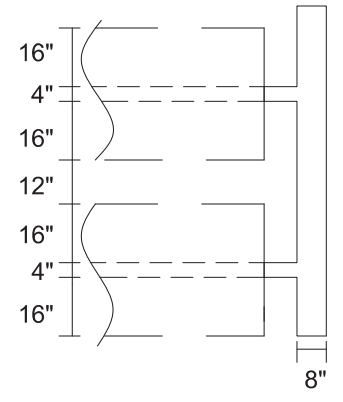
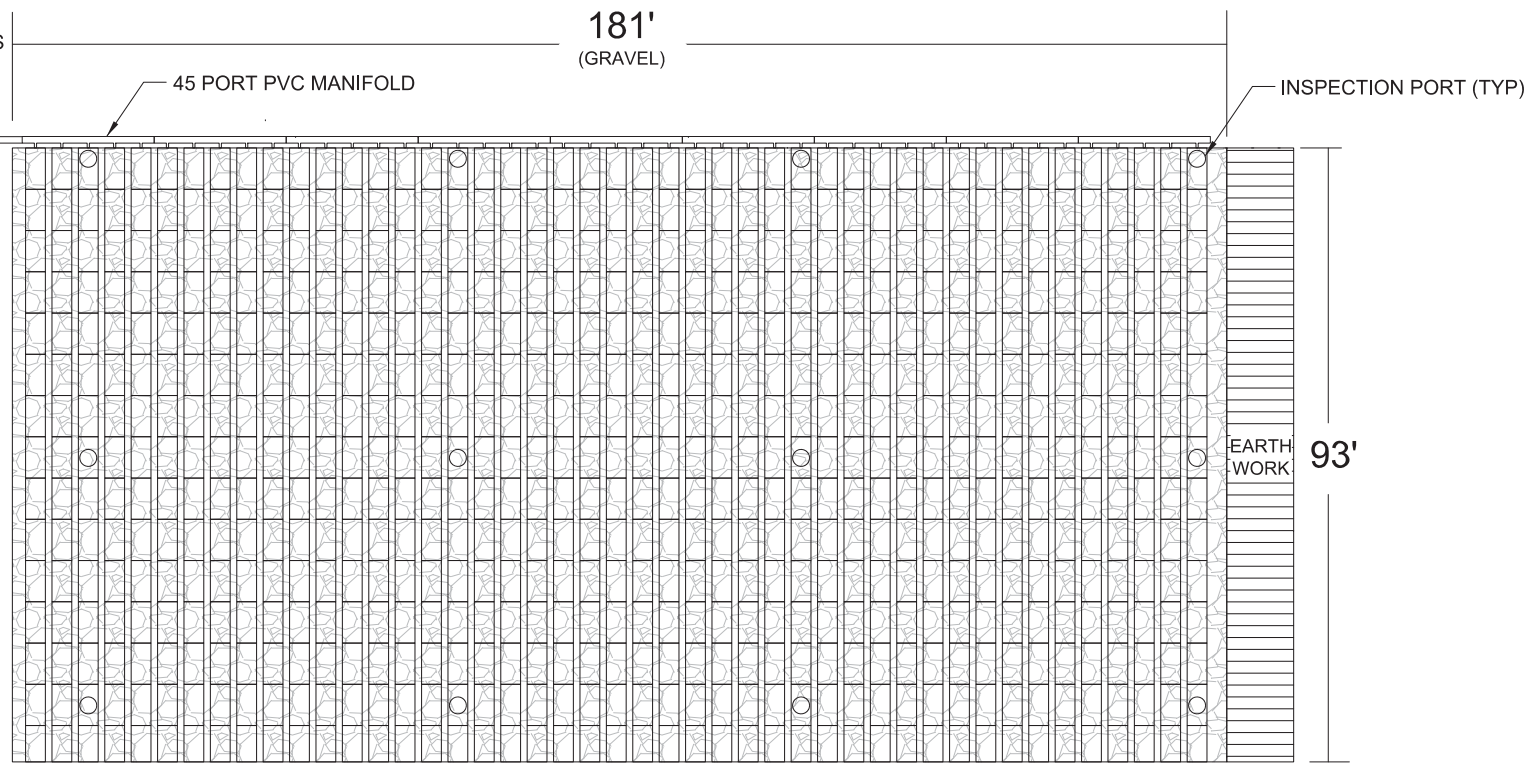
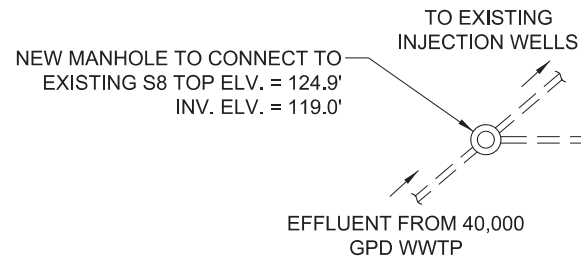


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 PO BOX 2985  
 WAILUKU, HI 96793  
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**PUAA SUBDIVISION WWTP**  
 OFF MOKULELE HIGHWAY  
 PUNENE, MAUI, HAWAII

Scale: NTS PROCESS FLOW DIAGRAM DWG No.: C-13

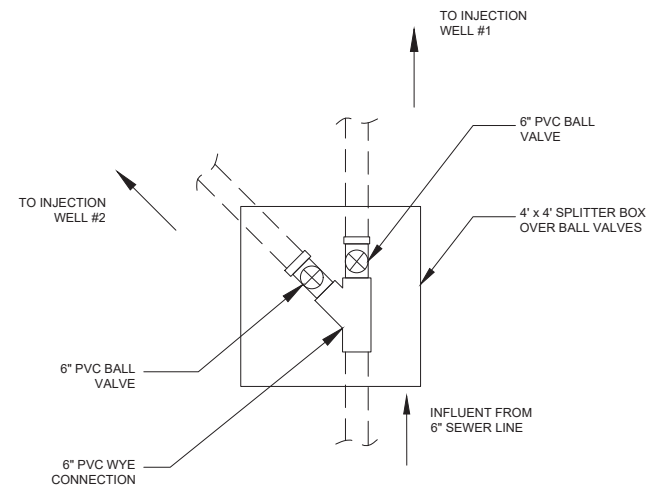
06-20-2019 TMK: (2) 3-8-104-030



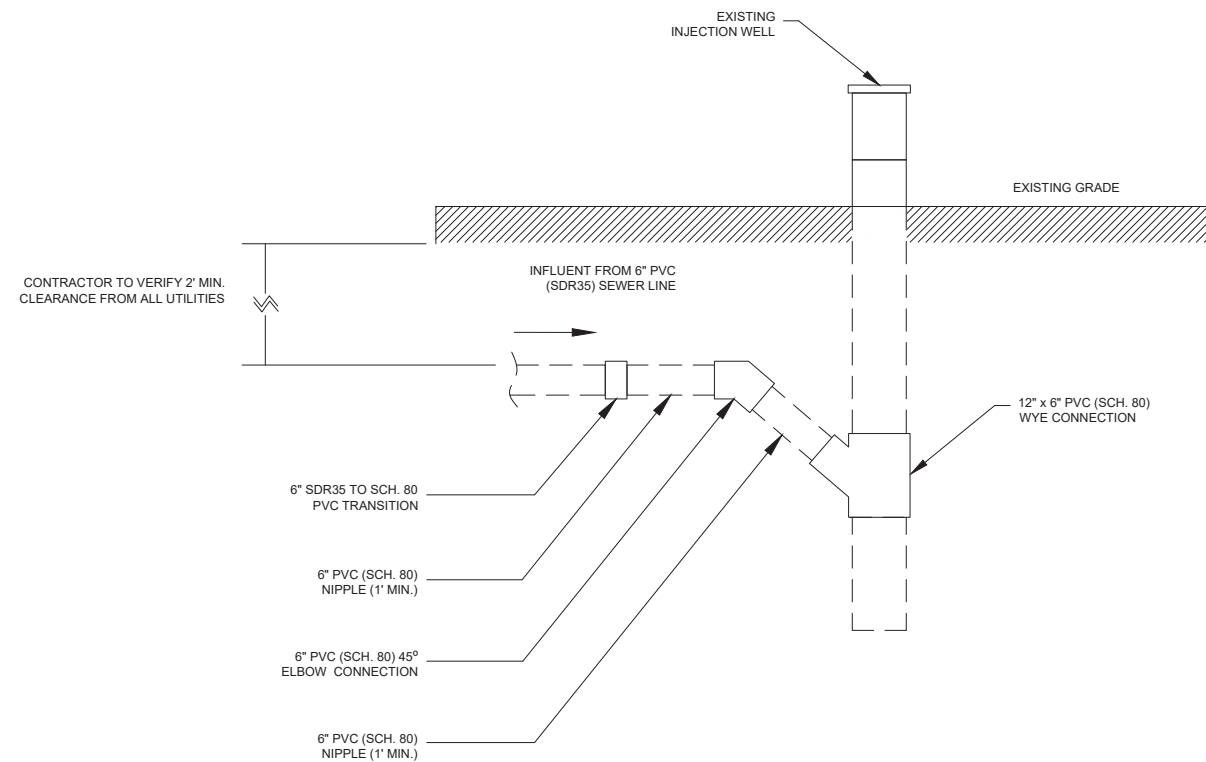
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**PUA SUBDIVISION WWTP**  
 OFF MOKULELE HIGHWAY  
 PUPUNENE, MAUI, HAWAII

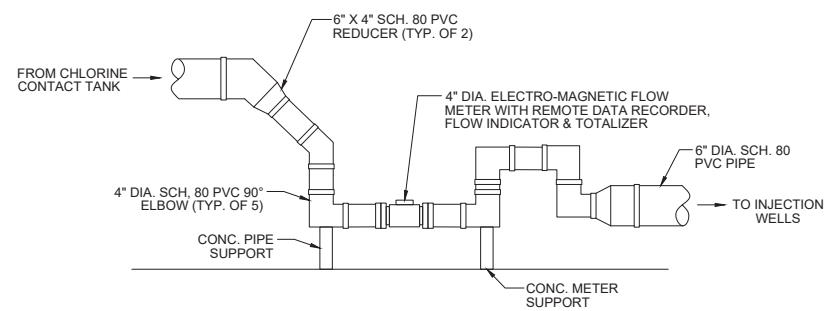
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06-20-2019		TMK: (2) 3-8-104-030	C-14



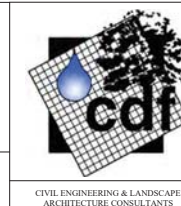
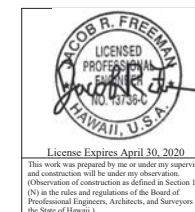
**PVC BALL VALVES**  
SCALE: 1" = 2'



**CONNECTION TO INJECTION WELLS - PROFILE VIEW**  
SCALE: 1" = 2'



**MAGNETIC EFFLUENT FLOW METER DETAIL**  
NOT TO SCALE



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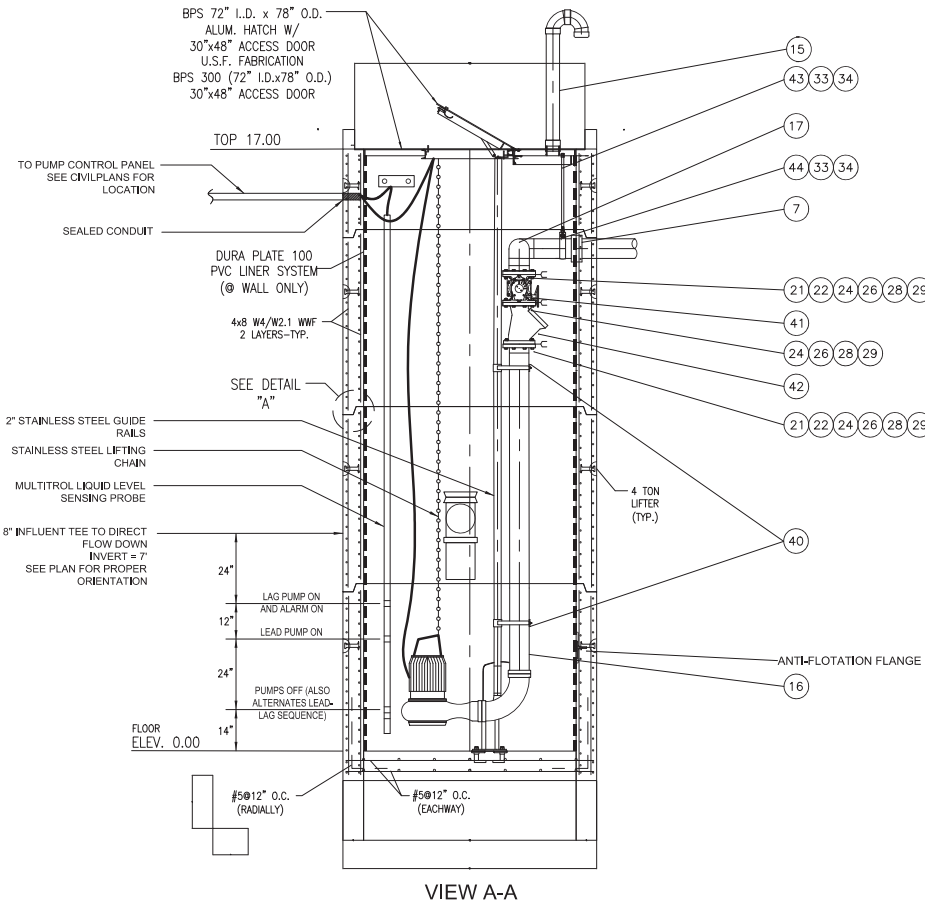
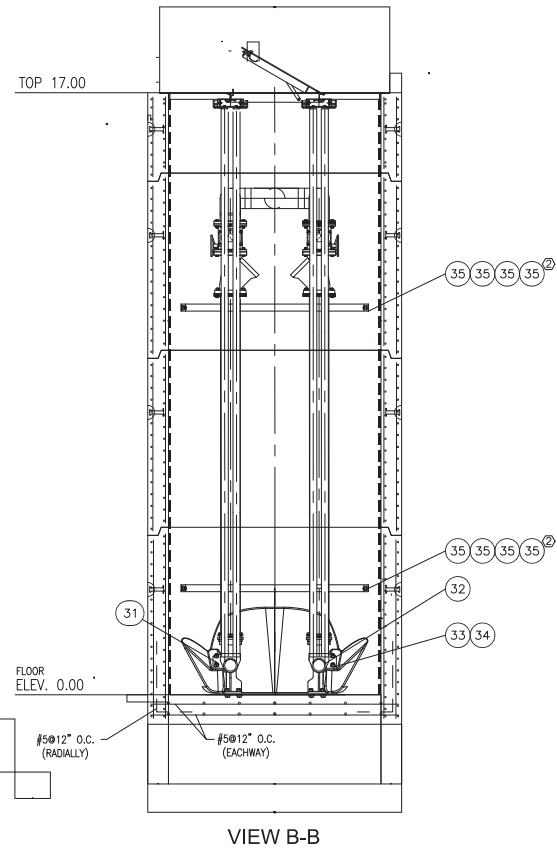
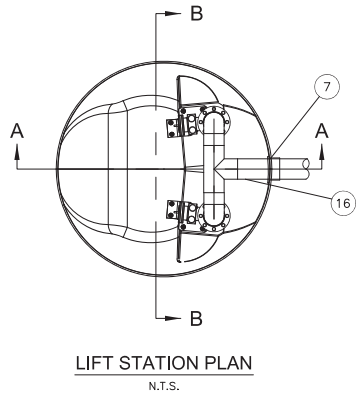
**PUAA SUBDIVISION WWTP**  
OFF MOKULELE HIGHWAY  
PUNENE, MAUI, HAWAII

Scale: NTS | SEWER LINE DETAILS | DWG No.: C-15

06-20-2019 | TMK: (2) 3-8-104-030

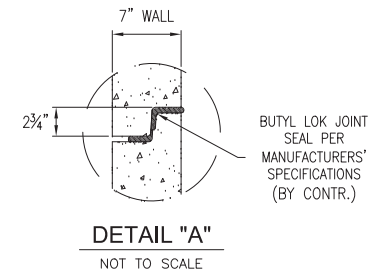
This work was prepared by me or under my supervision and construction will be under my observation. (Observation of construction as defined in Section 1.2 (N) in the rules and regulations of the Board of Professional Engineers, Architects, and Surveyors of the State of Hawaii.)

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\* NOTE:  
1. ALL INTERIOR (VERT.) SURFACES OF MANHOLE SHALL BE LINED WITH "DURA PLATE 100" PVC LINER PER MANUFACTURER'S SPECIFICATIONS.

NOTES:  
1. STATION DEPTH: MIN 5ft, MAX 20ft. AVAILABLE IN 1ft INCREMENTS.  
2. ALL BOLT PENETRATIONS THRU WALLS MUST BE SEALED WITH SILICONE SEALANT.  
3. STATION IS ALSO AVAILABLE IN 304L STAINLESS.



BUTYL LOK JOINT SEAL PER MANUFACTURER'S SPECIFICATIONS (BY CONTR.)

**CONSTRUCTION NOTES:**

- CONTRACTOR SHALL VISIT THE SITE AND BE COMPLETELY FAMILIAR WITH THE EXISTING CONDITIONS AND THE AMOUNT AND KIND OF WORK TO BE PERFORMED. CONTRACTOR SHALL VERIFY THE LOCATION, INVERT, SIZE, MATERIAL, AND CONDITIONS OF EXISTING STRUCTURES AND UTILITIES AND NOTIFY THE ENGINEER IMMEDIATELY IF ANY DISCREPANCIES ARE ENCOUNTERED.
- FOR THE ACTUAL FABRICATION, INSTALLATION AND TESTING OF WORK UNDER THIS SECTION, THE CONTRACTOR SHALL USE ONLY THOROUGHLY TRAINED AND EXPERIENCED WORKMEN, COMPLETELY FAMILIAR WITH THE ITEMS REQUIRED AND WITH THE MANUFACTURER'S RECOMMENDATIONS AS TO THEIR USE.
- ALL WORK SHALL CONFORM TO THE UBC, UPC, UMC, UFG, NEC, NFPA, AND ALL OTHER APPLICABLE CODES AND STANDARDS.
- CONTRACTOR SHALL PROVIDE, INSTALL, AND MAINTAIN ALL NECESSARY SIGNS, LIGHTS, FLARES, BARRICADES AND OTHER PROTECTIVE DEVICES FOR THE PROTECTION, SAFETY, AND CONVENIENCE OF THE PUBLIC.
- CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS AND PAY ALL APPLICABLE FEES PRIOR TO COMMENCING ANY WORK.
- CONTRACTOR SHALL PROVIDE (6) SETS OF SHOP DRAWINGS FOR ALL MATERIALS AND EQUIPMENT FOR APPROVAL BY THE ENGINEER PRIOR TO COMMENCING ANY WORK. ALL WORK DONE WITHOUT PRIOR APPROVAL SHALL BE SUBJECT TO REPAIR OR REPLACEMENT AT NO ADDITIONAL COST TO THE OWNER.
- MATERIALS: MANUFACTURERS LISTED BELOW SHOW STYLE AND QUALITY. EQUIVALENT FIXTURES MAY BE SUBSTITUTED WITH THE APPROVAL OF THE ENGINEER. WWTP MUST BE WPMO CERTIFIED.
  - WWTP - AS DESCRIBED IN THESE CONSTRUCTION DOCUMENTS
  - OR APPROVED EQUAL, THE TANK SHALL HAVE DOUBLE COMPARTMENTS WITH MANHOLE ACCESS OVER BOTH COMPARTMENTS.
  - FABRIC LINER - AMOCO 1199 HEAVY DUTY WOVEN FABRIC.
  - PERFORATED PIPE - 4 INCH SCHEDULE 40 PVC WITH 1/2-INCH DIAMETER HOLES DRILLED AT 12-INCH SPACINGS.
  - CRUSH ROCK - GRADATION ASTM DESIGNATION NO. 2, 2-1/2-INCH TO 3/4-INCH MANUFACTURED FROM DURABLE CLEAN ROCKS.
- CONTRACTOR SHALL NOTIFY ENGINEER FOR A SITE INSPECTION PRIOR TO BACKFILL AFTER PERFORATED PIPES HAVE BEEN LAID.
- CONTRACTOR SHALL PROVIDE AS-BUILT DRAWINGS UPON COMPLETION AND ACCEPTANCE OF WORK.
- CONTRACTOR SHALL PROVIDE A WRITTEN GUARANTEE TO REPAIR OR REPLACE AT HIS OWN EXPENSE ANY PARTS THAT MAY DEVELOP ANY DEFECTS DUE TO FAULTY MATERIALS OR WORKMANSHIP FOR A PERIOD OF ONE (1) YEAR AFTER FINAL PAYMENT.

**OPERATIONS AND MAINTENANCE OF WASTEWATER TREATMENT PLANT (WWTP)**

**REQUIREMENTS OF WWTP**

- SHALL NOT CONTAMINATE ANY DRINKING WATER.
- SHALL NOT BE ACCESSIBLE TO INSECTS, RODENTS OR OTHER POSSIBLE DISEASE CARRIERS WHICH MAY COME INTO CONTACT WITH FOOD OR DRINKING WATER.
- SHALL NOT POLLUTE OR CONTAMINATE THE WATERS OF ANY BATHING BEACH OR STREAM USED FOR PUBLIC OR DOMESTIC WATER SUPPLY PURPOSES OR FOR RECREATIONAL PURPOSES.
- SHALL NOT BE A HEALTH HAZARD BY BEING ACCESSIBLE TO CHILDREN.
- SHALL NOT GIVE RISE TO A NUISANCE DUE TO ODOR OR UNSIGHTLY APPEARANCE.
- SHALL NOT VIOLATE ANY OTHER LAWS OR REGULATIONS GOVERNING WATER POLLUTION OR SEWAGE DISPOSAL.

**ABSORPTION FIELD**

- THE ABSORPTION OR LEACH FIELD IS THE SECOND MOST IMPORTANT PART OF THE WASTE WATER SYSTEM AS LONG AS THE MAINTENANCE OF THE WWTP IS DONE REGULARLY. SOLIDS SHOULD NOT ENTER THE ABSORPTION FIELD.
- POSSIBLE FAILURE OR REPLACEMENT OF THE FIELD MAY OCCUR IF THE SLUDGE AND SCUM THAT ESCAPES FROM THE WWTP ENTERS THE PERFORATED PIPES WITHIN THE LEACH FIELD.
- USE INSPECTION PORTS TO CHECK IF THERE IS ANY STANDING EFFLUENT WATER IN THE ABSORPTION BED. IF NEEDED,
- REMOVE ANY SOLIDS FROM THE DISTRIBUTION BOX ANNUALLY.

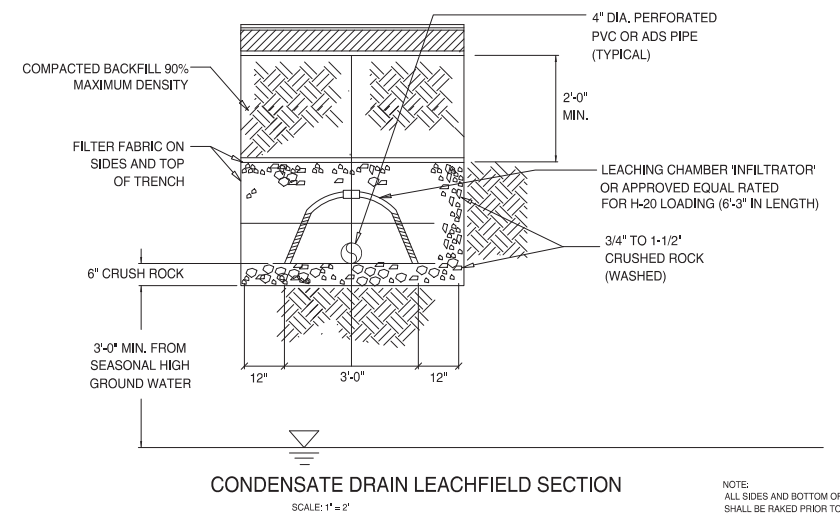
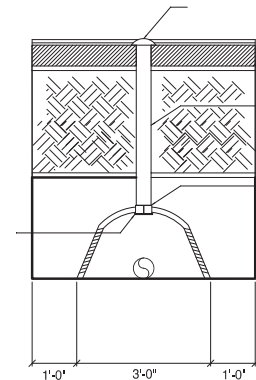
**PREVENTIVE MAINTENANCE RECORDS**

KEEP A RECORD OF THE MAINTENANCE OF THE WWTP WHICH SHOULD INCLUDE THE FOLLOWING:

- DATE OF PUMPING
- DESCRIPTION OF WORK DONE.
- NAME OF PUMPING CONTRACTOR.
- COST OF JOB.
- COMMENTS REGARDING CONDITIONS OF THE WWTP.

**RECOMMENDATIONS**

- INSPECT FOR SCUM AND SLUDGE DEPTH ONCE A MONTH. PUMP TANK AT PROPER INTERVALS.
- LIMIT WATER ENTERING WWTP.
- PREVENT INSECTS OR RODENTS ENTERING THE TANK.
- DO NOT USE BIOLOGICAL OR CHEMICAL ADDITIVES IN THE WWTP.
- KEEP THOROUGH MAINTENANCE RECORDS AND HAVE THEM AVAILABLE FOR INSPECTION UPON REQUEST FROM STATE HEALTH AUTHORITIES.



NOTE:  
ALL SIDES AND BOTTOM OF BED SHALL BE RAKED PRIOR TO INSTALLATION OF FABRIC, PIPE, AND CRUSH ROCK SO AS TO ELIMINATE SMEARING OF SOIL CREATED DURING EXCAVATION.

**ABSORPTION FIELD CALCULATION:**

PROJECT: PUA SUBDIVISION WWTP  
 LOCATION: 0 MOKULELE HIGHWAY, PUNENE, HAWAII 96753  
 T.M.K. (2) 3-8-104030  
 BASIS OF DESIGN: DESIGN FLOW: 19,800 GPD; POPULATION: 560 EMPLOYEES  
 FOR FACTORY USE, USE 35 GAL/EMPLOYEE/DAY PER APPENDIX TABLE 1, HAW 11-62; 560 EMPLOYEES X 35 GAL/EMPLOYEE/DAY = 19,600 GPD  
 VP PRIVATE WASTEWATER RECEIVING FACILITY = 20,000 GPD  
 DESIGN FLOW: 39,800 GALLONS  
 WWTP: 40,000 GALLON PER DAY CAPACITY QUAD-TRAIN WWTP  
 PERCOLATION RATE: 2 MIN/LIN  
 MINIMUM BED AREA: 85 S.F./200 GAL X 39,800 GAL = 16,830 S.F.  
 ABSORPTION BED DIMENSIONS: 92' X 161' = 14,832 S.F.; THEREFORE, ONE (1) ABSORPTION FIELDS AND TWO (2) INJECTION WELLS (IJC #UM-2933) = 33,666 S.F.

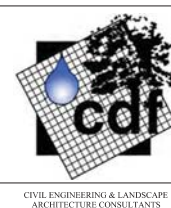
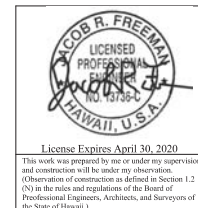
\* REFERENCE SECTION 11-62-34 OF HAWAII STATE DEPARTMENT OF HEALTH - WASTEWATER BRANCH IWS INFORMATION PACKET, FEBRUARY 1994.

**\* McMASTER-CARR**

ITEM	DESCRIPTION	PART NUMBER	QTY
43	3/10 316 SST THREADED ROD	93250A036	1
42	4" FLANGED BALL CHECK VALVE		2
41	4" FLANGED VALVE W/ WORM GEAR	5804R7A08	2
4	4" FLANGED VALVE W/ HANDLE	5804 RN W/ 4L	2
40	U-BOLT 1/2-11 x 6-2, 6" PIPE	29605T8	4
35	BRACE, DISCHARGE PIPE,	14-68 21 59	2
34	NUT, 1/2-10, 316 SST	94805A135	9
33	WASHER, 1/2 ID, 1 1/2 OD, GENERAL PURPOSE, 316 SST	91950A036	12
32	4" DISCHARGE CONNECTION (RIGHT)		1
31	4" DISCHARGE CONNECTION (LEFT)		1
29	NUT, 1/2-11, 316 SST	994804A351	53
28	WASHER, 1/2 ID, 1-4 OD, GENERAL PURPOSE, 316 SST	90107A035	101
26	BOLT, HEX HEAD, 1/2-11 x 3 316 SST	93190A854	48
24	4" FLANGE GASKET (EDPM)		6
22	4", 150# CARBON STEEL FLANGE		4
21	4", SCH 10, 316 SST, STUB IN		4
17	4", SCH 10, 316 SST 90° ELBOW		2
16	PIPE, SCH 10, 4" 316 STAINLESS STEEL		4 (4x)
15	VENT PIPE, 4"	14-68 22 02	1-2
7	BOOT, FLEXIBLE ENTRY, 4" (DISCHARGE)		1
ITEM	DESCRIPTION	PART NUMBER	QTY

**NOTES:**

- CONTRACTOR SHALL PROVIDE AN INSPECTION HOLE 4'-0" BELOW THE ABSORPTION BED AND CONTACT ENGINEER.
- THE DEPTHS TO INVERTS OF THE WWTP AND LEACHFIELD ARE CONTROLLED BY: (1) TOPOGRAPHIC FEATURES AND (2) THE INVERT OF THE INCOMING SEWER. THESE FACTORS MAY IMPACT THE DEPTHS SHOWN ON THE DRAWINGS.



**CDF Engineering LLC**  
 PO BOX 2985  
 WAILUKU, HI 96793  
 PHONE: (808) 891-2400  
**PUAA SUBDIVISION WWTP**  
 OFF MOKULELE HIGHWAY  
 PUNENE, MAUI, HAWAII  
 Scale: NTS  
 DWG No.: C-16  
 License Expires April 30, 2020  
 This work was prepared by me or under my supervision and construction will be under my observation. (Observation of construction as defined in Section 1.2 (8) in the rules and regulations of the Board of Professional Engineers, Architects, and Surveyors of the State of Hawaii.)  
 CIVIL ENGINEERING & LANDSCAPE ARCHITECTURE CONSULTANTS  
 06-20-2019  
 TMK: (2) 3-8-104-030

6.0 APPENDICES

- A. Engineer's Certification
- B. Owner's Certification
- C. Specifications
- D. Operations and Maintenance Manual
- E. Geotechnical Engineering Report
- F. Operations and Maintenance Manual for Absorption Field
- G. Operations and Maintenance Manual for Injection Wells
- H. Sludge Disposal Plan

CDF Engineering LLC  
Civil Engineering & Land Surveying Consultants  
P.O. Box 2985 Wailuku, HI 96793  
Phone: (808) 891-2400 - Fax: (808) 879-2402  
[www.cdfengineers.com](http://www.cdfengineers.com) - Lic. No. ABC-33139



Page 26

## APPENDIX A


### Engineer's Certification

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**Certifications in Accordance with  
Hawaii Administrative Rules (HAR) 11-62.23.1(a)**

**1. Engineer's Certification**

I certify that the proposed wastewater treatment works was designed to meet all applicable effluent requirements of Hawaii Administrative Rules, Chapter 62, sections 11-62-26 and 11-62-27.

  
\_\_\_\_\_  
Jacob Freeman, PE  
CDF Engineering LLC

June 20, 2019  
Date

**2. Owner's Certification**

I certify that the wastewater treatment works shall be operated and maintained in accordance with all of the provisions of the operation and maintenance manual developed pursuant to HAR 11-62-23.1(d)(2). The operation and maintenance manual shall be available to the operator of the treatment works.

Upon sale or transfer of ownership of the treatment works, the sale or transfer will include construction drawings, equipment manuals, operational data collected, and the appropriate transfer documents and provisions binding the new owner to the operation and maintenance manual.

\_\_\_\_\_  
Ryan Churchill  
\_\_\_\_\_

\_\_\_\_\_  
Date

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CDF Engineering LLC  
Civil Engineering & Land Surveying Consultants  
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Page 28

## **APPENDIX B**


### Owner's Certification

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**Certifications in Accordance with  
Hawaii Administrative Rules (HAR) 11-62.23.1(a)**

**1. Engineer's Certification**

I certify that the proposed wastewater treatment works was designed to meet all applicable effluent requirements of Hawaii Administrative Rules, Chapter 62, sections 11-62-26 and 11-62-27.

  
\_\_\_\_\_  
Jacob Freeman, PE  
CDF Engineering LLC

June 20, 2019  
Date

**2. Owner's Certification**

I certify that the wastewater treatment works shall be operated and maintained in accordance with all of the provisions of the operation and maintenance manual developed pursuant to HAR 11-62-23.1(d)(2). The operation and maintenance manual shall be available to the operator of the treatment works.

Upon sale or transfer of ownership of the treatment works, the sale or transfer will include construction drawings, equipment manuals, operational data collected, and the appropriate transfer documents and provisions binding the new owner to the operation and maintenance manual.

\_\_\_\_\_  
Ryan Churchill  
\_\_\_\_\_

\_\_\_\_\_  
Date

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Page 30

## APPENDIX C

### Specifications

# RWL Water

## **Package Biological Wastewater Treatment System Equipment Specifications**

Contractor: Mr. Sal Marino  
Valley Isle Pumping

Project Details: Design Flow – 40,000 Gallons per day

Project Location: Pulehunui Project  
Maui, HI  
USA

**RWL Water USA**  
**PACKAGED BIOLOGICAL WASTEWATER TREATMENT PLANT**  
**EQUIPMENT SPECIFICATION**

**WASTEWATER TREATMENT PLANT****PART 1 - GENERAL**

- 1.01 The contractor shall furnish and install one package biological wastewater treatment system, complete and ready for operation in accordance with the plans and specifications stated herein. The wastewater treatment system shall include four (4) Tipton Series Model TEII-200-DFESHG prefabricated steel extended aeration process package wastewater treatment system as manufactured by RWL WATER USA, Golden Valley, Minnesota, U.S.A. The package wastewater treatment system will have a total design flow of 40,000 gallons per day domestic waste. The system shall be complete with a common flow equalization chamber, dualized secondary treatment systems, each with a sludge holding chamber, aeration chamber and clarifier, and a common chlorine contact chamber. The clarifier shall be of the gravity hopper clarifier type based on a four-hour retention of the average design flow. The package wastewater treatment system shall include the necessary tank vessels, internal piping, valving, weirs, baffles and all items of equipment as listed below. The secondary treatment system shall be complete with all necessary tank vessels, component equipment necessary for efficient and proper plant operation. The electrical power shall be 480 volt, 3 phase 60 Hz.
- 1.02 The package wastewater treatment system shall be factory prefabricated and assembled, so far as possible, taking into consideration shipping and erection limitations. Because of the total system length the tankage shall be shipped to the project site in four major tank sections. All vessel surfaces shall be factory painted as described below.
- 1.03 The basic equipment furnished by the manufacturer shall include, but not be limited to tanks vessels, those vessels being factory painted, all tank internal piping and valving, blower motor unit assemblies, service walkways, pumps and electrical control equipment.
- 1.04 The plans and specifications have been based on the Tipton Series wastewater treatment system as manufactured by RWL Water USA., Golden Valley, Minnesota, U.S.A.
- 1.05 General Contractor Field Services - The General Contractor shall perform the installation of the TIPTON Series wastewater treatment system. The following is a brief description of the general contractor's responsibilities regarding the installation:
- A. Provide a crane and other equipment for off loading and setting of the wastewater treatment system. The system is delivered in four major sections for setting it onto its foundation pad. Attach the anchoring facilities to be positioned in the foundation pad as defined by the contract drawings.
  - B. Once the system has been set into position the equipment which has been disconnected for shipping such as the piping, valving, grating, handrails and electrical controls must be reassembled.
  - C. The general contractor's electrical field crew shall install at the location shown on the drawings the electrical consoles such as; Model CP-1 (Main Control Panel). In addition, the contractor shall run the electrical wiring and conduit to the appropriate ancillary components within the wastewater treatment structure.
  - D. All areas requiring touch up painting shall be painted by the Contractors field crew. The anchors to the foundation pad shall be welded to the anchor tabs by the field contractor. This area shall require touch up painting.

- E. An adequate access road to the plant site shall be provided to enable the lowboy truck into the project site and for off loading.
- F. Provide facilities and crane for off loading and setting of the wastewater treatment system onto its concrete foundation pad. It is recommended that the crane size should be a minimum of 100 ton.
- G. All site utilities to the system shall be tied-in to the system. The electrical power requirements shall be provided at each power block of each control console. The main power to the wastewater treatment system shall be supplied through an electrical power meter, main disconnect, and disconnect for the sub-panel – CP-1. This disconnect shall be supplied by the owner's field electrical contractor. Any of the sub-panels shall be supplied with a power block to receive the electrical power from this disconnect. The power shall be 480 volts, 3 phase, 60 Hz. A total of one sub-panel shall be provided. The necessary control voltage of 120 volt, 1 phase for the ancillary equipment shall be obtained through transformers. The main disconnect panel shall be supplied by others.
- H. The foundation pad, with anchor facilities, for setting the system on shall be furnished by the field contractor.
- J. Finish grade and placement of gravel around the clarifier shall be performed by the field contractor, if required.
- K. All field piping and wiring shall be by the field contractor.

## **PART 2 - SYSTEM DESIGN CRITERIA AND PARAMETERS**

- 2.00 The wastewater treatment system will have a total design flow of 40,000 gallons per day of domestic wastewater. The following design criteria were used in sizing the wastewater treatment system:
  - 2.01 Flow Equalization Chamber Criteria
    - A. Flow Equalization Chamber Holding Volume = 10,000 gallons
    - B. Air Supplied = Two (2) blowers each at 30 SCFM @ 5 psi
    - C. Controlled by a time clock
  - 2.02 Aeration Chamber # 1 Criteria
    - D. Aeration Chamber Holding Volume = 10,000 gallons
    - E. Air Supplied = Two (2) blowers at 65 SCFM @ 5 psi each
    - F. Controlled by a time clock
  - 2.03 Sludge Holding # 1 Criteria
    - A. Holding Volume = 1700 gallons
    - B. Air Supplied from main blower motor units
    - C. Supernatant Decant assembly
  - 2.04 Clarifier Chamber # 1 Criteria
    - A. Design Flow Rate = 10,000 GPD
    - B. Clarifier Chamber Holding Volume = 4 hours retention = 1667 gallons
    - C. Gravity Hopper type
    - D. One (1) 3" Sludge return system for clarifier
    - E. Two (2) 2" Airlift skimmer assemblies for clarifier

- F. Air Supplied for clarifier from main secondary blower units
- 2.05 Aeration Chamber # 2 Criteria
- G. Aeration Chamber Holding Volume = 10,000 gallons
  - H. Air Supplied = One (1) blowers at 65 SCFM @ 5 psi each
  - I. Controlled by a time clock
- 2.06 Sludge Holding # 2 Criteria
- D. Holding Volume = 1700 gallons
  - E. Air Supplied from main blower motor units
  - F. Supernatant Decant assembly
- 2.07 Clarifier Chamber # 2 Criteria
- G. Design Flow Rate = 10,000 GPD
  - H. Clarifier Chamber Holding Volume = 4 hours retention = 1667 gallons
  - I. Gravity Hopper type
  - J. One (1) 3" Sludge return system for clarifier
  - K. Two (2) 2" Airlift skimmer assemblies for clarifier
  - L. Air Supplied for clarifier from main secondary blower units
- 2.08 Aeration Chamber # 3 Criteria
- J. Aeration Chamber Holding Volume = 10,000 gallons
  - K. Air Supplied = One (1) blowers at 65 SCFM @ 5 psi each
  - L. Controlled by a time clock
- 2.09 Sludge Holding # 3 Criteria
- G. Holding Volume = 1700 gallons
  - H. Air Supplied from main blower motor units
  - I. Supernatant Decant assembly
- 2.10 Clarifier Chamber # 3 Criteria
- M. Design Flow Rate = 10,000 GPD
  - N. Clarifier Chamber Holding Volume = 4 hours retention = 1667 gallons
  - O. Gravity Hopper type
  - P. One (1) 3" Sludge return system for clarifier
  - Q. Two (2) 2" Airlift skimmer assemblies for clarifier
  - R. Air Supplied for clarifier from main secondary blower units
- 2.11 Aeration Chamber # 4 Criteria
- M. Aeration Chamber Holding Volume = 10,000 gallons
  - N. Air Supplied = One (1) blowers at 65 SCFM @ 5 psi each
  - O. Controlled by a time clock
- 2.12 Sludge Holding # 4 Criteria
- J. Holding Volume = 1700 gallons
  - K. Air Supplied from main blower motor units
  - L. Supernatant Decant assembly
- 2.13 Clarifier Chamber # 4 Criteria



- S. Design Flow Rate = 10,000 GPD
- T. Clarifier Chamber Holding Volume = 4 hours retention = 1667 gallon
- U. Gravity Hopper typ
- V. One (1) 3" Sludge return system for clarifier
- W. Two (2) 2" Airlift skimmer assemblies for clarifier
- X. Air Supplied for clarifier from main secondary blower units

#### 2.14 Disinfection System Criteria

- A. One (1) Chlorine contact chamber with a volume of 416 gallons shall be provided, complete with tablet type chlorination.

### **PART 3 - VESSEL TANK CONSTRUCTION**

- 3.01 All tank vessels shall be fabricated of 1/4" structural grade A-36 steel plate; joined by arc welding with fillets of adequate section for the joint involved. All walls shall be continuous, watertight and shall be supported by structural reinforcing members where required. Fabrication and erection shall conform to the standard fabrication procedures of RWL Water USA. All other areas such as the tank floor, tank end walls, and internal bulkheads shall be adequately reinforced.
- 3.02 All piping and valving shall be a minimum of schedule 40 steel pipe. The painting of this pipe and valving to be as defined in section below:
- 3.03 The package wastewater treatment system shall be transported to the project site on one low boy truck in four (4) major sections. The contractor shall be responsible for offloading and installing once the system arrives at the project site.

### **PART 4 - PAINTING AND CORROSION CONTROL**

- 4.01 All tank vessel surfaces to be painted shall be properly prepared in a workmanlike manner to obtain a smooth, clean, and dry surface. All rust, metal fragments, dust, weld slag, and mill scale as well as extraneous matter, shall be removed by means of sandblasting.
- 4.02 All interior tank vessel surfaces below the main box beam shall be painted with Tnemec coal tar epoxy 8-10 mils DFT.
- 4.03 All exterior tank vessel surfaces including the box beam shall be painted with Tnemec coal tar epoxy, 8-10 mils DFT.
- 4.04 All steel piping & valving shall be painted with Tnemec coal tar epoxy, 8-10 mils DFT.
- 4.05 Six (6) magnesium anodes, 17 LBS each shall be provided.

### **PART 5 - FOUNDATION**

- 5.01 A concrete foundation pad shall be constructed conforming to the project specifications for level and flatness as specified by the contract drawings.

### **EQUIPMENT DETAIL SECTION**

#### **PART 6 - FLOW EQUALIZATION SYSTEM**

- 6.01 To control the peak hourly flow rates, two (2) 5,000-gallon common flow equalization system (totaling 10,000 gallons) shall be provided at the influent end of the wastewater treatment system. The influent peak flow rates shall enter into the flow equalization system where it is held and aerated until the secondary treatment system is ready to process it. Once the influent has been

received by the flow equalization chamber it shall be processed by dual flow equalization pumps, pumping it to the flow-proportioning chamber. This chamber shall be so designed that it will allow the average daily flow to be processed and pass through the chamber into the aeration chamber. To control the flow rate from the flow equalization pumps a series of a v-notch weir and a flat weir, which is adjustable, to be provided. The flow equalization control system shall be complete with bar screen, dual flow equalization pumps, liquid level control system, flow proportioning chamber, electrical controls, air blower, coarse air diffuser with air manifold. During low flow periods, the flow equalization chamber can be put in bypass. There shall be supplied a two-way flow splitter within the flow proportioning chamber to split the flow to each of the secondary treatment systems.

RWL WATER USA shall provide the following equipment for the flow equalization chamber:

- (A) One Flow Equalization Air Blower Unit, 30 SCFM @ 5 psi. 480/3/60
- (B) Four Liquid Level Sensors, narrow angle, non-mercury, type controlling the surge pumps
- (C) One Time clock for controlling the surge blower
- (D) One Lot of Course Air Diffusers with drop assemblies
- (E) Two Flow equalization pumps P-1, P-2 . 480/3/60
- (F) Two 5,000-gallon flow equalization chamber
- (G) One Bar screen
- (H) One Flow Proportioning Chamber with two-way flow splitter

## **PART 7 INLET CONNECTION**

- 7.1 An influent connection to the wastewater system shall be provided. It shall consist of one 4" inlet entering into the flow proportioning chamber. The influent shall be discharged into the bar screen and the design flow shall be pumped from the flow equalization chamber to the flow proportioning chamber by dual flow equalization pumps where the design flow will be processed through. Any surges will overflow from the flow proportioning chamber back to the flow equalization chamber for processing.

## **PART 8 Bar Screen**

- 8.1 Bar screen shall be provided as shown on the contract drawings located in the flow equalization chamber. Its purpose is to remove any unusually large solids from the incoming crude sewage flow rate. The bar screen shall be fabricated from one-half inch diameter bars spaced one-inch apart and arranged as shown on the drawings. The bars shall be sloped to permit easy cleaning of accumulating debris. A large drying area shall be provided.

## **PART 9 AIR SUPPLY FOR FLOW EQUALIZATION SYSTEM**

- 9.1 For supplying the air requirements of the Flow Equalization System, One (1) Model BMU-30-R22 Blower Motor Units shall be provided as shown on the drawings. The voltage shall be 480 volts, 3 phase, 60 Hz. The unit shall have the capacity of providing 100% of the air requirements for the flow equalization system. The blower unit shall be installed at the location shown on the drawings. The unit shall be completely factory built and tested before shipping. The blower unit shall be installed within one Fiberglass Sound Enclosure model TEII-FE-SE complete with dual lockable doors. The inlet filter silencer, pressure relief valve, pressure gauge, with only the blower discharge rubber hose connection being provided as a single line hook up for the blower. The necessary electrical connection from the blower to CP-1 shall be provided and pre-wired. The blower motor unit and control panel shall be factory pre mounted on a steel skid for ease of installation by the field contractor. The enclosure shall have ivory finish. The blower motor enclosure unit shall be mounted on four (4) vibration pad dampers tagged VP-1. This will help reduce blower vibration and noise transmission. The Blower system shall be equipped with one 1" blower discharge pipe with a 1" marine rubber hose with 2 stainless steel clamps.

- 9.2 The blower units shall be a Model BMU-30-R22 shall be furnished for supplying all the air requirements needed for the flow equalization Basin. The unit shall be capable of delivering 30 SCFM at an operating pressure of 5 psi.
- 9.3 The blower shall be of the positive displacement type and shall manufactured by Roots Division of Dresser Industries, Inc., Connersville, Indiana or approval equal. The Model number of the blower will be a URAI-22 and equipped with a 1" discharge.
- 9.4 The motor shall be 2 Hp for operation on 480 volt, 3 phase, 60 Cycle Service, and 1800 RPM. The motor shall be of the TEFC type. The wiring to this motor from the control panel shall be provided and installed by the field contractor.
- 9.5 For determining the blower performance, and/or diffuser condition, a pressure relief valve and pressure gauge. These items shall be premounted and piped within the blower enclosure.

## **PART 10 FLOW EQUALIZATION ELECTRICAL CONTROLS**

- 10.1 An electrical control center, for the flow equalization system shall be located in the main control console, CP-1. This control panel shall be installed within a NEMA 4X fiberglass electrical weatherproof enclosure complete with floor mounting facilities installation atop the package wastewater treatment system as shown on the drawings. The voltage shall be 480 volts, 3 phase, 60 Hz. and shall be supplied to each panel at the power block.
- 10.2 A step down transformer shall be supplied to step the electrical power down from 480 volt to 120-volt power for control voltages for the secondary power.
- 10.3 The electrical control center Model CP-1 shall control the operation of the following equipment for the flow equalization system:
- A) Flow Equalization Blower Motor Unit BM-4, 2 HP, The voltage shall be 480/3/60
  - B) Flow Equalization Pump No. 1: P-1, 1/2 HP, 480/3/60
  - C) Flow Equalization Pump No. 2: P-2, 1/2 HP, 480/3/60
  - D) Liquid level sensors -4 level sensors narrow angle
- 10.4 Flow Equalization Blower Motor Unit - The Flow Equalization blower unit operation shall be controlled by a time clock.
- 10.5 Flow Equalization Tank Pumps Control - The Flow Equalization pumps shall operate on a duplex pump alternator operation I mode where as pump one will operate alternately with pump no 1 and 2 on cycles. The pump operation shall be controlled by four (4) encapsulated mercury float Switches (narrow angle) each individually adjustable for the following:
- A) All Pumps off
  - B) Lead Pump on
  - C) Lag Pump on
  - D) High Level Alarm
- 10.6 The Flow Equalization pumps shall operate on a lead-lag with the two pumps alternating. If the liquid level reaches lag pump on level, both pumps shall operate. If the liquid level reaches the high water level, the alarm will be activated.
- 10.7 All wiring, terminal blocks, supports and accessories required for the operations of the control panel shall be provided in compliance with the National Electric Code.
- 10.8 Flow Equalization Pumps Tagged P-1, P-2, The voltage shall be 480 volts, 3 phase, 60 Hz. The Flow Equalization pumps shall be of the Gould's submersible type. Each pump shall be as manufactured by the Gould's pump company. The pump shall have a 1/2 horsepower motor which

will operate on 480 volt, 3 phase, 60 Hz. Each Flow Equalization pumps shall be supplied with a 2-inch discharge.

- 10.9 For easy removal of the flow equalization pumps, a hoist shall be provided adjacent to the pump location.

## **PART 11 - AERATION CHAMBERS**

- 11.01 There shall be supplied four (4) independent aeration chambers to work in conjunction with their corresponding clarifier chamber and sludge holding chamber of secondary treatment system. The aeration chambers shall *EACH* conform to the following specifications:
- 11.02 Each aeration chamber shall have a volume of 10,000 gallons. The vessel shall be shaped in such a way to prevent sludge accumulation, enhancing the rotation of the vessel contents, and to prevent scum and froth accumulation. To insure maximum retention time and eliminate short circuiting, the aeration chamber shall be constructed with air diffusers, placed longitudinally along one side of the chamber so as to, in conjunction with flow control baffles, enhance the spiral rotation of the chamber contents. To ensure adequate circulation velocity, the proportion of the chamber width to depth, in the direction of rotation, shall not exceed 1.33 to 1. The velocity of rotation shall be sufficient to scour the bottom and prevent sludge filleting. In addition prevent the escape of minuscule air diffusion bubbles to the surface, thus causing their entrapment to provide maximum oxygenation efficiency.
- 11.03 An air distribution manifold shall be installed longitudinally on one side of the tank with diffuser drop assemblies connected thereto. This manifold shall be designed to create a bank of air to supply the air needs of the system, and other ancillary equipment such as the air diffusers, airlift pumps, and scum skimmer to draw from this bank of air.
- 11.04 Each diffuser drop assembly shall be equipped with an air regulating and/or shutoff valve, a disconnecting union and a diffuser bar with non-clog air diffuser nozzles mounted on the tee bar. The airflow per diffuser shall range from 1 to 5 CFM. This minimum air velocity shall be maintained to insure sufficient velocity for self-cleaning. The diffusers shall be parallel to and near the base of the vessel sidewall and at an elevation, which will provide the optimum diffusion and mixing of the vessel contents. The oxygen transfer capacity of each diffuser shall be such that an adequate supply of oxygen will be maintained in the aeration chamber to meet treatment requirements of the design sewage load. The air diffuser shall be on the air check diaphragm type constructed with a diaphragm mounted on top of the diffuser body. The diffuser body consists of ten (10), 3/16" diameter air discharge holes evenly distributed around the diffuser disk. The diffuser will be supplied with standard male pipe thread connections.

## **PART 12 CLARIFIER CHAMBERS**

- 12.01 There shall be furnished a single gravity hopper type clarifier chamber for each train, to work in conjunction with the corresponding aeration chamber and sludge holding chamber of the system. Each clarifier chamber shall be of the following specification:
- A. The water level from top of tank to water level = 18"
  - B. The clarifier hopper slope to be on a 1 to 1.7 slope
- 12.02 Each clarifier chamber shall be of such size as to provide a minimum of four (4) hours retention, equal to a total of 1667 gallons, based upon the same design flow rate governing the design flow (10,000 GPD), of the corresponding treatment train and shall have proper baffling to prevent short circuiting and to provide maximum uniform solids settling area. The clarifier shall be of the gravity hopper clarifier type. Settled sludge shall be returned from the clarifier hopper cap floor (sludge well) to the aeration chamber by a positive displacement sludge return system, consisting of an airlift pump type.

- 12.03 The inlet of the clarifier chamber shall be provided with an influent baffle. Its purpose is to slow the velocity of the flow from the aeration chamber to start the settling process. It shall prevent the floatables from entering the clarifier settling area. A skimmer assembly shall be provided in this zone to remove the floatables and return them back to the aeration zone for additional processing.
- 12.04 The clarifier effluent shall pass over the edge of the baffled adjustable effluent weir plate into the effluent trough. The double-edged weir plate will be constructed of 1/8" galvanized steel, and will be gasketed with neoprene strips.

### **PART 13 AIRLIFT SLUDGE RECIRCULATION SYSTEM**

- 13.01 There shall be installed within *each* of the clarifier chambers a sludge recirculation system consisting of a positive sludge re-circulation pumping system using airlifts. The gravity hopper clarifier shall be equipped with one (1) 3" diameter airlift sludge return assembly, meeting the following specifications: The airlift pump system shall have the re-circulation capacity ranging from 0% to 150% of the average design flow. The airline supplying air to the pump shall be equipped with an air control valve, which shall vary the capacity of the pumping rate. The airlift pump shall be firmly supported and shall be equipped with a clean-out plug to allow for easy cleaning and maintenance.

### **PART 14 - AIRLIFT SCUM RECIRCULATION SYSTEM**

- 14.01 There shall be installed within each of the clarifier chambers a scum recirculation system for controlling and returning floatables and scum back to the aeration system. The clarifier shall be equipped with two (2) 2" diameter airlift skimming systems. Each skimming device shall be of the positive airlift pump type, located in a position to skim and return floating material to the aeration chamber. The air line supplying air to the skimming device shall be equipped with a needle valve to regulate the rate of return. The scum intake shall be equipped with an adjustable assembly, which will enable exact positioning of the skimmer at water level without placing a hand in the wastewater. The discharge port shall be sloped to enable the operator to determine the flow rate.

### **PART 15 - SLUDGE HOLDING CHAMBERS**

- 15.01 There shall be supplied an aerated sludge holding chamber for each train to work in conjunction with the aeration chamber and clarifier chamber of the corresponding secondary treatment system. The aerated sludge holding chamber shall be an integral section of the package wastewater treatment system as shown on the drawings.
- 15.02 The sludge holding chamber shall be of sufficient capacity to provide a total volume minimum chamber volume of 1,700 gallons for each train.
- 15.03 The sludge holding chamber shall be equipped with a supernatant decant airlift to transfer the supernatant back to the secondary treatment system for processing and to concentrate the sludge within the sludge holding chamber.
- 15.04 The chamber shall be of the aerated type. Diffused air shall be supplied by the main secondary blower motor units. The diffusers and diffuser piping shall be as specified for the aeration chamber.

### **PART 16 - AIR SUPPLY SYSTEM SECONDARY TREATMENT SYSTEM**

- 16.01 For supplying the air requirements of the secondary wastewater treatment systems, are six (6) main aeration blowers of the positive displacement type model BMU-68-R24. Each unit shall have the capacity of providing 100% of the air requirements for the secondary system. The blower units shall be installed within blower motor unit fiberglass sound enclosure housing at the location shown on the drawings, and shall be remotely mounted complete with base. The blower speed and horsepower has been corrected for this elevation levels at the project site. The discharge

pipng of the blowers shall be positioned both within the enclosure and exterior of the enclosure to help reduce the vibration and the noise created by the air discharged. The check valves shall all be located at the discharge of the blower. Each blower shall discharge into the air plantum with a discharge rubber hose connection being provided for each blower. The blower motor enclosure unit shall be mounted on four (4) vibration pad dampers tagged VP-1. This will help reduce blower vibration and noise transmission. The Fiberglass housing shall be equipped with a blower discharge pipe with a marine rubber hose with 2" stainless steel clamps. Each blower unit shall be completely factory built and tested before shipping.

- 16.02 The blower motor units shall each be capable of delivering 68 SCFM at an operating pressure of 5 psi.
- 16.03 The blower shall be of the positive displacement type and shall be manufactured by Roots Division of Dresser Industries, Inc., Connersville, Indiana or equal Sutorbilt Blower Division Company, Compton, California; or approved equal.
- 16.04 The motor shall be 3 HP for operation on 480 Volt, 3 phase, 60 Cycle Service, and 1,800 RPM. The wiring to this motor from the control panel shall be provided and installed by the field contractor.
- 16.05 For determining the blower performance, and/or diffuser condition, a pressure relief valve and pressure gauge. These items shall be premounted and piped within the blower sound enclosure.
- 16.06 The blowers shall operate at a noise level of 79 dba or less at 3 meters

#### **PART 17 – MAIN SECONDARY TREATMENT CONTROLS WITHIN CONTROL PANEL CP-1**

- 17.01 An electrical control panel, Model CP-1, shall be installed within a NEMA 4X fiberglass weatherproof enclosure complete with legs and installed as shown on the drawing.
- 17.02 A step down transformer shall be supplied to step the electrical power down from 480 volt to 120-volt control voltage.
- 17.03 The electrical control panel shall control the operation of the following secondary system equipment:
  - A. Blower Motor Unit BM-1, 3 HP. 480/3/60 Main Secondary Train # 1
  - B. Blower Motor Unit BM-2, 3 HP. 480/3/60 Main Secondary Train # 2
  - C. Blower Motor Unit BM-3, 3 HP. 480/3/60 Main Secondary Train # 1 or # 2
  - D. Blower Motor Unit BM-1, 3 HP. 480/3/60 Main Secondary Train # 3
  - E. Blower Motor Unit BM-2, 3 HP. 480/3/60 Main Secondary Train # 4
  - F. Blower Motor Unit BM-3, 3 HP. 480/3/60 Main Secondary Train # 3 or # 4
- 17.04 The electrical control panel shall control the operation of all the ancillary component equipment requiring electrical power. The blower motor unit operation time will be intermittent and controlled by the main blower timers. The plant operator shall control the operation time to obtain the correct air control. The necessary selector switches shall be provided to allow either automatic or manual operation of the auxiliary equipment.
- 17.05 The enclosure shall be NEMA 4X fiberglass. The electrical controls shall consist of IEC motor starters, timers, and selector switches. Properly sized circuit breakers or fuses shall protect all electrical equipment and circuitry.
- 17.06 All wire and conduit required between the control panel and the electrical power service should be furnished by and installed by the field controller. The main power supply shall be 480 Volt, 3 phase, 60 Cycle. Power to the control panel shall be 120 volt, 1 phase. A power block in the control panel shall be supplied for the main electrical connection.

- 17.07 The control panel shall be a Model CP-1 and shall be completely factory assembled and tested prior to shipment.
- 17.08 Controls shall be mounted to a removable sub-panel within the enclosure and shall be wired and spaced in accordance with the latest National Electric Code.
- 17.09 Blower Operation Controls Method: Each blower for the aeration chamber shall be able to be controlled by the programmable timers. A selector switch within the control panel shall be used to select between automatic operation or manual operation. The six (6) main blowers for the secondary treatment system shall be controlled by six (6) 24-hour, 7-day time clock and an alternator and shall be capable of being programmed to control the blower run cycle and to adjust both the start set point every 15 minutes on the 24 hour cycle.

#### **PART 19 - SERVICE WALKWAY**

- 19.01 A service walkway shall be provided for the service area only to service the plant equipment. of one-piece skid resistant aluminum. All grating panels shall be constructed of aluminum with maximum yield strength of 37,000 psi. Each grating panel has a standard 9-inch surface width, and a 2-1/2-inch rib depth. Furthermore, each panel shall have a safe uniform load carrying capacity of 120 pounds per square foot. The grating panels shall be painted with a cold galv for extra corrosion protection.
- 19.02 Handrail shall be provided around the perimeter of the tank structure. The handrail system shall consist of aluminum top rail, stanchions and fittings, along with a triple center cable railing system. All hardware to be stainless steel.

#### **PART 20 - DISINFECTION SYSTEM**

##### Tablet Chlorination System

- 20.01 A common chlorine contact chamber shall be provided with a volume of 416 gallons providing a 30-minute detention time based on the total average daily flow of 40,000 gpd.
- 20.02 A model Sanuril 1000 tablet chlorinator shall be supplied for chlorination.

#### **Part 21 - EFFLUENT CONNECTION**

- 21.01 The effluent connection of the wastewater treatment system shall be located as shown on the plans and shall consist of one (1) 4" diameter standard flanged pipe at the location shown.
- 21.02 An effluent v-notch weir with staff gauge shall be provided for flow measurement.

END OF SECTION



CDF Engineering LLC  
Civil Engineering & Land Surveying Consultants  
P.O. Box 2985 Wailuku, HI 96793  
Phone: (808) 891-2400 - Fax: (808) 879-2402  
[www.cdfengineers.com](http://www.cdfengineers.com) - Lic. No. ABC-33139



Page 42

## **APPENDIX D**

### Operations and Maintenance Manual

# Operations and Maintenance Manual

**Project: Pulehunui Project  
Maui, Hawaii**

**Design Flow: 40,000 Gallons per Day**



**RWL**  
Water<sup>SM</sup>

7135 Madison Avenue West  
Golden Valley, MN 55427  
+1 800 879 3677  
info@rwlwater.com

# TABLE OF CONTENTS

1. INTRODUCTION.....	3
1.1 Brief Overview of the System .....	3
1.2 Plant Design Parameters .....	3
1.3 System Scope of Supply.....	4
2. BRIEF DESCRIPTION OF MAJOR PROCESSES .....	6
2.1 Flow Equalization System .....	6
2.2 Aeration Chamber .....	7
2.3 Hopper Clarifier.....	8
3. DETAIL DESCRIPTION OF EACH UNIT PROCESS .....	9
3.1 Flow Equalization System .....	9
3.2 Secondary Treatment System.....	11
3.2.1 Aeration Chamber .....	11
3.2.4 Clarifier Chamber .....	13
3.2.7 Sludge Holding Chamber.....	15
3.2.8 Disinfection Chamber (Chlorination).....	16
4. SLUDGE HANDLING AND DISPOSAL .....	17
4.1 General Summary .....	17
4.2 Sludge Holding Chamber Details .....	17
4.3 Procedures for Wasting Sludge .....	18
4.4 Sludge Disposal Methods .....	18
5. TESTING AND RECORDKEEPING .....	19
5.1 Recommended Tests .....	19
5.2 Settleability Test.....	19
5.2 Settleometer Test .....	19
5.3 Settleability Test.....	19
5.4 pH Test .....	20
5.5 Color Test .....	20
5.4 Dissolved Oxygen Test.....	21
6. MAINTENANCE MANAGEMENT .....	22
6.1 Daily.....	22
6.2 Weekly .....	22
6.3 Monthly.....	22
6.1 Recommended Spare Parts .....	22
7. SYSTEM START UP GUIDE.....	25
8. TROUBLESHOOTING GUIDE .....	26
9. PLANT ADJUSTMENT GUIDE .....	27
10. TEST PROCEDURES.....	30

## 1. Introduction

### 1.1 Brief overview of system:

The RWL Water TIPTON Series packaged wastewater treatment equipment outlined in this Manual was manufactured by RWL Water of Golden Valley, MN.

The package wastewater treatment system is a customized package wastewater treatment system. The degree of treatment of this design flow would be considered secondary complete with flow equalization, secondary treatment, which includes the following:

Main Systems Provided:

- Flow Equalization System
- Secondary System sludge holding and aeration chamber
- Blower Units for air supply
- Electrical Console Panels
- Air Diffusion System
- Hopper Clarifier
- Sludge Return System
- Scum Return System
- Effluent Weir
- Chlorination Disinfection System

### 1.2 Plant Design Parameters:

The package wastewater treatment system is designed to meet the following effluent limitations when operated properly:

<b>Average Daily Flow Rate:</b>			<b>40,000 GPD</b>
<b>Parameters</b>	<b>Unit</b>	<b>Influent</b>	<b>Projected Effluent</b>
BOD <sub>5</sub> :	(mg/L)	250	≤ 20 mg/L
TSS:	(mg/L)	250	≤ 20 mg/L
pH:		6.9-8.5	6.9-8.5
Fecal Coliform	(N/CML)		200/100

## 2.1 Flow equalization Chamber

One (1)	Common 10,000 gallon flow equalization chamber
One (1)	Flow proportioning chamber with four-way flow splitter with cover
Two (2)	Submersible flow equalization pumps, 1/2hp, 480 volt, 3 phase, 60Hz.
Four (4)	Liquid level sensors for flow equalization pump control
One (1)	Hoist with stainless steel cable for flow equalization pump removal
Two (2)	Blower motor units, 30 SCFM @ 5 psi, 2hp, 480 volt, 3 phase, 60 Hz. mounted within a fiberglass sound enclosure
One (1)	Electrical controls for the flow equalization pumps and blower unit to be located in control panel CP-1.

## 2.2 Sludge Holding Chambers

Four (4)	1,700-gallon aerated sludge holding chambers with air supplied from the main blower motor units
Four (4)	Supernatant decant assembly

## 2.3 Aeration Chambers

Four (4)	Aeration chamber with a volume of 10,000 gallons each
Five (5)	Blower motor units each with a capacity of 68 SCFM at 5 PSI, equipped with 3 HP motor 480 volt, 3-phase, 60 hz. mounted within a fiberglass enclosure
One (1)	Air manifold with diffuser drop assemblies
One (1)	Lot of coarse air diffusers
One (1)	Lot piping painted steel, schedule 40
One (1)	Pre-wired electrical control system Model CP-1 complete with enclosure NEMA 4X fiberglass with the necessary Motor starters, circuit breakers, programmable 24/7 timers, selector switches all designed to operate off of 480 volt, 3 phase, 60 Hz.

## 2.4 Clarifier Chambers

Four (4)	Gravity hopper type clarifiers each with a volume of 1,667 gallons
Four (4)	3" sludge return assemblies, airlift type
Four (4)	2" skimmer return assemblies, airlift type

## 2.5 Disinfection

Two (2)	Common Chlorine contact chambers with a volume of 416 gallons
Two (2)	Sanuril 1000 tablet chlorinator

## 2.6 Effluent Flow Measurement

Two (2)	V-Notch weirs at the outlet of the system with staff gauge
---------	--

## 2.7 Service Walkway

One (1)	Lot of aluminum, non-skid grating over the service area only
One (1)	Lot of handrail, around the perimeter of the system, aluminum with triple center cable rail

## 2.8 Corrosion Prevention

One (1)	Interior surface sandblast SSSP-SP10
One (1)	Exterior surface sandblast SSSP-SP6
One (1)	Interior surface protection, Tnemec coal tar epoxy, 8-10 mils
One (1)	Exterior surface protection, Tnemec coal tar epoxy, 8-10 mils

Six (6)	17# magnesium anodes
---------	----------------------

## 2. Brief Description of Major Processes

### 2.1 FLOW EQUALIZATION

- 2.1.1 The primary function of the flow equalization system is to handle any surge flows that the system might see. This chamber allows only the design flow rate to enter the secondary treatment trains. At the inlet to the flow equalization chamber, a bar screen is located at the inlet of the system within the flow equalization chamber. The bar screen is used to remove unusually large objects out of the waste stream, collecting on the inclined bars, whereas the operator can rake those screenings onto the drying deck and remove once dried. The operator should clean the drying rack frequently to prevent garage buildup that could potentially spill into the flow equalization chamber and plug the flow equalization pumps.
- 2.1.2 Once the flow has passed the bar screen, it shall pass into the flow equalization chamber. This chamber is aerated and is designed to regulate the surge flows of the system so that the secondary system shall receive only the design flow. Dual flow equalization pumps pump the flow into the flow proportion box, which is mounted above the flow equalization chamber. The v-notch weir plate is equipped with a bolt assembly, so that once the level of the v-notch is reached the screws on the back side of the v-notch weir is tightened so that a minimal amount of liquid can pass behind the weir plate. The operator can manually adjust this to regulate the flows into the system. Details are outlined in Section C.2 below.
- 2.1.3 The flow rates over the v-notch weir can be determined by formula using the degree of the weir, which the flow passes. The chart below shows what those rates are with respect to the head height of the flow passing through the v-notch. For a system specific v-notch setting, refer to Section C.2 below.

#### V-Notch Weir Size & GPM

Head Height	22.5	30	45	60	90
1"	0.4	0.5	0.8	1.2	2.0
1.5"	1.2	1.7	2.6	3.5	6.1
2.0"	2.6	3.4	5.3	7.3	9.1
2.5"	4.4	5.9	9.1	12.7	22.0
3.0"	7.0	9.4	14.4	20.1	34.8
3.5"	10.3	13.8	21.3	29.6	51.3
4.0"	14.4	19.2	29.6	41.1	71.2
5.0"	25.2	33.6	51.8	71.9	124.8

To determine the design flow rate divide the total flow rate per day by 1440 minutes per day. Using the charge below multiply the GPM by 1440 minutes per day to arrive at the design flow rate in GPD.

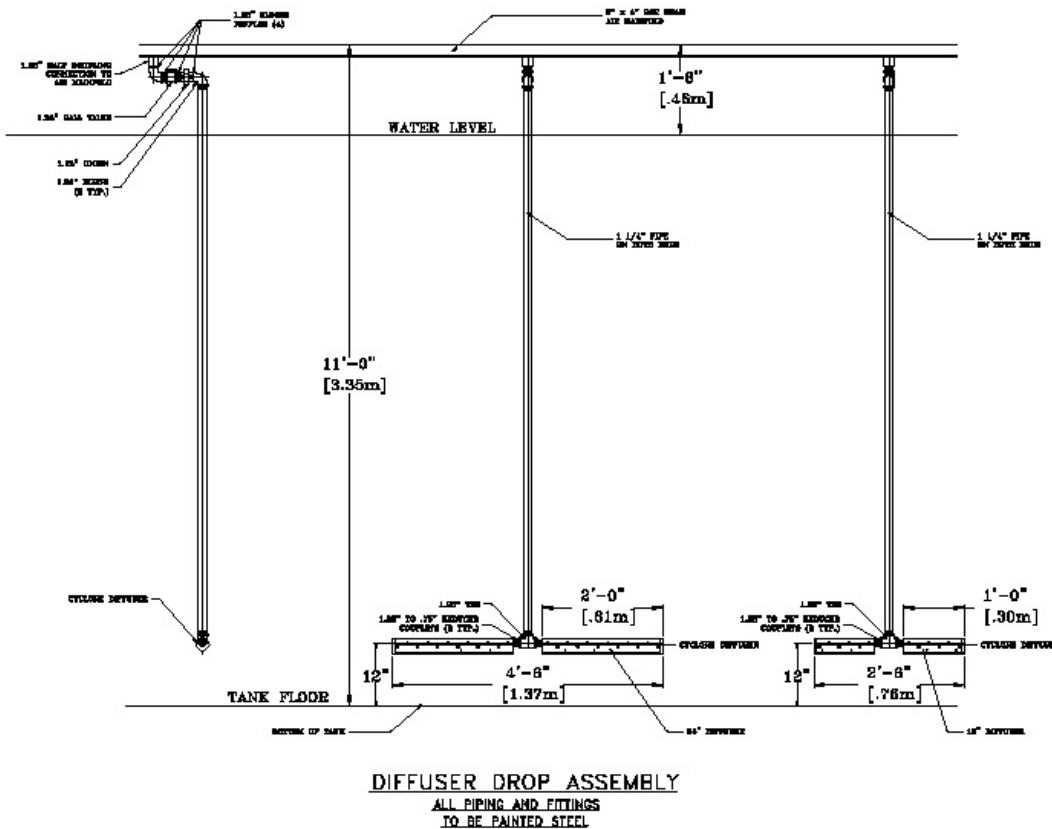
Air may be provided to the diffusers in the equalization tank from the surge blower. This operational mode prevents raw wastewater from becoming septic over long periods of no flow.

- 2.1.4 The liquid level sensors controlling the dual flow equalization pumps should match the heights shown in the as built drawings and as described in Section C.2 below.



## 2.2 AERATION CHAMBER

- 2.2.1 The wastewater treatment system has been provided with an aeration chamber and clarifier chamber for the secondary treatment process. This is a quadruple train system with four (4) aeration, sludge holding and clarifier chambers. The system's aeration chamber has a volume of 10,000 gallons per train.
- 2.2.2 The aeration chamber is the key part of the secondary treatment plant, bacteria and other microorganisms thrive and multiply here as they consume the food (organic material) in the wastewater. This aerobic biological process, biological, in that, bacteria and other microorganisms are essential to the process, and aerobic, in that, these microorganisms need air or dissolved oxygen to survive, is called an activated sludge treatment system. The microorganisms or "bugs" are typical of all living things in that they need food, oxygen, and a compatible environment in which to thrive and multiply. Most of the biological aerobic action occurs in the aeration chambers. The clarifier allows the microorganisms to settle, producing a clear discharge, as discussed below in Section 3.0.
- 2.2.3 The food and water needed by the microorganisms is supplied by the wastewater, the food being the organic matter in the wastewater. As the wastewater enters the aeration chamber, it is mixed with the microorganisms and aerated by either diffused or mechanical aerators. The aeration provides the needed oxygen, and the mixing brings the microorganisms in contact with the organic material. This mixture of wastewater and microorganisms in the aeration chamber is called mixed liquor.
- 2.2.4 The aeration basin must be kept uniformly aerated and mixed, thereby providing oxygen for the bacteria, keeping the solids in suspension and allowing a rapid mix of the raw wastewater with the bacteria for oxidation and synthesis of the organic matter. The aeration basin should be inspected each time a site visit is made to determine that uniform mixing is occurring. Improper mixing in the aeration chamber could result in sludge deposits that may become septic, hindering proper operation of the aeration chamber.
- 2.2.5 Diffusers - Air (oxygen) is supplied to the aeration chamber from the blowers to vertical down feed pipes (drop pipes), located along one of the longer sides of the chamber, then and then into the air diffusers. Each drop pipe has a diffuser tee with two CYCLONE type diffusers. The diffuser drops come with a ball valve located at the top of each drop pipe. Under normal operation, these valves should remain open. The diffuser drop is equipped with a union for easy disconnect and removal. See diagram below for detail. A detail is also provided in Part IV, Section A.



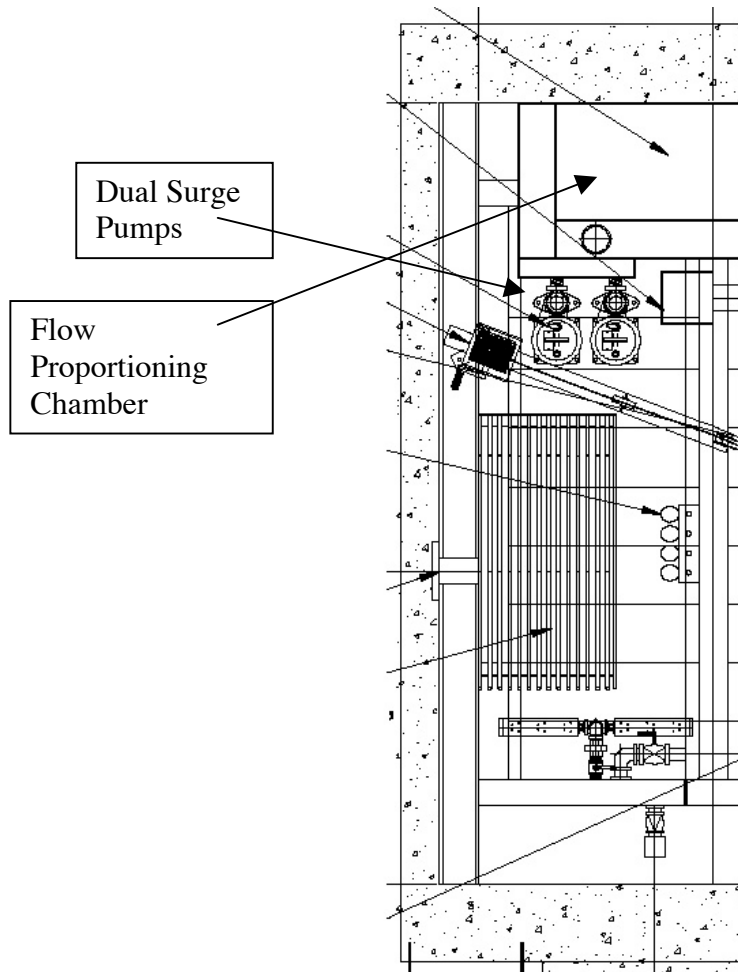
## 2.3 HOPPER CLARIFIER CHAMBER

- 2.3.1 The purpose of the hopper clarifier chamber is to separate floating and settleable solids from the incoming mixed liquor from the aeration zone. The clarifier is an extremely important part of the wastewater treatment plant. If it does not operate properly the clarifier will cause a poor quality effluent. The clarifier must remain quiet so that settled and floating solids can be removed from the mixed liquor. The skimmer and return sludge pump must be operated properly to remove solids from the clarifier in a timely manner.
- 2.3.2 Installed within each hopper clarifier chamber, a positive sludge recirculation system, consisting of one (1) 3" diameter airlift sludge return assembly. The airlift pump systems have the recirculation capacity ranging from 0% to 250% of the design flow. The airline supplying air to the pump shall be equipped with a needle valve varying the capacity of the pump. The airlift pump is firmly supported and shall be equipped with a clean-out plug to allow for easy cleaning and maintenance.
- 2.3.3 Installed within each of the clarifier hoppers is a positive scum and skimming recirculation system consisting of two (2) 2" airlift skimming device. The airlift pump system shall be of a positive airlift pump type, located in a position to skim and return floating material to the aeration chamber. The airline supplying air to the skimming device shall be equipped with a needle valve to regulate the rate of return. The scum intake shall be equipped with an adjustable assembly, which will enable exact positioning of the skimmer at water level without placing a hand under the water.

### 3. Detail Description for Each Unit Process

#### 3.1. FLOW EQUALIZATION

3.1.1 A 10,000-gallon flow equalization system of chambers has been provided to control the peak hourly flow rates of your system and to accommodate batch flows of effluent from the septage receiving facility. All of the incoming surge flow enters into this chamber and is processed by dual submersible pumps. At the system inlet, there is bar screen for catching debris entering into the system. This bar screen is supplied with a drying deck. The operator should clean the bar screen on a regular basis to prevent debris from entering into the system.



- 3.1.2 Flow Equalization Pumps - Dual flow equalization pumps are provided for this system. The pumps are a Gould's model 3887BF WS0534BF. For detailed pump information, refer to Part IV, D.
- 3.1.3 Pump Control Sequence - The Flow Equalization Pumping System is controlled and operated by four (4) level sensors that function with the water level within the flow equalization basin. The following equipment controls this operation and is located within the flow equalization control panel, CP-1. For detailed control wiring information, refer to Part IV Section B.

- 3.1.4 The liquid level sensors are attached to a bracket and hang from the side wall of the flow equalization basin. The following are those liquid level sensors and their function:
- Liquid Level Sensor - LS1 (All pumps off)
  - Liquid Level Sensor - LS2 (Lead EQ Pump on)
  - Liquid Level Sensor - LS3 (Lag EQ Pump on)
  - Liquid Level Sensor - LS4 (High level alarm with light on)
- 3.1.5 The Flow Equalization Pumps will alternate after each pumping cycle, when the pump(s) are turned off by the low water level sensor the alternator will select the lag pump (pump which was not running) to cycle on next if both pumps are operating it will select the pump which has the least amount of run time to cycle on.
- 3.1.6 - Flow Proportioning and V-Notch - The flow equalization pumps pump the incoming flow up into the flow proportioning chamber. The flow proportioning chamber allows the design flow rate to pass into the secondary treatment system. The 45-degree v-notch weir plates are equipped with a bolt assembly, so that once the desired level of the v-notch is reached the screws on the back side of the v-notch weir is tightened so that a minimal amount of liquid can pass behind the weir plate. The operator can manually adjust this to regulate the flows into the system. A detail of the flow box is shown.
- 3.1.7 V-Notch Settings at Design Flow - The following setting for the v-notch should be used when the system is operating at the average design flow:

#### **V-Notch Weir Size & GPM**

<u>Head Height</u>	<u>45 degree v-notch</u>
2-7/8"	13.8 gpm

- 3.1.8 Flow Equalization Blower Unit - It is important to keep the flow equalization chamber aerated while in use. This keeps the incoming waste stream from turning septic and disrupting the aerobic condition within the aeration chamber. Two blower units have been supplied for this chamber. The units are rated at 30SCFM at 5psi. For details on the ROOTS Model URAI-22, refer to Part IV Section D.
- 3.1.9 Flow Equalization Blower Operating Sequence - The flow equalization blower unit operation is controlled by the Flow Equalization control located in CP-1. The blower motor unit operation time will be intermittent and as controlled by the blower timer. The plant operator shall control the operation time. The necessary selector switches shall be provided to allow either automatic or manual operation of the blower motor unit. The blower for the flow equalization chamber is controlled by a programmable mechanical type timer. A selector switch within the control panel shall be used to select the program for automatic operation. The blower for the flow equalization system shall be controlled by a 24-hour, 7-day time clock and shall be capable of being programmed to control the blower run cycle and to adjust both the start set point every 15 minutes on the 24-hour cycle. A selector switch is to be provided with hand off auto for operation selection. For detailed electrical wiring information, refer to Part IV Section B.

### **3.2 SECONDARY TREATMENT SYSTEMS**

- 3.2.1 **Aeration Chamber** – Four (4) 10,000-gallon aeration chambers have been provided for the secondary treatment system. Flow enters this chamber from the flow proportioning chamber discussed previously. It is then split between each train by means of a flow splitter within the flow proportioning chamber. The aeration chambers are the main chambers of the biological treatment process. This is where the most biological treatment takes place because this is where you are creating an ideal environment for aerobic microbes. The operator's only control over this biological process is the control of the air supply for the system.

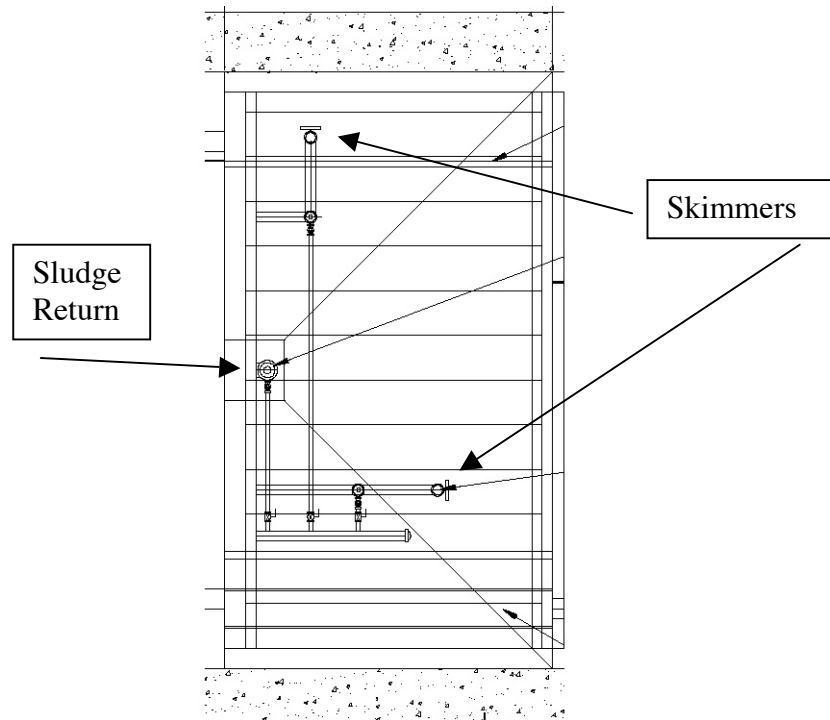
- 3.2.2 Blower Motor Units Secondary– Five blower motor units have been provided for the secondary treatment system. Each blower unit has a capacity of 68 SCFM at 5psi. For details of the ROOTS blower, refer to manual in Part IV Section B. The model of the main blower unit is a model URAI-24. Each blower is designed to handle 100% of the air supply for the secondary treatment system. The two blower units should never be running at the same time as the blower piping was not sized to handle this much pressure. The blowers are each operated on a time clock. Each corresponding time clock should be set so that only one blower is running at a time. It is recommended that one blower be used as a week day blower and one a weekend blower. The amount of time the blower should be run is a function of how the biology of the aeration chamber is performing. To start the system, it is recommended that the blower timer be set for 30 minutes on and 15 minutes off. If this is too much air, that is, if the aeration chamber turns a light brown color, the air should be cut back to 15 minutes on and 15 minutes off. If the system is very dark in color, more air is needed. The timers should first be adjusted to 45 minutes on, 15 minutes off. If the color does not improve, the blower time should be increased incrementally until the color improves. Do not let the aeration chamber be without air for more than 15 minutes on the hour under normal operating conditions. The blowers should never be off for more than 30 minutes at a time to keep the system from going septic, keeping the aerobic microbes stable. During normal operation, it is usually not required to run blowers continuously.

An air filter is attached to the intake of the blower. This filter is of the disposable type (paper), and must be kept clean for maximum blower life. Failure to keep the inlet air filter clean is one of the most common maintenance problems. The blower has a normal discharge pressure of 5psig for this system. There is supplied with each blower unit a pressure gauge and pressure relief valve. The pressure relief valve is adjustable so that the 5psig design pressure can be maintained. It is important to make sure the pressure relief valve is properly adjusted, as if it is too tight, pressure will build up. If the valve is too loose, air could be wasted out of the valve, causing a low percentage of air to make its way to the secondary treatment system. A check valve on the blower discharge is also supplied. It will prevent water from entering the drop pipe when the blower is off. A check valve is located near the discharge of each blower to prevent the blower that is not in operation from rotating backwards. If the rotation of the blower is reversed, a vacuum will be produced. Before startup, the blower should be operated for a few seconds to ensure that it is producing air at its discharge rather than drawing a vacuum. This procedure could prevent water from being sucked into the blower, which could damage the blower and void the factory warranty.

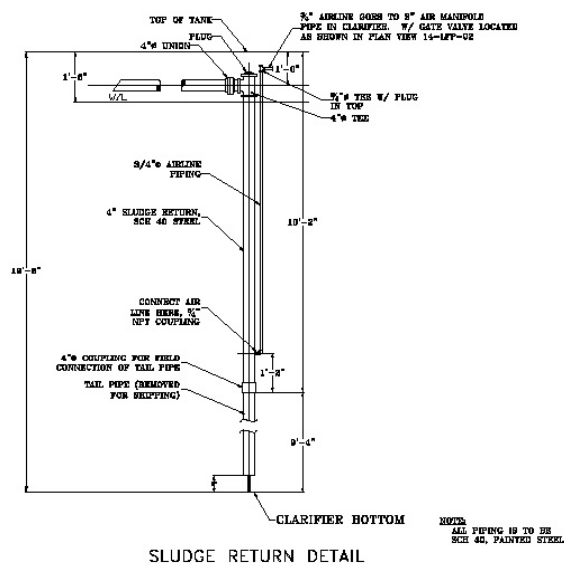
- 3.2.3 Main Blower Operating Sequence – The main blower units operation are controlled by the Main Control Panel, CP-1. The blower motor unit operation time will be intermittent and as controlled by the blower timers. The plant operator shall control the operation time. The necessary selector switches shall be provided to allow either automatic or manual operation of the blower motor units. Each blower is controlled by a program timer. A selector switch within the control panel shall be used to select the program for automatic operation. The three blowers for the secondary shall be controlled by two 24-hour, 7-day manual time clock and an alternator and shall be capable of being programmed to control the blower run cycle and to adjust both the start set point every 15 minutes on the 24-hour cycle. A selector switch is be provided with hand off auto for operation selection. For detailed electrical wiring information, refer to Part IV Section B for CP-1. One of the main blowers shall be able to provide air to either train of the system.
- 3.2.4 Clarifier Chamber – A gravity hopper type clarifier has been provided for each train. Because the purpose of the clarifier is to separate floating and settleable solids from the liquid, it should be opened properly. The operator should inspect the clarifier and its operation thoroughly during every visit. As general maintenance, the clarifier walls should be cleaned off by means of a squeegee at least once a month to prevent a buildup of solids from accumulating on the chamber walls. The main purpose of the clarifier is to settle out solids that have carried over from the aeration chamber. These solids, along with any floatables including oils and

greases, are returned to the aeration chamber by the sludge return and skimmers as described below.

Clarifier Chamber:



3.2.5 Sludge Return - After the mixed liquor has been in the aeration chamber for 24 hours it flows to the clarifier, where settling occurs. The settled biomass, which is now concentrated, is returned to the aeration chamber through the return sludge line as shown below. Sludge returning from the clarifier has not been aerated for several hours, therefore, it will exert an oxygen demand in the aeration chamber. For this reason, while the sludge is being returned to the aeration chamber, the aeration chamber is always being aerated by the main blower units.

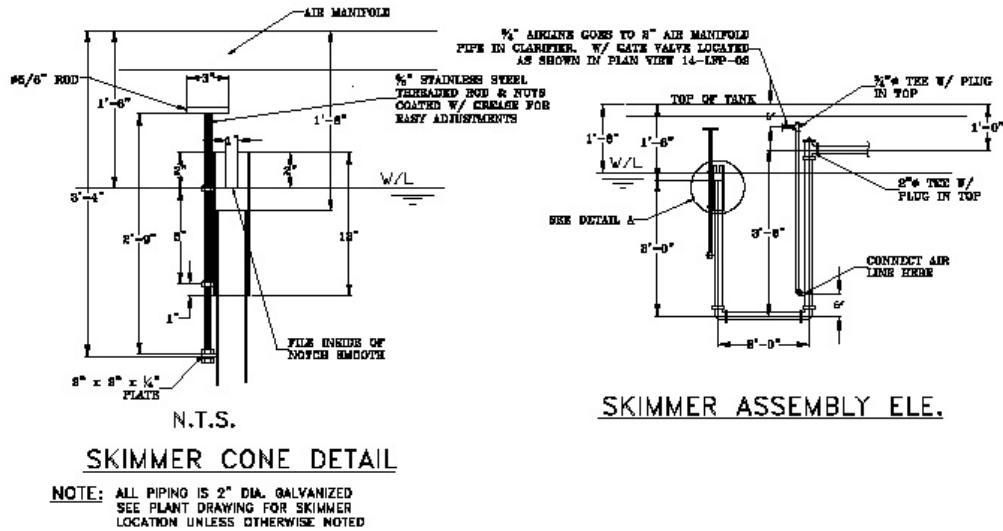


The above detail is taken from the drawing set located in Part IV, Section A of this manual. The sludge return should operate at a half of a pipe full of return sludge at normal operating conditions. If there is more or less flow going through the return pipe, the operator should make an adjustment by the gate valve located on the sludge return pipe within the aeration chamber. The return sludge rate will directly affect clarifier operation. The operator must adjust the rate of sludge withdrawal to maintain a minimum inventory of solids in the clarifier. An excessively high return sludge rate will increase velocities at the inlet to the clarifier and in the clarifier itself. This will disrupt the sludge blanket and cause solids to be swept over the effluent weir. An insufficient return rate may allow solids to remain in the clarifier too long, causing them to become septic, float to the surface, and possibly flow out with the effluent. Gas bubbles in the clarifier are another indication that sludge is remaining in the clarifier too long. Floating sludge and gas bubbles could also indicate equipment failure.

If the operator finds that the valve of the sludge return is open and there is no return flow, this is a sign of plugging. To unplug a sludge return airlift, the operator should remove the cap on the top of the downpipe of the airlift assembly and rod out the pipe until the blockage is removed. While this is not a common problem, it is a possibility, especially if the train is not operating for an extended period.

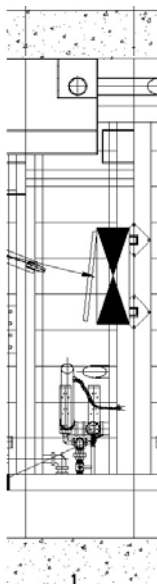
- 3.2.6 **Skimmer Return Assembly** - The other (smaller) line from the clarifier to the aeration chamber is the skimmer. The skimmer returns floating solids from the clarifier to the aeration basin. Unlike the sludge return assembly it is critical that only the minimum air required be supplied to the skimmer. If more air is supplied than is needed, the diffusers or the return sludge airlift pump will be robbed of air. As shown below, the skimmer air is adjusted by the gate valve located on the skimmer line located within the clarifier chamber. The below detail is shown in Part IV, Section A.





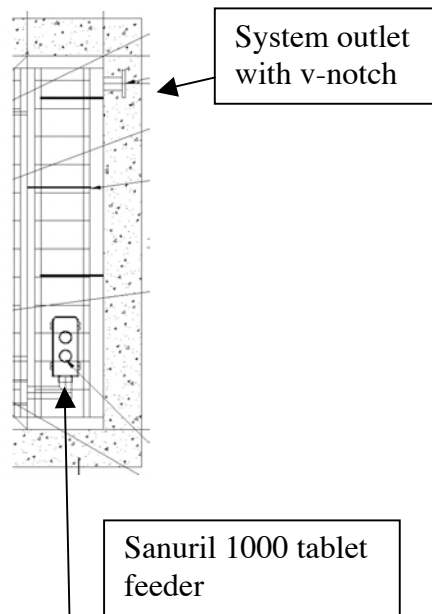
Just as the sludge return assembly has a cleanout procedure, so does the skimmer assembly. This 2" airlift also has a cap at the top of the down pipe of the assembly. If a clog is suspected, remove the cap and rod out the downpipe.

3.2.7 **Sludge Holding Chamber**– A 1,700-gallon sludge holding chamber has been provided for each train, making the total sludge holding capacity 6,800 gallons for the total system. This chamber should be continuously aerated while in use to keep the chamber from going septic. There has been provided for this chamber an airlift type supernatant decant assembly. This airlift is used to skim the clear liquid from the top of the chamber, which further concentrates the contents of the chamber. The clear liquid, or supernatant, is returned to the aeration chamber for reprocessing. Air for this chamber is supplied from the main blower units. The operator can feed the sludge holding chamber from the airlift sludge return of the clarifier chamber. The gate valve located in the aeration chamber on the sludge return should be closed while the gate valve on the sludge return feeding the sludge holding chamber should be opened. This is a manual operation for feeding sludge into the chamber. For details on sludge wasting procedures, refer to Part II, Section D below.



### 3.2.8 – Disinfection Chamber

Chlorine contact Chamber - Two chlorine contact chambers have been provided with a volume of 416 gallons has been provided, complete with two Model Sanuril 1000 tablet feeders. Baffles have been provided to allow for the required 30-minute detention period. The operator should keep chlorine tablets in the feed tubes at all times. The number of tablets can be adjusted depending on the current plant flow rate.



## 4. Sludge Handling and Disposal

### 4.1 - General Summary of Sludge Handling and Disposal

Even when your package extended aeration plant receives the proper amount of food, has the correct pH, is supplied plenty of air, and has good mixing, it will not produce a clear effluent indefinitely. The microorganisms in the treatment plant must be wasted periodically to keep them performing at maximum efficiency. Removal of organic material will cause inert solids to accumulate. Sludge may be wasted to prevent the treatment plant from becoming choked with solids. For the package extended aeration process, solids should remain in the plant for 30 to 40 days. This means that 1/30 to 1/40 of the solids in the plant should be wasted daily. The time the solids remain in the plant is called the solids retention time. If sludge is not wasted routinely, solids may accumulate in the plant and be lost over the discharge weir in the clarifier. Old sludge will also produce a thick, dark, matty foam in the clarifier.

Wasting sludge is a routine process for large treatment plants with well-trained operators. The volumes of the aeration chamber and the clarifier are known, and the suspended solids test can be used to determine the solids concentration in the mixed liquor and in the return sludge. The quantity of solids in the plant may then be calculated, and the solids retention time will determine how much must be wasted daily. Because solids are usually wasted from the return sludge, knowing the solids concentration of the return sludge will allow the operator to calculate the volume of return sludge that must be wasted to an aerated sludge holding tank.

Wasting sludge from small plants is not routine. Unfortunately, many small-extended aeration plants do not have operators who can perform the suspended solids test or facilities that can measure the return sludge rate. In addition, some plants do not have a sludge holding tank. For small plants, the 30-minute settleability test is used to determine when sludge should be wasted. Generally, not more than 20% of the mixed liquor solids, as indicated by the 30-minute settleability test, should be wasted in a week. Not more than 10% of the solids should be wasted at any one time. For example, if settleability tests routinely indicate 50% solids, then the amount of sludge to be wasted is 0.10 (50) equal 5%, and the settleability test after wasting should indicate 50% minus 5% which equals 45%. To achieve 20% wasting for the week, another Settleable solids test is run approximately 3 days later. At that time, 10% of that reading would then be wasted. This procedure exchanges the mixed liquor every 35 days.

- 4.2 Sludge Holding Chambers - There is provided a total sludge holding volume of 6,800 gallons for the system. There are four (4) independently operating 1,700-gallon sludge holding chambers. As discussed, each chamber includes a supernatant decant airlift assembly for concentrating the solids. The sludge retention under normal operating conditions at the average system design flow is as defined below:

System Data = 40000 GPD @ 250 mg/L BOD5

**Total pounds of BOD5 for the system:**

$.04 \times 250 \times 8.34 = 83.4$  lbs BOD per day

Sludge concentration = 10,000 to 20,000 mg/L; use 15,000 for calculation purposes

Estimate 90% treatment at effluent:  $.9 \times 83.4 = 75$  lbs BOD

For every pound of influent BOD you produce .15 pounds of waste sludge

$75 \times .15 = 11.3$  pounds of waste sludge

Number of days of retention (when concentrated)

$6,800 \text{ gal.} = .0068 \times 40000 \times 8.34 \text{ divided by } 11.3 = 200$  days

4.3 Procedures for Wasting Sludge - The following procedures should be followed when wasting sludge to the sludge holding tank:

1. At least 1 hour before wasting sludge, close the air valve to the diffusers in the sludge holding tank. This will allow the sludge already in the tank to settle, leaving a clear liquid (supernatant) on top. The clear liquid is returned to the aeration chamber through the overflow when sludge is wasted to the tank. If the diffusers are not turned off, the same amount of sludge that entered the tank will leave the tank.
2. Run a 30-minute Settleable solids test on the mixed liquor solids. *Remember: only 10% of that reading is to be wasted.* Be sure the blower has been on long enough to completely re-suspend the aeration chamber contents.
3. Open the valve on waste sludge line that leads to the sludge holding tank and then close the valve on the return sludge line leading to the aeration chamber. Valves must be operated in this order, or the clarifier could be backflushed if the blower were operating.
4. Waste sludge for approximately 15 minutes. This is an arbitrary time, with experience, the proper wasting time for each wastewater treatment plant can be determined.
5. Open valve on the return sludge line leading to the aeration chamber and then close the valve on the waste line that leads to the sludge holding tank.
6. Open air valve to the diffusers in the sludge holding tank to obtain good mixing. Once a good rolling action has been established, do not open the air valve any further. *It is critical that this valve be opened after wasting sludge.* If the valve is not opened, the sludge holding tank will become septic and produce a foul odor.
7. Allow the wastewater treatment plant to operate approximately 1 hour before conducting a mixed liquor Settleable solids test in the aeration chamber. No more than 10% of the solids in the aeration chamber should be wasted at a time. Sludge should not be wasted twice in 1 day.
8. Be aware that sludge will eventually become so concentrated in the sludge-holding tank that when the diffusers are turned off, very little clear liquid will appear over the sludge. When this occurs, the sludge holding tank should be pumped by a septic tank pumping truck for proper disposal, or the sludge should be pumped to drying beds. If for any reason the sludge holding tank is pumped, it should be immediately refilled with water to minimize any uplift pressures from groundwater in the surrounding soil.

The U.S. Environmental Protection Agency's report, "Package Treatment Plants," EPA-430/9-77-005, is suggested as another source of information for wasting sludge.

4.4 - Sludge Disposal - When sludge is wasted it is usually either pumped to a scavenger truck or a sludge holding tank. The sludge holding tank is constructed with air diffusers that operate when the plant blower is operating, this keeps the sludge aerobic for final disposal. The overflow from the tank is called the supernatant return. The supernatant is routinely returned to the aeration chamber, as discuss previously. Wasting sludge is usually accomplished by diverting a portion of the return sludge from the clarifier. This is done by opening the waste sludge control valve to the sludge holding tank and closing the return sludge control valve to the aeration chamber.

The thickened sludge in the aerated sludge holding tank may be disposed at an approved landfill, a large municipal treatment plant, or approved land application sites.

## 5. Testing and Record Keeping

- 5.1 **Recommended Tests** - Parameters that are recommended to be monitored and that give a good picture of the treatment plant's condition are settleability, pH, color, dissolved oxygen, and residual chlorine (if chlorine is used for disinfection). If portable test kits are used, everything will fit into a 3-gal plastic bucket. The required test equipment includes a 3-gal plastic sample bucket with rope, DO test kit, pH test kit, two calibrated quart jars, a residual chlorine test kit, and elbow-length rubber gloves. One other piece of equipment needed to operate the plant successfully is a squeegee that is long enough to reach the bottom of the plant.
- 5.2 **Settleability Test** - An indicator of good settling is a test that measures how well the biological floc will settle. There are two such tests, settleability and settleometer test.

The settleability test, or 30-minute settling test, should be considered the major process control test for small package plants. A 1000-mL graduated cylinder or a calibrated Mason jar may be used to determine the percent of settled sludge by volume. A Mason jar needs to be calibrated applying markings on a piece of adhesive tape at 13-mm (0.5 in.) increments from the bottom to where the jar begins to curve. The marks are then labeled from 0 to 100% in 10% intervals. A sample from the aeration chamber (taken after blower has operated for 10 minutes) is allowed to settle in the jar for 30 minutes. After the percent of settled solids is determined, the samples should be taken at the same location in the aeration chamber and at the same time of the day to allow for comparison of tests taken on different days. The sample should not be taken near the plant influent or near a return sludge line. When the settleability test is conducted, the quart jar should be placed in the shade, on a level surface, and away from any vibration caused by the blowers.

The operator should observe the settleability test for the first five minutes. How the sludge settles is just as important as the final amount that settles. During the five minutes of the settleability test, a healthy sludge should compact slowly, forming a screening blanket, and squeezing clear liquid from the sludge. A good settling sludge will settle at 20 to 50% of its original volume after 30 minutes. A problem may exist if the sludge settles quickly, leaving finer particles in the supernatant, even though the final percentage of solids reading is within the acceptable range. A rapidly settling sludge, a cloudy supernatant, and a dark brown color usually indicates an old sludge with a large amount of inorganic solids, in this case, increased sludge wasting would then be recommended. If the settleability test results are less than 20% and the supernatant is cloudy, but the sludge settles slowly and the color is light brown, then a young sludge is probably present. In this situation, the system could be simply lightly loaded.

At times the settleability test results will be above the recommended range. This condition could be caused by either too much or too little sludge in the system. The particular problem can be determined by the 50% Dilution Test. If the wastewater treatment plant is just experiencing start-up, the microorganisms are growing rapidly and have not developed enough weight to settle well. The sludge will have a light brown color and very little settling will occur after 30 minutes. If this is the case, then sludge wasting should be reduced or eliminated until the microorganism population produces a good settling floc. At that time, sludge wasting could be initiated as described in sludge wasting section.

A high sludge reading could also be produced by an old sludge. If sludge wasting is inadequate the sludge will become old and denser, which will make it compact easily. Initially, the percent solids may seem to decrease. If inadequate wasting is continued, the old sludge will eventually accumulate, even though it compacts well. The percent solids reading will continue to increase above the recommended range.

- 5.3 - **Settleometer Test** - Another control test procedure similar to the settleability test is the settleometer test. This test is conducted with a sample from the aeration chamber. The sample is placed in a 1000-mL beaker or a quart jar and allowed to settle for 60 minutes,

with readings taken every 5 minutes for the first half hour and every 10 minutes during the second half hour. Settling results from the settleometer will indicate what is taking place in the clarifier.

The settleometer test readings are then plotted on graph paper, with the time variable on the horizontal axis and the settled sludge reading on the vertical axis. The slope and shape of the curve indicates the sludge quality. The ideal settling curve does not guarantee a clear discharge. (See page 29) The settleometer test simply indicates how the sludge should settle in the clarifier. If the clarifier is designed properly and all units are operating effectively, the effluent from the clarifier should be clearer than the supernatant in the settleometer. If the effluent is not clearer, there is a problem in the clarifier.

After an ideal settling curve has been developed, the operator must try to maintain it, however, there is no cause for alarm if the plant occasionally deviates from the ideal curve. The operator has little control over what enters the plant, if possible, the public should be informed of what should and what should not enter the system. Assuming that the plant is not receiving a toxic material, it is important that the operator recognize possible reasons the settling curve is above the ideal curve and possible reasons why it is below. The 50% Dilution Test is used to determine which condition applies the procedures described previously should then be followed.

At times the actual settling curve may be less than ideal. This condition could result for several reasons. When there is a dashed settling curve, it indicates an old sludge that contains a large amount of inorganic solids that settles very rapidly and has a dark brown color. This condition can usually be corrected by increasing sludge wasting.

When the settling curve is below the recommended range the sludge does not settle rapidly and has a light brown color, then the plant may simply be lightly loaded. Sludge wasting, in this case, would not be required. How the sludge settles, and what color it is will determine whether or not the plant is lightly loaded. Flow data can also help determine if the plant is lightly loaded.

The condition of the settled sludge after 60 minutes is significant. A sludge that begins to rise after 60 minutes may be over-oxidized. A properly oxidized sludge will not rise to the surface until 2 to 4 hours after the test begins. If the sludge begins to rise at the 60-minute mark, sludge wasting is required.

Many parameters can be used to control the operation of package extended aeration plant, for example the F/M ratio, depth of sludge blanket, dissolved oxygen, return sludge rate, and sludge volume index, the settleability and settleometer tests provide the required information, yet do not require a laboratory or a laboratory technician. It is important, however, that the small plant operator understands how to interpret test results.

- 5.4 **pH Test** - As noted before, the aeration chamber should have a pH between 6.5 and 8.5. It should also be clean at all times and chemical reagents should not become contaminated. Once the pH value has been determined, the operator must enter that value on the operating log. Any time a test is conducted it should be entered on the operating log. Poor record keeping is one of the biggest deficiencies for small package extended aeration plant operators. A history of the plant operation is often the key to solving current operating problems.
- 5.5 **Color Test** - The color of the aeration chamber is one of the quickest way is to check the system operation the color should be brown, similar to coffee with cream. If the aeration chamber is this color and has a musty odor similar to a damp basement or mushrooms, the sludge is probably healthy. If the color is gray, the plant is not receiving enough air. Possible reasons for this are that the plant is receiving too much food, the control time clocks are not allowing the aerators to operate enough, the diffusers may be partially plugged, or the plant may have received some toxic material. A black color accompanied by a rotten egg odor indicates that the plant is septic. When this occurs, the plant should be placed on constant aeration until the light brown, coffee color returns. A septic plant is usually the result of poor attention by the operator. Although



aerator and power failures, plugged diffusers, and toxic material will cause the plant to go septic, the most common cause is neglect.

Other colors that may be observed occasionally are white, red, and purple. A white aeration chamber occurs when the plant is extremely lightly loaded. The sludge, in this case, is completely oxidized and only ash remains. Feeding the plant is not recommended. A red color may be encountered when the plant is over-aerated, and a filamentous bacterium called *leptothrix* is present. The sludge will settle poorly and thick matty foam will form. A purple color is not natural, but has been encountered when iron removal water systems, which use potassium permanganate to regenerate the media, use the wastewater system to dispose of backwash and flushing water. Therefore, the operator should know what is connected to the wastewater system. REMEMBER: The package extended aeration treatment plant is designed to treat *domestic waste* only and anything else can cause an operating problem.

Dissolved oxygen (DO) is one of the most important ingredients of the mixture in the aeration chamber. Oxygen is necessary for aerobic bacteria to consume organic material, without it, microorganisms wouldn't survive in septic conditions 5 or 8.5. Either a pH meter or a small liquid color comparator test kit may be used to test the pH. Although the color comparator is excellent in determining pH for operational control, its results may not be accepted by the appropriate regulatory agency.

Highly suspended solids or high chlorine residuals in the testing samples will interfere with the pH test. Samples taken from the aeration chamber must be allowed to settle for about 10 minutes, at which time the pH of the supernatant can be checked. Effluent samples with chlorine residuals greater than 1.0 mg/L must be dechlorinated. If a color comparator is used, its range should be at least one pH unit above 8.5 and one pH unit below 6.5. The wide range pH test kit, with a range from 4.0 to 10.0, is popular among small plant operators. Whether a pH meter or a color comparator kit is used, the instructions furnished with the test equipment must be followed carefully. The amount (concentration) of oxygen that can be dissolved in the mixed liquor is temperature dependent, the colder the water, the greater the amount of oxygen that can be dissolved. The oxygen concentration is measured in milligrams per liter (mg/L), the ideal oxygen concentration in the aeration chamber is 2 mg. The DO in a clarifier should be at least 1 mg/L to prevent septic conditions, which would result in gas bubble formation, rising sludge, and unpleasant odors. When wastewater flows are erratic, aeration will be difficult to yield the ideal 1.5 oxygen concentration

- 5.6 Dissolved Oxygen (DO) Test -. It is better to have a DO concentration that is greater than 2 mg/L than to let it become completely depleted so fewer unpleasant consequences result.

The test for DO is performed on the mixed liquor from the aeration chamber for operational control, and may have to be conducted on the plant effluent for regulatory control. Because oxygen is required in the aeration chamber at all times, plants that are aerated intermittently must be sampled near the end of the "off aeration" period, to indicate the minimum oxygen dissolved in the water. The best method for testing the DO in the aeration chamber is to use a DO meter. If the probe is placed at mid-depth in the aeration chamber, the DO concentration can be read directly. The meter eliminates the need to obtain a sample from the aeration chamber, a common source of error. Sampling is ineffective when the samples are inadvertently agitated, which induces oxygen, and when the sample is taken near the surface, which does not give a true indication of the oxygen content in the aeration chamber or if the sample is not tested immediately. If a DO meter is unavailable, the proper sampling equipment to obtain a sample at mid-depth of the operation chamber should be used.



## 6. Maintenance Management

Recommended Maintenance Schedule - In addition to the required tests as described above, below is a recommended schedule of maintenance for your system.

### 6.1 Daily Maintenance Procedure

- Make a daily visual inspection of the plant to be sure that all mechanical equipment is operating.
- Rake bar screen and burn or burr screenings. (If applicable)
- Check to see that there is equal air distribution along entire length of tank.
- Check to see that sludge return pumps are returning sludge to the aeration chamber.
- Check to see that air lift skimmer is working.
- Check and break up scum, in settling tank to insure proper return through skimmer (See Section for, Plant Adjustments).
- Check flow proportioning chamber for proper operation
- Check chlorine tablet feeder for tablets

### 6.2 Weekly Maintenance Procedure

- Thirty-minute settling test - Collect one sample from aeration tank and one from the effluent from the settling tank (See Section VII, Test Procedures).
- Clean the grease and floating solids from walls and water surface of aeration and settling tanks.
- Check all equipment to see that it is operating properly and if any fuses are blown or circuit breakers opened.
- Clean the growths and accumulated solids from weirs and pipe inlets.
- Check to see if diffusers and aerators are all working properly and not plugged.
- Check to see if airlift sludge return pump or skimmers is clogged or about to clog.
- Run pH and run dissolved oxygen test (See Section for, Test Procedures).
- Clean trash and weeds from around plant and equipment.
- Record average daily effluent flow in plant log

### 6.3 Monthly Maintenance Procedure

- Check blower oil level
- Check air filters and clean when necessary.
- Update plant log

- Annual Maintenance Procedure

1. Wire-brush and paint all rusted metal and touchup paint any areas cleaned.

Notes:

- a. Refer to equipment manufacturer's operation and maintenance manuals.

OPERATION & PREVENTATIVE MAINTENANCE	DAILY	WEEKLY	MONTHLY	3 MO	6 MO	YEARLY	AS NEEDED
<b><i>Inlet &amp; Outlet Facilities</i></b>	X						X
1. Clean weirs, weir troughs, & weir boxes							
2. Flush influent sewer, if possible, use water from fire hydrant or street cleaning water truck		X					
<b><i>Screening</i></b>							
1. Remove & dispose of rags & accumulations from bar-screens	X						X
<b><i>Aeration Basin</i></b>							
1. Visually check aeration system for even air distribution, no dead spots	X						
2. Raise & clean rags from diffusers		X					
3. Check for air leaks around base and fittings of blower	X						
4. Check blower motor and bearings for excessive heat	X		X				
5. Check aeration system for unusual noises or vibration	X						
<b><i>Clarifier</i></b>							
1. Remove any floating material on top of clarifier	X						
2. Verify that scum skimmer airlift is operating properly	X						
3. Scrub weirs with brush and squeegee sidewalls		X					
<b><i>Pumps Motors and Mixers</i></b>							
1. Check for blockages in Return airlift return pumps	X						
2. Check pumps for clogging or near clogging condition		X					

#### 6.4 Recommended Spare Parts

Below is the recommended spare parts list for your system:

(Contact RWL Water for a quote)

- Case of Blower Oil
- Case of replacement filter elements for each size blower
- Three pressure gauges
- One pressure relief valve of each size
- Two spare diffusers
- Blower repair kit for each model blower
- Two sets of v-belts
- Two liquid level sensors
- One overload of each size
- One circuit breaker of each size
- Replacement anodes
- Touchup paint
- 45LB pail of chlorine tablets

## 7. System Startup Guide

### 7.1: Prior to our arrival. Items to be completed by Contractor

1. All equipment must be installed per specifications, including blowers, controls, and all other equipment and component parts supplied to make the system complete and operational.
2. All equipment must be connected to the plant as per specifications, including all external piping involved with the operation of the system.
3. All equipment requiring electrical connections must be completed.
4. Power must be supplied to the system.
5. The system must be filled with clean water to the point of flowing over the clarifier weirs to exit the system.
6. In order to leave the system operational when we leave, the inlet and outlet connections should be made. Normal flow through the system is good at the time of operator training.
7. Any chemicals required for the operation, such as alum or lime for phosphorus removal, must be supplied and available at time of start-up

### 7.2: After our arrival at the treatment system.

1. A visual inspection of all equipment will be done.
2. A check for oil and lubrication of required equipment will be done.
3. The blower units and any pumps involved should be checked for rotation.
4. All electrical equipment will be tested for correct rotation, function, amp draw, and alignment.
5. All equipment requiring adjustments will be done, which includes weirs, skimmers, level sensors, and any other equipment requiring adjustment.
6. After all adjustments are completed and tested the operation and maintenance training will begin.
7. We will first start with the maintenance of all the equipment. Which will cover the when and how to take care of all the equipment involved in the system.
8. We will then cover the function of each section of the system, which includes flow equalization, aeration basin, clarifier, sludge holding, Chlorine contact chamber
9. We will then go through each piece of equipment supplied by RWL Water, and explain how it operates and why it is required.
10. The above procedures will take us through the system about three (3) times and after this we will be open for questions.
11. Lubricate the blower in accordance with the manufacturer's instructions. Fill the blower casing with oil of the correct grade and amount.
12. Inspect operation and direction of rotation of the pumps and the air blowers.
13. Check the belt drive for alignment, centering of sheaves on shaft, and tension on air blower.

## 8. Wastewater Treatment System Troubleshooting Guide

### MOST COMMON PROBLEMS AND PRACTICAL SOLUTIONS

#### 1. Motors will not run:

- a. General power outage
- b. Fuses blown
- c. Motors overloaded-push re-set button; check overload heaters if reset does not start motor.

#### 2. Excessive Foaming:

- a. Over Aeration – reduce blower run time
- b. Lack of solids – (usually found only during first month of operation).
- c. Excessive use of detergents – eliminate before they enter the plant.

#### 3. Equipment will not work on automatic:

- a. Check set points on HMI-check positions of H-O-A switches
- b. Overload may be released – push reset

#### 4. Sludge accumulation on top of settling tank:

- a. Air-lift skimmer not returning
- b. Sludge return pumps not returning or not returning enough – check clarifier for sludge build-up
- c. Excessive amounts of grease – check grease traps and clean, if necessary; or eliminate before entering plant (if required)

#### 5. Large quantities of solids going over effluent weir:

- a. Sludge pumps not returning or not returning enough – check airlines for blockage
- b. Plant overloaded – check sewage flow and volume and have raw sewage analyzed for BOD and suspended solids
- c. Remove sludge from clarifier more completely; when sludge clings to vertical surface, remove by scraping with squeegee.

#### 6. Roll in aeration tank not uniform:

- a. Adjust valves at drop pipes
- b. Diffusers bad – pull drops, check diffusers for clogging
- c. Check blowers be sure 100% of design air volume is being delivered

#### 7. Skimmer not returning or returning enough:

- a. Check for blockage around skimmer cone – clean if necessary
- b. Check airline – adjust if necessary

## 9. Wastewater Treatment System Plant Adjustment

After the plant is filled, several adjustments will need to be made. As water begins to enter the flow equalization chamber, the raw wastewater will be pumped from the flow equalization chamber to the Aeration chamber through an adjustable weir flow control box, adjust the flat weirs located on each side of the flow box so the correct amount of flow will then be transferred into the Aeration Zone. This is calculated by dividing the plant capacity of GPD by 1440 to obtain the GPM influent rate. (Refer to V-notch flow chart this section. Failure to perform this adjustment results in "over loading" the plant.

If water is not flowing over the clarifier weir across its entire length of the trough, adjust the "V" notch weir plate so an even distribution is obtained. Failure to perform this adjustment results in "short circuiting" a portion of the clarifier flow which tends to draft solids up and over the weir. Sludge lost in this manner increases effluent solids and BOD, and also causes a loss of sludge from the plant if allowed to continue. Proper use of the clarifier depends on full use of designed weir length.

Sludge return is also important to plant and clarifier operation. Extended Aeration Plants operate on a 150% sludge return rate using one or more air lift pumps employing air regulated by valves. This means that for every gallon of water entering the plant, a gallon of sludge is returned from the Clarifier to the Aeration Zone. In normal practice, sludge return is based on plant design flow in GPM and return pumps operate at a constant rate. If practical, the airlift pump flow can be measured with a 5-gallon bucket and a stopwatch. As an example, a 7200 GPD plant will have a sludge return rate of about 7.5 GPM. This is calculated by dividing the plant capacity of GPD by 1440 to obtain the GPM return rate. The sludge return pump provided should pump 1/2 of the GPM calculated. When it is impractical to measure flow by bucket, adjust the air so that a full-flow pipe is being discharged. After solid growth has stabilized, a sample of the discharge, when allowed to settle 30 minutes should show that 1/2 to 3/4 of the volume is settled sludge. If less than 1/2 is sludge, reduce the air to the pump. If more than 3/4 is sludge, increase the air to the pump. When the sludge return is not high enough, sludge will be black and will smell bad. (For anoxic zone see Section IX).

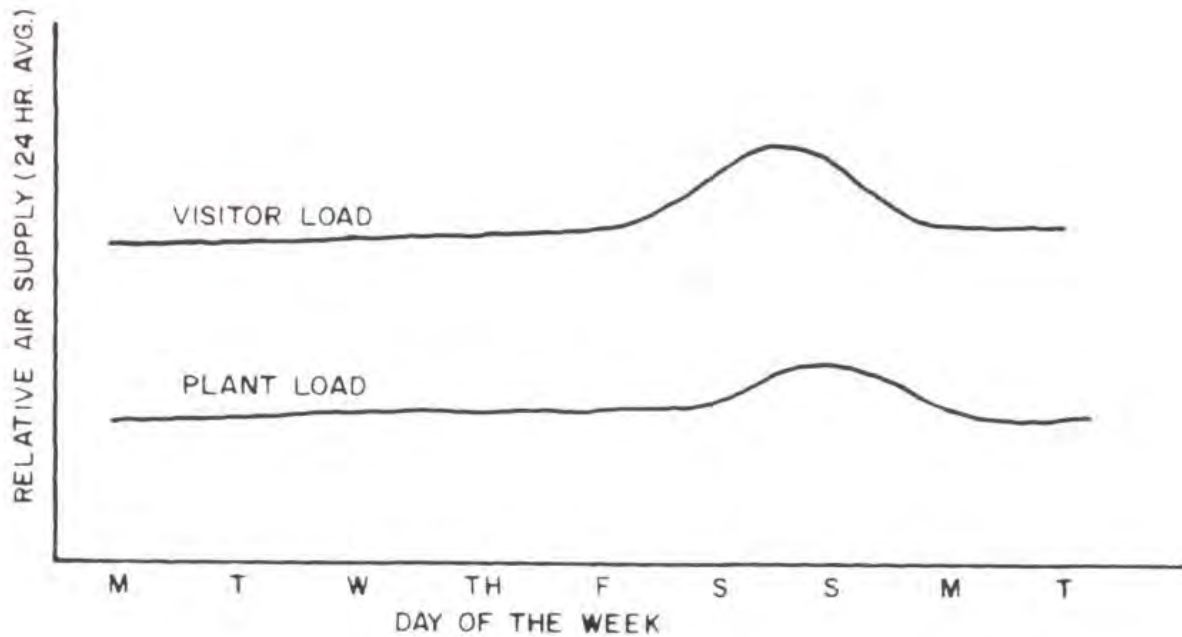
The aeration system needs to create enough mixing action to rapidly rotate contents of the tank. If this does not occur, check blowers and lines to be sure that 100% of designed air volume is being delivered. Failure to provide a proper roll will permit solids to settle in the lower portion of the Aeration Zone and produce an anaerobic condition. After 30 minutes, check the Mixed Liquor Dissolved Oxygen concentration as described in the Sampling and Analysis Section of the Operating Instructions. The DO concentration should be 1 mg/l or greater. If DO is less than 1 mg/l, the air supply is inadequate and should be investigated. You should look for valves not fully open; a leak in the airline or possibly too much air is being used for the airlift sludge return pumps. If the problem is not found in the system, then it is possible that the wastewater is septic or stronger than anticipated.

During normal operation, it will not be required to run blowers continuously; time clocks that activate the blower circuits several times each day are recommended, if allowed by state regulations. In the case of alternate use of two blower/motor units, an alternator located within the control panel will be supplied, each time one blower unit shuts off with the time clock settings this will activate the alternator to start-up the second blower, this will occur each time the time clock calls for an "off" run time. Time clocks with day-of-the-week wheels and those with 15 minute operational intervals throughout the 24 hour period (for on off flexibility) are supplied.

The use of a time clock is more economical than air bleed off and allows for adjustments to improve effluent. If the clarifier effluent quality is poor, a change in run time may be recommended instead of, or in conjunction with, a return sludge rate and/or wasting rate adjustment. At least 7 days should be allowed for the mixed liquor to respond before any other changes are made, except for when the plant goes septic. The aeration chamber of a plant receiving design flow should not be without air for more

than 60 minutes. Graph shown below gives a typical aeration cycle for a plant that is heavily loaded on weekdays. Aeration cycles could vary during the day if most of the loading is received in a couple of relatively short periods of the day.

Adjustment of the return sludge rate and of the aeration times are only too many variables that could affect effluent quality. pH and temperature were discussed previously. In addition, good mixing is needed in the aeration compartment and the proper F/M ratio, as controlled by sludge wasting is important. With experience, an operator should be able to evaluate how each variable affects the plant and make the necessary corrections.



	6 PM-6 AM		6 AM-6 PM	
	ON	OFF	ON	OFF
<b>BLOWER #1</b>				
TU	15	45	15	45
W	15	45	15	45
TH	15	45	15	45
F	15	45	15	45
<b>BLOWER #2</b>				
S	15	15	15	30
SUN	15	15	15	30
M	15	15	15	30



Skimmer return cone in clarifier should be adjusted so that the water will be about 3/8" to 1/2" below the top of the trough. Adjust air valve so that water is drawn out of the scum trough for maximum water volume returned to aeration chamber.

Discharge flow rate is based on the following formula:

$$\begin{aligned}
 \text{F (cubic feet/second)} &= 0.50 H^{2.5} \quad 22\frac{1}{2}^\circ \\
 &= 0.67 H^{2.5} \quad 30^\circ \\
 &= 1.03 H^{2.5} \quad 45^\circ \\
 &= 1.43 H^{2.5} \quad 60^\circ \\
 &= 2.48 H^{2.5} \quad 90^\circ
 \end{aligned}$$

HEAD "H"		DISCHARGE OVER WEIR – GPM "V-NOTCH WEIR ANGLE				
INCHES	10 <sup>TH</sup> OF FOOT	22½°	30°	45°	60°	90°
1	.083	0.4	0.5	0.8	1.2	2.0
1¼	.104	0.8	1.0	1.6	2.2	3.9
1½	.125	1.2	1.7	2.6	3.5	6.1
1¾	.146	1.8	2.4	3.8	5.2	9.1
2	.167	2.6	3.4	5.3	7.3	12.7
2¼	.188	3.4	4.6	7.1	9.8	17.1
2½	.208	4.4	5.9	9.1	12.7	22.0
2¾	.229	5.6	7.5	11.6	16.1	27.9
3	.250	7.0	9.4	14.4	20.1	34.8
3¼	.271	8.7	11.4	17.9	24.9	43.1
3½	.292	10.3	13.8	21.3	29.6	51.3
3¾	.313	12.3	16.4	25.3	35.2	61.0
4	.333	14.4	19.2	29.6	41.1	71.2
4¼	.354	16.7	22.3	34.5	47.8	83.0
4½	.375	19.3	25.8	39.8	55.3	95.8
4¾	.396	22.1	29.5	45.6	63.3	109.9
5	.417	25.2	33.6	51.8	71.9	124.8
5¼	.437	28.3	37.8	58.4	81.1	140.6
5½	.458	31.9	42.5	65.6	91.1	158.0
5¾	.479	35.6	47.4	73.3	101.7	176.4
6	.500	39.7	53.0	81.8	113.6	196.9

## 10. Wastewater Treatment System Test Procedures

### Example Calculations Sludge Scale Reading:

1. Glass Jar:  
 (Scale reading) x (10) = % sludge volume  
 Example: (2.5) (10) = 25% sludge volume

2. 1,000 ml Graduated Cylinder:  

$$\frac{(\text{Scale reading})}{10} = \% \text{ sludge volume}$$

Example:  

$$\frac{250}{10} = 25\% \text{ sludge volume}$$

3. 2-Liter Beaker Marked from 0-1,000  

$$\frac{(\text{Scale reading}) \times 100}{1,000} = \% \text{ sludge volume}$$
  
 Example:  

$$\frac{250 \times 100}{1,000} = 25\% \text{ sludge volume}$$

### **pH Test:**

#### **Purpose:**

This daily test is used to determine the acidity or alkalinity of the wastewater, both the raw waste and mixed liquor.

#### Interpretation

A "neutral" pH is 7. Below that, an acidic condition exists and above 7 alkaline conditions exist. The most favorable pH for a biological system is between 6.5 and 7.5, but the aeration basin may have a range of 5-8. Extreme changes in raw waste pH may indicate an industrial spill. If the pH does change abnormally, it can be corrected by adding certain chemicals. The state regulatory official or the operator's consulting engineer should be contacted for instructions.

pH change not related to industrial spills may be observed. A low pH following clarification may indicate that the sludge is remaining too long in the clarifier.

#### Test and Interpretations

Listed below are sampling locations and tests that can be performed at a treatment plant. The list includes both those for operational control of the plant and is used to confirm conditions suspected in plant observation and those that measure the efficiency of the treatment system and are used for reporting to the state regulatory agency. The tests indicated by asterisks are those for which the portable laboratory can be furnished.

Raw Wastewater: BOD5, Suspended Solids (SS), pH\*, Temperature, Flow

Aeration Tank: Mixed Liquor Suspended Solids (MLSS), Centrifuge Settleometer Settleability\*, pH\*, Dissolved Oxygen (DO)\*, Temperature

Clarifier: BOD5 In/Out, SS In/Out\*, pH In/Out\*, DO In/Out\*, SS of Returned Sludge\*, Settleability, Turbidity Out

\*Those test procedures that are not covered in the Test Booklet can be found in detail in the EPA 430/9-77-005.

Following is a discussion of the above tests and how they apply to treatment plant operation:

### Settleability Test

#### Purpose:

This test is conducted daily to assist the operator in routine process control and identification of specific problems. It involves obtaining samples from the aeration tank and clarifier, setting them at within five minutes of collection and allowing the samples to settle for a 30 to 60 minute period.

#### Interpretation

#### Well Operating Plant:

1. **Mixed Liquor:**
  - a. Sludge will be dense and will stay settled for at least one hour.
  - b. Sludge reading should be about 50-70 percent at five minutes, 35-50 at 30 minutes and 30-40 percent at 60 minutes. At about 30 percent at 1 hour, the foam in the aeration tank begins to increase and turns white and the color of the tank contents gets lighter.  
Note: These figures are typical values and will vary from plant to plant.
2. **Settling Tank Effluent:**
  - a. Clear and solids free
  - b. Slight "dusting" of sludge on bottom of jar
  - c. Light solids suspended in clear supernatant

#### Poorly Operating Plant

1. **Mixed Liquor:**
  - a. Turbid settling vessel supernatant, black sludge, and odor (plant not getting enough air)
  - b. Reddish color (over aeration)
  - c. Solids in jar rise within an hour after settling (over aeration)
  - d. Settleability after 5 minutes either above 80 percent or below 40 percent
2. **Settling Tank Effluent:**
  - a. Turbid settling vessel supernatant (sludge is being mechanically torn apart in clarifier, or the sludge has gone septic due to remaining in clarifier too long. Sludge return line may be plugged).

### Settleometer Test:

#### Purpose:

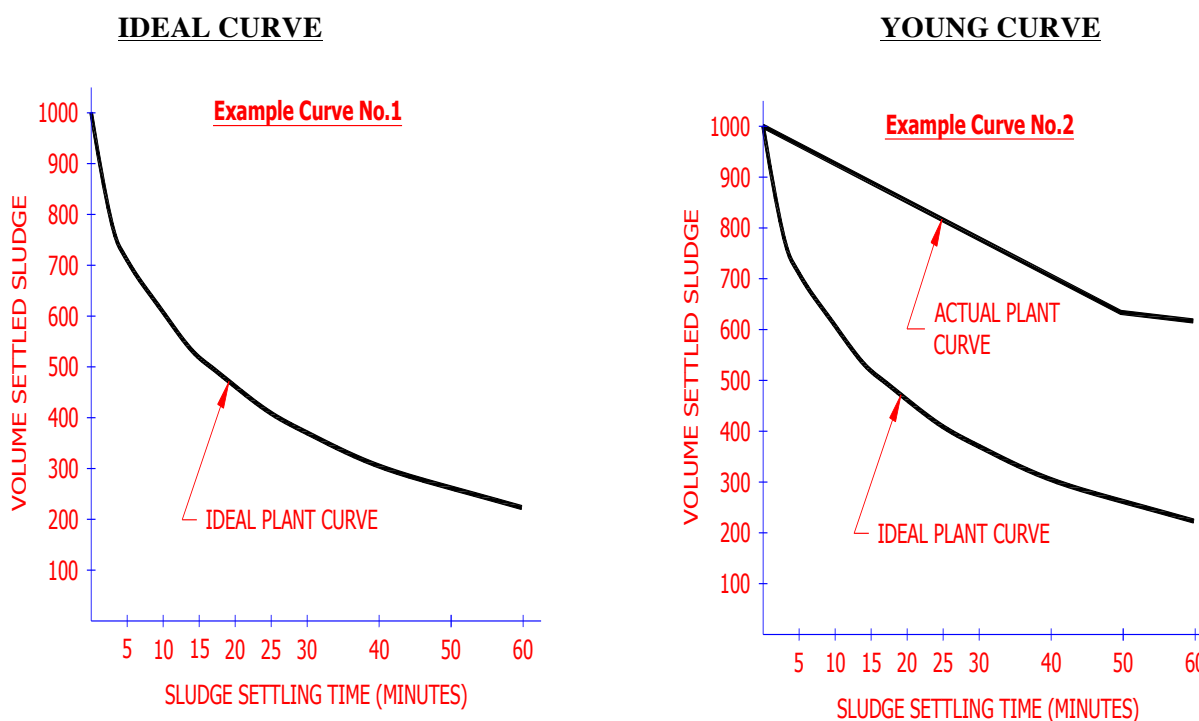
This daily test is to observe sludge quality and to give the operator advance warning of the need to change process control. It is more informative than the previously mentioned settleability test.

### **Interpretation:**

Plot the sludge settling data as shown in Example Curve No.1. A typical plant that is operating properly should develop a similar curve. In each plant, a particular curve will occur when all phases of the plant are operating well;

I.e., clear effluent, good settling in the clarifier, proper color. This curve, reflecting good operation of the plant becomes the curve that the operator strives to maintain.

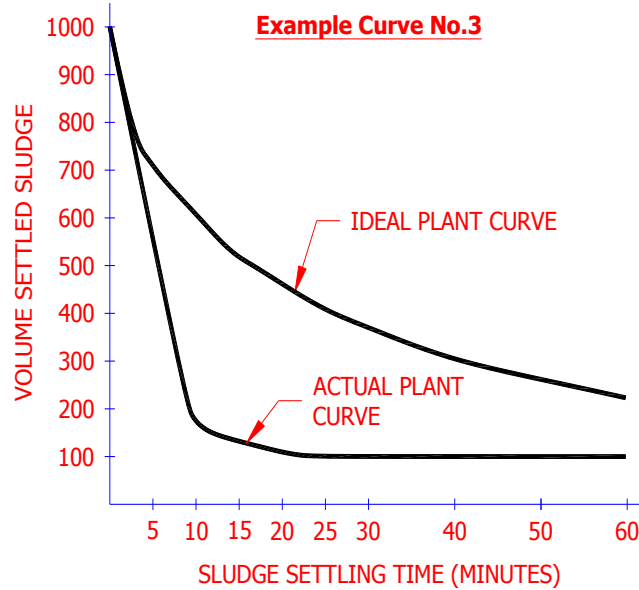
**NOTE:** Following Diagrams.



When the curve tends to rise from the ideal plant curve, as depicted in Example Curve No.2 (usually accompanied by excessive white sudsy foam in the aeration basin), the sludge age is probably young and the return sludge rate from the clarifier should be adjusted. This is usually done in steps of 20 percent increase at one time. This also should be accomplished by decreasing the sludge wasting from the system and reducing the air into the aeration basin.

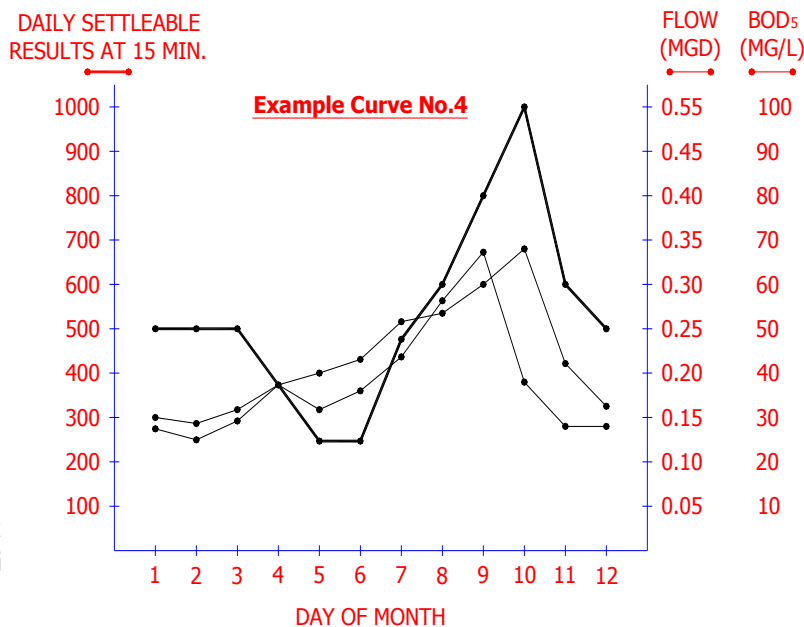
Possible causes of this condition are too great or too fast of removal of sludge from the system or high organic load.

OLD SLUDGE



When the resulting curve drops down the ideal plant curve, as depicted in Example Curve No. 3 (usually accompanied by thick, scummy, dark tan foam) the sludge age is considered to be too old and the operator should begin to increase the sludge-wasting rate. (See the topic Observations: Aeration Tank, of Section 2 for information on sludge wasting). Possible causes are: reduced organic loading, too high a return rate from the clarifier, long periods of over aeration, and retaining old sludge for long periods of time. These day-to-day curves may be combined into a weekly or monthly graph as in Example Curve No. 4 along with additional data from flow, BOD<sub>5</sub>, or just the operator's observation of the clearness of the supernatant. A scale could be made from 0-10 with "0" being a perfectly clear supernatant after 60 minute of settling and 10 would represent a very murky liquid. This will give the operator a graphic view of the possible causes for changes in the process. The operator should then be able to know the limits of the plant, such as when a certain hydraulic surge or flow will cause solids loss and how long it takes to cause the loss, or at what MLSS level range does the clarifier perform well. It should also enable the operator to answer questions regarding the plant's ability to accept additional loads connected to the plant.

GRAPHING LAB RESULTS



The settlemet National Traini

ns available from the

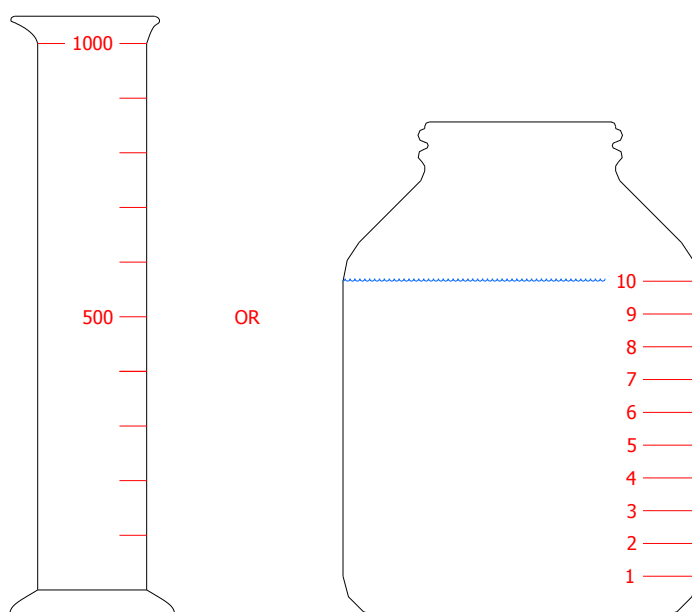
## How to Perform Settleability Test

### Purpose:

This test is conducted daily to assist the operator in routine process control and identification of specific problems, using one of the following:

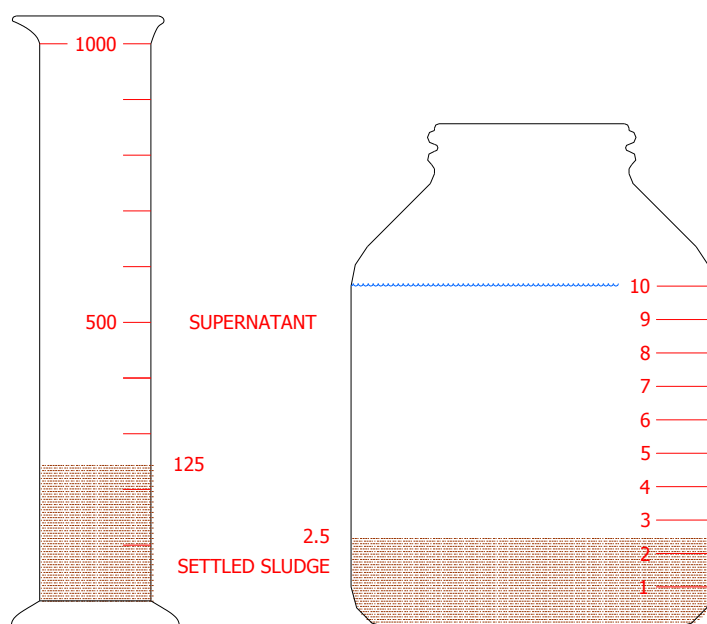
### Equipment:

1. Quart of liter jars (clear glass) marked with a scale from 1-10.
2. Graduated glass cylinders.



**Procedure:**

1. Fill the container with mixed liquor (liquid from aeration tank.) It should be filled to the upper mark on the scale.
2. Let container sit for 60 minutes.
3. At 5, 30, and 60 minutes note:
  - a. Mixed Liquor
    1. Scale reading at top of settled sludge
    2. Density of sludge (thick or light)
    3. Clarity of supernatant (clear or cloudy)



Low pH in the mixed liquor in plants with high sludge age may be caused by nitrification depleting alkalinity, particularly if the alkalinity of the raw waste is low (less than 100). Sodium bicarbonate may be added without causing problems. Check with your consultant or regulatory personnel.

Note: The following tests used color comparison and will not be allowed by U.S. EPA for NPDES reporting. The procedure is included for use for process control as a handy tool.

**Equipment:**

1. pH comparator
2. Brom thymol blue indicator
3. Eye dropper with a 1-ml mark on glass tube



**Procedure:**

1. Obtain a fresh sample of raw waste.
2. Fill the tubes with a portion of the sample.
3. To one tube add the amount of indicator recommended on pH disc.
4. Place tube with indicator in the opening behind the clear glass.
5. Place tube without indicator in the opening behind the colored disc.
6. Compare colors by rotating the disc. Read the pH of the indicator having the color closest to the sample color.
7. Wash and dry sample tubes.
8. Repeat procedure-using supernatant from a sample of mixed liquor. This test should run within 10 minutes of collection time.

**Dissolved Oxygen Test (DO)****Purpose:**

Dissolved oxygen can be determined by using a meter by Hack Kit, which has been supplied. It is important to maintain proper DO levels in the aeration basin for an activated sludge process to work.

**Procedure: (High Range [1 drop = 1 mg/l DO])**

1. Fill the glass-stoppered DO bottle with the water High Range to be tested by allowing the water to overflow the bottle for 2 or 3 minutes. Be certain there are no air bubbles present in the bottle.
2. Add the contents of one pillow each of Dissolved Oxygen 1 Reagent Powder and Dissolved Oxygen 2 Reagent Powder. Stopper the bottle carefully so that air is not trapped in the bottle. See Note: A. Grip the bottle and stopper firmly and shake vigorously to mix. See Note: B. A flocculant precipitate will be formed. If oxygen is present the precipitate will be brownish-orange in color.
3. Allow the sample to stand until the floc has settled halfway and leaves the upper half of the bottle clear. See Note E. then again shake the bottle and let it stand until the upper half of the bottle is clear.
4. Remove the stopper and add the contents of one pillow of Dissolved Oxygen 3 Reagent Powder. Carefully restopper and shake to mix. The floc will dissolve and a yellow color will develop if oxygen was present. This is the prepared sample.
5. Fill the plastic measuring tube level full with prepared sample and pour it into the mixing bottle.
6. While swirling the sample to mix, add PAO Titrant dropwise, counting each drop, until the sample changes from yellow to colorless. The dropper must be held in a vertical manner. Each drop is equal to 1 mg/l-dissolved oxygen. See Note F.

**Low Range: (Low Range [1 drop = .02 mg/l DO])**

If the result from Step 6 is very low (such as 3 mg/l or less) it is advisable to test a larger sample to obtain a more sensitive test. This may be done to titrating directly in the DO sample bottle as follows:

1. Using the prepared sample left over from Step 4 above, pour off the contents of the DO bottle until the level reaches the mark on the bottles.
2. While swirling the DO bottle to mix the sample, add PAO Titrant dropwise, counting each drop, until the sample changes for yellow to colorless. Each drop of PAO Titrant added is equal to .02 mg/l dissolved oxygen in the sample. See Note F.

**Notes:**

- A. It is a bit tricky to stopper the DO bottle without trapping an air bubble inside. To avoid this problem, incline the DO bottle slightly and insert the stopper with a quick thrust. This will force air bubbles out. If bubbles are trapped in the DO bottle, in Steps 2 or 4, the sample should be discarded and the test started over.
- B. A small amount of powdered reagent may remain stuck to the bottom of the DO bottle at this point, but this will not affect the test.
- C. Do not allow the PAO Titrant to stand in direct sunlight as it is decomposed by ultraviolet radiation.
- D. If DO is to be determined in sewage, pretreatment with Copper Sulfate-Sulfamic Acid Solution is required.
- E. In samples that contain high concentrations of chlorine, such as seawaters, this flow will not settle. However, no interference is observed as long as the sample is allowed to stand in contact with the flocculant for 4 or 5 minutes.
- F. A more sensitive test can be performed by using Starch Indicator Solution (Cat. No. 349.13, not included in kit) while titrating the sample with PAO Titrant. To use effectively, titrate the sample until the color begins to change from yellow-brown to light yellow. Add two drops of Starch Indicator Solution. Continue titration, sample indicates the exact concentration of dissolved oxygen in the sample.
- G. For a better definition of test procedures, refer to pamphlets located in your test set

CDF Engineering LLC  
Civil Engineering & Land Surveying Consultants  
P.O. Box 2985 Wailuku, HI 96793  
Phone: (808) 891-2400 - Fax: (808) 879-2402  
[www.cdfengineers.com](http://www.cdfengineers.com) - Lic. No. ABC-33139



Page 79

## **APPENDIX E**

### Geotechnical Engineering Report

# ISLAND GEOTECHNICAL ENGINEERING, INC.

*Geotechnical Consultants*

330 Ohukai Road, Suite 119  
Kihei, Maui, Hawaii 96753  
Phone: (808) 875-7355  
Fax: (808) 875-7122

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October 28, 2015  
Project No. 131599-TM

CMBY 2011 Investment, LLC  
Attn.: Blanca Lafolette  
P.O. Box 220  
Kihei, HI. 96753

Subject: **Field Percolation Test Report #1 and Test Pit  
WWTP and Percolation Testing at Puunene Heavy Industrial Subd.  
Puunene, Maui, Hawaii**

## Percolation Testing

Three (3) field percolation tests were performed in accordance with the Hawaii State Department of Health, Wastewater Branch test procedure. The location of the percolation test's (Perc-1, Perc-2, Perc-3) are shown on the attached plan, Plate P. The Hawaii State Department of Health, Wastewater Branch test forms are attached as the last three pages of this report.

Percolation Test 1 was performed at a depth of 3.0 feet below existing grade and the percolation rate was 6 minutes per inch.

Percolation Test 2 was performed at a depth of 3.0 feet below existing grade and the percolation rate was 12 minutes per inch.

Percolation Test 3 was performed at a depth of 3.0 feet below existing grade and the percolation rate was 7 minutes per inch.

## Test Pit

One test pit (Test Pit 1) was performed at the site at the location shown on the attached plan, Plate P. The log of Test Pit 1 is attached as Plate 1.

Test Pit 1 encountered moderately stiff gravelly SILT with sand, cobbles and boulders from the surface to a depth of 2 feet below existing grade followed by very stiff SILT with sand to a depth of 3 feet below existing grade followed by very dense silty GRAVEL with sand to the final depth of the test pit at 4.5 feet below existing grade where BASALT ROCK was encountered and could not be penetrated at 4.5 feet below existing grade.

Should you have any questions or require any further information, please do not hesitate

CMBY 2011 Investment, LLC  
October 28, 2015  
Page Two

to contact us.

Very truly yours,

ISLAND GEOTECHNICAL ENGINEERING, INC.

Charles K. Biegel, P.E.  
President



# LOG OF TEST PIT NO. 1

ELEVATION: see Plate P

EQUIPMENT USED: Backhoe: Case 580 Super M

DEPTH OF TEST PIT (FT.): 4.5

DATE DRILLED: October 2, 2015

DEPTH OF GROUNDWATER: unknown

DEPTH (FT.)	GRAPHIC SYMBOL	SOIL CLASSIFICATION	DESCRIPTION	SAMPLE	COLOR	MOISTURE	CONSISTENCY	DRY DENSITY (PCF)	MOISTURE CONTENT (% OF DRY WT.)	PENETROMETER (TSF)	ATTERBERG LIMITS		
											LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
0		ML	gravelly SILT with sand, cobbles and boulders (to 2' diameter)		dusky red	mod. moist	mod. stiff		9.0				
1													
2		ML	SILT with sand		reddish brown	moist	very stiff		18.8				
3		GM	silty GRAVEL with sand  ---large boulder				very dense						
4													
5		rock	END OF TEST PIT BASALT ROCK: REFUSAL				mod. hard to hard						
6													
7													

PROJECT NAME: WWTP & PERC TESTING PUUNENE HEAVY INDUSTRIAL SUBDIVISION

ISLAND GEOTECHNICAL ENGINEERING, INC.

PLATE

PROJECT NO.: 131599-TM

Geotechnical Consultants

1



SITE EVALUATION / PERCOLATION TEST

PERC-1

Date / Time: October 5/6, 2015

Test performed by: Island Geotechnical Engineering, Inc.

Owner: Puunene WWTP

Tax Map Key: (2) 3-8-008:019

Elevation: existing grade ft  
 Depth to Groundwater Table: more than 3.0 ft below grade  
 Depth to Bedrock (if observed): more than 3.0 ft below grade  
 Diameter of Hole: 6 in  
 Depth to Hole Bottom: 3.0 ft below grade

Depth, inches below grade	Soil Profile (color, texture, other)
<u>0 to 30</u>	<u>dusky red SILT with gravel</u>
<u>30-36</u>	<u>light reddish brown sandy SILT</u>

PERCOLATION READINGS

Time 12 in of water to seep away: 76 min  
 Time 12 in of water to seep away: 223 min

Check one:


Percolation tests in sandy soils, recorded time intervals and water drops at least every 10 minutes for at least 1 hour.

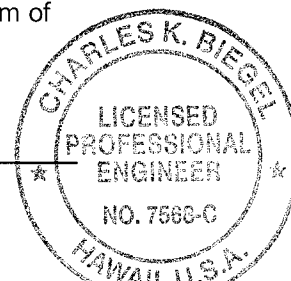
Percolation tests in non-sandy soils, presoaked the test hole for at least 4 hours. Recorded time intervals and water drops at least every 10 minutes for 1 hour or if the time for the first 6 inches to seep away is greater than 30 minutes record time intervals and water drops at least every 30 minutes for 4 hours or until 2 successive drops do not vary by more than 1/16 inch.

Time interval	Drop in inches	Time interval	Drop in inches
<u>30 minutes</u>	<u>3 14/16</u>	<u>30 minutes</u>	<u>4 11/16</u>
<u>30 minutes</u>	<u>4 14/16</u>	<u>30 minutes</u>	<u>5</u>
<u>30 minutes</u>	<u>5</u>		
<u>30 minutes</u>	<u>5 3/16</u>		
<u>30 minutes</u>	<u>5 3/16</u>		
<u>30 minutes</u>	<u>5 2/16</u>		

Percolation Rate (time / final water level drop): 6 min / in

As the engineer responsible for gathering and providing site information and percolation test results, I attest to the fact that above site information is accurate and that the site evaluation was conducted in accordance with the provisions of Chapter 11-62, "Wastewater Systems" and the results were acceptable. I also attest that three feet of suitable soil exist between the bottom of the soil absorption system and the groundwater table or any other limiting layer.

  
 Engineer's Signature / Stamp



SITE EVALUATION / PERCOLATION TEST

**PERC-2**

Date / Time: October 5/6, 2015

Test performed by: Island Geotechnical Engineering, Inc.

Owner: Puunene WWTP

Tax Map Key: (2) 3-8-008:019

Elevation: existing grade ft  
 Depth to Groundwater Table: more than 3.0 ft below grade  
 Depth to Bedrock (if observed): more than 3.0 ft below grade  
 Diameter of Hole: 6 in  
 Depth to Hole Bottom: 3.0 ft below grade

Depth, inches below grade	Soil Profile (color, texture, other)
<u>0 to 30</u>	<u>dusky red SILT with gravel</u>
<u>30-36</u>	<u>light reddish brown sandy SILT</u>

PERCOLATION READINGS

Time 12 in of water to seep away: 66 min  
 Time 12 in of water to seep away: 133 min

Check one:

Percolation tests in sandy soils, recorded time intervals and water drops at least every 10 minutes for at least 1 hour.

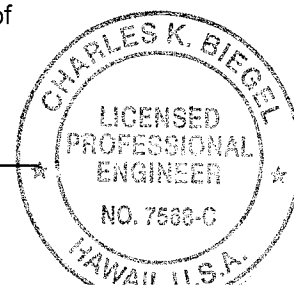
Percolation tests in non-sandy soils, presoaked the test hole for at least 4 hours. Recorded time intervals and water drops at least every 10 minutes for 1 hour or if the time for the first 6 inches to seep away is greater than 30 minutes record time intervals and water drops at least every 30 minutes for 4 hours or until 2 successive drops do not vary by more than 1/16 inch.

Time interval	Drop in inches	Time interval	Drop in inches
<u>30 minutes</u>	<u>4 6/16</u>	<u>30 minutes</u>	<u>2 8/16</u>
<u>30 minutes</u>	<u>3 5/16</u>	<u>30 minutes</u>	<u>2 8/16</u>
<u>30 minutes</u>	<u>2 14/16</u>		
<u>30 minutes</u>	<u>2 11/16</u>		
<u>30 minutes</u>	<u>2 10/16</u>		
<u>30 minutes</u>	<u>2 12/16</u>		

Percolation Rate (time / final water level drop): 12 min / in

As the engineer responsible for gathering and providing site information and percolation test results, I attest to the fact that above site information is accurate and that the site evaluation was conducted in accordance with the provisions of Chapter 11-62, "Wastewater Systems" and the results were acceptable. I also attest that three feet of suitable soil exist between the bottom of the soil absorption system and the groundwater table or any other limiting layer.

  
 \_\_\_\_\_  
 Engineer's Signature / Stamp



SITE EVALUATION / PERCOLATION TEST

PERC-3

Date / Time: October 5/6, 2015

Test performed by: Island Geotechnical Engineering, Inc.

Owner: Puunene WWTP

Tax Map Key: (2) 3-8-008:019

Elevation: existing grade ft  
 Depth to Groundwater Table: more than 3.0 ft below grade  
 Depth to Bedrock (if observed): more than 3.0 ft below grade  
 Diameter of Hole: 6 in  
 Depth to Hole Bottom: 3.0 ft below grade

Depth, inches below grade	Soil Profile (color, texture, other)
<u>0 to 24</u>	<u>dusky red SILT with gravel</u>
<u>24-36</u>	<u>reddish brown sandy SILT</u>

PERCOLATION READINGS

Time 12 in of water to seep away: 26 min  
 Time 12 in of water to seep away: 43 min

Check one:

Percolation tests in sandy soils, recorded time intervals and water drops at least every 10 minutes for at least 1 hour.

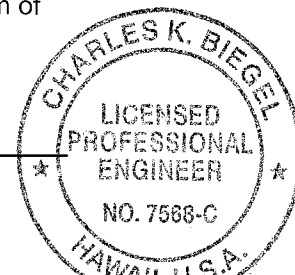
Percolation tests in non-sandy soils, presoaked the test hole for at least 4 hours. Recorded time intervals and water drops at least every 10 minutes for 1 hour or if the time for the first 6 inches to seep away is greater than 30 minutes record time intervals and water drops at least every 30 minutes for 4 hours or until 2 successive drops do not vary by more than 1/16 inch.

Time interval	Drop in inches	Time interval	Drop in inches
<u>30 minutes</u>	<u>6 5/16</u>	<u>30 minutes</u>	<u>4 9/16</u>
<u>30 minutes</u>	<u>6 4/16</u>	<u>30 minutes</u>	<u>4 6/16</u>
<u>30 minutes</u>	<u>5 8/16</u>		
<u>30 minutes</u>	<u>5</u>		
<u>30 minutes</u>	<u>4 11/16</u>		
<u>30 minutes</u>	<u>4 12/16</u>		

Percolation Rate (time / final water level drop): 7 min / in

As the engineer responsible for gathering and providing site information and percolation test results, I attest to the fact that above site information is accurate and that the site evaluation was conducted in accordance with the provisions of Chapter 11-62, "Wastewater Systems" and the results were acceptable. I also attest that three feet of suitable soil exist between the bottom of the soil absorption system and the groundwater table or any other limiting layer.

  
 \_\_\_\_\_  
 Engineer's Signature / Stamp



CDF Engineering LLC  
Civil Engineering & Land Surveying Consultants  
P.O. Box 2985 Wailuku, HI 96793  
Phone: (808) 891-2400 - Fax: (808) 879-2402  
[www.cdfengineers.com](http://www.cdfengineers.com) - Lic. No. ABC-33139



Page 87

## **APPENDIX F**

### **Operations and Maintenance Manual for Absorption Field**

OPERATING AND MAINTENANCE INSTRUCTIONS

FOR

ABSORPTION FIELD

THESE OPERATION AND MAINTENANCE MANUAL IS FOR USE ONLY BY A LICENSED WASTEWATER TREATMENT SYSTEM OPERATOR/COMPANY SPECIALIZED AND LICENSED TO PERFORM THE WORK ON THE SYSTEM.

**WARNING:**

DO NOT ENTER THE MANHOLES AT ANY TIME, UNLESS TRAINED AND EQUIPPED WITH THE PROPER CREW AND SAFETY EQUIPEMENT – LIFT AND HARNESS EQUIPMENT, VENTILATING FAN, ETC. THERE MAY BE TOXIC GASES THAT ARE LETHAL. THE MANHOLES ARE CONSIDERED CONFINED SPACES AND SPECIAL EQUIPMENT AND TRAINING ARE REQUIRED. USE ONLY A COMPANY SPECIALIZED AND LICENSED TO PERFORM THE WORK ON THE SYSTEM.

**THE ABSORPTION SYSTEM**

If the treatment system is maintained properly it will prevent sludge and scum from entering the absorption field or the injection wells. If sludge or scum enters the field it will clog the drain lines and the crushed rock bed. Continued neglect to correct this will result in failure of the field and necessitate replacement of the field which is very expensive.

**DISTRIBUTION MANHOLES**

Check the manhole between the treatment unit and leach field and/or the injection wells. The distribution/diverter valves/box should be free of debris. If any material is present, use a garden hose and flush the pipes. NOTIFY A COMPANY SPECIALIZING IN LEACH FIELD CLEANING FOR APPROPRIATE ACTION.

**DISTRIBUTION MANHOLES AND BOXES**

Multi-port distribution boxes in Manholes are used to provide even distribution to each of the drain trenches. If any material has obstructed the openings, use the garden hose to flush the material free. NOTIFY A COMPANY SPECIALIZING IN LEACH FIELD CLEANING FOR APPROPRIATE ACTION.

**INSPECTION PORTS**

There are inspection ports provided on several of the leach fields to allow checking of the water depth and condition of portions of the field. Use a depth gauge pole to determine the level in the field. If the water



level is deeper than 12 inches in the leach field consider switching the flow into the backup disposal system.





CDF Engineering LLC  
Civil Engineering & Land Surveying Consultants  
P.O. Box 2985 Wailuku, HI 96793  
Phone: (808) 891-2400 - Fax: (808) 879-2402  
[www.cdfengineers.com](http://www.cdfengineers.com) - Lic. No. ABC-33139



Page 90

## APPENDIX G

### Operations and Maintenance Manual for Injection Wells

CDF Engineering LLC  
Civil Engineering & Land Surveying Consultants  
P.O. Box 2985 Wailuku, HI 96793  
Phone: (808) 891-2400 - Fax: (808) 879-2402  
[www.cdfengineers.com](http://www.cdfengineers.com) - Lic. No. ABC-33139



## **Injection Well Operations and Maintenance Plan**

**For**

**Pu'unene Heavy Industrial Subdivision  
Wastewater Treatment Facility**

**Puunene, Maui, Hawaii**

**TMK: (2) 3-8-008:019**

This operation and maintenance plan is for use only by a licensed wastewater treatment system operator/company specialized and licensed to perform the work on the system.

### **WARNING:**

Do not enter the manholes any time, unless trained and equipped with the proper crew and safety equipment – lift and harness equipment, ventilating fan, etc. There may be toxic gases that are lethal. The manholes are considered confined spaces and special equipment and training are required. Use only a company specialized and licensed to perform the work on the system.

The operator of any injection well or wells shall keep detailed records of the operation of the well or wells, including, but not limited to, the type and quantity of injected fluids, and the method and rate of injection for each well (State of Hawaii HAR 11-23-18).

The Owner of any injection well or wells shall, within one month, report any change in ownership to the Director in writing. Until such time as the notice of change in ownership is submitted, the registered owner shall be responsible for the operation of the well or wells and for damage resulting from improper operation of the well or wells.

### **THE INJECTION WELLS**

If the treatment system is maintained properly, it will prevent sludge and scum from entering the injection wells. If the sludge or scum enters the injection well, it can clog the well. Continued neglect to correct this will result in failure of the injection well and may necessitate expensive jetting and cleaning of the injection well, or replacement of the injection well.

CDF Engineering LLC  
Civil Engineering & Land Surveying Consultants  
P.O. Box 2985 Wailuku, HI 96793  
Phone: (808) 891-2400 - Fax: (808) 879-2402  
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Page 93

## APPENDIX H

### SLUDGE DISPOSAL PLAN

CDF Engineering LLC  
Civil Engineering & Land Surveying Consultants  
P.O. Box 2985 Wailuku, HI 96793  
Phone: (808) 891-2400 - Fax: (808) 879-2402  
[www.cdfengineers.com](http://www.cdfengineers.com) - Lic. No. ABC-33139



**Sludge Disposal Plan**

**For**

**Pu'unene Heavy Industrial Subdivision  
Wastewater Treatment Facility**

**Puunene, Maui, Hawaii**

**TMK: (2) 3-8-104:030**

A licensed, registered, and permitted Sludge Hauler through the County of Maui and the State of Hawaii Department of Health will be contracted as a requirement of the approval to operate the wastewater treatment facility. Scheduled inspections and pumping will be as required by the system and as per the maintenance contract.

## APPENDIX E

### VALLEY ISLE PUMPING INC. RECEIVING FACILITY ENGINEERING DESIGN REPORT

CDF Engineering LLC  
Civil Engineering & Land Surveying Consultants  
P.O. Box 2985 Wailuku, HI 96793  
Phone: (808) 891-2400 - Fax: (808) 879-2402  
[www.cdfengineers.com](http://www.cdfengineers.com) - Lic. No. ABC-33139



## ENGINEERING DESIGN REPORT

FOR

### VALLEY ISLE PUMPING INC RECEIVING FACILITY

Puunene, Maui, Hawaii

T.M.K.: (2) 3-8-104: 017

Prepared for:

Valley Isle Pumping, Inc.  
291 Lower Kula Road  
Makawao, Maui, Hawaii, 96768

September 2019

TABLE OF CONTENTS

1.0	INTRODUCTION	3
2.0	EXISTING INFRASTRUCTURE	4
2.1	SEWER	4
3.0	PROPOSED INFRASTRUCTURE	4
3.1	UPGRADE SUMMARY	4
3.2	RECEIVING STATION	4
3.3	SEWER	5
3.4	ESTIMATED WASTEWATER FLOW CALCULATIONS	5
3.5	MASS/HYDRAULIC BALANCE CALCULATIONS	6
3.6	EFFLUENT DISPOSAL SYSTEM	7
3.7	RECEIVING STATION SLUDGE DISPOSAL PLAN	8
4.0	REFERENCES	9
5.0	EXHIBITS	9
A.	TITLE SHEET WITH LOCATION & VICINITY MAP	10
B.	SITE PLAN	11
C.	SITE PLAN INSET	12
D.	CONSTRUCTION DRAWINGS FOR RECEIVING STATION	13
E.	LIFT STATIONS DETAILS	21
F.	PROCESS FLOW DIAGRAM	22
6.0	APPENDICES	23
A.	ENGINEER'S & OWNER'S CERTIFICATION	24
B.	SPECIFICATIONS	26
C.	OPERATIONS AND MAINTENANCE MANUAL RECEIVING FACILITY	33



## 1.0 INTRODUCTION

The purpose of this report is to evaluate the adequacy of proposed upgrades to the existing wastewater infrastructure. Upgrades consist of a proposed wastewater receiving station, and capacity added to the existing wastewater treatment plant.

The subject parcel is currently identified as T.M.K.: (2) 3-8-104: 017, and encompasses an area of approximately 2.88 acres. It is also known as Lot 2Q of the Pua'a Subdivision. The receiving facility will be installed on Lot 2-Q which has been condominiumized into two (2) separate units. The facility will be located on Unit A of this condominium. A sewer lift station will pump the effluent from this receiving facility to the existing common area wastewater treatment plant. The subdivision is bordered by undeveloped land, an irrigation reservoir and sugar cane fields to the north; sugar cane fields and a quarry to the east, sugar cane fields to the south, and the old Puunene Airport to the west (Otomo, 2012). Lot 2-Q will be accessed via the main access road (Nopu Street) and abuts a culdesac.

Access to the project site is from Kama'aina Road, South Firebreak Road, and Lower Kihei Road. There is an existing traffic signal at the Mokulele Highway – Kama'aina Road intersection with a left turn storage lane and a right turn deceleration lane (Otomo, 2012).

The project is zoned heavy industrial. The heavy industrial zoning district provides for a minimum lot size of 10,000 square feet. The subdivision consists of 28 lots, ranging in size from over two acres to twenty acres.

For purposes of this report, we are focusing on the addition of a receiving station on Lot 2-Q and upgrades to the existing wastewater system only.

Valley Isle Pumping, Inc. (VIP) is a local wastewater company which has been operating on Maui for over 40 years. VIP is a general engineering contractor, has a fleet of pump trucks, and operates and maintains many of Maui's private wastewater treatment plants and pump stations. VIP has an interest in lot 2Q in the subdivision and is seeking to create a private disposal facility for some of the wastewater collected around the island of Maui. The pricing, safety, and reliability of County of Maui receiving stations all have negative trends in recent years. Multiple spills, unannounced fee increases, and waste produced on Maui but not accepted at COM facilities all point to the inadequacy of having public facilities as the only disposal option and underscore the need for a private facility.

## 2.0 EXISTING INFRASTRUCTURE

### 2.1 SEWER

There are no County sewer facilities within or adjacent to the project site. The nearest County sewerline is approximately 10,000 feet to the south of the project site in Kihei (Otomo, 2012).

The subdivision contains a private wastewater collection system along with a privately owned and operated 20,000 GPD wastewater treatment plant (referred to hereon as the 'Existing WWTP'). Each lot is required to connect to the sewer lateral provided. Wastewater is conveyed via a common collection system from each lot into the common Existing WWTP, which then outlets to two injection wells. Existing WWTP consists of two (2) 10,000 GPD activated sludge units designed to operate in parallel.

## 3.0 PROPOSED INFRASTRUCTURE

### 3.1 UPGRADE SUMMARY

VIP is proposing to install a receiving facility within lot 2Q and upgrade the Existing WWTP to accept the increased flow from said receiving station. This project consists of a receiving and pretreatment process for private domestic wastewater collected by VIP's pump trucks. Effluent from the receiving facility will flow to a lift station and force main to the upgraded WWTP inlet (referred to below as the Upgraded WWTP). Upgraded WWTP will consist of two additional 10,000 GPD units, for a total treatment capacity of 40,000 GPD, and an additional absorption field effluent disposal system. A separate Engineering Design Report has been created for this expansion under separate title.

### 3.2 RECEIVING STATION

Influent will consist of up to 20,000 GPD of waste collected privately by VIP pump trucks. This waste is to include residential septage, sewer sludge, and other domestic wastewater. Receiving station equipment will consist of a grit chamber, receiving and equalization tank, pumps/ grinders, polymer mixing system, and belt press. A Process Flow Diagram is attached as Exhibit F. Process effluent will flow into a lift station located in the south west corner of lot

2Q, from where it will be pumped via force main located along the common area easement to the EQ basin of the Upgraded WWTP. Processed solids will be deposited via conveyor into a roll-off container.

The hours of operation are considered to be 6:00 AM to 6:00 PM (12 hours per day). The average truck will arrive onsite and spend approximately 25 minutes parking, connecting to the dump hose, emptying the truck into the receiving tank, updating the manifest, and cleaning the vehicle (if necessary). A series of valves on the dump hose and the truck will be utilized to minimize the potential for spillage.

### 3.3 SEWER

Existing WWTP will be upgraded to accommodate increased flow with the addition of two (2) identical 10,000 GPD parallel treatment units (increasing the capacity to 40,000 GPD. These will be integrated into a common EQ basin and splitter box, as designed from the package WWTP supplier. Flow received from the common area collection system as well as the receiving station will enter the EQ basin from separate inlets and be separately metered.

### 3.4 ESTIMATED WASTEWATER FLOW CALCULATIONS FOR UPGRADED PLANT

Maximum Flow	20,000 GPD*
Average Truck Loads (2,000 Gallons/truck)	10 loads

\*Facility will be limited to VIP trucks only for purposes of wastewater disposal.

Average Flow for subdivision	19,600 GPD**
Population (Employees)	560 persons

\*\*28 lots with projected 10,000 square feet floor area/lot yields 280,000 square feet of floor area. State of Hawaii Wastewater Flow Standards from HAR 11-62-08(c) and 11-62-24(b) state that for factories that do not produce industrial waste, the contribution to the wastewater system is 35 Gallons/Employee/shift. Additionally, the Wastewater Flow Standards state

that one (1) Industrial Employee should be accounted for in every 500 square feet of floor area. Therefore:

280,000 square feet x 1 Employee/500 square feet = 560 Employees  
35 Gallons/Employee/day x 560 Employees = 19,600 GPD Average Flow  
Wastewater flow from the subdivision will NOT enter the receiving facility and will flow through the collection system directly to the Upgraded WWTP.

### 3.5 MASS/HYDRAULIC BALANCE CALCULATIONS

It is anticipated that the incoming household septage will arrive at the facility with a minimum BOD concentration of 6,800 mg/L. There is provided a total sludge holding volume of 31,500 gallons for the system. There are two independently operating sludge-holding chambers: one (1) 2,000 gallon grit chamber; one (1) 29,500 gallon receiving chamber. As discussed, the receiving chamber includes a supernatant decant airlift assembly for concentrating the solids. However, the grit chamber will be used for this calculation only. The sludge retention under normal operating conditions at the average system design flow is as defined below:

System Data = 20,000 GPD @ 6,800 mg/L BOD5

#### **Total pounds of BOD5 for the system:**

$0.02 \times 6800 \times 8.34 = 1134.24$  lbs BOD per day

Sludge concentration = 10,000 to 20,000 mg/L; use 15,000 for calculation purposes: Estimate 90% treatment at effluent.

For every pound of influent BOD, the plant produces 0.15 pounds of waste sludge:  $41.7 \times .9 \times .15 = 153.12$  pounds of waste sludge

#### Number of days of retention (when concentrated)

2,000 gal. =  $.002 \times 20,000 \times 8.34$  divided by 153.12 = 2.18 days

Should the receiving facility become non-operational, the disposal site would be closed down until facility operations resume. Additionally, the waste sludge from the initial grit removal can be further processed in the

remaining aspects of the facility. Mainly, the belt press, with a 20% cake solid will produce the following:

Properties of Liquid Septage

1.100	Specific Gravity
1,860	pounds/cubic yard
9.170	pounds/gallon
218.11	gallons/ton
2.00%	feed solids
0.183	pounds dry solids/gallon
57,218,304	pounds/year
30,762	cubic yards/year
28,609	tons/year
1,144,366	dry solids/year
572.183	tons dry solids/year

Properties of Dewatered Solids:

20%	cake solids
0.917	pounds cake solids/gallon
5,721,830	lbs. cake solids per year
2,861	tons cake solids per year*

\*If each roll-on/roll-off container can hold 20 tons of solids, then there would be approximately 143 loads to be removed from the site per year. This equates to approximately three (3) loads per week.

The specifications and Operations and Maintenance Manual are attached to this Engineering Design Report in the Appendix.

3.6 EFFLUENT DISPOSAL SYSTEM

Injection wells are currently in use for the Existing WWTP. An absorption field will be installed to accommodate additional flow and will be utilized as the primary effluent disposal system. Calculations for the absorption field, along with details, are provided in the Engineering Design Report for the WWTP. Existing injection wells will provide full redundancy for the Upgraded WWTP.

### 3.7 RECEIVING STATION SLUDGE DISPOSAL PLAN

Grit and screenings will be removed with a vacuum truck and hauled to an approved State of Hawaii DOH facility (the Central Maui Landfill) at an anticipated rate of once per month. Dried solids produced at the receiving station during the pretreatment process will be placed into roll-off dumpsters. From there, dried solids will be brought to the Central Maui landfill using a roll-on/ roll-off truck at an expected frequency of three (3) truck loads per week. Remaining liquid from the pre-treatment process will be pumped, via lift station, from the receiving facility to the Upgraded WWTP.

A licensed, registered, and permitted Sludge Hauler through the County of Maui and the State of Hawaii Department of Health will be contracted as a requirement of the approval to operate the wastewater treatment facility. Scheduled inspections will be conducted by a licensed wastewater operator as required by the system and as per the maintenance agreement.

### 4.0 REFERENCES

- A. Soil Survey of Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii, prepared by U.S. Department of Agriculture, Soil Conservation Service, August, 1972.
- B. Water System Standards, Department of Water Supply, County of Maui, 2002.
- C. Groundwater Resource and Water System Assessment for the Proposed Puunene Industrial Subdivision, prepared by Tom Nance Water Resource Engineering, June 2011.
- D. Field Percolation Test Report #1 and Test Pit WWTP and Percolation Testing at Puunene Heavy Industrial Subd., prepared by Charles K. Biegel, Island Geotechnical Engineering, Inc., October 2015.
- E. Preliminary Engineering Report for Puunene Heavy Industrial Subdivision., prepared by Otomo Engineering, Inc., February 2012.
- F. Engineering Design Report for Pulehunui Heavy Industrial Subdivision Wastewater Treatment Facility., prepared by CDF Engineering LLC, July 2019.

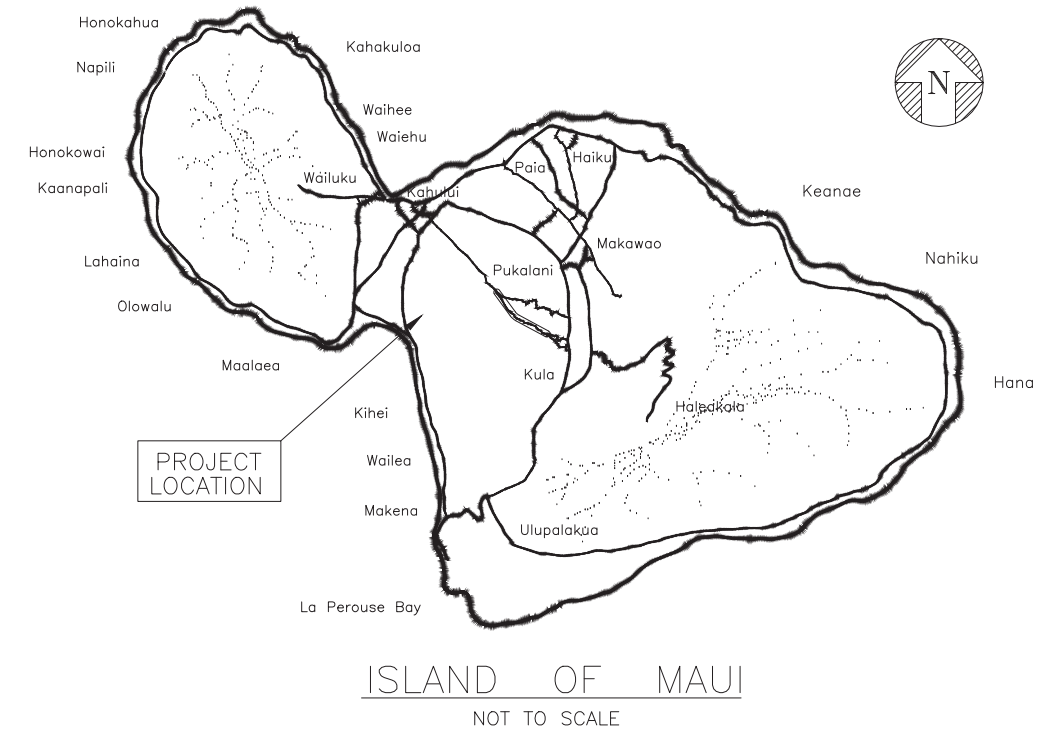
## 5.0 EXHIBITS

- A. TITLE SHEET WITH LOCATION AND VICINITY MAP
- B. SITE PLAN
- C. SITE PLAN INSET
- D. RECEIVING FACILITY DETAILS
- E. LIFT STATION DETAILS
- F. PROCESS FLOW DIAGRAM

# CONSTRUCTION PLANS FOR: VALLEY ISLE PUMPING RECEIVING FACILITY 440 NOPU STREET PU'UNENE, MAUI, HAWAII TMK: (2) 3-8-104:017

PREPARED FOR: *Valley Isle Pumping  
291 Lower Kula Rd., Pukalani, HI 96768  
(808) 878-8807*

PREPARED BY: *CDF Engineering, LLC  
P.O. Box 2985, Wailuku, HI 96793  
Phone: (808) 891-2400  
Email: info@cdfengineers.com*



VICINITY MAP

INDEX OF DRAWING

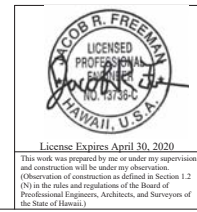


SHEET	DESCRIPTION
T-1	TITLE SHEET
C-1	SITE PLAN
C-2	SITE PLAN INSET
C-3	GRIT CHAMBER PLAN
C-4	RECEIVING TANK PLAN
C-5	RECEIVING TANK PROFILE
C-6	RECEIVING TANK FRONT VIEW
C-7	HOUSING PLAN
C-8	TRAFFIC FLOW DIAGRAM
C-9	LIFT STATION DETAILS
C-10	PROCESS FLOW DIAGRAM
E-1	ELECTRICAL PLAN
P-1	PLUMBING PLAN





0 150 300 450  
 SCALE: 1" = 150'



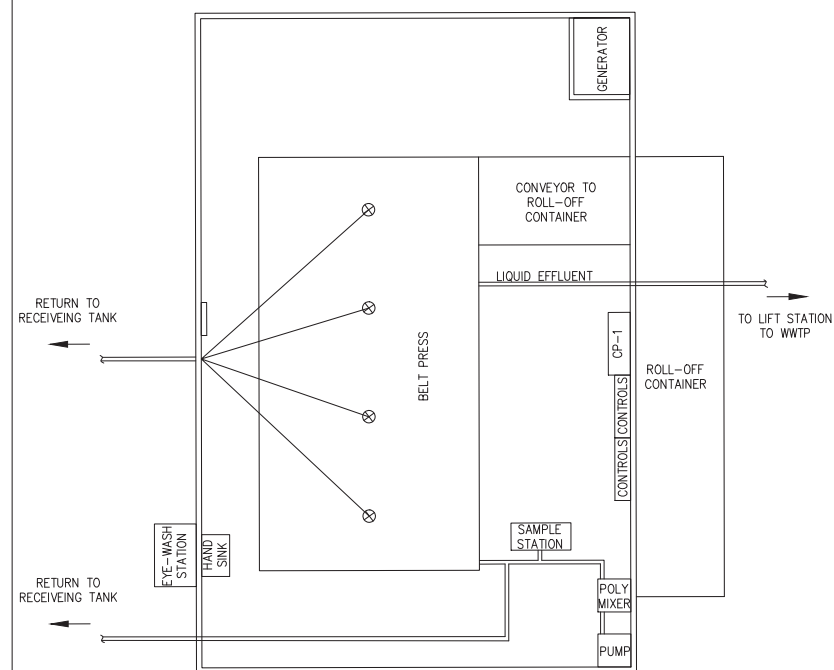
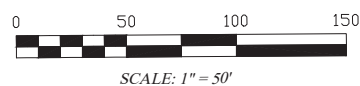
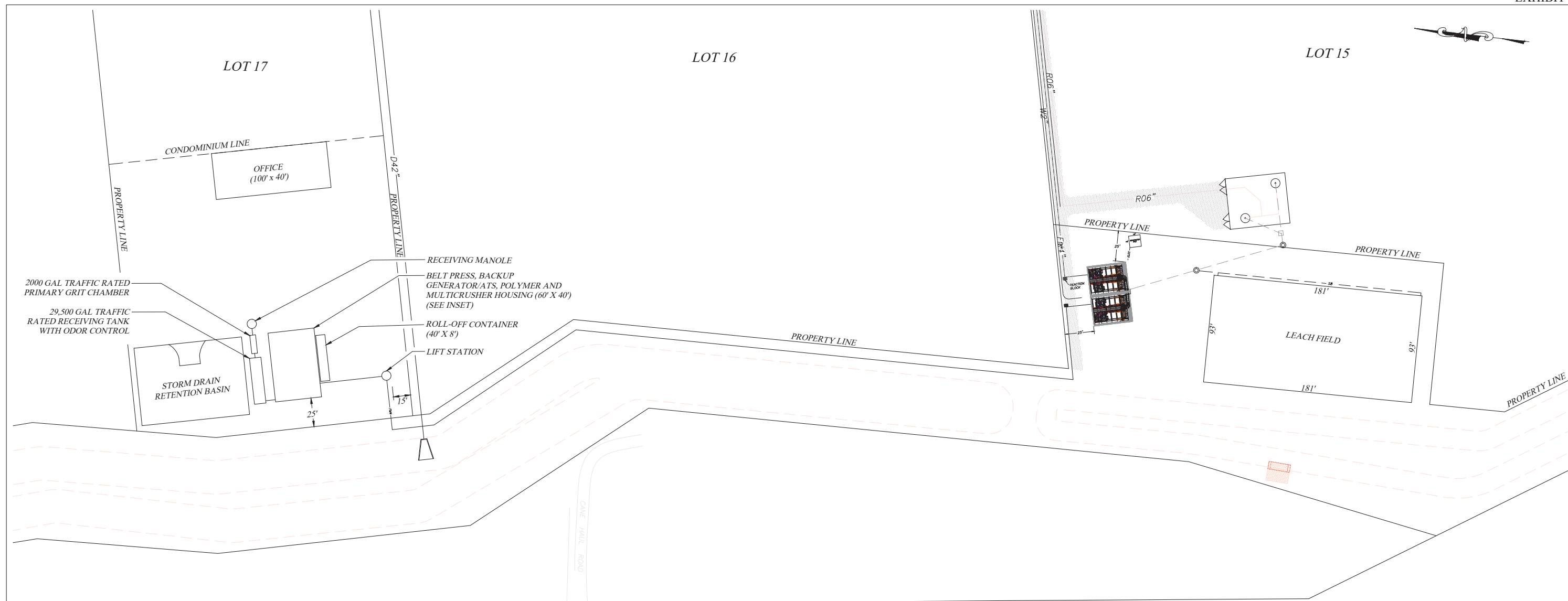
**CDF Engineering LLC**  
 PO BOX 2985  
 WAILUKU, HI 96793  
 PHONE: (808) 891-2400  
**VALLEY ISLE PUMPING RECEIVING FACILITY**  
 440 NOKU STREET  
 PUUNENE, HI 96784

Scale:  
 SCALE: 1" = 150'

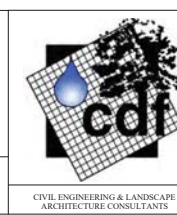
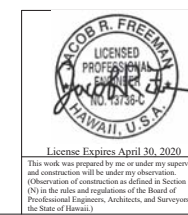
**SITE PLAN**

DWG No:  
 C-1

08-21-2019 TMK: (2) 3-8-104-017



HOUSING INSET  
SCALE: 1"=8'

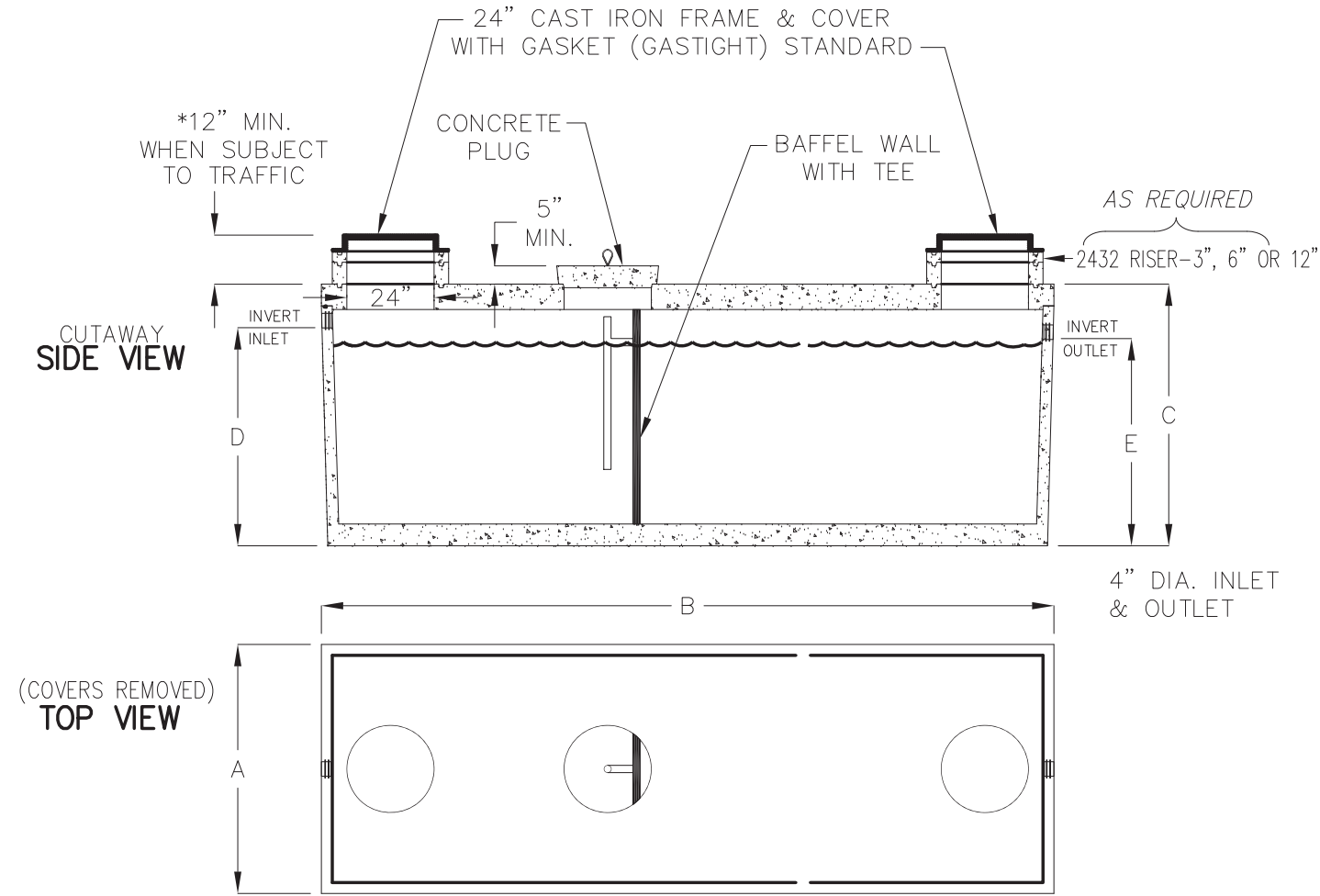


**CDF Engineering LLC**  
 PO BOX 2985  
 WAILUKU, HI 96793  
 PHONE: (808) 891-2400

**VALLEY ISLE PUMPING RECEIVING FACILITY**  
 440 NOPIU STREET  
 PUUNENE, HI 96784

Scale: SCALE: 1" = 40'  
 08-21-2019  
 TMK: (2) 3-8-104-017

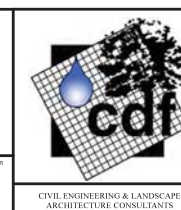
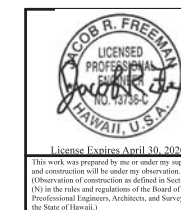
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NOTE: NOT RECOMMENDED FOR POTABLE WATER OR ABOVE GROUND USE. NO WARRANTIES EXPRESSED OR IMPLIED FOR MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

MODEL NUMBER	LIQUID CAPACITY GALLONS	WIDTH 'A'	OVERALL LENGTH 'B'	TANK HEIGHT 'C'	INLET 'D'	OUTLET 'E'	MINIMUM EXCAVATION WIDTH	MINIMUM EXCAVATION LENGTH	*DEPTH OF BURY	MAX. LIFT WEIGHT
HJ2000HT	2000	7'-2"	16'-2"	4'-11"	3'-10"	3'-7"	8'-2"	17'-2"	6' MAX.	24,700

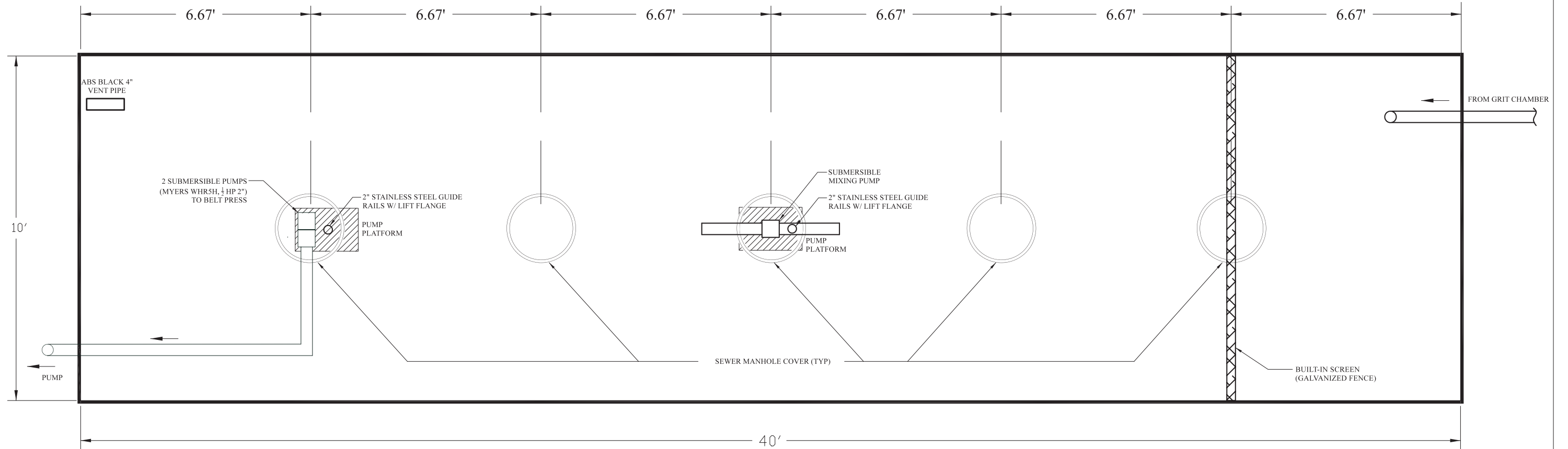
- TANK DESIGNED FOR H-20 TRAFFIC WHEEL LOAD WITH 1' TO 6' MAX. EARTH COVER AND WATER TABLE AT ONE FOOT BELOW GRADE.



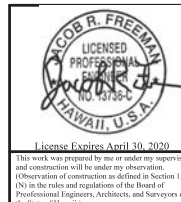
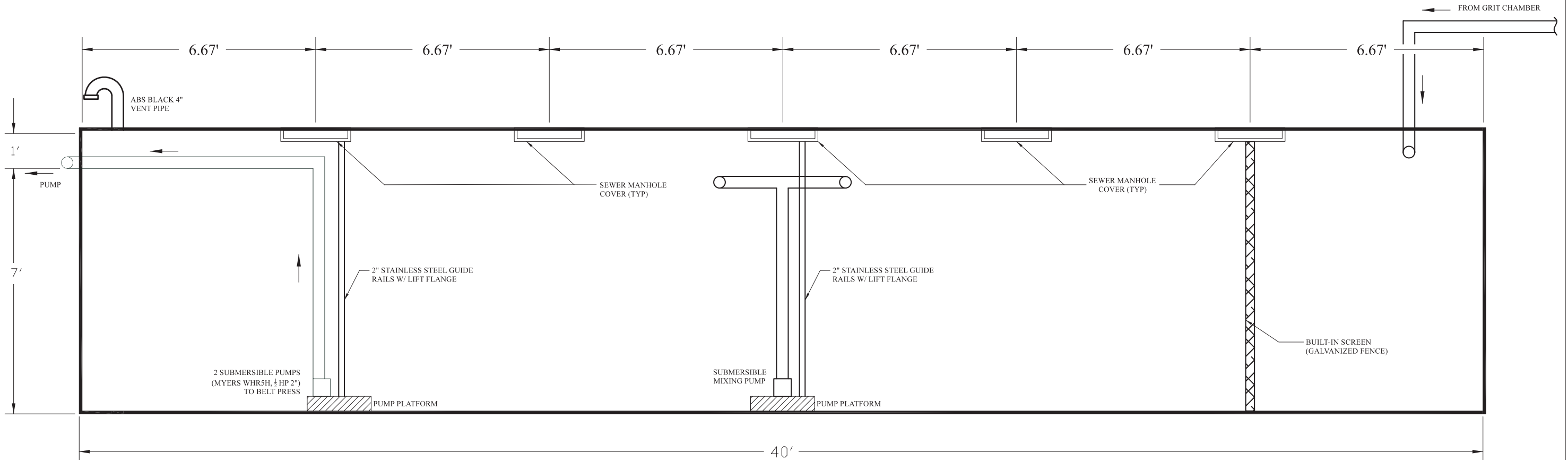
**CDF Engineering LLC**  
 PO BOX 2985  
 WAILUKU, HI 96793  
 PHONE: (808) 891-2400

**VALLEY ISLE PUMPING RECEIVING FACILITY**  
 440 NOPU STREET  
 PUUNENE, HI 96784

Scale: N.T.S. GRIT CHAMBER  
 DWG No.: C-3  
 08-21-2019 TMK: (2) 3-8-104-017



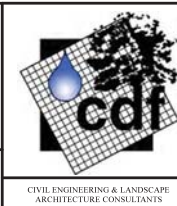
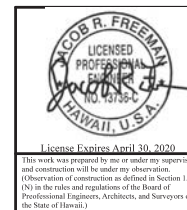
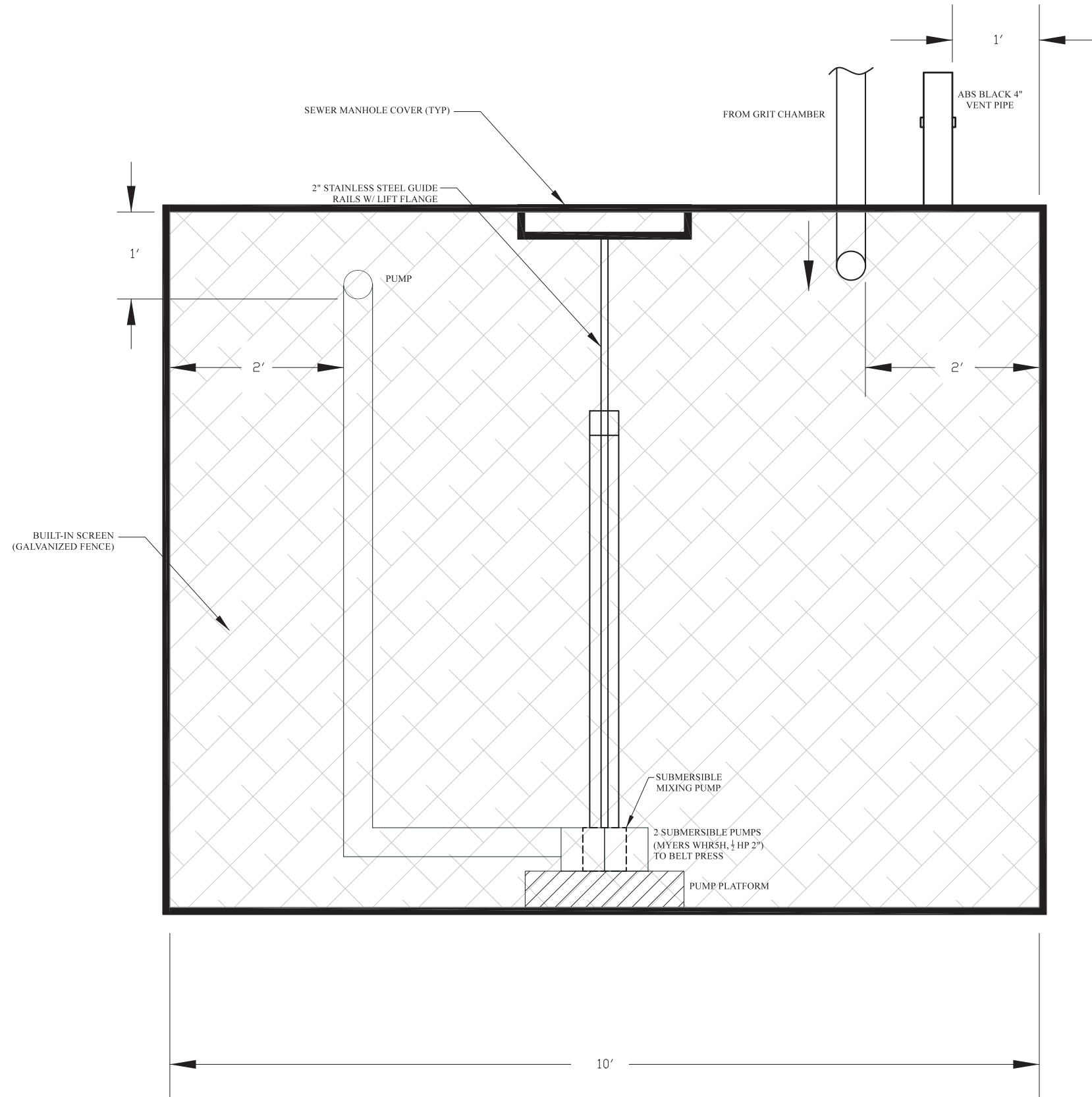
		<b>CDF Engineering LLC</b> PO BOX 2985 WAILUKU, HI 96793 PHONE: (808) 891-2400	
		<b>VALLEY ISLE PUMPING RECEIVING FACILITY</b> 440 NOPU STREET PUUNENE, HI 96784	
Scale: N.T.S.		RECEIVING TANK PLAN	DWG No.: C-4
08-21-2019		TMK: (2) 3-8-104-017	



**CDF Engineering LLC**  
 PO BOX 2985  
 WAILUKU, HI 96793  
 PHONE: (808) 891-2400

**VALLEY ISLE PUMPING RECEIVING FACILITY**  
 440 NOPU STREET  
 PUUNENE, HI 96784

<small>This work was prepared by me or under my supervision and construction will be under my observation. (Observation of construction as defined in Section 1.2 (N) in the rules and regulations of the Board of Professional Engineers, Architects, and Surveyors of the State of Hawaii.)</small> License Expires April 30, 2020	CIVIL ENGINEERING & LANDSCAPE ARCHITECTURE CONSULTANTS	Scale: N.T.S. DATE: 08-21-2019	RECEIVING TANK PROFILE TMK: (2) 3-8-104-017	DWG No.: C-5
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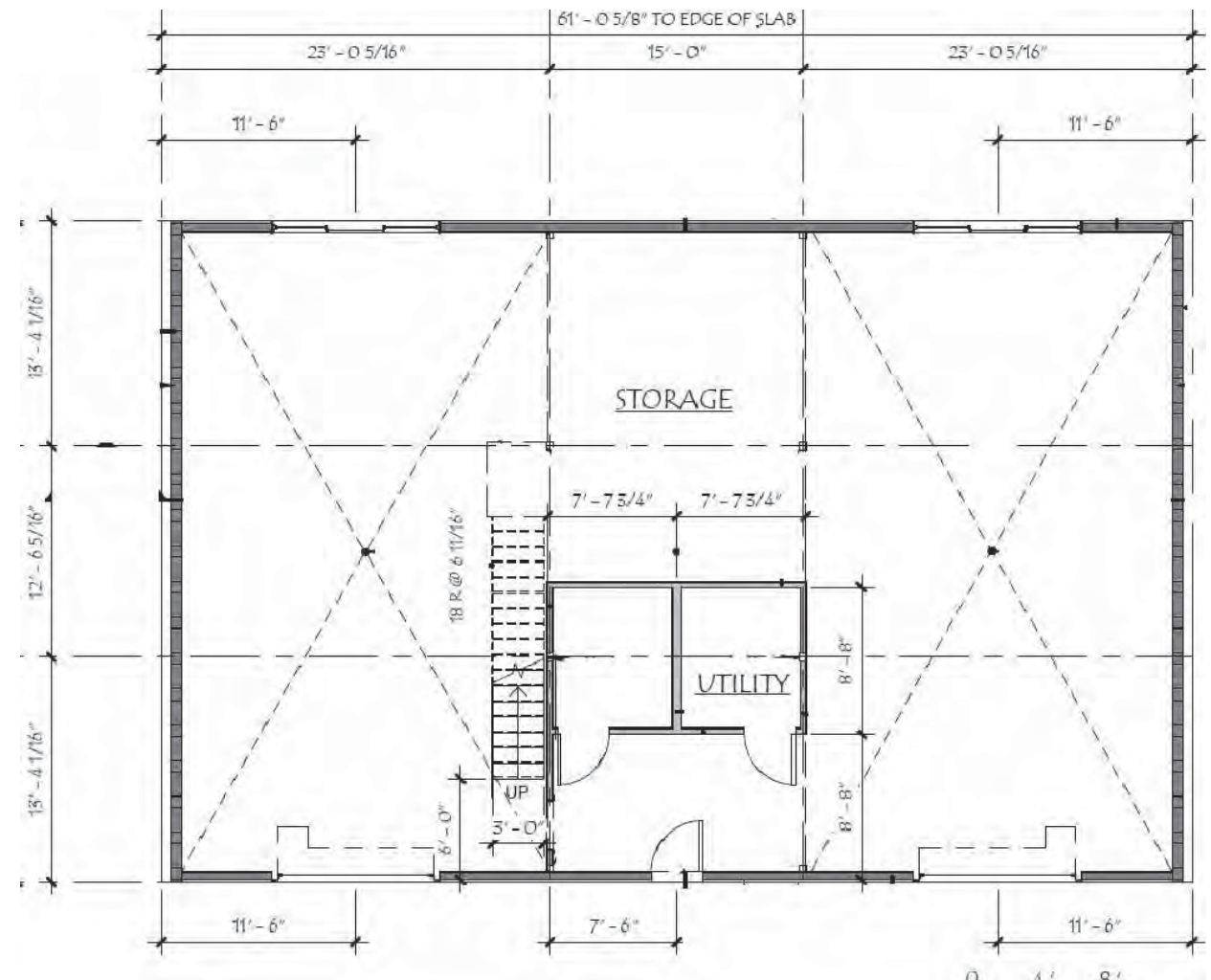
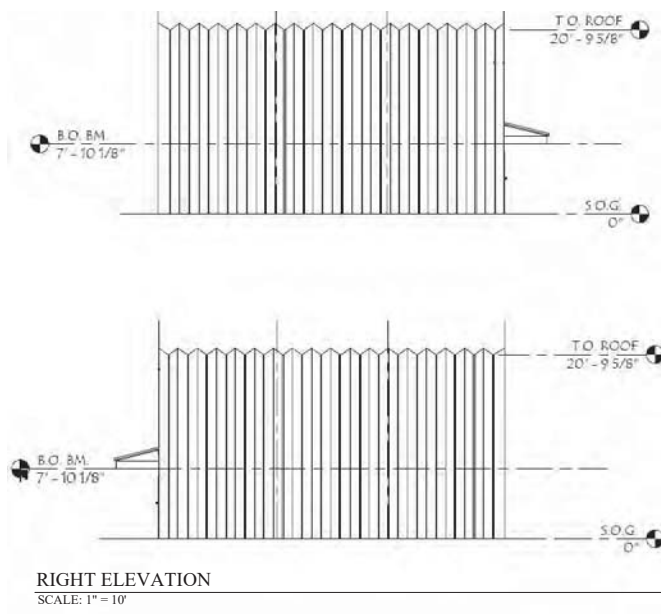
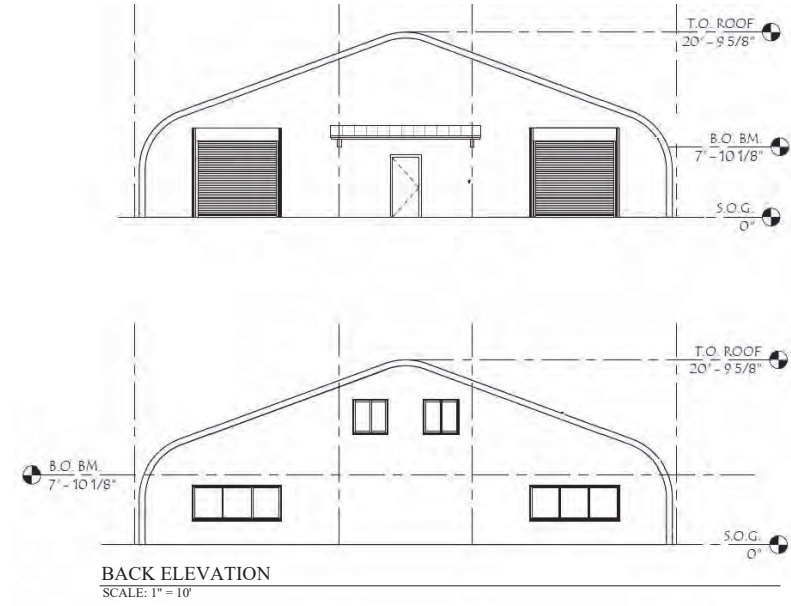
**CDF Engineering LLC**  
 PO BOX 2985  
 WAILUKU, HI 96793  
 PHONE: (808) 891-2400

**VALLEY ISLE PUMPING RECEIVING FACILITY**  
 440 NOPU STREET  
 PUUNENE, HI 96784

Scale: N.T.S. RECEIVING TANK FRONT VIEW DWG No: C-6

08-21-2019 TMK: (2) 3-8-104-017

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		<b>CDF Engineering LLC</b> PO BOX 2985 WAILUKU, HI 96793 PHONE: (808) 891-2400		DWG No.: <b>C-7</b>
		<b>VALLEY ISLE PUMPING RECEIVING FACILITY</b> 440 NOPU STREET PUNAHONA, HI 96784		
Scale: AS NOTED		HOUSING PLAN		
License Expires April 30, 2020 <small>This work was prepared by me or under my supervision and construction will be under my observation. (Observation of construction as defined in Section 1.2 (b) in the rules and regulations of the Board of Professional Engineers, Architects, and Surveyors of the State of Hawaii.)</small>		08-21-2019		TMK: (2) 3-8-104-017



OWNER: CMBY 2011 INVESTMENT LLC  
 TMK: (2) 3-8-104-030  
 NATURE OF BUSINESS: REMNANT  
 UTILITY LOT FOR HEAVY INDUSTRIAL  
 SUBDIVISION

OWNER: TJ GOMES TRUCKING CO.  
 TMK: (2) 3-8-104-018  
 NATURE OF BUSINESS: TRUCKING & EXCAVATION

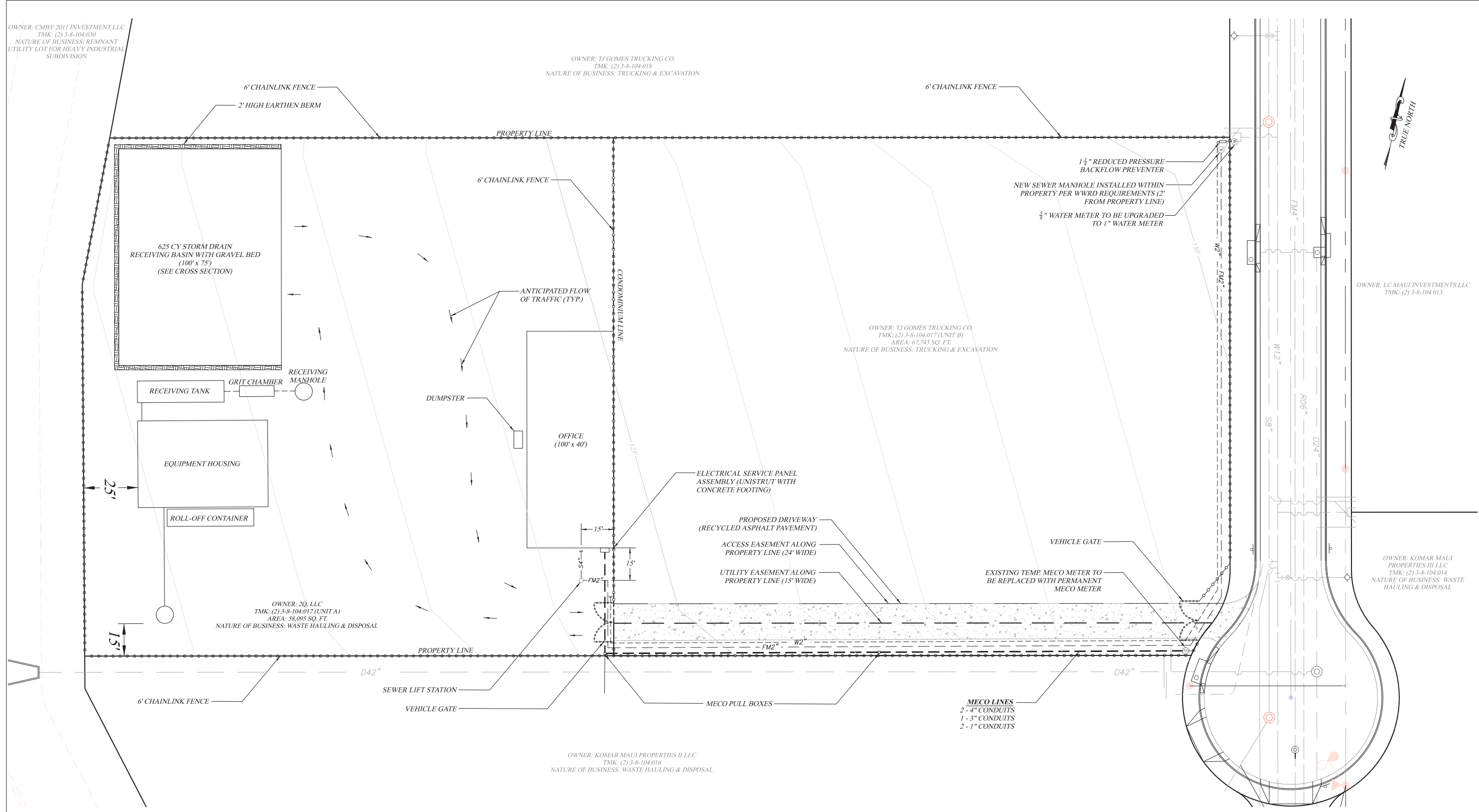
OWNER: TJ GOMES TRUCKING CO.  
 TMK: (2) 3-8-104-017 (UNIT B)  
 AREA: 67,743 SQ. FT.  
 NATURE OF BUSINESS: TRUCKING & EXCAVATION

OWNER: LC MAUI INVESTMENTS LLC  
 TMK: (2) 3-8-104-013

OWNER: KOMAR MAUI  
 PROPERTIES III LLC  
 TMK: (2) 3-8-104-014  
 NATURE OF BUSINESS: WASTE  
 HAULING & DISPOSAL

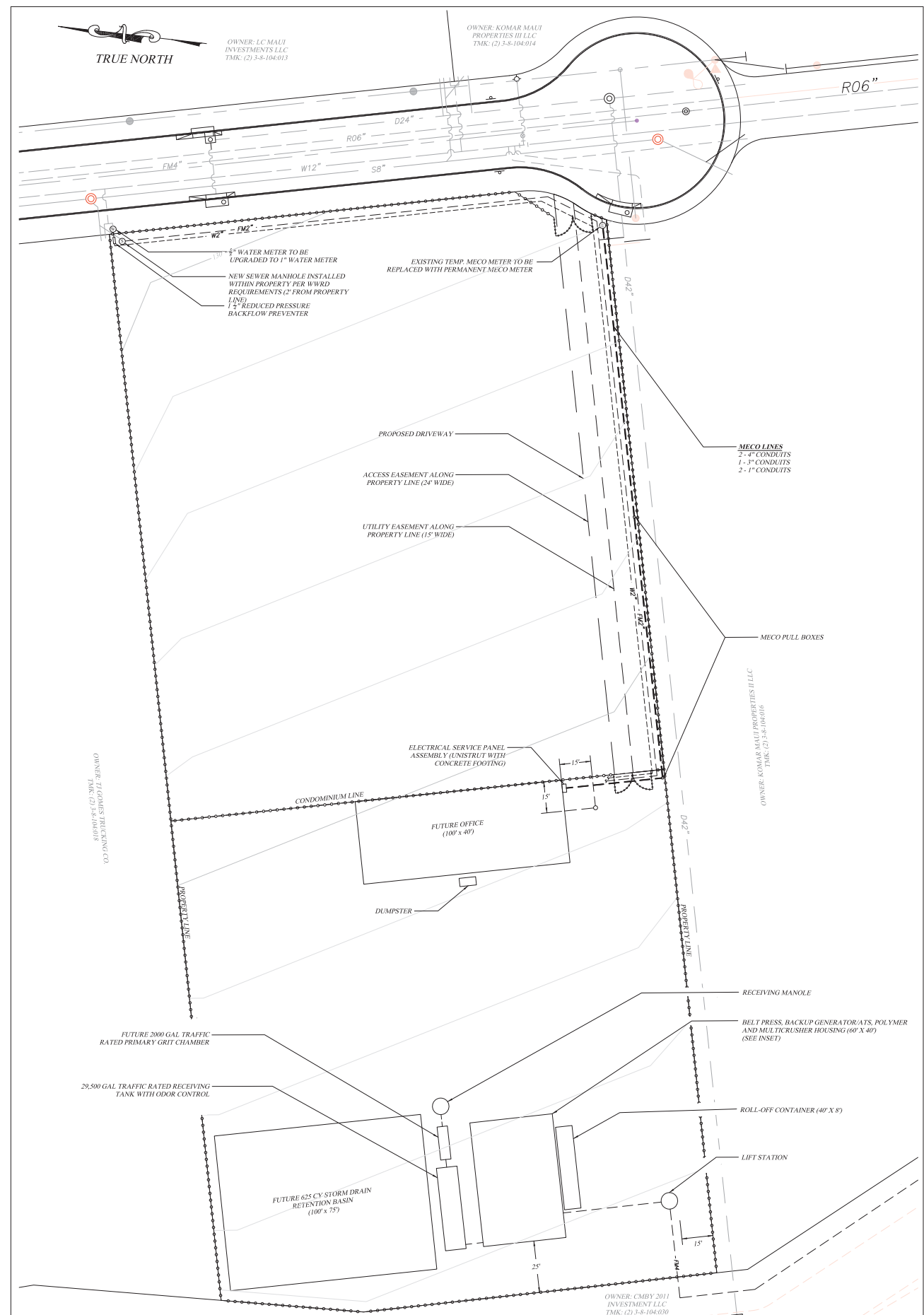
OWNER: 2Q, LLC  
 TMK: (2) 3-8-104-017 (UNIT A)  
 AREA: 58,095 SQ. FT.  
 NATURE OF BUSINESS: WASTE HAULING & DISPOSAL

OWNER: KOMAR MAUI PROPERTIES II LLC  
 TMK: (2) 3-8-104-016  
 NATURE OF BUSINESS: WASTE HAULING & DISPOSAL



		<b>CDF Engineering LLC</b> PO BOX 2985 WAILUKU, HI 96793 PHONE: (808) 891-2400		
		<b>VALLEY ISLE PUMPING RECEIVING FACILITY</b> 440 NOPU STREET PUUNENE, HI 96784		
License Expires April 30, 2020 <small>This work was prepared by me or under my supervision and construction will be under my observation. (Observation of construction as defined in Section 1-2 (N) in the rules and regulations of the Board of Professional Engineers, Architects, and Surveyors of the State of Hawaii.)</small>		Scale: N.T.S.	TRAFFIC FLOW DIAGRAM	DWG No.: C-8
CIVIL ENGINEERING & LANDSCAPE ARCHITECTURE CONSULTANTS		08-21-2019	TMK: (2) 3-8-104-017	





TRUE NORTH

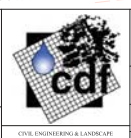
OWNER: LC MAUI INVESTMENTS LLC  
TMK: (2) 3-8-104.013

OWNER: KOMAR MAUI PROPERTIES III LLC  
TMK: (2) 3-8-104.014

OWNER: TIGER TRADING CO.  
TMK: (2) 3-8-104.016

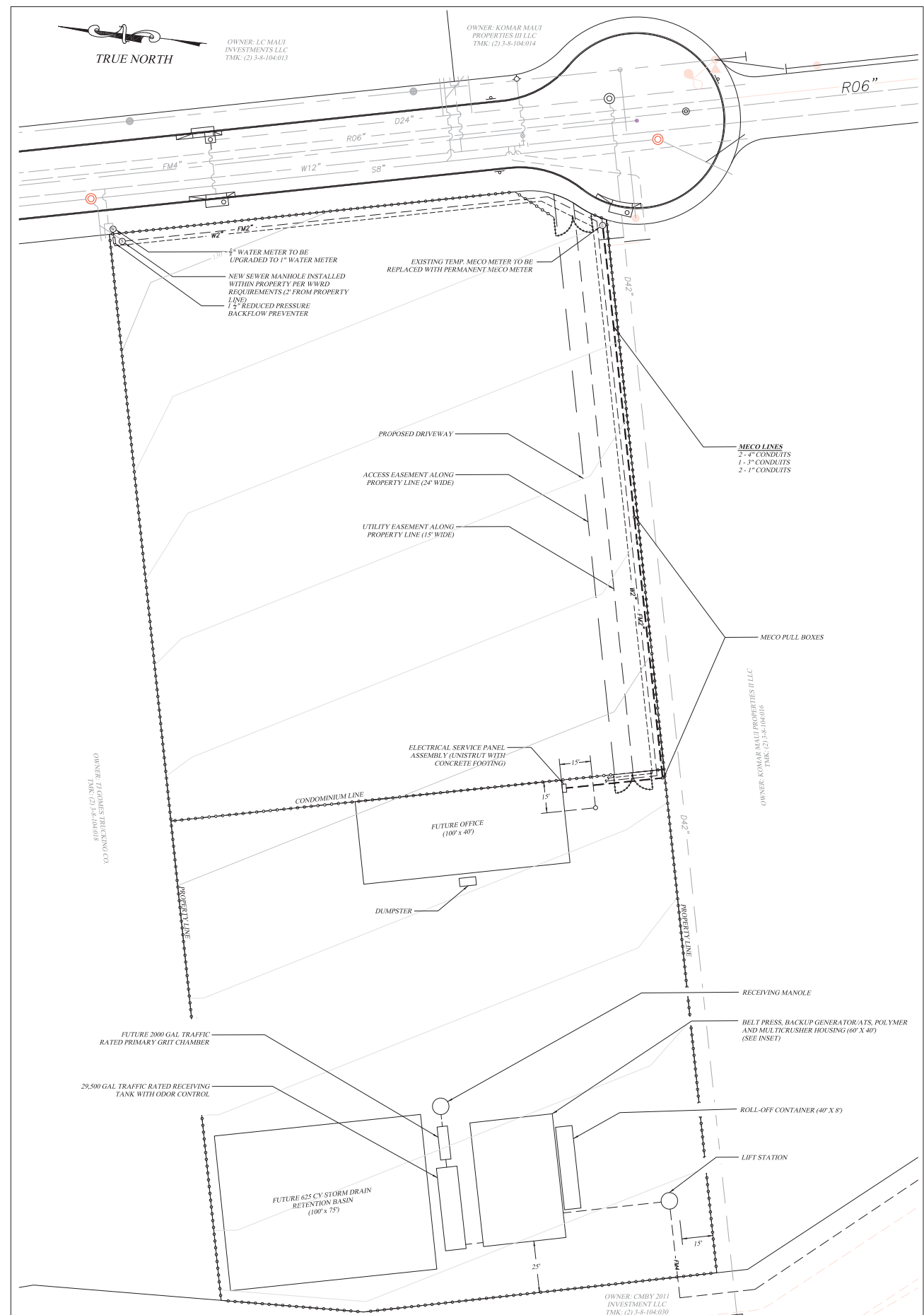
OWNER: KOMAR MAUI PROPERTIES III LLC  
TMK: (2) 3-8-104.016

OWNER: CMHY 2011 INVESTMENT LLC  
TMK: (2) 3-8-104.030



**CDF Engineering LLC**  
PO BOX 2985  
WAILUKU, HI 96793  
PHONE: (808) 971-2400  
**VALLEY ISLE PUMPING RECEIVING FACILITY**  
440 NUPU STREET  
PUUNENE, HI 96784  
SCALE: 1" = 20'  
ELECTRICAL SITE PLAN  
DATE: 08-21-2019  
TMK: (2) 3-8-104.013

FIG. No. E-1



TRUE NORTH

OWNER: LC MAUI INVESTMENTS LLC  
TMK: (2) 3-8-104-013

OWNER: KOMAR MAUI PROPERTIES III LLC  
TMK: (2) 3-8-104-014

OWNER: TIGER TRADING CO.  
TMK: (2) 3-8-104-016

OWNER: KOMAR MAUI PROPERTIES III LLC  
TMK: (2) 3-8-104-016

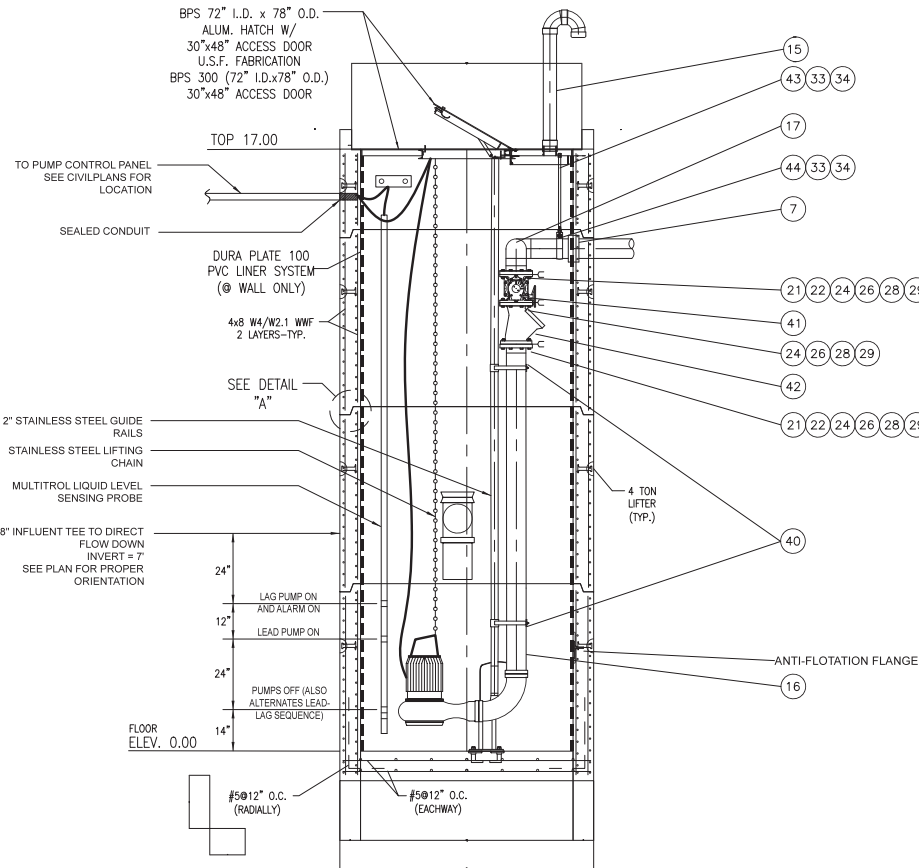
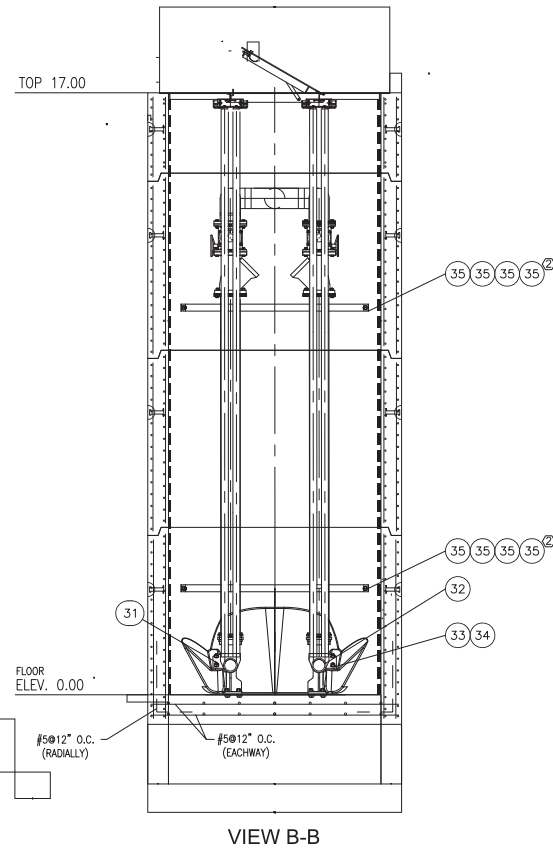
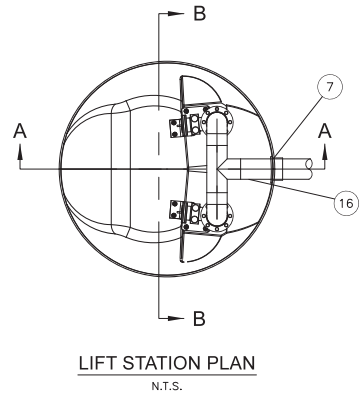
OWNER: CMHY 2011 INVESTMENT LLC  
TMK: (2) 3-8-104-030



**CDF Engineering LLC**  
PO BOX 2985  
WAILUKU, HI 96793  
PHONE: (808) 971-2400  
**VALLEY ISLE PUMPING RECEIVING FACILITY**  
440 NOLI STREET  
PUUNENE, HI 96784  
SCALE: 1" = 20'  
PLUMBING SITE PLAN  
08-21-2019

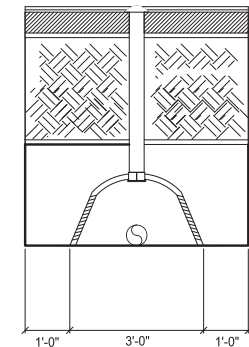
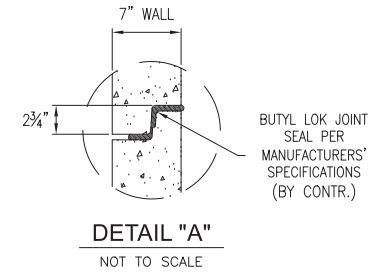
T.M.K. (2) 3-8-104-013

P-1



\* NOTE:  
1. ALL INTERIOR (VERT.) SURFACES OF MANHOLE SHALL BE LINED WITH "DURA PLATE 100" PVC LINER PER MANUFACTURER'S SPECIFICATIONS.

NOTES:  
1. STATION DEPTH: MIN 5ft. MAX 20ft. AVAILABLE IN 1ft INCREMENTS.  
2. ALL BOLT PENETRATIONS THRU WALLS MUST BE SEALED WITH SILICONE SEALANT.  
3. STATION IS ALSO AVAILABLE IN 304L STAINLESS.



INSPECTION PORT DETAIL  
SCALE: 1" = 2'

CONSTRUCTION NOTES:

- CONTRACTOR SHALL VISIT THE SITE AND BE COMPLETELY FAMILIAR WITH THE EXISTING CONDITIONS AND THE AMOUNT AND KIND OF WORK TO BE PERFORMED. CONTRACTOR SHALL VERIFY THE LOCATION, INVERT, SIZE, MATERIAL, AND CONDITIONS OF EXISTING STRUCTURES AND UTILITIES AND NOTIFY THE ENGINEER IMMEDIATELY IF ANY DISCREPANCIES ARE ENCOUNTERED.
- FOR THE ACTUAL FABRICATION, INSTALLATION AND TESTING OF WORK UNDER THIS SECTION, THE CONTRACTOR SHALL USE ONLY THOROUGHLY TRAINED AND EXPERIENCED WORKMEN, COMPLETELY FAMILIAR WITH THE ITEMS REQUIRED AND WITH THE MANUFACTURER'S RECOMMENDATIONS AS TO THEIR USE.
- ALL WORK SHALL CONFORM TO THE UBC, UPC, UMC, UFC, NEC, NFPA, AND ALL OTHER APPLICABLE CODES AND STANDARDS.
- CONTRACTOR SHALL PROVIDE, INSTALL, AND MAINTAIN ALL NECESSARY SIGNS, LIGHTS, FLARES, BARRICADES AND OTHER PROTECTIVE DEVICES FOR THE PROTECTION, SAFETY, AND CONVENIENCE OF THE PUBLIC.
- CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS AND PAY ALL APPLICABLE FEES PRIOR TO COMMENCING ANY WORK.
- CONTRACTOR SHALL PROVIDE (6) SETS OF SHOP DRAWINGS FOR ALL MATERIALS AND EQUIPMENT FOR APPROVAL BY THE ENGINEER PRIOR TO COMMENCING ANY WORK. ALL WORK DONE WITHOUT PRIOR APPROVAL SHALL BE SUBJECT TO REPAIR OR REPLACEMENT AT NO ADDITIONAL COST TO THE OWNER.
- MATERIALS: MANUFACTURERS LISTED BELOW SHOW STYLE AND QUALITY. EQUIVALENT FIXTURES MAY BE SUBSTITUTED WITH THE APPROVAL OF THE ENGINEER. WWTP MUST BE IAPMO CERTIFIED.
  - A. WWTP - AS DESCRIBED IN THESE CONSTRUCTION DOCUMENTS
  - B. FABRIC LINER - AMOCO 1199 HEAVY DUTY WOVEN FABRIC.
  - C. PERFORATED PIPE - 4 INCH SCHEDULE 40 PVC WITH 1/2-INCH DIAMETER HOLES DRILLED AT 12-INCH SPACINGS
  - D. CRUSH ROCK - GRADATION ASTM DESIGNATION NO. 2, 2-1/2-INCH TO 3/4-INCH MANUFACTURED FROM DURABLE CLEAN ROCKS.
- CONTRACTOR SHALL NOTIFY ENGINEER FOR A SITE INSPECTION PRIOR TO BACKFILL AFTER PERFORATED PIPES HAVE BEEN LAID.
- CONTRACTOR SHALL PROVIDE AS-BUILT DRAWINGS UPON COMPLETION AND ACCEPTANCE OF WORK.
- CONTRACTOR SHALL PROVIDE A WRITTEN GUARANTEE TO REPAIR OR REPLACE AT HIS OWN EXPENSE ANY PARTS THAT MAY DEVELOP ANY DEFECTS DUE TO FAULTY MATERIALS OR WORKMANSHIP FOR A PERIOD OF ONE (1) YEAR AFTER FINAL PAYMENT.

OPERATIONS AND MAINTENANCE OF WASTEWATER TREATMENT PLANT (WWTP)

REQUIREMENTS OF WWTP

- SHALL NOT CONTAMINATE ANY DRINKING WATER.
- SHALL NOT BE ACCESSIBLE TO INSECTS, RODENTS OR OTHER POSSIBLE DISEASE CARRIERS WHICH MAY COME INTO CONTACT WITH FOOD OR DRINKING WATER.
- SHALL NOT POLLUTE OR CONTAMINATE THE WATERS OF ANY BATHING BEACH OR STREAM USED FOR PUBLIC OR DOMESTIC WATER SUPPLY PURPOSES OF FOR RECREATIONAL PURPOSES.
- SHALL NOT BE A HEALTH HAZARD BY BEING ACCESSIBLE TO CHILDREN.
- SHALL NOT GIVE RISE TO A NUISANCE DUE TO ODOR OR UNSIGHTLY APPEARANCE.
- SHALL NOT VIOLATE ANY OTHER LAWS OR REGULATIONS GOVERNING WATER POLLUTION OR SEWAGE DISPOSAL.

ABSORPTION FIELD

- THE ABSORPTION OR LEACH FIELD IS THE SECOND MOST IMPORTANT PART OF THE WASTE WATER SYSTEM AS LONG AS THE MAINTENANCE OF THE WWTP IS DONE REGULARLY. SOLIDS SHOULD NOT ENTER THE ABSORPTION FIELD.
- POSSIBLE FAILURE OR REPLACEMENT OF THE FIELD MAY OCCUR IF THE SLUDGE AND SCUM THAT ESCAPES FROM THE WWTP ENTERS THE PERFORATED PIPES WITHIN THE LEACH FIELD.
- USE INSPECTION PORTS TO CHECK IF THERE IS ANY STANDING EFFLUENT WATER IN THE ABSORPTION BED, IF NEEDED.
- REMOVE ANY SOLIDS FROM THE DISTRIBUTION BOX ANNUALLY.

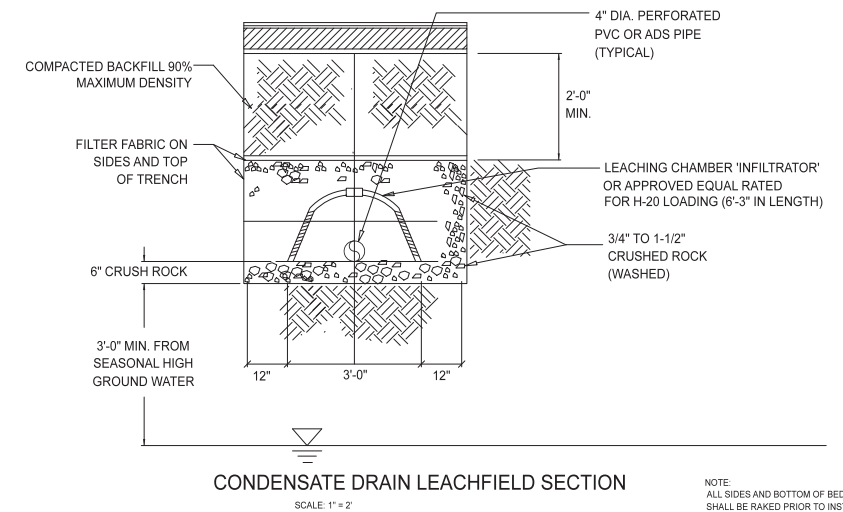
PREVENTIVE MAINTENANCE RECORDS

KEEP A RECORD OF THE MAINTENANCE OF THE WWTP WHICH SHOULD INCLUDE THE FOLLOWING:

- DATE OF PUMPING
- DESCRIPTION OF WORK DONE
- NAME OF PUMPING CONTRACTOR
- COST OF JOB
- COMMENTS REGARDING CONDITIONS OF THE WWTP.

RECOMMENDATIONS

- INSPECT FOR SCUM AND SLUDGE DEPTH ONCE A MONTH.
- PUMP TANK AT PROPER INTERVALS.
- LIMIT WATER ENTERING WWTP.
- PREVENT INSECTS OR RODENTS ENTERING THE TANK.
- DO NOT USE BIOLOGICAL OR CHEMICAL ADDITIVES IN THE WWTP.
- KEEP THOROUGH MAINTENANCE RECORDS AND HAVE THEM AVAILABLE FOR INSPECTION UPON REQUEST FROM STATE HEALTH AUTHORITIES.



CONDENSATE DRAIN LEACHFIELD SECTION  
SCALE: 1" = 2'

NOTE:  
ALL SIDES AND BOTTOM OF BED SHALL BE RAKED PRIOR TO INSTALLATION OF FABRIC, PIPE, AND CRUSH ROCK SO AS TO ELIMINATE SMEARING OF SOIL CREATED DURING EXCAVATION.

- NOTES:
- CONTRACTOR SHALL PROVIDE AN INSPECTION HOLE 4'-0" BELOW THE ABSORPTION BED AND CONTACT ENGINEER.
  - THE DEPTHS TO INVERTS OF THE WWTP AND LEACHFIELD ARE CONTROLLED BY: (1) TOPOGRAPHIC FEATURES AND (2) THE INVERT OF THE INCOMING SEWER. THESE FACTORS MAY IMPACT THE DEPTHS SHOWN ON THE DRAWINGS.

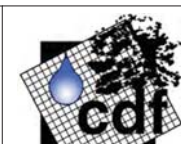
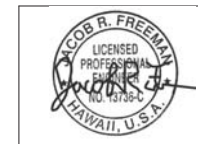
ABSORPTION FIELD CALCULATION:

PROJECT:	PUAA SUBDIVISION WWTP
LOCATION:	0 MOKULELE HIGHWAY PUUNENE, HAWAII 96753
T.M.K.	(2) 3-8-104-030
BASIS OF DESIGN:	DESIGN FLOW: 19,800 GPD POPULATION: 560 EMPLOYEES
	FOR FACTORY USE, USE 35 GAL/EMPLOYEE/DAY PER APPENDIX TABLE 1, HAR 11-62 560 EMPLOYEES X 35 GAL/EMPLOYEE/DAY = 19,600 GPD VIP PRIVATE WASTEWATER RECEIVING FACILITY = 20,000 GPD
DESIGN FLOW:	39,600 GALLONS
WWTP:	40,000 GALLON PER DAY CAPACITY QUAD-TRAIN WWTP
PERCOLATION RATE:	2 MIN./IN
MINIMUM BED AREA:	* 85 S.F./200 GAL X 39,600 GAL = 16,830 S.F.
ABSORPTION BED DIMENSIONS:	93' X 181' = 16,833 S.F. THEREFORE, ONE (1) ABSORPTION FIELDS AND TWO (2) INJECTION WELLS (LIC #UM-2933) = 33,666 S.F.

\* REFERENCE SECTION 11-62-34 OF HAWAII STATE DEPARTMENT OF HEALTH - WASTEWATER BRANCH IWS INFORMATION PACKET, FEBRUARY 1994.

\* McMASTER-CARR

ITEM	DESCRIPTION	PART NUMBER	QTY
43	1/4-10 316 SST THREADED ROD	93250A036	1
42	2" FLANGED BALL CHECK VALVE	5804R7A08	2
41	2" FLANGED VALVE W/ WORM GEAR	5804 RN W/ 4L	2
40	2" FLANGED VALVE W/ HANDLE	29605T8	4
35	U-BOLT 1/2-11 x 6-1/2, 6" PIPE	14-68 21 59	2
34	BRACE, DISCHARGE PIPE	94805A135	9
33	NUT, 1/2-10, 316 SST	91950A036	12
32	WASHER, 1/2 ID, 1 1/8 OD, GENERAL PURPOSE, 316 SST	994804A351	53
31	2" DISCHARGE CONNECTOR (RIGHT)	90107A035	101
29	2" DISCHARGE CONNECTOR (LEFT)	93190A854	48
28	NUT, 1/2-11, 316 SST		6
27	WASHER, 1/2 ID, 1 1/8 OD, GENERAL PURPOSE, 316 SST		4
26	BOLT, HEX HEAD, 1/2-11 x 3 316 SST		4
24	2" FLANGE GASKET (EDPM)		4
22	2", 150# CARBON STEEL FLANGE		4
21	2", SCH 10, 316 SST, STUB IN		4
17	2", SCH 10, 316 SST 90° ELBOW		2
16	PIPE, SCH 10, 4" 316 STAINLESS STEEL		2 (4x)
15	VENT PIPE, 4"	14-68 22 02	1-2
7	BOOT, FLEXIBLE ENTRY, 2" (DISCHARGE)		1



**CDF Engineering LLC**  
PO BOX 2985  
WAILUKU, HI 96793  
PHONE: (808) 891-2400

**VALLEY ISLE PUMPING RECEIVING FACILITY**  
440 NOPU STREET  
PUUNENE, HI 96784



6.0 APPENDICES

A. Engineer's & Owner's Certification

B. Specifications

C. Operations and Maintenance Manual

CDF Engineering LLC  
Civil Engineering & Land Surveying Consultants  
P.O. Box 2985 Wailuku, HI 96793  
Phone: (808) 891-2400 - Fax: (808) 879-2402  
[www.cdfengineers.com](http://www.cdfengineers.com) - Lic. No. ABC-33139



Page 24

## APPENDIX A


### Engineer's & Owner's Certifications

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**Certifications in Accordance with  
Hawaii Administrative Rules (HAR) 11-62.23.1(a)**

**1. Engineer's Certification**

I certify that the proposed wastewater treatment works was designed to meet all applicable effluent requirements of Hawaii Administrative Rules, Chapter 62, sections 11-62-26 and 11-62-27.


  
\_\_\_\_\_  
Jacob Freeman, PE  
CDF Engineering LLC

January 23, 2019  
Date

**2. Owner's Certification**

I certify that the wastewater treatment works shall be operated and maintained in accordance with all of the provisions of the operation and maintenance manual developed pursuant to HAR 11-62-23.1(d)(2). The operation and maintenance manual shall be available to the operator of the treatment works.

Upon sale or transfer of ownership of the treatment works, the sale or transfer will include construction drawings, equipment manuals, operational data collected, and the appropriate transfer documents and provisions binding the new owner to the operation and maintenance manual.

  
\_\_\_\_\_  
Salvatore Marino  
Valley Isle Pumping, Inc

January 23, 2019  
Date

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CDF Engineering LLC  
Civil Engineering & Land Surveying Consultants  
P.O. Box 2985 Wailuku, HI 96793  
Phone: (808) 891-2400 - Fax: (808) 879-2402  
[www.cdfengineers.com](http://www.cdfengineers.com) - Lic. No. ABC-33139



Page 26

## **APPENDIX B**

### Specifications



# PULEHUNUI RECEIVING FACILITY

## Custom Receiving Facility Equipment Specifications

Contractor: Mr. Sal Marino  
Valley Isle Pumping, Inc.

Project Details: Design Flow – 20,000 Gallons per day

Project Location: Pulehunui Heavy Industrial Subdivision  
Puunene, Maui, HI  
USA

**CDF ENGINEERING LLC  
CUSTOM RECEIVING FACILITY  
EQUIPMENT SPECIFICATION**

**RECEIVING FACILITY  
PART 1 - GENERAL**

- 1.01 The contractor shall furnish and install one custom wastewater receiving facility, complete and ready for operation in accordance with the plans and specifications stated herein. The wastewater receiving facility shall include one (1) Precast concrete 29,500 Gallon prefabricated tank, as designed by CDF Engineering LLC, Wailuku, Maui, HI, U.S.A. The custom receiving facility will have a total design flow of 20,000 gallons per day of domestic wastewater. The system shall be complete with a grit chamber, receiving and equalization chamber, belt press with conveyor, and roll-off dumpster. The belt press shall be of the fully automated sludge dewatering type. The wastewater receiving system shall include the necessary tank vessels, internal piping, valving, baffles and all items of equipment as listed below. The system shall be complete with all component equipment necessary for efficient and proper plant operation. The electrical power shall be 208 volts.
- 1.02 The belt press shall be factory prefabricated and assembled, so far as possible, taking into consideration shipping and erection limitations. The accompanying tankage shall be separately shipped to the project site in four (4) major tank sections.
- 1.03 The basic equipment furnished by the supplier shall include, but not be limited to tanks vessels, all tank internal piping and valving, blower motor unit assemblies, pumps and electrical control equipment.
- 1.04 General Contractor Field Services - The General Contractor shall perform the installation of the Receiving Facility. The following is a brief description of the general contractor's responsibilities regarding the installation:
- A. Provide a crane and other equipment for off loading and setting of the wastewater receiving system including; grit chamber, receiving basin tank sections, and belt press.
  - B. Once the system components have been set into position the equipment which has been disconnected for shipping such as the piping, valving, and electrical controls must be reassembled.
  - C. The general contractor's electrical field crew shall install at the location shown on the drawings the electrical consoles such as; Model CP-1 (Main Control Panel), CP-2 (flow equalization). In addition, the contractor shall run the electrical wiring and conduit to the appropriate ancillary components within the wastewater receiving facility structure.
  - D. An adequate access road to the facility site shall be provided to enable the lowboy truck into the project site and for off loading.
  - E. Provide facilities and crane for off loading and setting of the wastewater receiving facility components onto their concrete/gravel foundation pads. It is recommended that the crane size should be a minimum of 20-ton.
  - F. All site utilities to the system shall be tied-in to the system. The electrical power requirements shall be provided at each power block of each control console. The main power to the wastewater treatment system shall be supplied through an electrical power meter, main disconnect, and disconnect for the sub-panels – CP-1 CP-2 along with the flow meter panel. This disconnect shall be supplied by the owner's field electrical contractor. Any of the sub-panels shall be supplied with a power block to receive the electrical power from these

- disconnects. The power shall be 208 volts. A total of two sub-panels, shall be provided. The necessary control voltage of 120 volt, 1 phase for the ancillary equipment shall be obtained through transformers. The main disconnect panel shall be supplied by others.
- G. Belt press is to be located within the metal building as shown in attached Drawings. Concrete pad will include underdrains to receiving tank for washdown purposes.
  - H. All field piping shall be by the field contractor.

## **PART 2 - SYSTEM DESIGN CRITERIA AND PARAMETERS**

- 2.00 The wastewater receiving facility will have a total design flow of 20,000 gallons per day of domestic wastewater. The following design criteria were used in sizing the wastewater treatment system:
  - 2.01 Primary Grit Chamber Criteria
    - A. Grit Chamber Holding Volume = 2,000 gallons
  - 2.02 Receiving Chamber # 1 Criteria
    - B. Receiving Chamber Holding Volume = 29,500 gallons
    - C. Air Supplied = Two (2) blowers at 85 SCFM @ 5 psi each
    - D. Mixing provided= one Flygt 5HP pump and piping as shown in receiving tank detail
    - E. Controlled by a time clock and HOA switch located in CP-2
  - 2.03 Belt Press # 1 Criteria
    - A. Design Flow Rate = 20,000 GPD
    - B. Belt Press GPM processing rate of up to 300 GPM
    - C. Flow Through conveyor type

## **PART 3 - VESSEL TANK CONSTRUCTION**

- 3.01 All tank vessels shall be fabricated of Concrete joined by asphalt seals and grout with fillets of adequate section for the joint involved. All walls shall be continuous, watertight and shall be supported by structural reinforcing members where required. Fabrication and erection shall conform to the standard fabrication procedures of CDF Engineering LLC. All other areas such as the tank floor, tank end walls, and internal bulkheads shall be adequately reinforced.
- 3.02 All piping and valving shall be a minimum of schedule 40 PVC pipe. Air lines to be stainless steel.
- 3.03 The receiving tank shall be transported to the project site on one low boy truck in four major sections. The belt press shall arrive on a prefabricated skid. The contractor shall be responsible for offloading and installing each component once the system arrives at the project site.

## **EQUIPMENT DETAIL SECTION**

### **PART 4 - Grit Chamber**

- 4.01 To remove grit and large settleable solids influent will first pass through a grit chamber. The grit chamber will also be equipped with a bar screen to remove any large floatable inorganic solid materials, rags or other trash.

CDF Engineering LLC shall provide the specifications for the following equipment for the grit chamber:

- A. One 2,000-gallon tank with baffle
- B. One Custom type bar screen (Stainless Steel)

#### **PART 5 INLET CONNECTION**

- 5.1 An influent connection to the receiving facility shall be provided. It shall consist of a standard cast sewer manhole cover opening into the first chamber of the grit tank.

#### **PART 6 BAR SCREEN**

- 7.1 Bar screen (Custom Type) shall be located within the grit chamber, and installed along the baffle wall opening as shown on the contract drawings. Its purpose is to remove any inorganic materials, rags or other trash from the influent flow. The bar screen shall be fabricated from one-half inch diameter bars spaced one-inch apart and arranged to trap material within the first chamber of the grit tank as shown on the drawings.

#### **PART 8 ELECTRICAL CONTROL CONSOLE CP-2**

- 8.1 An electrical control center for the flow equalization system shall be the Model CP-2. This control panel shall be installed within a NEMA 4X fiberglass electrical weatherproof enclosure complete with floor mounting facilities installation in the control utility room as shown on the drawings. The voltage shall be 208 volts and shall be supplied to each panel at the power block.
- 8.2 The electrical control center Model CP-2 shall control the operation of the following equipment:
- A) Liquid level sensors -4 level sensors narrow angle
- 8.3 Flow Equalization Mixer Unit - The Flow Equalization mixer unit operation shall be controlled by a HOA switch within CP-2.
- 8.4 Receiving/ Equalization Tank Pump Control - The Flow Equalization pumps shall operate on a duplex pump alternator operation mode whereas pump one will operate alternately with pump no 1 and 2 on cycles. Controls will allow for manual selection of a lead/lag pump. The pump operation shall be controlled by four (4) encapsulated mercury float Switches (narrow angle) each individually adjustable for the following:
- A) All Pumps off
  - B) Lead Pump on
  - C) Lag Pump on
  - D) High Level Alarm
- 8.5 The Flow Equalization pumps shall operate on a lead-lag with the two pumps alternating unless a primary lead pump is selected by the operator. If the liquid level reaches lag pump on level, both pumps shall operate. If the liquid level reaches the high-water level, the alarm will be activated.
- 8.6 All wiring, terminal blocks, supports and accessories required for the operations of the control panel shall be provided in compliance with the National Electric Code.
- 8.7 Flow Equalization Pumps Tagged P-1 & P-2. Each flow equalization pumps shall be supplied with a 3-inch discharge.

#### **PART 9 – RECEIVING AND EQUALIZATION CHAMBER**

- 9.01 The receiving chamber shall conform to the following specifications:

- 9.02 To control the flow rates, a 29,500-gallon receiving tank and equalization chamber shall be provided at the influent end of the receiving facility. The influent peak flow rates shall enter into the flow equalization system where it is held and mixed until the belt press is ready to process it. Once the influent has been received by the grit chamber it shall be flow via gravity to the receiving basin. The vessel shall be shaped in such a way to prevent sludge accumulation, enhancing the rotation of the vessel contents, and to prevent scum and froth accumulation. To insure optimum mixing, the receiving chamber shall be constructed with air diffusers, placed longitudinally along one side of the chamber so as to, in conjunction with flow control baffles, enhance the spiral rotation of the chamber contents. The velocity of rotation shall be sufficient to scour the bottom and prevent sludge filleting.
- 9.03 An air distribution manifold shall be installed longitudinally on one side of the tank with diffuser drop assemblies connected thereto. This manifold shall be designed to create air to supply the needs of the system, Air distribution header and drop pipes will be made of 316 Stainless Steel.
- 9.04 Each diffuser drop assembly shall be equipped with an air regulating and/or shutoff valve, a disconnecting union and a diffuser bar with non-clog air diffuser nozzles mounted on the tee bar. The airflow per diffuser shall range from 1 to 5 CFM. This minimum air velocity shall be maintained to insure sufficient velocity for self-cleaning. The diffusers shall be parallel to and near the base of the vessel sidewall and at an elevation, which will provide the optimum diffusion and mixing of the vessel contents. The oxygen transfer capacity of each diffuser shall be such that an adequate supply of oxygen will be maintained in the receiving chamber to meet treatment requirements of the design sewage load. The air diffuser shall be of the sock-type fine bubble diffuser, EDI FlexAir T-Series, EPDM.

#### **PART 10 MIXING FOR RECEIVING AND EQUALIZATION TANK**

- 10.1 Mixing shall be provided by a Flygt Model 3102 4" submersible pump, with associated piping as shown in Drawing x. Mixing will also be provided by two 85 scfm blowers with air diffusers.

#### **PART 11 BELT PRESS**

- 11.01 There shall be furnished a single fully automated sludge dewatering belt filter press system skid to work in conjunction with the corresponding grit and receiving/ equalization chamber of the system. The receiving chamber shall be of the following specification:
- A. BDP Industries, Inc., 1.0m 3DP w/10' Gravity Belt Thickener
  - B. The belt press slope should be level laterally within 1/16" overall and secured with anchor bolts and nuts.
  - C. Locate the polymer mix tank and feed pump skid as near as possible to the press without it interfering with the operation and maintenance of the press.
- 11.02 The belt press shall be housed in the belt pressing housing with adequate room for appurtenances and future maintenance and replacement requirements. The belt press shall be of such a size as to provide a minimum of 200 GPM worth of processing at up to 2% feed solids, based upon the same design flow rate governing the facility design flow (20,000 GPD). The belt filter press shall be of the fully automated sludge dewatering type, skid mounted, with sludge conditioning, mixing devices, seamed woven belts, nylon coated drive/pressure rolls and idler rolls, hydraulic belt tensioning and tracking devices, variable speed press drive, controls and starting equipment, and accessory items for special construction including stainless steel hardware.
- 11.03 The belt press solid waste shall pass via conveyor into a roll-off dumpster for disposal at the local landfill.

#### **PART 12 - BELT PRESS ELECTRICAL CONTROL PANEL, CP-1**

- 12.01 An electrical control panel, Model CP-1, shall be installed within a NEMA 4X fiberglass weatherproof enclosure complete with legs and installed as shown on the drawing. The electrical control panel shall control the operation of the following system equipment:
- A. Belt Press Model No. BDP Industries 3DP Skid Mounted System
  - B. Boerger HCL 390 multicrusher sludge grinder
  - C. Electronic GPM flow meter
  - D. Polymer pump and mixing equipment
  - E. Conveyor to Roll-off container
- 12.03 An electrical control panel, Model CP-2, shall be installed within a NEMA 4X fiberglass weatherproof enclosure complete with legs and installed as shown on the drawing. The electrical control panel shall control the operation of the following system equipment:
- A. Receiving tank Blower
  - B. Receiving tank EQ pumps
  - C. Receiving tank mixer pump
- 12.04 An electrical control panel, Model CP-LS, shall be installed within a NEMA 4X fiberglass weatherproof enclosure complete with legs and installed as shown on the drawing. The electrical control panel shall control the operation of the following system equipment:
- A. Effluent LS to WWTP
  - B. Seametrics 4" flow meter
- 12.04 The enclosures shall be NEMA 4X fiberglass. The electrical controls shall consist of IEC motor starters, timers, and selector switches. Properly sized circuit breakers or fuses shall protect all electrical equipment and circuitry.
- 12.05 All wire and conduit required between the control panels and the electrical power service should be furnished by and installed by the field controller. The main power supply shall be 208 volts. Power to the control panel shall be 120 volt, 1 phase. A power block in the control panel shall be supplied for the main electrical connection.
- 12.06 The control panels shall be labeled as CP-1 and CP-2 and shall be completely factory assembled and tested prior to shipment.
- 12.07 Controls shall be mounted to a removable sub-panel within the enclosure and shall be wired and spaced in accordance with the latest National Electric Code.

### **PART 13 - EFFLUENT CONNECTION**

- 13.01 The effluent connection of the receiving facility shall be located as shown on the plans and shall consist of one (1) 4" diameter standard flanged pipe at the location shown. The effluent from the facility will flow to a lift station. From the lift station, the effluent will be pumped to the private Pulehunui Heavy Industrial Subdivision Wastewater Treatment Plant for secondary treatment. As discussed in the accompanying EDR detailing the proposed WWTP expansion.
- 13.02 A Seametrics iMAG 4700 magnetic flow meter will be installed with remote totalizer readout in the control panel CP-LS.

END OF SECTION

CDF Engineering LLC  
Civil Engineering & Land Surveying Consultants  
P.O. Box 2985 Wailuku, HI 96793  
Phone: (808) 891-2400 - Fax: (808) 879-2402  
[www.cdfengineers.com](http://www.cdfengineers.com) - Lic. No. ABC-33139



Page 33

## APPENDIX C

### Operations and Maintenance Manual

# Operations and Maintenance Manual

**Project: Valley Isle Pumping Wastewater Receiving Facility  
Pulehunui, Puunene, Maui, Hawaii**

**Design Flow: 20,000 Gallons per Day**





# TABLE OF CONTENTS

1. INTRODUCTION.....	3
1.1 Brief Overview of the System.....	3
1.2 WRF Design Parameters .....	3
2. BRIEF DESCRIPTION OF MAJOR PROCESSES .....	6
2.1 Grit Chamber.....	6
2.2 Receiving Chamber .....	6
2.3 Belt Press.....	7
3. DETAIL DESCRIPTION OF EACH UNIT PROCESS.....	8
3.1 Grit Chamber.....	8
3.2 Receiving & Equalization.....	9
3.3 Dewatering Process.....	11
4. SLUDGE HANDLING AND DISPOSAL .....	12
4.1 Procedures for Pumping and Wasting Sludge .....	12
5. TESTING AND RECORDKEEPING .....	13
5.1 Recommended Tests.....	13
5.2 pH Test.....	13
5.3 Color Test.....	13
5.4 Dissolved Oxygen Test.....	13
6. MAINTENANCE MANAGEMENT.....	14
6.1 Daily.....	14
6.2 Weekly.....	14
6.3 Monthly.....	14
6.4 Annually.....	14
6.5 Recommended Spare Parts.....	16
7. SYSTEM START UP GUIDE.....	18
8. TROUBLESHOOTING GUIDE .....	19
9. RECEIVING FACILITY INITIAL ADJUSTMENT AND OPERATION.....	20
10. TEST PROCEDURES.....	21

## 1. Introduction

### 1.1 Brief overview of system:

The CDF Engineering LLC custom wastewater receiving facility equipment outlined in this Manual was designed by CDF Engineering LLC and had coordinated manufacturing by Valley Isle Pumping, Inc. and Crystal Environmental, as well as by manufacturers of specific facility components.

The wastewater receiving facility is a customized facility utilizing pre-manufactured equipment and components to achieve solids separation. The degree of treatment of this design flow would be considered primary complete with grit removal, flow equalization, dewatering, and solids removal and disposal which includes the following:

Main Systems Provided:

- Grit Chamber
- Receiving tank (equalization tank) with odor control
- Polymer mixing and belt press
- Return lines
- Conveyor belt
- Solid disposal system (roll-off container)
- Lift station

### 1.2 Plant Design Parameters:

The package wastewater treatment system is designed to meet the following effluent limitations when operated properly:

<b>Average Daily Flow Rate:</b>	<b>20,000 GPD</b>
---------------------------------	-------------------

<b>Parameters</b>	<b>Unit</b>	<b>Influent</b>	<b>Projected Effluent</b>
BOD <sub>5</sub> :	(mg/L)	6,800	≤ 200 mg/L
TSS:	(mg/L)	15,000	≤ 200 mg/L
pH:		6.0	6.9-8.5
Fecal Coliform	(N/CML)		200/100

## Primary Grit Chamber

One (1)	2,000-gallon traffic rated concrete septic tank

## Receiving Chamber with Odor Control

One (1)	Receiving chamber with a volume of 29,500 gallons
Two (2)	Blower motor units each with a capacity of 85 SCFM at 5 PSI, equipped with 5 HP motor mounted within a fiberglass enclosure
One (1)	Air manifold with diffuser drop assemblies
One (1)	Lot of fine air diffusers
One (1)	Lot piping stainless steel
One (1)	Submersible pump and piping installed as physical mixer
Two (2)	Submersible pumps to belt press
One (1)	Pre-wired electrical control system Model CP-2 complete with enclosure NEMA 4X fiberglass with the necessary Motor starters, circuit breakers, programmable 24/7 timers, selector switches.

## Polymer Mixing and Belt Press Housing

One (1)	Quonset Hut
One (1)	50 KW backup generator
One (1)	Automatic Transfer Switch
One (1)	Polymer holding tank
One (1)	Belt Press Assembly
One (1)	Hand sink
One (1)	Emergency Eye-Wash Station
Two (2)	Polymer mixing pump, ½-hp
One (1)	Sample Station
One (1)	CP-1 Control Panel complete with enclosure NEMA 4X fiberglass with the necessary Motor starters, circuit breakers, programmable 24/7 timers, selector switches.

## Conveyor Belt

One (1)	Conveyor Belt for solids transfer to roll-off
---------	---

## Roll-off Container

One (1)	8' x 40' roll-off container (replaceable)
---------	---

## Lift Station

One (1)	3' Diameter concrete sewer manhole
Two (2)	Submersible flow equalization pumps, ½-hp
One (1)	Effluent flow meter. 4" Seametrics mag-meter
One (1)	CP-LS control panel complete with enclosure NEMA 4X fiberglass with the necessary Motor starters, circuit breakers, and selector switches.

## 2. Brief Description of Major Processes

### 2.1 PRIMARY GRIT CHAMBER

2.1.1 The primary function of the grit chamber is to remove grit and large settleable solids. The grit chamber will also be equipped with baffles and a bar screen to remove any large floatable inorganic solid materials, rags or other trash. A receiving manhole is installed prior to the grit chamber for easy access and dumping.

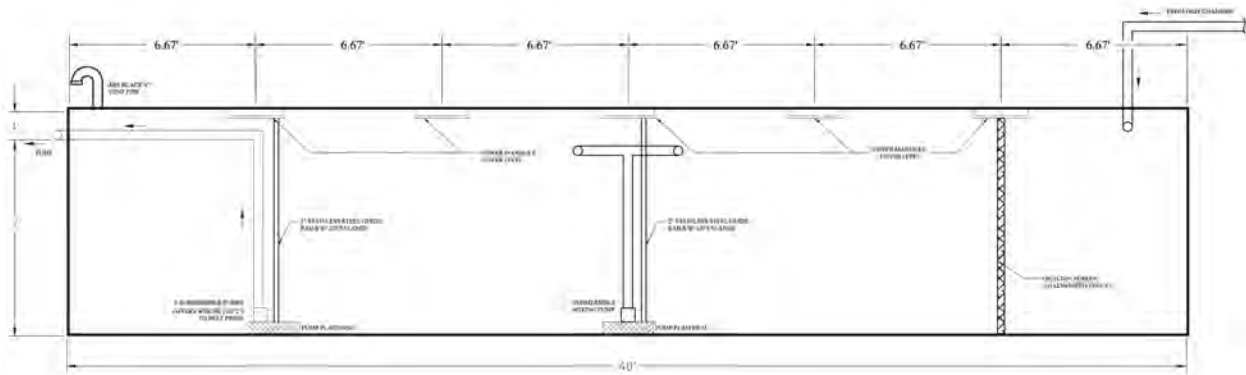
### 2.2 RECEIVING CHAMBER

2.2.1 The wastewater receiving facility has been provided with a receiving and equalization chamber. The system's receiving chamber has a volume of 29,500 gallons.

2.2.2 The receiving and equalization chamber is where the waste is stored prior to entering the dewatering process. The volume of this basin and dual feed pumps enable the operator to control the rate of flow to the belt press.

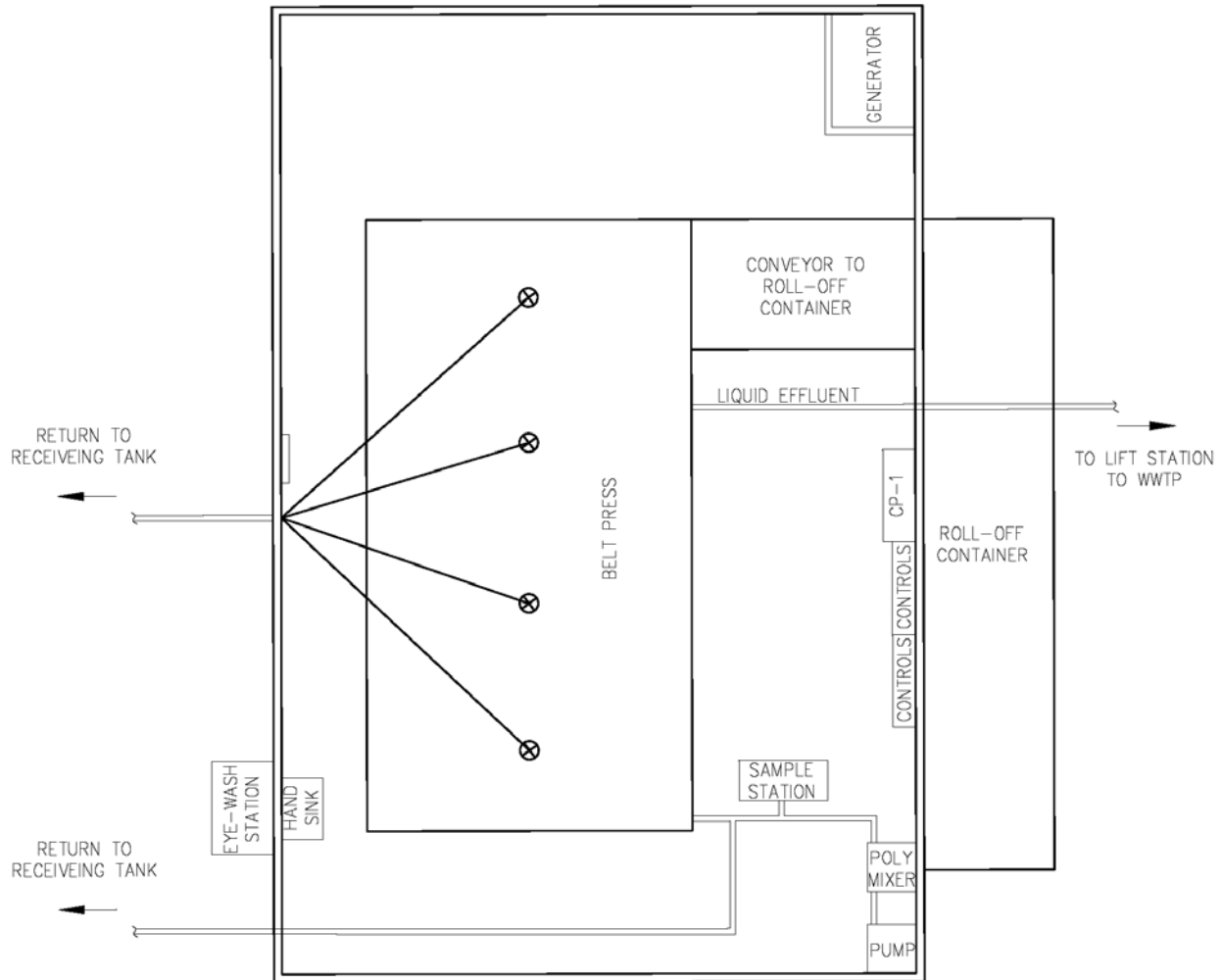
2.2.4 The receiving basin must be kept uniformly aerated and mixed, thereby providing oxygen for stabilization of the received waste and providing a uniformly mixed waste stream to the polymer mixing system and belt press. The receiving basin should be inspected each time a site visit is made to determine that uniform mixing is occurring. Improper mixing in the receiving chamber could result in sludge deposits that may become septic, hindering proper operation of the receiving chamber and allowing undesirable microorganisms to multiply. Improper mixing will also result in less than desirable flocculation rates in the following polymer mixing stage.

2.2.5 Diffusers – Air is supplied to the aeration chamber from the blowers to vertical down feed pipes (drop pipes), located along the length of the chamber, and then into the air diffusers. Each drop pipe has a diffuser tee with two fine bubble type diffusers. The diffuser drop pipes come with a ball valve located at the top of each drop pipe. Under normal operation, these valves should remain partially open. The diffuser drop pipe is equipped with a union for easy disconnect and removal for cleaning. See diagram below for detail.



## 2. 3 BELT PRESS

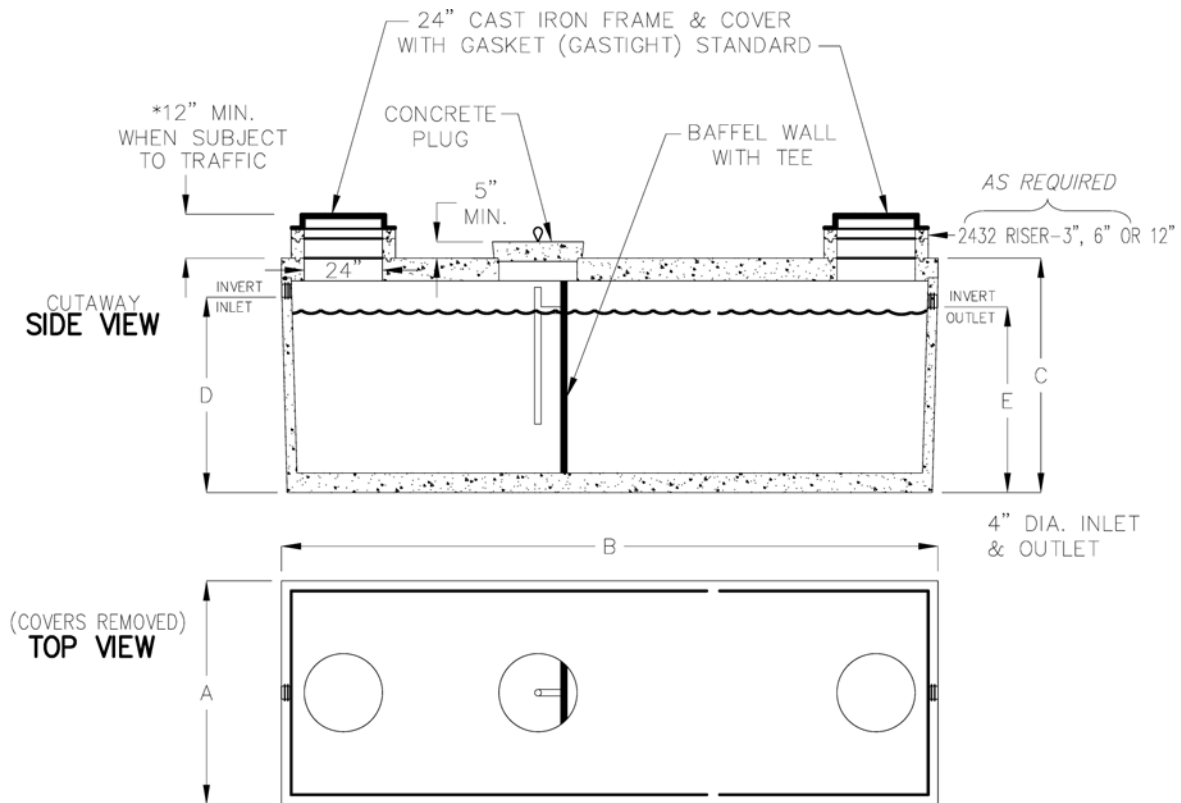
- 2.3.1 The purpose of the belt press is to filter and dewater the wastewater received. This is the main component of this wastewater receiving facility, around which each of the other ancillary components are designed.
- 2.3.2 Installed at the tail end of the belt press is a conveyor which exits out the housing wall and deposits dried sludge into a roll-off container. Roll-off is to be equipped with a tarp cover and is to be kept covered at all times that belt press is not in use.



### 3. Detail Description for Each Unit Process

#### 3.1. GRIT CHAMBER

3.1.1 A 2,000-gallon Grit chamber has been provided to control the initial flow rates of your system. A sewer manhole provides the initial dump outlet for incoming trucks. All of the incoming surge flow enters into this manhole and flows through the custom screen isolating the first section of the first chamber. Grit and other large settleable solids are deposited within this first chamber. Floatable solids are trapped within the first chamber by the baffle wall. Waste then exits through the final Tee to the receiving and equalization basin. During each process inspection, operator should open each cover and ensure that; screen is still unobstructed enough to allow flow to pass through; baffle and Tee are not blocked or obstructed. Sludge judge or probe may be used to determine the level of floatable solids and grit present. It is recommended that the grit chamber be emptied and cleaned once every month, or when the solids content is greater than 30% of the total volume of the tank as determined by sludge-judge.



NOTE: NOT RECOMMENDED FOR POTABLE WATER OR ABOVE GROUND USE.  
 NO WARRANTIES EXPRESSED OR IMPLIED FOR MERCHANTABILITY OR  
 FITNESS FOR ANY PARTICULAR PURPOSE.

MODEL NUMBER	LIQUID CAPACITY GALLONS	WIDTH 'A'	OVERALL LENGTH 'B'	TANK HEIGHT 'C'	INLET 'D'	OUTLET 'E'	MINIMUM EXCAVATION WIDTH	MINIMUM EXCAVATION LENGTH	*DEPTH OF BURY	MAX. LIFT WEIGHT
HJ2000HT	2000	7'-2"	16'-2"	4'-11"	3'-10"	3'-7"	8'-2"	17'-2"	6' MAX.	24,700

- TANK DESIGNED FOR H-20 TRAFFIC WHEEL LOAD WITH 1' TO 6' MAX. EARTH COVER AND WATER TABLE AT ONE FOOT BELOW GRADE.

### 3.2 RECEIVING AND EQUALIZATION

- 3.2.1 Receiving and Equalization Chamber – One 29,500-gallon receiving chamber has been provided for the wastewater receiving facility. Flow enters this chamber from the grit chamber discussed previously. The receiving chamber is where waste is stored to equalize flow rates to the dewatering skid, and where waste is mixed and prepared to enter the dewatering process. The operator must visually inspect this tank and the following components during each routine inspection.
- 3.2.2 Flow Equalization Pumps - Dual flow equalization pumps to the dewatering skid are provided for this system. The pumps are a Meyers model WG50-WGX50 or approved equivalent.



- 3.2.3 Pump Control Sequence - The Flow Equalization Pumping System is controlled and operated by four (4) level sensors that function with the water level within the flow equalization basin. The following equipment controls this operation and is located within the flow equalization control panel, CP-2. For detailed control wiring information, refer to Part IV Section B.
- 3.2.4 The liquid level sensors are attached to a bracket and hang from the side wall of the flow equalization basin. The following are those liquid level sensors and their function:
- |                     |       |                                  |
|---------------------|-------|----------------------------------|
| Liquid Level Sensor | - LS1 | (All pumps off)                  |
| Liquid Level Sensor | - LS2 | (Lead EQ Pump on)                |
| Liquid Level Sensor | - LS3 | (Lag EQ Pump on)                 |
| Liquid Level Sensor | - LS4 | (High level alarm with light on) |
- 3.2.5 The Flow Equalization Pumps will remain in the Off position until an operator is preparing to process waste through the dewatering skid. Once the dewatering skid processes are ready to receive waste, recycle valve will be turned on and pump station switched to Auto. Operator will run through the polymer mixing and flocculation procedures described below and then turn valves to allow flow to the belt press.
- 3.2.6 - Flow Proportioning Valves - Valves on the discharge piping of the equalization pump can be adjusted to feed only the desired GPM flow rate to the polymer mixing system and dewatering skid- in accordance with the belt press O&M manual, and as determined by the flow meter located within the belt press assembly.
- 3.2.7 Flow Equalization Mixer – Mixer is used to keep solids from settling out or turning septic. Mixer consists of a centrally mounted submersible pump with discharge piping running to either end of the receiving tank. This will create a pattern of flow that ensures a complete mix of the basin's contents.
- 3.2.8 Flow Equalization Mixer Operating Sequence - The mixer operation is controlled by an HOA switch within CP-2. During fill periods, the operation time will be intermittent and as controlled by the mixer timer. The plant operator shall control the operation time. During periods of batching to the dewatering skid, the mixer will be operated on Hand.
- 3.2.9 Blower Motor Units– Two (2) blower motor units have been provided for the receiving and equalization basin. Each blower unit has a capacity of 85 SCFM at 5psi. Each blower is designed to handle 100% of the air supply. The two blower units should never be running at the same time as the blower piping was not sized to handle this much pressure. The blowers are each operated on a time clock. Operator is to adjust the timeclock in order to prevent waste within the tank from becoming septic, and to provide for stabilization of incoming waste. Run time can be increased or blower operation switched to Hand if operator detects odors or otherwise determines that the waste received requires more stabilization.

An air filter is attached to the intake of the blower. This filter is of the disposable type (paper), and must be kept clean for maximum blower life. Failure to keep the inlet air filter clean is one of the most common maintenance problems. The blower has a normal discharge pressure of 5psig for this system. There is supplied with each blower unit a pressure gauge and pressure relief valve. The pressure relief valve is adjustable so that the 5psig design pressure can be maintained. It is important to make sure the pressure relief valve is properly adjusted, as if it is too tight, pressure will build up. If the valve is too loose, air could be wasted out of the valve, causing a low percentage of air to make its way to the secondary treatment system. A check valve on the blower discharge is also supplied. It will prevent water from entering the drop pipe when the blower is off. A check valve is located near the discharge of each blower to prevent the blower that is not in operation from rotating backwards. If the rotation of the blower is reversed, a vacuum will be produced. Before startup, the blower should be operated for a few seconds to

ensure that it is producing air at its discharge rather than drawing a vacuum. This procedure could prevent water from being sucked into the blower, which could damage the blower and void the factory warranty.

### 3.3 DEWATERING PROCESS

3.3.1 Belt Press – A Belt Press has been provided for this receiving facility. Because the purpose of the belt press is to filter and process sludge, it should be operated as described in the belt press manual, with operations performed by qualified personnel only. The belt press should only operate while the operator is present and monitoring the operations. As general maintenance, the belt press floor areas containing sludge, polymer or other debris should be hosed down the drains provided which return to the receiving tank. Solid cake produced is conveyed out of the facility into the roll-off container and hauled to the local landfill for disposal.

The independent gravity section of the belt press allows for maximum solids thickening before entering the pressure section of the press. The frame of the press is made up of welded heavy-duty rectangular steel tubing conforming to ASTM A-500 Specifications. All rollers are constructed of carbon steel pipe with carbon steel journals and double flanges.

The actual dosage fed for any belt press operation depends on the following:

- A. The type of sludge being dewatered.
- B. The proper operation of the polymer system.

The operator will consult specifically with the supplier on proper product, method of mixing, solutions strengths, use of dilution water, and points of application. Approximately 50 to 60% of the filtrate removed from the total dewatering of a sludge will be removed in the gravity belt thickener. The variable speed feature of the belt allows optimum dewatering to be obtained. As the GBT runs, the belt material is constantly kept clean with a spray header fitted with spray nozzles.

The gravity belt is fed with an upflow feed box to allow for coagulation/flocculation of the sludge and polymer. The head box and venture mixer are constructed of 316SS. The gravity is also covered in the operation and troubleshooting sections of the manual. The sludge flows over a smooth weir and onto the gravity belt. As the sludge is passing onto the belt it is traveling faster than the belt is traveling. Depending on belt speed and flow rate, the sludge and belt will begin to travel at the same speed in between the feedbox and furrowing plows. If the sludge is flowing faster than the belt as the sludge enters the plows, the gravity section will eventually flood. Under proper operating conditions, large amounts of water will be removed in the first foot of the gravity section. Proper drainage can be easily viewed under the gravity deck.

Paramount to the successful operation of the gravity section is proper chemical conditioning of the sludge being dewatered. The optimum chemical dosage must be used at all times or the belt will begin to blind. However, the advantage of the GBT is that even if it is blinded by improper polymer dosing for hours at a time, it will respond to the proper dosage quickly and resume proper operation after several minutes due to the spray water effectiveness in cleaning the belt.

## 4. Sludge Handling, Disposal, and Component Cleansing

- 4.1 **Procedures for Pumping and Cleaning System Components** - The following procedures should be followed:
1. Twice per week, operator will schedule a third-party hauler to remove 30 cubic yard dumpster from the facility.
  2. Once per month the operator will schedule the pumping and cleaning of the grit chamber and receiving and equalization tank. The bulk of the load will be thoroughly emptying and cleaning the grit chamber. Once emptied, the receiving tank screen will be hosed and cleaned along with and scum or floating debris within the receiving tank, as needed and as directed by the plant operator.
  3. Once every 3 years the receiving and equalization tank shall be completely emptied and cleaned of all accumulated material, with diffusers or other components replaced as needed and the overall condition of the tank evaluated.
  4. Waste pumped is to be disposed of properly by the hauler at an appropriate County of Maui facility.
  5. The belt press machine is provided with (3) 1-1/2" diameter, 316 stainless steel, self-cleaning, and adjustable angle showers. Each shower is equipped with a handwheel for self-cleaning. The showers clean from the non-cake side of the filter media. The spray pattern is perpendicular to the belt to allow the water to flush out the residue on the cake side. It is critical to have the optimal belt cleaning from the shower system to obtain the driest cake. Important variables are spray angle, clean nozzles, adequate pressure, and adequate water supply.

## 5. Testing and Record Keeping

- 5.1 **Recommended Tests** - Parameters that are recommended to be monitored and that give a good picture of the receiving facility's status and condition are levels within each tank, pH, color, and dissolved oxygen. The required test equipment includes, DO meter, pH meter, and proper PPE. A copy of O&M records, repair history, and effluent test results must be kept on-site for a period of two (2) years.
- 5.2 **pH Test** – Operator shall perform a daily pH test of the receiving and equalization tank prior to batching to the dewatering skid. Operator may add a buffer or pH adjusting additive to raise pH levels as necessary, and as required to meet operating parameters of the belt press. The receiving chamber is expected to have a pH between 5 and 7. pH value should be determined on a daily basis by the operator, using a handheld meter. Meter probe should be placed at mid-depth of the receiving tank. Once the pH value has been determined, the operator must enter that value on the operating log. If pH is found to be lower than 5, the properly certified wastewater operator can introduce a corrective chemical at their discretion. Soda Ash and Sodium Bicarbonate are commonly used and purchased in 50lb bags. Operator should not introduce more than 50lbs, or approximately one bag, into the chamber within a 12-hour period. Operator must always read MSDS and wear appropriate PPE when dealing with chemicals
- 5.3 **Color Test** - The color of the receiving chamber is one of the quickest ways to check the system status. If the receiving tank's color is gray or black, the tank is not receiving enough air. Possible reasons for this are that the control time clocks are not allowing the aerators to operate enough, the diffusers may be partially plugged, or the tank may have received some high BOD material. A black color accompanied by a rotten egg odor indicates that the tank is septic. When this occurs, the tank aerators should be placed on Hand for constant aeration until the tank is no longer black and septic. Operator may also adjust the schedule of loads received in to the tank at that time to include waste activated sludge from a package treatment plant to stabilize the other loads.
- 5.4 **Dissolved Oxygen (DO) Test** – DO concentration should remain at or above 1 mg/L.

The test for DO is performed within the receiving chamber for operational control, and may have to be conducted on the plant effluent for regulatory control. Operator can use DO reading as a basis for adjusting blower run times if DO is found significantly below 1mg/L. The best method for testing the DO in the receiving chamber is to use a DO meter. If the probe is placed at mid-depth in the receiving chamber, the DO concentration can be read directly.

Dissolved oxygen (DO) is for both physical mixing and waste stabilization/ odor control within the receiving chamber. The oxygen concentration is measured in milligrams per liter (mg/L), the ideal oxygen concentration in the receiving chamber is greater than 1 mg/L. This level is to be maintained to prevent septic conditions and odor/ process issues which result from that. If DO level is below 1 mg/L operator may place the tank aerators on Hand to run constantly until DO has increased.

## 6. Maintenance Management

Recommended Maintenance Schedule - In addition to the required tests as described above, below is a recommended schedule of maintenance for your system.

### 6.1 Daily Maintenance Procedure

- Make a daily visual inspection of the receiving facility to be sure that all mechanical equipment is operating.
- Observe screen, baffle T and levels within the Grit Chamber
- Observe screen, inlet T and levels within the receiving and equalization tank
- Check to see that there is equal air distribution along entire length of the receiving tank.
- Check to see that dewatering feed pumps are each functional by testing on Hand with return line valve on.
- Check to see that the mixing pump is functional by running on Hand and opening tank manholes to observe.
- Hose and break up and floating scum or debris within the receiving tank.
- Take DO and pH reading within the receiving tank
- Check Polymer levels within the dewatering housing.
- Perform belt press inspection per manufacturer's instructions and maintenance manual.
- Hose and clean belt press waste to underdrains after each batch is processed
- Check level and pump status of the effluent lift station to WWTP.
- Perform check of WWTP as described in the Upgraded WWTP EDR and O&M manual.

### 6.2 Weekly Maintenance Procedure

- Clean the interior of the receiving facility belt press housing.
- Check all electrical equipment to see that if it is operating properly and if any fuses are blown or circuit breakers opened.
- Clean the growths and accumulated solids from inlets and outlet baffles within grit chamber and receiving tank.
- Check to see if diffusers and aerators are all working properly and not plugged.
- Check amperage readings on mixing pump, EQ, and LS pumps and ensure they are operating within range.
- Schedule the following week's roll-off hauling.
- Run pH and Dissolved Oxygen (DO) test and record in facility log (See Section 5.5 for, Test Procedures).
- Clean trash and weeds from around facility and equipment.

### 6.3 Monthly Maintenance Procedure

- Check blower oil level
- Check air filters and clean or replace when necessary.
- Check and replace belts as necessary
- Run back-up aeration basin blower and check for proper operation
- Completely empty and clean bottom and walls of grit chamber. Skim receiving basin.
- Check generator and transfer switch for proper operation

### 6.4 Annual/ Periodic Maintenance Procedure

1. Completely empty and clean bottom and walls of receiving basin once every 3 years.
2. Change blower oil annually.
3. Schedule professional servicing of generator.

4. Perform annual maintenance tasks on belt press and dewatering equipment as recommended by manufacturer and described in maintenance manuals.

Notes:

- a. Refer to equipment manufacturer's operation and maintenance manuals.

OPERATION & PREVENTATIVE MAINTENANCE	DAILY	WEEKLY	MONTHLY	3 MO	6 MO	YEARLY	AS NEEDED
<b><i>Inlet &amp; Outlet Facilities</i></b>	X						X
1. Clean Manholes, troughs, & chutes, and weirs							
2. Flush influent sewer, if possible, use water from fire hydrant or street cleaning water truck		X					
<b><i>Screening</i></b>							
1. View Grit Chamber	x						
2. Remove & dispose of rags & accumulations from bar-screens	X						X
<b><i>Receiving Basin</i></b>							
1. Visually check aeration system for even air distribution, no dead spots	X						
2. Raise & clean rags from diffusers		X					
3. Check for air leaks around base and fittings of blower	X						
4. Check blower motor and bearings for excessive heat	X		X				
5. Check aeration system for unusual noises or vibration	X						
<b><i>Belt Press</i></b>							
1. Check Belts, crusher and polymer mixer	X						
2. Verify levels	X						
3. Ensure cleanliness of apparatus		X					
<b><i>Pumps Motors and Mixers</i></b>							
1. Check for blockages in Return airlift return pumps	X						
2. Check pumps for clogging or near clogging condition		X					

## 6.5 Recommended Spare Parts

Below is the recommended spare parts list for your system:

- Case of Blower Oil
- Case of replacement filter elements for each size blower
- Three pressure gauges
- One pressure relief valve of each size
- Two spare diffusers
- Spare receiving tank mixing pump
- Spare dewatering skid feed pump
- Repair kit for polymer mixing system and pump
- Set of spare bearings and repair kit for belt press
- Blower repair kit for each model blower
- Two sets of v-belts
- Two liquid level sensors
- One overload of each size
- One circuit breaker of each size



## 7. System Startup Guide

### 7.1: Prior to our arrival. Items to be completed by Contractor

1. All equipment must be installed per specifications, including blowers, mixers, controls, and all other equipment and component parts supplied to make the system complete and operational.
2. All equipment must be connected as per specifications, including all external piping involved with the operation of the system.
3. All equipment requiring electrical connections must be completed.
4. Power must be supplied to the system.
5. In order to leave the system operational, the inlet and outlet connections should be made. Operator training will involve the filling stage when trucks are offloading through the grit chamber, and the dewatering stage when a batch is being processed to the belt press.
6. Any chemicals that may be required for the operation, such as soda ash or sodium bicarbonate may be available at time of training if desired.

### 7.2: After our arrival at the receiving facility.

1. A visual inspection of all equipment will be done.
2. A check for oil and lubrication of required equipment will be done.
3. The blower units and any pumps involved should be checked for rotation.
4. All electrical equipment will be tested for correct rotation, function, amp draw, and alignment.
5. All equipment requiring adjustments will be done, which includes timers, level sensors, valves, and any other equipment requiring adjustment.
6. After all adjustments are completed and tested the operation and maintenance training will begin.
7. We will first start with the maintenance of all the equipment. Which will cover the when and how to take care of all the mechanical equipment involved in the system.
8. We will then cover the function of each section of the system, which includes the equalization and receiving basin, belt press, and grit chamber.
9. We will then go through each piece of equipment designed by CDF Engineering LLC, and explain how it operates and why it is required.
10. The above procedures will take us through the system about three (3) times and after this we will be open for questions.
11. Lubricate the blower in accordance with the manufacturer's instructions. Fill the blower casing with oil of the correct grade and amount.
12. Inspect operation and direction of rotation of the pumps and the air blowers.
13. Check the belt drive for alignment, centering of sheaves on shaft, and tension on air blower.
14. Start-up and configure belt press according to the manufacturer's start-up procedure as described in the manual provided.

## **8. Wastewater Treatment System Troubleshooting Guide**

### **MOST COMMON PROBLEMS AND PRACTICAL SOLUTIONS**

#### **1. Motors will not run:**

- a. General power outage
- b. Fuses blown
- c. Motors overloaded-push re-set button; check overload heaters if reset does not start motor.

#### **2. Excessive Foaming:**

- a. Over Aeration – reduce blower run time
- b. Lack of solids – (usually found only during first month of operation).

#### **3. Equipment will not work on automatic:**

- a. Check set points on HMI-check positions of H-O-A switches
- b. Overload may be released – push reset

#### **4. Sludge accumulation on top of receiving tank:**

- a. Mixing pump not functioning. Check pump amperage. Check outlet lines for obstructions.
- c. Check receiving tank screen.
- d. Schedule cleaning.

#### **5. Large quantities of plastics entering receiving tank:**

- a. Screen clogged or malfunctioning. Check grit chamber screen and receiving tank screen. Schedule cleaning if necessary.
- b. Grit chamber overloaded – check rate and hose position of trucks dumping into grit chamber.

#### **6. Roll in receiving tank not uniform:**

- a. Adjust valves at drop pipes
- b. Diffusers bad – pull drops, check diffusers for clogging
- c. Check blowers be sure 100% of design air volume is being delivered

#### **7. Receiving Tank Feed pump to dewatering skid not delivering flow:**

- a. Check pump amperage- pull and clear if necessary
- b. Check HOA switches and float switches – adjust if necessary
- c. Check and reset motor overloads

## 9. Receiving Facility Initial Adjustment and Operation

Check receiving manhole of grit chamber and ensure dump hose is properly positioned so as to not overwhelm screen. Observe incoming loads and monitor grit chamber and receiving tank levels. After the receiving and equalization tank has been filled, several preparations will need to be made prior to batching over to dewatering skid. Turn on blower and adjust air valves on drop pipes until uniform aeration is achieved. Turn on mixing pump and ensure that proper mixing is achieved.

Perform a visual check of belt press and all equipment within the dewatering housing. Perform a visual check of conveyor to roll-off. Visually inspect level of sludge (if any) within roll-off to ensure enough room remains for the subsequent batch.

Place the receiving tank feed pumps to the recirculation position and operate each pump on Hand to observe that they are operating correctly. Then switch to Auto so pumping continues until the Off-float position is reached. Switch multicrusher-grinder to Hand. Turn polymer system on and check levels within polymer storage tank.

Next, turn polymer system on and begin sampling the return line until proper flocculation is observed as described in the polymer mixing unit operation and maintenance manual. Once flocculation has been achieved, the belt press may be switched to Hand in preparation for receiving flow. Turn the recirculation valve to the batching position and begin sending flow to the belt press. Perform belt press system checks as described in the manufacturer's operation and maintenance manual. Continually observe the conveyor to roll-off and ensure it is not over-filled.

Once the low-level float has been triggered within the receiving tank, feed pumps will be switched off. At that time, switch the polymer system off, then the multicrusher, followed by the belt press and conveyor. Note final fill level of roll off and note in facility log. Cover if necessary. Check effluent LS to WWTP for proper operation. Note flow meter reading in plant log and calculate daily totals. Check the Upgraded WWTP as described in the operation and maintenance manual for that facility.

The aeration system needs to create enough mixing action to rapidly rotate contents of the tank. If this does not occur, check blowers and lines to be sure that 100% of designed air volume is being delivered. Failure to provide a proper roll will permit solids to settle in the lower portion of the Aeration Zone and produce an anaerobic condition.

On the operation of the belt filter press, the faster the belts speed in the gravity zone and the slower the speed in the pressure zone, the drier the cake will be, and the more the belt pressure can be applied within the pressure section. The independent gravity belt section is the key to the driest sludge cake and highest machine throughput. In turn, its operation is totally at the mercy of the proper conditioning of the sludge with the polymer. Some sludge will only release a certain quantity of bound water and no more (i.e. there is a limit to the cake dryness that can be obtained). Generally, the higher the pressure is in the pressure zone, the drier cake and the more solids in the filtrate. The lower the pressure is in the pressure zone, the wetter the cake and the fewer solids in the filtrate.

The belt press machine should be started with the sludge being rerouted off the belt press via bypass valving into the sump area. Once the proper floc is reached, the sludge should be routed to the gravity section of the machine and the belt speed should be adjusted. Overdosing with the polymer will affect the sludge nearly the same as under dosing. Foam in the filtrate indicates overdosing; a lack of floc and dirty filtrate indicates under dosing.

Operational variables include polymer dosing, gravity belt speed, feedbox rotational speed, gravity zone sludge depth, top belt pressure, bottom belt pressure, pressure section belt speed, and sludge feed rate. The items should be visually checked during operation of the belt press.

## 10. Wastewater System Test Procedures

### pH Test (Test using a modern, handheld pH meter with digital readout):

#### **Purpose:**

This weekly test is used to determine the acidity or alkalinity of the wastewater, both the raw waste and mixed liquor.

#### Interpretation

A "neutral" pH is 7. Below 7 an acidic condition exists and above 7 alkaline conditions exist. The most favorable pH for a biological system is between 6.5 and 7.5, but the aeration basin may have a range of 5-8. Extreme changes in raw waste pH may indicate an industrial spill. If the pH does change abnormally, it can be corrected by an appropriately trained and licensed operator adding the correct chemicals. The state regulatory official or the operator's consulting engineer should be contacted for instructions. MSDS should be consulted and proper PPE used.

pH changes not related to industrial spills may be observed. A low pH following clarification may indicate that the sludge is remaining too long in the clarifier.

### Dissolved Oxygen Test (DO) (Test using a modern, handheld DO meter with digital readout):

#### **Purpose:**

Dissolved oxygen can be determined using a modern handheld meter. It is important to maintain proper DO levels in the aeration basin for an activated sludge process to work. The DO level should be between 2-4 mg/l. If not, please refer to section 5 details regarding troubleshooting low DO and adjusting blower timeclock.

#### Test and Interpretations

Listed below are sampling locations and tests that can be performed at a treatment plant. The list includes both those for operational control of the plant and is used to confirm conditions suspected in plant observation and those that measure the efficiency of the treatment system and are used for reporting to the state regulatory agency. The tests indicated by asterisks are those for which the portable laboratory can be furnished.

Raw Wastewater: BOD5, Suspended Solids (SS), pH\*, Temperature, Flow

Receiving Tank: Mixed Liquor Suspended Solids (MLSS), , pH\*, Dissolved Oxygen (DO)\*, Temperature

Belt Press: BOD5 In/Out, SS In/Out\*, pH In/Out\*, DO In/Out\*, SS of Returned Sludge\*, Settleability, Turbidity Out

\*Those test procedures that are not covered in the Test Booklet can be found in detail in the EPA 430/9-77-005.

## REFERENCES

- A. Soil Survey of Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii, prepared by U.S. Department of Agriculture, Soil Conservation Service, August, 1972.
- B. Erosion and Sediment Control Guide for Hawaii, prepared by U.S. Department of Agriculture, Soil Conservation Service, March, 1981.
- C. Rainfall-Frequency Atlas of the Hawaiian Islands, Technical Paper No. 43, U.S. Department of Commerce, Weather Bureau, 1962.
- D. Flood Insurance Rate Maps of the County of Maui, Sept. 29, 2009
- E. Chapter 4, Rules for the Design of Storm Drainage Facilities in the County of Maui, prepared by the Department of Public Works and Waste Management, County of Maui, 1995.
- F. Water System Standards, Department of Water Supply, County of Maui, 2002.
- G. Traffic Impact Analysis Report for Puunene Heavy Industrial Subdivision, prepared by Phillip Rowell and Associates, January 24, 2012.
- H. Groundwater Resource and Water System Assessment for the Proposed Puunene Industrial Subdivision, prepared by Tom Nance Water Resource Engineering, June 2011.
- I. Preliminary Engineering Report for Puunene Heavy Industrial Subdivision., prepared by Otomo Engineering, Inc., February 2012.



DRAINAGE REPORT

APPENDIX

A-2



# Drainage Report

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## IMPROVEMENTS for PULEHUNUI WWTP & VIP LOT 2Q (UNIT A)

Pulehunui, Maui, Hawaii  
TMK (2) 3-8-104: 030 & 017 (Unit A)

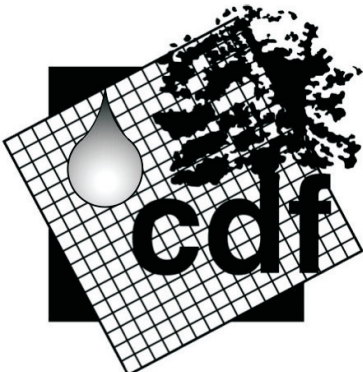
Prepared for:

2Q, LLC  
Nopu Street  
Pulehunui, Maui, Hawaii



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This work was prepared by me  
or under my supervision



Date: July 30, 2019

## TABLE OF CONTENTS

	Page
Introduction	3
Existing Conditions	3
Hydrology	4
Proposed Drainage Mitigation	4
Conclusion	4
APPENDIX	5
A. Soil Erosion Control Plan	
B. Swale & Retention Area Operations and Maintenance Plan	
C. Hydrologic Calculations - hydrographs	
D. Storm Water Quality Calculation (Title MC 15-111)	
E. Retention Basin Sizing	
EXHIBITS	13
1. Location Map	
2. TMK Map	
3. Soil Survey Map	
4. Existing Condition Drainage Area Map	
5. Proposed Condition Drainage Area Map	



## **INTRODUCTION:**

The purpose of this report is to evaluate the existing and proposed drainage conditions for the subject project.

## **PROPOSED PROJECT:**

### LOCATION:

The subject lots are located in Pulehunui (Puunene) on Nopu Street, and are portions of their respective parcels designated by Tax Map Key (2) 3-8-104: 030 & 017. The main subject lot is a condominium lot, unit A of parcel 017, and is approximately 58,095 square feet in size. The remainder of the parcel (approximately 67,743 square feet) is condominium lot B. The disturbed area will be the entire condominium lot, unit A as well as the access easement through condominium lot, unit B for a total of 63,000 square feet.

The secondary lot, parcel 030, is a utility lot for the subdivision that has mostly retention basins associated with it. Additionally, a portion of the lot houses the private wastewater treatment plant for the subdivision. The existing plant was built in 2019 and grading for the expansion associated with this project was conducted at that time.

### PROJECT DESCRIPTION:

The proposed improvements for the main subject project include a 17' wide paved driveway through an access easement, as well as an office building and wastewater receiving facility and paved surfaces covering the entire condominium lot, unit A except for the above ground retention area, for a total impervious area of approximately **58,000 SF**. The remaining disturbed area will be landscaped to maintain or improve the drainage characteristic of the existing condition.

The proposed improvements for secondary subject project include installation of additional wastewater treatment plant components requiring 22' x 30' (660 sq. ft.) of area.

## **EXISTING CONDITIONS:**

### ADJACENT LAND USE:

The project is located on Nopu Street in Pulehunui, Maui, Hawaii. Properties adjacent to the subject property are currently undeveloped. The adjacent condominium lot to the east, unit B will be developed as a trucking operation baseyard. The main subject condominium lot, unit A is bound to the west by the drainage lot containing the subdivision's above ground retention basins, to which all the lots drain. The secondary subject area is contained within the drainage lot.

### ONSITE CONDITIONS:

The majority of the main existing project area is open, poorly grassed land. The secondary project area was graded, compacted, and graveled during the initial wastewater treatment plant installation.

**TOPOGRAPHY AND SOIL CONDITIONS:**

The lots slope at approximately 2%, and elevations on the site range from approximately 130 feet to 120 feet.

According to the “Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii (August, 1972),” prepared by the United States Department of Agriculture Soil Conservation Service, the soils within the project site are classified as WID2, Waiakoa Extremely Stony Silty Clay Loam 3–25% slopes. This soil type is characterized as having high runoff, low to moderately low permeability, and a slight to moderate erosion hazard. The available water capacity is about 3.9 inches per foot of soil.

**HYDROLOGY:**

For drainage areas of 100 acres of less, the Rational Method, as described in the “Title MC-15, Department of Public Works and Waste Management, County of Maui, Chapter 4, rules for the design of Storm drainage Facilities in the County of Maui” are used in calculating rainfall runoff. Calculations are based on a 50-year storm event.

Existing runoff volume for the main project site (parcel 017) is estimated at **4,172 CF**, sheet-flowing in a westerly direction towards the Pulehunui Subdivision retention basins in the drainage lot.

The total developed runoff volume is **4,983 CF**. The post-development drainage pattern includes directing all surface runoff that comes in contact with impervious surface through the new on-site above ground retention system. The overflow wier from the proposed retention system basin is directed towards the Pulehunui Subdivision retention basins to the west in the drainage lot.

The net increase in volume due to the proposed development is **811 CF**. See Appendix C for calculations. The required storage volume for stormwater quality is **4,913 CF**. See Appendix D for calculations.

Existing runoff volume for the secondary project site (parcel 030) is estimated to be negligible, sheet flowing in a westerly direction towards the Pulehunui Subdivision retention basins contained within parcel 030.

**PROPOSED DRAINAGE MITIGATION:**

The proposed improvements on the main parcel are expected to increase runoff by **811 CF**. This additional runoff will be conveyed via swale into the new retention basin with a capacity of **8,260 CF** located on the north western corner of the property near the rear of the lot. The new on-site aboveground retention basin will overflow off site to the existing Pulehunui Subdivision retention basins, which have been adequately sized to deal with the post-development runoff from the individual lots (reference: *Preliminary Engineering Report for Puunene Heavy Industrial Subdivision*, by Otomo Engineering Inc., Feb. 2010). See Appendix E for new on-site aboveground retention basin capacity calculation.

Pulehunui WWTP & VIP – Lot 2Q (Unit A)

July 30, 2019

TMK (2) 3-8-104: 030 & 017 (Unit A)

The proposed improvements on the secondary parcel are not expected to significantly increase runoff. The existing drainage condition will remain with stormwater flowing to the retention basin adjacent to the WWTP location.

**CONCLUSION:**

The existing runoff volume is calculated to be **4,172 CF**. The proposed improvements to the area are expected to generate a surface runoff volume of **4,983 CF**. Due to the proposed development there will be a **net increase** of **811 CF**. The total capacity of the proposed above-ground retention basin is **8,260 CF**. See Appendices C and E for calculations.

The proposed drainage system will prevent the increase in runoff from adversely affecting the adjacent and downstream properties. Adjacent and downstream properties will not be adversely affected by the proposed project.

**APPENDIX:**

- A. SOIL EROSION CONTROL PLAN
- B. SWALE AND RETENTION AREA OPERATIONS AND MAINTANCE PLAN
- C. HYDROLOGIC CALCULATIONS
- D. STORM WATER QUALITY CALCULATION (TITLE MC 15-111)
- E. RETENTION BASIN CAPACITY CALCULATIONS

## **APPENDIX A: SOIL EROSION CONTROL PLAN**

### **GENERAL:**

The following measure will be taken to control erosion during the construction period.

1. Minimize construction time.
2. Retain existing ground cover as long as possible.
3. Early installation of erosion control measures.
4. Use temporary area sprinklers in non-active areas when ground cover is removed.
5. Provide water for immediate sprinkling, as needed, in active areas.
6. Use temporary erosion control measures where needed.
7. Thoroughly water graded areas at the end of each work day and weekends.
8. Provide temporary irrigation system, and grass all cut and fill slopes within 30 days after grading work is completed.

### **MINIMUM BMP CHECKLIST FOR SMALL PROJECTS:**

#### **1 STABILIZED CONSTRUCTION ENTRANCE**

All points of egress and ingress to a site shall be protected with a stabilized construction entrance. 20' x 20' min.

#### **2 STOCKPILES**

Stockpiles shall not be located in drainage ways or other areas of concentrated flows. During periods of wet weather, such as the rainy season, stockpiles shall be stabilized. Stockpiles covered in plastic when not in use.

#### **3 DUST CONTROL**

Dust control should be applied to reduce dust emissions. Contractor to spray water as necessary.

#### **4 SEDIMENT BARRIERS OR TRAPS**

Sediment trapping devices such as fences, trap basins or barriers shall be used down slope of all disturbed areas and around the base of all material stockpiles. Stockpiles to be covered with plastic.

#### **5 INLET PROTECTION**

All storm drain inlets on site, and those offsite that may receive runoff from the site shall used an inlet protection device.

#### **6 PERMANENT STABILIZATION**

All disturbed areas shall be permanently stabilized prior to removing Erosion and sediment measures. All temporary erosion and sediment Control measures shall be removed within 30 days after final site stabilization or after the temporary measures are no longer needed. Trapped sediment and areas of disturbed soil which result from the removal of the temporary measures shall be immediately permanently stabilized. Area to be permanently seeded/mulched within 14 days of final grade except house area which will be formed and slabbed within 14 days.

## **APPENDIX B: SWALE & RETENTION AREA OPERATIONS AND MAINTENANCE PLAN**

Regular maintenance designed to ensure the long-term efficiency of these systems shall include:

1. Periodic removal of the sediment/soil that is deposited in the vegetated swales and/or retention areas and restore to the original dimensions.
2. Overgrown vegetation on the bottom, sides, and benches of the retention areas shall be removed by means of mowing and/or herbicide spraying.
3. Maintain a vigorous growth of vegetation on all swales and bare soil which includes re-seeding, mulching/matting to protect the disturbed area while vegetation becomes established. Overgrown vegetation along swales shall be removed by means of mowing. If possible avoid herbicides in these areas.
4. Do not pave over, drive over or trample grassed swale and retention area.
5. Keep all culverts free flowing and maintain the original construction ridge height and capacity of vegetated berms and swales. The surface of the berms should be compacted to avoid a blow out if a very large storm occurs. Vegetative growth and accumulated silt deposits at all drainage outlets and at all overflow weirs shall be removed and kept clear at all times.
6. Mosquito infestation shall be controlled by removing stagnant water at bottom of retention areas.
7. After the occurrence of a major storm event, visually inspect the retention basins and swales for accumulation of sediment and debris. Immediately remove any obstruction or blockage in culverts and retention areas. Removal of sediment and debris shall be done after it is deemed safe to accomplish remedial work.
8. All access paths to the retention basin shall be maintained and clear of obstructions. Vegetative growth and accumulated silt shall be removed. Loose gravel/dirt within access path shall be compacted to maintain a safe route for vehicles used for the maintenance of the retention basins.
9. Roof drains, swimming pool or spa back flush, foundation drains and drainage from other sources producing intermittent or constant volumes of water should not be piped directly into swale or retention area.
10. In the event that the property is sold, the current owner shall pass this operations and maintenance plan to the new owner.

Pulehunui WWTP & VIP – Lot 2Q (Unit A)  
July 30, 2019  
TMK (2) 3-8-104: 030 & 017 (Unit A)

**APPENDIX C:**

**Hydrologic Calculations – (50-yr 1-hr storm event)  
Hydrographs**

**EXISTING CONDITION - DRAIN AREA 1**

**Reference:** Title MC-15, Department of Public Works and Waste Management, County of Maui, Chapter 4, Rules for the Design of Storm Drainage Facilities in the County of Maui. Unified Rational Calculations are used to determine the increase in volume of runoff.

**I. Project Parameters:**

**50-Yr. - 1-Hr. Rainfall:**

From "Rainfall Frequency Atlas of the Hawaiian Islands", for Pulehunui, Maui  
 R(50 Yr. - 1 Hr.) = 2.30 inches

**Total Area:**

Area (Ac.): 125,838 SF = **2.89**

**II. Determine Pre-Development Runoff:**

**Pre-Development Runoff Coefficients:**

Infiltration:	Medium	0.07
Relief:	Flat (0-5%)	0.00
Vegetal Cover:	Good (10-50%)	0.03
Development Type:	Agricultural	0.15

Runoff Coeff.,  $C_{undeveloped}$ : **0.25**

$$C_{weighted} = \frac{A_{impervious}C_{impervious} + A_{landscaped}C_{landscaped} + A_{unimproved}C_{unimproved}}{A_{total}}$$

$$\frac{0 \text{ SF} \times 0.95 + 0 \text{ SF} \times 0.25 + 125,838 \text{ SF} \times 0.25 + 0 \text{ SF} \times 0.85}{125,838 \text{ SF}} = \mathbf{0.25}$$

**Pre-Development Time of Concentration:**

Approx. Elev. Diff'l (ft):		10
Higher Elev. (ft):	130	
Lower Elev. (ft):	120	
Approx. Runoff Length (ft):		580
Average Slope:		1.7%
Time of Concentration (min.):		17.0

**Pre-Development Intensity:**

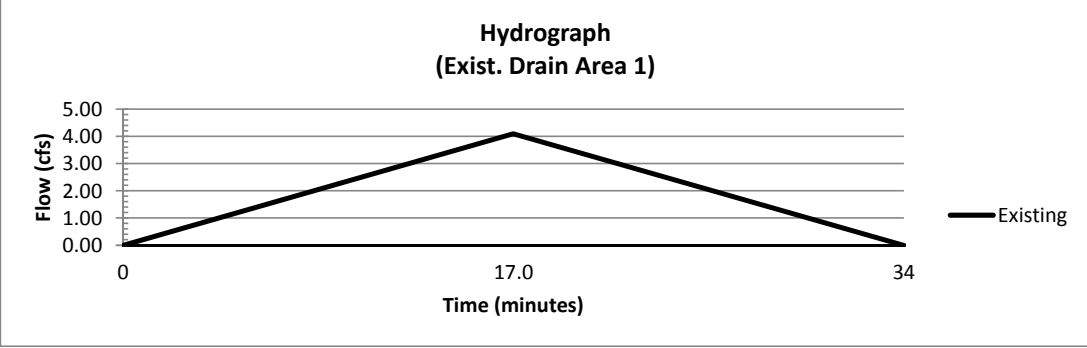
Intensity (in/hr.): **4.7**

**Pre-Development Runoff:**

$Q = C_{weighted} \times I \times A$  (cfs): **4.09**

**Existing Runoff for Drain Area 1 - Q (cfs):**

**4.09**



Exist. Runoff Volume (area under hydrograph) =  $Q_{peak} \times T_{conc} \times 60 \text{ seconds/minute} = 4.09 \text{ cfs} \times 17.0 \text{ min.} \times 60 \text{ sec./min.}$

**Total Pre-Development Runoff Volume: 4,172 cubic feet**

**PROPOSED CONDITION - DRAIN AREA 1A**

**Reference:** Title MC-15, Department of Public Works and Waste Management, County of Maui, Chapter 4, Rules for the Design of Storm Drainage Facilities in the County of Maui. Unified Rational Calculations are used to determine the increase in volume of runoff.

**I. Project Parameters:**

**50-Yr. - 1-Hr. Rainfall:**

From "Rainfall Frequency Atlas of the Hawaiian Islands", for Pulehunui, Maui  
 R(50 Yr. - 1 Hr.) = 2.30 inches

**Total Area:**

Area (Ac.): 125,838 SF = **2.89**

**II. Determine Post-Development Runoff:**

**Post-Development Runoff Coefficients:**

Infiltration:	Medium	0.07
Relief:	Flat (0-5%)	0.00
Vegetal Cover:	Poor (<10%)	0.05
Development Type:	Agricultural	0.15

Runoff Coeff.,  $C_{undeveloped}$ : 0.27

$$C_{weighted} = \frac{A_{impervious}C_{impervious} + A_{landscaped}C_{landscaped} + A_{unimproved}C_{unimproved}}{A_{total}}$$

$$\frac{58,000 \text{ SF} \times 0.95 + 0 \text{ SF} \times 0.25 + 67,838 \text{ SF} \times 0.27 + 0 \text{ SF} \times 0.85}{125,838 \text{ SF}} = \mathbf{0.58}$$

= **0.58**

**Post-Development Time of Concentration:**

Approx. Elev. Diff'l (ft):		10
Higher Elev. (ft):	130	
Lower Elev. (ft):	120	
Approx. Runoff Length (ft):		580
Average Slope:		1.7%
Time of Concentration (min.):		10.5

**Post-Development Intensity:**

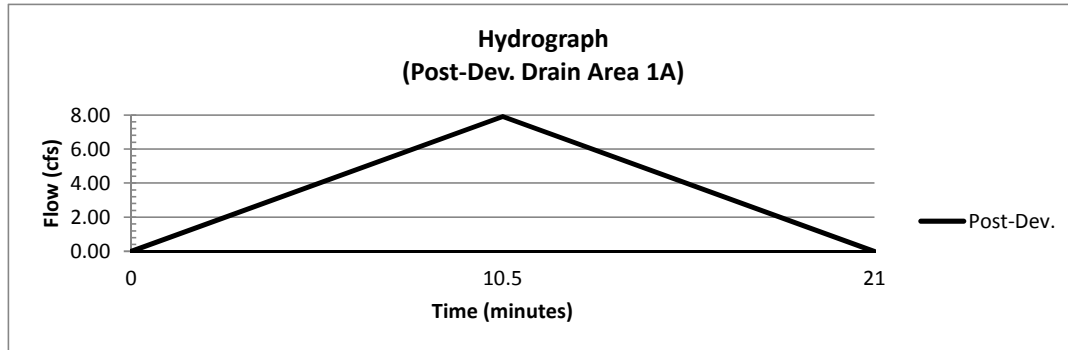
Intensity (in/hr.): **4.72**

**Post-Development Runoff:**

$Q = C_{weighted} \times I \times A$  (cfs): 7.91

**Proposed Runoff for Drain Area 1A - Q (cfs):**

**7.91**



Prop. Runoff Volume (area under hydrograph) =  $Q_{peak} \times T_{conc} \times 60 \text{ seconds/minute} = 7.91 \text{ cfs} \times 10.5 \text{ min.} \times 60 \text{ sec.}$

**Total Post-Development Runoff Volume: 4,983 cubic feet**



APPENDIX D. - STORM WATER QUALITY CALCULATION

CONTRIBUTORY AREA DETAILS:

BASIN AREA = 2.89 Acres; Percent Impervious = 46.1 %

PER MC 15-111-06 (2) - (Dry Extended Detention Ponds)

PER MC 15-111-06 (5) - Water Quality Design Volume (WQDV)  
 Reference: Figure 1

BASIN - WQDV = 1,700 CF/Acre (x 2.89 Acres = 4,913 CF)

PER MC 15-111-06 (6) - Average Outlet Discharge Rates  
 Reference: Figure 2

BASIN - "Full to Half" Flow Rate = 0.020 cfs/Acre (x 2.89 Acres = 0.058 cfs)  
 "Half to Empty" Flow Rate = 0.007 cfs/Acre (x 2.89 Acres = 0.020 cfs)

Figure 1  
 Required Water Quality Design Volume for  
 Detention Based Systems

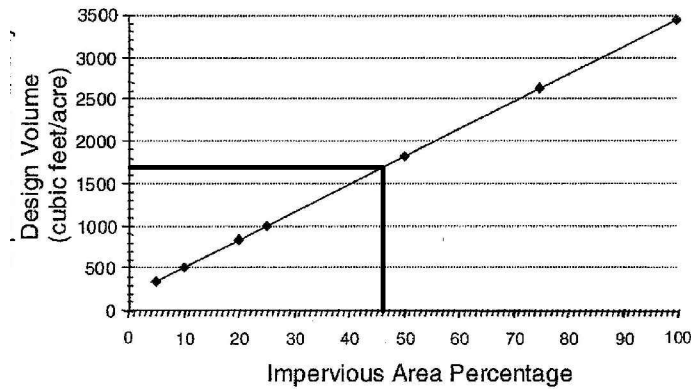
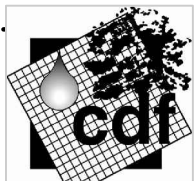
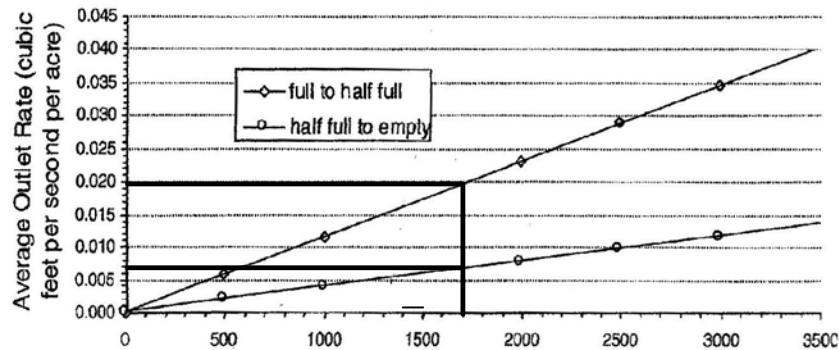


Figure 2: Required Average Outlet Discharge Rates  
 for Extended Detention Volume



Pulehunui WWTP & VIP – Lot 2Q (Unit A)

July 30, 2019

TMK (2) 3-8-104: 030 & 017 (Unit A)

**APPENDIX E: RETENTION BASIN CAPACITY CALCULATIONS:**

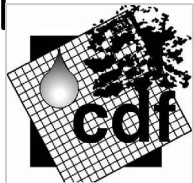
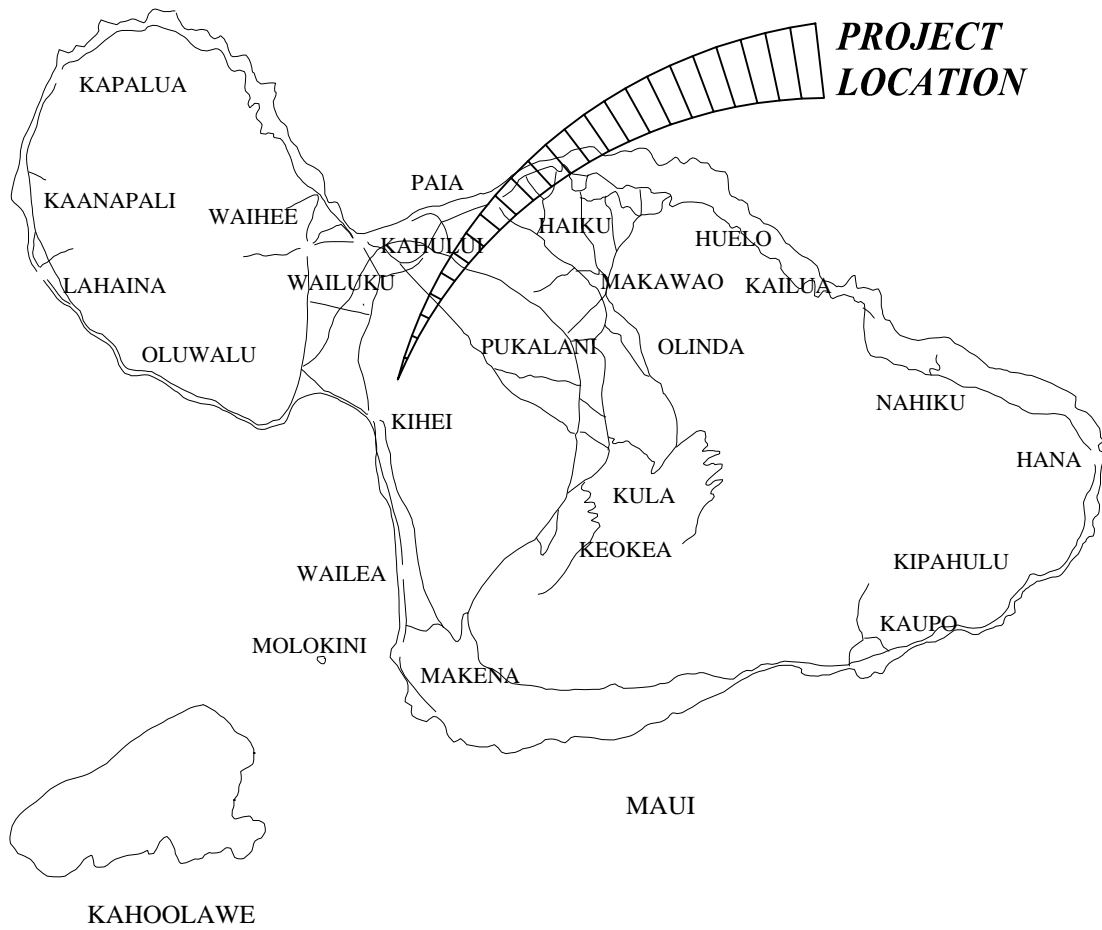
**RETENTION BASIN**

121.0' elevation Contour Area:	4,882 Sq. Ft.
120.0' elevation Contour Area:	3,880 Sq. Ft.
Δ elevation (depth):	1.0 Ft.
Average Contour Area = (4,882 + 3,880)/2 =	4,381 Sq. Ft.
Average Volumetric Capacity = 4,381 x 1.0 =	<u>4,381 Cu. Ft.</u>
120.0' elevation Contour Area:	3,880 Sq. Ft.
119.0' elevation Contour Area:	2,979Sq. Ft.
Δ elevation (depth):	1.0 Ft.
Average Contour Area = (3,880 + 2,979)/2 =	3,429.5 Sq. Ft.
Average Volumetric Capacity = 3,429.5 x 1.0 =	<u>3,429.5 Cu. Ft.</u>
<b>Total Basin Capacity = 4,831 + 3,429.5 =</b>	<b><u>8,260.5 Cu. Ft</u></b>

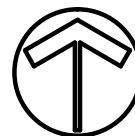
Pulehunui WWTP & VIP – Lot 2Q (Unit A)  
July 30, 2019  
TMK (2) 3-8-104: 030 & 017 (Unit A)

## **EXHIBITS**

1. Location Map
2. Vicinity Map
3. Soil Survey Map
4. Existing Condition Drainage Area Map
5. Proposed Condition Drainage Area Map



PULEHUNUI VIP



**EXHIBIT 1**  
ISLAND LOCATION MAP

**PROJECT  
LOCATION**

TMK: (2) 3-8-008: 005

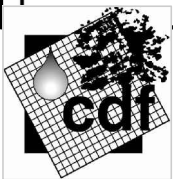
TMK: (2) 3-8-008: 001

TMK: (2) 3-8-008: 037

TMK: (2) 3-8-008: 038

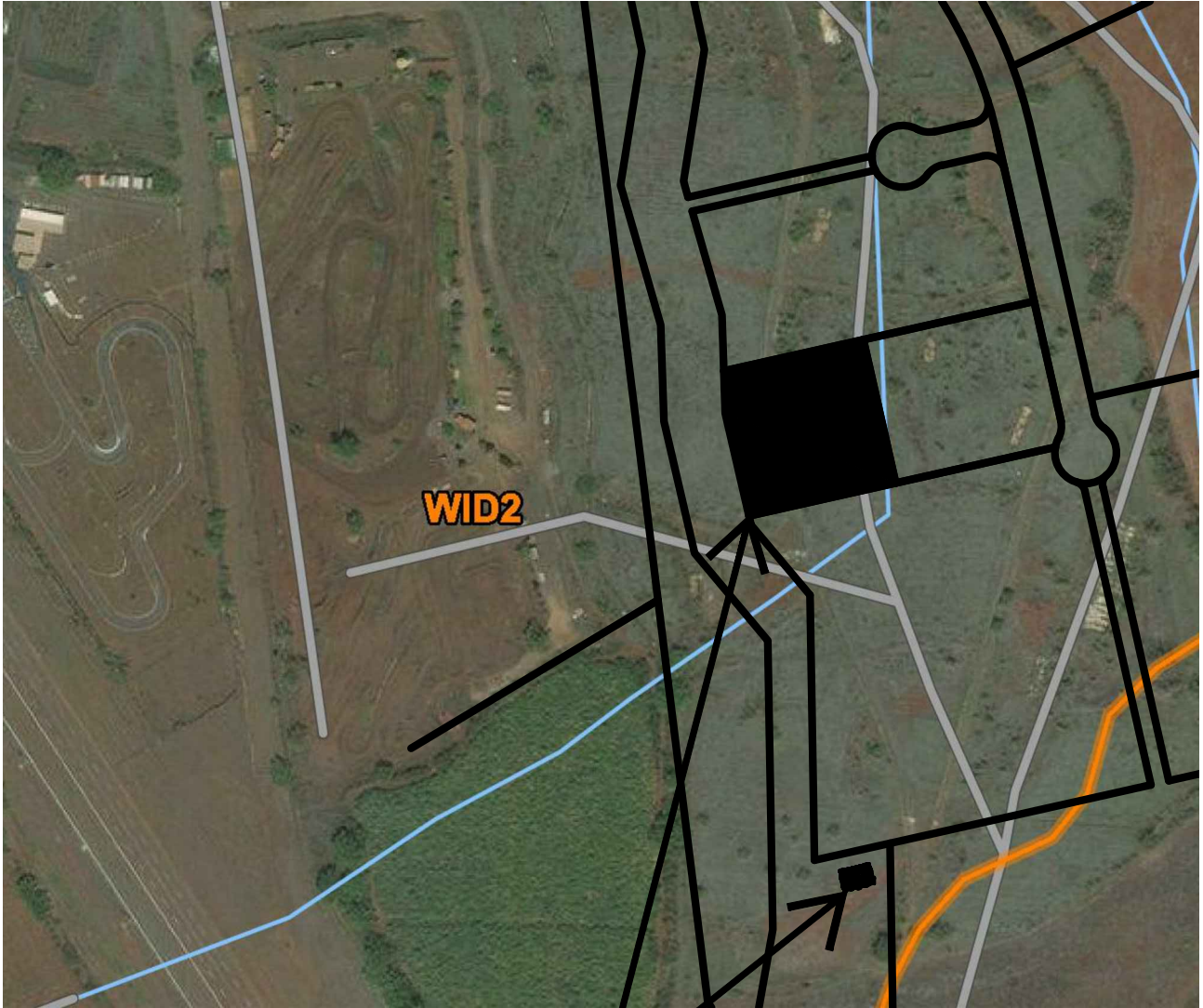
MOKULELE HIGHWAY

350



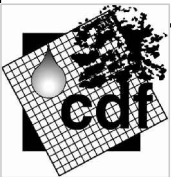
PULEHUNUI VIP

**EXHIBIT 2**  
VICINITY/TMK MAP



PROJECT LOCATION

SOIL TYPE = WID2



PULEHUNUI VIP

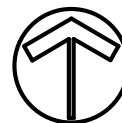


EXHIBIT 3  
SOIL TYPES

OWNER: KOMAR MAUI PROPERTIES II LLC  
 TMK: (2) 3-8-104:016

OWNER: TJ GOMES TRUCKING CO.  
 TMK: (2) 3-8-104:017 (UNIT B)  
 AREA: 67,743 SQ. FT.

OWNER: 2Q, LLC  
 TMK: (2) 3-8-104:017 (UNIT A)  
 AREA: 58,095 SQ. FT.

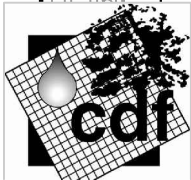
OWNER: TJ GOMES TRUCKING CO.  
 TMK: (2) 3-8-104:018

1

DRAINAGE AREA	DISCHARGES TO	WEIGHTED RUNOFF COEFF.	INTENSITY (In./Hr.)	AREA (AC.)	RUNOFF VOLUME
1	EXISTING OFF-SITE RETENTION BASINS	0.25	4.09	2.89	4,172 Cu.Ft.

NOPU STREET

EXIST. RETENTION BASIN



PULEHUNUI VIP

**EXHIBIT 4**  
**EXISTING CONDITION**

OWNER: KOMAR MAUI PROPERTIES II LLC  
 TMK: (2) 3-8-104:016

OWNER: TJ GOMES TRUCKING CO.  
 TMK: (2) 3-8-104:017 (UNIT B)  
 AREA: 67,743 SQ. FT.

OWNER: TJ GOMES TRUCKING CO.  
 TMK: (2) 3-8-104:017 (UNIT A)  
 AREA: 58,095 SQ. FT.

OWNER: TJ GOMES TRUCKING CO.  
 TMK: (2) 3-8-104:018

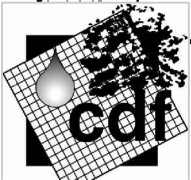
ABOVE-GROUND RETENTION BASIN:  
 VOLUMETRIC CAPACITY = 8,260 C.F. MIN.  
 WATER SURFACE ELEV. = 121.0'  
 BASIN INVERT ELEV. = 119.0'

DRAINAGE AREA	DISCHARGES TO	WEIGHTED RUNOFF COEFF.	INTENSITY (In./Hr.)	AREA (AC.)	RUNOFF VOLUME
1A	ON-SITE RETENTION BASIN - OVERFLOW	0.58	4.72	2.89	4,983 Cu.Ft.

NOPU STREET

EXIST. RETENTION BASIN

1A



PULEHUNUI VIP

**EXHIBIT 5**  
**PROPOSED CONDITION**





LETTER FROM DEPARTMENT  
OF PUBLIC WORKS DATED  
MARCH 12, 2019

APPENDIX

**B**



MICHAEL P. VICTORINO  
Mayor

DAVID C. GOODE  
Interim Director

ROWENA M. DAGDAG-ANDAYA  
Deputy Director

GLEN A. UENO, P.E., L.S.  
Development Services Administration

RODRIGO "CHICO" R. RABARA, P.E.  
Engineering Division

JOHN R. SMITH, P.E.  
Highways Division

Telephone: (808) 270-7845  
Fax: (808) 270-7955



COUNTY OF MAUI  
**DEPARTMENT OF PUBLIC WORKS**  
200 SOUTH HIGH STREET, ROOM NO. 434  
WAILUKU, MAUI, HAWAII 96793

March 12, 2019

Mr. Sal Marino, Vice President  
Valley Isle Pumping  
291A Lower Kula Road  
Pukalani, Maui, Hawai'i 96768

Dear Mr. Marino:

**SUBJECT: CHAPTER 343, HAWAII REVISD STATUTES (HRS)  
ENVIRONMENTAL REVIEW FOR PROPOSED SEPTAGE  
PRETREATMENT FACILITY AND WASTEWATER TREATMENT  
PLANT IMPROVEMENTS AT PULEHUNUI INDUSTRIAL PARK,  
PULEHUNUI, MAUI, HAWAII (TMK NO. (2)3-8-104:017 and 030)**

The Department of Public Works (DPW) understands that Valley Isle Pumping (VIP) is proposing the development of a new septage pretreatment facility on a portion of a 2.89-acre parcel of land located in the Pulehunui Industrial Park identified as Tax Map Key (TMK) No. (2) 3-8-104:017 (Parcel 17). The pretreatment facility would process septage from VIP's clients, as well as stormwater waste from VIP, the Department of Public Works (DPW), and other sources. A portion of the facility's effluent will be treated in the Pulehunui Industrial Park subdivision's existing privately-owned Wastewater Treatment Plant (WWTP) located at TMK No. (2) 3-8-104:030 (Parcel 30) and will require improvements to the WWTP to provide additional capacity. As such, VIP is also proposing improvements to the subdivision's WWTP as part of the proposed project.

Based on consultation which has taken place between VIP and DPW, DPW further understands the following:

1. That the Environmental Review process pursuant to Hawaii Revised Statutes (HRS), Chapter 343 for the Pulehunui Industrial Park Subdivision was completed in 2013 with the publication of a Final Environmental Assessment (EA) with a Finding of No Significant Impact (FONSI) issued by the County of Maui, Department of Planning.

xc: Hways 3/12/19

2. That Parcel 17 is privately owned and is located on land zoned "M-3, Restricted Industrial" according to Maui County zoning, designated as "Heavy Industrial" according to the Kihei-Makena Community Plan, and is in the State Land Use "Urban" district. The proposed use is consistent with these designations and no land use entitlement amendments are required for the project to proceed. Further, the Pulehunui Industrial Park subdivision is not located within the County's Special Management Area (SMA).
3. The existing WWTP began operations in 2018 to treat the wastewater from the lots within the subdivision. The capacity of the existing WWTP is approximately 20,000 gallons per day (GPD).
4. Per Chapter 343-5(a), Hawai'i Revised Statutes (HRS), an Environmental Assessment (EA) is required for the construction of a wastewater treatment unit, except an individual wastewater system or wastewater treatment unit serving fewer than 50 single-family dwellings or the equivalent. During consultation prior to the development of the WWTP, the Department of Health (DOH) advised that a wastewater treatment unit with a capacity of 30,000 GPD would be considered to be the equivalent of a unit serving 50 single-family dwellings. As the subdivision WWTP capacity was below this threshold, there was no statutory trigger for environmental review pursuant to Chapter 343, HRS.
5. The improvements currently proposed by VIP would increase the WWTP capacity to approximately 40,000 GPD. During recent consultation with DOH (Wastewater Branch), DOH has advised that increasing the capacity of the subdivision WWTP beyond the 30,000 GPD threshold now triggers the statutory requirement for a Chapter 343, HRS Environmental Assessment (EA) to be prepared and processed. DOH has declined to serve as the Approving Agency for the EA and has suggested that the DPW take on this role due to the need for construction-related permits following DOH's approval of the facility design. The scope of the EA would provide an assessment of the potential environmental impacts related to VIP's proposed project, namely the new septage pretreatment facility on Parcel 17 and the related improvements to the subdivision WWTP on Parcel 30.

Pursuant to Title 11, Chapter 200-4(b), Hawai'i Administrative Rules, the responsibility for requiring environmental review rests with agencies receiving and granting a request for approvals for the project, to be determined by the Office of

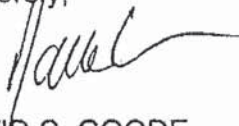


Mr. Sal Marino, Vice President  
March 12, 2019  
Page 3

Environmental Quality Control in the event that there is more than one agency with jurisdiction, if agreement is not reached upon consultation with those agencies. As DPW will be processing construction permits for the proposed project following DOH Wastewater Branch's approval of the facility's design, VIP has sought consultation with DPW regarding identification of the appropriate Approving Agency. By this letter to you (a copy of which has also been provided to DOH) and as follow-up to our meeting of March 11, 2019, we hereby confirm that DPW will be the Approving Agency for the Chapter 343, HRS EA for the septage pretreatment facility and related WWTP improvements proposed by VIP.

Should you have any questions in this regard, please contact John Smith or Mike Kehano of our Highways Division at (808) 270-7869.

Sincerely,



DAVID C. GOODE  
Interim Director of Public Works

DCG:jso

cc: Sina Pruder, Department of Health 3/12/19  
Gwendolyn Rivera, Munekiyo Hiraga 3/12/19

s:\david2\sal marino\_prop septage pretreatment fac & wwtp imp at pulehunui ind park  
03.12.19



BOTANICAL SURVEY

APPENDIX

C



BOTANICAL RESOURCE ASSESSMENT FOR THE  
PROPOSED PU'UNENE HEAVY INDUSTRIAL SUBDIVISION  
PU'UNENE, MAUI, HAWAII

TABLE OF CONTENTS

<i>INTRODUCTION</i>	3
<i>GENERAL SITE DESCRIPTION</i>	3
<i>METHODS</i>	3
<i>VEGETATION</i>	3
<i>DISCUSSION &amp; RECOMMENDATIONS</i>	5
<i>LITERATURE CITED</i>	6
<i>TABLES</i>	7
<i>Table 1. Plant Species List</i>	
<i>Appendix</i>	
<i>Site photographs</i>	11

Prepared by:

Maya LeGrande  
LeGrande Biological Surveys Inc  
68-310 Kikou Street  
Waialua HI 96791

Prepared for:

CMBY 2011 Investment, LLC  
1300 N. Holopono St., Suite 201  
P.O. Box 220  
Kihei, HI 96753

August 2011

## INTRODUCTION

This report includes the findings of a plant inventory conducted in Pulehuni on the island of Maui including portions of a parcel owned by CMBY2011 Investment, LLC [TMK (2) 3-8-08:19] and various easements required for access to the proposed subdivision. LeGrande Biological Surveys Inc. carried out a botanical field survey of the above location on the 16<sup>th</sup> and 17<sup>th</sup> of August 2011. The primary objectives of the field studies were to:

- 1) inventory the flora and;
- 2) provide a general description of the vegetation on the project site;
- 3) search for threatened and endangered species as well as species of concern; and
- 4) provide recommendations regarding potential impacts to the biological resources of the area in regards to the proposed development of the survey area.

Federal and State of Hawaii listed species status follows U.S. Fish and Wildlife Listed and Candidate Species (USFWS 2008) and Federal Register (2002).

## GENERAL SITE DESCRIPTION

The 86-acre subject parcel is located in Pulehuni to the south of Pu'umene town proper. The subject property lies to the east of the Old Pu'umene Airport (Maui Airport). Currently the area to the west is being used for recreational motor sports, the areas to the east and south are in crop cultivation, and to the north bordered by Lower Kihei Road. Additional to the subject parcel, two roadway easements were surveyed for this project, a 56-foot wide easement owned by the state along the existing Kama'aina Road, and an alternative 56-wide easement which travels around the existing Reservoir No. 6 to the north of the subject property.

## METHODS

Topographic maps were examined to determine terrain characteristics, access, boundaries, and reference points. Prior to undertaking the field studies, a search was made of the pertinent literature to familiarize the principal investigator with other botanical studies conducted in the general area. A walk-through survey method was used. The field survey included the 86-acre subject parcel as well and the two proposed roadway easements, both 56 feet wide. The easement transects were surveyed between 100 to 150 feet wide as the exact location of the easement could not be ascertained in the field and the construction of the roadway will no doubt include an area wider than the easement itself.

Notes were made on plant associations and distribution, disturbances, topography, substrate types, exposure, drainage, etc. Plant identifications were made in the field; plants that could not be positively identified were photo documented and described for later determination in the BISH herbarium, and for comparison with the recent taxonomic literature.

## VEGETATION

The subject parcel is characterized by Dry Kiawe/Bufelgrass vegetation. The main subject property is at approximately 120 feet in elevation. The easements range from 110 to 140 feet elevations along the roadway from Mokulele Highway to above the reservoir. The Mean Annual Rainfall is 12 to 20 inches per year. The NRCS Soil Survey delineates the entire 86-acre parcel

and both easements as WID2: Waiakoa extremely stony silty clay loam, 3 to 25 percent slope, eroded (NRCS, 2011).

There were a total of 50 plant species observed within the survey sites. 44 are alien (introduced) and 6 are indigenous (native to the Hawaiian Islands and elsewhere). Therefore, 88% of the plant species observed are alien and 12% are native. An inventory of all the plants observed within the survey area is presented in the species list (Table 1) at the end of the report.

## Main Parcel

The dominate vegetation of the subject parcel is a kiawe (*Prosopis pallida*)/bufelgrass (*Cenchrus ciliaris*) grassland with a koa hoale (*Leucaena leucocephala*) scrub transition between the southern boundary of the property. The northern section appears to have had relatively recent grading with large boulder piles near the gate entrance. Several other weedy native species were observed scattered throughout the property including; Jimson weed (*Datura stramonium*), cheese weed (*Melva parviflora*), Lion's ear (*Leonotis nepetifolia*), hairy spurge (*Chamaesyce hirta*), *Amaranthus* sp., and golden crownbeard (*Verbesina encelioides*). Few native species were observed within the survey area. They include three indigenous species, ilima (*Sida fallax*), popolo (*Solanum americanum*), and uhaloa (*Waltheria indica*).

The northeast corner of the subject property appeared to be in cattle operation historically. Several water troughs and barbed wire fencing are still evident in the area and other concrete structures that may be associated with ranching.

## State Easement

The "lower 56' easement" follows Kama'aina Road (State owned), South Firebreak Road (State & privately owned), and Lower Kihei Road (privately owned) with current sugar cane cultivation to the west and a reservoir bank to the east. Dominate roadside weeds are bufel grass and koa haole shrubs. Others species scattered along roadsides and the reservoir embankment include partridge pea (*Chamaecrista nictitans* subsp. *patellaria* var. *glabrata*), swollen finger grass (*Chloris barbata*), castor bean (*Ricinus communis*), manienie (*Cynodon dactylon*), kaliko (*Euphorbia heterophylla*), graceful spurge (*Chamaesyce hypericifolia*), obscure morning glory (*Ipomoea obscura*), and smooth rattlespod (*Crotalaria pallida*).

## Reservoir Easement

The "Upper 56' easement" borders the existing reservoir to the north and east. Monkeypod (*Samanea saman*) and Siris (*Albizia lebbek*) are the dominant tree species around the east boundary of the easement mixed with a Koa haole scrub. At the northern end of the reservoir a portion of the easement crosses over a drainage canal. Large Java plum (*Syzygium cumini*) trees dominate the area around the canal. During our survey we observed 'auku'u (Black-crowned night heron) roosting in the Java plum trees. Several other plant species were noted in the area including two indigenous species: milo (*Thespesia populnea*) and hala (*Pandanus tectorius*), as well as Guinea grass (*Panicum maximum*), and banana (*Musa* sp.).

As the easement heads north from the subject parcel it crosses a road leading to the Hawaii Cement Plant and then heads west into current sugar cane fields. A drainage ditch near the area where the easement turns west (past the reservoir) contains some plant species that are usually found near standing or running water. They included one native species 'ae'ae (*Bacopa monnieri*), and several non-native species such as water morning glory (*Ipomoea aquatic*), kalo



(*Colocasia esculenta*), false daisy (*Eclipta prostrata*), and vasey grass (*Paspalum urvillei*).

#### DISCUSSION & RECOMMENDATIONS

The vegetation on the project site is dominated by introduced species such as buffel grass, koa haole, kiawe, etc. Of a total of 50 plant species inventoried on the property, 44 (88%) are introduced and 6 (12%) are native. Of the natives, all 6 are indigenous, that is they are native to the Hawaiian Islands and elsewhere. These are the 'ilima, 'uhaloa, popolo, hala, milo, and 'ae ae.

None of the plants observed during the survey is a threatened or endangered species or a species of concern (U.S. Fish and Wildlife Service, 2008). The survey area has been impacted over time by agricultural and vehicular use and its biological resources have been altered from its native state. No wetlands were encountered during this survey. None of the three essential criteria for defining a federally recognized wetland were present within the study site. Those being: hydrophytic vegetation, hydric soils, and wetland hydrology.

The proposed Pu unene Heavy Industrial Subdivision and access easements are not expected to have significant negative impacts on the botanical resources of the site or the general region.

The client received comments from the USFWS regarding Blackburn Sphinx Moth host plants possibly occurring on the site. The recommendation to carry out the plant survey during or after the rainy season was noted. Host plants such as the introduced tree tobacco were observed very infrequently during the survey. Only a few small plants were seen over the entire subject property. Surrounding areas in Kihai and along the highway in Pu unene had an abundance of tree tobacco during the same dates as the survey was carried out. The area encompassed by our survey does not appear to be an optimum area for BSM host plants. As such, it is our opinion that a follow up survey in the spring is not warranted under the circumstances.

The reservoir easement borders the existing reservoir for much of its length. If this alignment is chosen for the easement, there should be a buffer between the reservoir and easement roadway during construction to protect the emergent native vegetation and native waterfowl present at the reservoir.

#### LITERATURE CITED

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TABLE 1. PLANT SPECIES LIST

The following checklist is an inventory of all the plant species observed within the survey area of the proposed Pu unene Heavy Industrial Subdivision [TMK (2) 3-8-08:19] and various easements required for access to the proposed subdivision during a site visit (August 16-17, 2011). The plant names are arranged alphabetically by family and then by species into two groups: Monocots and Dicots. The taxonomy and nomenclature of the flowering plants (Monocots and Dicots) are in accordance with Wagner *et al.* (1990), Wagner and Herbst (1999) and Staples and Herbst (2005). Recent name changes are those recorded in the Hawaii Biological Survey series (Evehuis and Eldredge, eds., 1999-2002) and the BISH native-naturalized checklist March 2010.

For each species, the following name is provided:

1. Scientific name with author citation.
2. Common English and/or Hawaiian name(s), when known.
3. Where the plant was observed; marked as in either the coastal or mauka sections of the project area or both.
4. Biogeographic status. The following symbols are used:

A = Alien species introduced to the Hawaiian Islands by humans, intentionally or accidentally.  
 I = Indigenous species native to the Hawaiian Islands and also found elsewhere in the world.  
 E = Endemic species found only in the Hawaiian Islands.

SCIENTIFIC NAME	COMMON NAME	STATUS
MONOCOTS		
ARACEAE		
<i>Colocasia esculenta</i> (L.) Schott	Kalo, iaro	A
MUSACEAE		
<i>Musa</i> sp. L.	banana	A
PANDANACEAE		
<i>Pandanus tectorius</i> Parkinson ex Z	hala, screwpine	I
POACEAE		
<i>Cenchrus ciliaris</i> L.	buffel grass	A
<i>Chloris barbata</i> (L.) Sw.	swollen finger grass	A
<i>Cynodon dactylon</i> (L.) Pers	manienie	A
<i>Eragrostis amabilis</i> (L.) Wight&Arn. Ex Nees	love grass	A
<i>Panicum maximum</i> L.	guinea grass	A

SCIENTIFIC NAME	COMMON NAME	STATUS
POACEAE		
<i>Paspalum urvillei</i> Steud.	vasey grass	A
<i>Saccharum officinarum</i> L.	ko, sugar cane	A
DICOTS		
AMARANTHACEAE		
<i>Amaranthus spinosus</i> L.	pakai kuku, spiny amaranth	A
<i>Amaranthus viridis</i> L.	ahchea, pakapakai, slender amaranth	A
ASTERACEAE		
<i>Eclipta prostrata</i> (L.) L.	false daisy	A
<i>Eschscholzia californica</i>	california poppy	A
<i>Pluchea indica</i> (L.) Less	sourbush, marsh flebane	A
<i>Tridax procumbens</i> L.	coat buttons	A
<i>Verbesina encelioides</i> (Cav.) Benth. & Hook.	golden crown beard	A
CHENOPODIACEAE		
<i>Chenopodium murale</i> L.	Lamb's quarters	A
CONVOLVULACEAE		
<i>Ipomoea aquatica</i> Forssk.	Water morning glory	A
<i>Ipomoea obscura</i> (L.) Ker-Gawl.	Obscure morning glory	A
<i>Merremia aegyptia</i> (L.) Urb.	Hairy merremia	A
CUCURBITACEAE		
<i>Momordica charantia</i> L.	bitter melon	A
EUPHORBIACEAE		
<i>Chamaesyce hirta</i> (L.) Millsp.	hairy spurge, garden spurge	A
<i>Chamaesyce hypericifolia</i> (L.) Millsp.	graceful spurge	A
<i>Euphorbia heterophylla</i> L.	kaliko	A

SCIENTIFIC NAME	COMMON NAME	STATUS
EUPHORBIACEAE		
<i>Ricinus communis</i> L.	castor bean	A
FABACEAE		
<i>Albizia lebbek</i> (L.) Benth.	Siris tree	A
<i>Chamaecrista nictitans</i> subsp. <i>patellaria</i> var. <i>glabrata</i> (Vogel) H.S.Irwin & Barney	Partridge pea	A
<i>Crotalaria incana</i> L.	fuzzy rattilepod	A
<i>Crotalaria pallida</i> Aiton	smooth rattilepod	A
<i>Desmanthus pernambucanus</i> (L.) Thell.	Slender or virgate mimosa	A
<i>Leucaena leucocephala</i> (Lam.) de Wit	Koa hoale	A
<i>Prosopis pallid</i> (Humb. & Boopl. ex Willd.) Kunth	Kiawe, mesquite	A
<i>Samanea saman</i> (Jacq.) Merr.	Monkey pod	A
LAMIACEAE		
<i>Leonotis nepetifolia</i> (L.) R. Br.	Lion's ear	A
MALVACEAE		
<i>Abutilon grandifolium</i> (Willd.) Sweet	Hairy abutilon	A
<i>Malva parvifolia</i> L.	Cheese weed	A
<i>Malvastrum coromandelianum</i> subsp. <i>coromandelianum</i> (L.) Garcke	False mallow	A
<i>Sida fallax</i> Walp.	Ilima	I
<i>Sida spinosa</i> L.		A
<i>Theopista populinea</i> (L.) Sol. ex Correa	milo	I
MYRTACEAE		
<i>Syzygium cumini</i> (L.) Skeels	Java plum	A
NYCTAGINACEAE		
<i>Boerhavia coccinea</i> L.	boerhavia	A

SCIENTIFIC NAME	COMMON NAME	STATUS
PLANTAGINACEAE		
<i>Bacopa monnieri</i> (L.) Pennell	'Ac'ac	I
SOLANACEAE		
<i>Datura stramonium</i> L.	Jimson weed	A
<i>Nicotiana tabacum</i> L.	tobacco	A
<i>Physalis angulata</i> L.	Husk tomato	A
<i>Solanum americanum</i> Mill.	popolo	I
<i>Solanum lycopersicum</i> var. <i>cerasiforme</i> (Dunal) D.M.Spooner, G.J. Anderson & R. K. Jansen	tomato, cherry tomato	A
STERCULIACEAE		
<i>Waltheria indica</i> L.	uhaloa	I

Appendix: Site Photographs



Figure 1. Vegetation of the 86-acre subject property is dominated by kiawe trees and buffelgrassland.



Figure 2. Lands adjacent to the southern section of the subject property are currently cultivated in sugar cane.



Figure 3. Vegetation along the Reservoir easement.



Figure 4. Roadside vegetation along portion of State Roadway Easement.



AVIFAUNAL AND FERAL  
MAMMAL SURVEY

APPENDIX

D





**AVIFAUNAL AND FERAL MAMMAL SURVEY FOR THE  
PROPOSED PU'UNENE HEAVY INDUSTRIAL SUBDIVISION  
PU'UNENE, MAUI, TMK: (2)3-8-888:019**

**INTRODUCTION**

The purpose of this report is to provide the findings of a two day (6, 7 July 2011) field survey of property proposed for the Pu'unene Heavy Industrial Subdivision Project at Pu'unene, Maui TMK (2) 3-8-008: 019. In addition to the data obtained from the field survey, relevant published and unpublished sources are also noted in the report. These resources add a broader perspective of the wildlife in this region of the island. The goals of the survey were:

- 1- Document the species of birds and mammals observed on or near the property.
- 2- Devote special attention to documenting the presence and/or possible use of this area by native and migratory species particularly those that are listed as threatened or endangered.

**Report prepared for:  
CMBY 2011 Investment, LLC**

**SITE DESCRIPTION**

This proposed project is located on a 86 acre parcel. Access to the proposed subdivision will be provided by Kama'aina Road and South Firebreak Road via a 56 foot wide access and utility easement. An alternative subdivision access road around the north and east side of an Hawaiian Commercial & Sugar irrigation reservoir was also examined. The property currently contains mostly alien (introduced) vegetation

**Survey and Report by:**

**Phillip L. Bruner  
Environmental Consultant  
Faunal (Bird & Mammal) surveys  
#1775 BYUH  
55-220 Kuluanui Street  
Lāie, HI 96762**

**Report (third revision)**

**8 August 2011**

dominated by Kiawe or Mesquite trees (*Prosopis pallida*) and dry grass/weeds. Surrounding lands are in sugar cane and similar dry brush/grass. An active irrigation reservoir is located nearby to the north of the property and adjacent to South Firebreak Road. This reservoir is fairly large with emergent vegetation along portions of its shoreline.

#### SURVEY PROTOCOL

The field survey was conducted over two consecutive days (6, 7, July 2011). Data were collected in the early morning and late in the day when birds and mammals are most active and more easily detected. Visual and auditory observations form the basis of the data. The entire property was examined along with adjoining lands including the irrigation reservoir. Observations of mammals were primarily limited to visual sightings. The evening of 6 July 2011 was devoted to a search for the presence of the endangered Hawaiian Hoary Bat (*Lasiurus cinereus semotus*). A Peterson Electronic AB Ultrasound Detector D 100 was used to listen for echolocating bats at several sites throughout the property and along the roads around the site as well as at the irrigation reservoir.

Weather during the survey was generally clear with some light passing showers in the early morning and evening. The wind was gusting above 30mph during mid-day.

Scientific and common vernacular names used in this report follow Honaaki et al. (1982) and Pyle (2002).

#### RESULTS AND DISCUSSION

##### Native Land Birds:

No native land birds were observed on the survey. The only species that might on rare occasions occur in this area is the Hawaiian Short-eared Owl or Pueo (*Astio flammeus sandwichensis*) (Pratt et al. 1987, Hawaii Audubon Society (2005). The Pueo is listed by the State of Hawaii as endangered on Oahu but not on Maui. They forage over an array of habitats including: forests, grasslands, agricultural fields and nest on the ground in high, dense grass (Hawaii Audubon Society 2005).

##### Native Waterbirds:

An average of 16 Auki'u or Black-crowned Night Heron were observed over the two day survey around the irrigation reservoir, but none were seen on the property proposed for development. This species is indigenous to Hawaii. It is not listed as endangered or threatened. They forage on a wide variety of prey and wetland habitats.

Over 40 Koloa or Hawaiian Duck (*Anas wyvilliana*) were tallied on the irrigation reservoir on both mornings of the survey. Koloa are an endangered species. Those on Maui are believed to be hybrids between the Koloa and Mallard (Hawaii Audubon

Society 2005). An average of 31 Hawaiian Coot or Alae Ke'oke'o (*Fulica alai*) were counted on the irrigation reservoir during the survey. This endangered waterbird is common on Maui. The only other native waterbird that might occur at times along the edges of the irrigation pond is the endangered Hawaiian or Black-necked Stilt or Ae'o (*Himantopus mexicanus knudseni*).

**Migratory shorebirds:**

At this time of year migratory shorebirds are on their breeding grounds in the arctic and subarctic. They winter in Hawaii between August and April. The only species that would potentially occur on this site would be the Pacific Golden-Plover or Kolea (*Pluvialis fulva*). Kolea forage for insects on lawns and other habitats in Hawaii. They can be seen on cane haul roads and in agricultural fields (Pratt et al. 1987, Hawaii Audubon Society 2005, ). They are not a threatened or endangered species. A few plover likely occur on this site during August – April. No other migratory shorebirds would likely occur at this site.

**Alien (Introduced) Birds:**

The property contains the usual array of introduced birds seen on similar property in Central Maui (Bruner 1993, 1994, 1995, 1996, 2002). Table One notes the species recorded on this survey. None of these are listed as endangered or threatened.

**Mammals:**

The only feral mammal observed was the Small Indian Mongoose (*Herpestes javanicus*). Rats (*Rattus spp.*) and Mice (*Mus musculus*) also likely occur on the site along with perhaps feral cats (*Felis catus*). No endangered Hawaiian Hoary Bat were detected by the ultrasound device during an evening search of the property on 6 July 2011. I know of no recent documented records for the Hawaiian Hoary Bat in the area of the proposed project. The Hawaiian Hoary Bat roosts solitarily in trees. They forage for flying insects in a wide variety of habitats including forests, agricultural lands, urban areas, as well as over bays and ponds (Tomich 1986, Kepler and Scott 1990, Jacobs 1991, 1993, Duval and Duval 1991, Reynolds et al. 1998, and Bonaccorso 2008 pers. comm.).

**EXECUTIVE SUMMARY AND RECOMMENDATIONS**

This survey found the typical assemblage of non-native (alien) birds and mammals on the proposed Heavy Industrial Subdivision Property. No endangered or threatened avian species were observed nor expected given the available resources on this site. The nearby irrigation reservoir, however, is utilized by at least two endangered waterbirds (Koloa, Alaeke'oke'o. This reservoir sits beside South Firebreak Road. The waterbirds were not responsive to the traffic noise from nearby roadways. The vegetation buffer around the irrigation pond also visually shields the birds from human disturbance unless one climbs up the embankment and walks along the edge of the pond. The

proposed Heavy Industrial Subdivision Project and alternative subdivision access road should not adversely impact the waterbirds at this reservoir. The road and 86 acre property is hidden from the actual irrigation pond by a high embankment and vegetation. The only potential migratory shorebird that might forage along roads and cleared areas in Pu'uene is the Pacific Golden-Plover. It is not threatened or endangered. I know of no published bat sightings for the area involved in this project. However, because they forage over a wide variety of habitats it is possible they could on rare occasion occur in this area. Bonaccorso (2008 pers. comm.) has conducted extensive research on the Hawaiian Hoary Bat on the island of Hawaii. He recommends that trees in a project area not be cut or disturbed between the months of April and August if there is any current evidence bats occur in the area. At this time of year young flightless bats are left in the tree while their mother forages.

TABLE ONE

Alien (Introduced Birds) found on a 6, 7 July 2011 field survey of TMK (2) 3-8-008: 019 at Pu'uene, Maui.

Common Name	Scientific Name
Cattle Egret	<i>Bubulcus ibis</i>
Gray Francolin	<i>Francolinus pondicerianus</i>
Black Francolin	<i>Francolinus francolinus</i>
Ring-necked Pheasant	<i>Phasianus colchicus</i>
Spotted Dove	<i>Streptopelia chinensis</i>
Zebra Dove	<i>Geopelia striata</i>
Barn Owl	<i>Tyto alba</i>
Japanese White-eye	<i>Zosterops japonicus</i>
Common Myna	<i>Acridotheres tristis</i>
Northern Cardinal	<i>Cardinalis cardinalis</i>
House Finch	<i>Carpodacus mexicanus</i>
Nutmeg Mannikin	<i>Lonchura punctulata</i>



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NENE (HAWAIIAN  
GOOSE) SURVEY

APPENDIX

E



## INTRODUCTION

The Pu' unēnē Heavy Industrial subdivision project lies on 86 acres of undeveloped land in lower Pūlehu, East Maui TMK (2) 3-8-08:19. Also included in this survey are the primary access road and the alternate access road to the project (see Figure 1). The project area has a plantation reservoir to the north, sugar cane fields and a rock crusher/cement operation to the east and south, and Maui Raceway Park to the west. The project area lies about a mile to the east of Mokuale Highway. This nēnē survey was initiated by the owners in response to comments received during the review of the biological studies submitted in support of the Environmental Assessment for the Pu' unēnē Heavy Industrial Subdivision Project.

## SITE DESCRIPTION

This area was the site of a former hog farm operation and as a result is heavily disturbed by intensive human and animal use. Much of the area remains cleared of vegetation with a network of old asphalt roadways. The existing vegetation consists mostly of buffelgrass (*Cenchrus ciliaris*) with scattered kiawe trees (*Protospis pallida*). The terrain is gently sloping down to the west at elevations from 110 feet to 140 feet above sea level. Soils consist primarily of Waialoa Extremely Silty Clay Loam (Footo et al. 1972). Rainfall averages about 12 inches per year with the bulk falling in a few winter storms (Armstrong 1983).

## SURVEY OBJECTIVES

This survey was called for to assess the potential of this project area for providing habitat for nēnē even if only incidental or temporary in nature and to document any such usage. It was intended to provide a random "snapshot" in time to assess this potential.

## METHODS

The survey was conducted as a walk-through reconnaissance to all parts of the project area. Binoculars were employed to get a detailed view of any nēnē activity on the ground or in the air. Nēnē are large and often vocal birds whose presence is easy to detect, especially in such open habitat as is found on this property.

SURVEY CONDUCTED ON JULY 16, 2012  
FOR THE NENE OR HAWAIIAN GOOSE (*Bramata samvicensis*)  
PU'UNENE HEAVY INDUSTRIAL SUBDIVISION PROJECT  
PULEHU, MAUI

By:  
Robert W. Hobby  
Environmental Consultant  
Koakomo, Maui

Prepared for: CMBY 2011 Investment, LLC

July 23, 2012

## RESULTS

No nēnē were seen on the ground or in flight over the project area. Many smaller birds were fairly plentiful including gray francolins (*Francolinus pondicerianus*), black francolin (*Francolinus francolinus*), zebra dove (*Geopelia striata*) and spotted dove (*Streptopelia chinensis*), but none of the much larger nēnē were observed anywhere on the project area. There was little in the way of food or water resources on this property that would attract nēnē here.

## DISCUSSION AND CONCLUSIONS

Nēnē are vegetarians that eat a variety of grasses, small fruits, seeds and other herbaceous vegetation. They prefer damp or wet sites with succulent young grasses. They are also powerful fliers that can cover many miles in search of preferred resources. They can often be seen on irrigated areas such as newly planted cane fields, large parks, golf courses, pastures and even on hydromulched roadside banks. Their use of such areas is unpredictably intermittent and temporary. Each of these wide-ranging, temporary resources can be termed important habitat for these Endangered nēnē, but to call any one of them essential to their survival is too much of a stretch.

The 86 acre project area is an un-irrigated parcel that is located in one of the driest parts of Maui. The area experiences long, hot and dry summers during which the grasses and herbaceous plants become sear and withered. In even a substantial wet season here the vegetation is tough and the greenness fleeting. There is nothing in this environment that would equate to preferred habitat for nēnē or which would attract them to feed or breed here. That no nēnē were observed here during this survey is an expected outcome, consistent with the existing environmental resources.

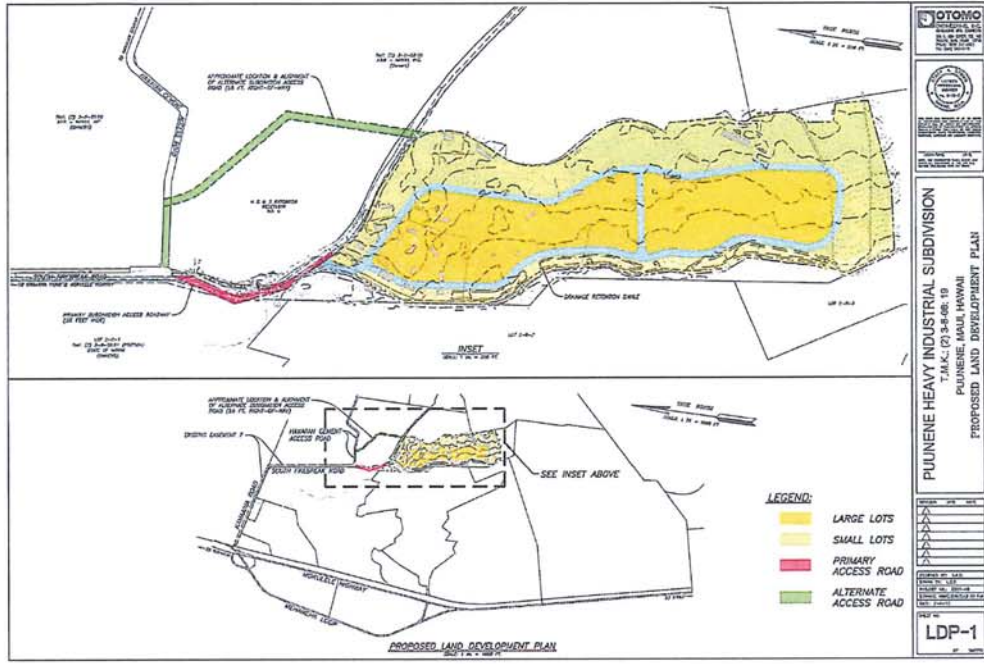


Figure 1

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ARTHROPOD STUDY

APPENDIX

F



PU'UNENE HEAVY INDUSTRIAL SUBDIVISION

ARTHROPOD STUDY – PULEHU, MAUI

Pu'unenē Heavy Industrial Subdivision Project

ARTHROPOD STUDY

INTRODUCTION

Pulehu, Maui

The Pu'unenē Heavy Industrial Subdivision project lies on 86 acres of undeveloped land in lower Pulehu, East Maui TMK (2) 3-8-08:19. This survey also includes the primary access road and the alternate access road to the project (see Figure 1). The project area has a plantation reservoir to the north, sugar cane fields and a rock crusher/cement operation to the east and south, and Maui Raceway Park to the west. The project area lies about a mile to the east of Mokualele Highway. This arthropod study was initiated by the owners in response to environmental requirements of the planning process.

SITE DESCRIPTION

This area was the site of a former hog farm operation and as a result is heavily disturbed by intensive human and animal use. Much of the area remains cleared of vegetation with a network of old asphalt roadways. The existing vegetation consists mostly of buffelgrass (*Cenchrus ciliaris*) with scattered kiawe trees (*Prosopis pallida*). The terrain is gently sloping down to the west at elevations from 110 feet to 140 feet above sea level. Soils consist primarily of Waikoa Extremely Stony Silty Clay Loam (Foote et al, 1972). Rainfall averages about 12 inches per year with the bulk falling in a few winter storms (Armstrong 1983).

By:  
Robert W. Hobby  
Environmental Consultant  
Koakomo, Maui

Prepared for: CMBY 2011 Investment, LLC

July 23, 2012



## SURVEY OBJECTIVES

Survey objectives were to inventory all arthropod species occurring on the property, recording species, distribution, abundance and status, and to identify any native species with special focus on any that are Endangered or Threatened species.

## METHODS

A walk-through survey method was employed, covering all parts of the project area. Binoculars and a magnifying lens were used and field notes taken for reference work.

## RESULTS

A total of 15 arthropods were recorded during the survey, representing seven Orders of spiders and insects. Taxonomy and nomenclature follow Nishida et al (1992). Just two species were common, the blowfly (*Eucalliphora latifrons*) and the honey bee (*Apis mellifera*). All others were uncommon to rare in the project area.

One native dragonfly was recorded, the globe skimmer (*Pantala flavescens*). This dragonfly is indigenous to Hawaii and quite common. It is also native worldwide in the tropics. It is of no particular environmental interest or concern.

Looked for but not seen was the Endangered Blackburn's sphinx moth *Manduca blackburni* (USFWS, 2000). None of its preferred alternate host plants, the tree tobacco (*Nicotiana glauca*) were found on the property and no adult moths, eggs or larvae were seen.

No other rare or endangered insects were seen.

## CONCLUSIONS

There were no Endangered or Threatened arthropod species found during the survey on this dry, un-irrigated project area. From an entomological standpoint the proposed developments on this property would not have a significant negative impact on the arthropod resources in this part of Maui.

No recommendations with regard to the arthropod fauna are deemed appropriate or necessary.

Following is a checklist of the animal species inventoried during the field work. Animal species are arranged in descending abundance for Arthropods only. For each species the following information is provided:

1. Common name
2. Scientific name
3. Bio-geographical status. The following symbols are used:
  - endemic = native only to Hawaii; not naturally occurring anywhere else in the world.
  - indigenous = native to the Hawaiian Islands and also to one or more other geographic area(s).
  - non-native = all those animals brought to Hawaii intentionally or accidentally after western contact.
  - migratory = spending a portion of the year in Hawaii and a portion elsewhere. In Hawaii the migratory birds are usually in the overwintering/non-breeding phase of their life cycle.
4. Abundance of each species within the project area:
  - abundant = many flocks or individuals seen throughout the area at all times of day.
  - common = a few flocks or well scattered individuals throughout the area.
  - uncommon = only one flock or several individuals seen within the project area.
  - rare = only one or two seen within the project area.



SCIENTIFIC NAME	COMMON NAME	STATUS	ABUNDANCE
Order ARANEAE - spiders			
ARANEIDAE (Orb Weaver Family)	European garden spider	non-native	rare
<i>Araneus diadematus</i> Clerck			
SALTICIDAE (Jumping Spider Family)	Adanson's house jumper	non-native	uncommon
<i>Hasarius adamsi</i> Audouin			
Order COLEOPTERA - beetles			
CRYPTOPHAGIDAE (Silken Fungus Beetle Family)	silken fungus beetle	non-native	rare
<i>Henoticus serratus</i> Gyllenhal			
Order DIPTERA - flies			
CALLIPHORIDAE (Blowfly Family)	blowfly	non-native	common
<i>Eucalliphora laifrons</i> Hough	blowfly	non-native	rare
<i>Rhina testacea</i> Robineau-Desvoidy	vinegar fly	non-native	uncommon
DROSOPHILIDAE (Fruit Fly Family)	vinegar fly	non-native	uncommon
<i>Chironomyza proceramus</i> Williston			
MUSCIDAE (House Fly Family)	dung fly	non-native	rare
<i>Musca sorbens</i> Wiedemann			
Order HYMENOPTERA - bees, wasps & ants			
APIDAE (Honey Bee Family)	honey bee	non-native	common
<i>Apis mellifera</i> Linnaeus			
FORMICIDAE (Ant Family)	Argentine ant	non-native	rare
<i>Linepithema humile</i> Mayr			
MEGACHILIDAE (Leafcutter Bee Family)	leafcutter bee	non-native	rare
<i>Megachile gentilis</i> Cresson			
SPHECIDAE (Sphecid Wasp Family)	jewel wasp	non-native	rare
<i>Ampulex compressa</i> Fabricius			
VESPIDAE (Vespid Wasp Family)	golden paper wasp	non-native	uncommon
<i>Polistes aurifer</i> Saussure			
Order LEPIDOPTERA - butterflies & moths			
NOCTUIDAE (Owllet Moth Family)	corn ear worm moth	non-native	rare
<i>Helioverpa zea</i> Boddie			
Order ODONATA - dragonflies & damselflies			
LIBELLULIDAE (Skimmer Dragonfly Family)	globe skimmer	indigenous	uncommon
<i>Pantala flavescens</i> Fabricius			
Order ORTHOPTERA - grasshoppers & crickets			
ACRIDIDAE (Grasshopper Family)	short-horned grasshopper	non-native	uncommon
<i>Oedipoda atripennis</i> Thunberg			

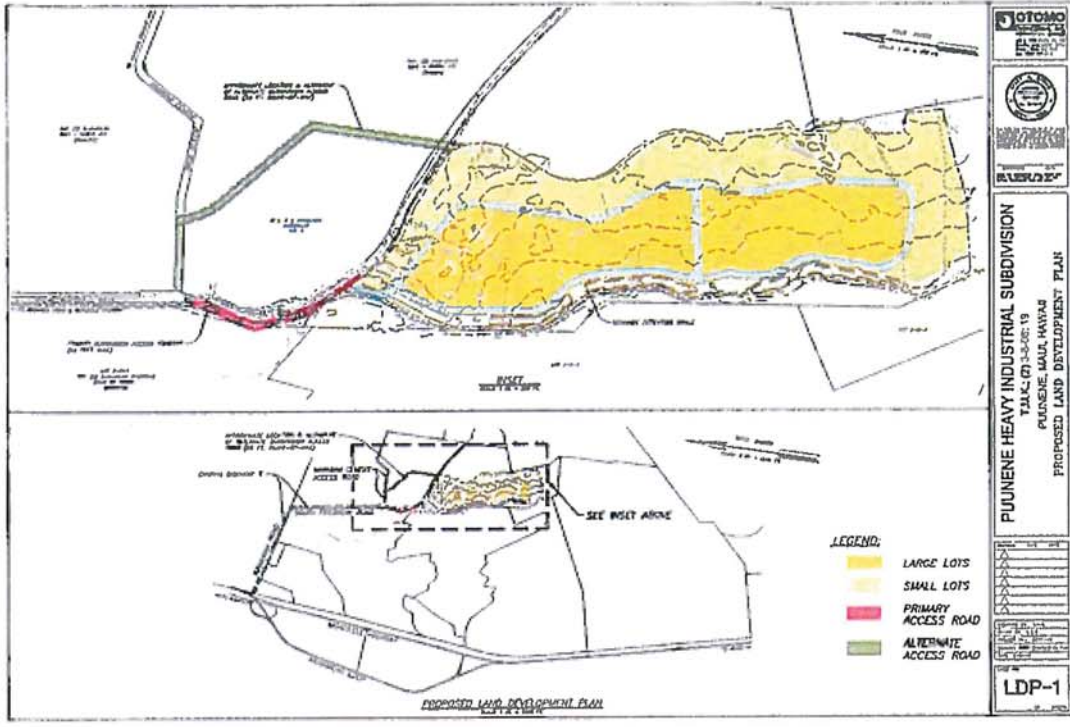


Figure 1

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NOISE STUDY

APPENDIX

G



**ACOUSTIC STUDY FOR THE  
PUUNENE HEAVY INDUSTRIAL SUBDIVISION  
PUUNENE, MAUI, HAWAII**

**TABLE OF CONTENTS**

<u>CHAPTER</u>	<u>CHAPTER TITLE</u>	<u>PAGE NO.</u>
	List of Figures .....	ii
	List of Tables .....	iii
I	SUMMARY .....	1
II	PURPOSE .....	3
III	NOISE DESCRIPTORS AND THEIR RELATIONSHIP TO LAND USE COMPATIBILITY .....	4
IV	GENERAL STUDY METHODOLOGY .....	9
V	EXISTING ACOUSTICAL ENVIRONMENT .....	13
VI	FUTURE NOISE ENVIRONMENT .....	16
VII	DISCUSSION OF PROJECT-RELATED NOISE IMPACTS AND POSSIBLE MITIGATION MEASURES .....	19
<u>APPENDICES</u>		
A	REFERENCES .....	24
B	EXCERPTS FROM EPA'S ACOUSTICAL TERMINOLOGY GUIDE .....	25
C	SUMMARY OF BASE YEAR AND YEAR 2015 TRAFFIC VOLUMES .....	28

Prepared for:  
**CMBY 2011 INVESTMENT, LLC**

Prepared by:  
**Y. EBISU & ASSOCIATES**  
1126 12th Avenue, Room 305  
Honolulu, Hawaii 96816

NOVEMBER 2011

LIST OF FIGURES

<u>NUMBER</u>	<u>FIGURE TITLE</u>	<u>PAGE NO.</u>
1	PROJECT LOCATION MAP AND NOISE MEASUREMENT LOCATIONS .....	2
2	LAND USE COMPATIBILITY WITH YEARLY AVERAGE DAY-NIGHT AVERAGE SOUND LEVEL (DNL) AT A SITE FOR BUILDINGS AS COMMONLY CONSTRUCTED .....	7
3	HOURLY VARIATIONS OF TRAFFIC NOISE AT 96 FT SETBACK DISTANCE FROM THE CENTERLINE OF MOKULELE HIGHWAY NEAR MAUI RACEWAY PARK (STA. 574031100336; MAY 13, 2009) .....	11
4	LOCATION OF PROJECT SITE IN RELATIONSHIP TO CLOSEST RESIDENTIAL COMMUNITIES .....	20
5	ANTICIPATED RANGE OF CONSTRUCTION NOISE LEVELS VS. DISTANCE .....	22
6	AVAILABLE WORK HOURS UNDER DOH PERMIT PROCEDURES FOR CONSTRUCTION NOISE .....	23

LIST OF TABLES

<u>NUMBER</u>	<u>TABLE TITLE</u>	<u>PAGE NO.</u>
1	EXTERIOR NOISE EXPOSURE CLASSIFICATION (RESIDENTIAL LAND USE) .....	5
2	EFFECTS OF NOISE ON PEOPLE (RESIDENTIAL LAND USES ONLY) .....	6
3	TRAFFIC AND BACKGROUND NOISE MEASUREMENT RESULTS .....	10
4	EXISTING (CY 2011) TRAFFIC VOLUMES AND NOISE LEVELS ALONG ROADWAYS IN PROJECT AREA (AM OR PM PEAK HOUR) .....	14
5	EXISTING AND CY 2015 DISTANCES TO 65 AND 70 DNL CONTOURS .....	15
6	FUTURE (CY 2015) TRAFFIC VOLUMES AND NOISE LEVELS ALONG ROADWAYS IN PROJECT AREA (AM OR PM PEAK HOUR, BUILD) .....	17
7	CALCULATIONS OF PROJECT AND NON-PROJECT TRAFFIC NOISE CONTRIBUTIONS (CY 2015) (DNL) .....	18



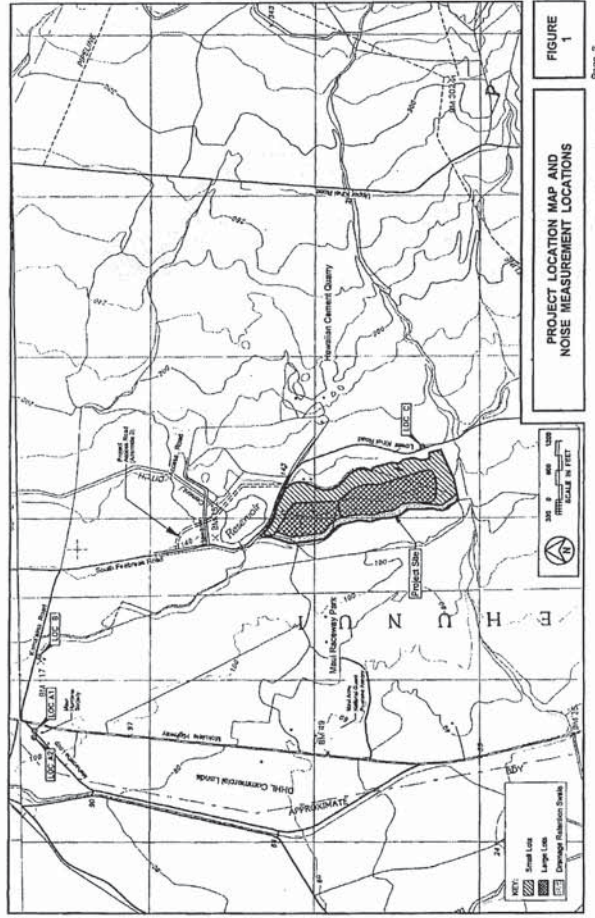
## CHAPTER I. SUMMARY

The existing and future traffic noise levels in the vicinity of the proposed Puunene Heavy Industrial Subdivision in Puunene, Maui were evaluated for their potential impacts and their relationship to current FHA/HUD noise standards. The traffic noise level increases along the roadways servicing the project site (see Figure 1) were calculated. No significant increases in traffic noise levels are predicted to occur along Mokulele Highway as a result of project traffic following project build-out by CY 2015. Large increases of 6.4 DNL are expected to occur along the roadways used by project traffic between the project site and Mokulele Highway.

Along Mokulele Highway in the vicinity of the project site, traffic noise levels are expected to increase by approximately 1.3 to 1.4 DNL by CY 2015 as a result of project and non-project traffic. Of this increase, a 1.0 DNL increase is expected to occur from non-project traffic by CY 2015. Project traffic will account for approximately 0.3 to 0.4 DNL units of noise increase along Mokulele Highway in the immediate vicinity of the project. Along Kamaaina Road and South Firebreak Road between Mokulele Highway and the project site, traffic noise levels are expected to increase by 6.4 DNL by CY 2015 as a result of project traffic. This level of traffic noise increase resulting from project generated traffic along Kamaaina Road and South Firebreak Road are considered to be large. The 6.4 DNL predicted increase in project generated traffic noise levels are limited to the roadways used by project traffic between Mokulele Highway and the project site, and are not expected to generate adverse noise impacts by CY 2015 due to the absence of noise sensitive developments along these roadways.

The project site is located near an existing quarry, with large buffer distances to the closest residential developments. The closest neighboring developments include a rock quarry, the Maui Humane Society, a motorsport raceway, an industrial subdivision, and military office facilities. Predicted worst case noise emissions from operating equipment within the proposed Puunene Heavy Industrial Subdivision are not expected to exceed noise impact thresholds at the nearest noise sensitive developments. Compliance with State Department of Health noise regulations for fixed on-site equipment are recommended to minimize adverse noise impacts on adjacent and distant properties.

Adverse noise impacts are not expected to occur during construction of the proposed project due to the relatively large buffer distances to the nearest developed properties and due to the non-noise sensitive nature of the neighboring properties. Because construction activities may be audible within the project site and at nearby properties, the quality of the acoustic environment may be degraded to unacceptable levels during periods of construction. Mitigation measures to reduce construction noise to inaudible levels will not be practical in all cases, but the use of quiet equipment and compliance with State Department of Health construction noise regulations are recommended as standard mitigation measures.



## CHAPTER II. PURPOSE

The primary objective of this study was to describe the existing and future traffic noise environment in the environs of the proposed Puunene Heavy Industrial Subdivision in Puunene on the island of Maui. Traffic forecasts for 2015 were used. Traffic noise level increases and impacts associated with the proposed project were to be determined within the project site as well as along the public roadways which are expected to service the project traffic. A specific objective was to determine future traffic noise level increases associated with both project and non-project traffic, and the potential noise impacts associated with these increases.

Noise impacts from on-site activities and short term construction noise at the project site were also included as noise study objectives. Recommendations for minimizing identified noise impacts were also to be provided as required.

## CHAPTER III. NOISE DESCRIPTORS AND THEIR RELATIONSHIP TO LAND USE COMPATIBILITY

The noise descriptor currently used by federal agencies (such as FHA/HUD) to assess environmental noise is the Day-Night Average Sound Level (DNL). This descriptor incorporates a 24-hour average of instantaneous A-Weighted Sound Levels as read on a standard Sound Level Meter. By definition, the minimum averaging period for the DNL descriptor is 24 hours. Additionally, sound levels which occur during the nighttime hours of 10:00 PM to 7:00 AM are increased by 10 decibels (dB) prior to computing the 24-hour average by the DNL descriptor. A more complete list of noise descriptors is provided in Appendix B to this report.

Table 1, derived from Reference 1, presents current federal noise standards and acceptability criteria for residential land uses. Table 2, also extracted from Reference 1, presents the general effects of noise on people in residential use situations. Land use compatibility guidelines for various levels of environmental noise as measured by the DNL descriptor system are shown in Figure 2 (from Reference 2). As a general rule, noise levels of 55 DNL or less occur in rural areas, or in areas which are removed from high volume roadways. In urbanized areas which are shielded from high volume streets, DNL levels generally range from 55 to 65 DNL, and are usually controlled by motor vehicle traffic noise. Residences which front major roadways are generally exposed to levels of 65 DNL, and as high as 75 DNL when the roadway is a high speed freeway. In the project area, traffic noise levels associated with Mokulele Highway are typically greater than 65 DNL along the Right-of-Way due to the relatively large volume of traffic and high vehicle speeds on this thoroughfare.

For purposes of determining noise acceptability for funding assistance from federal agencies (FHA/HUD and VA), an exterior noise level of 65 DNL or less is considered acceptable for residences. This standard is applied nationally (Reference 3), including Hawaii. Because of our open-living conditions, the predominant use of naturally ventilated dwellings, and the relatively low exterior-to-interior sound attenuation afforded by these naturally ventilated structures, an exterior noise level of 65 DNL does not eliminate all risks of noise impacts. Because of these factors, and as recommended in Reference 4, a lower level of 55 DNL is considered as the "Unconditionally Acceptable" (or "Near-Zero Risk") level of exterior noise. However, after considering the cost and feasibility of applying the lower level of 55 DNL, government agencies such as FHA/HUD and VA have selected 65 DNL as a more appropriate regulatory standard.

For commercial, industrial, and other non-noise sensitive land uses, exterior noise levels as high as 75 DNL are generally considered acceptable. Exceptions to this occur when naturally ventilated office and other commercial establishments are exposed to exterior levels which exceed 65 DNL.

On the island of Maui, the State Department of Health (DOH) regulates noise from construction activities through the issuance of permits for allowing excessive



TABLE 1

EXTERIOR NOISE EXPOSURE CLASSIFICATION  
(RESIDENTIAL LAND USE)

NOISE EXPOSURE CLASS	DAY-NIGHT SOUND LEVEL	EQUIVALENT SOUND LEVEL	FEDERAL (1) STANDARD
Minimal Exposure	Not Exceeding 55 DNL	Not Exceeding 55 Leq	Unconditionally Acceptable
Moderate Exposure	Above 55 DNL But Not Above 65 DNL	Above 55 Leq But Not Above 65 Leq	Acceptable(2)
Significant Exposure	Above 65 DNL But Not Above 75 DNL	Above 65 Leq But Not Above 75 Leq	Normally Unacceptable
Severe Exposure	Above 75 DNL	Above 75 Leq	Unacceptable

Notes: (1) Federal Housing Administration, Veterans Administration, Department of Defense, and Department of Transportation.

(2) FHWA uses the Leq instead of the Ldn descriptor. For planning purposes, both are equivalent if: (a) heavy trucks do not exceed 10 percent of total traffic flow in vehicles per 24 hours, and (b) traffic between 10:00 PM and 7:00 AM does not exceed 15 percent of average daily traffic flow in vehicles per 24 hours. The noise mitigation threshold used by FHWA for residences is 67 Leq.

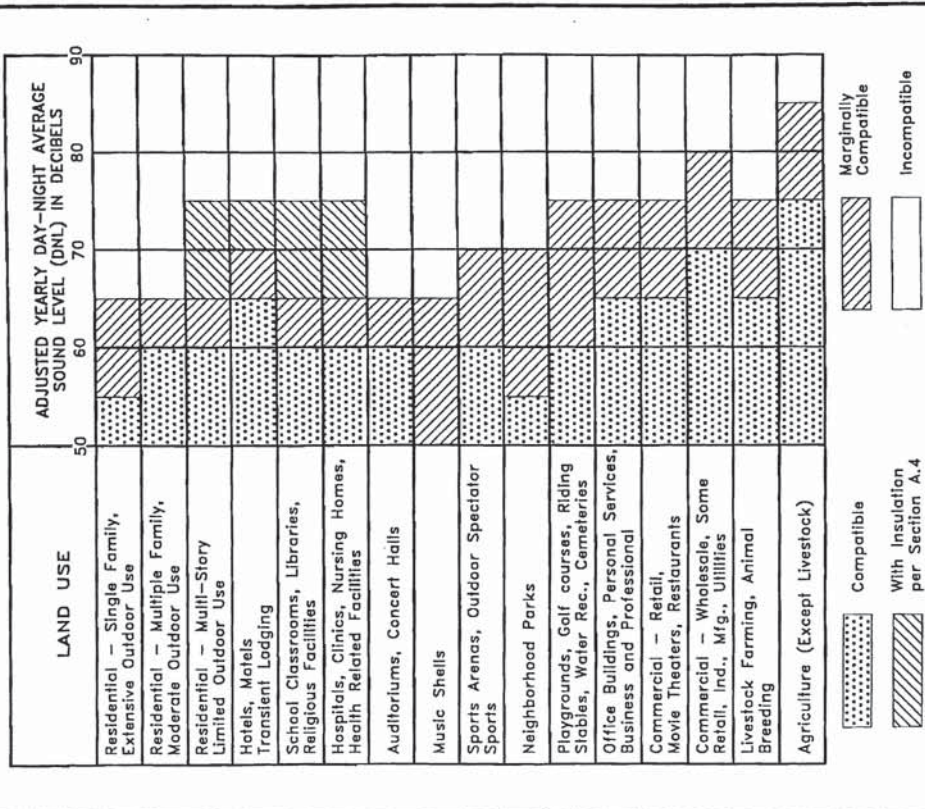
TABLE 2  
EFFECTS OF NOISE ON PEOPLE  
(Residential Land Uses Only)

General Community Attitude Towards Area	Average Community Reaction <sup>4</sup>	Annoyance <sup>2</sup>	% of Population Highly Annoyed <sup>3</sup>	Speech Interference		Hearing Loss	Description	Qualitative	DAY-NIGHT AVERAGE SOUND LEVEL IN DECIBELS
				Indoor	Outdoor				
Noise is likely to be the most important of all adverse aspects of the community environment.	Very	37%	0.5	98%	May Begin to Occur	Will Not Occur	Will Not Occur	Will Not Occur	75 and above
Noise is one of the most important adverse aspects of the community environment.	Severe	25%	0.9	99%	Will Not Occur	Likely Occur	Will Not Occur	Will Not Occur	70
Noise is one of the important adverse aspects of the community environment.	Significant	15%	1.5	100%	Will Not Occur	Will Not Occur	Will Not Occur	Will Not Occur	65
Noise may be considered an adverse aspect of the community environment.	Moderate	9%	2.0	100%	Will Not Occur	Will Not Occur	Will Not Occur	Will Not Occur	60
Noise considered no more important than various other environmental factors.	Slight	4%	3.5	100%	Will Not Occur	Will Not Occur	Will Not Occur	Will Not Occur	55 and below

1. "Speech Interference" data are drawn from the following tables in EPA's "Levels Document": Table 3, Fig. D-1, Fig. D-2, Fig. D-3. All other data from National Academy of Science report "Guidelines for Preparing Environmental Impact Statements on Noise," Report of Working Group on Evaluation of Environmental Impact of Noise." 2. Depends on attitudes and other factors. 3. The percentages of people reporting annoyance to lesser extents are higher in each case. An unknown small percent-age of people will report being "highly annoyed" even in the quietest surroundings. One reason is the difficulty all people have in integrating annoyance over a very long time. 4. Attitudes or other non-acoustic factors can modify this. Noise at low levels can still be an important problem, particularly when it intrudes into a quiet environment. NOTE: Research implicates noise as a factor producing stress-related health effects such as heart disease, high-blood pressure and stroke, ulcers and other digestive disorders. The relationships between noise and these effects, however, have not as yet been quantified.



noise during limited time periods. State DOH noise regulations are expressed in maximum allowable property line noise limits rather than DNL (see Reference 5). Although they are not directly comparable to noise criteria expressed in DNL, State DOH noise limits for residential, commercial, and industrial lands equate to approximately 55, 60, and 76 DNL, respectively.



LAND USE COMPATIBILITY WITH YEARLY AVERAGE DAY-NIGHT AVERAGE SOUND LEVEL (DNL) AT A SITE FOR BUILDINGS AS COMMONLY CONSTRUCTED.  
 (Source: American National Standards Institute S12.9-1998/Part 5)

**FIGURE 2**

CHAPTER IV. GENERAL STUDY METHODOLOGY

Existing traffic noise levels were measured at four locations (A1, A2, B, and C) in the project environs to provide a basis for developing the project's traffic noise contributions along the roadways which will service the proposed development. The locations of the measurement sites are shown in Figure 1. Noise measurements were performed during the month of October 2011. The results of the traffic noise measurements were compared with calculations of existing traffic noise levels to validate the computer model used. The traffic noise measurement results, and their comparisons with computer model predictions of existing traffic noise levels are summarized in Table 3.

Traffic noise calculations for the existing conditions as well as noise predictions for the Year 2015 were performed using the Federal Highway Administration (FHWA) Traffic Noise Model (Reference 6). Traffic data entered into the noise prediction model were: roadway and receiver locations; hourly traffic volumes; average vehicle speeds; estimates of traffic mix; and "Lawn and Loose Soil" propagation loss factors. The traffic data and forecasts for the project (Reference 7), plus the spot traffic counts obtained during the noise measurement periods were the primary sources of data inputs to the model. Appendix C summarizes the AM and PM peak hour traffic volumes for CY 2011 and 2015 which were used to model existing and future traffic noise along the roadways in the vicinity of the project site. For existing and future traffic along the roadways in the vicinity of the project site, it was assumed that the 24-hour DNL along those roadways were equal to the average noise levels, or Leq(24), during the AM peak traffic hour plus 1 dB. This assumption was based on computations of both the hourly Leq and the 24-hour DNL of traffic noise on Mokulele Highway (see Figure 3) using State of Hawaii hourly traffic counts from Reference 8.

Traffic noise calculations for both the existing and future conditions in the project environs were developed for ground level receptors with and without the benefit of shielding from natural terrain features or man made obstructions. Traffic noise levels were also calculated for future conditions with and without the proposed project. The forecasted changes in traffic noise levels over existing levels were calculated with and without the project, and noise impact risks evaluated. The relative contributions of non-project and project traffic to the total noise levels were also calculated, and an evaluation of possible traffic noise impacts was made.

Evaluations of potential noise impacts from on site noise sources were performed by predicting the noise levels from on site noise sources at the closest residential developments in Kiheti (2.3 miles), Pukalani (6.4 miles), and Kahului (4.0 miles). These predictions assumed that each of the small and large lots of the industrial subdivision emitted the maximum sound level of 70 dBA as allowed for industrial properties by the State DOH noise regulations (Reference 5). A total of 28 subdivision lots, each with 70 dBA noise emitters located within each lot (for a total of 28 continuous noise sources), was assumed for these noise modeling purposes. The

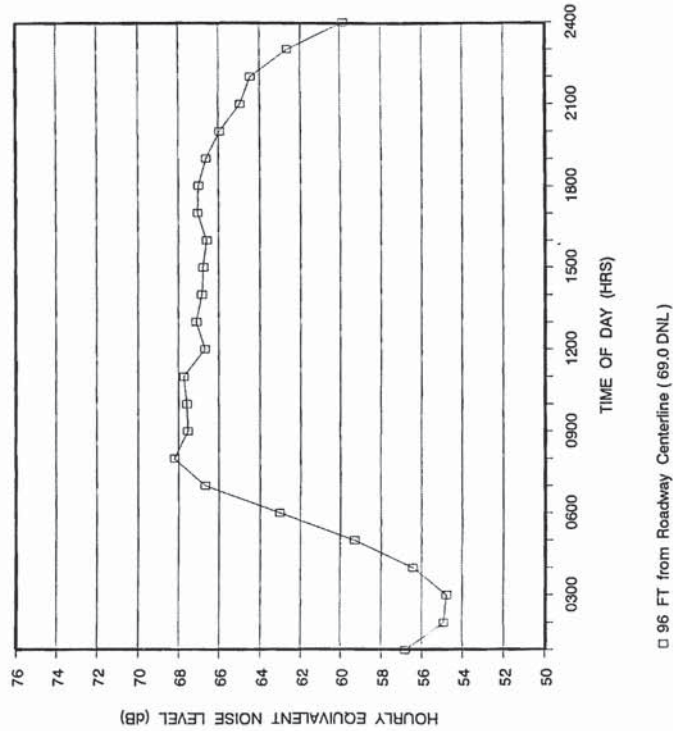
TABLE 3  
TRAFFIC AND BACKGROUND NOISE MEASUREMENT RESULTS

LOCATION	Time of Day	Ave. Speed (MPH)	Hourly Traffic Volume		Predicted Leg (dB)	Measured Leg (dB)
			AUTO	M.TRUCK		
A1. 96 FT from the center-line of Mokulele Hwy. (10/24/11)	TO	55	2,123	38	69.9	69.9
A2. 196 FT from the center-line of Mokulele Hwy. (10/24/11)	TO	55	2,123	38	61.9	62.0
B. 50 FT from the center-line of Kamaena Rd. (10/24/11)	TO	35	58	7	58.9	58.9
C. 44 FT from the center-line of Firebreak Rd. (10/24/11)	TO	35	3	9	60.1	60.1
A1. 96 FT from the center-line of Mokulele Hwy. (10/24/11)	TO	50	2,384	14	66.6	66.9
A2. 196 FT from the center-line of Mokulele Hwy. (10/24/11)	TO	50	2,384	14	56.9	58.7

worst case sound levels at the closest residential developments in Kihei, Pukalani, and Kahului resulting from this noise modeling assumption were then compared to existing background noise levels and noise impact criteria.

Calculations of average exterior and interior noise levels from construction activities were performed for typical naturally ventilated and air conditioned buildings. Predicted noise levels were compared with existing background ambient noise levels, and the potential for noise impacts was assessed.

**FIGURE 3**  
**HOURLY VARIATIONS OF TRAFFIC NOISE AT 96 FT**  
**SETBACK DISTANCE FROM THE CENTERLINE OF**  
**MOKULELE HIGHWAY NEAR MAUI RACEWAY PARK**  
**(STA. B74031100336; MAY 13, 2009)**



□ 96 FT from Roadway Centerline (69.0 DNL)





Predictions of future traffic noise levels were made using the traffic volume assignments of Reference 7 for CY 2015 with the proposed project. Estimates of CY 2015 traffic volumes with and without the project were contained in Reference 7. The future projections of project plus non-project traffic noise levels on the roadways which would service the project are shown in Table 6 for the AM and PM peak hours of traffic, under the Build Alternative. Predicted increases in the setback distances to the 65 and 70 DNL contours are shown in Table 5. The separate non-project and project traffic noise contributions for the Build Alternative are shown in Table 7.

Very small changes in traffic noise levels (0.3 to 0.4 DNL) are expected along Mokulele Highway in the project environs between CY 2011 and 2015 as a result of project traffic. The growth in non-project traffic by CY 2015 is predicted to result in a traffic noise level increase of 1.0 DNL along Mokulele Highway. By CY 2015, traffic noise levels in the project area along Mokulele Highway are expected to increase primarily due to the anticipated growth in non-project traffic, and it will be difficult to determine the increases in future traffic noise associated with the project traffic.

Along the project access roads between Mokulele Highway and the project site, existing traffic noise levels are expected to increase by 3.7 to 6.4 DNL solely as a result of project traffic. No changes in non-project traffic noise levels are expected along the access roads between the project site and Mokulele Highway. The increases in traffic noise levels due to project traffic are relatively high, but these increases are expected to occur in currently undeveloped, agricultural lands.

The dominant traffic noise sources in the project environs will continue to be traffic along Mokulele Highway, with the increases in future traffic noise levels being relatively small along these two roadways and primarily associated with non-project traffic.

Future traffic noise levels on the proposed project site will continue to be unaffected by traffic noise along Mokulele Highway due to the large buffer distance to the highway. Future traffic noise levels on the project site will be controlled by project traffic moving within the industrial subdivision and moving to and from the industrial subdivision. These future traffic noise levels within the industrial subdivision are not expected to exceed 70 DNL, and should be acceptable for the planned industrial land uses.

TABLE 5  
EXISTING AND CY 2015 DISTANCES TO 65  
AND 70 DNL CONTOURS

STREET SECTION	65 DNL SETBACK (FT) EXISTING		70 DNL SETBACK (FT) EXISTING		CY 2015	
	EXISTING	CY 2015	EXISTING	CY 2015	EXISTING	CY 2015
Mokulele Hwy. North of Kamaaina Rd.	174	202	106	122		
Mokulele Hwy. South of Kamaaina Rd.	172	194	104	118		
Kamaaina Rd. At Mokulele Hwy.	33	67	17	44		
Mehameha Lp. At Mokulele Hwy.	6	6	3	3		
<b>Under Project Access Alternative 1:</b>						
South Firebreak Rd. N. of Quarry Access Rd.	33	78	17	41		
Quarry Access Rd. At South Firebreak Rd.	33	33	17	17		
South Firebreak Rd. S. of Quarry Access Rd.	N/A	68	N/A	36		
<b>Under Project Access Alternative 2:</b>						
South Firebreak Rd. N. of Project Access Rd.	33	78	17	41		
South Firebreak Rd. S. of Project Access Rd.	33	33	17	17		
Quarry Access Rd. At South Firebreak Rd.	33	33	17	17		
Project Access Rd. At South Firebreak Rd.	N/A	68	N/A	36		

**Notes:**

- (1) All setback distances are from the roadways' centerlines.
- (2) See TABLES 4 and 6 for traffic volume, speed, and mix assumptions.
- (3) Setback distances are for ground level receptors.



FUTURE (CY 2015) TRAFFIC VOLUMES AND NOISE LEVELS  
ALONG ROADWAYS IN PROJECT AREA  
(AM OR PM PEAK HOUR, BUILD)

TABLE 6

LOCATION	SPEED (MPH)	TOTAL VPH	AUTOS	MTRUCKS	HTRUCKS	50' Leg	100' Leg	200' Leg
Mokulele Hwy, North of Kamaaina Rd. (AM)	55	3,035	2,941	52	42	77.9	71.0	64.1
Mokulele Hwy, North of Kamaaina Rd. (PM)	50	3,397	3,369	20	8	74.7	67.7	60.6
Mokulele Hwy, South of Kamaaina Rd. (AM)	55	2,873	2,790	49	34	77.6	70.7	63.7
Mokulele Hwy, South of Kamaaina Rd. (PM)	50	3,266	3,236	20	10	74.5	67.6	60.5
Kamaaina Rd. At Mokulele Hwy. (AM)	35	529	381	64	84	67.5	62.0	57.2
Kamaaina Rd. At Mokulele Hwy. (PM)	35	529	381	64	84	67.5	62.0	57.2
Mokulele Lp. At Mokulele Hwy. (AM)	35	508	374	62	72	67.1	61.6	56.7
Mokulele Lp. At Mokulele Hwy. (PM)	35	508	374	62	72	67.1	61.6	56.7
Mokulele Lp. At Mokulele Hwy. (AM)	35	36	28	1	7	55.9	50.5	45.8
Mokulele Lp. At Mokulele Hwy. (PM)	35	36	28	1	7	55.9	50.5	45.8
Quarry Access Rd. At South Firebreak Rd. (AM)	35	57	27	5	25	60.8	55.6	51.1
Quarry Access Rd. At South Firebreak Rd. (PM)	35	57	27	5	25	60.8	55.6	51.1
South Firebreak Rd. N. of Quarry Access Rd. (AM)	35	472	354	59	59	66.4	60.9	56.0
South Firebreak Rd. N. of Quarry Access Rd. (PM)	35	472	354	59	59	66.4	60.9	56.0
South Firebreak Rd. S. of Quarry Access Rd. (AM)	35	472	354	59	59	66.4	60.9	56.0
South Firebreak Rd. S. of Quarry Access Rd. (PM)	35	472	354	59	59	66.4	60.9	56.0
Under Project Access Alternative 1:								
South Firebreak Rd. N. of Quarry Access Rd.	35	529	381	64	84	67.5	62.0	57.2
Quarry Access Rd. At South Firebreak Rd.	35	57	27	5	25	60.8	55.6	51.1
South Firebreak Rd. S. of Quarry Access Rd.	35	472	354	59	59	66.4	60.9	56.0
Under Project Access Alternative 2:								
South Firebreak Rd. N. of Project Access Rd.	35	35	35	35	35	62.0	61.0	56.1
South Firebreak Rd. S. of Project Access Rd.	35	35	35	35	35	62.0	61.0	56.1
Quarry Access Rd. At South Firebreak Rd. (AM)	35	36	28	1	7	55.9	50.5	45.8
Quarry Access Rd. At South Firebreak Rd. (PM)	35	36	28	1	7	55.9	50.5	45.8
South Firebreak Rd. S. of Project Access Rd. (AM)	35	57	27	5	25	60.8	55.6	51.1
South Firebreak Rd. S. of Project Access Rd. (PM)	35	57	27	5	25	60.8	55.6	51.1
Project Access Rd. At South Firebreak Rd. (AM)	35	35	35	35	35	62.0	61.0	56.1
Project Access Rd. At South Firebreak Rd. (PM)	35	35	35	35	35	62.0	61.0	56.1

TABLE 7

CALCULATIONS OF PROJECT AND NON-PROJECT  
TRAFFIC NOISE CONTRIBUTIONS (CY 2015)  
(DNL)

STREET SECTION	NOISE LEVEL INCREASE DUE TO:	
	NON-PROJECT TRAFFIC	PROJECT TRAFFIC
Mokulele Hwy. North of Kamaaina Rd.	1.0	0.4
Mokulele Hwy. South of Kamaaina Rd.	1.0	0.3
Kamaaina Rd. At Mokulele Hwy.	0.0	3.7
Mehameha Lp. At Mokulele Hwy.	0.0	0.0
Under Project Access Alternative 1:		
South Firebreak Rd. N. of Quarry Access Rd.	0.0	6.4
Quarry Access Rd. At South Firebreak Rd.	0.0	0.0
South Firebreak Rd. S. of Quarry Access Rd.	N/A *	60.9
Under Project Access Alternative 2:		
South Firebreak Rd. N. of Project Access Rd.	0.0	6.4
South Firebreak Rd. S. of Project Access Rd.	0.0	0.0
Quarry Access Rd. At South Firebreak Rd.	0.0	0.0
Project Access Rd. At South Firebreak Rd.	N/A *	60.9

Note:

\* Existing noise levels from agricultural equipment are not included.

## CHAPTER VII. DISCUSSION OF PROJECT-RELATED NOISE IMPACTS AND POSSIBLE MITIGATION MEASURES

Traffic Noise. Existing traffic noise levels along Mokuiele Highway are relatively high, and are expected to remain so through CY 2015. Risks of future traffic noise impacts along the highway should continue to be low due to the absence of noise sensitive receptors along the highway in the project environs.

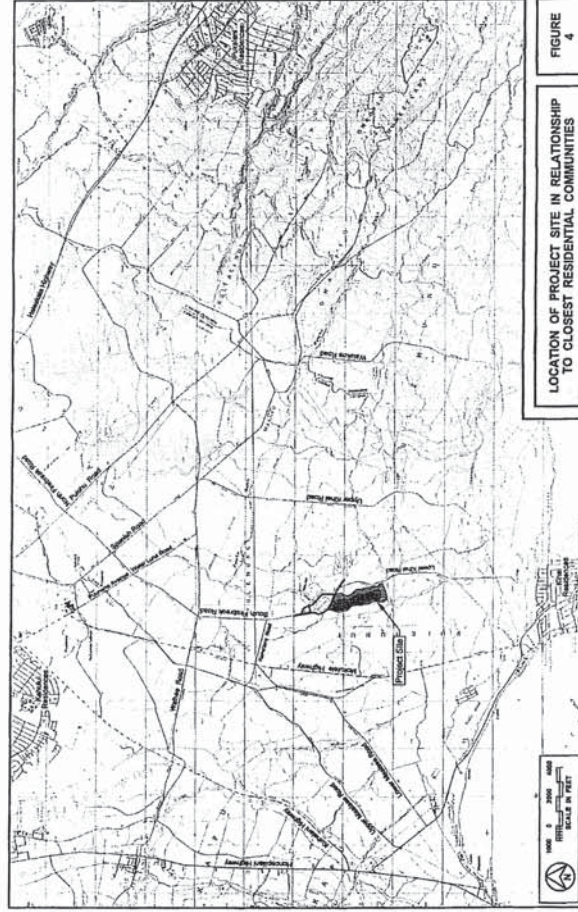
Project related traffic along Mokuiele Highway is not expected to cause measurable increases in future traffic noise levels. The predicted increases of 0.3 to 0.4 DNL in project related traffic noise are small compared to the 1.0 DNL increase expected from non-project traffic. For these reasons, traffic noise mitigation measures should not be required.

On-Site Noise Sources. By existing State Department of Health regulations, fixed machinery on industrial lots may emit sound levels continuously during the day and night, as long as their sound levels do not exceed 70 dBA at the lots' property boundaries. Therefore, using the industrial subdivision plan shown in Figure 1, it was assumed that there could be 4 large lots and 24 small lots within the subdivision. A total of 28 noise sources, each emitting sound levels of 70 dBA at their respective lot boundary lines, was assumed for modeling the potential sound level emissions from on-site sources within the proposed industrial subdivision. Under these hypothetical worst case conditions, the combined sound level from the 28 lots of the industrial subdivision would be approximately 45 dBA at 4,900 feet (0.93 mile) distance from the center of the subdivision. A continuous outdoor sound level of 45 dBA is considered to be acceptable by the State DOH and by all federal agencies for single family residences. Because there are no noise sensitive developments within 4,900 feet of the proposed heavy industrial subdivision (see Figure 4), risks of adverse noise impacts from on site noise sources are considered to be minimal.

Predicted noise levels under the hypothetical worst case condition described above were developed at the closest residential developments. These hypothetical worst case levels were: 29 dBA in Kihei at Kaiolohia Street; 3 dBA in Pukalani at Opailipali Place; 19 dBA at Puunene near the Sugar Museum; and 17 dBA in Kahului at Makalii Street. These worst case levels are very low, and will be below existing nighttime background noise levels in these communities.

Noise mitigation measures which limit the noise from fixed mechanical equipment to those allowed by the State Department of Health (Reference 5) should be required of all tenants within the industrial subdivision.

General Construction Noise. Audible construction noise will probably be unavoidable during the entire project construction period. The total time period for construction is unknown, but it is anticipated that the actual work will be moving from one location on the project site to another during that period. Actual length of exposure



Page 20



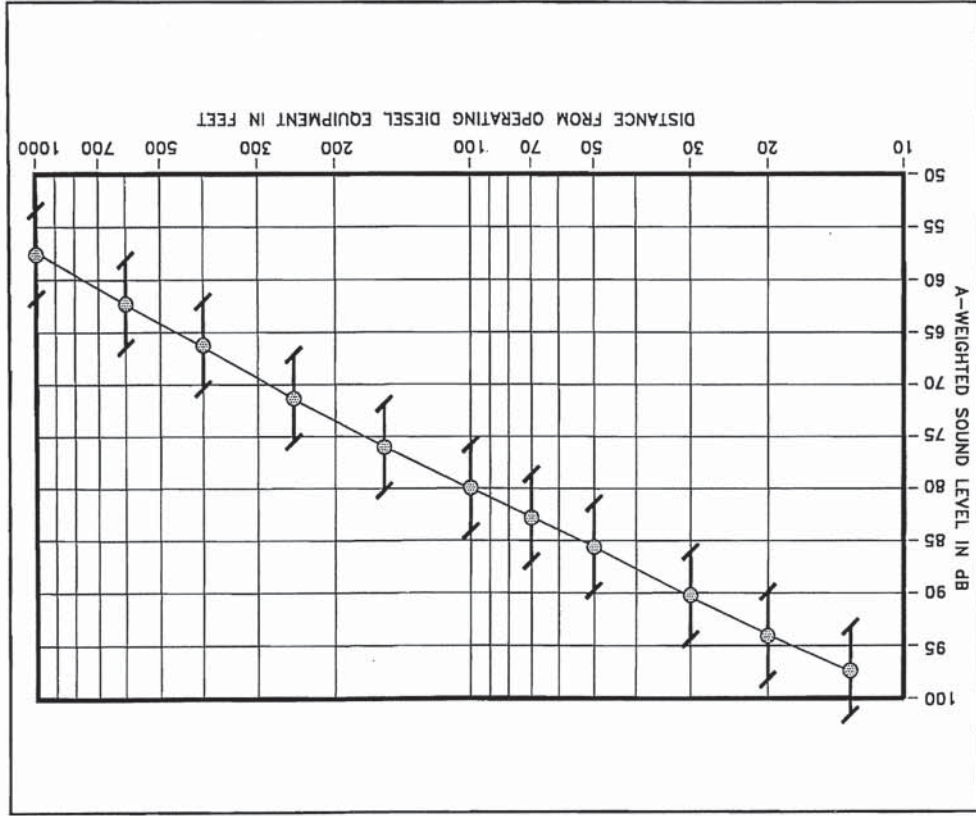
to construction noise at any receptor location will probably be less than the total construction period for the entire project. Typical levels of exterior noise from construction activity (excluding pile driving activity) at various distances from the job site are shown in Figure 5. The impulsive noise levels of impact pile drivers are approximately 15 dB higher than the levels shown in Figure 5, while the intermittent noise levels of vibratory pile drivers are at the upper end of the noise level ranges depicted in the figure. Typical levels of construction noise inside naturally ventilated and air conditioned structures are approximately 10 and 20 dB less, respectively, than the levels shown in Figure 5.

The closest residences to the project site are well beyond the 1,000 feet separation distance shown in Figure 5, and for this reason, risks of adverse noise impacts from construction activity on the project site are expected to be very low. The noise from construction activities will decrease and be masked by traffic noise from Mokulele Highway at the Maui Humane Society and National Guard facilities.

Peak airborne noise levels from pile driving may be as much as 15 dBA greater than noise levels shown in Figure 5 for non-impulsive (steady) construction noise sources. Although the pile driving can produce more intense noise levels, each pulse is of short individual duration (less than one second). Therefore, its impact on speech communication is not as severe as that of a steady source of the same noise level.

Adverse noise impacts are more likely to occur following completion of initial site preparation and infrastructure construction activities and at the initial subdivision tenants who are exposed to building construction noise from neighboring or nearby lots of the same subdivision. Adverse noise impacts are not expected to occur inside air conditioned structures which are beyond 200 FT of a building construction site. Inside naturally ventilated structures, interior noise levels (with windows or doors opened) are estimated to range between 65 to 53 dBA at 200 FT to 600 FT distances from the building construction site. Closure of all doors and windows facing the building construction site would generally reduce interior noise levels by an additional 5 to 10 dBA.

The use of properly muffled construction equipment should be required on all job sites. The incorporation of State Department of Health construction noise limits and curfew times, which are applicable throughout the State of Hawaii (Reference 5), is another noise mitigation measure which is normally applied to construction activities. Figure 6 depicts the normally permitted hours of construction. Noisy construction activities are not allowed on Sundays and holidays, during the early morning, and during the late evening and nighttime periods under the DOH permit procedures.



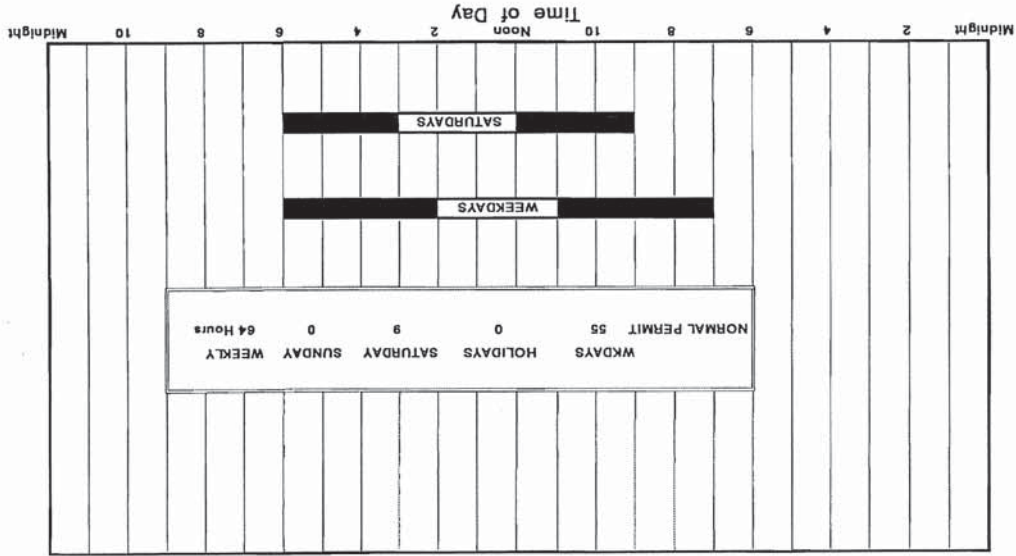
ANTICIPATED RANGE OF CONSTRUCTION NOISE LEVELS VS. DISTANCE

FIGURE 5



FIGURE 6

AVAILABLE WORK HOURS UNDER DOH PERMIT PROCEDURES FOR CONSTRUCTION NOISE



APPENDIX A. REFERENCES

- (1) "Guidelines for Considering Noise in Land Use Planning and Control;" Federal Interagency Committee on Urban Noise; June 1980.
- (2) American National Standard, "Sound Level Descriptors for Determination of Compatible Land Use," ANSI S12.9-1998/ Part 5; Acoustical Society of America.
- (3) "Environmental Criteria and Standards, Noise Abatement and Control, 24 CFR, Part 51, Subpart B;" U.S. Department of Housing and Urban Development; July 12, 1979.
- (4) "Information on Levels of Environmental Noise Requisite to Protect the Public Health and Welfare with an Adequate Margin of Safety;" U.S. Environmental Protection Agency; EPA 550/9-74-004; March 1974.
- (5) "Title 11, Administrative Rules, Chapter 46, Community Noise Control;" Hawaii State Department of Health; September 23, 1996.
- (6) "FHWA Highway Traffic Noise Model User's Guide;" FHWA-PD-96-009, Federal Highway Administration; Washington, D.C.; January 1998 and Version 2.5 Upgrade (April 14, 2004).
- (7) "Traffic Impact Analysis Report for Puunene Heavy Industrial Subdivision;" Phillip Rowell and Associates; September 26, 2011.
- (8) Hourly Traffic Counts At Station B74031100336, Mokuale Highway Near Maui Raceway Park; Hawaii State Department of Transportation; May 13, 2009.

TABLE I  
A-WEIGHTED RECOMMENDED DESCRIPTOR LIST

TERM	SYMBOL
1. A-Weighted Sound Level	$L_A$
2. A-Weighted Sound Power Level	$L_{WA}$
3. Maximum A-Weighted Sound Level	$L_{max}$
4. Peak A-Weighted Sound Level	$L_{Apk}$
5. Level Exceeded x% of the Time	$L_x$
6. Equivalent Sound Level	$L_{eq}$
7. Equivalent Sound Level over Time (T) (1)	$L_{eq}(T)$
8. Day Sound Level	$L_d$
9. Night Sound Level	$L_n$
10. Day-Night Sound Level	$L_{dn}$
11. Yearly Day-Night Sound Level	$L_{dn}(Y)$
12. Sound Exposure Level	$L_{SE}$

(1) Unless otherwise specified, time is in hours (e.g. the hourly equivalent level is  $L_{eq}(1)$ ). Time may be specified in non-quantitative terms (e.g., could be specified a  $L_{eq}(WASH)$  to mean the washing cycle noise for a washing machine).

SOURCE: EPA ACOUSTIC TERMINOLOGY GUIDE, BNA 8-14-78,

APPENDIX B

EXCERPTS FROM EPA'S ACOUSTIC TERMINOLOGY GUIDE

Descriptor Symbol Usage

The recommended symbols for the commonly used acoustic descriptors based on A-weighting are contained in Table I. As most acoustic criteria and standards used by EPA are derived from the A-weighted sound level, almost all descriptor symbol usage guidance is contained in Table I.

Since acoustic nomenclature includes weighting networks other than "A" and measurements other than pressure, an expansion of Table I was developed (Table II). The group adopted the ANSI descriptor-symbol scheme which is structured into three stages. The first stage indicates that the descriptor symbol (i.e., based upon the logarithm of the quantity) is the "A-weighted sound level" (e.g.,  $L_A$ ). The second stage, indicated by the "A" in the symbol, indicates the weighting network (A, B, C, D, E, etc.). If no weighting network is specified, "A" weighting is understood. Exceptions are the A-weighted sound level and the A-weighted peak sound level which require that the "A" be specified. For convenience in those situations in which an A-weighted descriptor is being compared to that of another weighting, the alternative column in Table II permits the inclusion of the "A". For example, a report on blast noise might wish to contrast the  $L_{dn}$  with the  $L_{dn,A}$ .

Although not included in the tables, it is also recommended that " $L_{pnr}$ " and " $L_{eqnr}$ " be used as symbols for perceived noise levels and effective perceived noise levels, respectively. It is recommended that in their initial use within a report, such terms be written in full, rather than abbreviated. An example of preferred usage is as follows:

The A-weighted sound level ( $L_A$ ) was measured before and after the installation of acoustical treatment. The measured  $L_A$  values were 85 and 75 dB respectively.

Descriptor Nomenclature

With regard to energy averaging over time, the term "average" should be discouraged in favor of the term "equivalent" or "equivalent level". The term "equivalent level" is preferred to "equivalent level" for  $L_d$ ,  $L_n$ , and  $L_{dn}$ , "equivalent" need not be stated since the concept of day, night, or day-night averaging is by definition understood. Therefore, the designations are "day sound level", "night sound level", and "day-night sound level", respectively.

The peak sound level is the logarithmic ratio of peak sound pressure to a reference pressure and not the maximum root mean square pressure. While the latter is the maximum sound pressure level, it is often incorrectly labelled peak. In that sound level meters have "peak" settings, this distinction is most important.

"background ambient" should be used in lieu of "background", "ambient", "residual", or "indigenous" to describe the level characteristics of the general background noise due to the contribution of many unidentifiable noise sources near and far.

With regard to units, it is recommended that the unit decibel (abbreviated dB) be used without modification. Hence, DBA, PNdB, and EPNdB are not to be used. Examples of this preferred usage are: the Perceived Noise Level ( $L_{pnr}$  was found to be 75 dB,  $L_{pnr} = 75$  dB). This decision was based upon the recommendation of the National Bureau of Standards, and the policies of ANSI and the Acoustical Society of America, all of which disallow any modification of bel except for prefixes indicating its multiples or submultiples (e.g., deci).

Noise Impact

In discussing noise impact, it is recommended that "level weighted population" (LWP) replace "Equivalent Noise Impact" (ENI). The term "Relative Change of Impact" (RCI) shall be used for comparing the relative differences in LWP between two alternatives.

Further, when appropriate, "Noise Impact Index" (NII) and "Population Weighted Loss of Hearing" (PHL) shall be used consistent with CHABA Working Group 69 Report Guidelines for Preparing Environmental Impact Statements (1977).

APPENDIX B (CONTINUED)

TABLE II  
RECOMMENDED DESCRIPTOR LIST

TERM	A-WEIGHTING	ALTERNATIVE(1)	OTHER(2)	UNWEIGHTED
	A-WEIGHTING	A-WEIGHTING	WEIGHTING	UNWEIGHTED
1. Sound (Pressure)(3) Level	L <sub>A</sub>	L <sub>pA</sub>	L <sub>B</sub> L <sub>pB</sub>	L <sub>p</sub>
2. Sound Power Level	L <sub>WA</sub>	L <sub>WB</sub>	L <sub>WB</sub>	L <sub>W</sub>
3. Max. Sound Level	L <sub>max</sub>	L <sub>Amax</sub>	L <sub>Bmax</sub>	L <sub>pmax</sub>
4. Peak Sound (Pressure) Level	L <sub>Apk</sub>	L <sub>Bpk</sub>	L <sub>Bpk</sub>	L <sub>pk</sub>
5. Level Exceeded x% of the Time	L <sub>x</sub>	L <sub>Ax</sub>	L <sub>Bx</sub>	L <sub>px</sub>
6. Equivalent Sound Level	L <sub>eq</sub>	L <sub>Aeq</sub>	L <sub>Beq</sub>	L <sub>peq</sub>
7. Equivalent Sound Level (4) Over Time(T)	L <sub>eq(T)</sub>	L <sub>Aeq(T)</sub>	L <sub>Beq(T)</sub>	L <sub>peq(T)</sub>
8. Day Sound Level	L <sub>d</sub>	L <sub>Ad</sub>	L <sub>Bd</sub>	L <sub>pd</sub>
9. Night Sound Level	L <sub>n</sub>	L <sub>An</sub>	L <sub>Bn</sub>	L <sub>pn</sub>
10. Day-Night Sound Level	L <sub>dn</sub>	L <sub>Adn</sub>	L <sub>Bdn</sub>	L <sub>pdn</sub>
11. Yearly Day-Night Sound Level	L <sub>dn(Y)</sub>	L <sub>Adn(Y)</sub>	L <sub>Bdn(Y)</sub>	L <sub>pdn(Y)</sub>
12. Sound Exposure Level	L <sub>S</sub>	L <sub>SA</sub>	L <sub>SB</sub>	L <sub>Sp</sub>
13. Energy Average Value Over (Non-Time Domain) Set of Observations	L <sub>eq(e)</sub>	L <sub>Aeq(e)</sub>	L <sub>Beq(e)</sub>	L <sub>peq(e)</sub>
14. Level Exceeded x% of the Total Set of (Non-Time Domain) Observations	L <sub>x(e)</sub>	L <sub>Ax(e)</sub>	L <sub>Bx(e)</sub>	L <sub>px(e)</sub>
15. Average L <sub>x</sub> Value	L <sub>x</sub>	L <sub>Ax</sub>	L <sub>Bx</sub>	L <sub>px</sub>

(1) "Alternative" symbols may be used to assure clarity or consistency.

(2) Only B-weighting shown. Applies also to C,D,E.....weighting.


(3) The term "pressure" is used only for the unweighted level.

(4) Unless otherwise specified, time is in hours (e.g., the hourly equivalent level is Leq(1). Time may be specified in non-quantitative terms (e.g., could be specified as Leq(WASH) to mean the washing cycle noise for a washing machine.

APPENDIX C

SUMMARY OF BASE YEAR AND YEAR 2015  
TRAFFIC VOLUMES

ROADWAY LANES	**** CY 2011 ****			CY 2015 (NO BUILD)			CY 2015 (BUILD)		
	AM VPH	PM VPH	PM VPH	AM VPH	PM VPH	PM VPH	AM VPH	PM VPH	PM VPH
Mokulele Hwy. N. of Kamaaina Rd. (NB)	1,104	1,218	1,380	1,380	1,557	1,438	1,438	1,788	1,788
Mokulele Hwy. N. of Kamaaina Rd. (SB)	1,093	1,172	1,354	1,354	1,347	1,597	1,597	1,609	1,609
Two-Way	2,197	2,390	2,743	2,743	3,104	3,035	3,035	3,397	3,397
Mokulele Hwy. S. of Kamaaina Rd. (NB)	1,101	1,190	1,386	1,386	1,529	1,535	1,535	1,567	1,567
Mokulele Hwy. S. of Kamaaina Rd. (SB)	1,046	1,163	1,307	1,307	1,558	1,338	1,338	1,659	1,659
Two-Way	2,147	2,373	2,693	2,693	3,087	2,873	2,873	3,266	3,266
Kamaaina Rd. At Mokulele Hwy. (EB)	37	8	37	37	8	429	429	108	108
Kamaaina Rd. At Mokulele Hwy. (WB)	20	28	20	28	28	100	100	400	400
Two-Way	57	36	57	57	36	529	529	508	508
Mehamaha Lp. At Mokulele Hwy. (EB)	4	30	4	30	4	4	4	30	30
Mehamaha Lp. At Mokulele Hwy. (WB)	31	11	31	31	11	11	11	11	11
Two-Way	35	41	35	35	41	35	35	41	41
South Firebreak Rd. N. of Quarry Access Rd. (NB) Alt. 1	20	28	20	28	28	100	100	400	400
South Firebreak Rd. N. of Quarry Access Rd. (SB) Alt. 1	37	8	37	37	8	429	429	108	108
Two-Way	57	36	57	57	36	529	529	508	508
Quarry Access Rd. At S. Firebreak Rd. (EB) Alt 1	37	8	37	37	8	37	37	8	8
Quarry Access Rd. At S. Firebreak Rd. (WB) Alt 1	20	28	20	28	28	100	100	28	28
Two-Way	57	36	57	57	36	57	57	36	36
South Firebreak Rd. S. of Quarry Access Rd. (NB) Alt. 1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	80	372
South Firebreak Rd. S. of Quarry Access Rd. (SB) Alt. 1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	392	100
Two-Way	N/A	N/A	N/A	N/A	N/A	N/A	N/A	472	472
South Firebreak Rd. N. of Project Access Rd. (NB) Alt. 2	20	28	20	28	28	100	100	400	400
South Firebreak Rd. N. of Project Access Rd. (SB) Alt. 2	37	8	37	37	8	429	429	108	108
Two-Way	57	36	57	57	36	529	529	508	508
South Firebreak Rd. S. of Project Access Rd. (NB) Alt. 2	20	28	20	28	28	100	100	28	28
South Firebreak Rd. S. of Project Access Rd. (SB) Alt. 2	37	8	37	37	8	37	37	8	8
Two-Way	57	36	57	57	36	57	57	36	36
Quarry Access Rd. At S. Firebreak Rd. (EB) Alt 2	37	8	37	37	8	37	37	39	39
Quarry Access Rd. At S. Firebreak Rd. (WB) Alt 2	20	28	20	28	28	100	100	28	28
Two-Way	57	36	57	57	36	57	57	67	67
Project Access Rd. At S. Firebreak Rd. (EB) Alt 2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	392	100
Project Access Rd. At S. Firebreak Rd. (WB) Alt 2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	80	372
Two-Way	N/A	N/A	N/A	N/A	N/A	N/A	N/A	472	472



DEPARTMENT OF HEALTH,  
SOLID AND HAZARDOUS  
WASTE BRANCH LETTER  
DATED JANUARY 9, 2012

APPENDIX

H







LOWETTA J. FURDY, A.C.S.W., M.P.H.  
DIRECTOR OF DCHHS

STATE OF HAWAII  
DEPARTMENT OF HEALTH  
ENVIRONMENTAL MANAGEMENT DIVISION  
SOLID AND HAZARDOUS WASTE BRANCH  
111 ALA MOANA BOULEVARD, 4TH FLOOR  
HONOLULU, HAWAII 96814

In reply, please refer to:  
EUC037476

Mr. Sean O'Keefe  
January 9, 2012  
Page 2

former solid waste activities that occurred at the subject site at this time. However, should additional information become available, additional activities may be necessary.

Should you have any questions regarding this letter, please call Mr. Todd Nichols of our Solid Waste Section at (808) 586-4226.

Sincerely,

Mr. Sean O'Keefe  
A&B Properties, Inc.  
P.O. Box 266  
Puunene, Hawaii 96784

Dear Mr. O'Keefe:

**SUBJECT:** No Further Action, Former Puunene Piggery  
TMK 2-3-8-8:19  
Puunene, Maui

The Department of Health (DOH), Solid Waste Section (SWS) is in receipt of your email dated December 22, 2011, informing us that our No Further Action letter dated December 14, 2011, contained an error in the TMK number. Therefore, the SWS is issuing this letter which contains the correct TMK number.

The SWS is in receipt of the October 2011, *Site Investigation Report for the Former Puunene Piggery*, as well as the June 27, 2011, report documenting the removal of solid waste from the subject site. In addition, the DOH inspected the site on July 8, 2011, and noted a minimal amount of visible solid waste. It is our understanding that use of the property will be limited to commercial/industrial land use and that soil will not be removed from the property.

The SWS concurs with your consultant's conclusion that the TPH-O level (730 mg/kg) in DUE does not appear to be a significant concern due to the biodegradability of TPH-O, the non-potable use of the groundwater beneath the property, and the greater than one hundred (100) foot depth to groundwater.

Based on the information provided, our inspection, and our aforementioned understanding, it appears that you have completed the removal of solid waste from the subject site and have adequately addressed impacts from solid waste activities that occurred at the site. Therefore, the SWS is requiring no further action regarding the

STEVEN Y.K. CHANG, P.E., CHIEF  
Solid and Hazardous Waste Branch



ARCHAEOLOGICAL  
INVENTORY SURVEY

APPENDIX

I

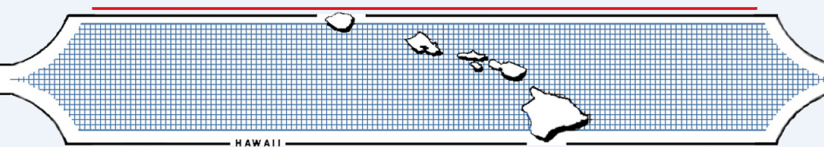


**AN ARCHAEOLOGICAL INVENTORY SURVEY  
OF AN APPROXIMATE 917 METER (3,007.8 FEET) LONG ALTERNATE  
ACCESS ROAD AND AN 86.029-ACRE PROPERTY IN PUUNENE,  
PŪLEHU NUI AHUPUA`A, WAILUKU DISTRICT,  
ISLAND OF MAUI, HAWAII  
[TMK: (2) 3-8-008: POR. 005, POR. 006, AND 019]**

Prepared by:  
**Guerin Tome, B.A.,**  
and  
**Michael F. Dega, Ph.D.**  
August 2012  
**FINAL**

Prepared for:  
**Ms. Blanca Lafolette**  
**Project Coordinator**  
**CMBY 2011 Investment, LLC**  
**1300 North Holocono Street, Suite 201**  
**Kihei, Hawaii`i 96753**

**SCIENTIFIC CONSULTANT SERVICES Inc.**



711 Kapiolani Blvd. Suite 975 Honolulu, Hawaii`i 96813



## ABSTRACT

Scientific Consultant Services, Inc. (SCS) conducted Archaeological Inventory Survey of an approximate 917 meter (3,007.8 feet) long alternate access road [TMK: (2) 3-8-008: pors. 005 and 006] and the 86.029-acre subject property [TMK: (2) 3-8-008:019] in Pu`unēnē, Pūlehu Nui Ahupua`a, Wailuku District, Island of Maui, Hawai`i. The proposed project area was comprised of two areas separated by an asphalt road. The larger portion of the proposed project area and two thirds of the alternate access road were previously investigated, in 1999, by International Archaeological Research Institute Incorporated (Tomonari-Tuggle *et al.* 2001) as part of a larger Inventory Survey and designated as the former Naval Air Station Puunene as Housing Area A, Southern and Northeastern Portions. Within the proposed project area, the 1999 International Archaeological Research Institute Incorporated (IARII) study identified two archaeological sites comprised of a section associated with the former Naval Air Station Puunene, State Site 50-50-09-4164, and a post-World War II cattle ranching site, State Site 50-50-09-4801 (*ibid*) (Tomonari-Tuggle *et al.* 2001). The current research led to relocation of these two historic sites, assessed the presence/absence of features within two sites, and identified previously undocumented features within the two sites.

A majority of the historic features within the proposed project area have been heavily impacted by modern mechanical clearing and ensuing debris removal. In general, most of the features composing State Site 50-50-09-4164 were mechanically impacted, abandoned, and neglected. The historic features associated with State Site 50-50-09-4801 were abandoned and neglected, but not mechanically impacted. Archival research has indicated the northern half of the proposed project area had been utilized for a pig farm and scrap metal storage site, while the southern half of the subject property remained fallow. A total of fifteen (15) features, interpreted as either NAS Puunene-related or post-war cattle ranching-related features, were not previously recorded. Of these 15 features recorded during the current study, three features were located in the State Site 50-50-09-4801 post-war cattle ranching area. The remaining twelve (12) features were located in the State Site 50-50-09-4164 former Naval Air Station Puunene area (Housing Area A).

To supplement the surface pedestrian survey, a total of twenty (20) stratigraphic trenches were mechanically excavated by SCS. Only one stratigraphic trench (ST-6) revealed the presence of subsurface architecture at Facility 177 (SCS Site T-25). The feature was initially utilized as a military storehouse and converted for animal husbandry purposes.

The features recorded herein as relates to the former two sites remain significant under Criterion D. State Site 50-50-09-4164 has also been assessed as significant under Criterion A, as it has yielded information important to the history of Maui. These 15 features have been recorded and subsumed under the existing State site numbers. No further archaeological work is recommended for the larger portion of the proposed project area. Since an updated Archaeological Inventory Survey was not conducted past the perimeter of the alternate access road, archaeological features that were documented during the 1999 International Archaeological Research Institute Incorporated IARII survey on the east and west sides of the access road (see Tomonari-Tuggle *et al.* 2001) could be impacted should physical alteration be applied. Thus, Archaeological Monitoring is recommended for the alternate access road.

## TABLE OF CONTENTS

ABSTRACT.....	ii
TABLE OF CONTENTS.....	iii
LIST OF FIGURES .....	iv
INTRODUCTION .....	1
GEOGRAPHIC SETTING.....	1
SOILS .....	8
VEGETATION.....	8
CLIMATE.....	8
TRADITIONAL AND HISTORIC SETTING.....	9
TRADITIONAL TIMES .....	9
HISTORIC TIMES .....	10
PREVIOUS ARCHAEOLOGY IN GENERAL AREA.....	12
PREVIOUS ARCHAEOLOGY IN THE PROPOSED PROJECT AREA .....	14
SETTLEMENT PATTERN.....	17
METHODOLOGY .....	18
FIELD METHODOLOGY .....	18
LABORATORY METHODOLOGY .....	19
INVENTORY SURVEY RESULTS.....	19
STATE SITE 50-50-09-4164 FORMER N.A.S. PUUNENE HOUSING AREA A SOUTHERN PORTION.....	23
STATE SITE 50-50-09-4801 POST-WAR CATTLE RANCHING COMPLEXES .....	48
DISCUSSION AND CONCLUSION.....	51
SIGNIFICANCE ASSESSMENTS AND RECOMMENDATIONS.....	51
REFERENCES .....	53
APPENDIX A: STRATIGRAPHIC TRENCH INFORMATION.....	A
APPENDIX B: ARTIFACT ANALYSIS.....	B

**LIST OF FIGURES**

Figure 1: United States Geological Survey (USGS) 1992 Puu O Kali Quadrangle Map Showing Proposed Project Location and the Alternate Access Road..... 2

Figure 2: Tax Map Key [TMK: (2) 3-8-008] Showing Proposed Project Location and the Alternate Access Road..... 3

Figure 3: Google Earth (2011) Image Showing Location of the Proposed Project and the Alternate Access Road..... 4

Figure 4: Photograph of Representative Basalt Boulders Amongst Tall Grass. View to Northeast..... 6

Figure 5: Photograph of Representative Impacted Area from Recent Mechanical Excavation. View to Southeast..... 7

Figure 6: International Archaeological Research Institute Incorporated (IARII) Plan View Map Showing Previously Recorded Archaeological Features and Current SCS Project Area Alternate Road..... 15

Figure 7: IARII Plan View Map Showing Previously Recorded Archaeological Features and Current SCS Project Area Perimeter of TMK (2) 3-8-008:019..... 16

Figure 8: USGS 1992 Puu O Kali Quadrangle Map Showing SCS Archaeological Sites and Trench Locations..... 21

Figure 9: Photograph of SCS Site T-7 Piggery Structure with Rooms. View to Northwest..... 29

Figure 10: Photograph of SCS Site T-14 Foundation Over View. View to Southeast..... 34

Figure 11: Plan View Drawing of SCS Site T-14 Foundation..... 35

Figure 12: Photograph of SCS Site T-25 Western Perimeter and Stratigraphic Trench 6 Over View. View to East..... 40

Figure 13: Plan View Drawing of SCS Site T-25 Western Perimeter and Stratigraphic Trench 6..... 41

## **INTRODUCTION**

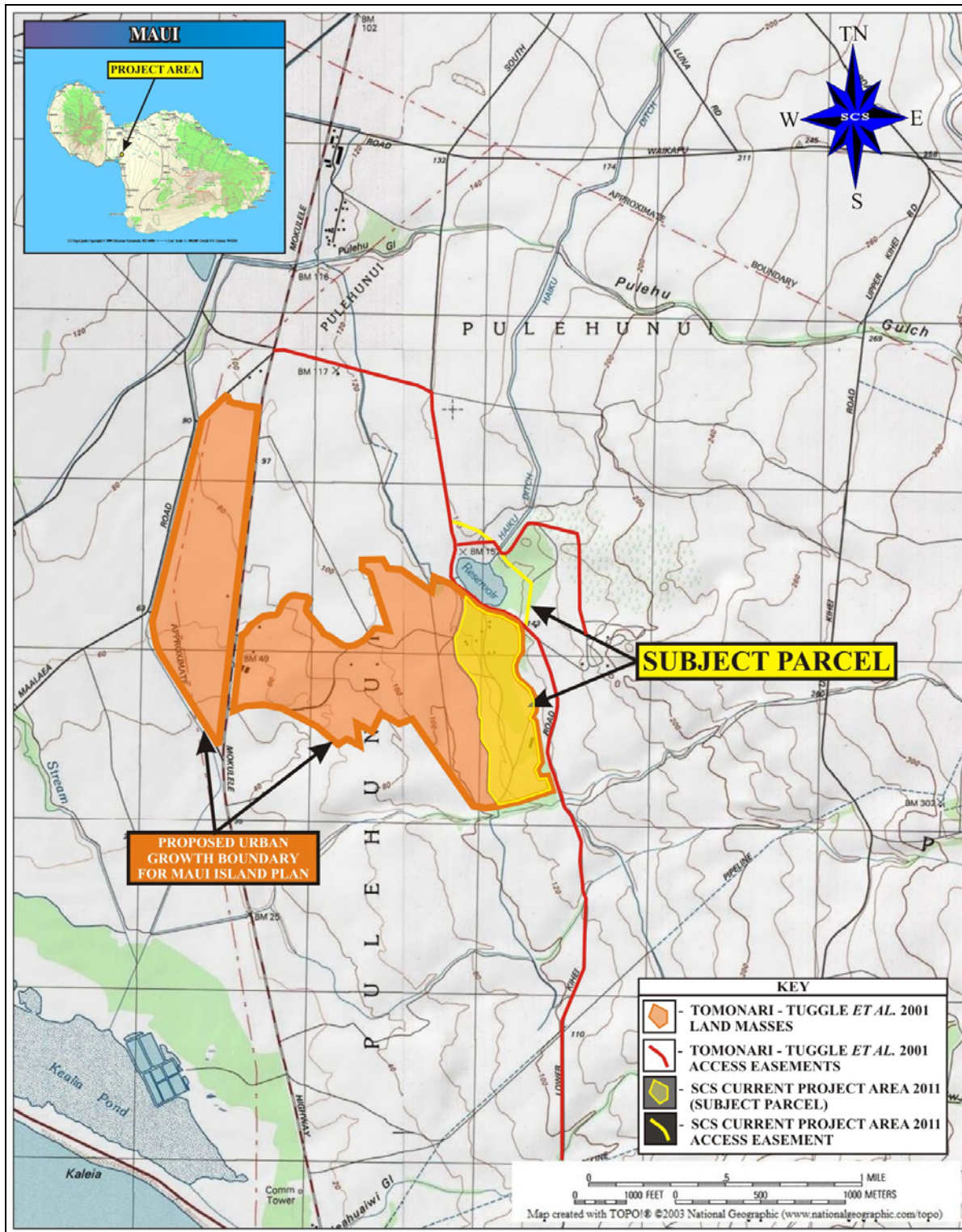
At the request of CMBY 2011 Investment, LLC. (CMBY), Scientific Consultant Services, Inc. (SCS), conducted an Archaeological Inventory Survey for the Puunene Heavy Industrial Subdivision Project (the proposed project area) on an approximately 917 meter (3,007.8 feet) long alternate access road [TMK: (2) 3-8-008: pors. 005 and 006] and on 86.029-acres of land [TMK: (2) 3-8-008: 019] within Pūlehu Nui Ahupua`a, Wailuku District, Island of Maui, Hawai`i (Figures 1, 2, and 3). According to the County of Maui Real Property Tax Division website, <http://www.mauipropertytax.com/>, the fee owner of the 86.029-acre subject property [TMK: (2) 3-8-008:019] is identified as CMBY. The fee owner of TMK: (2) 3-8-008:005 and 006 on which the 917 meter (3,007.8 feet) long alternative access road would be located, if necessary, is identified as Alexander & Baldwin, Inc.

Fieldwork was conducted between June 27 and 30, 2011 by SCS archaeologists Ian Bassford, B.A. and Guerin Tome, B.A., under the direction of Michael F. Dega, Ph.D., Principal Investigator. An Archaeological Inventory Survey was performed to investigate the presence/absence of archaeological features on the subject parcel, and if found, assess feature function, construction methods, associated cultural deposits, and site significance.

The proposed project area was previously subject to archaeological inquiry. In 1999 International Archaeological Research Institute, Inc. (IARII) conducted an Archaeological Inventory Survey of a large area, part of which included the proposed project area (Tomanari-Tuggle *et al.* 2001). During the IARII survey, two archaeological sites, State Site 50-50-09-4164 (former World War II Naval Air Station Puunene) and State Site 50-50-09-4801 (post-World War II cattle ranching site) were newly identified (*ibid*). During the current inventory survey, SCS archaeologists relocated these two previously identified archaeological sites and supplemented the initial study with the identification of additional, previously undocumented surface features within the two sites. Regarding the 917 meter 9 (3,007.8 feet) long alternative access road, although the 1999 IARII survey documented archaeological features set back from both sides of the road, the purpose of the current project was to focus only on the alternate access road and right of way, and not further beyond the footprint of the alternate access road.

## **GEOGRAPHIC SETTING**

Although both portions of the proposed project area are separated by an existing asphalt road, the 917 meter (3,007.8 feet) long alternative access road and 86.029-acre parcel are situated approximately 2.0 miles inland from the Kihei coastline, between *c.* 80 to 120 feet (24 to 37



**Figure 1: United States Geological Survey (USGS) 1992 Puu O Kali Quadrangle Map Showing Proposed Project Location and the Alternate Access Road.**

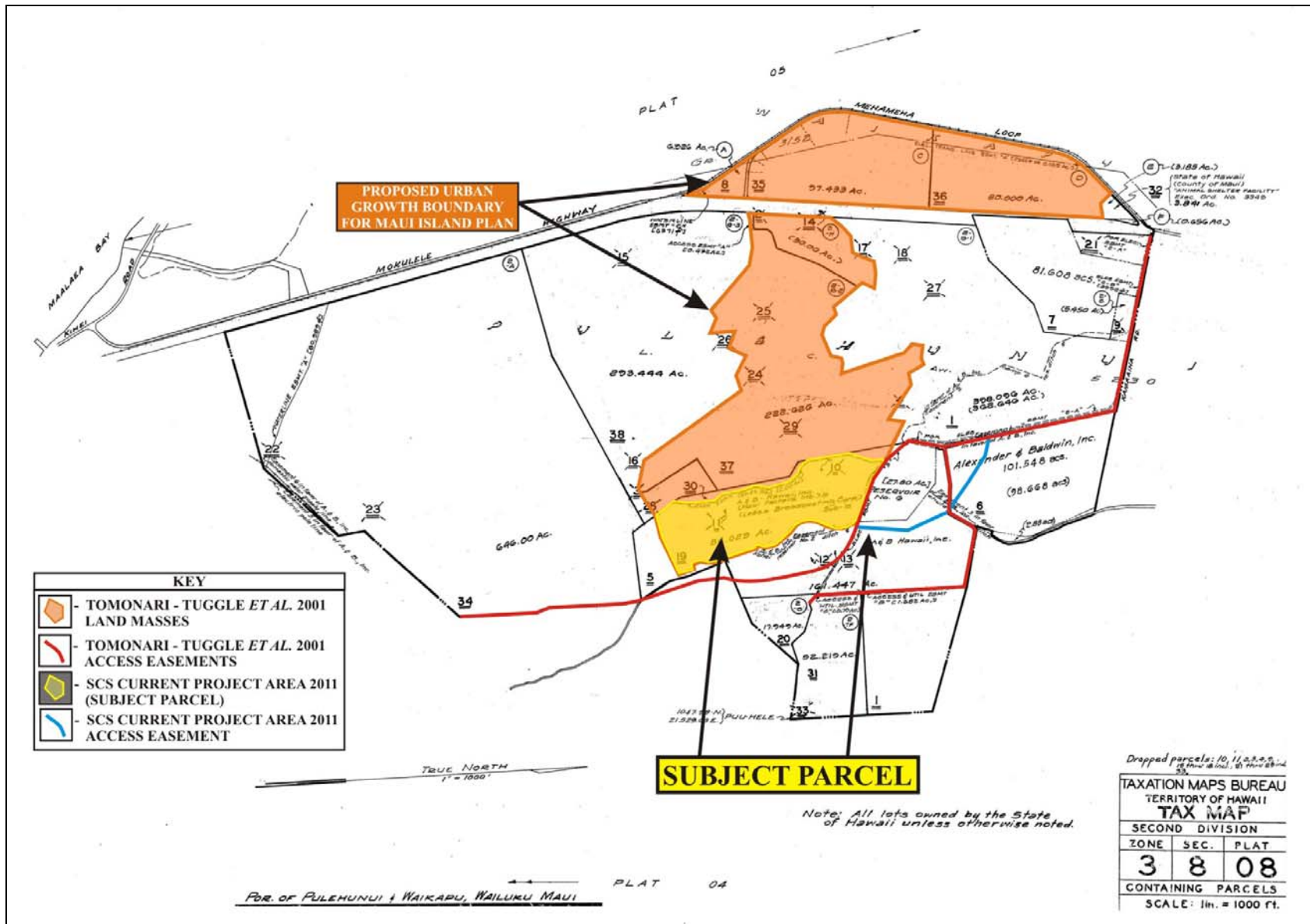
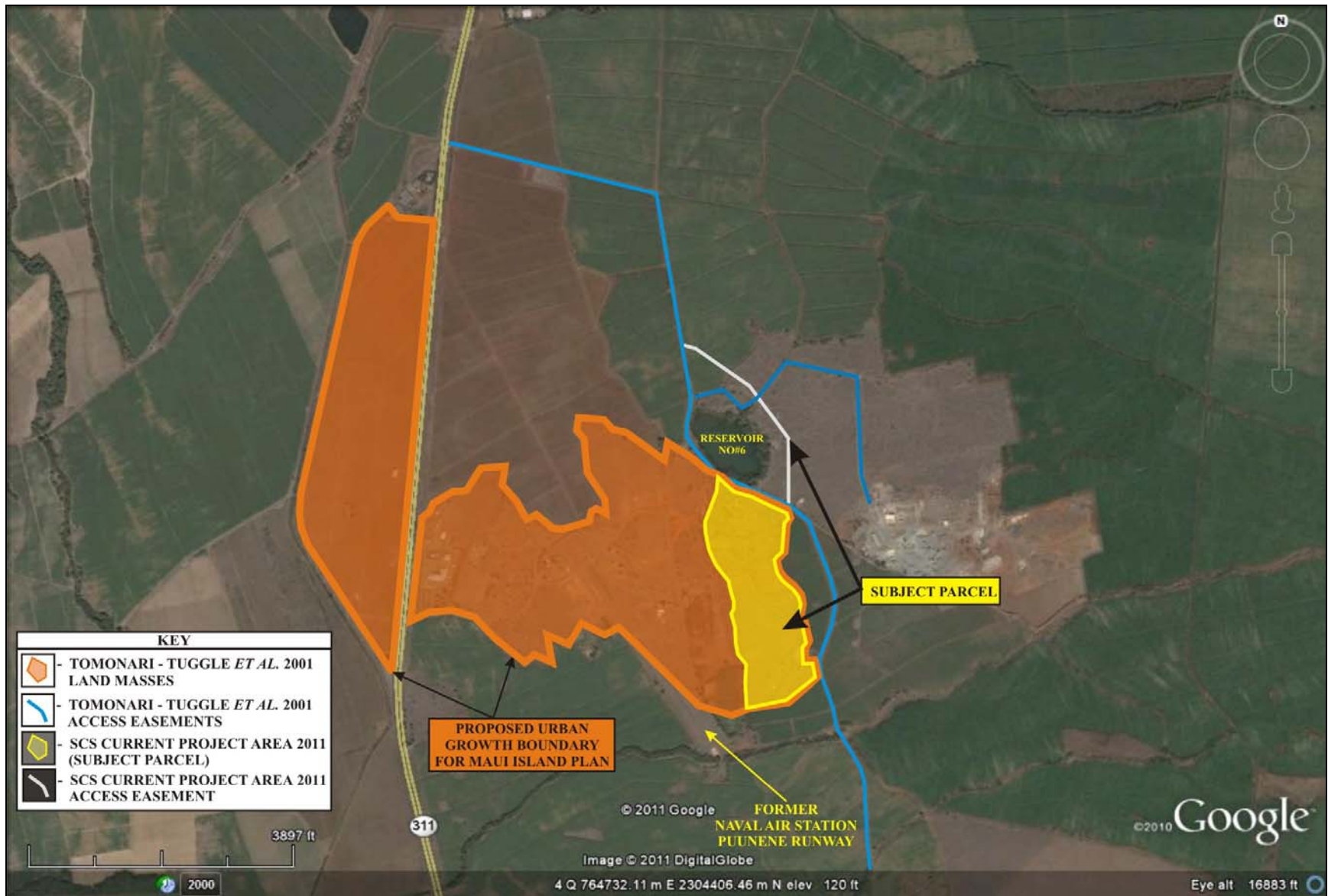


Figure 2: Tax Map Key [TMK: (2) 3-8-008] Showing Proposed Project Location and the Alternate Access Road.





**Figure 3: Google Earth (2011) Image Showing Location of the Proposed Project and the Alternate Access Road.**



meters) above mean sea level (amsl), on the lower west slope of Haleakalā. The 917 meter (3,007.8 feet) long alternate access road is located in Tax Map Keys (2) 3-8-008:005 and 006 both of which are owned by Alexander & Baldwin, Inc. The north, east, and south flanks of the 86.029-acre portion of the proposed project area are bordered by private land owned by Alexander & Baldwin, Inc. [TMK: (2) 3-8-008:005]. The west side of the proposed project area is bordered by private land owned by Alexander & Baldwin, Inc. [TMK: (2) 3-8-008:030] and land owned by the State of Hawaii [TMK: (2) 3-8-008:037]. Vehicular access from Mokulele Highway to the 86.029-acre subject parcel will be provided via Kama`aina road, South Firebreak Road, and Lower Kīhei Road via access and utility easements that are being requested from the State of Hawai`i and Alexander & Baldwin, Inc. In the unlikely event the easements are not granted, access to the subject parcel will be provided by the 917 meter (3, 007.8 feet) long alternate access road. At the time of this writing, there were several asphalt paved roads that divided the larger portion of the proposed project area into several unequal-sized sections; the names of the roads were not known.

The 917 meter (3,007.8 feet) long alternate access road was found in various conditions. With an average width of approximately 6.1 m (20 ft.), the southern half consisted of a dirt road that was not in constant use while the northern half was comprised of a paved asphalt road that was being used by Hawaiian Cement and active sugarcane lands. A bridge constructed by Hawaiian Cement was observed in the asphalt section of the alternative access road. Otherwise, the lands on which the alternate access road was situated, sat fallow.

Most of the proposed project area contained undulating terrain. The larger portion was slightly undulated amongst patches of flat terrain. Trees on the proposed project area had attained heights of approximately 30 feet tall. Approximately 30 percent of the proposed project area had grown fallow since the departure of a pig farm and scrap metal storage site. Basalt boulders from the size of basketballs to the size of a 55-gallon drum littered the landscape and created physical obstacles (Figure 4).

The landscape condition of the proposed project area's larger portion was varied. The northern portion of the proposed project area was cleaned up within the recent past, according to Ken Nomura of Alexander & Baldwin, Inc. Mr. Nomura relayed to the SCS field crew that following CMBY's purchase of the 86.029-acre property, Alexander & Baldwin, Inc. had cleared the land of debris associated with a pig farm and scrap metal storage site that had previously utilized the property. The result was that various portions of the project area were mechanically altered, on the surface and in subsurface contexts (Figure 5).





**Figure 4: Photograph of Representative Basalt Boulders Amongst Tall Grass. View to Northeast.**





**Figure 5: Photograph of Representative Impacted Area from Recent Mechanical Excavation. View to Southeast.**

Visibility of the mechanically altered ground surface was excellent. The mechanical clearance of the debris was not applied to the proposed project area, in its entirety. The areas that were not mechanically cleared were covered with dried, two to four feet tall grasses and vegetation. Nonetheless, man-made features were visible due to the mechanical clearance and the dried vegetation.

## **SOILS**

Based on Foote *et al.* (1972: 126–127; Map 106), the proposed project area is mainly situated within the Waiakoa very stony silty clay loam (WID2) series with a small section at the southern end of the proposed project area containing Alae cobbly sandy loam (AcB) (*ibid*: 26; Map 106). The Waiakoa extremely stony silty-clay loam which occurs on 3 to 25 percent slopes and is eroded, with medium runoff and severe erosional hazard. Stones cover approximately 3 to 15 percent of this soil surface. With the exception of sugarcane, this soil type has been utilized for pasture and wildlife. The Alae cobbly sandy loam has a slow runoff, is a slight erosional hazard, and is typically utilized for pastureland and sugarcane.

Subsurface testing of the WID2 and AcB soils on the southern portion of the proposed project area revealed the presence of volcanic cinders strata that were interpreted during the current survey as natural strata. Naturally occurring rounded basalt cobbles and small boulders were also being exposed during the excavation of the proposed project area matrices.

## **VEGETATION**

With the exception of few plant native species such as *`ilima* (*Sida fallax*) and *`uhaloa* (*Waltheria americana*), vegetation in the proposed project area was generally composed of non-native introductions. Although decomposing grasses dominated the vegetation regime, larger vegetation common to arid regions such as *kiawe* (*Prosopis pallida*), *koa haole* (*Leucaena leucocephala*), castor bean (*Ricinus communis*), lion's ear (*Leontis nepetifolia*), spiny amaranth (*kuku*; *Amaranthus spinosus*), tomato (*Solanum* sp.), goosefoot (*Chenopodium* sp.), golden crownbeard (*Verbesina encelioides*), *klu* (*kolu*; *Acacia farnesiana*), balsam pear (*Momordica charantia*), *koali kua hulu* (*Merremia aegyptia*), hairy abutilon (*ma`o*; *Abutilon grandifolium*), and coat buttons (*Tridax procumbens*) were present.

## **CLIMATE**

The project area lies near the dry, arid region of Maui's southwest coast. Rainfall indicators, according to Price (1983:62), show that the project area receives no more than five inches per year, with accumulations occurring mostly during the months of December and January. Unlike lower, coastal elevations, higher elevations of Pūlehu Nui Ahupua`a receive

more precipitation due to fog drip and lower temperature climates. The frequency of the project area receiving upland wash is based on the amount of water accumulated upslope and the available water drainages created within or near the project area.

Given the lack of constant water resources within the proposed project area, Traditional-type (*i.e.*, pre-1778 A.D.) crops such as dryland sweet potato may have been the only feasible subsistence resource planted in the area prior to the advent of large-scale plantation-type irrigation systems. Of the twenty (20) stratigraphic trenches excavated during the current survey, only eight (8) trenches revealed no more than a single soil layer. The windy conditions of the proposed project area suggest soils within the proposed project area may have been adversely affected. Upland, gravitational wash also may have contributed to soil movement through the proposed project area environs during the Traditional-Period.

### **TRADITIONAL AND HISTORIC SETTING**

Pūlehu Nui Ahupua`a is located on the southwestern side of Maui in the modern districts of both Wailuku and Makawao. Prior to being named the District of Makawao, the same district was traditionally known as Kula District. The proposed project area would have been partially within the traditional District of Kula. As such, the proposed project area's traditional and historic settings will be highlighted with events that occurred in the traditional District of Kula rather than in the modern District of Wailuku.

The proposed project area is situated near the leeward coast that is located on the lower, western slope of Maui's largest volcano, Haleakala, the latter which rises to over 3,048 meters (10,000 ft) amsl. The coastal area, on which the proposed project area lies, is currently referred to as "Kihei," which translates as "cape" or "cloak" in Hawaiian (Pukui *et al.* 1974:110).

### **TRADITIONAL TIMES**

Oral documentation for pre-Contact activity exists for the district of Kula as a whole that document activities such as chiefly (*ali`i*) landings, battles, and catholic work practices such as fishing and planting (Sterling 1998). Documented oral accounts of pre-Contact activities and events occurring in the Kihei area, specifically naming Pūlehu Nui Ahupua`a, are limited to events that occurred on a single, given period rather than long terms events (*e.g.*, area used as a place of worship for an extended period of time). A. Fornander, in Sterling (1998:253), reported that the area of Kiheipukoa was the location "where peace was concluded and festive reunions took place of warlike encounters." The festive reunions took place once Alapainui, once *Moi* of Maui, found out that his nephew Kamehamehanui succeeded him. A separate story dates to

1776 when Kalani`opu`u landed his warring faction at Kiheipuko`a between Kealia and Kapa`ahu thinking that “the *Alapa* were to drink of the waters of Wailuku. The *Alapa* were those who excelled at being warriors. Unfortunately for Kalani`opu`u, his warriors lost when battling with forces of Kahekili at Wailuku.

## **HISTORIC TIMES**

Although some accounts informally mention the possibility that Spanish traders may have known about the Hawaiian Islands two hundred years prior to the “discovery” by Captain James Cook on the H.M.S. Resolution, Cook was the first known Westerner to have recorded the Hawaiian Islands (Speakman 1978:19). When Cook “discovered” Maui in November 1778, he anchored near Kahului. Although attempting to travel to Maui’s western end, he never travelled to the leeward side of East Maui where the proposed project area lies. The first Western explorer credited with landing on Maui is Admiral Jean Francois Galaup, Comte de la Perouse of France. La Perouse, the name most used to recognize the French explorer, set foot in the area known today as La Perouse Bay, an area south of Makena.

From the early historic period, several industries became paramount in Kula: whaling, Irish potato cultivation, ranching, and sugar cane cultivation. Most of these endeavors transformed the upland landscape itself. The coastal areas were more impacted by commerce-related activities (*e.g.*, businesses, hostels, stores). Kolb *et al.* (1997:68–69) state that Kalepolepo (*i.e.*, Kihei) was an important provisioning area through the 1830s, when the area became “a hub of activity for all of Kula.” From the 1840s to 1860s a whaling station was maintained in Kihei. According to Colin *et al.* (14:2000), in 1849 John Halstead constructed “The Koa House” at Kalepolepo in Kihei, one of several such buildings supporting the whaling industry in Kihei. The Koa House served as a store, a residence, and a gathering place for whalers.

Following Contact, one of the greatest historic events impacting the population of the Hawaiian Islands was the Māhele of 1848. Thought to have been created under pressure from foreigners, Kamehameha III enacted the Māhele, which altered the system of land transactions and legal land ownership processes for the entire population of the islands:

By mid-century, the fledgling [Hawaiian] Kingdom undertook the single most significant inducement to cultural change, the Great *Māhele* or division of lands between the king, chiefs, and government, establishing land ownership on a Western-style, fee-simple basis. From this single act, an entire restructuring of the

ancient social, economic, and political order followed [Kirch 1985:309].

The Māhele statute paved the way for the private ownership of land [awarded claims were called Land Commission Awards]. The proposed project area does not contain Land Commission Awards (LCAs). However, LCA 5230 is the closest to the proposed project area and is shown on TMK (2) 3-8-04 to exist north of the proposed project area on the plains of Pūlehu Nui Ahupua`a (see Figure 2). LCA 5230 was awarded to Keaweamahi on September 28, 1853 with following Royal Patent numbers 8140 and 8252 being issued to the same individual on March 16, 1855 concluding a payment of \$5.00 (Burgett and Spear 1997:5). On this LCA Keaweamahi claimed 5 *apana* (land portions), 7 *lo`i* (wet taro) and 2 *kula* (pastures). Saltwater-associated geography (*i.e.*, shore and dunes) was also claimed by Keaweamahi as part of LCA 5230.

Based on a map contained within Sterling (1998:242) in conjunction with the tax map keys, the *ahupua`a* of Pūlehu Nui is shown to continue northeast upslope on the northwest side of Haleakala. LCA 5230 also extends into the upper portion of Pūlehu Nui Ahupua`a. An overview of upland LCAs within the upland portion of Pūlehu Nui Ahupua`a reveal that land at the higher elevations were utilized for sweet and Irish potatoes (Waihona `Aina 2011). LCA 9019:3, claimed by Helehua, located just below the modern Kula Highway and between Holopuni and Pulehu Roads, had pasture lands claimed. As a side note, Irish potatoes were also existent at the time of the claim (*i.e.*, the year 1848) although to pinpoint the location of such is difficult due to insufficient map sources. Above the Kula Highway, LCA 4567:4 claimed by Wahine in 1848, stated that Irish potatoes were present on his land and that sweet potatoes were also grown on his land, although not on the same piece of land (*ibid.*). Supplemental ethnographic research concerning upland LCA usage includes Bartholomew and Bailey (115:1994) who relay that “Hawaiians in higher elevations.... traditionally grew sweet potatoes.” For an in-depth look of LCA usage in upland areas of adjacent *ahupua`a*, please see Kolb *et al.* 1997.

Based on the information provided by the Tax Map Key, it appears that LCA 5230 is quite extensive and extends over a large portion of the *ahupua`a*. It further indicates that LCA 5230 is the largest LCA awarded in Pūlehunui Ahupua`a. Thus, it is difficult to ascertain where particular activities were conducted (*e.g.*, *lo`i*, *kula*, *apana*) within the LCA.



In Sterling (1998:254–257) it was reported that the late Governor W. L. Moehonua was an “owner” of Pūlehu Nui Ahupua`a and the boundaries of the *ahupua`a* were somewhat vague. Through the information provided by the Māhele, it was acknowledged that Keaweamahi previously owned land within the *ahupua`a*. Oral testimonies from multiple sources contribute to somewhat more specific but general boundaries of the *ahupua`a* and conclusions were found in favor of the late governor.

From the mid-19<sup>th</sup> Century to the early 20<sup>th</sup> Century, coastal activity remained concentrated at Kalepolepo, but by the 1870s whaling diminished and the potato industry moved to the Ulupalakua area (Colin *et al.* 26:2000). Coastal Kula became somewhat of a dusty, “dirty place” (Wilcox 1921). As a result of industry movement out of the Kihei area (for a time) or the vast expanses of land available, Haleakala Ranch utilized many coastal portions of Kula in the later 1800s.

Like the rest of Hawai`i (and the world) during the 1940s, Kihei in Pūlehu Nui Ahupua`a was interrupted by the advent of World War II (WWII). The coast from Ma`alaea to Makena was used by United States military forces as training areas in preparation for amphibious assaults that were to be made in the Pacific war theater (Davis and Fortini 2004, Tome and Dega 2004). The main military service operating along the coastal region of the Wailuku and Makawao (Kula) Districts was the United States Marine Corps’ 4<sup>th</sup> Marine Division, which used the coast during the latter part of 1944. The beautiful beaches of Kihei and Wailea were transformed with the construction of concrete military bunkers to simulate enemy positions expected during amphibious combat operations. A non-4<sup>th</sup> Marine Division military unit that also trained along the coastline was the underwater demolition teams, known as UDT. Comprised of Army and Navy personnel, these people were trained to rig and detonate explosives on various obstacles in the way of the U.S. amphibious assaults.

Following WWII, the Kihei coastline returned to its tranquil activities of ranching and the development of residential areas. During the 1960s, the Kihei stage was set for development of the area as a vacation haven for tourists and homebuyers which continues to the present day.

### **PREVIOUS ARCHAEOLOGY IN GENERAL AREA**

Archaeological studies in the greater area began in the early 20<sup>th</sup> Century by T. Thrum (1909), J. Stokes (1909–1916), and W. M. Walker (1931). These surveys included areas of leeward Maui and inventoried both coastal and upland sites of the Kula District. In the *ahupua`a*

of Pūlehu Nui Walker listed two sites identified as Haleokane Heiau and Nininiwai Heiau (see Sterling 1998:253).

Archival research indicates few archaeological projects have been conducted near the proposed project area. Although these projects occurred some distance from the subject parcel they are directly relevant. These studies provide background information to the current study area. The reader is referred to Tomonari-Tuggle *et al.* (2001:61-63) which provides a succinct summary of these studies.

Kennedy (1988) conducted a visual inspection of TMK: (2) 3-8-004:029 that did not identify archaeological sites. The absence of sites was attributed to prior development of the area for a construction baseyard with an installation of a large concrete culvert. In 1991 the Bishop Museum conducted an Archaeological Inventory Survey for the Kai Makani project that produced negative findings on the ground surface or subsurface contexts (Rotunno-Hazuka (1991).

In 1992 Aki Sinoto Consulting conducted an Archaeological Inventory Survey of the proposed location for the Kihei Gateway Complex which led to the identification of State Site 50-50-09-31, a remnant, historic concrete bridge (crossing Waiakoa Stream. It was suggested that the bridge was probably related to a narrow gauge cane railroad that operated through the area and may have serviced Kihei Camp 1 (Sinoto and Pantaleo 1992).

Between 1995 and 1999 Scientific Consultant Services, Inc. conducted an Inventory Survey (followed by two addendums) for the Puunene Bypass/ Mokulele Highway Improvements Corridor located in TMK: (2) 3-8:-04, 05, 06, and 07; Burgett and Spear 1997; Chaffee *et al.* 1999). No additional archaeological sites were identified. However, one previously recorded site was relocated and identified as the Naval Air Station Puunene Dump Site (State Site 50-50-09-4164). Scientific Consultant Services, Inc. conducted an archaeological study on TMK: (2) 3-9-041:027, which included excavation of nine stratigraphic trenches. No new sites were identified (Pestana and Dega 2002).

In 2005 Scientific Consultant Services, Inc. conducted an Archaeological Inventory Survey, including limited subsurface testing, was conducted on a 9.289-acre property in North Kīhei, Maui, Hawai`i [TMK: (2) 3-8-004:028] (Tome and Dega 2005). The proposed project area, located immediately adjacent and abutting the southern boundary of the Hale Piilani Park, had been partially modified by illegal dumping, utilization as an informal dirt bike course, and ranching activities. Two archaeological sites comprising four structural features were newly

identified during this Inventory Survey. The sites were interpreted respectively as a World War II-related site (State Site 50-50-09-5801, WW II training site) and a traditional Hawaiian site (State Site No. 50-50-09-5802, pre-Contact agricultural/habitation complex). The two sites date utilization of the subject parcel from the pre-Contact Period (*i.e.*, pre-1778) to the United States Marine Corps' 4<sup>th</sup> U.S. Marine Division training during the closing years of World War II.

### **PREVIOUS ARCHAEOLOGY IN THE PROPOSED PROJECT AREA**

The proposed project area [TMK: (2) 3-8-008:019] represents a portion of a larger project area previously subject to an Archaeological Inventory Survey in 1999 by International Archaeological Research Institute Inc. (IARII) (Tomonari-Tuggle *et al.* 2001) (Figures 6 and 7). In addition to surveying the proposed project area [TMK: (2) 3-8-008:019] as part of the initial survey, IARII also surveyed the remaining parcels in TMK: (2) 3-8-008. International Archaeological Research Institute Inc. (Tomonari-Tuggle *et al.* 2001) found that TMK: (2) 3-8-008 was utilized by multiple commercial businesses at the time which included:

- agriculture [sugarcane; Hawaiian Commercial and Sugar Company (HC&S), Ltd.],
- rock quarrying [Hawaiian Cement, (Maui Concrete and Aggregate Division)],
- motorsports recreational areas (Maui Raceway Park),
- an animal shelter (Maui Humane Society),
- a pig farm (Maui Hog) and scrap metal storage site, and
- a crop dusting operation (Murray Air, Ltd.).

Spread amongst the commercial businesses were five (5) archaeological sites.

- Former Naval Air Station Puunene (State Site 50-50-09-4164; Feature Amount: 165)
- Sugarcane Plantation Features (State Site 50-50-09-4800; Feature Amount: 7)
- Post-World War II Ranching Features (State Site 50-50-09-4800; two complexes of corrals, fences, troughs)
- Old Kihei Railroad Bed (State Site 50-50-09-4802; Feature Amount: 1)
- Haiku Ditch and Reservoir (State Site 50-50-09-4802; Feature Amount: 5)

IARII determined that at least two of these archaeological sites were used for multiple historic activities (Tomonari-Tuggle *et al.* 2001). For example, the crop dusting operation utilized the former Naval Air Station Puunene's airstrip as a runway for their planes. A few of the standing military structures located on the proposed project area [TMK: (2) 3-8-008:019] were converted from military features to holding facilities for pigs.

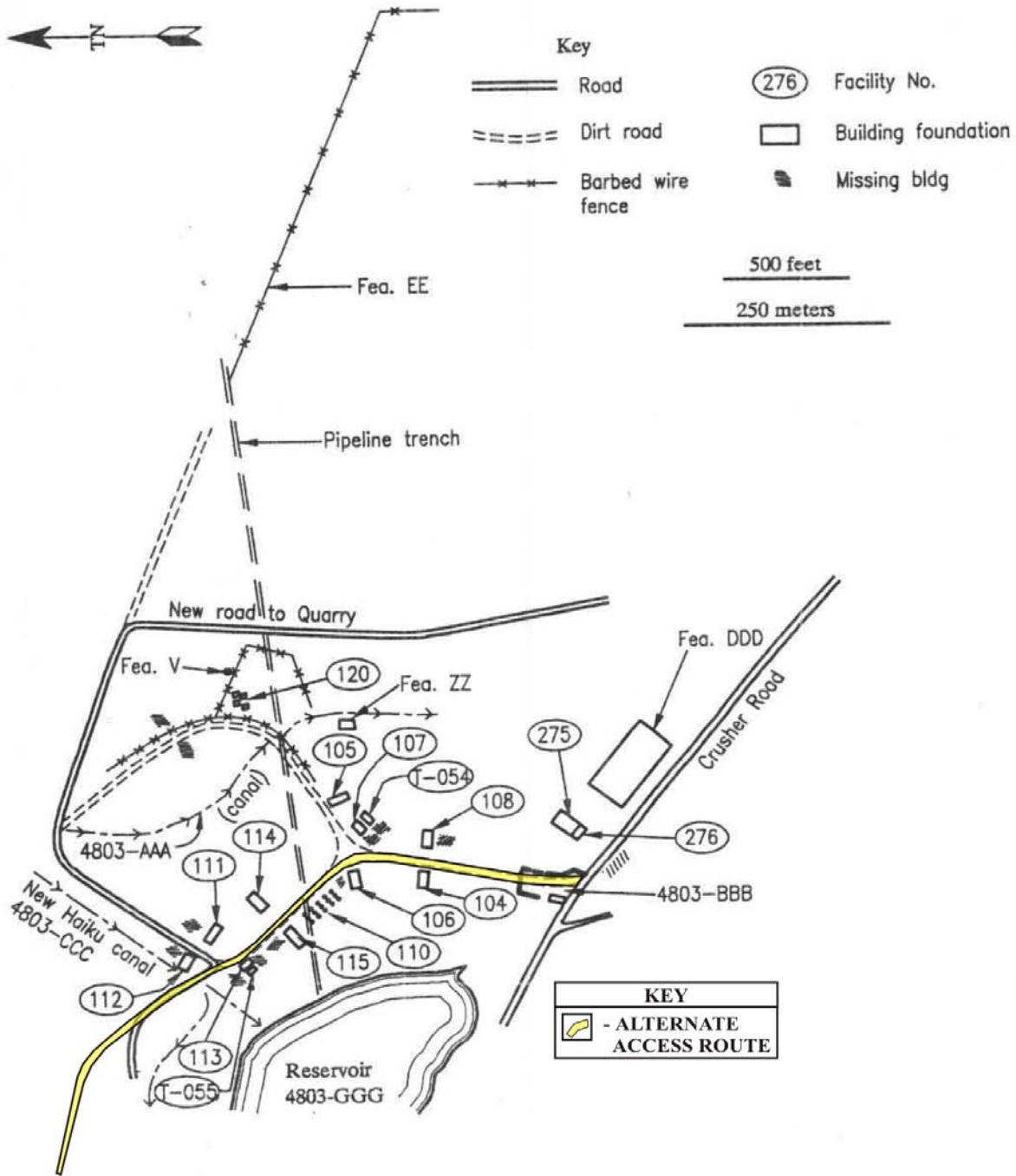
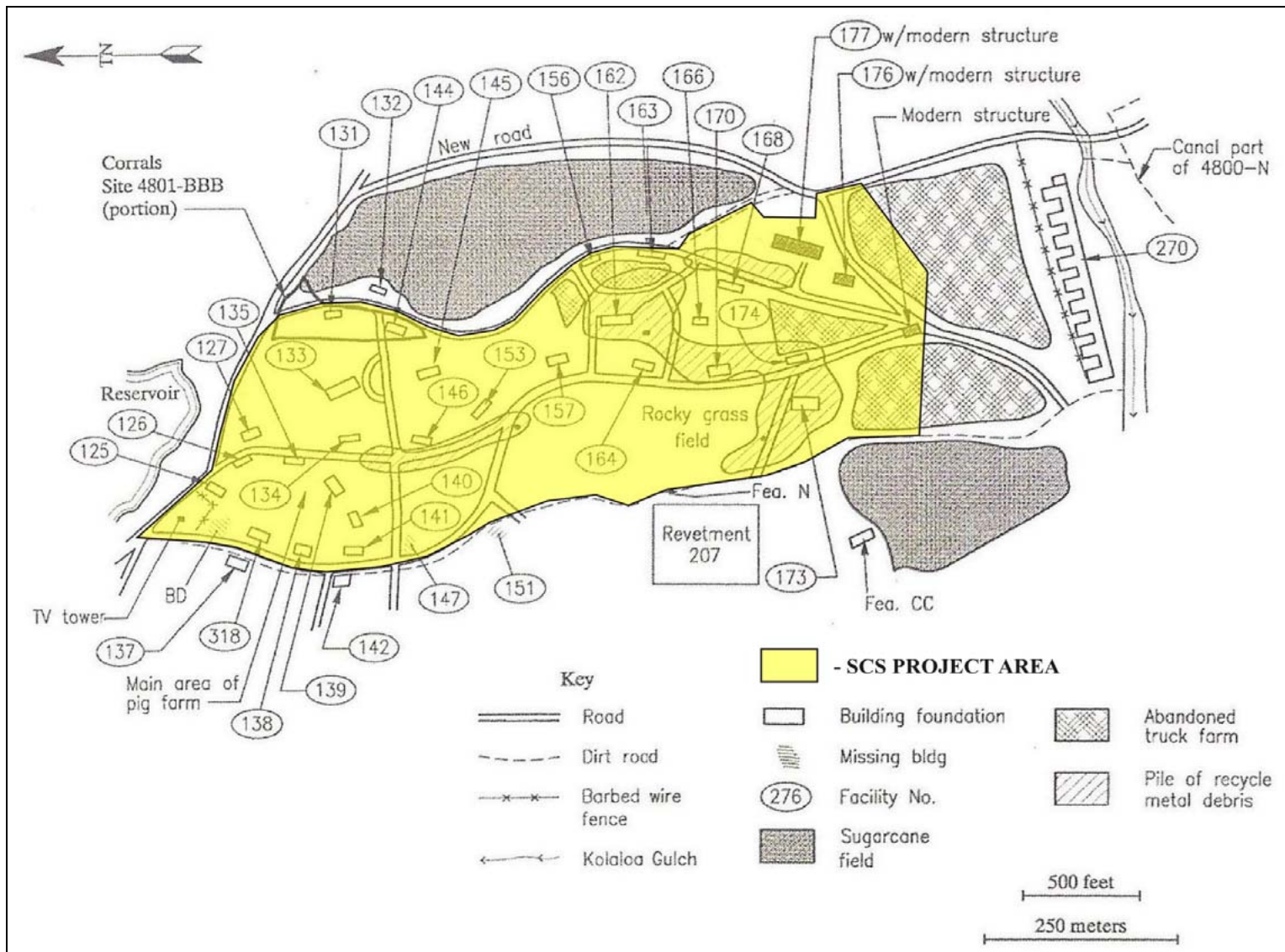


Figure 13. Northeastern section of Housing Area A.

Figure 6: International Archaeological Research Institute Incorporated (IARII) Plan View Map Showing Previously Recorded Archaeological Features and Current SCS Project Area Alternate Road.



**Figure 7: IARII Plan View Map Showing Previously Recorded Archaeological Features and Current SCS Project Area Perimeter of TMK (2) 3-8-008:019.**

The archaeological sites located in the proposed project area TMK: (2) 3-8-008:019 consist of the former Naval Air Station Puunene, which was recognized as a World War II archaeological site and designated as State Site 50-50-09-4164, and two post-World War II cattle ranching complexes that were consolidated and designated as State Site 50-50-09-4801. The current Archaeological Inventory Survey led to relocation of most of the previously identified sites, as well as several newly identified features. These new features have been incorporated into the existing State site numbers (see Inventory Survey Results Section below).

### **SETTLEMENT PATTERN**

Numerous settlement models for the traditional district of Honua`ula (and its Kula extent such as the proposed project area) have been proposed by researchers, including those by Kirch (1970), Barrera (1974), Cleghorn (1975), Cordy (1977), Cordy and Athens (1988), and Gosser *et al.* (1993 and Gosser *et al.* 1995). Parallels may be drawn between the studies above with the project area based physiographic and archaeological characteristics.

Cordy and Athens (1988) suggested that although the traditional district of Honua`ula seems to have had a fairly harsh environment; people settled in this district and coped successfully with the elements, both on the coast and inland. Early surveys indicated that the region between the coast and inland farming areas have been labeled the ‘barren zone,’ which was used for temporary or seasonal habitation and agriculture. Cordy and Athens (1998) agreed that major land use patterns, initially generated by archaeologists in the 1970s, indicated that inland areas where rainfall was adequate were primarily farming zone. Permanent habitation and intensity of settlement correlated to rainfall amounts (Cordy and Athens 1988:23–24, 100–103; Gosser *et al.* 1993).

Prehistorically, crops in the inland areas were dryland taro, sweet potato, and banana (Barrera 1974; Cordy and Athens 1988:18). More relevant to the proposed project area is Handy and Handy’s description of environmental conditions on the leeward side of Haleakala.

The great bulk and altitude of Haleakala makes its southern flank practically a water less desert, and the southeast and west flanks relatively dry, so that there were no *lo`i* (pond fields) cultivation at all. The arid country below the west and south slopes of Haleakala, including Kula, Honua`ula, Kahikinui, and Kaupo, were dependent on sweet potato (Handy and Handy 1972:488).

Irish potato became an important crop in the mid-1800s. Ranching became a significant enterprise in the uplands during historic times.

Based on a synthesis of previous archaeological work in the intermediate or barren zone of the Kula District where the proposed project area is located, the landscape was expected to contain a few prehistoric sites, such as scattered temporary or seasonal habitations and associated dryland agricultural sites. Site density in this area is likely very low. Farther inland in this region sites might include field shelters and special activity areas represented by small C-shaped structures, terraces, platforms, rock mounds, and caves. Construction of these features is expected to be less formal and more random than those along the coast (Gosser *et al.* 1993). Historic-period features have been recorded with perhaps more frequency in the barren zone, given limited habitation through time, making this an ideal training area. Historic period sites may include features related to WW II training such as c-shaped structures and concrete encasements/foundations, among others. Walls and enclosures representing the ranching era were also thought possible.

## **METHODOLOGY**

### **FIELD METHODOLOGY**

Multiple field tasks were completed during the Archaeological Inventory Survey program. First, pedestrian survey was conducted in order to identify archaeological sites and assess the proposed project area geographical/physiographical features. Transect spacing of twenty meters (65.62 feet) intervals was employed when surface visibility was high, primarily in the mechanically altered areas. Interval spacing of ten meters (32.81 feet) or less between SCS personnel was employed within the dried vegetation areas to ensure adequate area coverage during the survey. Once archaeological sites were located, they were marked with biodegradable florescent pink and blue flagging tape. During the pedestrian survey, results were compiled on standard graphing paper as well as with digital photography. Each site was given an SCS temporary site designation (*e.g.*, T-1) and plotted on a United States Geological Survey (USGS) map with a handheld Garmin GPS Map 60 CSx global positioning system (GPS) unit. The datum and coordinate system used for the GPS unit was NAD83 and UTM (Universal Transverse Mercator). True north compass orientation was also employed. All measurements were recorded in metric. Individual sites were also documented in plan view. Site boundaries were primarily determined by feature architecture boundaries. Exploration on the exterior of the features failed to yield cultural materials and thus, each feature recorded herein was defined by their exterior architecture. Vegetation within the proposed project area was identified using Whistler (1995) and Neal (1965)



Mechanically excavated stratigraphic trenches were utilized to locate any associated subsurface midden deposits. A total of 20 trenches were excavated throughout the larger portion of the proposed project area. No excavation was conducted on the alternate access road. Soil stratigraphy encountered during excavation was documented utilizing metric graph paper and United States Department of Agriculture (USDA) Munsell soil color charts (Appendix A). Only portable archaeological cultural materials were found on the ground surface of the proposed project area. No portable archaeological cultural materials were found within the excavation of stratigraphic trenches.

### **LABORATORY METHODOLOGY**

All field notes, digital photographs, and collected archaeological materials were curated at the SCS laboratory in Honolulu. Representative stratigraphic profiles have been drafted for presentation within this report. Representative plan view sketches showing location and morphology of identified sites/features/deposits were illustrated. All retrieved artifact and samples are cleaned, sorted, and analyzed (Appendix B). No definitive archaeological food midden samples were observed. Thus, none are available for analysis. Significant artifacts are scanned or photographed and classified for qualitative analysis. All metric measurements and weights are also recorded for quantitative analysis. All data are clearly recorded on standard laboratory forms that included numbers and weights (as appropriate) of each constituent category. Laboratory results are presented in Appendix B of this report.

### **INVENTORY SURVEY RESULTS**

An Archaeological Inventory Survey, including limited subsurface testing, was conducted on the 86.029-acre subject property in Puunene, Island of Maui, Hawai'i [TMK: (2) 3-8-008: 019] (see Figures 1 and 2). The 917 meter (3,007.8 feet) long alternate access road [TMK: (2) 3-8-008: por. 005 and 006] was not subjected to excavation since most of the access route was already established (*i.e.*, there is a combination of a dirt and asphalt road), and the area that did not contain an established road contained active sugarcane cultivation. Although the 1999 IARII survey documented archaeological features close to the east and west sides of the alternate access road, no archaeological sites or features were observed in the alternate access road corridor. These features that were documented along the alternate access road were assigned to State Site 50-50-09-4801, interpreted as a post-World War II cattle ranching site.

As stated elsewhere in this report, the proposed project area was previously subject to an Archaeological Inventory Survey in 1999 by IARII (see Figures 6 and 7). The proposed project area, part of the larger former Naval Air Station Puunene, was designated by the air station as

Housing Area A, Southern and Northeastern portions. Within the larger portion of the proposed project area, the IARII survey identified two archaeological sites comprised of a section associated with the former Naval Air Station Puunene (State Site 50-50-09-4164), as well as a post-World War II cattle ranching site (State Site 50-50-09-4801). The current survey relocated the two historic sites, assessed the presence/absence of those features within two sites, and identified previously undocumented features within the two sites (Figure 8). The newly identified features have been subsumed under the previous State site number designations.

Most of the historic features within in the proposed project area were heavily impacted by modern mechanical clearing and ensuing debris removal. The majority of those mechanically impacted features belonged to the former Naval Air Station Puunene (State Site 50-50-09-4164). Some of the historic features belonging to State Site 50-50-09-4164 did appear to have been mechanically impacted but also abandoned and neglected prior to any mechanical alterations. Prior to the mechanical disturbance, the north half of the proposed project area had been utilized for a pig farm (Maui Hog) and a scrap metal storage site. The south half of the subject property remained fallow.

A total of fifteen (15) features, interpreted as either related to the NAS Puunene or post-war cattle ranching period, were identified by SCS but not previously recorded during the IARII survey (Tomonari-Tuggle *et al.*2001). Of the 15 features that were not recorded, three (3) features were located in the State Site 50-50-09-4801 post-war cattle ranching area. The remaining twelve (12) features were located in the State Site 50-50-09-4164 former Naval Air Station Puunene area (Housing Area A).

To supplement the surface pedestrian survey, a total of twenty (20) stratigraphic trenches were mechanically excavated across the larger portion of the proposed project area (Table 1; see Figure 8 and Appendix A). Only one stratigraphic trench (ST-6) revealed the presence of subsurface architecture. This trench was placed at Facility 177 (SCS Site T-25) and the evidence showed that the historic feature was re-utilized in the recent past for animal husbandry. Besides Facility 177, no other surface features were subjected to excavation. No subsurface features were observed in any of the other 19 stratigraphic trenches. The following details the total list of SCS temporary sites recorded during the current Archaeological Inventory Survey. These features are being subsumed under the previously acquired State site numbers. No subsurface testing was conducted of the alternate access road due to its establishment as an unimproved road and partial location in an active sugarcane field.

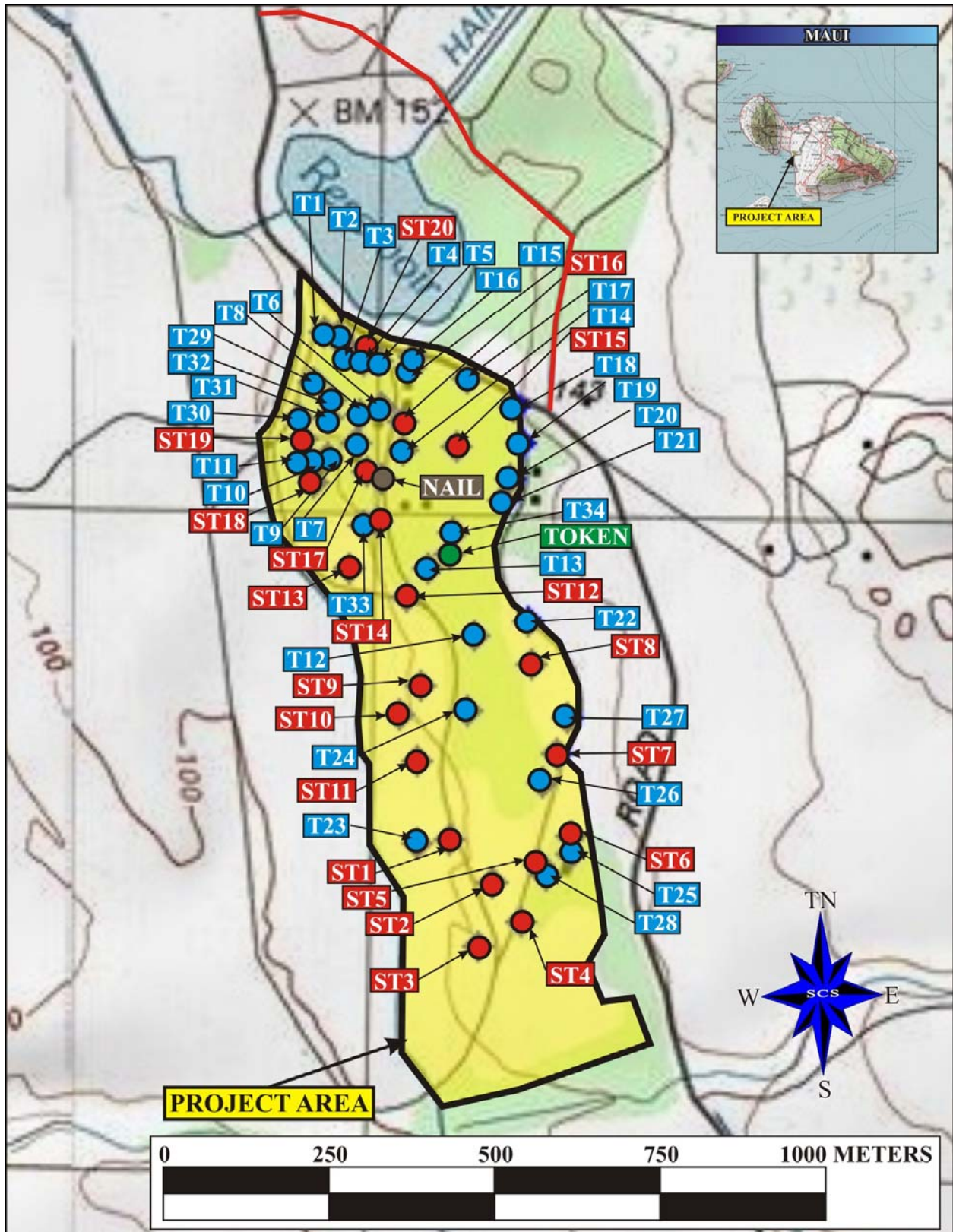


Figure 8: USGS 1992 Puu O Kali Quadrangle Map Showing SCS Archaeological Sites and Trench Locations.

**Table 1: Trenching Data**

Stratigraphic Trench Identification	GPS Coordinates	Long Axis Orientation (Degrees and North-type)	Dimensions (meters; L x W x Max. Depth)	Dimensions (feet: L x W x Max. Depth)	Exposed Strata Amount	Cultural Material Observed in Stratum	Stratum Interpretation
ST-1	East 765116 North 2303502	69/249° True	4.7 x 0.5 x 1.0	15.42 x 1.64 x 3.28	2	None	I-Natural II-Natural
ST-2	East 765184 North 2303438	63/243° True	5.1 x 0.5 x 1.1	16.73 x 1.64 x 3.61	2	None	I-Natural II-Natural
ST-3	East 765164 North 2303343	89/269° True	4.6 x 0.5 x 1.3	15.09 x 1.64 x 4.27	6	None	I-Natural II-Natural III-Natural IV-Natural V-Natural VI-Natural
ST-4	East 765229 North 2303382	68/248° True	4.8 x 0.5 x 1.3	15.75 x 1.64 x 4.27	4	None	I-Natural II-Natural III-Natural IV-Natural
ST-5	East 765252 North 2303466	84/264° True	5.3 x 0.5 x 0.85	17.39 x 1.64 x 2.79	4	Asphalt (I); Basalt Gravel (II); Basalt Gravel (III)	I-Fill II-Fill III-Fill IV-Natural
ST-6	East 765299 North 2303515	79/259° True	10.0 x 0.5 x 1.0	32.81 x 1.64 x 3.28	7	Concrete Slab (I); Basalt Gravel (II); Concrete Wall (III); Asphalt (IV)	I-Fill II-Fill III-Fill IV-Fill V-Disturbed Natural VI-Natural VII-Natural
ST-7	East 765279 North 2303638	004/184° True	4.5 x 0.5 x 0.8	14.76 x 1.64 x 2.62	2	None	I-Natural II-Natural
ST-8	East 765238 North 2303769	59/239° True	4.3 x 0.5 x 1.1	14.11 x 1.64 x 3.61	3	Asphalt (I)	I-Fill II-Disturbed Natural III-Natural
ST-9	East 765070 North 2303739	89/269° True	4.0 x 0.5 x 0.6	13.12 x 1.64 x 1.97	1	None	I-Natural
ST-10	East 765038 North 2303690	89/269° True	3.3 x 0.5 x 1.0	10.83 x 1.64 x 3.28	3	None	I-Natural II-Natural III-Natural
ST-11	East 765063 North 2303621	64/244° True	4.0 x 0.5 x 0.9	13.12 x 1.64 x 2.95	2	None	I-Natural II-Natural
ST-12	East 765043 North 2303871	179/359° True	6.1 x 0.5 x 1.2	20.01 x 1.64 x 3.94	1	None	I-Natural

Stratigraphic Trench Identification	GPS Coordinates	Long Axis Orientation (Degrees and North-type)	Dimensions (meters; L x W x Max. Depth)	Dimensions (feet: L x W x Max. Depth)	Exposed Strata Amount	Cultural Material Observed in Stratum	Stratum Interpretation
ST-13	East 764956 North 2303913	76/256° True	5.0 x 0.5 x 1.0	16.4 x 1.64 x 3.28	1	None	I-Natural
ST-14	East 764999 North 2303985	64/244° True	6.0 x 0.5 x 1.0	19.69 x 1.64 x 3.28	1	None	I-Natural
ST-15	East 765117 North 2304100	42/222° True	4.2 x 0.5 x 1.3	13.78 x 1.64x 4.27	2	None	I-Natural II-Natural
ST-16	East 765035 North 2304138	70/250° True	3.8 x 0.5 x 0.8	12.47 x 1.64 x 2.62	1	None	I-Natural
ST-17	East 764983 North 2304062	49/229° True	4.6 x 0.5 x 0.9	15.09 x 1.64 x 2.95	1	Plastic (I)	I-Disturbed Natural
ST-18	East 764903 North 2304044	65/245° True	5.8 x 0.5 x 1.0	19.03 x 1.64 x 3.28	1	None	I-Disturbed Natural
ST-19	East 764886 North 2304105	63/243° True	5.6 x 0.5 x 1.0	18.37 x 1.64 x 3.28	2	None	I-Natural II-Natural
ST-20	East 764999 North 2304229	004/184° True	5.2 x 0.5 x 0.8	17.06 x 1.64 x 2.62	3	Concrete (I); Plastic (II)	I-Fill II-Disturbed Natural III-Natural

The criteria outlined in the Hawai‘i Administrative Rules §13-275-6 was used to evaluate the significance of State Site 50-50-09-4164 and State Site 50-50-09-4801 (see Significance Assessments and Recommendations Section).

**STATE SITE 50-50-09-4164 FORMER N.A.S. PUUNENE HOUSING AREA A SOUTHERN PORTION**

Of the total 34 features identified by SCS during the current survey, thirty (30) features (T-1 through T-17 and T-22 though T-34) were found to be associated with the former Naval Air Station Puunene, which was previously designated as State Site 50-50-09-4164. Of these thirty features, twelve (12) were not identified during the previous IARII survey. These twelve features, designated herein as “temporary sites”, consist of three (3) rock walls, one (1) loading ramp (with platform), and eight (8) concrete foundations. The following provides descriptions of all thirty features identified associated with State Site 50-50-09-4164, inclusive of an update for those features previously recorded in 1999 by IARII.

SCS Temporary Site: T-1

GPS Coordinates: East 764912/ North 2304270

Previous Archaeological Recordation: None

Features: 1

Feature Type: Concrete slab  
Feature Function: Possible building foundation  
Feature Structural Integrity: Fair  
Feature Age Association: Possible World War II  
Criterion Significance: D  
Recommendations: No further work

SCS Site T-1 consisted of a rectangular concrete slab interpreted as a building foundation. Located on relatively flat terrain amongst dried grasses, the feature measured approximately 22.6 m long by 8.8 m wide (74.15 x 28.87 feet) with a long axis oriented southeast-northwest (165/345° True). The feature was constructed of concrete and steel rebar and not recorded during the 1999 IARII survey. IARII noted that a building was missing where T-1 was located. Cultural materials observed on the surface of the foundation were identified as ferrous metal wire, window and bottle glass sherds, and a United States (US) 1944 “S” copper wheat penny. T-1 was impacted by recent mechanical clearance of the proposed project area.

SCS Temporary Site: T-2  
GPS Coordinates: East 764939/ North 2304264  
Previous Archaeological Recordation: None  
Features: 1  
Feature Type: Wall  
Feature Function: Boundary  
Feature Structural Integrity: Fair  
Feature Age Association: Possible World War II  
Criterion Significance: D  
Recommendations: No further work

SCS Site T-2 consisted of a wall interpreted as a possibly being constructed during World War II, during the existence of N.A.S. Puunene. Located on relatively flat terrain amongst dried grasses, live kiawe (*Prosopis pallida*) and *koali kua hulu* (*Merremia aegyptia*), the feature measured approximately 25.0 m long by 4.0 m wide (82.02 x 13.12 feet) and heights above ground surface ranged from 0.2 to 1.3 meters (0.66 x 4.27 feet), with up to five courses of dry laid, piled basalt rocks. The feature’s long axis was oriented southeast-northwest (174/354° True) and constructed of sub-angular and sub-rounded basalt pebbles, cobbles, and small boulders. In plan view, the west face of the wall is angular, and curvilinear on its east face. T-2 was not recorded during the 1999 IARII survey. Cultural materials observed on the wall were

identified as a piece of a waterworn branch coral, several glass bottle and jug sherds, ferrous metal wire insulation, a whiteware cup base sherd with a painted blue whale design, and a US 1944 “S” copper wheat penny. This feature was not impacted by recent mechanical clearance of the proposed project area.

SCS Temporary Site: T-3

GPS Coordinates: East 764949/ North 2304248

Previous Archaeological Recordation: IARII (Facility 125)

Features: 1

Feature Type: Concrete slab

Feature Function: Building foundation for military barracks, later civilian quarters

Feature Structural Integrity: Good

Feature Age Association: World War II

Criterion Significance: A and D

Recommendations: No further work

SCS Site T-3 consisted of a concrete slab interpreted as a building foundation. Located on slight (3°) east to west slope amongst *haole koa* (*Leucaena leucocephala*), castor bean (*Ricinus communis*), *koali kua hulu* (*Merremia aegyptia*), and dried grasses, the concrete slab measured approximately 23.0 m long by 9.0 m wide (75.46 x 29.53 feet). The feature’s long axis was oriented northeast-southwest (015/195° True) and constructed of concrete and steel rebar. T-3 was previously recorded during the 1999 IARII survey as Facility 125. Cultural materials observed on the foundation surface were identified as bottle and window glass sherds. SCS Site T-3 was not impacted by recent mechanical clearance of the proposed project area.

SCS Temporary Site: T-4

GPS Coordinates: East 764975/ North 2304226

Previous Archaeological Recordation: None

Features: 1

Feature Type: Wall

Feature Function: Boundary

Feature Structural Integrity: Fair

Feature Age Association: Unknown

Criterion Significance: D

Recommendations: No further work



SCS Site T-4 consisted of a basalt rock wall. Located on small hill top amongst *koali kua hulu* (*Merremia aegyptia*), *kiawe* (*Prosopis pallida*), and dried grasses, the rock wall was curvilinear and measured approximately 22.0 m long by 1.0 to 1.5 m wide (72.18 x 3.28 x 4.92 feet). The T-4 end points were oriented northeast-southwest (059/239° True) and constructed of small, sub-rounded and sub-angular basalt boulders. T-4 was not recorded during the 1999 IARII survey. No cultural materials were observed on or near the site, and the site was not impacted by recent mechanical clearance of the proposed project area.

SCS Temporary Site: T-5

GPS Coordinates: East 764999/ North 2304226

Previous Archaeological Recordation: IARII (Facility 126)

Features: 1

Feature Type: Concrete slab

Feature Function: Building foundation for military barracks, later civilian quarters

Feature Structural Integrity: Fair

Feature Age Association: World War II

Criterion Significance: A and D

Recommendations: No further work

SCS Site T-5 consisted of an L-shaped concrete slab. This feature was interpreted as a building foundation. Located on a slightly elevated area amongst *koali kua hulu* (*Merremia aegyptia*), tomato (*Solanum* sp.), spiny amaranth (*Amaranthus spinosus*), *uhaloa* (*Waltheria indica*), *klu* (*Acacia farnesiana*), goosefeet (*Chenopodium* sp.), and dried grasses, the concrete slab measured approximately 22.7 m long by 9.9 m wide (74.48 x 32.48 feet). T-5's long axis was oriented northeast-southwest (120/300° True) and constructed of concrete and steel rebar. T-5 was previously recorded during the 1999 IARII survey as Facility 126. Cultural materials observed on the foundation surface were identified as bottle and window glass sherds and non-diagnostic ferrous metal and plastic. T-5 was impacted by recent mechanical clearance of the proposed project area.

SCS Temporary Site: T-6

GPS Coordinates: East 765002/ North 2304155

Previous Archaeological Recordation: IARII (Facility 135)

Features: 1

Feature Type: Concrete slab

Feature Function: Building foundation for Chief Petty Officer barracks, later civilian quarters

Feature Structural Integrity: Fair  
Feature Age Association: World War II  
Criterion Significance: A and D  
Recommendations: No further work

SCS Site T-6 consisted of a concrete slab interpreted as a building foundation. Located in a shallow swale amongst spiny amaranth (*Amaranthus spinosus*), klu (*Acacia farnesiana*), hairy abutilon (*Abutilon grandifolium*), golden crown beard (*Verbesina encelioides*), lion's ear (*Leonotis nepetifolia*), coat buttons (*Tridax procumbens*), and dried grasses, the concrete slab measured approximately 22.4 m long by 8.4 m wide (73.49 x 27.56 feet). T-6's long axis was oriented southeast-northwest (165/345° True) and constructed of concrete and steel rebar. T-6 was previously recorded during the 1999 IARII survey as Facility 135. Although not in use during the current survey, it was apparent that T-6 once had multiple rooms, as evident by the presence of multiple, mechanically altered low standing walls within the perimeter of the concrete slab. As each room had a cement trough, T-6 was interpreted as having been utilized by the pig farm that had recently occupied a portion of the proposed project area. Cultural material observed on the foundation surface was identified as bottle glass sherds, milled wood, galvanized nails, and a ceramic electrical insulator. T-6 was impacted by recent mechanical clearance of the proposed project area.

SCS Temporary Site: T-7  
GPS Coordinates: East 764967/ North 2304104  
Previous Archaeological Recordation: IARII (Facility 139)  
Features: 1  
Feature Type: Concrete slab  
Feature Function: Building foundation for military barracks, later civilian quarters  
Feature Structural Integrity: Fair  
Feature Age Association: World War II  
Criterion Significance: A and D  
Recommendations: No further work

SCS Site T-7 consisted of a concrete slab interpreted as a building foundation. Located on a slightly elevated area amongst golden crown beard (*Verbesina encelioides*), goosefeet (*Chenopodium* sp.), and dried grasses, the concrete slab measured approximately 22.4 m long by 9.0 m wide (73.49 x 29.53 feet). T-7's long axis was oriented northeast-southwest (029/209° True) and constructed of concrete and steel rebar. T-7 was previously recorded during the 1999

IARII survey as Facility 139. Although not in use during the current survey, it was apparent that T-7 once had multiple rooms, as evidenced by the presence of multiple, mechanically altered low standing walls within the perimeter of the concrete slab (Figure 9). As each room had cement trough, T-7 was interpreted as utilized by the pig farm that had recently occupied a portion of the proposed project area. Cultural material observed on the foundation surface was identified as a plastic PVC pipe and an electrical rubber insulator. T-7 was impacted by recent mechanical clearance of the proposed project area.

SCS Temporary Site: T-8

GPS Coordinates: East 764971/ North 2304146

Previous Archaeological Recordation: None

Features: 1

Feature Type: Concrete slab

Feature Function: Possible building foundation

Feature Structural Integrity: Fair

Feature Age Association: Possible World War II

Criterion Significance: D

Recommendations: No further work

SCS Site T-8 consisted of a concrete slab interpreted as a building foundation. Located on a slightly elevated area amongst golden crown beard, spiny amaranth, tomato, *haole koa*, balsam pear (*Momordica charantia*), klu, lion's ear, and *koali kua hulu*, and dried grasses, the concrete slab measured approximately 17.2 m long by 6.4 m wide (56.43 x 21.0 feet). T-8's long axis was oriented northeast-southwest (004/284° True) and constructed of concrete and steel rebar. T-8 was not recorded during the 1999 IARII survey. Although not in use during the current survey, it was apparent that T-8 was previously utilized by the pig farm because the exterior of the concrete slab's east and west sides were sloped inward, this for liquid drainage of animal waste. Cultural material observed on the foundation surface was identified as a green rubber hose, galvanized nails, ferrous metal, milled wood, and non-diagnostic plastic. T-8 was impacted by recent mechanical clearance of the proposed project area.



**Figure 9: Photograph of SCS Site T-7 Piggery Structure with Rooms. View to Northwest.**



SCS Temporary Site: T-9

GPS Coordinates: East 764922/ North 2304079

Previous Archaeological Recordation: IARII (Facility 140)

Features: 1

Feature Type: Concrete slab

Feature Function: Building foundation for military barracks, later civilian quarters

Feature Structural Integrity: Fair

Feature Age Association: World War II

Criterion Significance: A and D

Recommendations: No further work

SCS Site T-9 consisted of a rectangular-shaped concrete slab interpreted as a building foundation. Located on slight (~2°) northwest to southeast slope amongst golden crown beard and dried grasses, T-9 measured approximately 22.5 m long by 9.0 m wide (73.82 x 29.53 feet) with a long axis oriented southeast-northwest (059/239° True). T-9 was constructed of concrete and steel rebar and was previously recorded during the 1999 IARII survey. Cultural material observed on the surface of the foundation were identified as non-ferrous metal, bottle glass sherds, milled wood, galvanized nails, and a plastic container cap. T-9 was also impacted by recent mechanical clearance of the proposed project area.

SCS Temporary Site: T-10

GPS Coordinates: East 764894/ North 2304074

Previous Archaeological Recordation: None

Features: 1

Feature Type: Concrete slab

Feature Function: Possible building foundation

Feature Structural Integrity: Fair

Feature Age Association: Possible World War II

Criterion Significance: D

Recommendations: No further work

SCS Site T-10 consisted of a rectangular-shaped concrete slab interpreted as a building foundation. Located on relatively flat terrain amongst goosefeet and dried grasses, T-10 measured approximately 9.7 m long by 5.6 m wide (31.82 x 18.37 feet) with a long axis oriented southeast-northwest (169/349° True). T-10 was constructed of concrete and steel rebar and was

not recorded during the 1999 IARII survey. Cultural material observed on the surface of the foundation was identified as bottle glass sherds, basalt gravel, and a steel cable. T-10 was impacted by recent mechanical clearance of the proposed project area.

SCS Temporary Site: T-11

GPS Coordinates: East 764882/ North 2304074

Previous Archaeological Recordation: IARII (Facility 141)

Features: 1

Feature Type: Concrete slab

Feature Function: Building foundation for military recreation building and dispensary

Feature Structural Integrity: Fair

Feature Age Association: World War II

Criterion Significance: A and D

Recommendations: No further work

SCS Site T-11 consisted of a rectangular-shaped concrete slab interpreted as a building foundation. Located on relatively flat terrain amongst goosefeet, *uhaloa*, *haole koa*, klu, and dried grasses, T-11 measured approximately 14.3 m long by 6.8 m wide (46.92 x 22.31 feet) with a long axis oriented southeast-northwest (169/349° True). T-11 was constructed of concrete and steel rebar and was recorded during the 1999 IARII survey. Cultural material observed during the current survey on the surface of the foundation was identified as ferrous metal nails, ceramic tile, plastic beverage bottles, and a green rubber hose. T-11 was impacted by recent mechanical clearance of the proposed project area.

SCS Temporary Site: T-12

GPS Coordinates: East 765147/ North 2303813

Previous Archaeological Recordation: IARII (Facility 157)

Features: 1

Feature Type: Concrete slab

Feature Function: Building foundation for military barracks, later bachelor officer quarters

Feature Structural Integrity: Fair

Feature Age Association: World War II

Criterion Significance: A and D

Recommendations: No further work

SCS Site T-12 consisted of a rectangular-shaped concrete slab interpreted as a building foundation. Located on relatively flat terrain amongst dried grasses, T-12 measured approximately 22.6 m long by 8.9 m wide (74.15 x 29.49 feet) with a long axis oriented southeast-northwest (170/350° True). T-12 was constructed of concrete and steel rebar and was recorded during the 1999 IARII survey. Cultural material observed during the current survey on the surface of the foundation was identified as ferrous metal, plastic, a wound light blue glass bead, and sawn animal bones; the glass bead was collected. T-12 was impacted by recent mechanical clearance of the proposed project area.

SCS Temporary Site: T-13

GPS Coordinates: East 765078/ North 2303913

Previous Archaeological Recordation: IARII (Facility 153)

Features: 1

Feature Type: Concrete slab

Feature Function: Building foundation for military barracks, later mess attendant barracks

Feature Structural Integrity: Fair

Feature Age Association: World War II

Criterion Significance: A and D

Recommendations: No further work

SCS Site T-13 consisted of a rectangular-shaped concrete slab interpreted as a building foundation. Located on relatively flat terrain amongst dried grasses, T-13 measured approximately 42.5 m long by 8.9 m wide (139.44 x 29.2 feet) with a long axis oriented southeast-northwest (140/320° True). Constructed of concrete and steel rebar, T-13 was recorded during the 1999 IARII survey. Cultural material observed during the current survey on the surface of the foundation was identified as plastic and a porcelain plate sherd. T-13 was impacted by recent mechanical clearance of the proposed project area.

SCS Temporary Site: T-14

GPS Coordinates: East 765038/ North 2304093

Previous Archaeological Recordation: IARII (Facility 134)

Features: 1

Feature Type: Concrete slab

Feature Function: Building foundation for military barracks, later civilian quarters

Feature Structural Integrity: Fair

Feature Age Association: World War II



Criterion Significance: A and D

Recommendations: No further work

SCS Site T-14 consisted of a rectangular-shaped concrete slab interpreted as a building foundation (Figures 10 and 11). Located on relatively flat terrain amongst lion's ear, *kiawe*, and dried grasses, T-14 measured approximately 19.5 m long by 9.0 m wide (63.98 x 29.53 feet) with a long axis oriented southeast-northwest (173/353° True). Constructed of concrete and steel rebar, T-14 was recorded during the 1999 IARII survey. Cultural material observed during the current survey on the surface of the foundation was identified as window glass sherds. T-14 was impacted by recent mechanical clearance of the proposed project area.

SCS Temporary Site: T-15

GPS Coordinates: East 765046/ North 2304218

Previous Archaeological Recordation: IARII (Facility 127)

Features: 1

Feature Type: Concrete slab

Feature Function: Building foundation for Chief Petty Officer barracks, later civilian quarters

Feature Structural Integrity: Fair

Feature Age Association: World War II

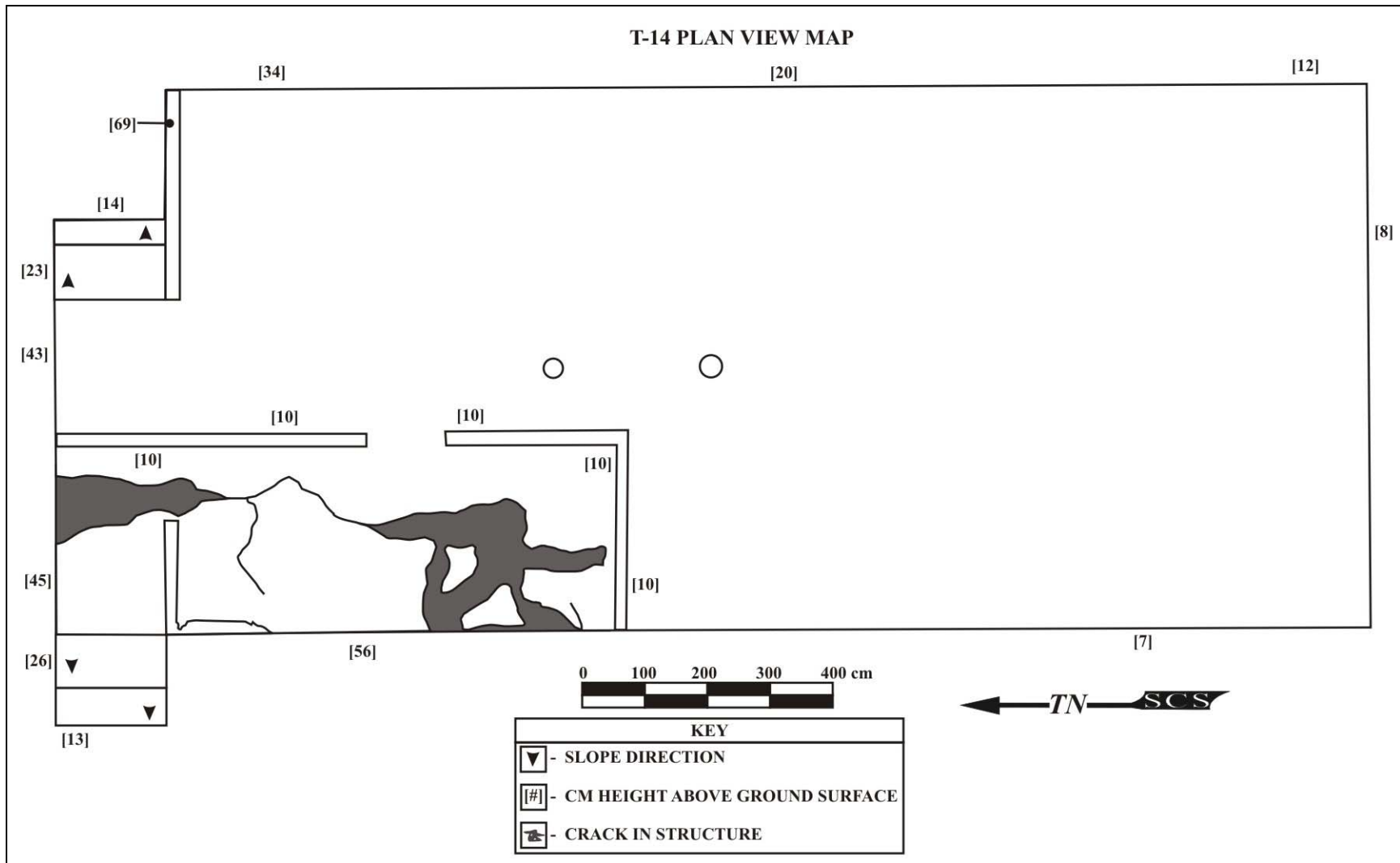
Criterion Significance: A and D

Recommendations: No further work

SCS Site T-15 consisted of a rectangular-shaped concrete slab interpreted as a building foundation. Located on an approximate 10 to 15° southwest to northeast slope amongst lion's ear, spiny amaranth, tomato, golden crown beard, and dried grasses, T-15 measured approximately 22.4 m long by 8.8 m wide (73.49 x 28.87 feet) with a maximum above ground surface build of approximately 1.0 m. The long axis of the site was oriented southeast-northwest (149/329° True). Constructed of concrete and steel rebar, T-15 was recorded during the 1999 IARII survey. Cultural material observed during the current survey on the surface of the foundation was identified as ferrous and non-ferrous metal (*i.e.*, pipes and an air compressor fitting). On the mechanically affected ground surface located to the north of the site were opihi (*Cellana* sp.) shells. These shell remnants were interpreted as modern marine food midden. T-15 was impacted by recent mechanical clearance of the proposed project area.



**Figure 10: Photograph of SCS Site T-14 Foundation Over View. View to Southeast.**



**Figure 11: Plan View Drawing of SCS Site T-14 Foundation.**

SCS Temporary Site: T-16

GPS Coordinates: East 765048/ North 2304234

Previous Archaeological Recordation: None

Features: 1

Feature Type: Wall

Feature Function: Boundary

Feature Structural Integrity: Fair

Feature Age Association: Indeterminate

Criterion Significance: D

Recommendations: No further work

SCS Site T-16 consisted of a linear basalt rock wall interpreted as utilized for boundary purposes. Located on relatively level terrain amongst lion's ear, tomato, *kiawe*, and dried grasses, T-16 measured approximately 5.7 m long by 1.1 m wide (18.7 x 3.61 feet) and above ground surface heights of 0.6 to 1.1 m. T-16 wall was constructed of up to four (4) courses high of piled, dry-laid sub-rounded basalt cobbles and small boulders and had a long axis oriented southeast-northwest (55/235° True). T-16 was not recorded during the 1999 IARII survey. Cultural material observed during the current survey on the site's architecture was identified as a concrete fragment and a ferrous metal paint can. T-16 was not impacted by recent mechanical clearance of the proposed project area.

SCS Temporary Site: T-17

GPS Coordinates: East 765132/ North 2304204

Previous Archaeological Recordation: None

Features: 1

Feature Type: Concrete slab

Feature Function: Possible building foundation

Feature Structural Integrity: Poor

Feature Age Association: Indeterminate

Criterion Significance: D

Recommendations: No further work

SCS Site T-17 consisted of a rectangular-shaped concrete slab interpreted as a building foundation. Located on relatively level terrain next to a mechanically created earthen ditch amongst *kiawe* and dried grasses, T-17 measured approximately 7.0 m long by 7.0 m wide

(22.97 x 22.97 feet). The long axis of the site was oriented northeast-southwest (026/206° True). Constructed of concrete, T-17 was not recorded during the 1999 IARII survey. Cultural material observed during the current survey on the surface of the foundation was identified as basalt gravel, concrete fragments, and a two-hole marine shell button of which the button was collected. Mechanically displaced soil matrices had been relocated onto the surface of the site prior to the current survey and obscured the total surface area of the site.

SCS Temporary Site: T-22

GPS Coordinates: East 765229/ North 2303838

Previous Archaeological Recordation: None

Features: 1

Feature Type: Concrete slab

Feature Function: Possible building foundation

Feature Structural Integrity: Excellent

Feature Age Association: Indeterminate

Criterion Significance: D

Recommendations: No further work

SCS Site T-22 consisted of a rectangular-shaped concrete slab interpreted as a building foundation. Located on relatively level terrain amongst dried grasses, T-22 measured approximately 18.4 m long by 6.8 m wide (60.37 x 22.31 feet). The long axis of the site was oriented southeast-northwest (130/310° True). Constructed of concrete and rebar, T-22 was not recorded during the 1999 IARII survey. Cultural material observed during the current survey on the surface of the foundation was identified as basalt gravel, steel nails, and concrete fragments. T-22 was not impacted by recent mechanical clearance of the proposed project area.

SCS Temporary Site: T-23

GPS Coordinates: East 765068/ North 2303499

Previous Archaeological Recordation: None

Features: 1

Feature Type: Concrete slab

Feature Function: Possible building foundation

Feature Structural Integrity: Excellent

Feature Age Association: Indeterminate

Criterion Significance: D

Recommendations: No further work



SCS Site T-23 consisted of a rectangular concrete slab interpreted as a building foundation. Located on relatively level terrain amongst dried grasses, T-23 measured approximately 14.7 m long by 6.4 m wide (48.23 x 21.0 feet). The long axis of the site was oriented southeast-northwest (130/310° True). Constructed of concrete and rebar, T-23 was not recorded during the 1999 IARII survey. Cultural material observed during the current survey on the surface of the foundation was identified as window glass sherds. Although T-23 was located near the IARII recorded Facility 173, the horizontal dimensions of T-23 do not match the horizontal dimensions of Facility 173. Thus, T-23 was not interpreted during the current survey as Facility 173. T-23 was not impacted by recent mechanical clearance of the proposed project area.

SCS Temporary Site: T-24

GPS Coordinates: East 765140/ North 2303699

Previous Archaeological Recordation: IARII (Facility 164)

Features: 1

Feature Type: Concrete slab

Feature Function: Building foundation for military barracks

Feature Structural Integrity: Fair

Feature Age Association: World War II

Criterion Significance: A and D

Recommendations: No further work

SCS Site T-24 consisted of an L-shaped concrete slab interpreted as a building foundation. Located on relatively level terrain amongst dried grasses, T-24 measured approximately 22.1 m long by 9.0 m wide (72.51 x 29.53 feet). The long axis of the site was oriented northeast-southwest (026/206° True). Constructed of concrete and rebar, T-24 was recorded during the 1999 IARII survey. Cultural material observed during the current survey on the surface of the foundation was identified as galvanized nails and concrete fragments. T-24 was impacted by recent mechanical clearance of the proposed project area.

SCS Temporary Site: T-25

GPS Coordinates: East 765300/ North 2303486

Previous Archaeological Recordation: IARII (Facility 177)

Features: 1

Feature Type: Concrete slab

Feature Function: Building foundation for storehouse

Feature Structural Integrity: Fair

Feature Age Association: World War II

Criterion Significance: A and D

Recommendations: No further work

SCS Site T-25 consisted of a rectangular-shaped concrete slab interpreted as a building foundation for a storehouse. Located on relatively level terrain amongst dried grasses, T-25 measured approximately 47.0 m long by 10.0 m wide (154.2 x 32.81 feet). The long axis of the site was oriented northeast-southwest (020/200° True). Constructed of concrete and rebar, T-25 was recorded during the 1999 IARII survey. During the current survey, what was interpreted as the top of the foundation was sloped from the west downward toward the east. The purpose of the slope was to drain away fluids related to animal waste. Stratigraphic Trench 6 was utilized to examine the site's method of construction that resulted in the exposure of subsurface architecture (Figures 12 and 13). Cultural material observed during the current survey on the surface of the foundation was identified as concrete bricks, aluminum cans, and bottle glass sherds. T-25 was impacted by recent mechanical clearance of the proposed project area.

#### Stratigraphic Trench 6

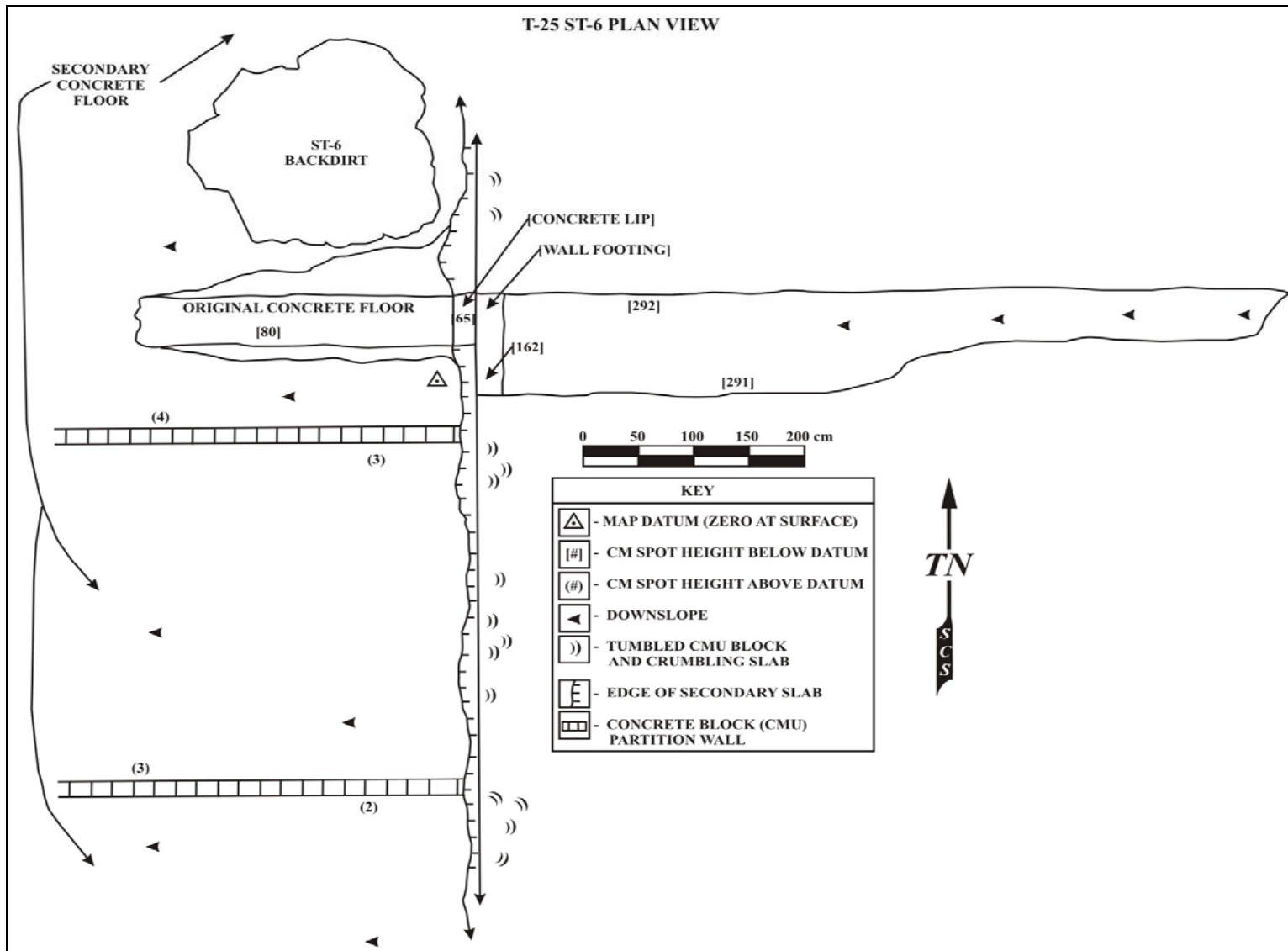
Stratigraphic Trench 6 (ST-6) was placed across the surface architecture of SCS Site T-25's (IARII Facility 177) west side to locate subterranean architecture and any cultural material that might aid in the interpretation of the site's function (see Figures 12 and 13). Measuring approximately 10.0 m long by a varying 0.5 to 1.0 m wide (32.81 x 1.64–3.28 feet), ST-6 was excavated to a depth of 2.80 m below the surface of the site's architecture. Although no cultural material was found in the excavation of ST-6, subsurface architecture was exposed and revealed the site's construction sequence. The excavation of ST-6 revealed the presence of seven (7) strata comprised of soil matrices and site architecture (see Appendix A).

- Layer I (0–10 cmbs) was a secondary concrete slab that was constructed following the military departure of the former Naval Air Station Puunene.
- Layer II (10–60 cmbs) was a compact, yellowish red (5YR 4/6, dry) silty clay with angular basalt pebbles and cobbles. Based on stratigraphic positioning, Layer II was interpreted as fill stratum that was utilized to elevate a future structure.
- Layer III (60–95 cmbs) was a primary concrete wall located above the ground surface. Layer III was observed in Layers IV, V, and VI.





**Figure 12: Photograph of SCS Site T-25 Western Perimeter and Stratigraphic Trench 6 Over View. View to East.**



**Figure 13: Plan View Drawing of SCS Site T-25 Western Perimeter and Stratigraphic Trench 6.**

- Layer IV (95–100 cmbs) was a black (10YR 2/1, dry) asphalt interpreted as imported fill for the site’s parking lot. With the asphalt removed, the concrete wall that was arbitrarily labeled as Layer III was observed.
- Layer V (100–125 cmbs) was a brown (7.5YR 4/4, dry) silt with volcanic cinder. It is possible that Layer V is fill however, it could not be confirmed definitively as such due to the lack of geological testing within the proposed project area. With Layer V removed, the concrete wall arbitrarily labeled as Layer III, was observed below the ground surface.
- Layer VI (125–175 cmbs) was a compact, dark reddish brown (5YR 3/4, dry) silty clay. Layer VI was interpreted as a natural stratum. With Layer VI removed, the concrete wall arbitrarily labeled Layer III was observed and terminated in at the bottom of Layer VI. Besides the concrete wall that was observed, no other cultural material or subsurface architecture was observed.
- Layer VII (175–285 cmbs) was a compact, dark brown (7.5YR 3/4 dry) silty clay. Layer VII was interpreted as a natural stratum. Constructed in the upper stratum of Layer VII was a concrete grade beam that was probably laid in a perimeter-like fashion in preparation for the laying of the concrete foundation. Besides the concrete grade beam that was observed, no other cultural material or subsurface architecture was observed.

Given that the excavation of Stratigraphic Trench 6 across SCS Temporary Site T-25 western structural perimeter revealed multiple construction phases, the following is an interpretation of the site’s construction sequence:

- 1) A trench was excavated to create a rectangular shape and was filled with concrete that created a concrete based grade beam.
- 2) Once the concrete grade beam was dry, a concrete wall (Layer III) of approximately 90 cm (2.95 feet) high was constructed, utilizing wooden forms, on the concrete grade beam.
- 3) A concrete slab for the foundation was poured on the east side of the concrete wall.
- 4) The site was abandoned by the military following the end of World War II.
- 5) The site was re-utilized by civilians for as an animal pen. In the process, soil fill of approximately 50 cm thick was laid over the concrete foundation.
- 6) Near the top of the soil fill (*i.e.*, Layer II), a shallow [approximately 20 cm (0.66 feet) deep] trench was excavated to facilitate the creation of a thin concrete grade beam of approximately 10 cm (0.33 feet) thick.
- 7) On the thin concrete grade beam, a concrete brick wall was constructed. These walls were likely the walls that separated animals.
- 8) Following the construction the walls that separated the animals, a thin (approximately 10 cm (0.33 feet) thick) sloped northwest to southeast concrete foundation was laid over the Layer II soil fill. The thin concrete foundation was sloped to facilitate the drainage of liquids associated with the site being utilized as for animal husbandry.



SCS Temporary Site: T-26

GPS Coordinates: East 765253/ North 2303593

Previous Archaeological Recordation: IARII (Facility 168)

Features: 1

Feature Type: Concrete slab

Feature Function: Building foundation for military squadron shops and a storehouse

Feature Structural Integrity: Fair

Feature Age Association: World War II

Criterion Significance: A and D

Recommendations: No further work

SCS Site T-26 consisted of a rectangular-shaped concrete slab interpreted as a building foundation for squadron shops and a storehouse. Located on relatively level terrain amongst dried grasses, T-26 measured approximately 24.5 m long by 6.6 m wide (80.38 x 21.65 feet). The long axis of the site was oriented northeast-southwest (020/200° True). Constructed of concrete and rebar, T-26 was recorded during the 1999 IARII survey. Cultural material observed during the current survey on the surface of the foundation was identified as galvanized nails. T-26 was impacted by recent mechanical clearance of the proposed project area.

SCS Temporary Site: T-27

GPS Coordinates: East 765292/ North 2303689

Previous Archaeological Recordation: IARII (Facility 163)

Features: 1

Feature Type: Concrete slab

Feature Function: Building foundation for a military storehouse

Feature Structural Integrity: Good

Feature Age Association: World War II

Criterion Significance: A and D

Recommendations: No further work

SCS Site T-27 consisted of a rectangular-shaped concrete slab interpreted as a building foundation for a military storehouse. Located on relatively level terrain amongst dried grasses, T-27 measured approximately 30.0 m long by 6.3 m wide (98.43 x 20.67 feet). The long axis of the site was oriented northeast-southwest (020/200° True). Constructed of concrete and rebar, T-27 was recorded during the 1999 IARII survey. Cultural material observed during the current survey on the surface of the foundation was identified as galvanized nails, concrete fragments,

and aluminum can. T-27 was not impacted by recent mechanical clearance of the proposed project area.

SCS Temporary Site: T-28

GPS Coordinates: East 765265/ North 2303454

Previous Archaeological Recordation: IARII (Facility 176)

Features: 1

Feature Type: Concrete slab

Feature Function: Building foundation for a military garage and maintenance

Feature Structural Integrity: Fair

Feature Age Association: World War II

Criterion Significance: A and D

Recommendations: No further work

SCS Site T-28 consisted of a rectangular-shaped concrete slab interpreted as a building foundation for a military garage and maintenance. Located on relatively level terrain amongst dried grasses, T-28 measured approximately 24.3 m long by 6.2 m wide (80.15 x 20.34 feet). The long axis of the site was oriented northeast-southwest (020/200° True). Constructed of concrete and rebar, T-28 was recorded during the 1999 IARII survey. Cultural material observed during the current survey on the surface of the foundation was identified as milled wood, ferrous metal nuts and bolts, and a plastic pen. T-28 was impacted by recent mechanical clearance of the proposed project area.

SCS Temporary Site: T-29

GPS Coordinates: East 764897/ North 2304194

Previous Archaeological Recordation: IARII (Facility 318)

Features: 1

Feature Type: Concrete slab

Feature Function: Building foundation for a military galley

Feature Structural Integrity: Fair

Feature Age Association: World War II

Criterion Significance: A and D

Recommendations: No further work

SCS Site T-29 consisted of a rectangular-shaped concrete slab interpreted as a building foundation for a military galley. Located on relatively level terrain amongst lion's ear, *kiawe*,

goosefeet, and dried grasses, T-29 measured approximately 30.0 m long by 12.5 m wide (98.43 x 41.01 feet). The long axis of the site was oriented northeast-southwest (010/190° True). Constructed of concrete and rebar, T-29 was recorded during the 1999 IARII survey. Cultural material observed during the current survey on the surface of the foundation was identified as plastic, window glass sherds, and basalt gravel. T-29 was impacted by recent mechanical clearance of the proposed project area.

SCS Temporary Site: T-30

GPS Coordinates: East 764881/ North 2304141

Previous Archaeological Recordation: IARII (Facility 138)

Features: 1

Feature Type: Concrete slab

Feature Function: Building foundation for Chief Petty Officer barracks; later civilian quarters

Feature Structural Integrity: Fair

Feature Age Association: World War II

Criterion Significance: A and D

Recommendations: No further work

SCS Site T-30 consisted of a rectangular-shaped concrete slab interpreted as a building foundation for chief petty officer barracks and later, civilian quarters. Located on relatively level terrain amongst *haole koa*, castor bean, and dried grasses, T-30 measured approximately 23.0 m long by 9.0 m wide (75.46 x 29.53 feet). The long axis of the site was oriented northeast-southwest (005/185° True). Constructed of concrete and rebar, T-30 was recorded during the 1999 IARII survey. Cultural material observed during the current survey on the surface of the foundation was identified as milled wood, window glass sherds, basalt gravel, and steel nuts and bolts. T-30 was impacted by recent mechanical clearance of the proposed project area.

SCS Temporary Site: T-31

GPS Coordinates: East 764922/ North 2304142

Previous Archaeological Recordation: None

Features: 1

Feature Type: Concrete slab

Feature Function: Possible building foundation

Feature Structural Integrity: Fair

Feature Age Association: Possible World War II

Criterion Significance: D

Recommendations: No further work

SCS Site T-31 consisted of a rectangular-shaped concrete slab interpreted as a possible building foundation. Located on relatively level terrain amongst lion's ear, spiny amaranth, tomato, goosefeet, and dried grasses, T-31 measured approximately 16.0 m long by 6.2 m wide (52.49 x 20.34 feet). The long axis of the site was oriented northeast-southwest (109/289° True). Constructed of concrete and rebar, T-31 was not recorded during the 1999 IARII survey. Cultural material observed during the current survey on the surface of the foundation was identified as milled wood, mirror and window glass sherds, and galvanized nails. T-31 was impacted by recent mechanical clearance of the proposed project area.

SCS Temporary Site: T-32

GPS Coordinates: East 764928/ North 2304169

Previous Archaeological Recordation: None

Features: 1

Feature Type: Concrete ramp and platform

Feature Function: Possible loading dock

Feature Structural Integrity: Fair

Feature Age Association: Possible World War II

Criterion Significance: D

Recommendations: No further work

SCS Site T-32 consisted of a single feature comprised of two components physically attached to each other. These two components were identified as a rectangular concrete ramp and square platform interpreted as a possible loading dock. Located on relatively level terrain amongst *haole koa*, castor bean, and dried grasses, T-32 measured approximately 14.5 m long by 3.7 m wide (47.57 x 12.14 feet). The long axis of the site was oriented northeast-southwest (020/200° True). Constructed of concrete and rebar, T-32 was not recorded during the 1999 IARII survey. No cultural material observed during the current survey on the surface of the possible loading dock. Although T-32 was not impacted by recent mechanical clearance of the proposed project area, abandonment and neglect has collapsed the square platform.

SCS Temporary Site: T-33

GPS Coordinates: East 764979/ North 2303980

Previous Archaeological Recordation: None



Features: 1

Feature Type: Concrete slab

Feature Function: Possible building foundation

Feature Structural Integrity: Fair

Feature Age Association: Possible World War II

Criterion Significance: D

Recommendations: No further work

SCS Site T-33 consisted of a rectangular-shaped concrete slab interpreted as a building foundation. Located on relatively level terrain amongst dried grasses, T-33 measured approximately 7.4 m long by 6.0 m wide (24.28 x 19.69 feet). The long axis of the site was oriented northeast-southwest (79/259° True). Constructed of concrete and rebar, T-33 was not recorded during the 1999 IARII survey. Cultural material observed during the current survey on the surface of the foundation was identified as non-diagnostic plastic, a whiteware ceramic sherd, and a galvanized pipe. T-33 was impacted by recent mechanical clearance of the proposed project area.

SCS Temporary Site: T-34

GPS Coordinates: East 765113/ North 2303972

Previous Archaeological Recordation: None

Features: 1

Feature Type: Concrete slab

Feature Function: Possible building foundation

Feature Structural Integrity: Fair

Feature Age Association: Possible World War II

Criterion Significance: D

Recommendations: No further work

SCS Site T-34 consisted of a rectangular-shaped concrete slab interpreted as a building foundation. Located on relatively level terrain amongst dried grasses, T-34 measured approximately 16.0 m long by 7.0 m wide (52.49 x 22.97 feet). The long axis of the site was oriented southeast-northwest (149/329° True). Constructed of concrete and rebar, T-34 was not recorded during the 1999 IARII survey. Cultural material observed during the current survey on the surface of the foundation was identified as concrete fragments, coral, basalt gravel, and calcareous sand. T-34 was not impacted by recent mechanical clearance of the proposed project area.

## STATE SITE 50-50-09-4801 POST-WAR CATTLE RANCHING COMPLEXES

Four (4) SCS temporary sites (numbered T-18 through T-21) were identified in the easternmost area of previously assigned State Site 50-50-09-4801, a post-war cattle ranching complex. Of the four features found during the current work, T-19 was the only one not previously recorded during the 1999 IARII survey.

SCS Temporary Site: T-18

GPS Coordinates: East 765205/ North 2304161

Previous Archaeological Recordation: Unknown

Features: 1

Feature Type: Water trough

Feature Function: Cattle rehydration

Feature Structural Integrity: Excellent

Feature Age Association: Post-World War II

Criterion Significance: D

Recommendations: No further work

SCS Site T-18 consisted of a rectangular-shaped trough interpreted as a water trough for cattle rehydration. Located on relatively level terrain amongst *kiawe*, lion's ear, and dried grasses, T-18 measured approximately 2.03 m long by 1.03 m wide (6.66 x 3.38 feet) and constructed four concrete bricks high. The long axis of the site was oriented northeast-southwest (096/276° True). Constructed of cement brick bounded with cement, T-18 was not singularly described during the 1999 IARII survey. Thus, it is unknown if T-18 was present during the 1999 IARII survey. No cultural material was observed during the current survey on or near the site. T-18 was not impacted by recent mechanical clearance of the proposed project area.

SCS Temporary Site: T-19

GPS Coordinates: East 765217/ North 2304108

Previous Archaeological Recordation: IARII (Facility 131)

Features: 2

Feature Types: Concrete slab (Feature 1), water trough (Feature 2)

Feature Function: Building foundation for military barracks, later civilian quarters (Feature 1); cattle rehydration station (Feature 2)

Feature Structural Integrity: Excellent

Feature Age Association: World War II (concrete slab); post-World War II (water trough)

Criterion Significance: A and D

Recommendations: No further work

SCS Site T-19 consisted of two features. The first is a rectangular-shaped concrete slab interpreted as a building foundation (Feature 1). The second feature consisted of a water trough (Feature 2) interpreted as a cattle rehydration station. Located on relatively level terrain amongst *kiawe*, lion's ear, golden crown beard, and dried grasses, the T-19 Feature 1 foundation measured approximately 17.0 m long by 6.9 m wide (55.77 x 22.64 feet). The long axis of the Feature 1 foundation was oriented southeast-northwest (169/349° True). Constructed of concrete and steel rebar, the T-19 Feature 1 foundation was recorded during the 1999 IARII survey. Located on the same terrain is T-19 Feature 2, a water trough that was also rectangular-shaped and measuring approximately 6.1 m by 1.1 m and oriented southeast-northwest (079/259 ° True). Constructed of concrete brick and cement, the Feature 2 water trough was not singularly described, but rather previously described collectively as part of State Site 50-50-09-4801, due to its proximity to Feature 1. Cultural material observed during the current survey on the surface of T-19 was identified as plastic agriculture lines, basalt gravel, and sawn cow bones. Neither of the two features collectively described as T-19 were impacted by recent mechanical clearance of the proposed project area.

SCS Temporary Site: T-20

GPS Coordinates: East 765200/ North 2304052

Previous Archaeological Recordation: Not singularly

Features: 2

Feature Types: Feed trough (Feature 1), water trough (Feature 2)

Feature Function: Cattle nourishment (Feature 1) and rehydration station (Feature 2)

Feature Structural Integrity: Excellent

Feature Age Association: post-World War II (feed and water trough)

Criterion Significance: D

Recommendations: No further work

SCS Site T-20 consisted of two features: a rectangular-shaped feed trough (Feature 1) and a water trough (Feature 2). These features were interpreted as a cattle nourishment station and rehydration station respectively. Located on relatively level terrain amongst *kiawe*, golden crown beard, lion's ear, and dried grasses, the T-20 Feature 1 feed trough measured approximately 43.0 m long by 1.5 m wide (141.08 x 4.92 feet). The long axis of the Feature 1 feed trough was oriented southeast-northwest (002/182° True). Constructed of concrete, it is not known if the T-20 Feature 1 feed trough was singularly recorded; it was more likely described

collectively as part of State Site 50-50-09-4801 during the 1999 IARII survey. Located on the same terrain is the T-20 Feature 2 water trough that was also rectangular shaped and measured approximately 6.1 m by 1.1 m (20.01 x 3.61 feet) and oriented southeast-northwest (092/272 ° True). Constructed of concrete brick and cement, it is not known if the Feature 2 water trough was singularly recorded; it was also likely described collectively as part of State Site 50-50-09-4801. Cultural material observed during the current survey on the surface of T-20 was identified as milled wood, ferrous metal, concrete, and cattle bones. Neither of the two features collectively described as T-20 were impacted by recent mechanical clearance of the proposed project area.

SCS Temporary Site: T-21

GPS Coordinates: East 765188/ North 2304018

Previous Archaeological Recordation: IARII (Facility 144)

Features: 2

Feature Types: Concrete slab (Feature 1), feed trough (Feature 2)

Feature Function: Building foundation for military barracks (Feature 1); cattle nourishment station (Feature 2)

Feature Structural Integrity: Excellent

Feature Age Association: World War II (concrete slab); post-World War II (feed trough)

Criterion Significance: A and D

Recommendations: No further work

SCS Site T-21 consisted of a two features: a rectangular-shaped concrete slab interpreted as a building foundation (Feature 1) and second, a water trough (Feature 2) interpreted as a cattle rehydration station. Located on relatively level terrain amongst *kiawe*, lion's ear, golden crown beard, and dried grasses, the T-21 Feature 1 foundation measured approximately 22.7 m long by 8.9 m wide (74.48 x 29.2 feet). The long axis of the Feature 1 foundation was oriented northeast-southwest (20/200° True). Constructed of concrete and steel rebar, the T-21 Feature 1 foundation was recorded during the 1999 IARII survey. Located on the same terrain is the T-21 Feature 2 feed trough, that was also rectangular-shaped and measured approximately 6.1 m by 1.1 m (20.01 x 3.61 feet) and oriented southeast-northwest (20/200 ° True). Constructed of concrete brick and cement, the Feature 2 feed trough was not singularly described; it was described collectively as part of State Site 50-50-09-4801. Cultural material observed during the current survey on the surface of T-19 was identified as milled wood, galvanized nails, and ferrous metal. Neither of these two features was impacted during recent mechanical clearance of the proposed project area.

## **DISCUSSION AND CONCLUSION**

Scientific Consultant Services, Inc. conducted Archaeological Inventory Survey of an approximate 917 meter (3,007.8 feet) long alternate access road [TMK: (2) 3-8-008: por. 005 and 006] and 86.029 acres of land located in TMK: (2) 3-8-008:019. The SCS research followed an earlier Archaeological Inventory Survey conducted in 1999 by IARII (Tomanari-Tuggle *et al.* 2001). During the IARII survey, two archaeological sites, State Site 50-50-09-4164 (former World War II Naval Air Station Puunene) and State Site 50-50-09-4801 (post-World War II cattle ranching site), were identified and recorded.

The current SCS study relocated the two previously identified archaeological sites and provided supplemental information in the form of documentation for fifteen (15) newly identified surface features occurring within the former two site boundaries. Of the 15 features that were newly recorded, three features were located within the State Site 50-50-09-4801 post-war cattle ranching area. The remaining twelve (12) features were located in the State Site 50-50-09-4164 former Naval Air Station Puunene area (Housing Area A Southern Portion). The mechanical excavation of twenty (20) stratigraphic trenches revealed positive results in only one trench (ST-6), where subsurface architecture associated with Facility 25 (SCS Site T-25) was identified. The feature was originally used for military use, but had been re-used in more recent times for animal husbandry (pig farm). The fifteen features newly identified by SCS during the current study are being subsumed under the original two State site numbers originally designated by IARII.

No pre-Contact archaeological sites were identified during the current study or during the previous investigation by IARII (Tomonari-Tuggle *et al.* 2001). The synthesis of previous archaeological work in the intermediate or barren zone of the Kula District suggests the landscape may have contained a few scattered temporary or seasonal habitations and associated dryland agricultural sites. However, given the extent of historic and modern land use in the area, it is likely that any traditional/early historic sites that may have existed, albeit likely few in number, would have been severely impact by use of the Naval Air Station and environs.

## **SIGNIFICANCE ASSESSMENTS AND RECOMMENDATIONS**

The fifteen (15) newly identified features associated with State Site 50-50-09-4164 and State Site 50-50-09-4801 were assessed for their significance as outlined in Hawai'i

Administrative Rules §13-275-6. To be assessed as significant a site must be characterized by one or more of the following five criteria:

- (A) It must be associated with events that have made a significant contribution to the broad patterns of our history, or be considered a traditional cultural property.
- (B) It must be associated with the lives of persons significant in the past.
- (C) It must embody distinctive characteristics of a type, period, or method of construction, or represent a significant and distinguishable entity whose components may lack individual distinction.
- (D) It must have yielded or may be likely to yield, information important in prehistory or history.
- (E) Have important value to native Hawaiian people or other ethnicities in the state, due to associations with cultural practices and traditional beliefs that were, or still are, carried out.

State Site 50-50-09-4164 and State Site 50-50-09-4801 were previously evaluated and found to be significant under Criterion D (Tomonari-Tuggle *et al.* (2001)). The 15 features newly identified by SCS have also been evaluated and found to be significant under Criterion D. In addition, State Site 50-50-09-4164 has also been found to be significant under Criterion A, due to the important information it has yielded in association with military history on Maui.

Given that two Inventory Survey projects have been conducted in the proposed project area, it seems likely that little new information would be gleaned from additional study of the area. As such, no further archaeological work is recommended for the larger portion of the proposed project area identified as TMK: (2) 3-8-008:019. However, since the 917 meter (3,007.8 feet) long alternate access road was only subjected to pedestrian survey and that archaeological features were documented near the east and west sides of the road during the 1999 IARII survey, Archaeological Monitoring is recommended for the alternate access road should physical alteration (*i.e.*, widening or excavation) be required as those features may be adversely impacted.

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**APPENDIX A: STRATIGRAPHIC TRENCH INFORMATION**

ST-16 NORTH WALL  
SECTIONAL PROFILE



KEY

**I** - LAYER I: DARK RED (2.5YR 3/6, DRY) SILTY CLAY

ST-17 SOUTH WALL  
SECTIONAL PROFILE



KEY

**I** - LAYER I: DARK RED (2.5YR 3/6, DRY) MOTTLED WITH BROWN (7.5YR 4/4, DRY) SILT

ST-18 NORTHWEST WALL  
SECTIONAL PROFILE



KEY

**I** - LAYER I: DARK RED (2.5YR 3/6, DRY) MOTTLED WITH BROWN (7.5YR 4/4, DRY) SILT

ST-19 SOUTH WALL  
SECTIONAL PROFILE



KEY

**I** - LAYER I: DARK RED (2.5YR 3/6, DRY) SILTY CLAY  
**II** - LAYER II: BROWN (7.5YR 4/4, DRY) SILT

ST-20 WEST WALL  
SECTIONAL PROFILE



KEY

**I** - LAYER I: CONCRETE WITH REBAR  
**II** - LAYER II: STRONG BROWN (7.5YR 4/4, DRY) SILT  
**III** - LAYER III: DARK BROWN (7.5YR 3/4, DRY) SILTY CLAY



ST-1 NORTH WALL  
SECTIONAL PROFILE



KEY

**I** - LAYER I: DARK REDDISH BROWN (5YR 3/4, DRY) SILTY CLAY  
**II** - LAYER II: REDDISH BROWN (5YR 4/3, DRY) SILT

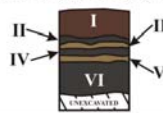
ST-2 NORTH WALL  
SECTIONAL PROFILE



KEY

**I** - LAYER I: DARK REDDISH BROWN (5YR 3/4, DRY) SILTY CLAY  
**II** - LAYER II: REDDISH BROWN (5YR 4/3, DRY) SILT

ST-3 SOUTH WALL  
SECTIONAL PROFILE



KEY

**I** - LAYER I: DARK REDDISH BROWN (5YR 3/4, DRY) SILTY CLAY  
**II** - LAYER II: BLACK (10YR 2/1, DRY) VOLCANIC CINDER  
**III** - LAYER III: YELLOWISH BROWN (10YR 5/6, DRY) SILT  
**IV** - LAYER IV: BLACK (10YR 2/1, DRY) VOLCANIC CINDER  
**V** - LAYER V: YELLOWISH BROWN (10YR 5/6, DRY) SILT  
**VI** - LAYER VI: BLACK (10YR 2/1, DRY) VOLCANIC CINDER

ST-4 SOUTH WALL  
SECTIONAL PROFILE



KEY

**I** - LAYER I: DARK REDDISH BROWN (5YR 3/4, DRY) SILTY CLAY  
**II** - LAYER II: BLACK (10YR 2/1, DRY) VOLCANIC CINDER  
**III** - LAYER III: DARK REDDISH BROWN (5YR 3/4, DRY) SILTY CLAY  
**IV** - LAYER IV: DARK BROWN (7.5YR 3/4, DRY) SILTY CLAY



ST-5 SOUTH WALL SECTIONAL PROFILE

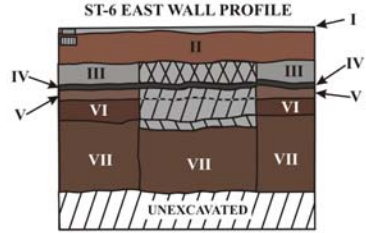


KEY	
<b>I</b>	- LAYER I: BLACK (10YR 2/1, DRY) ASPHALT
<b>II</b>	- LAYER II: GRAY (7.5YR 5/1, DRY) BASALT GRAVEL
<b>III</b>	- LAYER III: DARK REDDISH BROWN (5YR 3/4, DRY) SILTY CLAY
<b>IV</b>	- LAYER IV: DARK REDDISH BROWN (5YR 3/4, DRY) SILTY CLAY

ST-7 EAST WALL SECTIONAL PROFILE



KEY	
<b>I</b>	- LAYER I: DARK REDDISH BROWN (5YR 3/4, DRY) SILTY CLAY
<b>II</b>	- LAYER II: DARK BROWN (7.5YR 3/4, DRY) SILTY CLAY



KEY	
<b>I</b>	- LAYER I: SECONDARY CONCRETE SLAB
<b>II</b>	- LAYER II: YELLOWISH RED (5YR 4/6, DRY) SILTY CLAY
<b>III</b>	- LAYER III: ABOVE SURFACE PRIMARY CONCRETE WALL
<b>IV</b>	- LAYER IV: BLACK (10YR2/1, DRY) ASPHALT
<b>V</b>	- LAYER V: BROWN (7.5YR 4/4, DRY) SILT WITH VOLCANIC GLASS CINDER
<b>VI</b>	- LAYER VI: DARK REDDISH BROWN (5YR 3/4, DRY) SILTY CLAY
<b>VII</b>	- LAYER VII: DARK BROWN (7.5YR 3/4, DRY) SILTY CLAY
	- CONCRETE BRICK
	- SECONDARY CONCRETE GRADE BEAM
	- PRIMARY CONCRETE WALL ABOVE GROUND SURFACE
	- PRIMARY CONCRETE WALL BELOW GROUND SURFACE
	- PRIMARY CONCRETE GRADE BEAM

ST-8 SOUTH WALL SECTIONAL PROFILE



KEY	
<b>I</b>	- LAYER I: BLACK (10YR 2/1, DRY) ASPHALT
<b>II</b>	- LAYER II: BLACK (10YR 2/1, DRY) VOLCANIC CINDER
<b>III</b>	- LAYER III: DARK REDDISH BROWN (5YR 3/4, DRY) SILTY CLAY

ST-9 NORTH WALL SECTIONAL PROFILE



KEY	
<b>I</b>	- LAYER I: DARK REDDISH BROWN (5YR 3/4, DRY) SILTY CLAY

ST-10 NORTH WALL SECTIONAL PROFILE



KEY	
<b>I</b>	- LAYER I: DARK REDDISH BROWN (5YR 3/4, DRY) SILTY CLAY
<b>II</b>	- LAYER II: DARK YELLOWISH BROWN (10YR 4/4, DRY) SILTY CLAY
<b>III</b>	- LAYER III: DARK REDDISH BROWN (5YR 3/4, DRY) SILTY CLAY



ST-11 SOUTH WALL SECTIONAL PROFILE



KEY	
<b>I</b>	- LAYER I: DARK REDDISH BROWN (5YR 3/4, DRY) SILTY CLAY
<b>II</b>	- LAYER II: DARK YELLOWISH BROWN (10YR 4/4, DRY) SILTY CLAY



ST-12 EAST WALL  
SECTIONAL PROFILE



KEY

**I** - LAYER I: DARK REDDISH BROWN (5YR 3/4, DRY) SILTY CLAY

ST-13 SOUTH WALL  
SECTIONAL PROFILE



KEY

**I** - LAYER I: DARK REDDISH BROWN (5YR 3/4, DRY) SILTY CLAY

ST-14 SOUTH WALL  
SECTIONAL PROFILE

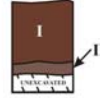


KEY

**I** - LAYER I: DARK REDDISH BROWN (5YR 3/4, DRY) SILTY CLAY



ST-15 SOUTH WALL  
SECTIONAL PROFILE



KEY

**I** - LAYER I: DARK RED (2.5YR 3/6, DRY) SILTY CLAY

**II** - LAYER II: BROWN (7.5YR 4/4, DRY) SILT


## **APPENDIX B: ARTIFACT ANALYSIS**

SCS TEMPORARY SITE	DEPTH	COLLECTED ITEM IDENTIFICATION	MEASUREMENTS	COUNT	REMARKS
T-1	Surface	Copper Penny	Diameter: 1.9 cm Thickness: 0.1 cm Weight: 3.0 g	1	United States 1944 "S" wheat penny
T-2	Surface	Copper Penny	Diameter: 1.9 cm Thickness: 0.1 cm Weight: 3.0 g	1	United States 1944 "S" wheat penny
T-12	Surface	Glass Bead	Diameter: 1.2 cm Weight: 2.2 g	1	Light blue, wound
T-17	Surface	Marine Shell Button	Diameter: 1.3 cm Thickness: 0.2 cm Weight: 0.6 g	1	Two hole button; obverse with elliptical depression, reverse flat
GENERAL PROJECT AREA	Surface	Ferrous Metal Square Nail	Length: 6.9 cm Weight: 13.9 g	1	Corroded; GPS coordinates: East 765005/ North 2303937
GENERAL PROJECT AREA	Surface	Non-Ferrous Metal School Token	Diameter: 2.3 cm Thickness: 0.1 cm Weight: 1.3 g	1	Aluminum, Kihei School 5 cent cafeteria token; obverse dented



SCS Project 1219 Artifacts

1. United States 1944 "S" Copper Wheat Penny (Bag 1)
2. United States 1944 "S" Copper Wheat Penny (Bag 2)
3. Glass Bead (Bag 3)
4. Marine Shell Button (Bag 4)
5. Ferrous Metal Square Nail (Bag 5)
6. Aluminum Kihei School 5 Cent Cafeteria Token (Bag 6)



STATE HISTORIC  
PRESERVATION DIVISION  
LETTER DATED  
JUNE 18, 2012

APPENDIX

J



NEIL ABERCROMBE  
GOVERNOR OF HAWAII



STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES

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

WILLIAM J. AILA, JR.  
INTERIM CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE MANAGEMENT

GUY H. KAULUKUKUI  
FIRST DEPUTY

WILLIAM M. TAM  
INTERIM DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES  
BOATING AND OCEAN RECREATION  
BUREAU OF CONVEYANCES  
COMMISSION ON WATER RESOURCE MANAGEMENT  
CONSERVATION AND COASTAL LANDS  
CONSERVATION AND RESOURCES ENFORCEMENT  
ENGINEERING

FORESTRY AND WILDLIFE  
HISTORIC PRESERVATION  
KAHOOLAWE ISLAND RESERVE COMMISSION  
LAND  
STATE PARKS

June 18, 2012

Robert L. Spear, Ph. D., Principal Investigator  
Scientific Consultant Services, Inc.  
711 Kapiolani Blvd., Suite 975  
Honolulu, Hawaii 96793

LOG NO: 2011.2267  
DOC NO: 1206MD01  
Archaeology

Dear Dr. Spear:

Subject: **Chapter 6E-42 Historic Preservation Review  
Archaeological Inventory Survey of 86.029 Acres within the Puunene Naval Air Station  
Pūlehū Nui Ahupua'a, Wailuku District, Island of Maui  
TMK: (2) 3-8-008:005 (por.), 006 (por.) and 019**

Thank you for submitting the subject report titled *Draft Archaeological Inventory Survey of an Approximate 91'7 meter (3,007.8 feet) Long Alternate Access Road and an 86.029-Acre Property in Puunene, Pulehu Nui Ahupua'a, Wailuku District, Island of Maui, Hawai'i [TMK: (2) 3-8-008: Por. 005, Por. 006, and 019]*, G. Tome and M. Dega September 2011. We received a draft dated October 7, 2011, and we apologize for the delay in completing this review.

This report documents the re-investigation of a project area that was included in a prior survey of a larger acreage (Tomonari-Tuggle, et al. 2001). The 2001 report documented two archaeological sites within the current project area: Housing Area A of the former Naval Air Station Puunene (SIHP Site 50-50-09-4164) and a post-war cattle ranching area (SIHP Site 4801). During the current study, twelve additional features were documented for Site 4164, and three new features were documented for Site 4801.

In addition to a full pedestrian survey, twenty (20) mechanical trenches were excavated during the survey. One trench uncovered structural remains (ST-6) related to Facility 177 (a feature of Site 4164). ST-6 consisted of a worn concrete slab interpreted as a building foundation; it was sufficiently recorded in this report.

Sites 4164 and 4018 were previously recommended as significant under HRHP Criterion "d" while Site 4164 was also recommended as significant under Criterion "a." This report does not recommend any changes to those findings and further recommends the newly documented features for no further work; we concur with those recommendations. However, given the lack of subsurface excavations in the area of the possible future site of an alternate access road, we agree that archaeological monitoring is recommended for work related to an alternate road. Should that alternate roadway be planned we recommend that an archaeological monitoring plan be submitted to SHPD for review and approval prior to the issuance of any permits related to ground-altering activity.

The report contains appropriate background information and documentation of the identified historic properties is adequate. The report is approved in accordance with Hawaii Administrative Rule §13-276. Please send one hardcopy of the document to both the Maui and Oahu offices marked FINAL, along with a copy of this review letter. Please send a text-searchable PDF file on CD to Kapolei with the hard copy. Please contact me at (808) 933-7653 or [Theresa.K.Donham@hawaii.gov](mailto:Theresa.K.Donham@hawaii.gov) if you have any questions about this letter.

Aloha,

A handwritten signature in black ink, appearing to read "Theresa K. Donham".

Theresa K. Donham  
Archaeology Branch Chief



ARCHAEOLOGICAL  
MONITORING PLAN

APPENDIX

K



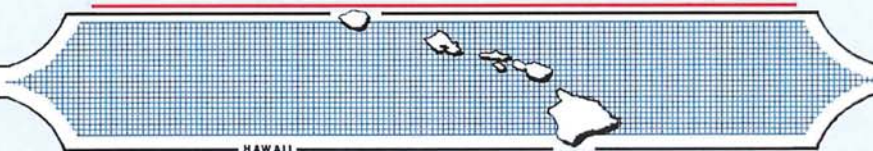


**AN ARCHAEOLOGICAL MONITORING PLAN FOR  
A 917 METER (3,007 FEET) LONG ALTERNATE ACCESS ROAD AND  
AN 86.029-ACRE PROPERTY IN PUUNENE,  
PŪLEHU NUI AHUPUA`A, WAIL UKU DISTRICT,  
ISLAND OF MAUI, HAWAII  
[TMK: (2) 3-8-008:005, 006, AND 019]**

Prepared by:  
**David B. Chaffee, B.A.,**  
and  
**Michael Dega, Ph.D.**  
Revised September 2012  
**FINAL**

Prepared for:  
**Ms. Blanca Lafolette**  
**Project Coordinator**  
**CMBY 2011 Investment, LLC**  
**1300 North Holopono Street, Suite 201**  
**Kihei, Hawai`i 96753**

**SCIENTIFIC CONSULTANT SERVICES Inc.**



**711 Kapiolani Blvd. Suite 975 Honolulu, Hawai`i 96813**

## TABLE OF CONTENTS

TABLE OF CONTENTS.....	ii
LIST OF FIGURES .....	ii
INTRODUCTION .....	1
PROJECT AREA AND VICINITY .....	1
REASON FOR MONITORING.....	6
GENERAL PROJECT AREA HISTORICAL BACKGROUND .....	6
PROJECT AREA SOILS.....	6
PROJECT AREA VEGETATION .....	6
CLIMATE.....	7
TRADITIONAL AND HISTORIC SETTING.....	7
TRADITIONAL TIMES .....	8
HISTORIC TIMES .....	8
PREVIOUS ARCHAEOLOGY IN GENERAL AREA.....	11
PREVIOUS ARCHAEOLOGY IN THE CURRENT PROJECT AREA.....	12
POTENTIAL SITE TYPES TO BE ENCOUNTERED.....	16
MONITORING CONVENTIONS AND METHODOLOGY.....	17
LABORATORY ANALYSIS .....	19
CURATION.....	19
REPORTING.....	20
REFERENCES CITED.....	21

## LIST OF FIGURES

Figure 1: USGS (Puu O Kali Quadrangle) Map, Showing Project Area Location.....	2
Figure 2: Tax Map Key [TMK] Showing Project Area.....	3
Figure 3: Plan View Map of Grading Plan for the Current Project Area. ....	4
Figure 4: International Archaeological Research Institute Incorporated (IARII) Plan View Map Showing Previously Recorded Archaeological Features and Current SCS Project Area Alternate Road. ....	13
Figure 5: IARII Plan View Map Showing Previously Recorded Archaeological Features and Current SCS Project Area Perimeter of TMK (2) 3-8-008:019.....	14



## **INTRODUCTION**

At the request of CMBY 2011 Investment, LLC., Scientific Consultant Services (SCS), Inc. prepared this Archaeological Monitoring Plan (AMP) for the proposed Puunene Heavy Industrial Subdivision Project on a 917 meter (3,007 feet) long alternate access road and on 86.029-acres of land within Pūlehu Nui Ahupua`a, Wailuku District, Island of Maui, Hawai`i [TMK: (2) 3-8-008:005, 006, and 019] (Figures 1, 2, and 3). This varied Monitoring program follows an Archaeological Inventory Survey (AIS; Tome and Dega 2011) of the proposed project area in which features associated with two known historic-era sites were newly documented (see below).

Archaeological Monitoring “shall entail the archaeological observation of, and possibly intervention with, on-going activities which may adversely affect historic properties” (§13-279-4, HAR). Thus, Monitoring will also ensure that significant cultural resources, if identified in the proposed project area are documented through profiles and plan view maps, possibly sampled through excavation of exposed features, and evaluated for their historical significance. This Monitoring Plan will also ensure that if human remains are identified during subsurface work, appropriate and lawful protocol concerning the Inadvertant Discovery of Human Remains (pursuant to §13-300-40a, b, c, HAR) is followed. As will be made aware to the construction team, the archaeological Monitor has the authority to halt any ground disturbing activities during this project in the immediate area of a find in order to appropriately carry out the provisions of this plan.

This AMP is varied in that full-time Monitoring will be conducted if the alternate access road is improved. For the remainder of the project area, intermittent Monitoring is recommended as the area has undergone two Inventory Survey studies (see below), has been subject to intensive land alterations through time, and contains only minimal probability that subsurface deposits would be identified. This AMP will require the approval of the State Historic Preservation Division (SHPD) prior to any land altering activities on the parcel. The following text provides more detailed information on the reasons for monitoring, potential site types to be encountered during excavation, monitoring conventions and methodology for both field and laboratory work, and discusses curation and reporting of cultural material recovered.

## **PROJECT AREA AND VICINITY**

The project is located within Pūlehu Nui Ahupua`a, Wailuku District, Island of Maui, Hawai`i. According to the County of Maui Real Property Tax Division website, <http://www.mauipropertytax.com/>, the fee owner of the 86.029-acre parcel [TMK: (2) 3-8-008:019] is identified as CMBY 2011 Investment, LLC. The fee owner of TMK: (2) 3-8-



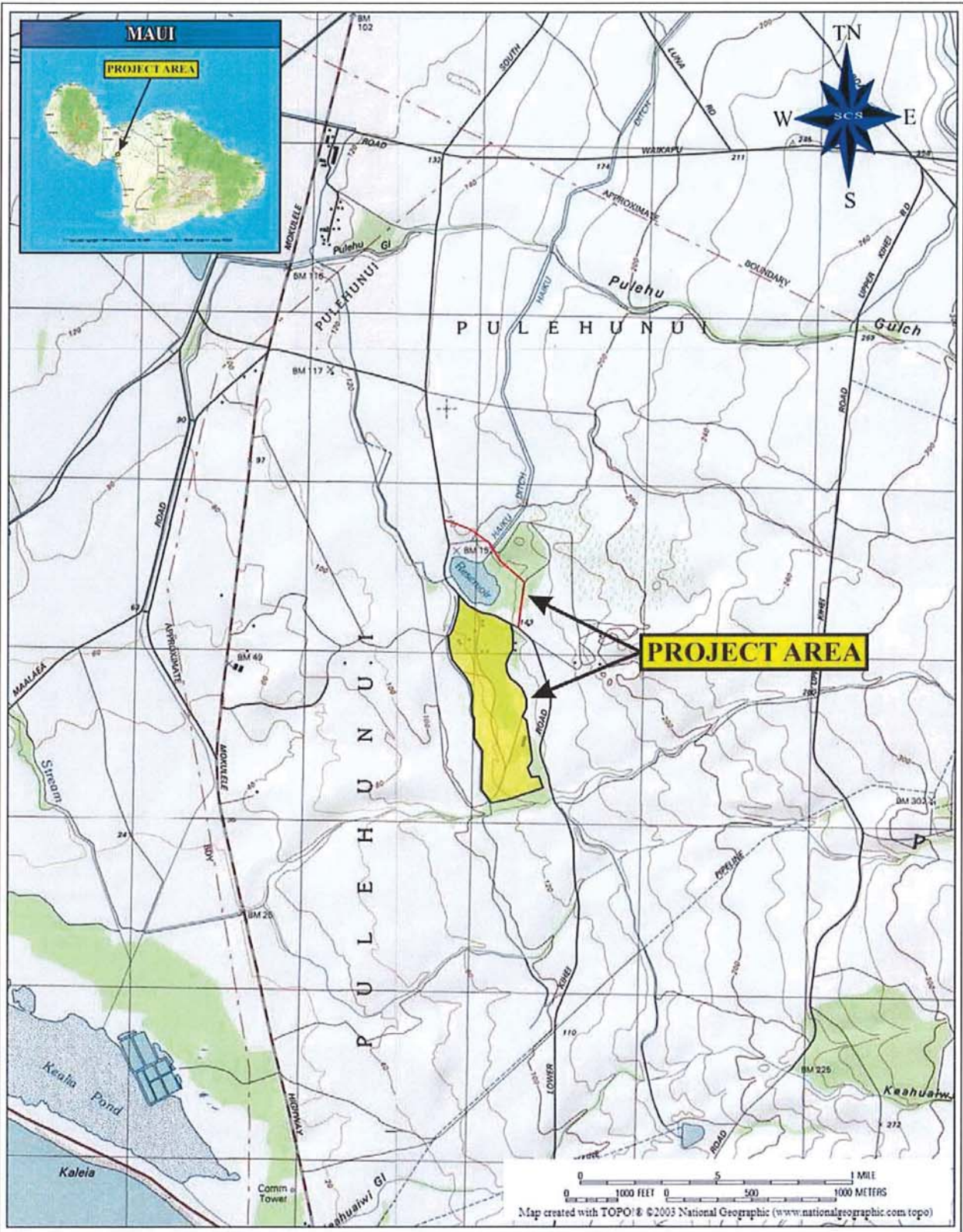


Figure 1: USGS (Puu O Kali Quadrangle) Map, Showing Project Area Location.





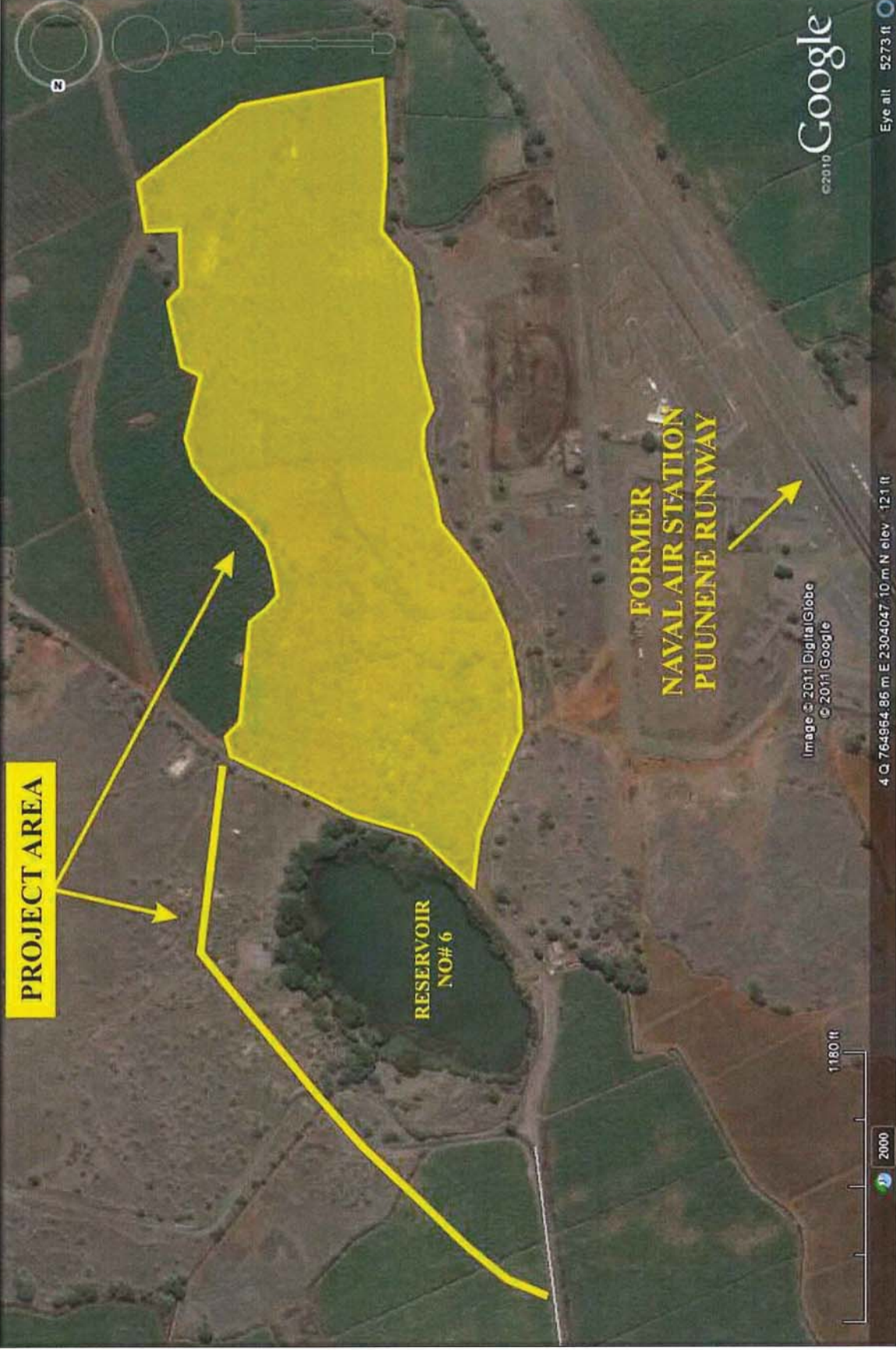


Figure 3: Plan View Map of Grading Plan for the Current Project Area.

008:005 and 006 on which the 917 meter (3,007 feet) long alternative access road is located, is identified as Alexander & Baldwin, Inc.

Although both portions of the project area are separated by an existing asphalt road, the alternative access road and 86.029-acre parcel are situated approximately 2.0 miles inland from the Kihei coastline, between *c.* 80 to 120 feet (24 to 37 meters) above mean sea level (amsl), on the lower west slope of Haleakalā. The alternate access road is located in Tax Map Keys (2) 3-8-008:005 and 006 of which both are owned by Alexander & Baldwin. The north, east, and south flanks of the 86-029-acre portion of the project area are bordered by private land owned by Alexander & Baldwin [TMK: (2) 3-8-008:005]. The west side of the project area is bordered by private land owned by Alexander & Baldwin [TMK: (2) 3-8-008:030] and land owned by the State of Hawaii [TMK: (2) 3-8-008:037]. At the time of this writing, there were several asphalt paved roads that divided the larger portion of the project area into several unequal-sized sections.

Most of the project area contained undulating terrain. The larger portion was slightly undulated amongst patches of flat terrain. Trees on the project area had attained heights of approximately 30 feet tall. Approximately 30 percent of the project area had grown fallow since the departure of a pig farm and scrap metal storage site. Basalt boulders from the size of basketballs to the size of a 55-gallon drum littered the landscape and created physical obstacles.

The landscape condition of the project area's larger portion was varied. The northern portion of the project area was cleaned up within the recent past, according to Ken Nomura of Alexander & Baldwin. Mr. Nomura relayed to the field crew that following CMBY's purchase of the 86-029-acre property, Alexander & Baldwin had cleared the land of debris associated with a pig farm and scrap metal storage site that had previously utilized the property. The result was that various portions of the project area were mechanically altered, on the surface and in subsurface contexts (Figure 5). Visibility of the mechanically altered ground surface was excellent. The mechanical clearance of the debris was not applied to the entire project area. The areas that were not mechanically cleared were covered with dried, two to four feet tall grasses and vegetation. Nonetheless, man-made features were visible due to the mechanical clearance and the dried vegetation.



## REASON FOR MONITORING

Archaeological Monitoring will occur on a full-time basis if improvements are made to the alternative access road and on an intermittent basis during all other ground altering activities (*i.e.*, excavation). There is only a slight probability of identifying additional cultural resources in the overall proposed project area. Thus, intermittent monitoring is recommended. If the alternate access road is graded or widened, full-time Monitoring is recommended, given that the area was not previously subjected to Inventory Survey-level testing. There still remains only a slight chance for encountering cultural resources along the alternate road corridor. Overall, Historic-period land use, and existing features left from the era of the Puunene Naval Air Field, remain in the proposed project area. Given the intensive historic use of the general area, Intermittent Monitoring will provide another opportunity to fully document and assess any additional cultural resources related to the two known historic sites (see below).

## GENERAL PROJECT AREA HISTORICAL BACKGROUND

### **PROJECT AREA SOILS**

Based on Foote *et al.* (1972: 126–127; Map 106), the project area is mainly situated within the Waiakoa very stony silty clay loam (WID2) series with a small section at the southern end of the project area containing Alae cobbly sandy loam (AcB) (*ibid.*: 26; Map 106). The Waiakoa extremely stony silty-clay loam which occurs on 3 to 25 percent slopes and is eroded, with medium runoff and severe erosional hazard. Stones cover approximately 3 to 15 percent of this soil surface. With the exception of sugarcane, this soil type has been utilized for pasture and wildlife. The Alae cobbly sandy loam has a slow runoff, is a slight erosional hazard, and is typically utilized for pastureland and sugarcane.

Subsurface testing of the WID2 and AcB soils on the southern portion of the project area revealed the presence of volcanic cinders strata that were interpreted during the current survey as natural strata. Naturally occurring rounded basalt cobbles and small boulders were also being exposed during the excavation of the project area matrices.

### **PROJECT AREA VEGETATION**

With the exception of few plant native species such as *`ilima* (*Sida fallax*) and *`uhaloa* (*Waltheria americana*), vegetation in the project area was generally composed of non-native introductions. Although decomposing grasses dominated the vegetation regime, larger vegetation common to arid regions such as *kiawe* (*Prosopis pallida*), *koa haole* (*Leucaena leucocephala*), castor bean (*Ricinus communis*), lion's ear (*Leontis nepetifolia*), spiny amaranth (*kuku*; *Amaranthus spinosus*), tomato (*Solanum* sp.), goosefoot (*Chenopodium* sp.), golden

crownbeard (*Verbesina encelioides*), klu (*kolu*; *Acacia farnesiana*), balsam pear (*Momordica charantia*), koali kua hulu (*Merremia aegyptia*), hairy abutilon (*ma`o*; *Abutilon grandifolium*), and coat buttons (*Tridax procumbens*) were present.

## **CLIMATE**

The project area lies near the dry, arid region of Maui's southwest coast. Rainfall indicators, according to Price (1983:62), show that the project area receives no more than five inches per year, with accumulations occurring mostly during the months of December and January. Unlike lower, coastal elevations, higher elevations of Pūlehu Nui Ahupua`a receive more precipitation due to fog drip and lower temperature climates. The frequency of the project area receiving upland wash is based on the amount of water accumulated upslope and the available water drainages created within or near the project area.

Given the lack of constant water resources within the project area, Traditional-type (*i.e.*, pre-1778 A.D.) crops such as dryland sweet potato may have been the only feasible subsistence resource planted in the area prior to the advent of large-scale plantation-type irrigation systems. Of the twenty (20) stratigraphic trenches excavated during the current survey, only eight (8) trenches revealed no more than a single soil layer. The windy conditions of the project area suggest soils within the project area may have been adversely affected. Upland, gravitational wash also may have contributed to soil movement through the project area environs during the Traditional-Period.

## **TRADITIONAL AND HISTORIC SETTING**

Pūlehu Nui Ahupua`a is located on the southwestern side of Maui in the modern districts of both Wailuku and Makawao. Prior to being named the District of Makawao, the same district was traditionally known as Kula District. The project area would have been partially within the traditional District of Kula. As such, the project area's traditional and historic settings will be highlighted with events that occurred in the traditional District of Kula rather than in the modern District of Wailuku.

The project area is situated near the leeward coast that is located on the lower, western slope of Maui's largest volcano, Haleakala, the latter which rises to over 3,048 meters (10,000 ft) amsl. The coastal area, on which the project area lies, is currently referred to as "Kihei," which translates as "cape" or "cloak" in Hawaiian (Pukui *et al.* 1974:110).



## TRADITIONAL TIMES

Oral documentation for pre-Contact activity exists for the district of Kula as a whole that document activities such as chiefly (*ali`i*) landings, battles, and catholic work practices such as fishing and planting (Sterling 1998). Documented oral accounts of pre-Contact activities and events occurring in the Kihei area, specifically naming Pūlehu Nui Ahupua`a, are limited to events that occurred on a single, given period rather than long terms events (*e.g.*, area used as a place of worship for an extended period of time). A. Fornander, in Sterling (1998:253), reported that the area of Kiheipukoa was the location “where peace was concluded and festive reunions took place of warlike encounters.” The festive reunions took place once Alapainui, once *Moi* of Maui, found out that his nephew Kamehamehanui succeeded him. A separate story dates to 1776 when Kalani`opu`u landed his warring faction at Kiheipuko`a between Kealia and Kapa`ahu thinking that “the *Alapa* were to drink of the waters of Wailuku. The *Alapa* were those who excelled at being warriors. Unfortunately for Kalani`opu`u, his warriors lost when battling with forces of Kahekili at Wailuku.

## HISTORIC TIMES

Although some accounts informally mention the possibility that Spanish traders may have known about the Hawaiian Islands two hundred years prior to the “discovery” by Captain James Cook on the H.M.S. Resolution, Cook was the first known Westerner to have recorded the Hawaiian Islands (Speakman 1978:19). When Cook “discovered” Maui in November 1778, he anchored near Kahului. Although attempting to travel to Maui’s western end, he never travelled to the leeward side of East Maui where the project area lies. The first Western explorer credited with landing on Maui is Admiral Jean Francois Galaup, Compte de la Perouse of France. La Perouse, the name most used to recognize the French explorer, set foot in the area known today as La Perouse Bay, an area south of Makena.

From the early historic period, several industries became paramount in Kula: whaling, Irish potato cultivation, ranching, and sugar cane cultivation. Most of these endeavors transformed the upland landscape itself. The coastal areas were more impacted by commerce-related activities (*e.g.*, businesses, hostels, stores). Kolb *et al.* (1997:68–69) state that Kalepolepo (*i.e.*, Kihei) was an important provisioning area through the 1830s, when the area became “a hub of activity for all of Kula.” From the 1840s to 1860s a whaling station was maintained in Kihei. According to Colin *et al.* (14:2000), in 1849 John Halstead constructed “The Koa House” at Kalepolepo in Kihei, one of several such buildings supporting the whaling industry in Kihei. The Koa House served as a store, a residence, and a gathering place for whalers.

Following Contact, one of the greatest historic events impacting the population of the Hawaiian Islands was the Māhele of 1848. Thought to have been created under pressure from foreigners, Kamehameha III (Kamehameha III) enacted the Māhele, which altered the system of land transactions and legal land ownership processes for the entire population of the islands:

By mid-century, the fledgling [Hawaiian] Kingdom undertook the single most significant inducement to cultural change, the Great *Māhele* or division of lands between the king, chiefs, and government, establishing land ownership on a Western-style, fee-simple basis. From this single act, an entire restructuring of the ancient social, economic, and political order followed [Kirch 1985:309].

The Māhele statute paved the way for the private ownership of land [awarded claims were called Land Commission Awards]. The present project area does not contain Land Commission Awards (LCAs). However, LCA 5230 is the closest to the project area and is shown on TMK (2) 3-8-04 to exist north of the project area on the plains of Pūlehu Nui Ahupua`a (see Figure 2). LCA 5230 was awarded to Keaweamahi on September 28, 1853 with following Royal Patent numbers 8140 and 8252 being issued to the same individual on March 16, 1855 concluding a payment of \$5.00 (Burgett and Spear 1997:5). On this LCA Keaweamahi claimed 5 *apana* (land portions), 7 *lo`i* (wet taro) and 2 *kula* (pastures). Saltwater-associated geography (*i.e.*, shore and dunes) was also claimed by Keaweamahi as part of LCA 5230.

Based on a map contained within Sterling (1998:242) in conjunction with the tax map keys, the ahupua`a of Pūlehu Nui is shown to continue northeast upslope on the northwest side of Haleakala. LCA 5230 also extends into the upper portion of Pūlehu Nui Ahupua`a. An overview of upland LCAs within the upland portion of Pūlehu Nui Ahupua`a reveal that land at the higher elevations were utilized for sweet and Irish potatoes (Waihona `Aina 2011). LCA 9019:3, claimed by Helehua, located just below the modern Kula Highway and between Holopuni and Pulehu Roads, had pasture lands claimed. As a side note, Irish potatoes were also existent at the time of the claim (*i.e.*, the year 1848) although to pinpoint the location of such is difficult due to insufficient map sources. Above the Kula Highway, LCA 4567:4 claimed by Wahine in 1848, stated that Irish potatoes were present on his land and that sweet potatoes were also grown on his land, although not on the same piece of land (*ibid.*). Supplemental ethnographic research concerning upland LCA usage includes Bartholomew and Bailey (115:1994) who relay that “Hawaiians in higher elevations.... traditionally grew sweet potatoes.”



For an in-depth look of LCA usage in upland areas of adjacent *ahupua`a*, please see Kolb *et al.* 1997.

Based on the information provided by the Tax Map Key, it appears that LCA 5230 is quite extensive and extends over a large portion of the *ahupua`a*. It further indicates that LCA 5230 is the largest LCA awarded in Pūlehu Nui Ahupua`a. Thus, it is difficult to ascertain where particular activities were conducted (*e.g., lo`i, kula, apana*) within the LCA.

In Sterling (1998:254–257) it was reported that the late Governor W. L. Moehonua was an “owner” of Pūlehu Nui Ahupua`a and the boundaries of the *ahupua`a* were somewhat vague. Through the information provided by the Māhele, it was acknowledged that Keaweamahi previously owned land within the *ahupua`a*. Oral testimonies from multiple sources contribute to somewhat more specific but general boundaries of the *ahupua`a* and conclusions were found in favor of the late governor.

From the mid-19<sup>th</sup> Century to the early 20<sup>th</sup> Century, coastal activity remained concentrated at Kalepolepo, but by the 1870s whaling diminished and the potato industry moved to the Ulupalakua area (Colin *et al.* 26:2000). Coastal Kula became somewhat of a dusty, “dirty place” (Wilcox 1921). As a result of industry movement out of the Kihei area (for a time) or the vast expanses of land available, Haleakala Ranch utilized many coastal portions of Kula in the later 1800s.

Like the rest of Hawai`i (and the world) during the 1940s, Kihei in Pūlehu Nui Ahupua`a was interrupted by the advent of World War II (WWII). The coast from Ma`alaea to Makena was used by United States military forces as training areas in preparation for amphibious assaults that were to be made in the Pacific war theater (Davis and Fortini 2004, Tome and Dega 2004). The main military service operating along the coastal region of the Wailuku and Makawao (Kula) Districts was the United States Marine Corps’ 4<sup>th</sup> Marine Division, which used the coast during the latter part of 1944. The beautiful beaches of Kihei and Wailea were transformed with the construction of concrete military bunkers to simulate enemy positions expected during amphibious combat operations. A non-4<sup>th</sup> Marine Division military unit that also trained along the coastline was the underwater demolition teams, known as UDT. Comprised of Army and Navy personnel, these people were trained to rig and detonate explosives on various obstacles in the way of the U.S. amphibious assaults.

Following WWII, the Kihei coastline returned to its tranquil activities of ranching and the development of residential areas. During the 1960s, the Kihei stage was set for development of the area as a vacation haven for tourists and homebuyers which continues to the present day.

### **PREVIOUS ARCHAEOLOGY IN GENERAL AREA**

Archaeological studies in the greater area began in the early 20<sup>th</sup> Century by T. Thrum (1909), J. Stokes (1909–1916), and W. M. Walker (1931). These surveys included areas of leeward Maui and inventoried both coastal and upland sites of the Kula District. In the ahupua`a of Pūlehu Nui Walker listed two sites identified as Haleokane Heiau and Nininiwai Heiau (see Sterling 1998:253).

Archival research indicates few archaeological projects have been conducted near the current project area. Although these projects occurred some distance from the current parcel they are directly relevant. These studies provide background information to the current study area. The reader is referred to Tomonari-Tuggle *et al.* (2001:61-63) which provides a succinct summary of these studies.

Kennedy (1988) conducted a visual inspection of TMK: (2) 3-8-004:029 that did not identify archaeological sites. The absence of sites was attributed to prior development of the area for a construction baseyard with an installation of a large concrete culvert. In 1991 the Bishop Museum conducted an Archaeological Inventory Survey for the Kai Makani project that produced negative findings on the ground surface or subsurface contexts (Rotunno-Hazuka (1991).

In 1992 Aki Sinoto Consulting conducted an Archaeological Inventory Survey of the proposed location for the Kihei Gateway Complex which led to the identification of State Site 50-50-09-31, a remnant, historic concrete bridge (crossing Waiakoa Stream. It was suggested that the bridge was probably related to a narrow gauge cane railroad that operated through the area and may have serviced Kihei Camp 1 (Sinoto and Pantaleo 1992).

Between 1995 and 1999 Scientific Consultant Services, Inc. conducted an Inventory Survey (followed by two addendums) for the Puunene Bypass/ Mokulele Highway Improvements Corridor located in TMK: (2) 3-8:-04, 05, 06, and 07; Burgett and Spear 1997; Chaffee *et al.* 1999). No additional archaeological sites were identified. However, one previously recorded site was relocated and identified as the Naval Air Station Puunene Dump



Site (State Site 50-50-09-4164). Scientific Consultant Services, Inc. conducted an archaeological study on TMK: (2) 3-9-041:027, which included excavation of nine stratigraphic trenches. No new sites were identified (Pestana and Dega 2002).

In 2005 Scientific Consultant Services, Inc. conducted an Archaeological Inventory Survey, including limited subsurface testing, was conducted on a 9.289-acre property in North Kīhei, Maui, Hawai'i [TMK: (2) 3-8-004:028] (Tome and Dega 2005). This project area, located immediately adjacent and abutting the southern boundary of the Hale Piilani Park, had been partially modified by illegal dumping, utilization as an informal dirt bike course, and ranching activities. Two archaeological sites comprising four structural features were newly identified during this Inventory Survey. The sites were interpreted respectively as a World War II-related site (State Site No. 50-50-09-5801, WW II training site) and a traditional Hawaiian site (State Site No. 50-50-09-5802, pre-Contact agricultural/habitation complex). The two sites date utilization of the subject parcel from the pre-Contact Period (*i.e.*, pre-1778) to the United States Marine Corps' 4<sup>th</sup> U.S. Marine Division training during the closing years of World War II.

#### **PREVIOUS ARCHAEOLOGY IN THE CURRENT PROJECT AREA**

An Archaeological Inventory Survey, including limited subsurface testing, was conducted on an 86.029-acre property in Puunene, Island of Maui, Hawai'i [TMK: (2) 3-8-008:005, 006, and 019]. Fieldwork was conducted between June 27 and 30, 2011 by SCS archaeologists Ian Bassford, B.A. and Guerin Tome, B.A., under the direction of the Principal Investigator Michael Dega, Ph.D (Tome and Dega 2011 *in prep.*).

The 917 meter (3,007 feet) long alternate access road was not subjected to excavation since most of the access route was already established (*i.e.*, there is a combination of a dirt and asphalt road), and the area that did not contain an established road contained active sugarcane cultivation. Although the 1999 IARII survey documented archaeological features close to the east and west sides of the alternate access road, no archaeological sites or features were observed in the alternate access road corridor. These features that were documented along the alternate access road were assigned to State Site State Site 50-50-09-4801, interpreted as a post-World War II cattle ranching site.

As stated elsewhere in this report, the current project area was previously subject to an Archaeological Inventory Survey in 1999 by IARII (see Figures 4 and 5). The current project area, part of the larger former Naval Air Station Puunene, was designated by the air station as Housing Area A, Southern and Northeastern portions. Within the larger portion of the current



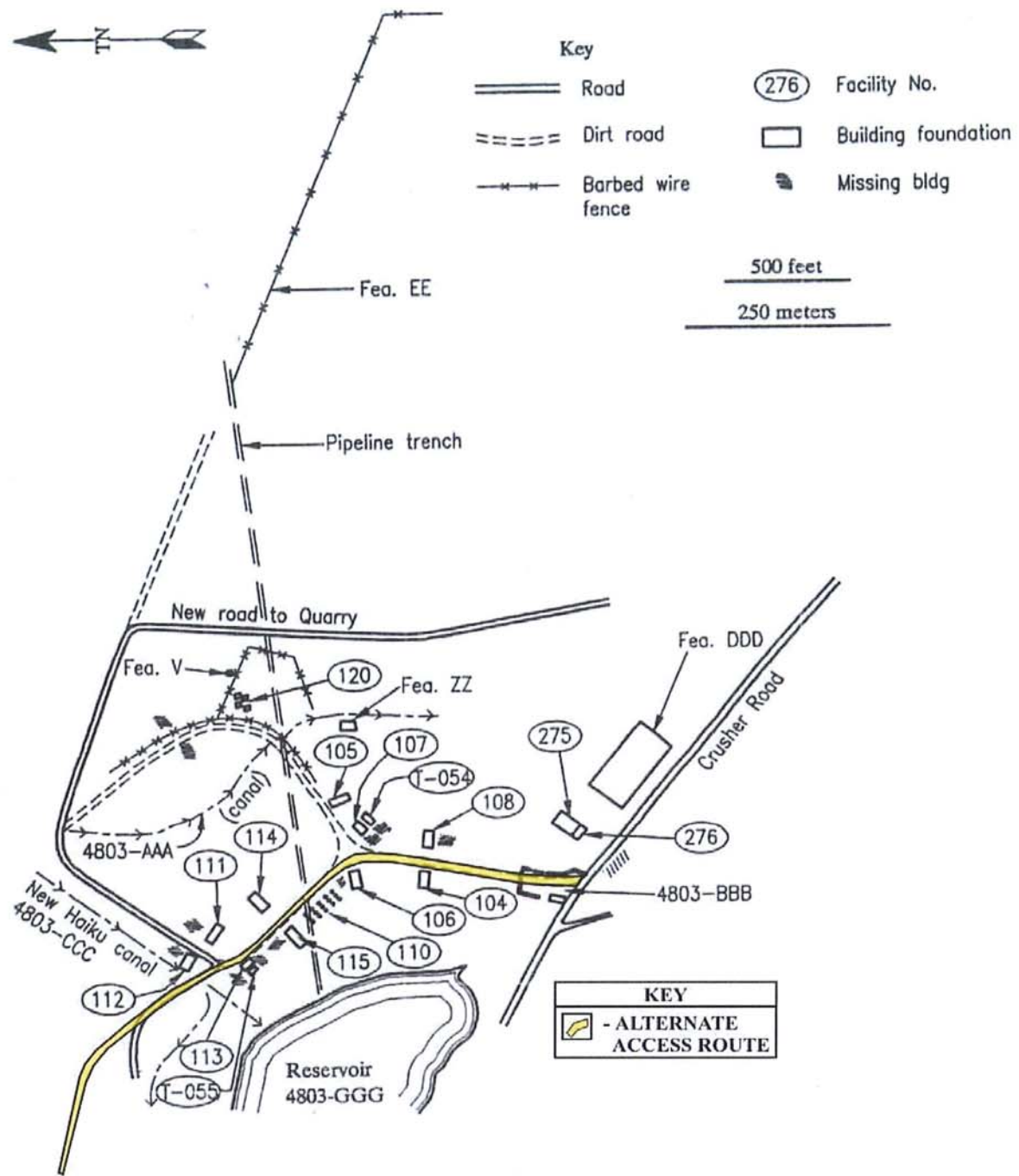


Figure 13. Northeastern section of Housing Area A.

Figure 4: International Archaeological Research Institute Incorporated (IARII) Plan View Map Showing Previously Recorded Archaeological Features and Current SCS Project Area Alternate Road.

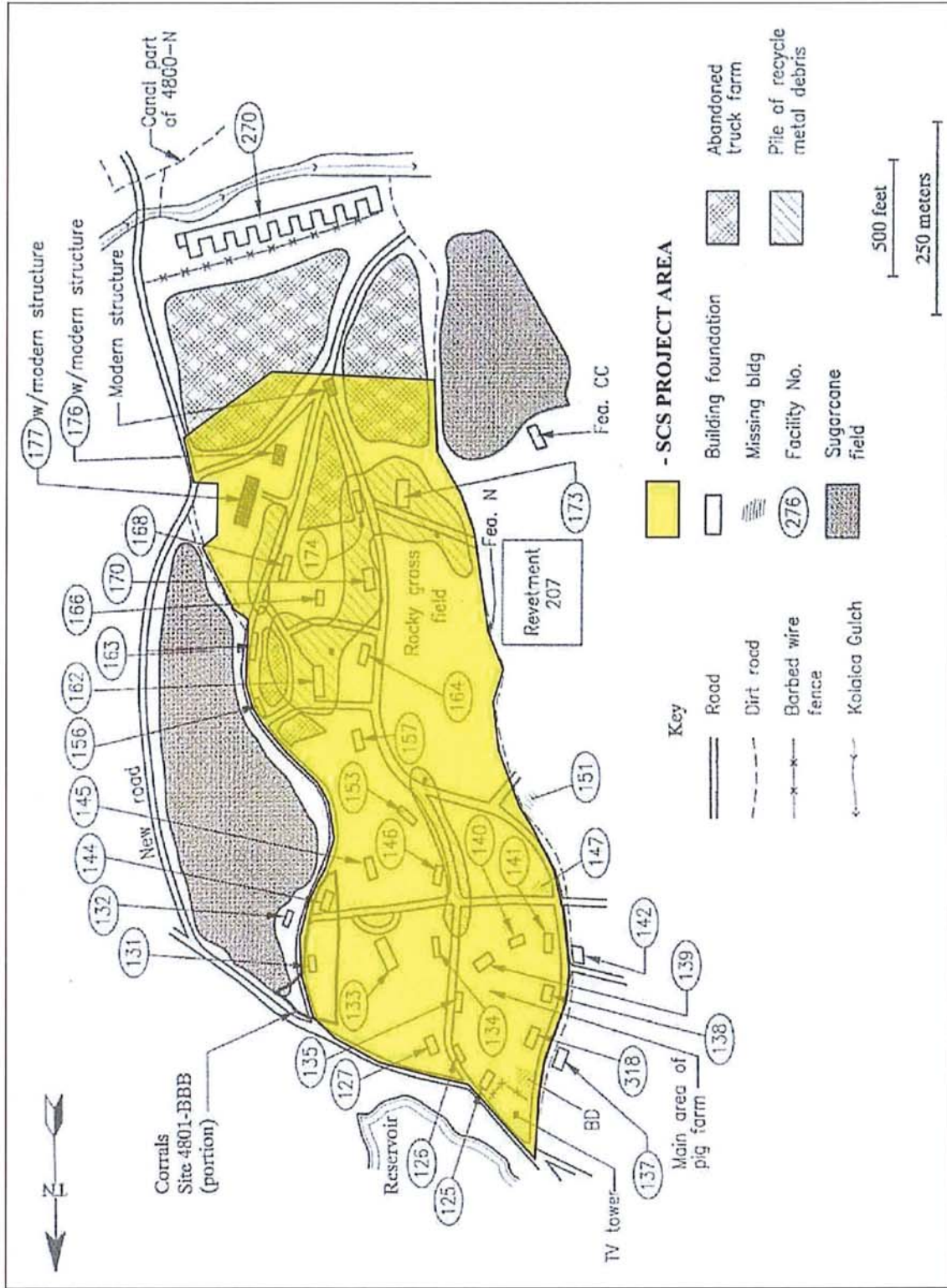


Figure 5: IARII Plan View Map Showing Previously Recorded Archaeological Features and Current SCS Project Area Perimeter of TMK (2) 3-8-008:019.



project area, the IARII survey identified two archaeological sites comprised of a section associated with the former Naval Air Station Puunene (State Site 50-50-09-4164), as well as a post-World War II cattle ranching site (State Site 50-50-09-4801). The current survey relocated the two historic sites, assessed the presence/absence of those features within two sites, and identified previously undocumented features within the two sites (Figure 8). The newly identified features have been subsumed under the previous State site number designations.

Most of the historic features within in the current project area were heavily impacted by modern mechanical clearing and ensuing debris removal. The majority of those mechanically impacted features belonged to the former Naval Air Station Puunene (Site -4164). Some of the historic features belonging to Site -4164 did appear to have been mechanically impacted but also abandoned and neglected prior to any mechanical alterations. Prior to the mechanical disturbance, the north half of the current project area had been utilized for a pig farm (Maui Hog) and a scrap metal storage site. The south half of the subject property remained fallow.

A total of fifteen (15) features, interpreted as either related to the NAS Puunene or post-war cattle ranching period, were identified by SCS but not previously recorded during the IARII survey (Tomonari-Tuggle *et al.* 2001). Of the 15 features that were not recorded, three (3) features were located in the State Site 50-50-09-4801 post-war cattle ranching area. The remaining twelve (12) features were located in the State Site 50-50-09-4164 former Naval Air Station Puunene area (Housing Area A).

The current project area [TMK: (2) 3-8-008:019] represents a portion of a larger project area previously subject to an Archaeological Inventory Survey in 1999 by International Archaeological Research Institute Inc. (IARII) (Tomonari-Tuggle *et al.* 2001) (Figures 6 and 7). In addition to surveying the current project area [TMK: (2) 3-8-008:019] as part of the initial survey, IARII also surveyed the remaining parcels in TMK: (2) 3-8-008. International Archaeological Research Institute Inc. (Tomonari-Tuggle *et al.* 2001) found that TMK: (2) 3-8-008 was utilized by multiple commercial businesses that included:

- agriculture [sugarcane; Hawaiian Commercial and Sugar Company (HC&S), Ltd.],
- rock quarrying [Hawaiian Cement, (Maui Concrete and Aggregate Division)],
- motorsports recreational areas (Maui Raceway Park),
- an animal shelter (Maui Humane Society),
- a pig farm (Maui Hog) and scrap metal storage site; and
- a crop dusting operation (Murray Air, Ltd.).

Spread amongst the commercial businesses were five (5) archaeological sites.

- Former Naval Air Station Puunene (State Site 50-50-09-4164; Feature Amount: 165)
- Sugarcane Plantation Features (State Site 50-50-09-4800; Feature Amount: 7)
- Post-World War II Ranching Features (State Site 50-50-09-4800; two complexes of corrals, fences, troughs)
- Old Kihei Railroad Bed (State Site 50-50-09-4802; Feature Amount: 1)
- Haiku Ditch and Reservoir (State Site 50-50-09-4802; Feature Amount: 5)

IARII determined that at least two of these archaeological sites were used for multiple historic activities (Tomonari-Tuggle *et al.* 2001). For example, the crop dusting operation utilized the former Naval Air Station Puunene's airstrip as a runway for their planes. A few of the standing military structures located on the current project area [TMK: (2) 3-8-008:019] were converted from military features to holding facilities for pigs.

The archaeological sites located in the current project area [TMK: (2) 3-8-008:019] consist of the former Naval Air Station Puunene, which was recognized as a World War II archaeological site and designated as State Site 50-50-09-4164, and two post-World War cattle ranching complexes that were consolidated and designated as State Site 50-50-09-4801. The current Archaeological Inventory Survey led to relocation of most of the previously identified sites, as well as several newly identified features. These new features have been incorporated into the existing State site numbers.

### **POTENTIAL SITE TYPES TO BE ENCOUNTERED**

Archaeological and documentary evidence in and around the project area illustrates the types of sites that may be encountered during Archaeological Monitoring. The two Inventory Survey projects, noted above, showed the area to contain much historical information regarding the former Naval Station and cattle ranching complexes. No other time periods, beyond modern debris and land clearing, were identified. Potential sites to be encountered would thus include cultural deposits (historic metal, glass, etc. debris) and architecture (concrete foundations, rock walls, etc.) directly related to construction and use of the Naval Station and cattle complexes. There appears at present very little probability of identifying prehistoric cultural resources or burials.



## MONITORING CONVENTIONS AND METHODOLOGY

This AMP has been prepared in accordance with DLNR/SHPD administrative “Rules Governing Standards for Archaeological Monitoring Studies and Reports” (§ 13-279, DLNR-SHPD 2002). Archaeological Monitors will adhere to the following guidelines during monitoring:

1. A qualified archaeologist intimately familiar with the project area and the results of previous archaeological work conducted in the Puunene area will intermittently monitor subsurface construction activities in the proposed project area. Full-time Monitoring is only recommended should the alternate road access be created. During Monitoring, one archaeologist will be required per each piece of ground altering machinery in use. No land altering activities will occur on the parcel until this AMP has been accepted by SHPD.

If significant deposits or features are identified and additional field personnel are required, the archaeological consultants conducting the Monitoring will notify the contractor or representatives thereof before additional personnel are brought to the site.

2. If features or cultural deposits are identified during Monitoring, the on-site archaeologist will have the authority to temporarily suspend construction activities at the significant location so that the cultural feature(s) or deposit(s) may be fully evaluated and appropriate treatment of the cultural deposit(s) is conducted. SHPD will be contacted to establish feature significance and potential mitigation procedures. Treatment activities primarily include documenting the feature/deposit through plotting its location on an overall site map, illustrating a plan view map of the feature/deposit, profiling the deposit in three dimensions, photographing the finds- with the exception of human burials, artifact and soil sample collection, and triangulation of the finds. Construction work and/or back-filling of excavation pits or trenches will only continue in the sample location when all documentation has been completed.
3. Control stratigraphy in association with subsurface cultural deposits will be noted and photographed, particularly those containing significant quantities or qualities of cultural materials. If deemed significant by SHPD and the contracting archaeologist, these deposits will be sampled, as determined by the same.
4. In the unlikely event that human remains are encountered, all work in the immediate area of the find will cease; the area will be secured from further activity until burial protocol has been completed. The SHPD island archaeologist and SHPD Cultural Historian will both be immediately identified as to the inadvertent discovery of human remains on the property. Notification of the inadvertent discovery will also be made to the Maui/Lanai Island Burial Council by the SHPD Maui staff or the

contracting archaeologist. A determination of minimum number of individuals (MNI), age(s), and ethnicity of the burial(s) will be ascertained in the field by the archaeological consultants conducting the Monitoring. Rules outlined in Chapter 6e, Section 43 shall be followed. Profiles, plan view maps, and illustrative documentation of skeletal parts will be recorded to document the burial(s). The burial location will be identified and marked. If a burial is disturbed during trench excavations, materials excavated from the vicinity of the burial(s) will be manually screened through 1/8" wire mesh screens to recover any displaced skeletal material. If the remains are to be removed, the work will be in compliance with HRS 6.E-43.6, Procedures Relating to Inadvertent Discoveries after approval from all parties (SHPD, Burial Council).

5. To ensure that contractors and the construction crew are aware of this Archaeological Monitoring Plan and possible site types to be encountered on the parcel, a brief coordination meeting will be held between the construction team and monitoring archaeologist prior to initiation of the project. The construction crew will also be informed as to the possibility that human burials could be encountered and how they should proceed if they observe such remains.
6. The archaeologist will provide all coordination with the contractor, SHPD, and any other groups involved in the project. The archaeologist will coordinate all Monitoring and sampling activities with the safety officers for the contractors to ensure that proper safety regulations and protective measures meet compliance. Close coordination will also be maintained with construction representatives in order to adequately inform personnel of the possibility that open archaeological units or trenches may occur in the project area.
7. As necessary, verbal reports will be made to SHPD and any other agencies as requested.
8. Acceptance of this Archaeological Monitoring Plan will be done in writing by the SHPD within 45-days of receipt. If no written response is forwarded by the SHPD after 45-days, concurrence with this documented shall be accepted and work will proceed, pursuant to 6e-42 HRS, Chapter 13-284 HAR.



## **LABORATORY ANALYSIS**

All samples collected during the project, except human remains, will undergo analysis at the SCS Maui laboratory. In the event that human remains are identified and the SHPD-Maui/Lanai Island Burial Council authorizes their removal, they will be curated on Maui. Photographs, illustrations, and all notes accumulated during the project will be curated at the laboratory of the archaeological consultants conducting the Monitoring. All retrieved artifact and midden samples will thoroughly cleaned, sorted, and analyzed. Significant artifacts will be photographically recorded, sketched, and classified (qualitative analysis). All metric attributes and weights will be recorded (quantitative analysis). These data will be presented in tabular form within the final monitoring report. Midden samples will be minimally identified to major “class” (*e.g.*, bivalve, gastropod mollusk, echinoderm, fish, bird, and mammal). All data will be clearly recorded on standard laboratory forms that include number and weight (as appropriate) of each constituent category. These counts will also be included in the final report.

Should any samples amenable to dating be collected from a significant cultural deposit, they will be prepared in the laboratory of the archaeological consultants conducting the Monitoring and submitted for specialized radiocarbon analysis. While primary emphasis for dating is placed on charcoal samples, we do not preclude the use of other material such as marine shell or nonhuman bone materials. The archaeological consultants conducting the Monitoring will consult with SHPD and the client if radiocarbon dates are deemed necessary.

All stratigraphic profiles will be drafted for presentation in the final report. Representative plan view sketches showing the location and morphology of identified sites/features/deposits will be compiled and illustrated.

## **CURATION**

If requested by the landowner, archaeological consultants conducting the Monitoring will curate all recovered materials in the laboratory of the archaeological consultants conducting the Monitoring (except human remains) until a permanent, more suitable curation center is identified. The landowner may request to curate all recovered cultural materials once analysis has been completed. Human remains will be stored on-site in a secure location until a Burial Treatment Plan has been prepared and accepted.



## **REPORTING**

An Archaeological Monitoring report documenting the project findings and interpretation, following SHPD guidelines for Archaeological Monitoring reports, will be prepared and submitted within 180 days after the completion of fieldwork.

If cultural features or deposits are identified during fieldwork, the sites will be evaluated for historical significance and assessed under State and Federal Significance Criteria. The Archaeological Monitoring report will be in draft form until accepted by SHPD and will be submitted to both SHPD and the client.

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 2011 (In Prep)  
*An Archaeological Inventory Survey Of An Approximate 917 Meter-Long Alternate Access Road And An 86.029-Acre Property In Puunene, Pūlehu Nui Ahupua`a, Wailuku District, Island Of Maui, Hawai`i [TMK: (2) 3-8-008:005, 006, And 019]*. SCS, Honolulu
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SHPD LETTER DATED  
AUGUST 24, 2012

APPENDIX

L





NEIL ABERCROMBIE  
GOVERNOR OF HAWAII



**HISTORIC PRESERVATION DIVISION  
DEPARTMENT OF LAND AND NATURAL RESOURCES**

601 Kamokila Boulevard, Suite 555  
Kapolei, HI 96806

WILLIAM J. AILA, JR.  
CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE MANAGEMENT

PAUL J. CONRY  
INTERIM FIRST DEPUTY

WILLIAM M. TANI  
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES  
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CONSERVATION AND COASTAL LANDS  
CONSERVATION AND RESOURCES ENFORCEMENT  
TRIMMER

FORESTRY AND WILDLIFE  
HISTORIC PRESERVATION  
KAHOOLAWE ISLAND RESERVE COMMISSION  
LAND  
STATE PARKS

August 24, 2012

Dr. Michael Dega  
Scientific Consultant Services, Inc (SCS)  
Via email: [mike@scshawaii.com](mailto:mike@scshawaii.com)

LOG NO: 2011.2740  
DOC NO: 1208JP18  
Archaeology

Aloha Dr. Dega:

**SUBJECT: Chapter 6E-42 Historic Preservation Review- Maui County  
Archaeological Monitoring Plan for a 917 Meter Access Road and 86.029 Acres  
Pulehu-Nui Ahupua'a, Wailuku District, Island of Maui  
TMK (2) 3-8-008:005, 006, and 019**

Thank you for the opportunity to review the draft plan titled *An Archaeological Monitoring Plan for A 917 Meter (3,007 feet) Long Alternate Access Road and an 86.029-Acre Property in Puunene, Pulehu Nui Ahupua'a, Wailuku District, Island of Maui, Hawai'i [TMK: (2) 3-8-008:005, 006, and 019]* by Chaffee and Dega (October 2011). This document was received by our staff on October 11, 2011. We recently accepted an archaeological inventory survey report for the subject project (*Log. 2011.2267, Doc. 1206MD01*).

The archaeological inventory survey reported the re-investigation of two documented sites (SIHP 50-50-09-4164 and 4801) which were included in an earlier survey for the larger acreage (Tomanari-Tuggle, et al. 2001). Twelve additional features were added to Site 4164, the Puunene Naval Air Station, and three additional features were added to Site 4801, a post-war cattle ranching area. The existing access road was not subject to subsurface archaeological testing, so archaeological monitoring was recommended for any sub-surface construction work on the proposed alternate access road project. The plan outlines the proposed objectives and procedures that will be implemented to prevent damage to unknown sites, including the identification and documentation of any newly discovered archaeological and cultural features.

The plan meets the requirements of HAR 13-279 and is accepted by SHPD. However, we request that the following minor corrections be made for the Final submittal:

1. Change all of the references to the associated accepted SCS AIS report from the *pending* status.
2. Remove "see Inventory Survey Results Section below" on page 16 (no AIS results Section identified)

Please send one hardcopy of the final document including the requested minor revisions, clearly marked **FINAL**, along with a copy of this review letter and a text-searchable PDF version on CD to the Kapolei SHPD office, attention SHPD Library. Please contact Jenny Pickett at (808) 243-5169 or [Jenny.L.Pickett@Hawaii.gov](mailto:Jenny.L.Pickett@Hawaii.gov) if you have any questions regarding this letter.

Mahalo,

A handwritten signature in black ink, appearing to read "Theresa K. Donham".

Theresa K. Donham  
Archaeology Branch Chief

cc: County of Maui, Department of Planning via email: [planning@mauicounty.gov](mailto:planning@mauicounty.gov)  
County of Maui DSA via fax to: (808) 270-7972  
Ms. Blanca Lafolette, Project Coordinator 1300 N Holo pono Street, Suite 201 Kihei HI 96753





CULTURAL IMPACT  
ASSESSMENT REPORT

APPENDIX

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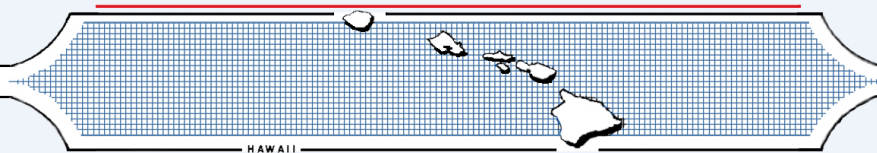


**A CULTURAL IMPACT ASSESSMENT REPORT  
FOR APROXIMATELY 86 ACRES, LAND OF  
PŪLEHU NUI, WAILUKU DISTRICT, MAUI, HAWAII  
[TMK: (2) 3-8-08:019]**

Prepared by:  
**Leann McGerty, B.A.**  
and  
**Robert L. Spear, Ph.D.**  
September 2011  
**FINAL**

Prepared for:  
**Ms. Blanca Lafollette**  
**Project Coordinator**  
**CMBY 2011 Investment, LCC**  
**P.O. Box 220**  
**Kihei, Hawai'i 96753**

**SCIENTIFIC CONSULTANT SERVICES Inc.**



**711 Kapiolani Blvd. Suite 975 Honolulu, Hawai'i 96813**

## TABLE OF CONTENTS

TABLE OF CONTENTS .....	ii
LIST OF FIGURES .....	iii
INTRODUCTION .....	1
METHODOLOGY .....	6
ARCHIVAL RESEARCH .....	8
INTERVIEW METHODOLOGY .....	8
PROJECT AREA AND VICINITY .....	9
CULTURAL HISTORICAL CONTEXT .....	9
PAST POLITICAL BOUNDARIES .....	10
TRADITIONAL SETTLEMENT PATTERNS .....	10
EARLY HISTORY .....	12
THE GREAT MĀHELE .....	13
HISTORIC LAND USE .....	15
SUGAR YEARS .....	15
WORLD WAR II .....	16
SUMMARY .....	22
ARCHAEOLOGY .....	23
CIA INQUIRY RESPONSE .....	24
CULTURAL ASSESSMEMNT .....	<b>ERROR! BOOKMARK NOT DEFINED.</b>
REFERENCES CITED .....	26
APPENDIX A: CIA CONSULTATION LETTERS - 1ST BATCH 8 JULY 2011 .....	A
APPENDIX B: NEWSPAPER NOTICES .....	B
APPENDIX C: OHA’S RESPONSE .....	C

## LIST OF FIGURES

Figure 1: USGS Quadrangle Map Showing Project Area. ....	2
Figure 2: Tax Map Key [TMK] of Project Area.....	3
Figure 3: Google Maps Plan View of Project Area. ....	4
Figure 4: Modified “Pulehenui Kula Maui, Survey and Map By M.D. Monsarrat 1879”, Showing <i>Ahupua`a</i> Meets and Bounds and Boundary of Spreckles Kula land(State Survey Office, Reg. Map #1770).....	14
Figure 5: “Kihei Plantation Co. [crossed out], Map of Lands in Kula, Maui Belonging to the “Five Companies” of the Maui Ag. Co., July 1904” (State Survey Office, Reg. Map #1770). ....	17
Figure 6: Close-up of Makawao Plantation Lands in Pūlehu Nui Ahupua`a (State Survey Office, Reg. Map #1770). ....	18
Figure 7: “1943 Arial View of Puunene” (National Archives Photo). ....	20
Figure 8: “Boundary Map NAS Puunene Pulehunui and Waikapu Districts of Kula and Wailuku Maui T.H. June 1944”, Showing Project Area (14 <sup>th</sup> Naval District, Pearl Harbor, T.H.; Courtesy of Hugh Starr).....	21

## INTRODUCTION

At the request of CMBY 2011 Investment, LCC (CMBY), Scientific Consultant Services (SCS), Inc., conducted a Cultural Impact Assessment (CIA) on approximately 86 acres in the lands of Pūlehu Nui , Wailuku District, Maui Island, Hawai`i [TMK: 3-8-01; (Figures 1 and 2)]. The CIA was conducted in preparation for the proposed Pu`unene Heavy Industrial Subdivision.

The Constitution of the State of Hawai`i 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 (2000) requires the State to “protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by *ahupua`a* tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778.” In spite of the establishment of the foreign concept of private ownership and western-style government, Kamehameha III (Kauikeaouli) preserved the peoples traditional right to subsistence. As a result in 1850, the Hawaiian Government confirmed the traditional access rights to native Hawaiian *ahupua`a* tenants to gather specific natural resources for customary uses from undeveloped private property and waterways under the Hawaiian Revised Statutes (HRS) 7-1. In 1992, the State of Hawai`i Supreme Court, reaffirmed HRS 7-1 and expanded it to include, “native Hawaiian rights...may extend beyond the *ahupua`a* 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 Hawai`i (2000) with House Bill (HB) 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 Hawai`i’s culture, and traditional and customary rights...[H.B. NO. 2895].

Articles IX and XII of the state constitution, other state laws, and the courts of the State impose on government agencies a duty to promote and protect cultural beliefs and practices, and resources of native Hawaiians as well as other ethnic groups. Act 50 also requires state agencies and other developers to assess the effects of proposed land use or shore line developments on the “cultural practices of the community and State” as part of the HRS Chapter 343 (2001) environmental review process.

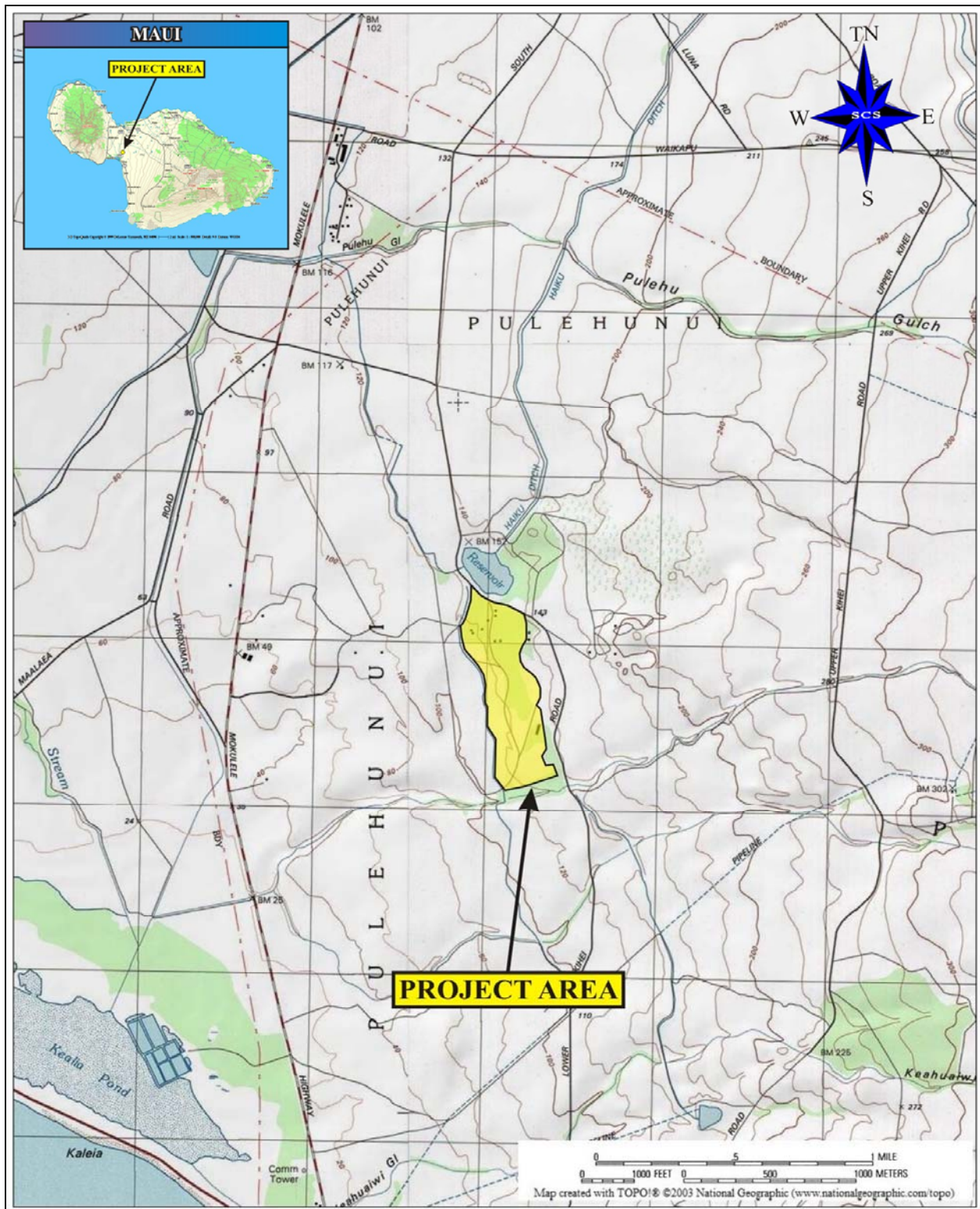


Figure 1: USGS Quadrangle Map Showing Project Area.

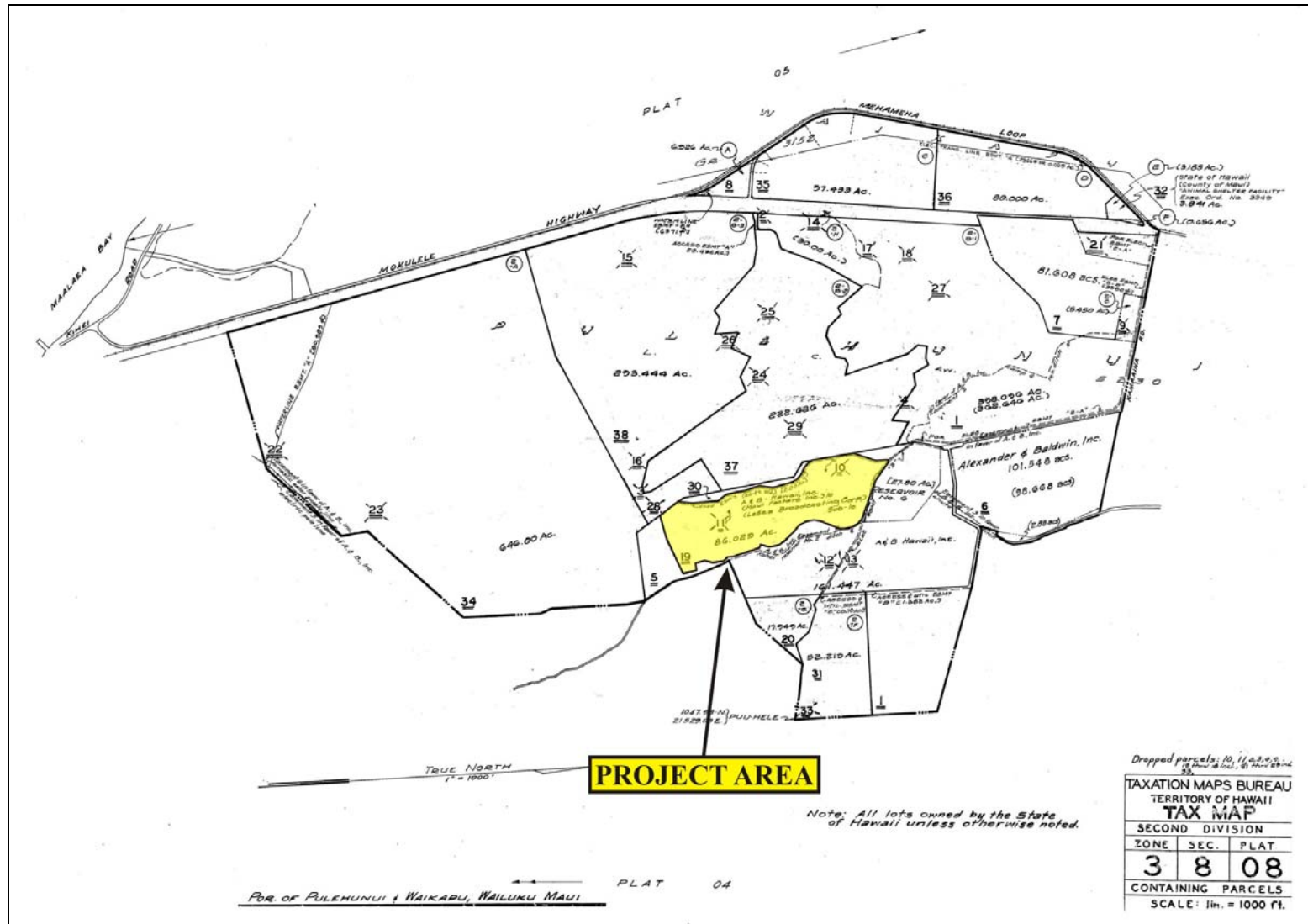
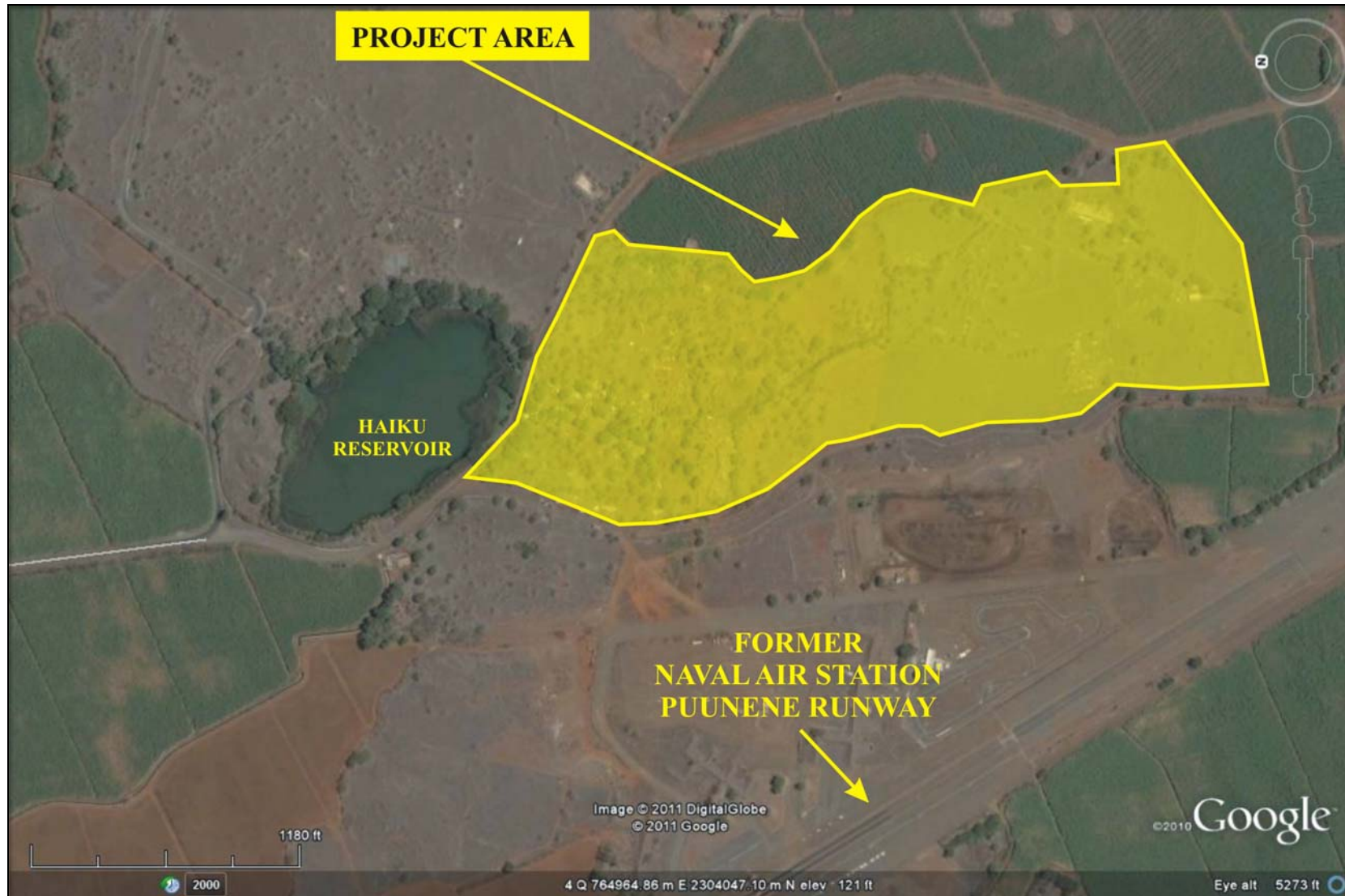


Figure 2: Tax Map Key [TMK] of Project Area.





**Figure 3: Google Maps Plan View of Project Area.**

It also re-defined the definition of “significant effect” to include “the sum of effects on the quality of the environment including actions impact a natural resource, limit the range of beneficial uses of the environment, 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). Cultural resources can include a broad range of often overlapping categories, including places, behaviors, values, beliefs, objects, records, stories, etc. (H.B. 2895, Act 50, 2000).

Thus, Act 50 requires that an assessment of cultural practices and the possible impacts of a proposed action be included in Environmental Assessments and 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.

Therefore, the purpose of a Cultural Impact Assessment is to identify the possibility of on-going cultural activities and resources within a project area, or its vicinity, and then assessing the potential for impacts on these cultural resources. The CIA is not intended to be a document of in depth archival-historical land research, or a record of oral family histories, unless these records contain information about specific cultural resources that might be impacted by a proposed project.

According to the Guidelines for Assessing Cultural Impacts established by the Hawaii State Office of Environmental Quality Control (OEQC 1997):

The types of cultural practices and beliefs subject to assessment may include subsistence, commercial, residential, agricultural, access-related, recreational, and religions and spiritual customs. The types of cultural resources subject to assessment may include traditional cultural properties or other types of historic sites, both man made and natural, which support such cultural beliefs.

The meaning of “traditional” was explained in *National Register Bulletin*:

Traditional” in this context refers to those beliefs, customs, and practices of a living community of people that have been passed down through the generations’, usually orally or through practice. The traditional cultural significance of a historic property then is significance derived from the role the property plays in a community’s historically rooted beliefs, customs, and practices. . . . [Parker and King 1990:1]

## **METHODOLOGY**

This Cultural Impact Assessment was prepared as much as possible in accordance with the suggested methodology and content protocol in the Guidelines for Assessing Cultural Impacts (OEQC 1997). In outlining the “Cultural Impact Assessment Methodology”, the OEQC states that:

“...information may be obtained through scoping, community meetings, ethnographic interviews and oral histories...”

This 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. Copies of the letters of inquiry are presented below in Appendix A; copies of posted legal notices are presented in Appendix B; and copies of the second group of letters of inquiry are presented below in Appendix C. This Cultural Impact Assessment was prepared in accordance with the suggested methodology and content protocol provided in the Guidelines for Assessing Cultural Impacts (OEQC 1997), whenever possible. The assessment concerning cultural impacts may include, but not be limited to, the following matters:

- (1) if consultation is available, 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 or limitations which 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) if conducted, 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 being 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.

If on-going cultural activities and/or resources are identified within the project area, assessments of the potential effects on the 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, land records, such as Land Commission Awards, Royal Patent Grants, and Boundary Commission records; historic accounts, and previous archaeological reports.

## **INTERVIEW METHODOLOGY**

Interviews are conducted in accordance with Federal and State laws, and guidelines, when knowledgeable individuals are able to identify cultural practices in, or in close proximity to, the project area. If they have knowledge of traditional stories, practices and beliefs associated with a project area or if they know of historical properties within the project area, they are sought out for additional consultation and interviews. 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 concerning particular cultural resources. Often people are recommended for their expertise, and indeed, organizations, such as Hawaiian Civic Clubs, the Island Branch of Office of Hawaiian Affairs (OHA), 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. It should be stressed again that this process does not include formal or in-depth ethnographic interviews or oral histories as described in the OEQC's *Guidelines for Assessing Cultural Impacts* (1997). The assessments are intended to identify potential impacts to on-going cultural practices, or resources, within a project area or in its close vicinity.

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 interview available for this study. When telephone interviews occur, a summary of the information is usually sent for correction and approval, or dictated by the informant and then incorporated into the document. If no cultural resource information is forthcoming and no knowledgeable informants are suggested for further inquiry, interviews are not conducted.

Letters were sent to organizations whose jurisdiction included knowledge of the area. Consultation was sought from the History and Culture Branch Chief of the State Historic Preservation Division; Office of Hawaiian Affairs (OHA), O`ahu Branch; Central Maui Hawaiian Civic Club; Kimokeo Kapahuleua; Maui SHPD, Cultural Branch; County of Maui, Department of Planning, Cultural Resources Commission; OHA Maui Branch; and Hale Mahaolu (Appendix A). In addition, a Cultural Impact Assessment Notice was published in *The Honolulu Star-Advertiser*, and *The Maui News*, on July 20, 21, and 24, as well as and the August issue of the OHA newspaper, *Ka Wai Ola* (Appendix B). These notices requested information of cultural resources or activities in the area of the proposed project, stated the TMK number, and where to respond with pertinent information. Based on the responses, an assessment of the potential effects on cultural resources in the project area and recommendations for mitigation of these effects can be proposed.

If on-going cultural activities and/or resources are identified within the project area, assessments of the potential effects on the cultural resources in the project area and recommendations for mitigation of these effects can be proposed.

## **PROJECT AREA AND VICINITY**

The project area is located in the land of Pūlehu Nui Ahupua`a, about 1.4 miles east of Mokulele Highway and adjacent to the Old Pu`unene Airport. Access from Mokulele Highway to the project area will be provided by a 56-ft wide access easement along Kama`aina Road, South Firebreak Road, and Lower Kihei road. An alternate access route around the north and east side of an HC&S irrigation reservoir was also examined. Both access routes were assessed as part of the CIA. (see Figure 3).

## **CULTURAL HISTORICAL CONTEXT**

The island of Maui ranks second in size of the eight main islands in the Hawaiian Archipelago. Pu`u Kukui, forming the west end of the island (1,215 m above mean sea level), is composed of large, heavily eroded amphitheater valleys that contain well-developed permanent stream systems that watered fertile agricultural lands extending to the coast. The deep valleys of West Maui and their associated coastal regions have been witness to many battles in ancient times and were coveted productive landscapes. These are joined together by an isthmus containing dry, open country (*kula*), and the land of Pūlehu Nui, among others.

## PAST POLITICAL BOUNDARIES

Traditionally, the division of Maui Island into districts (*moku*) and sub-districts was performed by a *kahuna* (priest, expert) named Kalaiha`ōhia, during the time of the *ali`i* Kaka`alaneo (Beckwith 1940:383; Fornander places Kaka`alaneo at the end of the 15<sup>th</sup> century or the beginning of the 16<sup>th</sup> century [Fornander 1919-20, Vol. 6:248]). Land was considered the property of the king or *ali`i`ai moku* (the *ali`i* who eats the island/district), which he held in trust for the gods. The title of *ali`i`ai moku* ensured rights and responsibilities pertaining to the land, but did not confer absolute ownership. The king kept the parcels he wanted, his higher chiefs received large parcels from him and, in turn, distributed smaller parcels to lesser chiefs. The *maka`āinana* (commoners) worked the individual plots of land.

In general, several terms, such as *moku*, *ahupua`a*, *`ili* or *`ili`āina* were used to delineate various land sections. A district (*moku*) contained smaller land divisions (*ahupua`a*) which customarily continued inland from the ocean and upland into the mountains. Extended household groups living within the *ahupua`a* were therefore, able to harvest from both the land and the sea. Ideally, this situation allowed each *ahupua`a* to be self-sufficient by supplying needed resources from different environmental zones (Lyons 1875:111). The *`ili`āina* or *`ili* were smaller land divisions next to importance to the *ahupua`a* and were administered by the chief who controlled the *ahupua`a* in which it was located (*ibid*:33; Lucas 1995:40). The *mo`o`āina* were narrow strips of land within an *`ili*. The land holding of a tenant or *hoa`āina* residing in a *ahupua`a* was called a *kuleana* (Lucas 1995:61). The project area is located in the lands of Pūlehu Nui which translated literally means “large pūlehu,” but since *pūlehu* means “broiled”, it might refer to the degree of broiling one could receive from the sun in this area (Pukui *et al.*:193).

## TRADITIONAL SETTLEMENT PATTERNS

The Hawaiian economy was based on agricultural production and marine exploitation, as well as raising livestock and collecting wild plants and birds. Extended household groups settled in various *ahupua`a*. During pre-Contact times, there were primarily two types of agriculture, wetland and dry land, both of which were dependent upon geography and physiography. River valleys provided ideal conditions for wetland *kalo* (*Colocasia esculenta*) agriculture that incorporated pond fields and irrigation canals. Other cultivars, such as *kō* (sugar cane, *Saccharum officinarum*) and *mai`a* (banana,



*Musa* sp.), were also grown and, where appropriate, such crops as *ʻuala* (sweet potato, *Ipomoea batatas*) were produced. This was the typical agricultural pattern seen during traditional times on all the Hawaiian Islands (Kirch and Sahlins 1992, Vol. 1:5, 119; Kirch 1985). It must be noted that Handy (1940:105 stated that, “. . . the bounds of cultivation . . . were strictly drawn by limitation of water for irrigation.” The word ”*kula*” meant “open country, or plain”, according to Handy and Handy, and was often used to differentiate between dry, or *kula* land, and wet-taro land. The height and size of Haleakalā to the east, prevents moisture from reaching its southern and western flanks, causing arid and desert-like conditions throughout the region (Handy and Handy 1972).

This is an essential characteristic of Kula, the central plain of Maui which is practically devoid of streams. Kula was always an arid region, throughout its long, low seashore, vast stony *kula* lands, and broad uplands [*ibid.*:510]

As to the occupation of this vast plain, Handy and Handy stated:

Both on the coast, where fishing was good, and on the lower westward slopes of Haleakala a considerable population existed. So far as we could learn Kula supported no Hawaiian taro, and the fishermen in this section must have depended for vegetable food mainly on *poi* brought from the wet lands of Waikapu and Wailuku to westward across the plain to supplement their usual sweet-potato diet [*ibid.*:511].

An early witness to its lack of productivity was George Vancouver. During his second visit to Hawai`i in 1793 as a Captain, he anchored in Mā`alaea Bay:

The appearance of this side of Mowee was scarcely less forbidding than that of its southern parts, which we had passed the preceding day. The shores, however, were not so steep and rocky, and were mostly composed of a sandy beach; the land did not rise so very abruptly from the sea towards the mountains, nor was its surface so much broken with hills and deep chasms; yet the soil had little appearance of fertility, and no cultivation was to be seen. A few habitations were promiscuously scattered near the water side, and the inhabitants who came off to us, like those seen the day before, had little to dispose of [1984:852]

Not much had changed 24 years later (1817) when Peter Corney sailed this way, bound for O`ahu. He made special reference to Keālia Pond (now the Keālia Pond and Wildlife Refuge), a short distance southwest of the project area:

. . . Next morning we passed Morokenee (Molokini), and made sail up Mackerey (Maalaea) bay. . . This bay is very deep and wide, and nearly divides the island, there being but a narrow neck of land and very low, keeping the two parts of the island together. . . On this neck of land are their principal salt-pans, where they make most excellent salt [Corney 1965:70-71]

## **EARLY HISTORY**

The Wailuku District was a center of political power often at war with its rival in Hana. Between 1775 to 1779, there was almost continual fighting between Kahekili, chief of Maui and Kalani`ōpu`ū, Chief from Hawai`i Island, who was often in residence at Hana (Kamakau 1961). After several skirmishes in which Kalani`ōpu`ū had been defeated by the warriors of Kahekili, Kalani`ōpu`ū retired to Hawai`i Island. He spent the next year gathering men from each of the six districts on the island, forming six divisions of warriors. His prize troops consisted of chiefs from his own group of attendants, which were named the `Ālapa and Pi`ipi`i. Leaving nothing to chance, Kalani`ōpu`ū then built *heiau* for his war gods, assuring success, and when all was ready (1776), he and his men returned to Maui (*ibid.*).

Rather than landing at Hana on the east side, the warriors came around the southern coast of Maui. They first landed at Keone`ō`io Bay and ravaged the country side giving Kahekili notice and time to prepare his fighting men (*ibid.*). Kalani`ōpu`ū's men traveled up the coast by sea and landed at Kiheipuko`a at Keālia, confident that the victory was to be theirs (*ibid.*) The 800 `Ālapa and Pi`ipi`i warriors marched across the plain (in which is the project area) to Wailuku where Kahekili and his warriors were waiting. Kamakau said:

They slew the Alapa on the sand hills at the southeast of Kalua. There the dead lay in heaps strewn like *kukui* branches; corpses lay heaped in death; they were slain like fish enclosed in a net...[*ibid.*:85-89].

An interesting anecdote is recounted by George W. Bates during his journey from Wailuku to Kahului in 1854:

Leaving Wai-lu-ku [town], and passing along toward the village Kahului, a distance of three miles, the traveler passes over the old battle-ground named after the village. It is distinctly marked by moving sand-hills, which owe their

formation to the action of the northeast trades. Here these winds blow almost with the violence of a sirocco, and clouds of sand are carried across the northern side of the isthmus to a height of several hundred feet. These sand-hills constitute a huge “Golgotha” for thousands of warriors who fell in ancient battles. In places laid bare by the action of the winds, there were human skeletons projecting, as if in the act of struggling for resurrection from their lurid sepulchers. In many portions of the plain who cart-loads were exposed in this way. Judging of the numbers of the dead, the contest of the old Hawaiians must have been exceedingly bloody. . . .[*Sandwich Island Notes*, 309]

The 1776 encounter between Kahekili and Kalani`ōpu`ū resulted in a temporary truce which was broken in 1790 by the battle of Kepaniwai, when Kamehameha I consolidated his control over Maui Island.

### **THE GREAT MĀHELE**

In the 1840s, traditional land tenure shifted drastically with the introduction of private land ownership based on western law. While it is a complex issue, many scholars believe that in order to protect Hawaiian sovereignty from foreign powers, Kamehameha III (Kamehameha III) was forced to establish laws changing the traditional Hawaiian economy to that of a market economy (Kame`eleihiwa 1992:169-70, 176; Kelly 1983:45, 1998:4; Daws 1962:111; Kuykendall 1938 Vol. I:145). The Great Māhele of 1848 divided Hawaiian lands between the king, the chiefs, the government, and began the process of private ownership of lands. The subsequently awarded parcels were called Land Commission Awards (LCAs). Once lands were thus made available 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. These claims did not include any previously cultivated but presently fallow land, *`ōkipū* (on O`ahu), stream fisheries, or many other resources necessary for traditional survival (Kelly 1983; Kame`eleihiwa 1992:295; Kirch and Sahlins 1992). If occupation could be established through the testimony of two witnesses, the petitioners were awarded the claimed LCA and issued a Royal Patent after which they could take possession of the property (Chinen 1961:16).

The *ahupua`a* of Pūlehu Nui extended across the Kula plain up through Makawao, to the edge of Haleakalā and would have included fruitful sections, not just the arid plains (Figure 4). There were 13 *kuleana* claimed in the *ahupua`a* of Pūlehu Nui. LCA 05230, consisting of 982 acres and belonging to Keaweamahi, appears to contain the portion of

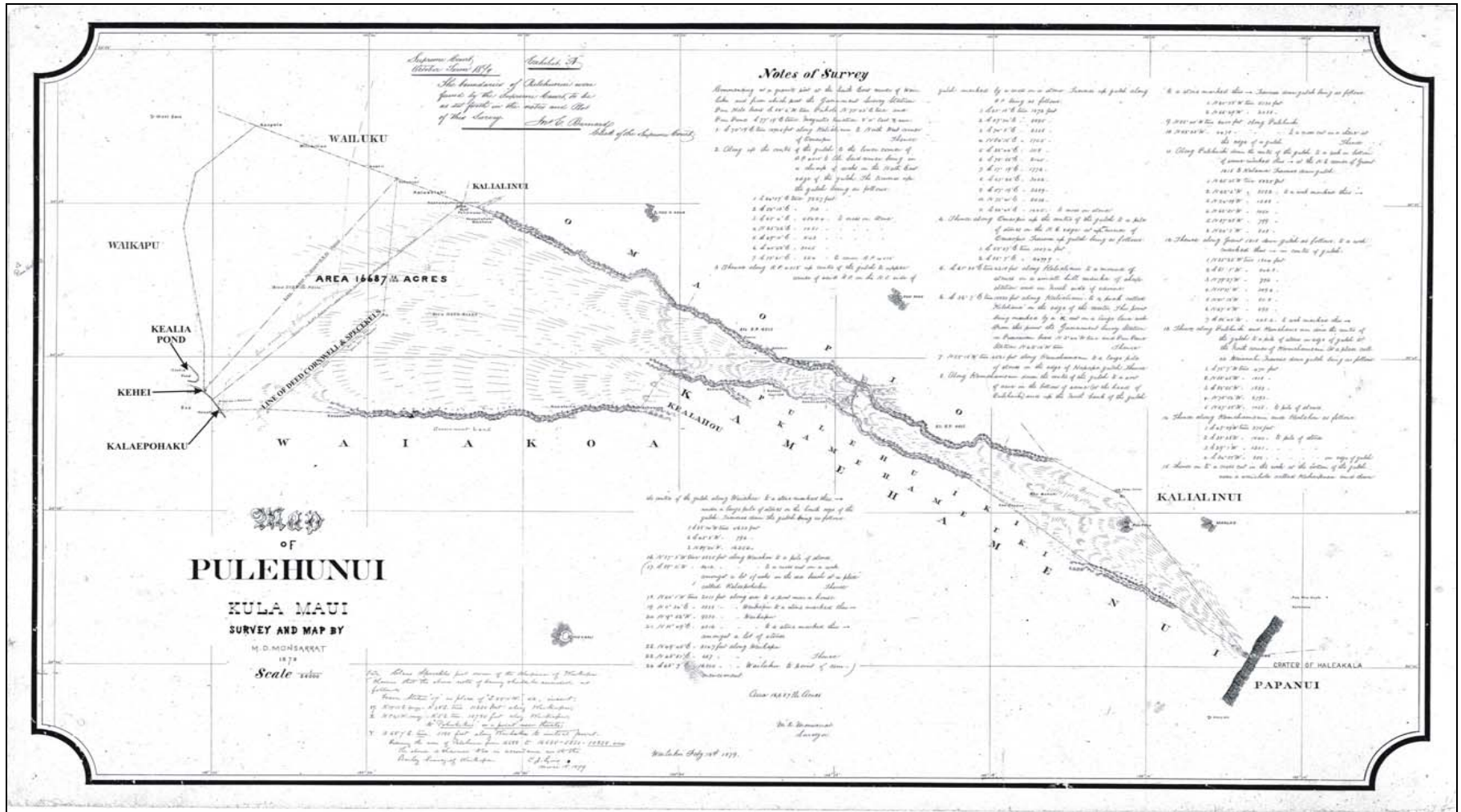


Figure 4: Modified “Pulehenui Kula Maui, Survey and Map By M.D. Monsarrat 1879”, Showing Ahupua`a Meets and Bounds and Boundary of Spreckles Kula land(State Survey Office, Reg. Map #1770)

Pūlehu Nui where the project area is located. On this LCA Keaweamahi claimed 5 *apana* (land portions), 7 *lo`i* (wet taro) and 2 *kula* (pastures). Saltwater-associated geography (*i.e.*, shore and dunes) was also claimed by Keaweamahi as part of LCA 5230 (Waihona `Aina Database 2011). However, of these 5 *apana* are listed in the project area.

## **HISTORIC LAND USE**

### **SUGAR YEARS**

As the sugar industry developed in the mid-1800s, more and more land was leased or purchased for what had become an intensely profitable endeavor. Water was an issue, but in 1876, the Hamakua Ditch Company (Alexander and Baldwin) was formed and within two years was bringing water from the streams of Haleakalā to four plantations in East Maui (Dorrance and Morgan 2000).

Also in 1876, the Reciprocity Treaty's ratification notice arrived by steamer, along with Claus Spreckles, California's sugar magnate, who viewed the sugar situation and decided two years later to turn the dry plains of Maui into a garden of cultivated cane (Van Dyke 2008). By various questionable means, he was able to acquire half interest in 16,000 acres of land in Waikapū commons and was able to lease 24,000 acres of Crown Lands on the Wailuku plains in central Maui for \$1,000 (*ibid.*). Figure 4 above, shows the survey line of the property extending across Pūlehu Nui, Claus Spreckles obtained from Henry Cornwell.

Having seen the success of the recently completed Hamakua Ditch now bringing mountain water to the otherwise dry, and unproductive East Maui fields, and having lost his battle to control this ditch water, Spreckles formed the Hawaiian Commercial Company and decided to construct a ditch system of his own on East Maui above the Hamakua Ditch, for his newly acquired land (Wilcox 1996). Spreckles' Haiku Ditch extended 30 miles, from Honomanu Stream to the Kīhei boundary and the water was used to irrigate his cane lands in the central Maui plains (*ibid.*). Presently, the Haiku Ditch ends at the Haiku reservoir abutting the project area to the north (see Figure 1).

In 1882, Spreckles reorganized his company into a California corporation, called Hawaiian Commercial and Sugar Company, or HC&S (Wilcox 1996). Later he constructed another water system known as the Waihee Ditch in West Maui. It brought

water from 15 miles away, starting at an elevation of 435 feet, to Kalua where it emptied into HC&S Waiale reservoir (*ibid.*).

The ensuing years brought trials and tribulations between Spreckles, his associates, and the Maui sugar planters, resulting finally in the 1898 sale of his HC&S stock, at an all time low, to James Castle in partnership with Alexander and Baldwin, and the departure of Claus Spreckles from Hawai`i (Dorrance and Morgan 2000; Wilcox 1996).

Henry Baldwin and Lorrin Thurston formed the Kihei Sugar Company in 1899, to grow cane on their ranch lands in south central Maui, which included the project area (Dorrance and Morgan 2000). It was sent to the mill at Pu`unēnē to be ground, but, although production was high, it was not enough to cover the costs (*ibid.*).

After the annexation in 1898, some of the planters on Maui, including Alexander and Baldwin, had decided to combine plantations to reap maximum profit. They formed the Maui Agricultural Company, a co-partnership that initially encompassed seven plantations and two mills. In 1904, five new plantations became part of the Maui Agricultural Company, as Kula Plantation Company, Makawao Plantation Company, Pulehu Plantation Company, Kailua Plantation and Kaliaui Plantation Company were newly formed by carving up the unprofitable Kihei Plantation land (Dorrance and Morgan 2000). Figure 5 shows the lands in Kula, previously Kihei Plantation Company, which became the “five companies” of the Maui Agricultural Company surveyed in 1904 by Arthur Alexander. The newly formed Makawao Plantation included the section of Pūlehu Nui containing the project area (Figure 6). Maui Agricultural Company merged with HC&S in 1948 (Dorrance and Morgan 2000).

## **WORLD WAR II**

A portion of the cane fields to the west of the project area was turned into a civil airfield for the Territory of Hawai`i in 1937, as the one located at Ma`alaea had become too small to accommodate ([www.airfields-freeman.com/HI/Airfields\\_HI\\_Maui.htm](http://www.airfields-freeman.com/HI/Airfields_HI_Maui.htm); 2011). Two years later, Inter-Island Airways began service to Maui, conveniently landing at Puunene Airport. As war loomed on the horizon (1940), the Navy began using the airport, along with a small Army Air Corps support base at the airfield (*ibid.*). At this time, the air station was being used to support Squadron VU-3, to tow targets and operate





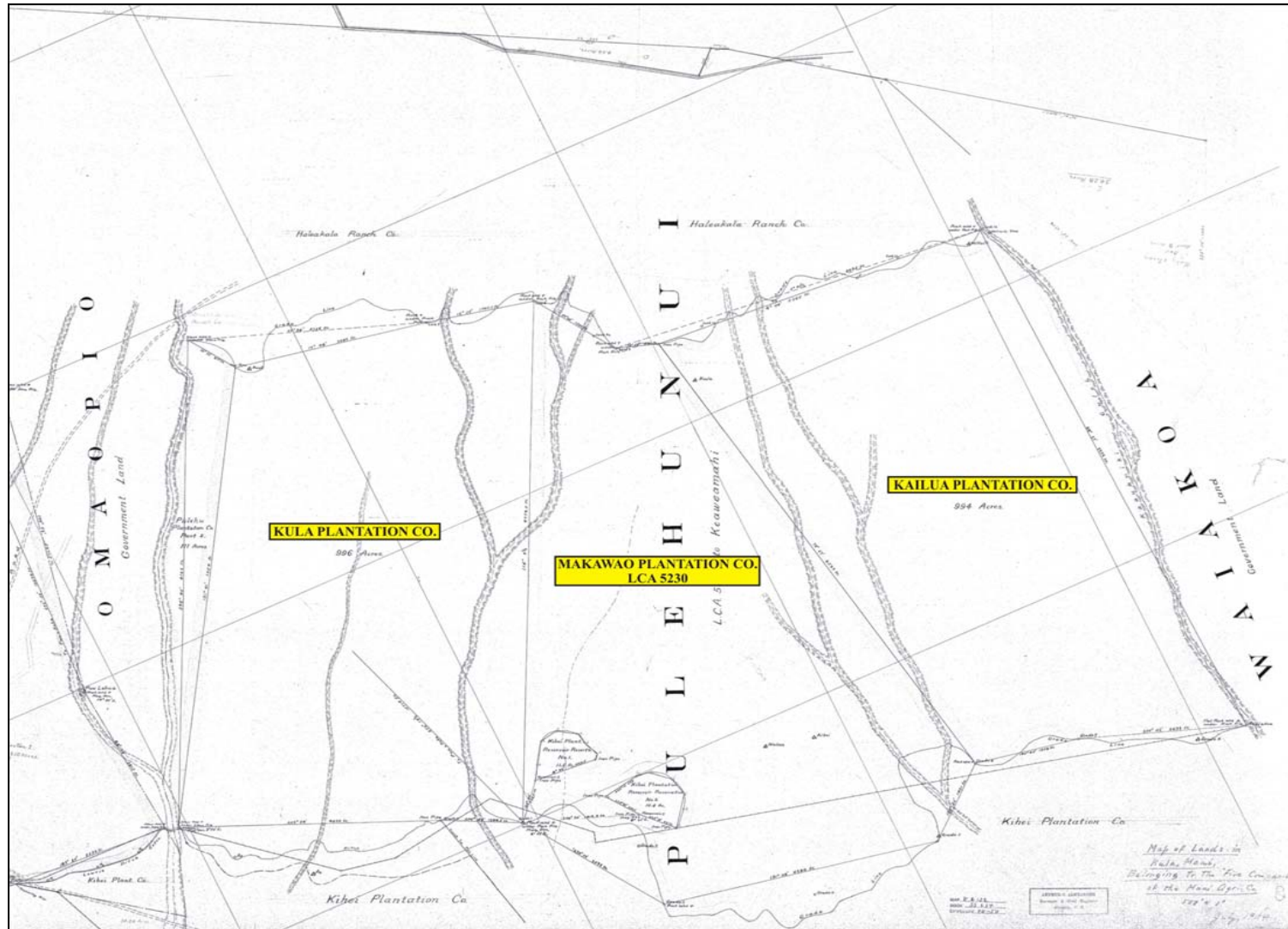
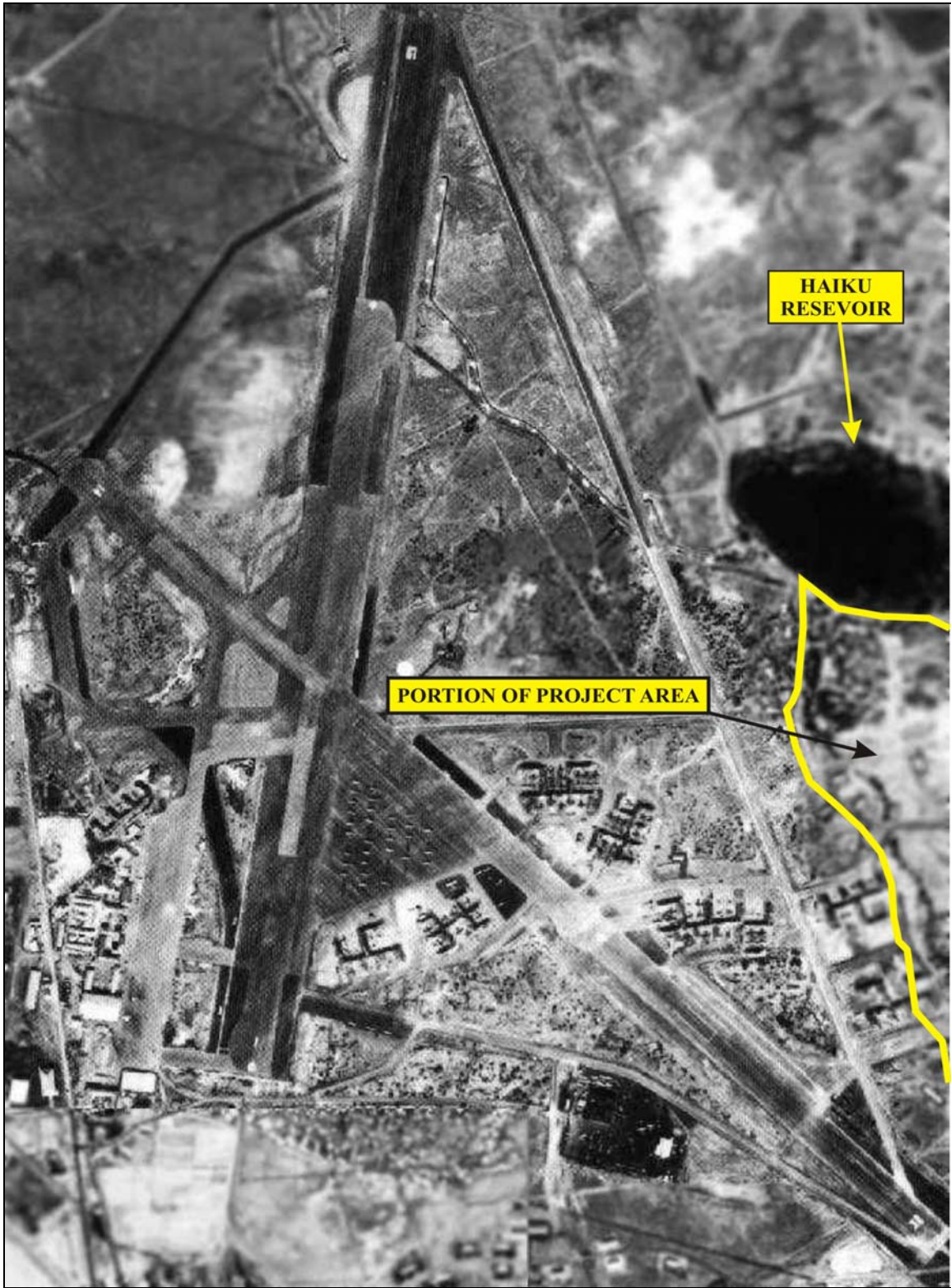


Figure 6: Close-up of Makawao Plantation Lands in Pūlehu Nui Ahupua`a (State Survey Office, Reg. Map #1770).

drones for the fleet. Shortly after the United States entered WWII, land in the area of the airport was condemned (1942), including the project parcel listed as parcel 2-C in the Declaration of Taking filed with the District Court of the United States for the District of Hawaii (on file Bureau of Conveyances, Honolulu). The airport was expanded and commissioned as Naval Air Station Maui (NAS). The Figure 7 photo illustrates the military impact on the area and shows a portion of the Haiku reservoir and the project area. The Navy lengthened and widened the runways and added Link trainers, as well as changing its name to NAS Puunene. One hundred and six squadrons and carrier groups passed through the NAS during WWII ([www.airfields-freeman.com/HI/Airfields\\_HI\\_Maui.htm](http://www.airfields-freeman.com/HI/Airfields_HI_Maui.htm) :2011).

Figure 8 shows a 1944 map of the Navel Air Station, including the Haiku Reservoir and the project area, in 1943. By 1945, the base consisted of a total of 2,202 acres, supporting over 3,300 personnel, and 271 aircraft. There were two paved runways, taxiways, ramps, hangars, and auxiliary buildings (*ibid.*).

The airfield was released by the Navy back to the Territory of Hawai`i in 1947 and was apparently used as the official inter-island Airport until at least 1952 when the Kahului Airport was available for civil use (*ibid.*). However, the Maui/Pu`unēnē airstrip, as it was known, serviced crop-dusters and other smaller aircraft and wasn't abandoned as a landing strip until sometime between 1961 and 1977 (*ibid.*). Over-grown military facilities were left in the area, including bunkers, revetments, and other bits and pieces. This is when the old airstrips were used for impromptu racing. All the land, except 222 acres, was sold back to HC&S by the State of Hawai`i. The 222 acres were deeded to the Maui County and the 2002 master plan for this land, included a raceway park, county fair grounds, Hawai`i National Guard, Maui Correctional Center and 3.5 (at the northeast end of the drag strip acres set aside for a naval memorial park at the northeast end of the drag strip (*ibid.*). Management is provided by the County Parks and Recreation Department and a portion of the airstrip is presently being used by the Maui Raceway Park Drag Strip, the Paradise Speedway Dirt Track, and the Maui Remote Airplane Club (*ibid.*).



**Figure 7: “1943 Aerial View of Puunene” (National Archives Photo).**



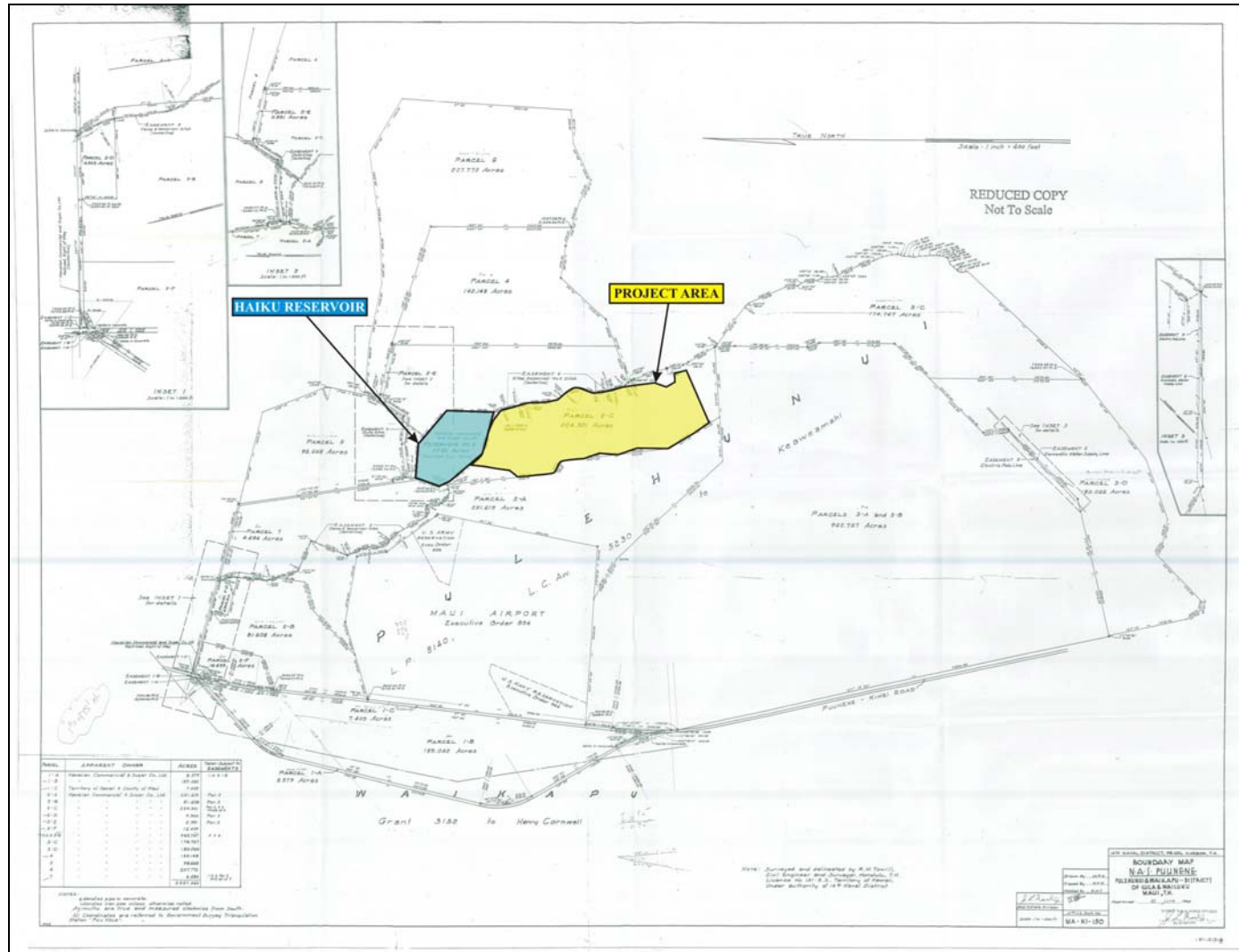


Figure 8: “Boundary Map NAS Puunene Pulehunui and Waikapu Districts of Kula and Wailuku Maui T.H. June 1944”, Showing Project Area (14<sup>th</sup> Naval District, Pearl Harbor, T.H.; Courtesy of Hugh Starr).

In recent times, the northern half of the 86-acre parcel had been used for a pig farm and as a scrap-metal storage site, while the southern half of the property remained fallow.

### **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. Sending inquiring letters to organizations concerning development of a piece of property that has already been totally impacted by previous activity and is located in an already developed industrial area may be a “good faith effort”. However, when many factors need to be considered, such as in coastal or mountain development, a good faith effort might mean an entirely different level of research activity.

In the case of the present parcel, letters of inquiry were sent to organizations whose expertise would include the project area. Consultation was sought from the History and Culture Branch Chief of the State Historic Preservation Division; Office of Hawaiian Affairs (OHA), O`ahu Branch; Central Maui Hawaiian Civic Club; Kimokeo Kapahuleua; Maui SHPD, Cultural Branch; County of Maui, Department of Planning, Cultural Resources Commission; OHA Maui Branch; and Hale Mahaolu. In addition, a Cultural Impact Assessment Notice was published in *The Honolulu Star-Advertiser*, and *The Maui News*, on July 20, 21, and 24, as well as and the August issue of the OHA newspaper, *Ka Wai Ola* (page 29).

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, Beckwith, Chinen, Kame`eleihiwa, Fornander, Kuykendall, Kelly, Handy and Handy, Puku`i and Elbert, Thrum, Sterling, 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.

## ARCHAEOLOGY

In depth archaeological information concerning the project area and vicinity can be found in the appropriate Archaeology section of the Environmental Impact Statement that covers the archaeological studies associated with this project. Individual reports can be found on file at the State Historic Preservation Division.

Briefly, International Archaeological Research Institute, Inc. (IARII) conducted Archaeological Inventory Survey in 1999 of a large area, part of which included the current the subject property (Tomanari-Tuggle *et al.* 2001). During the IARII survey, two archaeological sites, State Site 50-50-09-4164 (former World War Two Naval Air Station Puunene) and State Site 50-50-09-4801 (post-World War II cattle ranching site) were newly identified. IARII determined that at least two of these archaeological sites were used for multiple historic activities (Tomanari-Tuggle *et al.* 2001). For example, the crop dusting operation utilized the former Naval Air Station Puunene's airstrip as a runway for their planes. A few of the standing military structures located on the current project area [TMK: (2) 3-8-008:019] were converted from military features to holding facilities for pigs.

In 2011, SCS relocated these two archaeological sites and supplemented the initial study with the identification of additional, previously undocumented surface features within the two State sites identified by IARII (Tome and Dega 2011). Archival research indicated the northern half of the project area had been utilized for a pig farm and as a scrap-metal storage site, while the southern half of the subject property remained fallow. A total of fifteen (15) features, interpreted as either NAS Puunene-related or post-war cattle ranching-related features, had not been previously recorded. Of these 15 features recorded during this 2011 study, three features were located in the State Site 50-50-09-4801 post-war cattle ranching area. The remaining twelve (12) features were located in the State Site 50-50-09-4164 former Naval Air Station Pu'unēnē area.

Archaeology deals with material remains, and although cultural beliefs are often reflected through some sort of architecture, like *heiau*, or *ko`a*, there are many examples of cultural associations still important to the community with no physical structures to mark their significance. One such place, *Ulukukui O Lanikāula*, located on Moloka'i, is considered an extremely sacred spot. Another might be Kīlauea and Halema`uma`u, home of Pele o Hawai'i Island. These places have become important sites supporting a traditional belief system still held by the many peoples of Hawai'i. They contain no

identified archaeological features, however they are highly meaningful "...because of [their] association with cultural practices or beliefs of a living community . . ." (King 2003:3).

### **CIA INQUIRY RESPONSE**

As stated above, consultation was sought from the History and Culture Branch Chief of the State Historic Preservation Division; Office of Hawaiian Affairs (OHA), O'ahu Branch; Central Maui Hawaiian Civic Club; Kimokeo Kapahuleua; Maui SHPD, Cultural Branch; County of Maui, Department of Planning, Cultural Resources Commission; OHA Maui Branch; and Hale Mahaolu . In addition, a Cultural Impact Assessment Notice was published in *The Honolulu Star-Advertiser*, and *The Maui News*, on July 20, 21, and 24, as well as and the August issue of the OHA newspaper, *Ka Wai Ola* . In addition, contact was made with long time resident, Hugh Starr, who sent copies of reference documents and a map pertaining to the WWII use of the area. A letter was received from OHA, dated July 28, 2011, with no additional CIA referrals, but a number of suggestions concerning environmental aspects of the project that SCS passed on the client for their consideration (Appendix C).

No further comments, or information was received from the other letters of inquiry concerning the potential for cultural resources or cultural activities to occur in the project area (TMK 3-8-08:019), or with additional suggestions for further contacts.

### **CULTURAL ASSESSMEMNT**

Analysis of the potential effect of the project 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 also a suggested guideline of the OEQC (No. 10, 1997). To our knowledge, the project area has not been used for traditional cultural purposes within recent times. Based on historical research and no additional suggestion for contacts, analysis of the potential effect of the project 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 has not been used for traditional cultural purposes within recent times.

Based on the above 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 a portion of Parcel 019. Because there were no cultural activities identified within the project area, there are no adverse effects. The visual impact of the project from surrounding vantage points, e.g. the highway, mountains, and coast is minimal.

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**APPENDIX A: CIA CONSULTATION LETTERS - 1ST BATCH 8 JULY 2011**

Phyllis Coochie Cayan  
History and Culture Branch Chief  
State Historic Preservation Division  
601 Kamokila Blvd. Room 555  
Kapolei, Hawai'i 96707

July 8, 2011

Dear Ms. Cayan:

Scientific Consultant Services, Inc. (SCS) has been contracted by Pacific Rim Land Inc., to conduct a Cultural Impact Assessment (CIA) of a land parcel in Pu`unene, Pūlehunui Ahupua`a, Wailuku District, Maui Island [TMK: (2) 3-8-008:019] (Figures 1 and 2). According to documents supplied by Pacific Rim Land Inc., the project area consists of approximately 86 acres, which Pacific Rim Land Inc. plans to develop into a heavy industrial subdivision. Scientific Consultant Services is in the process of conducting an Archaeological Inventory Survey of the subject property and is assessing the probability of impacting cultural values and rights within the project area and its vicinity. A search of the Waihona `Aina Database (2011) indicates Land Commission Award (LCA) 5230 was issued to one Keaweama. According to the Tax Map Key (TMK), LCA 5230 appears to have included the current project area (see Figure 2).

According to the *Guidelines for Assessing Cultural Impacts* (Office of Environmental Quality Control, Nov. 1997):

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 man made and natural which support such cultural beliefs...

We are asking you for any information that might assist us in gathering knowledge of traditional activities, or traditional rights that might be impacted by development of the property. The results of our assessments rely greatly on the assistance and response of individuals and organizations such as yours. Enclosed are maps showing the location of the proposed project area. Please contact me or Leann McGerty at our SCS Honolulu office at (808) 597-1182; with any information or recommendations concerning this Cultural Impact Assessment.

Thank you in advance for your comments and help. We look forward to hearing from you.

Sincerely,

Cathleen A. Dagher  
Senior Archaeologist  
Scientific Consultant Services, Inc.

Attachments:

Figure 1: USGS Quadrangle (Wailuku) Map Showing Project Area Location.  
Figure 2: Tax Map Key [TMK: (2) 3-8-008] Showing Project Area Location.  
Land Commission Award 5230

Central Maui Hawaiian Civic Club  
P.O. Box 1493  
Wailuku, Hawai'i 96793

August 24, 2011

Dear Members:

Scientific Consultant Services, Inc. (SCS) has been contracted by Pacific Rim Land Inc., to conduct a Cultural Impact Assessment (CIA) of a land parcel in Pu`unene, Pūlehunui Ahupua`a, Wailuku District, Maui Island [TMK: (2) 3-8-008:019] (Figures 1 and 2). According to documents supplied by Pacific Rim Land Inc., the project area consists of approximately 86 acres, which Pacific Rim Land Inc. plans to develop into a heavy industrial subdivision. Scientific Consultant Services is in the process of conducting an Archaeological Inventory Survey of the subject property and is assessing the probability of impacting cultural values and rights within the project area and its vicinity. A search of the Waihona `Aina Database (2011) indicates Land Commission Award (LCA) 5230 was issued to one Keaweamahi. According to the Tax Map Key (TMK), LCA 5230 appears to have included the current project area (see Figure 2).

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Thank you in advance for your comments and help. We look forward to hearing from you.

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Scientific Consultant Services, Inc.

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Land Commission Award 5230



County of Maui  
Department of Planning  
Cultural Resources Commission  
250 S. High Street  
Wailuku, Hawai'i 96793

July 8, 2011

Dear Sir or Madam:

Scientific Consultant Services, Inc. (SCS) has been contracted by Pacific Rim Land Inc., to conduct a Cultural Impact Assessment (CIA) of a land parcel in Pu`unene, Pūlehunui Ahupua`a, Wailuku District, Maui Island [TMK: (2) 3-8-008:019] (Figures 1 and 2). According to documents supplied by Pacific Rim Land Inc., the project area consists of approximately 86 acres, which Pacific Rim Land Inc. plans to develop into a heavy industrial subdivision. Scientific Consultant Services is in the process of conducting an Archaeological Inventory Survey of the subject property and is assessing the probability of impacting cultural values and rights within the project area and its vicinity. A search of the Waihona `Aina Database (2011) indicates Land Commission Award (LCA) 5230 was issued to one Keaweama. According to the Tax Map Key (TMK), LCA 5230 appears to have included the current project area (see Figure 2).

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Land Commission Award 5230

Hale Mahaolu  
11 Mahaolu St.  
Kahului, Hawai'i 96732

July 8, 2011

Dear Members:

Scientific Consultant Services, Inc. (SCS) has been contracted by Pacific Rim Land Inc., to conduct a Cultural Impact Assessment (CIA) of a land parcel in Pu`unene, Pūlehunui Ahupua`a, Wailuku District, Maui Island [TMK: (2) 3-8-008:019] (Figures 1 and 2). According to documents supplied by Pacific Rim Land Inc., the project area consists of approximately 86 acres, which Pacific Rim Land Inc. plans to develop into a heavy industrial subdivision. Scientific Consultant Services is in the process of conducting an Archaeological Inventory Survey of the subject property and is assessing the probability of impacting cultural values and rights within the project area and its vicinity. A search of the Waihona `Aina Database (2011) indicates Land Commission Award (LCA) 5230 was issued to one Keaweamaahi. According to the Tax Map Key (TMK), LCA 5230 appears to have included the current project area (see Figure 2).

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Scientific Consultant Services, Inc.

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Land Commission Award 5230

Kimokeo Kapahulehua  
c/o `Ao`ao O Nā Loko I`a O Maui  
P.O. Box 1574  
Kīhei, Hawai`i 96731

July 8, 2011

Dear Mr. Kapahulehua:

Scientific Consultant Services, Inc. (SCS) has been contracted by Pacific Rim Land Inc., to conduct a Cultural Impact Assessment (CIA) of a land parcel in Pu`unene, Pūlehunui Ahupua`a, Wailuku District, Maui Island [TMK: (2) 3-8-008:019] (Figures 1 and 2). According to documents supplied by Pacific Rim Land Inc., the project area consists of approximately 86 acres, which Pacific Rim Land Inc. plans to develop into a heavy industrial subdivision. Scientific Consultant Services is in the process of conducting an Archaeological Inventory Survey of the subject property and is assessing the probability of impacting cultural values and rights within the project area and its vicinity. A search of the Waihona `Aina Database (2011) indicates Land Commission Award (LCA) 5230 was issued to one Keaweamahi. According to the Tax Map Key (TMK), LCA 5230 appears to have included the current project area (see Figure 2).

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Land Commission Award 5230

Office of Hawaiian Affairs  
360 Papa Place, Suite 105  
Kahului, Hawai'i 96732-2464

July 8, 2011

Dear Sir or Madam:

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Land Commission Award 5230

Clyde Nāmu`o, Director  
C/o Office of Hawaiian Affairs  
711 Kapi`olani Blvd, Suite 500  
Honolulu, Hawai`i 96813

July 8, 2011

Dear Mr. Nāmu`o:

Scientific Consultant Services, Inc. (SCS) has been contracted by Pacific Rim Land Inc., to conduct a Cultural Impact Assessment (CIA) of a land parcel in Pu`unene, Pūlehunui Ahupua`a, Wailuku District, Maui Island [TMK: (2) 3-8-008:019] (Figures 1 and 2). According to documents supplied by Pacific Rim Land Inc., the project area consists of approximately 86 acres, which Pacific Rim Land Inc. plans to develop into a heavy industrial subdivision. Scientific Consultant Services is in the process of conducting an Archaeological Inventory Survey of the subject property and is assessing the probability of impacting cultural values and rights within the project area and its vicinity. A search of the Waihona `Aina Database (2011) indicates Land Commission Award (LCA) 5230 was issued to one Keaweamahi. According to the Tax Map Key (TMK), LCA 5230 appears to have included the current project area (see Figure 2).

According to the *Guidelines for Assessing Cultural Impacts* (Office of Environmental Quality Control, Nov. 1997):

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 man made and natural which support such cultural beliefs...

We are asking you for any information that might assist us in gathering knowledge of traditional activities, or traditional rights that might be impacted by development of the property. The results of our assessments rely greatly on the assistance and response of individuals and organizations such as yours. Enclosed are maps showing the location of the proposed project area. Please contact me or Leann McGerty at our SCS Honolulu office at (808) 597-1182; with any information or recommendations concerning this Cultural Impact Assessment.

Thank you in advance for your comments and help. We look forward to hearing from you.

Sincerely,

Cathleen A. Dagher  
Senior Archaeologist  
Scientific Consultant Services, Inc.

Attachments:

Figure 1: USGS Quadrangle (Wailuku) Map Showing Project Area Location.  
Figure 2: Tax Map Key [TMK: (2) 3-8-008] Showing Project Area Location.  
Land Commission Award 5230

Hinano Rodrigues, Cultural Historian  
DLNR Maui Office Annex  
130 Mahalani Street  
Wailuku, Hawai'i 96791

July 8, 2011

Dear Hinano:

Scientific Consultant Services, Inc. (SCS) has been contracted by Pacific Rim Land Inc., to conduct a Cultural Impact Assessment (CIA) of a land parcel in Pu`unene, Pūlehunui Ahupua`a, Wailuku District, Maui Island [TMK: (2) 3-8-008:019] (Figures 1 and 2). According to documents supplied by Pacific Rim Land Inc., the project area consists of approximately 86 acres, which Pacific Rim Land Inc. plans to develop into a heavy industrial subdivision. Scientific Consultant Services is in the process of conducting an Archaeological Inventory Survey of the subject property and is assessing the probability of impacting cultural values and rights within the project area and its vicinity. A search of the Waihona `Aina Database (2011) indicates Land Commission Award (LCA) 5230 was issued to one Keaweama. According to the Tax Map Key (TMK), LCA 5230 appears to have included the current project area (see Figure 2).

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We are asking you for any information that might assist us in gathering knowledge of traditional activities, or traditional rights that might be impacted by development of the property. The results of our assessments rely greatly on the assistance and response of individuals and organizations such as yours. Enclosed are maps showing the location of the proposed project area. Please contact me or Leann McGerty at our SCS Honolulu office at (808) 597-1182; with any information or recommendations concerning this Cultural Impact Assessment.

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Sincerely,

Cathleen A. Dagher  
Senior Archaeologist  
Scientific Consultant Services, Inc.

Attachments:

Figure 1: USGS Quadrangle (Wailuku) Map Showing Project Area Location.  
Figure 2: Tax Map Key [TMK: (2) 3-8-008] Showing Project Area Location.  
Land Commission Award 5230

**APPENDIX B: NEWSPAPER NOTICES**



**CULTURAL IMPACT ASSESSMENT NOTICE:**

Information requested by SCS of cultural resources or on-going cultural activities on or near a land parcel in Pu`unene, Pūlehunui Ahupua`a, Wailuku District, Maui, Island, Hawai`i [TMK: (2) 3-8-008:019].

Please respond within 30 days to SCS at (808) 597-1182

Ka Wai Ola  
Honolulu Advertiser  
Maui News

SCIENTIFIC CONSULTANT SERVICES, Inc.



711 Kapiolani Blvd., Suite 975 Honolulu, Hawaii 96813

PH: 808-597-1182

FAX: 808-597-1193

FAX OR TRANSMITTAL MEMORANDUM

To: STAR ADVERTISER Date: 7/14/2011
Firm: Legal Dept. Phone: 529-4344
Address: Fax: 529-4829
LegalIS@StarAdvertiser.com

The following is being sent to you: By Fax Enclosed Under Separate Cover
SCS Report(s) Contract(s) Billing(s) Bid Other

Enclosed Item:
SCS Project Number: 1221

RUN Dates 7/20/7/21/724

- ( ) For your files ( ) For your signature and return ( ) For necessary action
( ) For your client ( ) Submitted as a "DRAFT" ( ) As requested
( ) For review and comment ( ) Submitted as a "FINAL" ( ) As per our conversation

Comments:
Many Thanks, Sumner

Mahaio,

For SCS:

Spear / Chaffee / Dega / McGerty / Pestana / Dagher / Baker / Tome / Smitherman

**CULTURAL IMPACT ASSESSMENT NOTICE:**

Information requested by SCS of cultural resources or on-going cultural activities on or near a land parcel in Pu`unene, Pūlehunui Ahupua`a, Wailuku District, Maui, Island, Hawai`i [TMK: (2) 3-8-008:019].

Please respond within 30 days to SCS at (808) 597-1182

Ka Wai Ola  
Honolulu Advertiser  
Maui News

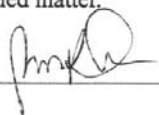
**AFFIDAVIT OF PUBLICATION**

STATE OF HAWAII, }  
County of Maui. } ss.

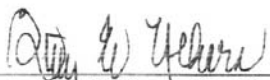
Rhonda M. Kurohara being duly sworn  
deposes and says, that she is in Advertising Sales of  
the Maui Publishing Co., Ltd., publishers of THE MAUI NEWS, a  
newspaper published in Wailuku, County of Maui, State of Hawaii;  
that the ordered publication as to \_\_\_\_\_  
CULTURAL IMPACT ASSESSMENT NOTICE

of which the annexed is a true and correct printed notice, was  
published 3 times in THE MAUI NEWS, aforesaid, commencing  
on the 20th day of July, 2011, and ending  
on the 24th day of July, 2011, (both days  
inclusive), to-wit: on \_\_\_\_\_  
July 20, 21, 24, 2011

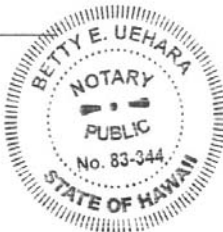
and that affiant is not a party to or in any way interested in the above  
entitled matter.

  
\_\_\_\_\_

This 1 page Cultural Impact, dated  
July 20, 21, 24, 2011,  
was subscribed and sworn to before me this 25th day of  
July, 2011, in the Second Circuit of the State of Hawaii,  
by Rhonda M. Kurohara

  
\_\_\_\_\_  
Notary Public, Second Judicial  
Circuit, State of Hawaii

BETTY E. UEHARA  
My commission expires 09-26-11



**CULTURAL IMPACT ASSESSMENT NOTICE:**  
Information requested by SCS of cultural resources or on-going cultural activities on or near a land parcel in Pu'unene, Pulehunui Ahupua'a, Wailuku district, Maui, Island, Hawai'i (TMK: (2) 3-8-008:019).  
Please respond within 30 days to SCS at (808) 597-1182.  
(MN: July 20, 21, 24, 2011)

1221

AFFIDAVIT OF PUBLICATION

IN THE MATTER OF  
Public Notice

}  
}  
}  
}  
}

STATE OF HAWAII }  
} SS.  
City and County of Honolulu }

Doc. Date: JUL 25 2011 # Pages: 1  
 Notary Name: Patricia K. Reese First Judicial Circuit  
 Doc. Description: Affidavit of  
Publication  
 Notary Signature: *Patricia K. Reese* Date: JUL 25 2011



**CULTURAL IMPACT ASSESSMENT NOTICE:**  
 Information requested by SGS of cultural resources or on-going cultural activities on or near a land parcel in Pu'unene, Puiehonui Ahupua'a, Wailuku District, Maui Island, Hawaii (TMK: (2) 3-8-008-019). Please respond within 30 days to SGS at (808) 597-1152 (SA329665 7/20, 7/21, 7/24/11)

Rose Rosales being duly sworn, deposes and says that she is a clerk, duly authorized to execute this affidavit of Oahu Publications, Inc. publisher of The Honolulu Star-Advertiser and MidWeek, that said newspapers are newspapers of general circulation in the State of Hawaii, and that the attached notice is true notice as was published in the aforementioned newspapers as follows:

Honolulu Star-Advertiser 3 times on:  
07/20, 07/21, 07/24/2011

Midweek Wed. 0 times on:

           times on:

And that affiant is not a party to or in any way interested in the above entitled matter

*Rose Rosales*  
 Rose Rosales  
 Subscribed to and sworn before me this 25<sup>th</sup> day  
 of July A.D. 2011  
*Patricia K. Reese*  
 Patricia K. Reese, Notary Public of the First Judicial Circuit, State of Hawaii  
 My commission expires: Oct 07 2014



Ad # 0000329665

LN: \_\_\_\_\_



CP  
[Signature]

Scientific Consultant Services 2x2  
CLASS2011 7/20 Wed tu  
1498565 - Page 1 - Composite

**CULTURAL IMPACT  
ASSESSMENT NOTICE:**

Information requested by SCS of cultural resources or on-going cultural activities on or near a land parcel in Pu'unene, Pu'uhonui Ahupua'a, Wailuku district, Maui, Island, Hawai'i [TMK: (2) 3-8-008:019].

Please respond within 30 days to SCS at (808) 597-1182.  
(MN: July 20, 21, 24, 2011)

cos #19843

To: Guerra

From: Rhonda  
The Maui News Classified Dept.  
Ph: (808) 242-6333 Fax: (808) 242-6389

Your ad proof. Please call or fax your corrections/approval by \_\_\_\_\_  
Mahalo!

Received Time Jul.19. 9:58AM

**APPENDIX C: OHA'S RESPONSE**





**STATE OF HAWAII**  
**OFFICE OF HAWAIIAN AFFAIRS**  
711 KAPI'OLANI BOULEVARD, SUITE 500  
HONOLULU, HAWAII 96813

HRD11/5837B

July 28, 2011

Cathleen A. Dagher, Senior Archaeologist  
Scientific Consultant Services, Inc.  
711 Kapi'olani Boulevard, Suite 975  
Honolulu, Hawaii'i 96813

**Re: Pre-Cultural Impact Assessment Consultation  
Pu'unene Heavy Industrial Subdivision  
Island of Maui**

Aloha e Cathleen A. Dagher,

The Office of Hawaiian Affairs (OHA) is in receipt of your July 8, 2011 letter with enclosures initiating consultation ahead of a cultural impact assessment (CIA) for the proposed development of a heavy industrial subdivision (project) on 86 acres in Kihei on the Island of Maui. OHA is concurrently responding to a June 23, 2011 request for comments on this project from Chris Hart & Partners, Inc. who will be preparing a draft environmental assessment (DEA). It is our understanding your CIA will become a supporting document to certain determinations within the DEA.

Your letter indicates that your firm will be conducting an archaeological inventory survey (AIS) of the project area. We look forward to reviewing the results of the AIS. Your archival research indicates Land Commission Award 5230 to Keaweamahi is within the project area. We appreciate that you have provided this information in your letter.

OHA suggests that your CIA comprehensively discuss how project infrastructure (wastewater and onsite drainage systems) intends to contain chemicals and materials and prevent them from entering adjacent irrigation water systems or adversely impact the overall quality of the South Maui watershed (watershed) and groundwater. As you know, in traditional thinking natural resources (such as water) and cultural resources are one and the same and necessary to perpetuate traditional cultural practices.

OHA notes that the Kealia Pond National Wildlife Refuge (NWR) serves as a "settling basin" for the entire watershed and is subject to intermittent flooding during the winter months. It is possible, that any chemicals or pollutants which enter the watershed end up in the NWR adversely impacting native species and near shore marine water quality.

Cathleen A. Dagher, Senior Archaeologist  
Scientific Consultant Services, Inc.  
July 28, 2011  
Page 2 of 2

We have no additional comments or referrals to individuals or organizations who may be interested in participating in consultation for this project to offer to you at this time. Thank you for initiating consultation. We look forward to reviewing the CIA and providing additional comments at that time. Should you have any questions or concerns, please contact Keola Lindsey at 594-0244 or keolal@oha.org.

'O wau iho nō me ka 'ōia'i'o,



Clyde W. Nāmu'o  
Chief Executive Officer

C: OHA- Maui COC



TRAFFIC IMPACT  
ANALYSIS REPORT

APPENDIX

N



TRAFFIC IMPACT ANALYSIS REPORT FOR

# **PUUNENE HEAVY INDUSTRIAL SUBDIVISION**

TMK: (2) 3-8-008:019  
IN PUUNENE, MAUI, HAWAII

Prepared For  
**CMBY 2011 INVESTMENT, LLC**

**Phillip Rowell and Associates**  
47-273 'D' Hui Iwa Street  
Kaneohe, Hawai'i 96744  
Tel: 808-239-8206 Fax: 808-239-4175  
Email: [prowell@hawaiiantel.net](mailto:prowell@hawaiiantel.net)

September 2013

## TABLE OF CONTENTS

1. INTRODUCTION .....	Page 1
Project Location and Description .....	Page 1
Study Methodology .....	Page 4
Order of Presentation .....	Page 5
2. ANALYSIS OF EXISTING CONDITIONS .....	Page 6
Existing Streets and Intersection Controls .....	Page 6
Existing Peak Hour Traffic Volumes .....	Page 8
Level-of-Service Concept .....	Page 10
Methodology for Level-of-Service Analysis .....	Page 11
Level-of-Service Analysis of Existing Conditions .....	Page 12
Existing Deficiencies .....	Page 12
Existing Public Transportation .....	Page 13
3. PROJECTED BACKGROUND TRAFFIC CONDITIONS .....	Page 14
Design Year for Traffic Forecasts .....	Page 14
Background Traffic Growth .....	Page 15
Related Projects .....	Page 15
2015 Background Traffic Projections .....	Page 20
2015 Background Levels-of-Service .....	Page 20
Mitigation Required for 2015 Background Conditions .....	Page 20
4. PROJECT-RELATED TRAFFIC CONDITIONS .....	Page 22
Methodology .....	Page 22
Trip Generation of Proposed Development .....	Page 22
Trip Distribution and Assignments .....	Page 23
2015 Background Plus Project Projections .....	Page 25
5. TRAFFIC IMPACT ANALYSIS .....	Page 27
Changes in Total Intersection Volumes .....	Page 27
2015 Background Plus Project Level-of-Service Analysis .....	Page 28
Mitigation Measures - Mokulele Highway at Kama'aina Road & Mehamaha Loop .....	Page 30
Levels-of-Service of Unsignalized Intersections .....	Page 30
Required Left Turn Storage Lane Lengths .....	Page 33
Summary Mitigation Measures and Recommendations .....	Page 34
Early Consultation Letters and Responses .....	Page 35

## APPENDICES

Appendix A	Proposed Land Development Plan
Appendix B	Traffic Count Summary Worksheets
Appendix C	Level-of-Service Worksheets for Existing Conditions
Appendix D	Level-of-Service Worksheets for 2015 Background Conditions
Appendix E	Level-of-Service Worksheets for 2015 Background Plus Project Conditions
Appendix F	Level-of-Service Worksheets for 2015 Background Plus Project Conditions with Mitigation
Appendix G	Level-of-Service Worksheets for Unsignalized Intersections
Appendix H	Response to Early Consultation Comments for State of Hawaii Department of Transportation and Maui Police Department
Appendix I	Engineer's Drawing of Proposed Mitigation Improvements at Intersection of Mokulele Highway at Kama'aina Road and Mehamaha Loop
Appendix J	Comment Letter from State of Hawaii Department of Transportation

**LIST OF FIGURES**

Figure 1 Project Location on Maui ..... Page 2  
Figure 2 Schematic Drawing of Access Routes to Project Site ..... Page 3  
Figure 3 Schematic of Intersection of Mokulele Highway at Kama’aina Road and Mehamaha Loop  
..... Page 7  
Figure 4 Existing (2011) Peak Hour Traffic Volumes ..... Page 9  
Figure 5 Locations of Related Project ..... Page 18  
Figure 6 Background Growth and Related Projects’ Trip Assignments ..... Page 19  
Figure 7 2015 Background Peak Hour Traffic Projections ..... Page 21  
Figure 8 Peak Hour Project Trip Assignments ..... Page 24  
Figure 9 2015 Background Plus Project Peak Hour Traffic Projections ..... Page 26  
Figure 10 Background Plus Project Peak Hour Traffic Volumes at Unsignalized intersections  
..... Page 32

**LIST OF TABLES**

Table 1 Level-of-Service Definitions for Signalized Intersections ..... Page 10  
Table 2 Level-of-Service Definitions for Unsignalized Intersections ..... Page 11  
Table 3 2011 Levels-of-Service - Mokulele Highway at Kama’aina Road & Mehamaha Loop  
..... Page 12  
Table 4 Trip Generation Summary of Related Projects ..... Page 17  
Table 5 2015 Background Levels-of-Service - Mokulele Highway at Kama’aina Road & Mehamaha  
Loop ..... Page 20  
Table 6 Trip Generation Calculations ..... Page 23  
Table 7 Analysis of Project’s Share of Total Intersection Approach Volumes ..... Page 28  
Table 8 Analysis of Project’s Share of Total Intersection Approach Volumes Growth .... Page 28  
Table 9 2015 Levels-of-Service - Mokulele Highway at Kaima’ana Road ..... Page 29  
Table 10 2015 Levels-of-Service of Unsignalized Intersection ..... Page 30  
Table 11 Left Turn Storage Lane Requirements ..... Page 33  
Table 12 Assessment of Deceleration Lane Requirements ..... Page 34  
Table 13 Summary of Recommended Mitigation for 2015 Background Conditions ..... Page 34

## **1. INTRODUCTION**

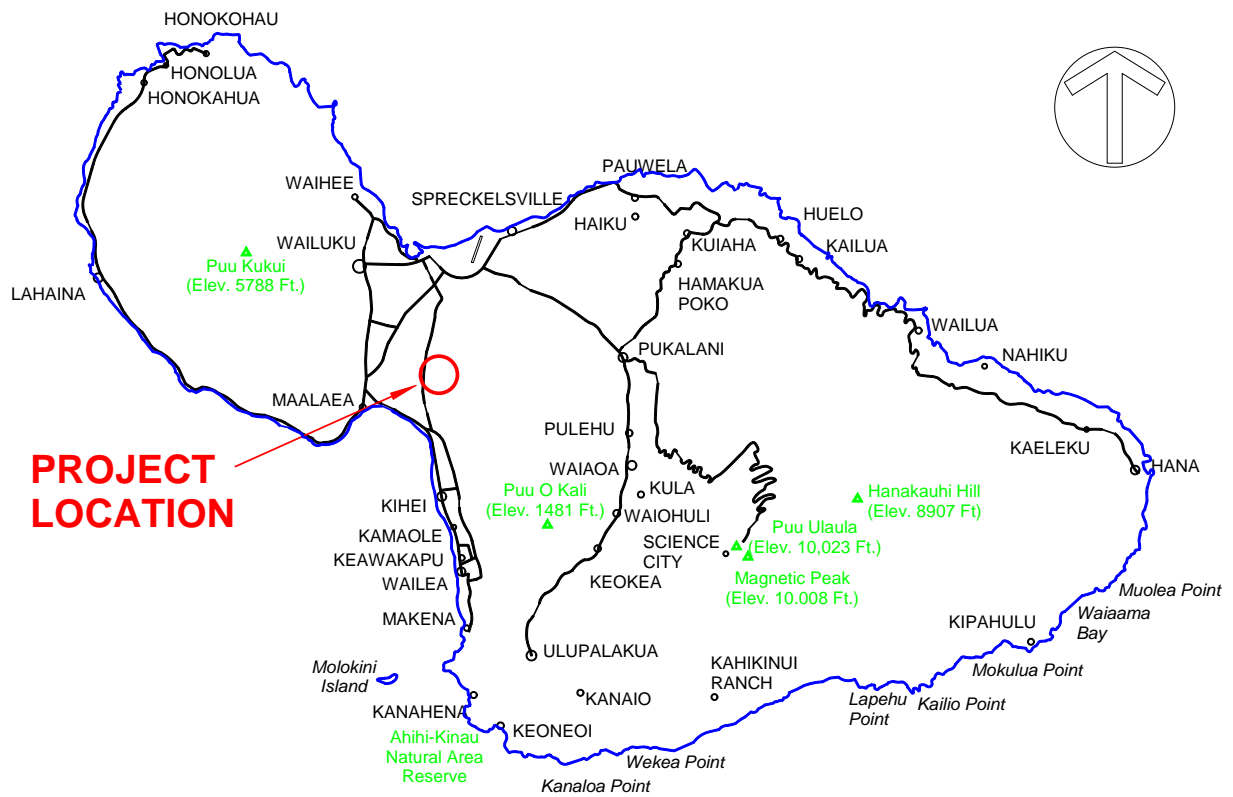
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Phillip Rowell and Associates has been retained to prepare a Traffic Impact Analysis Report for the proposed heavy industrial subdivision in Puunene, Maui, Hawaii. This introductory chapter discusses the location of the project, the proposed development, and the study methodology.

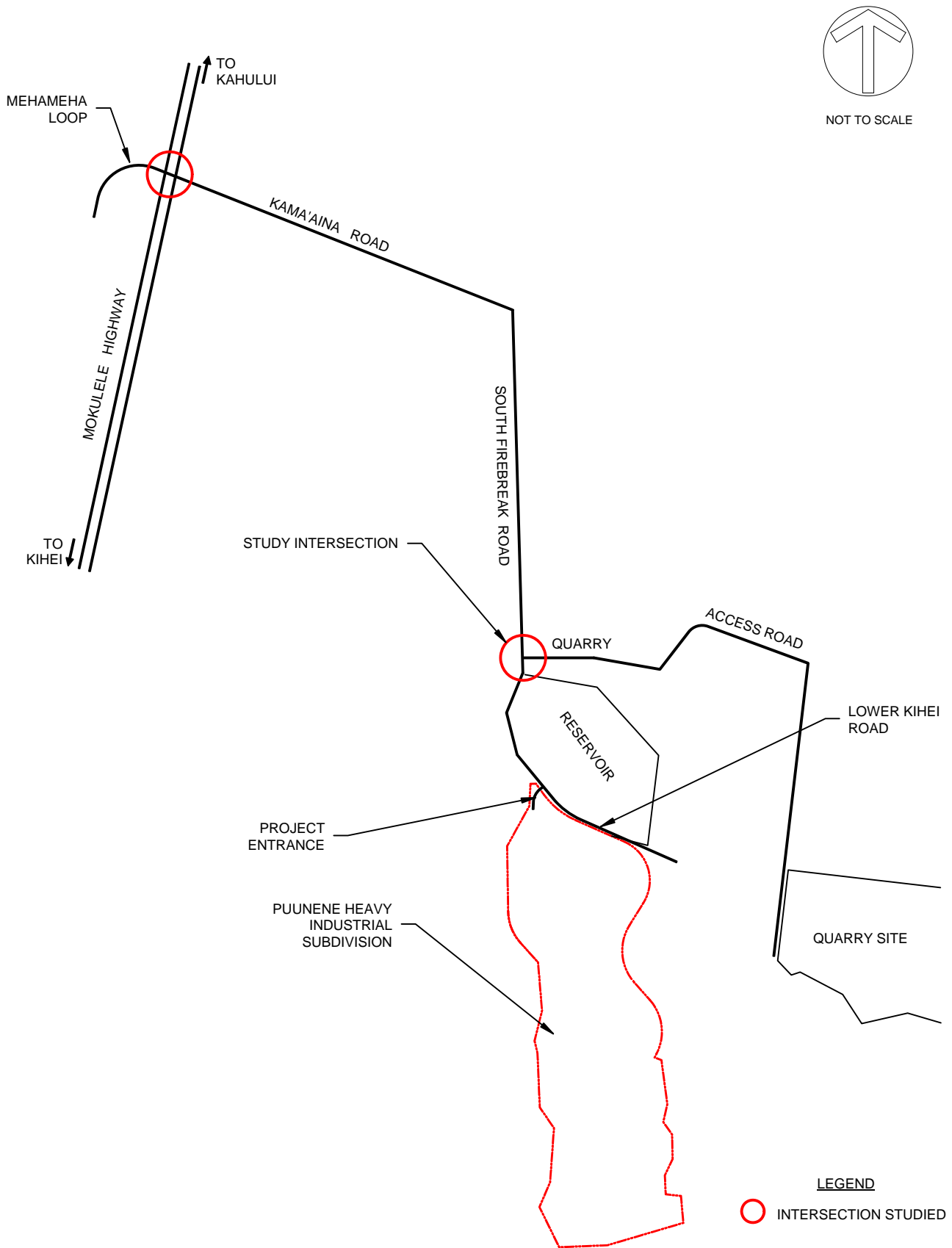
### **Project Location and Description**

1. The project is located approximately 1.4 miles east of Mokulele Highway in the vicinity of the Old Puunene Airport. [Figure 1](#) indicates the approximate location on the Island of Maui.
2. The total project area of the subdivision is 86 acres. Approximately 76.9 acres will be developed as industrial lots, while the remaining 9.1 acres will be a drainage reserve. The current plan is to subdivide the project into 28 lots. A proposed subdivision plan is provided as [Appendix A](#).
3. Access to and egress from the project will be via Kama'aina Road, which intersects Mokulele Highway adjacent to the Maui Humane Society at the intersection of Mokulele Highway at Mehameha Loop, South Firebreak Road and Lower Kihei Road. A schematic drawing of this access route is shown on [Figure 2](#).





**Figure 1**  
**PROJECT LOCATION ON MAUI**



**Figure 2**  
**SCHEMATIC DRAWING OF ACCESS ROUTES TO PROJECT**

4. The project will have no right of access to Maui Raceway Park roads. Additionally, there will be a drainage swale between the project lots and the property line adjacent to the park. This will prevent any traffic connection between the project and the park.
5. Since the current plan is to subdivide the property, 2015 is used as the project completion date.

### **Study Methodology**

The following is a summary list of the tasks performed:

1. A field reconnaissance was performed to identify existing roadway cross-sections, intersection lane configurations, traffic control devices, and surrounding land uses.
2. Existing weekday peak hour traffic volumes were obtained for the intersection of Mokulele Highway at Kama'aina Road. Since existing and proposed traffic using Kama'aina Road is industrial related, traffic data included the number of heavy vehicles. Existing levels-of-service were determined using the methodology described in the *2000 Highway Capacity Manual*.
3. A list of related development projects within and adjacent to the study area that will impact traffic conditions at the study intersections was compiled.
4. Future background traffic volumes without traffic generated by the study project were estimated. A level-of-service analysis was performed to determine traffic operating conditions and levels-of-service as a result of background growth and traffic generated by other known future development projects.
5. Peak hour traffic that the proposed project will generate was estimated using trip generation analysis procedures recommended by the Institute of Transportation Engineers. Project generated traffic was distributed and assigned to the adjacent roadway network.
6. A level-of-service analysis for future traffic conditions with traffic generated by the study project was performed.
7. The impacts of traffic generated by the proposed project were quantified and summarized.
8. Improvements or modifications necessary to mitigate the traffic impacts of the project and to provide adequate access to and egress from the site were identified and analyzed.
9. A report documenting the conclusions of the analyses performed and recommendations was prepared.

## **Order of Presentation**

Chapter 2 describes existing traffic conditions, the Level-of-Service (LOS) concept and the results of the Level-of-Service analysis of existing conditions.

Chapter 3 describes the process used to estimate 2015 background traffic volumes and the resulting background traffic projections. Background conditions are defined as future background traffic conditions without traffic generation by the study project.

Chapter 4 describes the methodology used to estimate the traffic characteristics of the proposed project, including 2015 background plus project traffic projections.

Chapter 5 describes the traffic impacts of the proposed project, conclusions of the impact analysis and recommended mitigation measures.

## **2. ANALYSIS OF EXISTING CONDITIONS**

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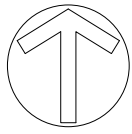
This chapter presents the existing traffic conditions on the roadways adjacent to the proposed project. The level-of-service (LOS) concept and the results of the LOS analysis for existing conditions are also presented. The purpose of this analysis is to identify existing deficiencies and to establish the base conditions for the determination of the impacts of the project which are described in a subsequent chapter.

### **Existing Streets and Intersection Controls**

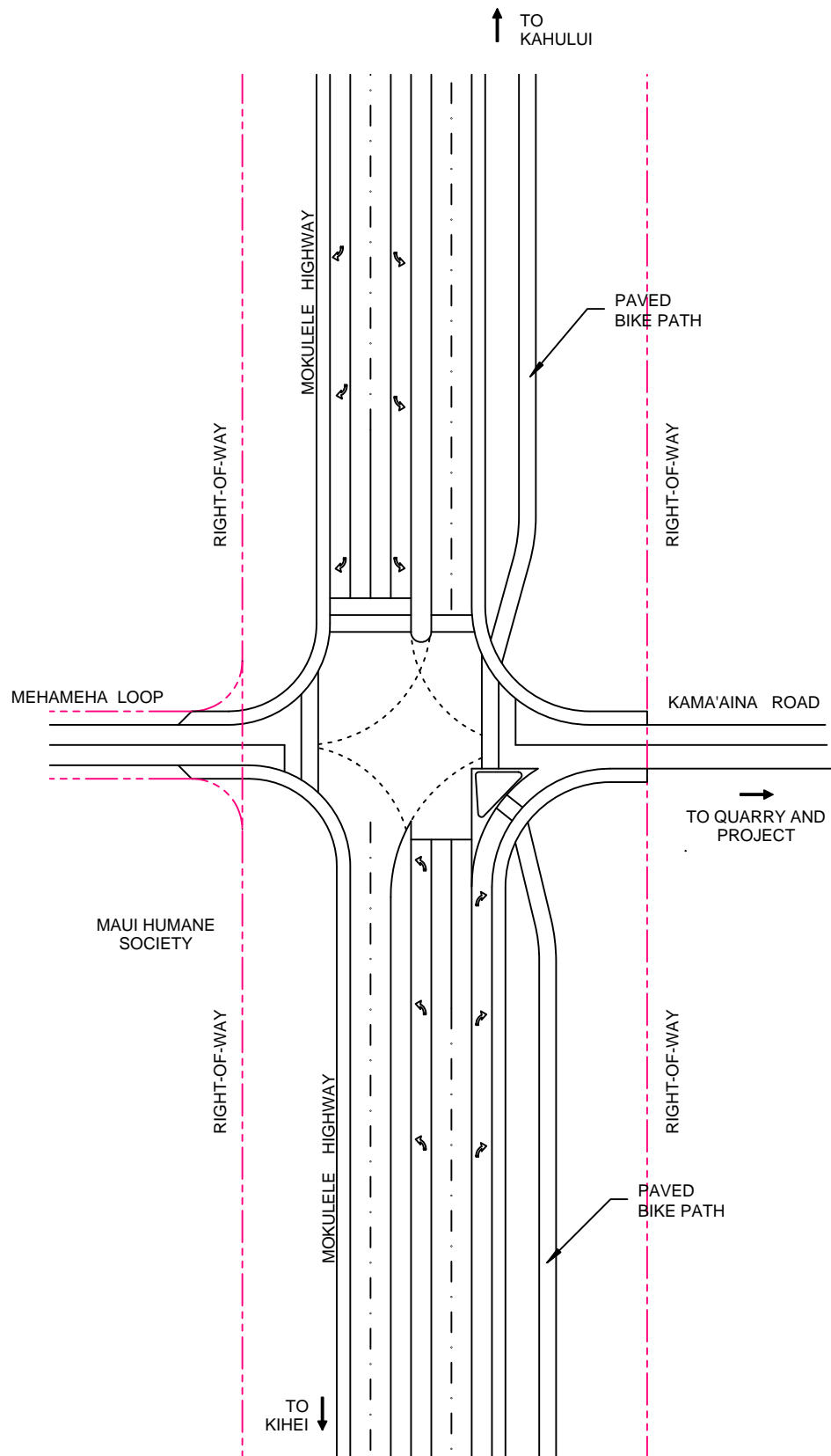
All traffic will access and egress the project via the intersection of Mokulele Highway at Kama'aina Road and Mehamaha Loop. The north and south approaches are Mokulele Highway. The east approach is Kama'aina Road and the west approach is Mehamaha Loop. Kama'aina Road, along with South Firebreak Road, connects Mokulele Highway with the Hawaiian Cement Quarry and the west leg connects with the Maui Humane Society facility. A schematic of this intersection is provided as [Figure 3](#).

Mokulele Highway is a four-lane, divided highway with a north-south orientation connecting Kahului to the north with Kihei to the south. The posted speed limit is 45 miles per hour. There is a separate bike path along the east side of the highway.

Kama'aina Road is a 25-foot wide roadway within a 56-foot wide easement.



NOT TO SCALE



**Figure 3**  
**SCHEMATIC DRAWING OF INTERSECTION OF**  
**MOKULELE HIGHWAY AT KAMA'AINA ROAD AND MEHAMEHA LOOP**

The intersection of Mokulele Highway at Kama'aina Road is a four-legged, signalized intersection. The northbound and southbound approaches of Mokulele Highway both have separate left turn and right turn deceleration and turn storage lanes. Northbound and southbound left turn lanes are protected. The eastbound (Mehameha Loop) and westbound (Kama'aina Road) approaches are one lane each.

### Existing Peak Hour Traffic Volumes

The intersection of Mokulele Highway at Kama'aina Road was counted from 6:30 AM to 9:00 AM on Friday, August 12, 2011 and from 3:00 PM to 6:00 PM on Thursday, August 11, 2011. Since Kama'aina Road provides access to the quarry and is heavily used by heavy trucks, the number of heavy vehicles was also counted. A heavy vehicle is defined by the *Highway Capacity Manual* as "a vehicle with more than four wheels touching the pavement during normal operation."<sup>1</sup> Heavy vehicles have a significant impact on the capacity of an intersection as a result of the vehicles operating characteristics. The percentage of heavy vehicles is therefore a critical input to the capacity analysis of this intersection.

The results of the traffic counts are summarized as [Figure 4](#). Shown are the peak hour volumes of heavy vehicles, other vehicles and total vehicles. Also shown are the percentages of heavy vehicles of each traffic movement.

The traffic count summary worksheets are provided as [Appendix B](#).

The morning peak hour is from 7:15 AM to 8:15 AM. This is consistent with traffic counts completed in 2010 at the intersection of Mokulele Highway at North Kihei Road, which is the next signalized intersection south of this intersection. The total morning peak hour volume along Mokulele Highway is approximately 2,200 vehicles per hour. The direction split is 50/50. Left and right turns are minimal. Traffic turning into and out of Kama'aina Road is largely heavy vehicles. The percentages of westbound left and right turns from Kama'aina Road that are heavy vehicles are 80% and 67%, respectively. 48% of the southbound left turns and 17% of the northbound right turns into Kama'aina Road are heavy vehicles also.

The afternoon peak hour along Mokulele Highway is from 3:30 PM to 4:30 PM. The total afternoon peak hour traffic volume is approximately 2,380 vehicles per hour. The directional split is also 50/50. 100% of the southbound left turns, 73% of the westbound left turns are heavy vehicles and 84% of the northbound right turns are heavy vehicles.

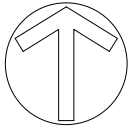
The peak hour volumes along Mehameha Loop are approximately 35 vehicles per hour during the morning peak hour and 40 vehicles per hour during the afternoon peak hour. There were no heavy vehicles along Mehameha Loop during the peak hours.

The peak hour volumes along Kama'aina Road are 57 vehicles per hour during the morning peak hour and 36 during the afternoon peak hour. During the morning peak hour, 25% of the vehicles along Kama'aina Road are heavy vehicles. During the afternoon peak hour, 22% of the vehicles are heavy vehicles.

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<sup>1</sup> Transportation Research Board, *Highway Capacity Manual*, Washington, D.C., page 5-7.

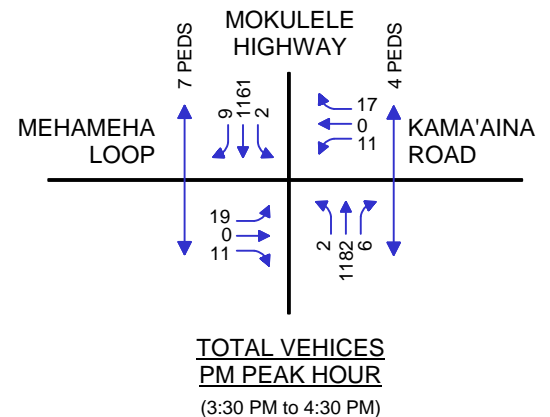
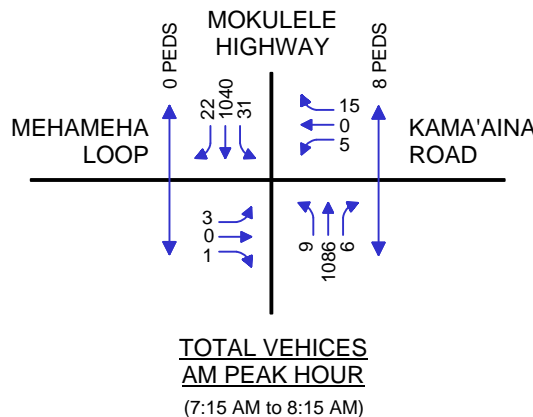
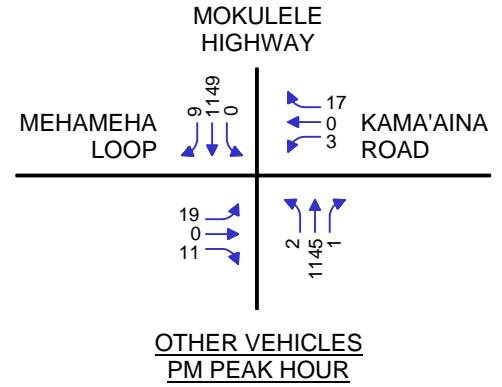
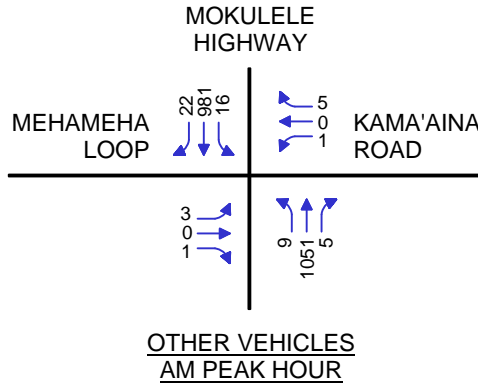
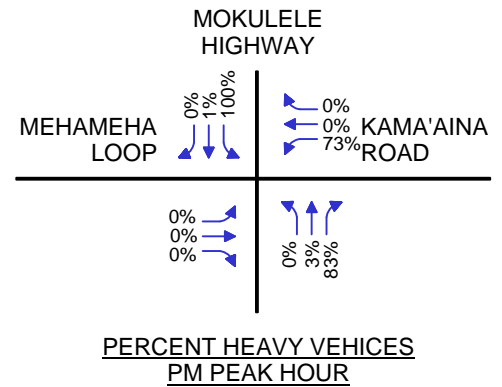
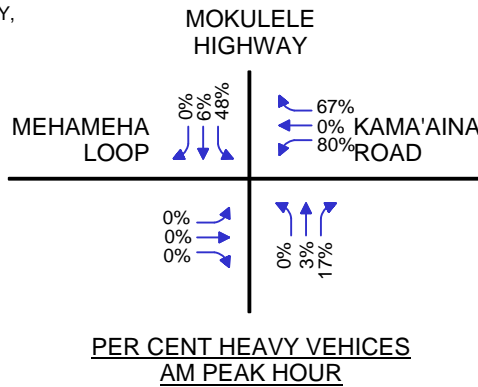
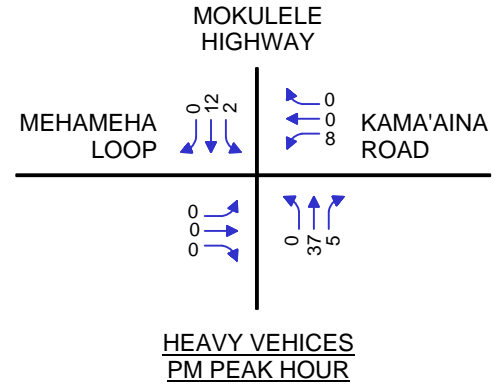
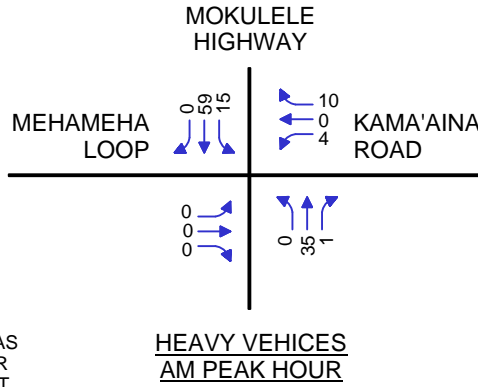




NOT TO SCALE

NOTES:

1. HEAVY VEHICLES ARE DEFINED BY THE HIGHWAY CAPACITY MANUAL AS "A VEHICLE WITH MORE THAN FOUR WHEELS TOUCHING THE PAVEMENT DURING NORMAL OPERATION" (PAGE 5-7).
2. TRAFFIC COUNTS WERE PERFORMED ON THURSDAY, AUGUST 11 AND FRIDAY, AUGUST 12, 2011.



**Figure 4**  
**EXISTING PEAK HOUR TRAFFIC VOLUMES**

## Level-of-Service Concept

### Signalized Intersections

"Level-of-Service" is a term which denotes any of an infinite number of combinations of traffic operating conditions that may occur on a given lane or roadway when it is subjected to various traffic volumes. Level-of-service (LOS) is a qualitative measure of the effect of a number of factors which include space, speed, travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience.

There are six levels-of-service, A through F, which relate to the driving conditions from best to worst, respectively. The characteristics of traffic operations for each level-of-service are summarized in [Table 1](#). In general, LOS A represents free-flow conditions with no congestion. LOS F, on the other hand, represents severe congestion with stop-and-go conditions. Level-of-service D is typically considered acceptable for peak hour conditions in urban areas.<sup>2</sup>

Corresponding to each level-of-service shown in the table is a volume/capacity ratio. This is the ratio of either existing or projected traffic volumes to the capacity of the intersection. Capacity is defined as the maximum number of vehicles that can be accommodated by the roadway during a specified period of time. The capacity of a particular roadway is dependent upon its physical characteristics such as the number of lanes, the operational characteristics of the roadway (one-way, two-way, turn prohibitions, bus stops, etc.), the type of traffic using the roadway (trucks, buses, etc.) and turning movements.

**Table 1 Level-of-Service Definitions for Signalized Intersections<sup>(1)</sup>**

Level of Service	Interpretation	Volume-to-Capacity Ratio <sup>(2)</sup>	Stopped Delay (Seconds)
A, B	Uncongested operations; all vehicles clear in a single cycle.	0.000-0.700	<20.0
C	Light congestion; occasional backups on critical approaches	0.701-0.800	20.1-35.0
D	Congestion on critical approaches but intersection functional. Vehicles must wait through more than one cycle during short periods. No long standing lines formed.	0.801-0.900	35.1-55.0
E	Severe congestion with some standing lines on critical approaches. Blockage of intersection may occur if signal does not provide protected turning movements.	0.901-1.000	55.1-80.0
F	Total breakdown with stop-and-go operation	>1.001	>80.0

Notes:

(1) Source: *Highway Capacity Manual*, 2000.

(2) This is the ratio of the calculated critical volume to Level-of-Service E Capacity.

<sup>2</sup> Institute of Transportation Engineers, *Transportation Impact Analyses for Site Development*, Washington, D.C., 2006, page 56 - 60

### Unsignalized Intersections

Like signalized intersections, the operating conditions of intersections controlled by stop signs can be classified by a level-of-service from A to F. However, the method for determining level-of-service for unsignalized intersections is based on the use of gaps in traffic on the major street by vehicles crossing or turning through that stream. Specifically, the capacity of the controlled legs of an intersection is based on two factors: 1) the distribution of gaps in the major street traffic stream, and 2) driver judgement in selecting gaps through which to execute a desired maneuver. The criteria for level-of-service at an unsignalized intersection is therefore based on delay of each turning movement. [Table 2](#) summarizes the definitions for level-of-service and the corresponding delay.

**Table 2 Level-of-Service Definitions for Unsignalized Intersections<sup>(1)</sup>**

Level-of-Service	Expected Delay to Minor Street Traffic	Delay (Seconds)
A	Little or no delay	<10.0
B	Short traffic delays	10.1 to 15.0
C	Average traffic delays	15.1 to 25.0
D	Long traffic delays	25.1 to 35.0
E	Very long traffic delays	35.1 to 50.0
F	See note (2) below	>50.1

Notes:

(1) Source: *Highway Capacity Manual*, 2000.

(2) When demand volume exceeds the capacity of the lane, extreme delays will be encountered with queuing which may cause severe congestion affecting other traffic movements in the intersection. This condition usually warrants improvement of the intersection.

### Methodology for Level-of-Service Analysis

1. Synchro 6 was used to perform the level-of-service analysis. Synchro 6 is based on the *Highway Capacity Manual*.
2. The percentage of heavy vehicles as shown previously ([Figure 4](#)) was input for the appropriate lane group.
3. The *Highway Capacity Manual* defines level-of-service by delay.

### Level-of-Service Analysis of Existing Conditions

The existing levels-of-service of the intersection of Mokulele Highway at Kama’aina Road and Mehamaha Loop are summarized in Table 3. The volume-to-capacity ratios, delays and levels-of-service of the overall intersection and each lane group as reported by *Synchro* are shown.

**Table 3 2011 Levels-of-Service - Mokulele Highway at Kama’aina Road & Mehamaha Loop**

Intersection and Movement	AM Peak Hour			PM Peak Hour		
	7:15 AM to 8:15 AM			3:30 PM to 4:30 PM		
	V/C	Delay <sup>1</sup>	LOS <sup>2</sup>	V/C	Delay	LOS
<b>Overall Intersection</b>	<b>0.50</b>	<b>5.9</b>	<b>A</b>	<b>0.50</b>	<b>5.0</b>	<b>A</b>
<b>Traffic Signal Cycle = 60 seconds</b>						
Eastbound Left ,Thru & Right	0.10	37.1	D	0.25	36.2	D
Westbound Left, Thru & Right	0.25	39.4	D	0.30	37.3	D
Northbound Left	0.48	50.9	D	0.16	41.1	D
Northbound Thru	0.46	5.0	A	0.49	3.9	A
Northbound Right	0.01	2.9	A	0.01	2.1	A
Southbound Left	0.56	47.7	D	0.31	51.2	D
Southbound Thru	0.41	3.5	A	0.45	3.7	A
Southbound Right	0.03	2.2	A	0.01	2.1	A

NOTES:

- (1) Delay is in seconds per vehicle.
- (2) LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. Level-of-Service is based on delay.
- (3) See Appendix C for Level-of-Service Analysis Worksheets.

### Existing Deficiencies

We have used the Institute of Transportation Engineers standard that Level-of-Service D is the minimum acceptable Level-of-Service and that the criteria is applicable to the overall intersection rather than each controlled lane group. Minor movements, such as left turns, and minor side street approaches may operate at Level-of-Service E or F for short periods of time during the peak hours so that the overall intersection and major movements along the major highway will operate at Level-of-Service D, or better. All volume-to-capacity ratios must be 1.00 or less.

Using this standard, no deficiencies were identified at the intersection of Mokulele Highway at Kama’aina Road at Mehamaha Loop. The overall intersection operates at Level-of-Service A during both morning and afternoon peak hours. The eastbound approach, the westbound approach, the northbound left turn lane and the southbound left turn lane are shown as operating at Level-of-Service D. The levels-of-service shown are based on the calculated delay of the lane group. However, the volume-to-capacity ratio is low. This indicates that the long delay is because vehicles must wait for the signal to go through the rest of the traffic signal cycle resulting in a longer delay than desirable. As previously noted, Level-of-Service D is considered an acceptable level-of-service.

### **Existing Public Transportation**

The Maui Public Bus system operates the Kihei Islander bus route (Route 10) along Mokulele Highway at one hour intervals between 5:30 AM and 9:30 PM. This route connects Kahului and Kihei. There are no bus stops along Mokulele Highway. Therefore, there is no bus service available to the project site.

### **3. PROJECTED BACKGROUND TRAFFIC CONDITIONS**

The purpose of this chapter is to discuss anticipated 2015 background conditions without project generated traffic. Background traffic conditions are defined as future traffic projections without traffic generated by the proposed project under study.

Future traffic growth consists of two components. The first is ambient background growth that is a result of regional growth and cannot be attributed to a specific project. This growth also considers traffic associated with minor, or small, projects for which no traffic data, or traffic study, are available. The second component is estimated traffic that will be generated by other major development projects in the vicinity of the proposed project. Included in the assessment of future background conditions are roadway improvements that are part of the related projects.

A level-of-service of future (2015) background traffic conditions is then performed, existing deficiencies identified and appropriate mitigation measures identified and assessed where needed. The purpose of this process is to identify roadway improvements required to mitigate unacceptable conditions as a result of background traffic growth and traffic generated by related projects in the area so that improvements can be assessed against the appropriate project.

#### **Design Year for Traffic Forecasts**

The design, or horizon, year of a project is the future year for which background traffic conditions are estimated. The design year is typically several years after completion of the study project. The year 2015 is used in this study to be compatible with the traffic studies for other major projects within and adjacent to the study area.

## Background Traffic Growth

The *Maui Long Range Transportation Plan*<sup>3</sup> concluded that traffic on Maui would increase an average of 1.6% per year from 1990 to 2020. This growth rate was used to estimate the background growth between 2011 and 2015, which is the design year for this project. The growth factor was calculated using the following formula:

$$F = (1 + i)^n$$

where F = Growth Factor

i = Average annual growth rate, or 0.016

n = Growth period, or 4 years

It should be noted that some traffic studies for projects in Kihei have used a growth factor of 2.0% rather than 1.6% used in the study. We have checked with the other consultants and verified that this is the result of rounding.

This growth factor was applied to the northbound and southbound through traffic movements along Mokulele Highway.

## Related Projects

The second component in estimating background traffic volumes is traffic resulting from other proposed projects in the vicinity. Related projects are defined as those projects that are under construction or have been approved for construction and would significantly impact traffic in the study area. Related projects may be development projects or roadway improvements. The following related projects were identified.

### *Kaiwahine Village*

The proposed Kaiwahine Subdivision is located at the east end of Kaiwahine Street and will consist of 120 multi-family units. The traffic assignments for the subdivision were obtained from the traffic study for the project<sup>4</sup>.

### *Maui Lu Resort*

Maui Lu Resort is located in the northeast quadrant of the intersection of South Kihei Road at Kaonoulu Street. The existing resort will be demolished and a 400 unit timeshare will be constructed. Each timeshare unit will have one lock off unit which may be used as a separate hotel room. As part of the Maui Lu project, the intersection of South Kihei Road at Kaonoulu Street will

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<sup>3</sup> Kaku Associates, *Maui Long Range Land Transportation Plan*, October 1996

<sup>4</sup> Phillip Rowell and Associates, *TIAR for Kaiwahine Village*, July 15, 2010



be signalized and a separate southbound to eastbound left turn lane will also be constructed. The traffic assignments for the project were obtained from the traffic study for the project<sup>5</sup>.

#### *Kihei Residential Subdivision*

The Kihei Residential Subdivision will be located along the east side of Piilani Highway between Kaiwahine Street and North Kihei Road. The project will consist of 400 single family units, 200 multifamily units, 2,000 square feet of commercial floor area and 7,000 square feet of office floor area. The traffic assignments for the project were obtained from the traffic study for the project<sup>6</sup>.

Primary access to and egress from this project is via the intersection of Piilani Highway at Kaiwahine Street. The TIAR includes improvements at this intersection to accommodate project generated traffic. These improvements are:

- a. Modify the eastbound approach of Uwapo Road to provide separate left, through and right turn lanes.
- b. Modify the westbound approach of Kaiwahine Street to provide two left turn lanes, one through lane and one right turn only lane.
- c. Modify the southbound approach of Piilani Highway to provide two separate left turn lanes.

#### *Kihei High School*

The proposed Kihei High School will be located along the east side of Piilani Highway across from the Piilani Subdivision. According to the Environmental Impact Statement Preparation Notice (EISPN), the school will have a capacity of 1600 students for grades 9 through 12.

As described in the EISPN, access and egress will be via the intersection of Piilani Highway at Kulanihakoi Road, which will be modified with an extension of Kulanihakoi Road across Piilani Highway. Right turns only will be allowed into and out of the school site and the intersection will be unsignalized.

The number of trips that the high school will generate was estimated for a 1600-student high school using Institute of Transportation Engineers trip generation data. These trips were assigned based on the traffic circulation patterns described in the EISPN.

#### *Kenolio 6 Affordable Housing Project*

The Kenolio 6 Affordable Housing Project is located between Piilani Highway and Kenolio Road in the southwest quadrant of the intersection of Kaonoulu Street at Piilani Highway. The project is a 124 unit multi-family affordable housing development.

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<sup>5</sup> Phillip Rowell and Associates, *TIAR for Maui Lu Resort*, March 7, 2007

<sup>6</sup> Austin, Tsutsumi & Associates, *TIAR for Kihei Residential Project*, May 22, 2007

Access to and egress from the project will be via two driveways along the east side of Kenolio Road.

The traffic assignments for the project were obtained from the traffic study for the project <sup>7</sup>.

*Piilani Promenade*

The project is located along the mauka (east) side of Piilani Highway opposite Kaonoulu Street in the Kihei area of Maui. The extension of Kaonoulu Street will divide the project into two parcels. The north parcel is referred to as the Maui Outlet Center and will consist of 290,000 leasable square feet of retail and commercial uses. The south parcel is referred to as the Maui Retail Center and will consist of 410,000 leasable square feet of retail floor area. This includes 38,000 square feet for an outdoor garden area.

The traffic assignments for the project were obtained <sup>8</sup> from the traffic study for the project. As part of the project, the intersection of Piilani Highway at Kaonoulu Street will be signalized.

The projects that were identified as related projects and the estimated number of peak hour trips generated by each are summarized in [Table 4](#). The approximate locations of these projects are shown in [Figure 5](#). Traffic assignments at the intersection of Mokulele Highway at Kama’aina Road and Mehamaha Loop for the related projects are shown as [Figure 6](#).

It was assumed that traffic volumes into and out of the Maui Humane Society facility and the Hawaiian Cement quarry would not change.

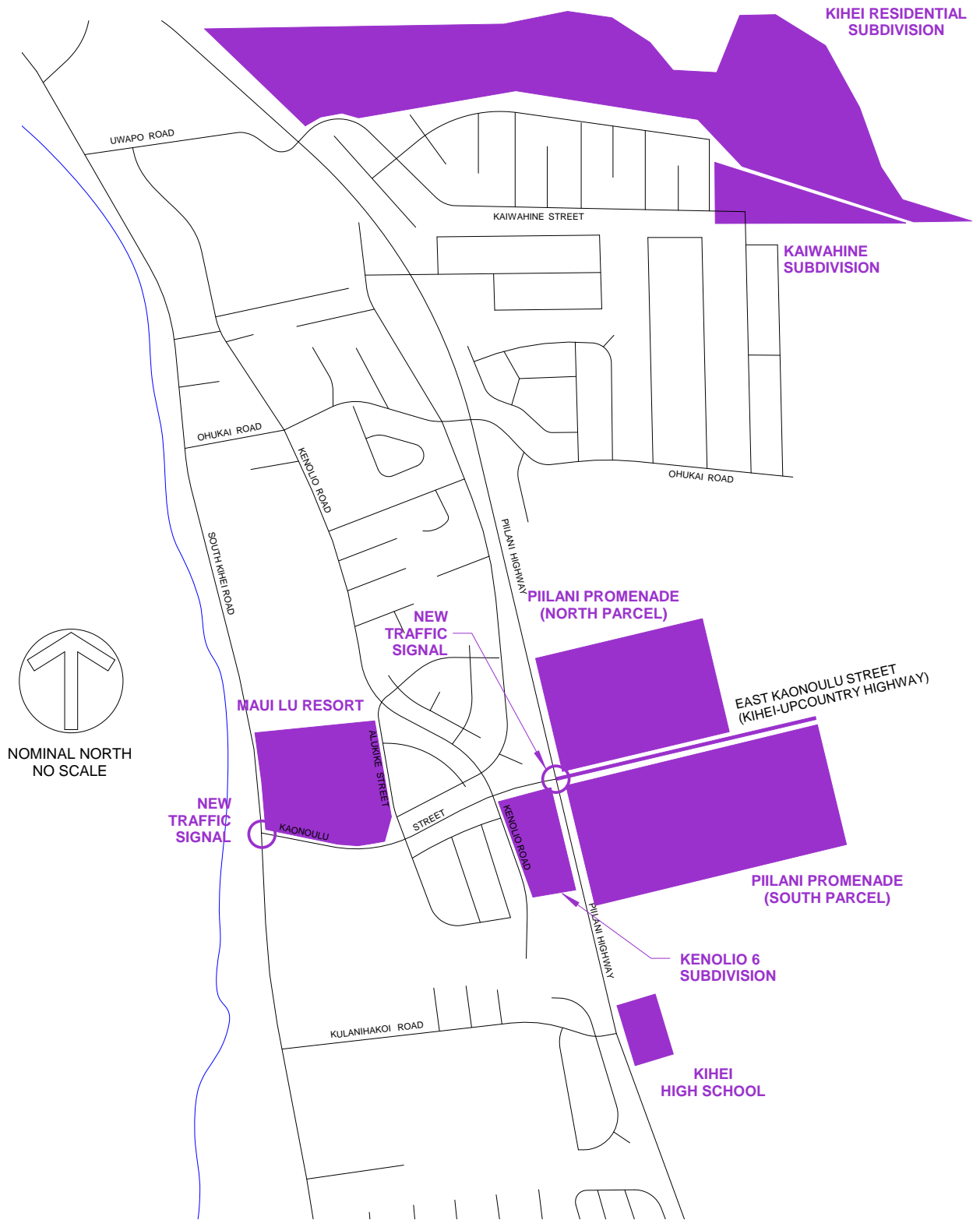
**Table 4 Trip Generation Summary of Related Projects**

<u>Related Project</u>	<u>Description</u>	<u>AM Peak Hour</u>			<u>PM Peak Hour</u>		
		<u>In</u>	<u>Out</u>	<u>Total</u>	<u>In</u>	<u>Out</u>	<u>Total</u>
A	Kaiwahine Village 120 Multi-Family	19	47	66	49	31	80
B	Maui Lu Resort 400 Timeshares + 400 Lock Off Units (Maximum)	245	140	385	205	230	435
C	Kihei Residential 400 Single Family 200 Multi-Family 2,000 SF Commercial 7,000 SF Office	213	403	616	405	332	737
D	Kihei High School 1600 Students Grades 9 thru 12	455	200	655	105	120	225
E	Kenolio 6 Affordable Housing Project 124 Multi-Family	20	48	68	51	32	83
F	Piilani Promenade 700,000 SF Retail	422	268	690	1,391	1,507	2,898
<b>TOTALS</b>		<b>1,374</b>	<b>1,106</b>	<b>2,480</b>	<b>2,206</b>	<b>2,252</b>	<b>4,458</b>

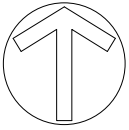
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<sup>7</sup> Phillip Rowell and Associates, *TIAR for Kenolio 6 Affordable Housing Project*, May 27, 2010

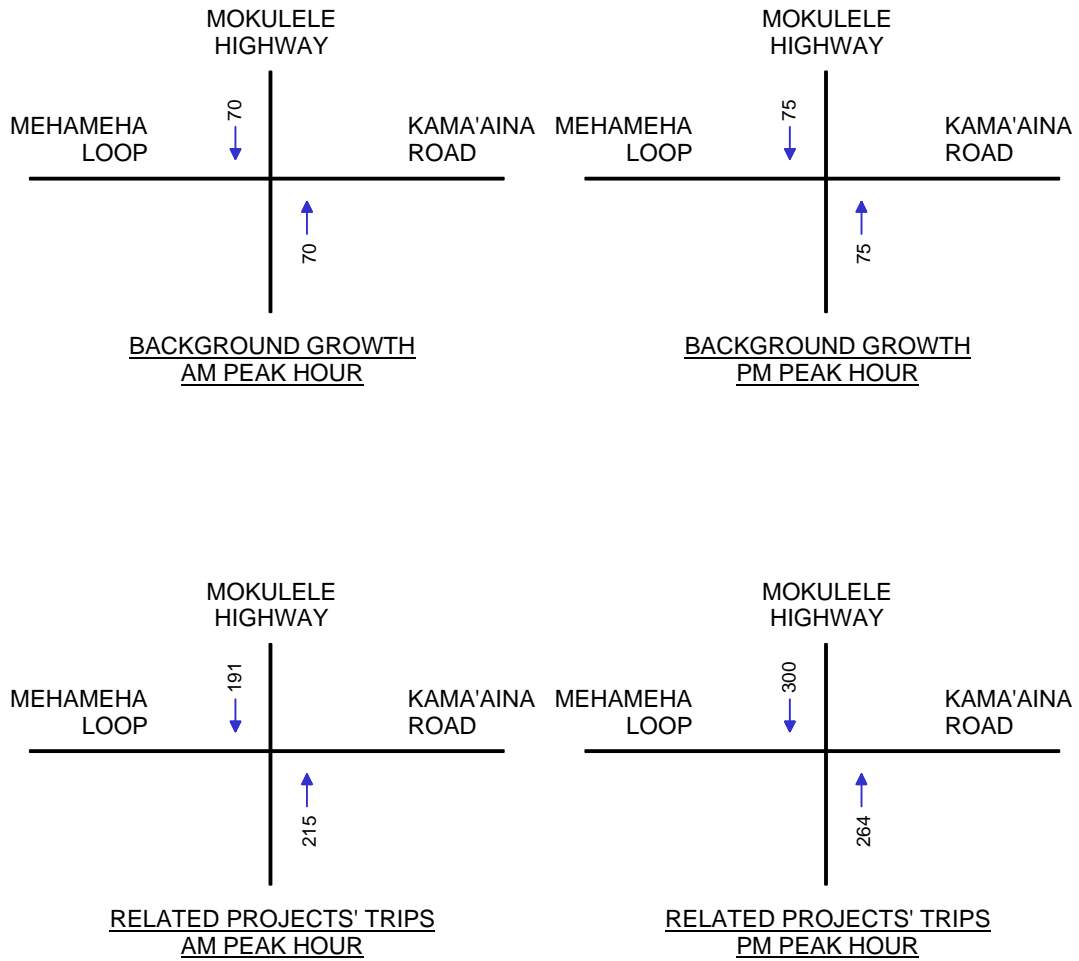
<sup>8</sup> Phillip Rowell and Associates, *TIAR for Piilani Promenade*, June 7, 2011



**Figure 5**  
**LOCATIONS OF RELATED PROJECTS**



NOT TO SCALE



**Figure 6**  
**BACKGROUND GROWTH AND RELATED PROJECTS' TRIPS**

## 2015 Background Traffic Projections

2015 background traffic projections were calculated by expanding existing traffic volumes by the appropriate growth rates and then superimposing traffic generated by related projects. The 2015 background peak hour traffic projections at the intersection of Mokulele Highway at Kama'aina Road and Mehamaha Loop are shown in [Figure 7](#).

## 2015 Background Levels-of-Service

[Table 5](#) summarizes the results of the level-of-service analysis of the intersection of Mokulele Highway at Kama'aina Road for 2015 background conditions without project generated traffic. Volume-to-capacity ratios, delays and levels-of-service of the overall intersection and each lane group as reported by *Synchro* are shown.

**Table 5 2015 Background Levels-of-Service - Mokulele Highway at Kama'aina Road & Mehamaha Loop**

Intersection and Movement	AM Peak Hour			PM Peak Hour		
	V/C	Delay <sup>1</sup>	LOS <sup>2</sup>	V/C	Delay	LOS
<b>Overall Intersection</b>	<b>0.59</b>	<b>6.3</b>	<b>A</b>	<b>0.59</b>	<b>5.6</b>	<b>A</b>
	<b>Cycle Length = 60 seconds</b>			<b>Cycle Length = 60 seconds</b>		
Eastbound Left, Thru & Right	0.10	37.1	D	0.25	36.2	D
Westbound Left, Thru & Right	0.24	39.3	D	0.30	37.3	D
Northbound Left	0.41	46.7	D	0.16	41.1	D
Northbound Thru	0.56	5.8	A	0.59	4.7	A
Northbound Right	0.01	2.9	A	0.01	2.1	A
Southbound Left	0.56	47.6	D	0.31	51.2	D
Southbound Thru	0.52	4.3	A	0.59	4.7	A
Southbound Right	0.03	2.2	A	0.01	2.1	A

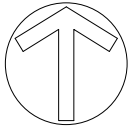
NOTES:

- (1) Delay is in seconds per vehicle.
- (2) LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. Level-of-Service is based on delay.
- (3) See [Appendix D](#) for Level-of-Service Analysis Worksheets.

## Mitigation Required for 2015 Background Conditions

The results are consistent with the results and conclusions of the level-of-service analysis of existing conditions. The overall intersection operates at Level-of-Service A during both morning and afternoon peak hours. The eastbound approach, the westbound approach, the northbound left turn lane and the southbound left turn lane are shown as operating at Level-of-Service D. The levels-of-service shown are based on the calculated delay of the lane group. However, the volume-to-capacity ratio is low. This indicates that the long delay is because vehicles must wait for the signal to go through the rest of the traffic signal cycle resulting in a longer delay than desirable. As previously noted, Level-of-Service D is considered an acceptable level-of-service.

No mitigation is required for 2015 background conditions.



NOT TO SCALE

NOTES:

1. HEAVY VEHICLES ARE DEFINED BY THE HIGHWAY CAPACITY MANUAL AS "A VEHICLE WITH MORE THAN FOUR WHEELS TOUCHING THE PAVEMENT DURING NORMAL OPERATION" (PAGE 5-7).

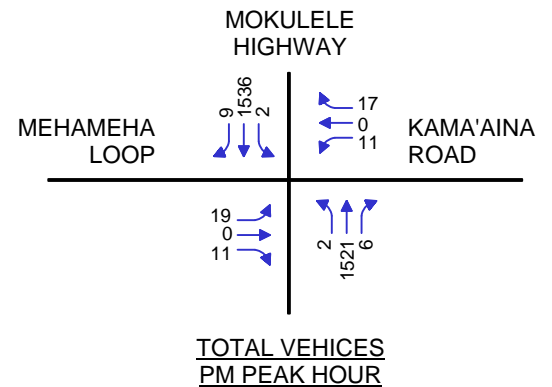
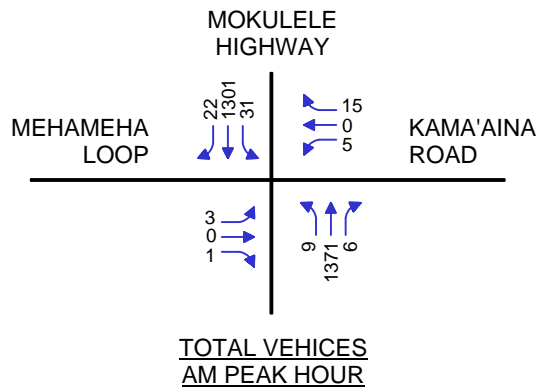
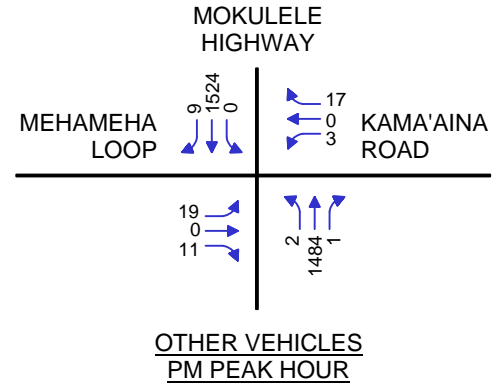
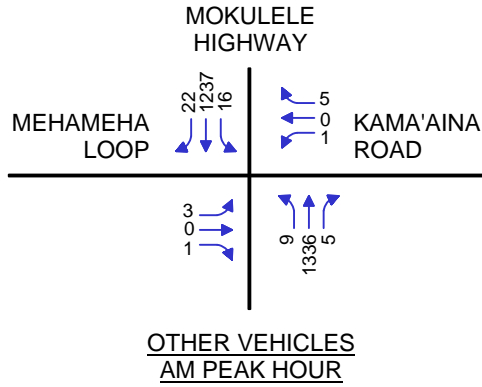
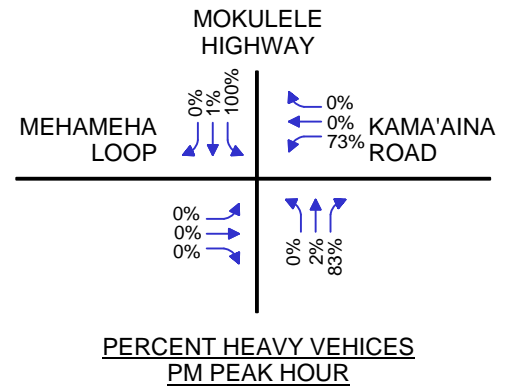
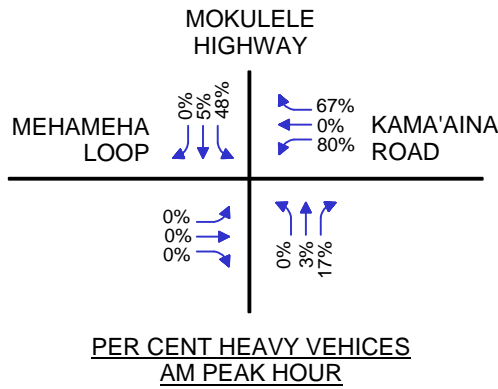
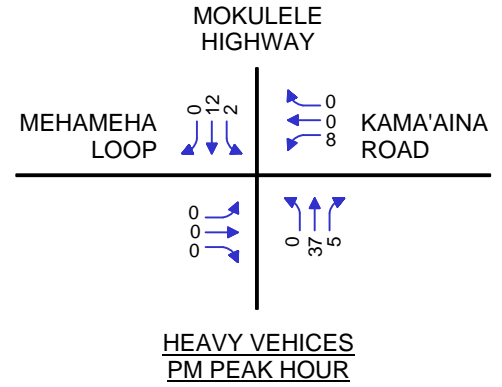
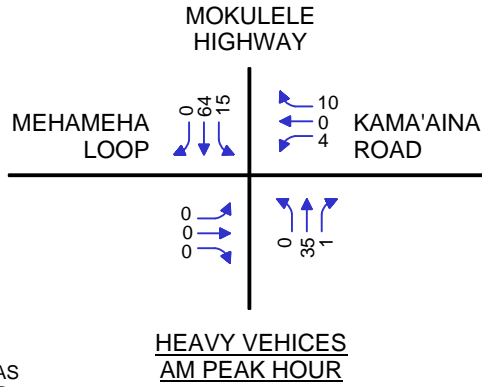


Figure 7  
2015 BACKGROUND TRAFFIC PROJECTIONS

## 4. PROJECT-RELATED TRAFFIC CONDITIONS

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This chapter discusses the methodology used to identify the traffic-related impacts of the proposed project. This chapter presents the generation, distribution and assignment of project generated traffic and the background plus project traffic projections. The result of the level-of-service analysis of background plus project conditions is presented in the following chapter.

### Methodology

Future traffic volumes generated by the project were estimated using the procedures described in the *Trip Generation Handbook*<sup>9</sup> and data provided in *Trip Generation*<sup>10</sup>. This method used trip generation rates or formulas to estimate the number of trips that the project will generate during the peak hours.

### Trip Generation of Proposed Development

Trip generation equations for industrial parks (Land Use Code 130) were used to estimate the number of peak hour trips generated by the project. These rates are based on the number of acres to be developed.

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<sup>9</sup> Institute of Transportation Engineers, *Trip Generation Handbook*, Washington, D.C., 1998, p. 7-12

<sup>10</sup> Institute of Transportation Engineers, *Trip Generation*, Washington, D.C., 2003



The area used to estimate the number of trips the project will generate was the net area to be developed, 76.90 acres. The area is the total project area minus the drainage reserve, as shown:

<u>Acres</u>	<u>Use</u>
76.90	Lots
9.10	Drainage Reserve
86.00	Total Area

The results of the trip generation calculations are shown as [Table 6](#). The project will generate 392 inbound and 80 outbound trips during the morning peak hour. During the afternoon peak hour, the project will generate 99 inbound and 372 outbound trips.

**Table 6 Trip Generation Calculations**

Time Period	Direction	Industrial Park (LU Code 130)			Heavy Vehicle Trips	
		Equation or %	Acres	Total Trips	%	Trips
AM Peak Hour	Total	$\text{Ln}(T) = 0.78\text{Ln}(A) + 2.89$	76.90	532	20%	108
	In	83%		442	40%	42
	Out	17%		90	60%	64
PM Peak Hour	Total	$\text{Ln}(T) = 0.72\text{Ln}(A) + 3.14$		527	15%	79
	In	21%		111	85%	67
	Out	79%		416	15%	12

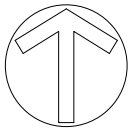
Based on traffic counts at the Consolidated Baseyard, it was estimated that 20% of the vehicles entering and exiting the baseyard during the morning peak hour would be heavy vehicles and that 15% of the vehicle entering and exiting during the afternoon peak hour are heavy vehicles. The inbound/outbound split is 40/60 during the morning peak hour and 85/15 during the afternoon peak hour.

### Trip Distribution and Assignments

The project-related trips were distributed along the anticipated approach and departure routes from the project site based on the distribution of population as reported in the *Maui Long Range Land Transportation Plan*. The distribution of population in 2015 was estimated by interpolating between the 1990 and 2020 population estimates provided in the appendices of the Plan. Accordingly, 62% of the project trips were distributed as approaching from and departing to the north. The remaining 38% of the project trips were distributed as approaching from and departing to the south.

The project will have no right of access to Maui Raceway Park roads. Additionally, there will be a drainage swale between the project lots and the property line adjacent to the park. This will prevent any traffic connection between the project and the park. Accordingly, all traffic was assigned to us the intersection of Mokulele Highway at Kama'aina Road and Mehameha Loop.

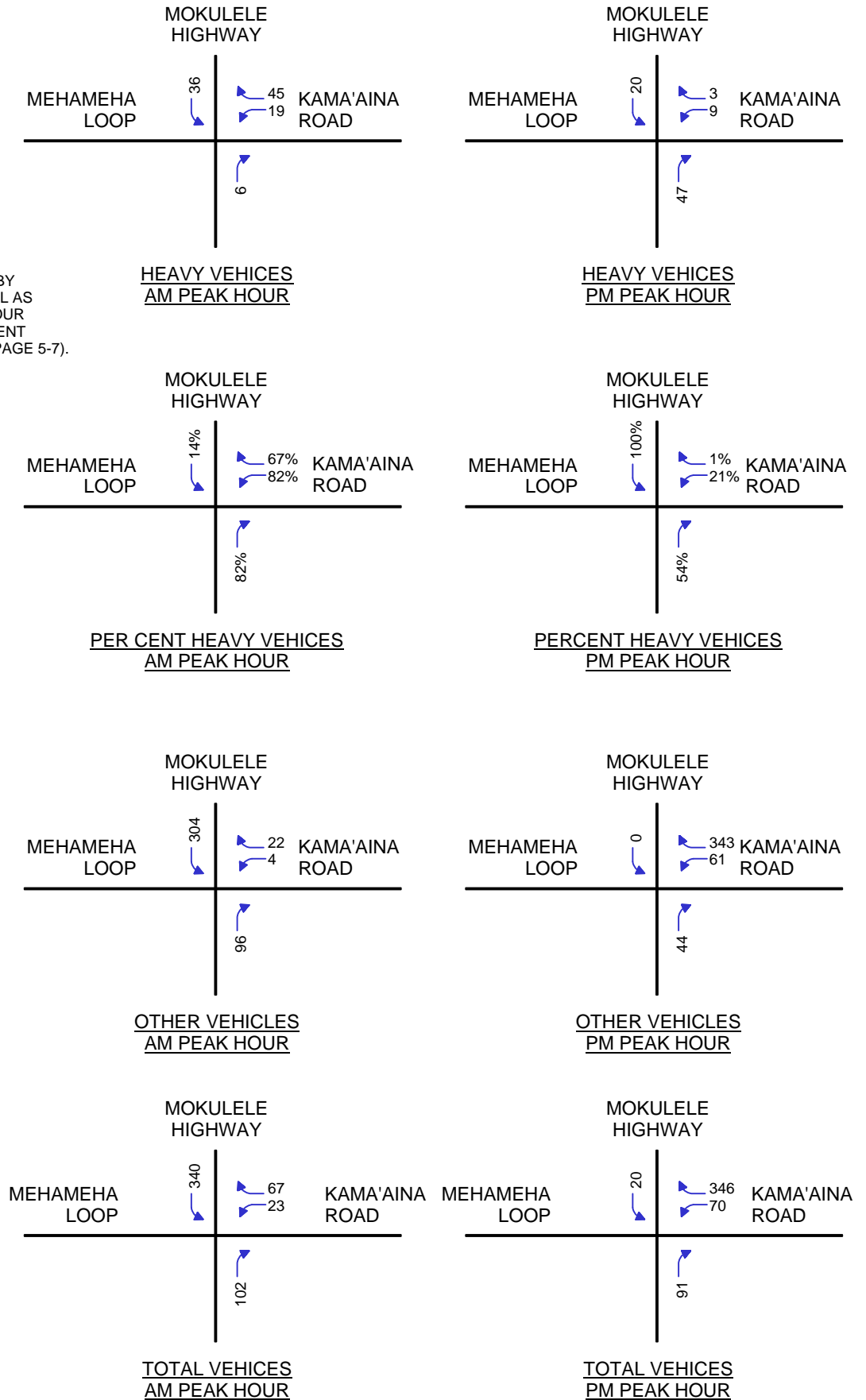
The project morning and afternoon peak hour trip assignments at the intersection of Mokulele Highway at Kama'aina Road and Mehameha Loop are shown in [Figure 8](#).



NOT TO SCALE

NOTES:

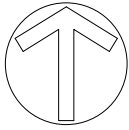
1. HEAVY VEHICLES ARE DEFINED BY THE HIGHWAY CAPACITY MANUAL AS "A VEHICLE WITH MORE THAN FOUR WHEELS TOUCHING THE PAVEMENT DURING NORMAL OPERATION" (PAGE 5-7).



**Figure 8**  
**PROJECT TRIP ASSIGNMENTS**

## **2015 Background Plus Project Projections**

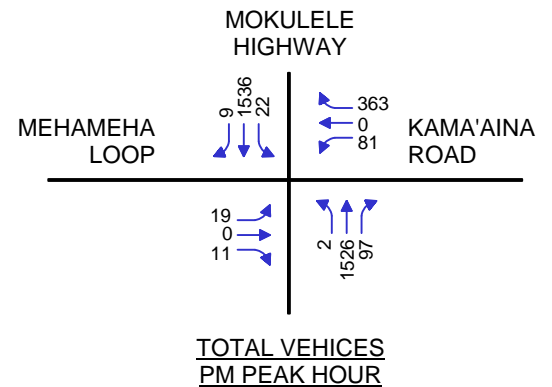
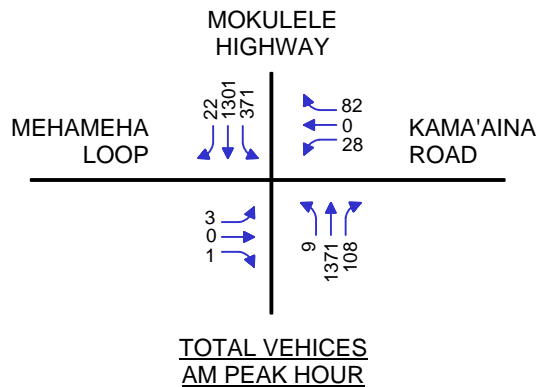
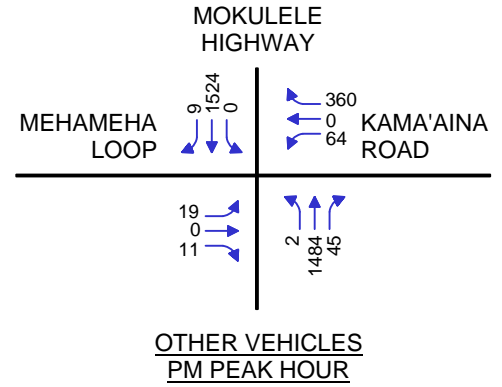
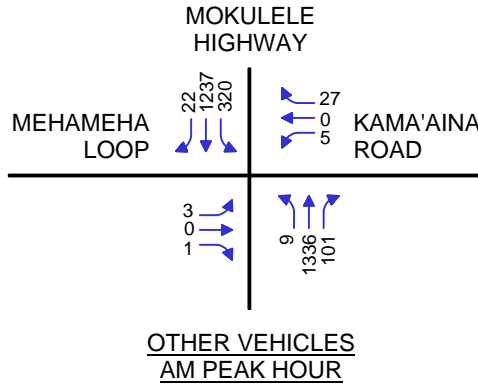
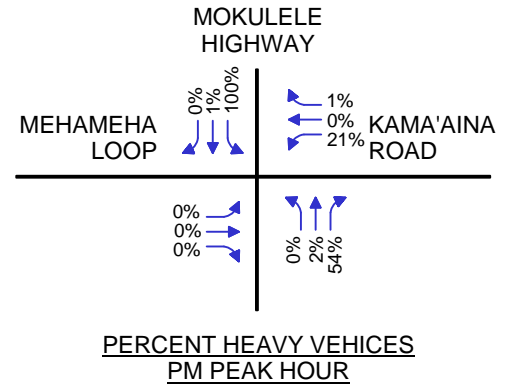
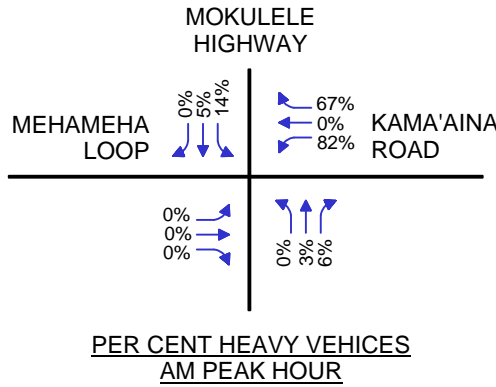
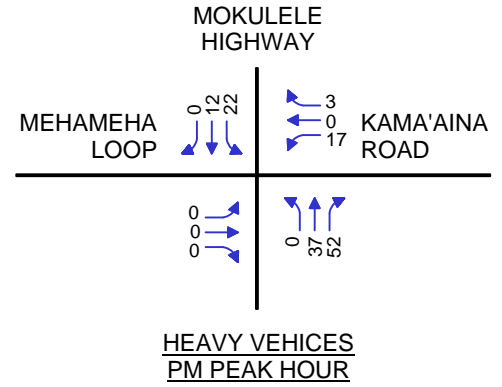
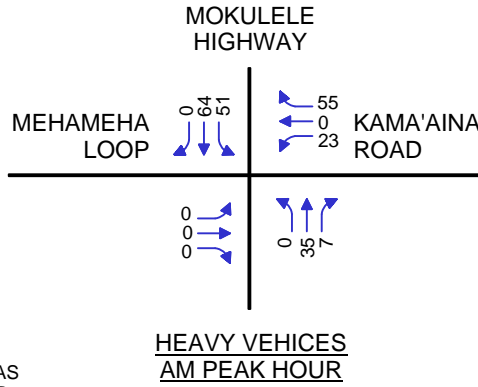
Background plus project traffic conditions are defined as 2015 background traffic conditions plus project related traffic. The 2015 background plus project traffic projections were estimated by superimposing the peak hourly traffic generated by the proposed project on the 2015 background peak hour traffic volumes presented in Chapter 3. The 2015 background plus the project traffic projections at the intersection of Mokulele Highway at Kama'aina Road and Mehamaha Loop are shown on [Figure 9](#).



NOT TO SCALE

NOTES:

1. HEAVY VEHICLES ARE DEFINED BY THE HIGHWAY CAPACITY MANUAL AS "A VEHICLE WITH MORE THAN FOUR WHEELS TOUCHING THE PAVEMENT DURING NORMAL OPERATION" (PAGE 5-7).



**Figure 9**  
**2015 BACKGROUND PLUS PROJECT TRAFFIC PROJECTIONS**

## 5. TRAFFIC IMPACT ANALYSIS

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The impact of the project was assessed by analyzing the changes in traffic volumes and levels-of-service at the study intersections. These impacts are discussed in this chapter. Intersection traffic movements that do not meet the standard for acceptable levels-of-service are identified and improvements that will result in acceptable levels-of-service are identified and assessed.

This chapter also describes anticipated traffic operating conditions at the project's driveways along Kama'aina Road.

### Changes in Total Intersection Volumes

An analysis of the project's share of 2015 background plus project intersection approach volumes at the intersection of Mokulele Highway at Kama'aina Road is summarized in [Table 7](#). The table summarizes the project's share of total 2015 peak hour approach volumes. Also shown are the percentage of 2015 background plus project traffic that is the result of background growth and traffic generated by related projects. As shown, project generated traffic will represent 16.1% of the morning peak hour traffic and 14.4% of the afternoon peak hour traffic.

An analysis of the project's pro rata share of the increase of traffic volumes between 2010 and 2015 is summarized in [Table 8](#). This table summarizes the growth between 2010 and 2015 and indicates the percentage of growth resulting from background growth and related projects, and the percentage growth resulting from project generated traffic.

**Table 7 Analysis of Project's Share of Total Intersection Approach Volumes <sup>(1)</sup>**

Intersection	Period	Existing	2015 Background	2015 Background Plus Project	Background Growth		Project Traffic	
					Trips	Percent of Total Traffic <sup>(2)</sup>	Trips	Percent of Total Traffic <sup>(3)</sup>
Mokulele Hwy at Kama'aina Road	AM	2218	2764	3296	546	16.6%	532	16.1%
	PM	2420	3139	3666	719	19.6%	527	14.4%

Notes:

- (1) Volumes shown are total intersection approach volumes or projections.
- (2) Percentage of total 2015 background plus project traffic.

**Table 8 Analysis of Project's Share of Total Intersection Approach Volumes Growth <sup>(1)</sup>**

Intersection	Period	Existing	2015 Background	Background Plus Project	Background Growth <sup>(2)</sup>		Project Trips <sup>(3)</sup>	
					Volume	% of 2010 to 2015 Growth	Volume <sup>(4)</sup>	% of 2010 to 2015 Growth
Mokulele Hwy at Kama'aina Road	AM	2218	2764	3296	546	50.6%	532	49.4%
	PM	2420	3139	3666	719	57.7%	527	42.3%

Notes:

- (1) Volumes shown are total intersection approach volumes or projections.
- (2) Background versus existing.
- (3) Background plus project versus background.
- (4) Project generated traffic.

### 2015 Background Plus Project Level-of-Service Analysis

The level-of-service analysis was performed for background and background plus project conditions. The incremental difference between the two conditions quantifies the impact of the project. The results of the Level-of-Service analysis of the intersection of Mokulele Highway at Kama'aina Road and Mehamaha Loop are summarized in [Table 9](#).

The findings of the level-of-service analysis are:

1. During the morning peak hour, the volume-to-capacity ratio of the overall intersection is 1.03. The volume-to-capacity ratio of the southbound left turn is 1.31. Mitigation is required.
2. During the afternoon peak hour, the volume-to-capacity ratio of the overall intersection is 1.02 and the volume-to-capacity ratio of the southbound left turn is 1.04. Mitigation is required.

**Table 9 Mitigation Analysis - Mokulele Highway at Kama'aina Road & Mehameha Loop**

Intersection and Movement	AM Peak Hour									PM Peak Hour								
	Without Project			With Project						Without Project			With Project					
				Without Mitigation			With Mitigation						Without Mitigation			With Mitigation		
	V/C	Delay <sup>1</sup>	LOS <sup>2</sup>	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
<b>Overall Intersection</b>	<b>0.59</b>	<b>6.3</b>	<b>A</b>	<b>1.03</b>	<b>35.0</b>	<b>C</b>	<b>0.84</b>	<b>17.1</b>	<b>B</b>	<b>0.59</b>	<b>5.6</b>	<b>A</b>	<b>1.02</b>	<b>25.9</b>	<b>C</b>	<b>0.79</b>	<b>16.4</b>	<b>B</b>
	<b>Cycle Length = 60 seconds</b>			<b>Cycle Length = 60 seconds</b>			<b>Cycle Length = 75 seconds</b>			<b>Cycle Length = 60 seconds</b>			<b>Cycle Length = 60 seconds</b>			<b>Cycle Length = 75 seconds</b>		
Eastbound Left , Thru & Right	0.10	37.1	D	0.04	21.4	C	0.10	33.6	C	0.25	36.2	D	0.08	15.8	B	0.17	31.5	C
Westbound Left, Thru & Right	0.24	39.3	D	0.37	24.2	C				0.30	37.3	D	0.93	48.8	D			
Westbound Left & Thru							0.60	50.9	D							0.74	53.5	D
Westbound Right							0.22	18.1	B							0.99	74.8	E
Northbound Left	0.41	46.7	D	0.70	91.4	F	0.50	47.2	D	0.16	41.1	D	0.18	32.5	C	0.29	48.5	D
Northbound Thru	0.56	5.8	A	0.90	22.4	C	0.81	19.1	B	0.59	4.7	A	0.92	23.2	c	0.69	9.9	A
Northbound Right	0.01	2.9	A	0.08	8.7	A	0.08	9.4	A	0.01	2.1	A	0.10	8.3	A	0.10	5.1	A
Southbound Left	0.56	47.6	D	<b>1.31</b>	<b>183.8</b>	<b>F</b>	0.94	53.4	D	0.31	51.2	D	<b>1.04</b>	<b>230.2</b>	<b>F</b>	0.34	36.0	D
Southbound Thru	0.52	4.3	A	0.62	7.2	A	0.52	4.0	A	0.59	4.7	A	0.89	20.2	C	0.62	6.3	A
Southbound Right	0.03	2.2	A	0.03	3.7	A	0.03	2.0	A	0.01	2.1	A	0.01	7.2	A	0.01	2.9	A

NOTES:

- (1) Delay is in seconds per vehicle.
- (2) LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. Level-of-Service is based on delay.
- (3) See [Appendix D](#) for Level-of-Service Analysis Worksheets for Background Conditions.
- (4) See [Appendix E](#) for Level-of-Service Analysis Worksheets for Background Plus Project Conditions.
- (5) See [Appendix F](#) for Level-of-Service Analysis Worksheets for Background Plus Project Conditions with Mitigation.



### **Mitigation Measures - Mokulele Highway at Kama'aina Road & Mehameha Loop**

After an assessment of various mitigation measures, it was determined that the westbound approach should be modified and the traffic signal cycle length should be modified. An assessment of modifying the westbound approach to provide a separate right turn lane and increasing the traffic signal cycle length from 60 to 75 seconds is summarized in [Table 9](#). With these improvements, all controlled movements will operate at Level-of-Service D, or better, except the westbound to northbound right turn, the overall intersection will operate at Level-of-Service B and all volume-to-capacity ratios are less than 1.00. The level-of-service of the northbound through movement will decrease from Level-of-Service A to Level-of-Service B. All the remaining movements will operate at the same level-of-service as for the background without project conditions.

Because of the large number of heavy trucks entering and exiting the project via the intersection of Mokulele Highway at Kama'aina Road, the need for an acceleration lane for traffic turning from westbound Kama'aina Road to northbound Mokulele Highway was assessed. A review of information provided in *A Policy on Geometric Design of Highways and Streets*, published by the American Association of State Highway and Transportation Officials (AASHTO), concluded that there are general guidelines regarding the need for an acceleration lane, but no warrants. It should be noted that an acceleration lane was not provided at this intersection or the exit from the Central Maui Baseyard, which is 4,500 feet north of this intersection along Mokulele Highway, when Mokulele Highway was recently widened.

The projected number of heavy vehicles that would use an acceleration lane at this location is significantly higher than estimated for background without project conditions. The number of heavy vehicles is expected to increase from 10 to 55 vehicles per hour during the morning peak hour and from zero to 3 vehicles during the afternoon peak hour. Given this significant increase and the impacts that heavy vehicles have on the capacity of intersections and roadways, it is recommended that an acceleration lane be provided for vehicles turning right from westbound Kama'aina Road to northbound Mokulele Highway.

### **Levels-of-Service of Unsignalized Intersections**

The results of the level-of-service analysis of the unsignalized intersection of Lower Kihei Road at the Quarry Access Road are summarized in [Table 10](#), the only unsignalized intersection with controlled lane groups. At this intersection, all project related traffic will continue south to the industrial subdivision while all quarry related traffic will use the Quarry Access Road. It was assumed that the Quarry Access Road approach is the STOP sign controlled approach and that all approaches are one lane each. Refer to [Figure 10](#).

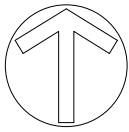
**Table 10 2015 Levels-of-Service of Unsignalized Intersection**

Intersection and Movement	AM Peak Hour		PM Peak Hour	
	With Project		With Project	
	Delay <sup>(2)</sup>	LOS <sup>(3)</sup>	Delay	LOS
<b>S. Firebreak Rd at Quarry Access Rd</b>	<b>1.0</b>	<b>A</b>	<b>0.7</b>	<b>A</b>
Westbound Left & Right	9.6	A	11.2	B
Southbound Left & Thru	0.9	A	0.8	A

NOTES:

- (1) Denotes volume-to-capacity ratio. Volume-to-capacity ratios are not calculated for the unsignalized intersections.
- (2) Delay is in seconds per vehicle.
- (3) LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. Level-of-Service is based on delay.
- (4) See [Appendix G](#) for Level-of-Service Analysis Worksheets.

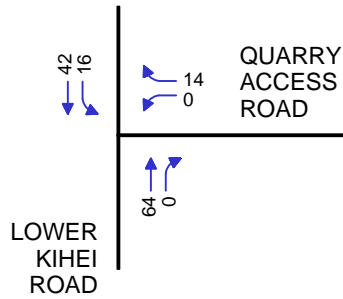
All controlled lane groups will operate at Level-of-Service A or B. This implies good operating conditions and minimal delays.



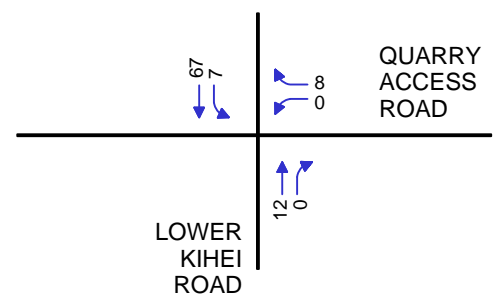
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NOTES:

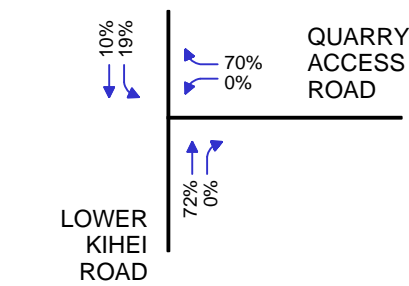
1. HEAVY VEHICLES ARE DEFINED BY THE HIGHWAY CAPACITY MANUAL AS "A VEHICLE WITH MORE THAN FOUR WHEELS TOUCHING THE PAVEMENT DURING NORMAL OPERATION" (PAGE 5-7).



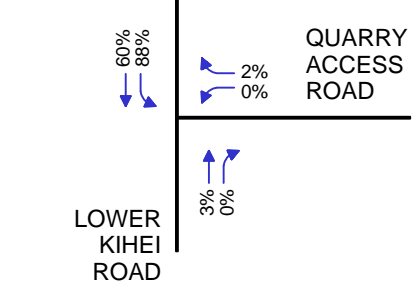
HEAVY VEHICLES  
AM PEAK HOUR



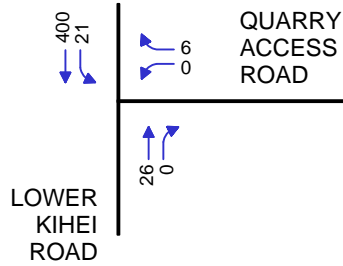
HEAVY VEHICLES  
PM PEAK HOUR



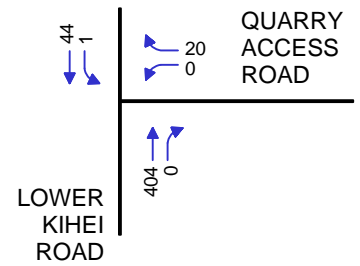
PER CENT HEAVY VEHICLES  
AM PEAK HOUR



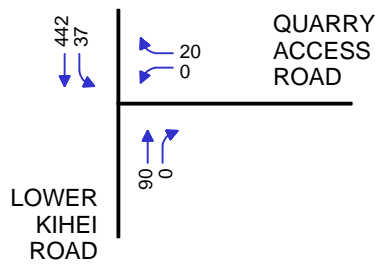
PERCENT HEAVY VEHICLES  
PM PEAK HOUR



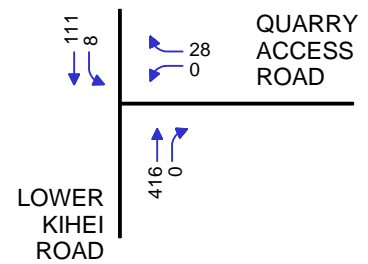
OTHER VEHICLES  
AM PEAK HOUR



OTHER VEHICLES  
PM PEAK HOUR



TOTAL VEHICLES  
AM PEAK HOUR



TOTAL VEHICLES  
PM PEAK HOUR

**Figure 10**  
**2015 BACKGROUND PLUS PROJECT TRAFFIC PROJECTIONS**

## Required Left Turn Storage Lane Lengths

The left turn storage lengths required to accommodate estimated traffic volumes were calculated using guidelines in *A Policy on Geometric Design of Highways and Streets* published by the American Association of State Highway and Transportation Officials. There are separate policies for signalized and unsignalized intersections, but as the subject intersection is signalized, only the policy relative to signalized intersections is provided. The policy and assumptions used are as follows:

1. For signalized intersections, the length of the left turn storage lane should be “1.5 to 2.0 times the average number of vehicles that would store per cycle, which is predicted on the design volume.”
2. The average length required per vehicle is 25 feet.
3. As a minimum, a left turn storage lane should accommodate two vehicles, one automobile size vehicle and one truck. A length of 60 feet has been typically used as a minimum.
4. A traffic signal cycle length of 90 seconds was used. This is longer than the cycle length currently in use. Since the length of the left turn storage lane is directly related to the signal cycle length, using a longer cycle length will insure that queues do not exceed the capacity of the storage lane if the traffic signal timing is modified at a future date.

Using the above criteria, the left turn storage lane requirements were calculated and the results are summarized in [Table 11](#). Also shown are the storage lane length recommended.

**Table 11 Left Turn Storage Lane Requirements**

Intersection	Approach & Time Period		Design Volume	Cycle Length (Seconds)	Cycles per Hour	Average Vehicles per Cycle	Recommended Length <sup>(1)</sup>				Recommendation
							Minimum		Desirable		
							Veh	Ft	Veh	Ft	
Mokulele Hwy at Kama'aina Road	NB	AM	9	90	40	0	0	0	0	0	Retain 60 ft storage lane
		PM	2	90	40	0	0	0	0	0	
	SB	AM	371	90	40	9	14	350	18	450	Increase length of left turn storage lane from 60 to 450 ft
		PM	22	90	40	1	2	50	2	50	

NOTE:

(1) Minimum queue length is 1.5 time average number of vehicles. Desirable queue length is 2.0 time average number of vehicles.

The existing and recommended turn lanes and storage lane lengths at the intersection of Mokulele Highway at Kama’aina Road are summarized as [Table 12](#). The turn lanes consist of three components: the taper, the deceleration length and the storage length. The deceleration length is a function of the design speed of the roadway. It is the length required for a driver to safely decelerate from the travel speed of the roadway to a stop condition at the beginning of the storage area. The storage length calculations are described above.

**Table 12 Assessment of Deceleration Lane Requirements**

Intersection	Approach & Movement		Existing <sup>(1)</sup>			Recommended		
			Taper (feet)	Deceleration Length (feet)	Storage (feet)	Taper (feet)	Deceleration Length (feet)	Storage (feet)
Mokulele Hwy at Kama’aina Road	NB	Left	180	510	60	180	510	60
		Right	180	475	60	180	475	60
	SB	Left	180	485	60	180	485	450
		Right	180	430	60	180	430	60

NOTE:  
 (1) Existing lengths were obtained from construction plans of the subject intersection. Plans are dated June 2005.

**Summary Mitigation Measures and Recommendations**

[Table 13](#) is a summary of mitigation required at the intersection of Mokulele Highway at Kama’aina Road. A drawing of these mitigation improvements prepared by the project’s civil engineer is presented as [Appendix I](#).

**Table 13 Summary of Recommended Mitigation for 2015 Background Conditions**

Intersection	Mitigation Required to Mitigate Existing (2011) Deficiencies	Mitigation Required to Mitigate Background Deficiencies	Mitigation Required to Mitigate Background Plus Project Deficiencies
Mokulele Hwy at Kama’aina Rd and Mehomeha Loop	No mitigation required.	No mitigation required.	<ol style="list-style-type: none"> <li>1. Modify westbound approach to provide a separate right turn lane. Right turn should be signalized to run concurrently with southbound left turn.</li> <li>2. Increase traffic signal cycle length to 75 seconds.</li> <li>3. Provide acceleration lane for westbound to northbound right turns.</li> <li>4. Lengthen southbound left turn deceleration lane from 60 feet to 450 feet.</li> </ol>

In addition to the mitigation measures described above, the following is recommended:

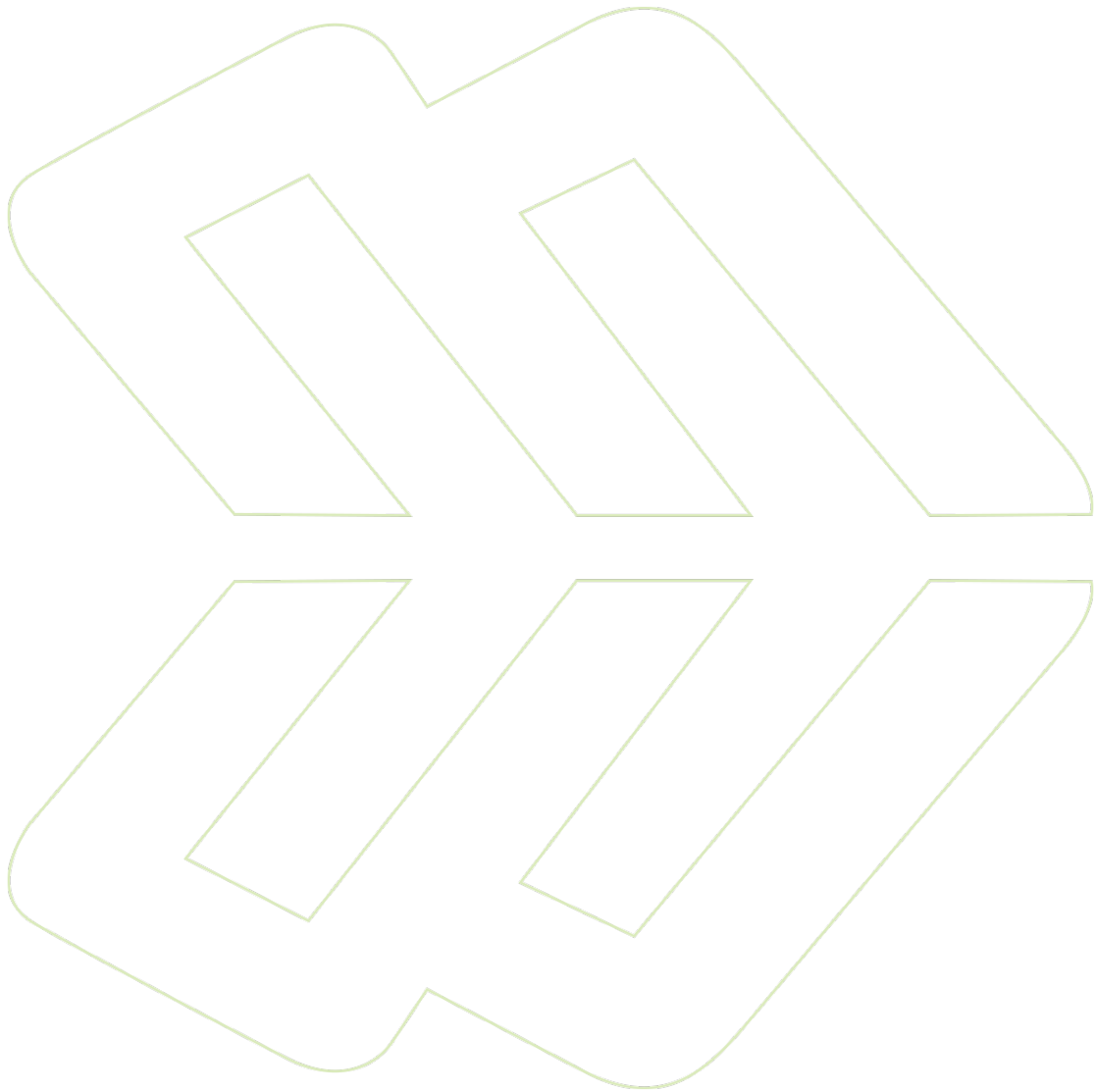
1. The areas adjacent to Kama'aina Road, South Firebreak Road and Lower Kihei Road should be monitored to insure that the sugar cane growth does not impede sight distances and that visibility of traffic control devices is maintained.
2. Because of the increased traffic volumes along Kama'aina Road, South Firebreak Road and Lower Kihei Road as a result of the project, these roadways should be striped and signed per County of Maui Standards. The high proportion of traffic that will be heavy vehicles should be considered in the design and installation of traffic control devices, especially the longer stopping distances required for the heavy vehicles.

### **Early Consultation Letters and Responses**

Letters were received from the following agencies in response to requests for early consultation comments:

- a. State of Hawaii Department of Transportation
- b. State of Hawaii Department of Business, Economic Development and Tourism Office of Planning
- c. County of Maui Police Department
- d. County of Maui Department of Planning

The letter from County of Maui Department of Planning did not contain any issues relative to the TIAR and the comments from Office of Planning advised to contact State of Hawaii Department of Transportation, which was done and a comment letter received. The comments from State of Hawaii Department of Transportation and County of Maui Police Department have been responded to. The comments and responses are provided as [Appendix H](#).



**MUNEKIYO HIRAGA**

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