FILE COPY
MAR 23 2018

DAVID Y. IGE
GOVERNOR

CRAIG K. HIRAI
EXECUTIVE DIRECTOR

In reply, refer to:

18:DEV/034

STATE OF HAWAII
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM
HAWAII HOUSING FINANCE AND DEVELOPMENT CORPORATION
677 QUEEN STREET, SUITE 300
HONOLULU, HAWAII 96813
FAX: (808) 587-0600

March 12, 2018

RECEIVED
'18 MAR 13 A9:53
OFC. OF ENVIRONMENTAL QUALITY CONTROL

Mr. Scott Glenn, Director
Office of Environmental Quality Control
Department of Health
235 S. Beretania Street, Room 702
Honolulu, Hawai'i 96813

Dear Director Glenn:

Subject: Draft Environmental Assessment for The Central Ala Moana at 1391 Kapiolani Boulevard (Tax Map Key: (1) 2-3-039:011)

With this letter, the Hawaii Housing Finance & Development Corporation (HHFDC) hereby transmits the draft environmental assessment and anticipated finding of no significant impact (DEA-AFONSI) for The Central Ala Moana condominium situated at 1391 Kapiolani Boulevard, Tax Map Key (1) 2-3-039:011, in the Honolulu District on the island of Oahu for publication in the next available edition of the Environmental Notice.

Enclosed is a completed OEQC Publication Form, two copies of the DEA-AFONSI, an Adobe Acrobat PDF file of the same, and an electronic copy of the publication form in MS Word. Simultaneous with this letter, we have submitted the summary of the action in a text file by electronic mail to your office.

If there are any questions, please contact Ken Takahashi (HHFDC) at (808) 587-0547 or the consultant, Lowell Chun at (808) 386-9596, pacificcatalyst@gmail.com.

Sincerely,

Craig K. Hirai
Executive Director

Enclosures

C: SamKoo Hawaii, LLC

18-438

APPLICANT
PUBLICATION FORM

Project Name:	The Central Ala Moana
Project Short Name:	The Central Ala Moana
HRS §343-5 Trigger(s):	Amendment to existing county general plan.
Island(s):	Oahu
Judicial District(s):	Honolulu
TMK(s):	(1)2-3-039:011
Permit(s)/Approval(s):	HRS Sec. 201H-38, building, electrical, plumbing, sidewalk/driveway and demolition work (variance for building permit when work done in setbacks), Grubbing, grading/trenching, Street Usage, and Stockpiling Permit, sewer connection, water connection, water quality.
Approving Agency:	Hawaii Housing Finance & Development Corporation (HHFDC)
Contact Name, Email, Telephone, Address	Ken Takahashi Email: ken.t.takahashi@hawaii.gov Telephone: (808) 587-0547 Address: 677 Queen Street 3rd Floor Honolulu, Hawaii 96813
Applicant:	SamKoo Hawaii, LLC
Contact Name, Email, Telephone, Address	Timothy Yi, President Email: timyi@samkoocorp.com Telephone: (808)941-2300 Address: 1391 Kapiolani Boulevard Suite 103 Honolulu, Hawaii 96814
Consultant:	Pacific Catalyst, LLC
Contact Name, Email, Telephone, Address	Lowell K.W. Chun Email: pacificcatalyst@gmail.com Telephone: (808) 386-9596 Address: 1296 Kapiolani Boulevard Ste. 1907 Honolulu, Hawaii 96814

Status (select one)	**Submittal Requirements**
__X__DEA-AFNSI	Submit 1) the approving agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the DEA, and 4) a searchable PDF of the DEA; a 30-day comment period follows from the date of publication in the Notice.
____ FEA-FONSI	Submit 1) the approving agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEA, and 4) a searchable PDF of the FEA; no comment period follows from publication in the Notice.

____ FEA-EISPN	Submit 1) the approving agency notice of determination/transmittal letter on agency letterhead, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEA, and 4) a searchable PDF of the FEA; a 30-day comment period follows from the date of publication in the Notice.
____ Act 172-12 EISPN ("Direct to EIS")	Submit 1) the approving agency notice of determination letter on agency letterhead and 2) this completed OEQC publication form as a Word file; no EA is required and a 30-day comment period follows from the date of publication in the Notice.
____ DEIS	Submit 1) a transmittal letter to the OEQC and to the approving agency, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the DEIS, 4) a searchable PDF of the DEIS, and 5) a searchable PDF of the distribution list; a 45-day comment period follows from the date of publication in the Notice.
____ FEIS	Submit 1) a transmittal letter to the OEQC and to the approving agency, 2) this completed OEQC publication form as a Word file, 3) a hard copy of the FEIS, 4) a searchable PDF of the FEIS, and 5) a searchable PDF of the distribution list; no comment period follows from publication in the Notice.
___ FEIS Acceptance Determination	The approving agency simultaneously transmits to both the OEQC and the applicant a letter of its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS; no comment period ensues upon publication in the Notice.
____ FEIS Statutory Acceptance	The approving agency simultaneously transmits to both the OEQC and the applicant a notice that it did not make a timely determination on the acceptance or nonacceptance of the applicant's FEIS under Section 343-5(c), HRS, and therefore the applicant's FEIS is deemed accepted as a matter of law.
____ Supplemental EIS Determination	The approving agency simultaneously transmits its notice to both the applicant and the OEQC that it has reviewed (pursuant to Section 11-200-27, HAR) the previously accepted FEIS and determines that a supplemental EIS is or is not required; no EA is required and no comment period ensues upon publication in the Notice.
____ Withdrawal	Identify the specific document(s) to withdraw and explain in the project summary section.
____ Other	Contact the OEQC if your action is not one of the above items.

Project Summary

SamKoo Hawaii, LLC proposes to construct a 513-unit residential project, named "The Central Ala Moana", in a 43-story tower on a 1.43 acre (62,528 square feet) site located at 1391 Kapiolani Boulevard at its intersection with Kona Iki Street.

The project will provide a mix of affordable and market-rate condominiums and ground floor commercial spaces in proximity to support services, facilities, and amenities, including shopping, dining, professional and family services, business and employment opportunities, and multiple transportation choices.

THE CENTRAL
ALA MOANA
at
1391 Kapiolani Boulevard

TMK: (1) 2-3-039:011

Draft Environmental Assessment

SamKoo Hawaii, LLC
1391 Kapiolani Boulevard
Suite 103
Honolulu, Hawaii 96814

March 2018

THE CENTRAL
ALA MOANA

Draft Environmental Assessment

SamKoo Hawaii, LLC
1391 Kapiolani Boulevard
Suite 103
Honolulu, Hawaii 96814

March 2018

Prepared by Pacific Catalyst, LLC

TABLE OF CONTENTS

OVERVIEW 1

1. INTRODUCTION 3

1.1 PROJECT PROFILE 3

1.2 COMPLIANCE WITH STATE OF HAWAII ENVIRONMENTAL LAWS 6

2. PROJECT DESCRIPTION 7

2.1 CONTEXT 7

2.1.1 Project Location 7

2.1.2 Vicinity and Onsite Conditions 9

2.1.3 A Summary of the Institutional Context 20

2.2 THE PROJECT 24

2.2.1 Statement of Purpose and Need 24

2.2.2 Project Affordability 26

2.2.3 Facility Description 27

2.3 Preliminary Market Distribution of Affordable Units 43

2.4 DEVELOPMENT TIMETABLE 44

2.5 NEARBY RESIDENT SERVICES AND AMENITIES 44

3. THE AFFECTED ENVIRONMENT, POTENTIAL IMPACTS, AND MITIGATIVE MEASURES **49**

3.1 Climate 49

3.2 Topography 52

3.3 Soils 52

3.4 Flora and Fauna 55

3.5 Archaeological and Historic Resources 56

3.6 Cultural Resources 59

3.7 Visual Resources 61

TABLE OF CONTENTS (cont'd.)

3.8 Roads and Traffic 64

3.9 Noise 81

3.10 Natural Hazards 82

3.11 Man-Made Hazards 84

3.12 Socio-Economic Characteristics 86

3.13 Infrastructure 88

3.13.1 Water 88

3.13.2 Wastewater 90

3.13.3 Drainage 91

3.13.4 Solid Waste 93

3.13.5 Electrical and Communications 94

3.13.6 Gas 95

3.2 Public Services 96

3.2.1 Schools 96

3.2.2 Police 96

3.2.3 Fire 98

3.2.4 Medical Facilities 98

3.2.5 Recreational Facilities 99

4. THE INSTITUTIONAL CONTEXT: LAND USE POLICIES AND CONTROLS 103

4.1 State of Hawaii 103

4.1.1 Hawaii State Plan (Chapter 226, Hawaii Revised Statutes) 103

4.1.2 State Land Use Law (Chapter 205, Hawaii Revised Statutes) 106

4.1.3 Coastal Zone Management (Chapter 205A, Hawaii Rev. Statutes) 106

4.2 City and County of Honolulu 108

4.2.1 General Plan 108

TABLE OF CONTENTS (cont'd.)

4.2.2 Primary Urban Center Development Plan 111

4.2.3 City and County of Honolulu Land Use Ordinance 114

4.2.4 Ala Moana Neighborhood Transit-Oriented Development Plan & Ordinance 12-010, the Interim TOD Ordinance 115

4.3 Approvals and Permits 117

5. CHAPTER 201H REQUESTED EXEMPTIONS 118

5.1 Introduction 118

5.2 Requested Exemptions 119

5.3 Summary Table of Requested Exemptions 125

6. ALTERNATIVES TO THE PROPOSED ACTION 131

6.1 NO ACTION 132

6.2 DEVELOPMENT IN ACCORDANCE WITH LUO AND PARK DEDICATION STANDARDS AND REQUIREMENTS 132

6.3 DEVELOPMENT IN ACCORDANCE WITH THE ALA MOANA NEIGHBORHOOD TOD PLAN INTENT USING ORDINANCE 14-010 AS A PROCESSING VEHICLE 136

6.4 CONCLUSION 140

7. DETERMINATION, FINDINGS, AND SUPPORTING REASONS FOR DETERMINATION 141

7.1 Significance Criteria 141

7.2 Determination 148

8. CONSULTATION 149

8.1 AGENCIES CONSULTED 149

8.2 ADDITIONAL CONSULTATION 150

0 REFERENCES 151

TABLE OF CONTENTS (cont'd.)

APPENDICES

A Topographic Survey Map

B Department of Planning and Permitting Correspondence

C Market Study

D Kapiolani Residence Architectural Drawings and Project Overall Schedule

E Phase 1 Environmental Site Assessment

F Soil and Groundwater Management Plan

G Archaeological Inventory Survey

H Traffic Impact Analysis

I Preliminary Engineering Report

J Arborist Report

K Preliminary Project Schedule

L Wind Study

M Shadow Studies

N Draft Environmental Assessment (DEA) Comment Letters & Responses

LIST OF TABLES

1	Preliminary Space Program Summary	34
2	Unit Distribution by Bedroom and Market Type	35
3	**3.1:** Unit Distribution, Residential Floors 2 - 20	36
	3.2: Unit Distribution, Residential Floors 21 - 28	37
	3.3: Unit Distribution, Residential Floors 29 - 33	37
	3.4: Unit Distribution, Residential Floors 34 - 43	37
4	Distribution of Parking Stalls by Usage Type	38
5	Preliminary Market Distribution of Residential Units	43
6	Preliminary Development Time Table	44

TABLE OF CONTENTS (cont'd.)

7	Proximity to Services, Schools, Shopping, and Recreational Opportunities	46
8	LOS Definitions	69
9	LOS Criteria for Unsignalized Intersections	70
10	LOS Criteria for Signalized Intersections	70
11	Current and 2024 Levels of Service at Unsignalized Intersections	71
12	Current and 2024 Levels of Service at Signalized Intersections	72
13	LOS Criteria for Pedestrian Travel Modes	73
14	Current and 2024 Pedestrian Levels of Service at Signalized Crosswalks	73
15	Ala Moana Station Peak Hour Vehicle Trip Generation	80
16	2030 Intersection Peak Hour Levels of Service (LOS)	80
17	Estimated Wastewater Flows	90
18	Approvals and Permits Summary	117

LIST OF FIGURES

1	A Quiet Day at The Central Ala Moana	1
2	Project Location	6
3	Project Site Tax Map	8
4	The Central Ala Moana (Illustrated "rendered" site) and Immediate Environs	8
5	Comparative Tower Heights, Project Environs	10
6	The Continuous Kapiolani Canopy	12
7	Kapiolani Boulevard's Mixed Development Pattern, Monkeypods, and Traffic	12
8	Kona Street Immediately Behind Project Site Toward Keeaumoku Entrance	13
9	Kona Street;Project Site Left,Ala Moana Garage Right,Ala Moana Hotel Ahead	13
10	Kona Iki Street; Project Site Left, Bank Right, Ala Moana Garage Ahead	14

TABLE OF CONTENTS (cont'd.)

11	Existing Project Site Uses	16
12	The Canopy of Monkeypods Fronting the Project Site	17
13	Project Site Looking West from Kona Iki Street at Dredging Parking Lot	18
14	East End of Project Site from Kapiolani Boulevard	18
15	Kona Street Edge of Project Site (The Beige and Blue Wall)	18
16	East Buildings	19
17	Garage Building (with Storage)	19
18	Closeup of SamKoo Offices	19
19	Fence with Dredging Beyond	19
20	Dredging Offices and Lot	19
21	Dredging Lot Toward Kapiolani	19
22	Parking in Garage Interior	19
23	Storage in Garage Interior	19
24	State Land Use Designation	20
25	Portion of Primary Urban Center Land Use Map	21
26	Zoning Map in Project Area	23
27	Street Level Leisure at The Central Ala Moana	26
28	Site (Street Level) Plan	30
29	Elevated (11th Floor) Recreation Deck	31
30	The Central Ala Moana Viewed Along its Kapiolani Boulevard Frontage	32
31	Project Looking West (Ewa), Showing Approximate Heights of Tower & Garage	33
32	The Central Ala Moana Location Map	47
33	Soils Map of the General Project Area	53
34	Map of Oahu from Kou (Honolulu) to Waikiki, Showing Project Site	57

TABLE OF CONTENTS (cont'd.)

35	Photo from Kawaiahao Church Toward Diamond Head Showing Project Area	57
36	Crushed Coral Fill in Kewalo Near Project Site, 1931	58
37	Project Area, Future Ala Moana Center, and Ala Moana Regional Park, 1936	58
38	Primary Urban Development Plan View Corridor Diagram	62
39	Flood Insurance Rate Map	83
40	City and County of Honolulu Tsunami Zone Map	84
41	Schematic Bird's Eye View of The Central Ala Moana's Recreation Deck	101

ACRONYMS AND ABBREVIATIONS

ADA	Americans with Disabiities Act
ACM	Asbestos Containing Materials
AMI	Area Median Income (as defined by U.S. Department of Housing and Urban Development (HUD)
BWS	Board of Water Supply, City and County of Honolulu
DLNR	Department of Land and Natural Resources, State of Hawaii
DOE	Department of Education, State of Hawaii
DOH	Department of Health, State of Hawaii
DPP	Department of Planning and Permitting, City and County of Honolulu
EA	Environmental Assessment
FAR	Floor Area Ratio
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
HAR	Hawaii Administrative Rules
HART	Honolulu Authority for Rapid Transit, City and County of Honolulu
HECO	Hawaiian Electric Company
HHFDC	Hawaii Housing Finance and Development Corporation, State of Hawaii

TABLE OF CONTENTS (cont'd.)

HPD	Honolulu Police Department, City and County of Honolulu
HRS	Hawaii Revised Statutes, State of Hawaii
HUD	U.S. Department of Housing and Urban Development
LUO	Land Use Ordinance, Dept. of Planning and Permitting ("DPP"), City & County of Honolulu
MSL	Mean Sea Level
NRCS	Natural Resource Conservation Service
PMA	Primary Market Area
PUC	Primary Urban Center
RCRA	Resource Conservation and Recovery Act
REC	Recognized Environmental Condition
SHPD	State Historic Preservation Division, DLNR, State of Hawaii
SMA	Special Management Area
TMK	Tax Map Key
TOD	Transit-Oriented Development

OVERVIEW

SamKoo Hawaii proposes to develop a 43-story 513-unit residential tower, to be called *The Central Ala Moana ("The Central")*, at 1391 Kapiolani Boulevard, a 1.43 acre (62,328 square foot) site (TMK: (1) 2-3-039:011) located along the edge of Kapiolani Boulevard at its intersection with Kona Iki Street. In its immediate vicinity, the Bank of Hawaii Building (also known as "The Ala Moana Building") rises to the east of the site at the Keeaumoku Street entrance to Ala Moana Center, while the American Savings Bank Tower stands immediately to the west of it on the opposite side of Kona Iki Street. Further west are the Watamull Properties Corporation building at 1344 Kona Street, Uraku Tower, the Ala Moana offices of Hawaii National Bank, and Piikoi Street. The Ala Moana HART Station has been proposed at the Watamull property location. Figure 4 illustrates the location of The Central Ala Moana within its immediate environs.

The Central is being developed in accordance with the 201H Affordable Housing Program administered by HHFDC. The Project will house 513 units. Over 60% or 310 of these units will be priced to be affordable to persons or households earning between 100 - 140% of the Area Median Income ("AMI") as defined by the U.S. Department of Housing and Urban Development (HUD) and the State of Hawaii Department of Business, Economic Development, and Tourism ("DBEDT"). 202 of the units will be "market" units, priced at market rates, while a single remaining unit will be set aside for a resident property manager.

The Project's intent is to provide a substantial offering of quality affordable and market rate housing opportunities at a premium Central Honolulu location, in exceptional proximity to a comprehensive array of urban lifestyle support services, facilities, amenities, and attractions, and with ready access to other Honolulu destinations via a variety of transportation modes.

Figure 1: A Quiet Day at The Central Ala Moana

The Ala Moana District in which The Central Ala Moana will be located is an area in transition. It currently consists of a mixture of older low-rise commercial buildings and newer mid- to high-rise towers built during the last half of the twentieth century, each reflective of the social and technical milieus of their respective contexts. With the planned presence of an Ala Moana station for the City and County of Honolulu's ("the City's") rail transportation ("HART") system, the City has targeted the area for intensified urbanization to support existing commercial enterprises in ways that will create a "livable community": A place that will attract urban residents, support their lifestyle needs and preferences, and provide them with the enhanced mobility choices the district's existing and planned transportation modes are intended to offer.

The City's proposed "Ala Moana Neighborhood Transit-Oriented Development Plan" offers a policy framework for this transformation. Development of regulatory ordinances to implement this plan are intended to follow the adoption of this plan.

1. INTRODUCTION

This draft Environmental Assessment ("EA") is prepared in accordance with Chapter 343, Hawaii Revised Statutes ("HRS") for The Central Ala Moana, a proposed residential tower housing affordable and market-rate units adjacent to Ala Moana Center in the Ala Moana neighborhood of Central Honolulu. This chapter presents basic project information and a citation of pertinent environmental statutory requirements.

1.1 Project Profile

Project Name:	The Central Ala Moana
Location:	1391 Kapiolani Boulevard Honolulu, Hawaii 96814
Judicial District	Honolulu
Tax Map Key:	(1) 2-3-039:011
Project Area:	1.431 acres (62,328 square feet)
Existing Uses	Commercial
Recorded Fee Owner	SamKoo Hawaii, LLC 1391 Kapiolani Boulevard Suite 103 Honolulu, HI 96814
Developer/Applicant	SamKoo Hawaii, LLC 1391 Kapiolani Boulevard Suite 103 Honolulu, HI 96814
Approving Agency	Hawaii Housing Finance and Development Corporation 677 Queen Street Ste. 300 Honolulu, Hawaii 96813
Agent/Preparer	Pacific Catalyst, LLC 1296 Kapiolani Boulevard Ste. 1907 Honolulu, Hawaii 96814

Land Use Policies and Controls	
State Land Use	Urban
Development Plan	District Commercial
County Zoning	BMX-3: Community Business Mixed Use
Special District	The Ala Moana Neighborhood Transit-Oriented Development Plan expresses the City and County of Honolulu's policy intent for the area. It is not an ordinance.
Special Management Area	Not in Special Management Area
Consulted Agencies, Organizations, and Persons	
Federal Agencies	U.S. Fish and Wildlife Service
State of Hawaii	Department of Education
	Department of Land and Natural Resources
	Hawaii Housing Finance and Development Corporation
	Office of Environmental Quality Control
	Department of Health, Environmental Health Division
	Disability and Communication Access Board
	Department of Transportation
	Department of Business, Economic Development, Tourism, and Energy
	Department of Defense
	Office of Planning
	University of Hawaii Environmental Center
City and County of Honolulu	Board of Water Supply
	Department of Community Services
	Department of Design and Construction

City and County of Honolulu (cont'd.)	Department of Environmental Services
	Department of Facility Maintenance
	Department of Parks and Recreation
	Department of Transportation Services
	Department of Planning and Permitting - Land Use Approvals Branch - Traffic Review Branch - Zoning Plan Review Branch - Civil Engineering Branch - Subdivision Branch - Wastewater Branch
	Fire Department
	Police Department
	Honolulu Authority for Rapid Transit
Other Individuals and Organizations: *The following were contacted informally at the start of the SamKoo project effort while the definition of a Kapiolani Boulevard project was still in process. Further consultations are planned as part of the continuing project consultation process*	
	Hawaiian Electric Company
	Councilmember and Chair Ron Menor
	Councilmember Kymberly Pine
	Councilmember Ikaika Anderson
	Councilmember Trevor Ozawa
	Councilmember Joey Manahan
	Councilmember Ann Kobayashi
	Councilmember Carol Fukunaga
	Councilmember Ernest Y. Martin
	Councilmember Brandon Elefante

1.2 Compliance with State of Hawaii Environmental Laws

Development of an Environmental Assessment for The Central Ala Moana is being conducted as part of the documentation requirements of the HHFDC 201H Affordable Housing Program. Compliance with Chapter 343, Hawaii Revised Statutes, is an integral part of the HHFDC project development and review process. This Environmental Assessment has been developed and is being presented in fulfillment of that part of the process.

Figure 2: Project Location

2. PROJECT DESCRIPTION

2.1 CONTEXT

2.1.1 Project Location

The Central Ala Moana will be located in the Ala Moana neighborhood of Central Honolulu, an area of high property values which have been increasing with the City and County of Honolulu's ("the City's") designation of this district as a "Transit-Oriented Neighborhood" with new property development policies, regulations, and standards oriented toward increasing allowable property development densities there. The City has developed the "Ala Moana Neighborhood Transit-Oriented Development Plan" (the Ala Moana "TOD Plan") as a proposed policy framework for this Neighborhood. It is now under review by the Honolulu City Council.

At its location directly adjacent to Ala Moana Center and with its accompanying proximity to the quality facilities and professional services available in its immediate vicinity and the nearby Kakaako district, The Central Ala Moana will occupy a landmark location capable of offering its future residents premium urban lifestyle opportunities and conveniences.

The Central Ala Moana's approximately 1 acre (62,328 square feet) project site is located on tax map parcel (1) 2-3-039:011 along the makai edge of Kapiolani Boulevard at its intersection with Kona Iki Street, a private street owned by GGP, Inc., owner of Ala Moana Center. Kona Street, a private road also owned by GGP, Inc., runs along the makai edge of the project site. Providing service and customer access to the Center, it is heavily used daily by a variety of types and sizes of vehicles, ranging from large trucks and tour buses to passenger automobiles, mopeds, and motorcycles. The Center's Ewa-Mauka parking garage, accessed from Piikoi Street, stands directly opposite the project site along Kona Street's makai edge.

Immediately west or Ewa of the site are the American Savings Bank Tower, which stands immediately across Kona Iki Street from the site. The Watamull Properties building, the projected HART station location, stands immediately beyond the American Savings Tower. Immediately west of the Watamull properties building are Uraku Tower and a Hawaii National Bank branch office building which anchors the Diamond Head/Makai corner of the Piikoi-Kapiolani intersection.

To the east or Diamond Head of the project site are a collection of low-rise commercial buildings on three parcels with the Bank of Hawaii (or "Ala Moana") Building just beyond, signaling the location of the Keeaumoku Street entrance to Ala Moana Center.

The mauka edge of Kapiolani Boulevard opposite the project site between Piikoi and Keeaumoku Streets is made up of predominantly low-rise commercial structures exhibiting a variety of utilitarian styles and anchored at either end with high-rise office buildings: "615 Piikoi" at Piikoi Street and the "Pacific Guardian Tower" at Keeaumoku Street.

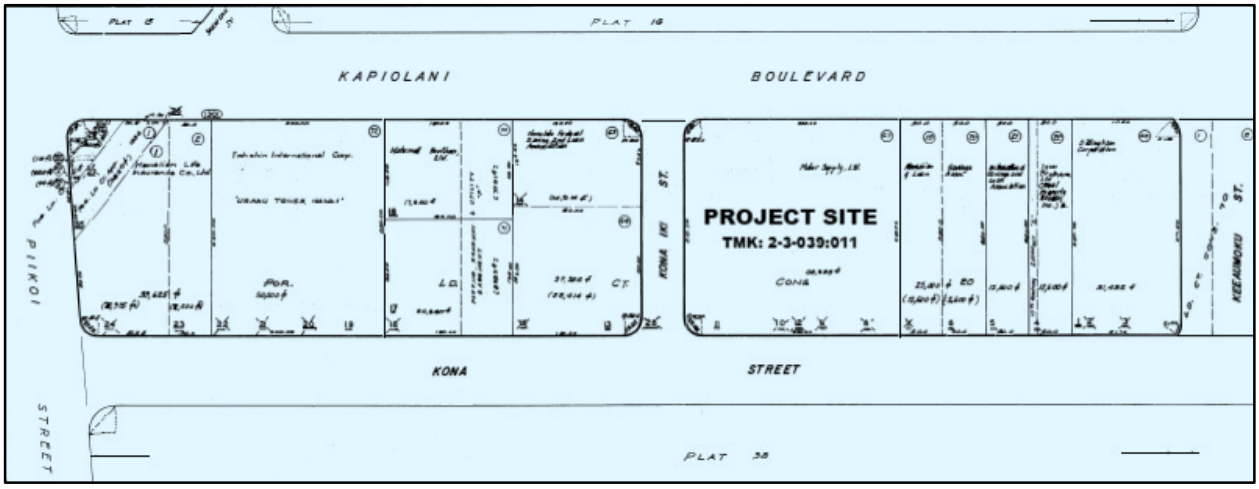


Figure 3: Project Site Tax Map

Figure 2 shows the location of the project site in its larger Central Honolulu context. Figure 3 above displays the project site tax map. Figure 4 is an aerial photograph illustrating the project site and its immediate environs.

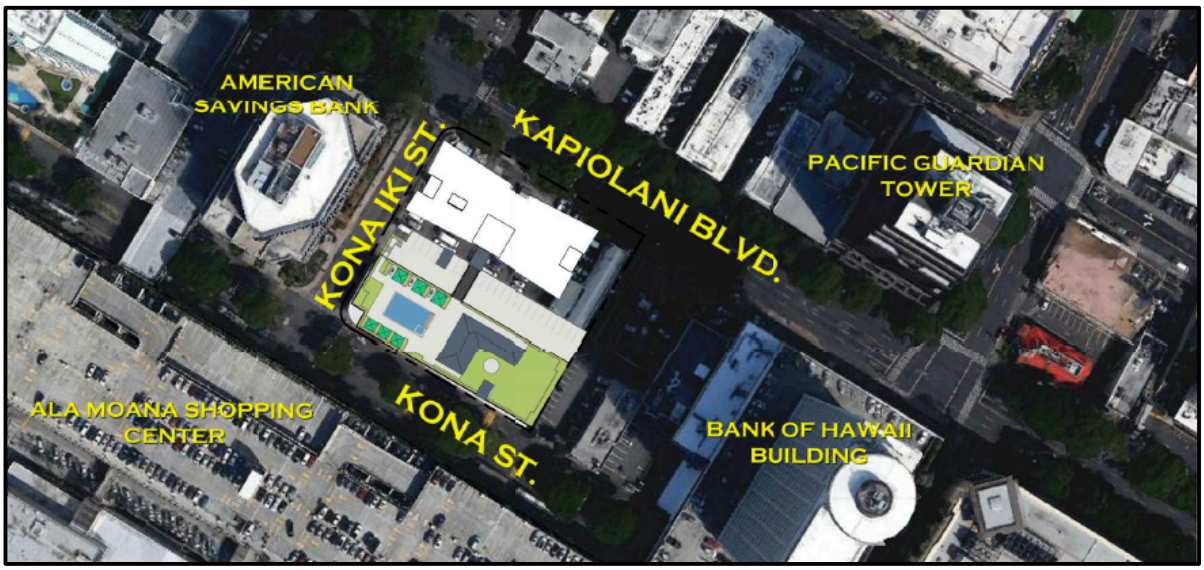


Figure 4: The Central Ala Moana (illustrated "rendered" site) and Immediate Environs

2.1.2. Vicinity and Onsite Conditions

Urban Pattern:

As previously cited, The Central Ala Moana will be located in the Ala Moana neighborhood of Central Honolulu, an area the City and County of Honolulu proposes to designate as a "Transit-Oriented Neighborhood" roughly centered on the location of a planned HART station at the Watamull property site in the Ala Moana area. This "Transit-Oriented Neighborhood" extends westward or "Ewa" to Piikoi Street, eastward or "Diamond Head" to Kalakaua Avenue and the Ala Wai Canal, northward or "mauka" to Young Street, and southward or "makai" to Ala Moana Boulevard.

Within this area, the existing urban "fabric" or "development texture" varies widely, from single family homes and single story commercial buildings to a wide range of larger buildings in more intensely developed areas, all reflecting the evolving needs, market contexts, institutional controls, and building technologies existing at the time of their construction. This existing pattern is generally more intense within one-quarter mile of the City's intended "Ala Moana Station". The pattern is generally less intense beyond this one-quarter mile radius, extending to a distance of approximately one-half mile from the intended station.

The TOD Plan envisions compatible patterns of redevelopment and land use intensifications consisting of compatible mixtures of land uses throughout this proposed TOD neighborhood, with the highest potential densities and largest building types located within a zone extending approximately one-quarter of a mile from the "Ala Moana Station".

The Central Ala Moana will be located within this one-quarter mile zone along Kapiolani Boulevard, the immediate environs of which have been generally designated in the City's TOD Plan as the "Kapiolani Corridor", an area targeted for future development intensification under the Plan. Redevelopment over the past forty years has been concentrated roughly in the Kapiolani Corridor area and its immediate vicinity, from the Ala Wai Canal to Piikoi Street. In this area, low-rise one- and two-story commercial buildings whose origins extend far back into the 20th Century are interspersed with Hawaii's largest shopping mall at Ala Moana Center, more recent big box retailers, and mid- to high-rise residential and commercial towers that extend, among their smaller, frequently older neighbors, from the Ala Wai Canal/Pawaa Area to the eastern reaches of the Kakaako District.

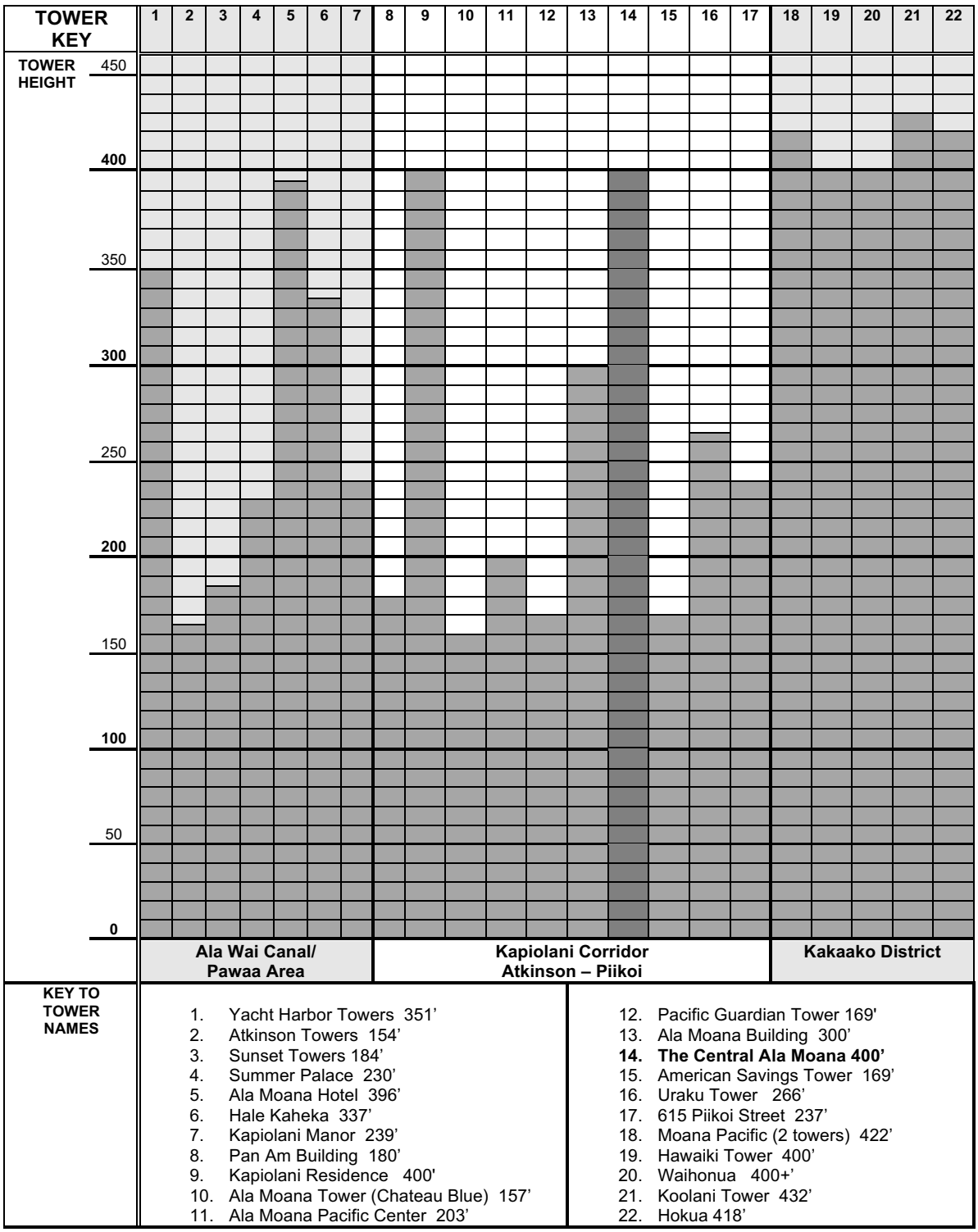


Figure 5: Comparative Tower Heights, Project Environs

These towers, built over roughly the last half century, include the 47-year old, 396-foot Ala Moana Hotel which opened in 1970, the more recent 21st Century, glass-skinned high-rise residential towers in east Kakaako rising to heights at or in excess of 400 feet, and a variety of

office and residential towers built during the latter years of the 20th Century ranging between approximately 200 - 350 feet in height. Figure 5: *Comparative Tower Heights, Project Environs*, provides a graphic diagram of these towers, displayed in geographic progression, from the Ala Wai Canal/ Pawaa end of this study area at the left side of the graphic to the eastern edges of Kakaako at the right side of the graphic. In this graphic context, The Central Ala Moana stands among towers of varying heights. The City's pending Ala Moana TOD Plan proposes building envelope parameters compatible with The Central's height and scale.

In addition to the emergence of taller buildings which occurred gradually over the past several decades in the Kapiolani Corridor and immediately adjacent areas, other indications of potential area transformations are in progress. While much of the mauka edge of Kapiolani Boulevard in the immediate vicinity of The Central consists predominantly of older commercial buildings, this area and locations further mauka of it are also locations for numerous current project proposals in various stages of development and intent. These contemplated projects, in combination with the City's catalytically intended HART and Ala Moana TOD neighborhood proposals may be interpreted as harbingers of potential near-term changes and urban intensifications in The Central's vicinity.

The Streetscape Context:

Kapiolani Boulevard is one of Honolulu's most significant urban arterials, running from the Capitol District at the edge of the Downtown Financial District at its western end through Ala Moana and Waikiki to the edge of Kapahulu at its eastern terminus. It is very heavily travelled on a daily basis and is a signature Honolulu thoroughfare. The wide canopies of the monkeypod trees which line both sides of the Boulevard and frame the driving experience impart a shaded softening of the driving experience through most of its length, creating an ambience unmatched by any other street in Honolulu. For some, Kapiolani Boulevard is Honolulu's "forest within the heart of the city", providing an atmosphere capable of bringing a measure of relief from the frenetic activity and frequently disquieting experiences its drivers, passengers, and pedestrians must navigate on a daily basis.

For many of its travelers, what Kapiolani Boulevard has to offer is unmatched and irreplaceable. For the businesses and homes which line this route, it is the indispensable connecting lifeline for commerce and to lifestyle-enriching essentials and amenities.

Figure 6: The Continuous Kapiolani Canopy

Figure 7: Kapiolani Boulevard's Mixed Development Pattern, Monkeypods, and Traffic

Figure 8: Kona Street Immediately Behind Project Site Toward Keeaumoku Entrance

Figure 9: Kona Street; Project Site Left, Ala Moana Garage Right, Ala Moana Hotel Ahead

Figure 10: Kona Iki Street; Project Site Left, Bank Right, Ala Moana Garage Ahead

Kona Street and the Ala Moana Center are located immediately makai of the project site. Kona Street, which runs along the site's makai edge, is owned by Ala Moana Center, and serves as an important service street for the Center as well as a City bus route and hub and an alternative route for private passenger vehicles. The 6-story Ala Moana Center mauka parking structure looms directly opposite the project site along the makai edge of the street.

Kona Iki Street, also privately owned and well used, forms the project site's western ("Ewa") edge. It connects Kona Street with Kapiolani Boulevard. The American Savings Tower stands immediately opposite the site along the Ewa edge of this street.

Figure 6: *The Continuous Kapiolani Canopy* illustrates the shading canopy fabric that Kapiolani's monkeypods provide above the Boulevard's daily diet of heavy vehicular traffic.

Figure 7: *Kapiolani Boulevard's Mixed Development Pattern, Monkeypods, and Traffic* illustrate the signature ambience of Kapiolani Boulevard and its heavy vehicular use along with the mixture of development scales and abrupt changes in building sizes along its mauka side.

Figures 8 and 9 depict views of Kona Street eastward toward Ala Moana Center's Keeaumoku Street entry and bus transfer hub. Figure 9 shows the imposing Center mauka parking garage. Figure 10: *Kona Iki Street; Project Site Left, Bank Right, Ala Moana Garage Ahead* shows the west edge of the project site and the heavily used Kona Iki Street, which often serves as an alternative or "shortcut" access from Kona Street to Kapiolani Boulevard and Piikoi Street.

Onsite Conditions:

The 1.4-acre project site is very flat. Its current surface or ground level ("elevation") ranges between 5.3 - 6.1 feet above Mean Sea Level (MSL), with an average finished (paved) surface elevation of 5.5 feet MSL. The site lies in an area that has been extensively altered by a series of modifications for a succession of human uses, with some of the most extensive modifications occurring with the urbanization of Honolulu, reflecting changing human needs and construction technologies.

In recent times, the project site was used for a long time as an automobile sales dealership and repair facility. After its purchase by the current owner, it hosted several commercial establishments: "Taste Tea": a bubble tea establishment, Auto X-Change, Inc., "King's Pizza" Restaurant, and an automobile repairing and detailing facility, with the remainder of the site serving as a parking lot. During the construction of the Ala Moana Center Ewa Wing, a portion of the site also served as a staging area for construction activities.

Today, the site remains predominantly a parking lot with two separate, linear buildings along its eastern and Kona Street edges. The building along its eastern boundary houses the "Taste Tea" bubble tea refreshment facility and the SamKoo Hawaii offices (labelled "Kapiolani Residence Offices" in Figure 11). The building along the site's Kona Street edge serves as an automobile garage and the construction offices for the Hawaiian Dredging Construction Company personnel engaged in the construction of the *Kapiolani Residence* residential tower, a predominantly affordable housing project developed under the provisions of the HHFDC 201H Affordable Housing program and approved via resolution by the Honolulu City Council. Parking for Hawaiian Dredging personnel occupies the Ewa or western portion of the parking lot, separated by a vinyl fence from the open parking facilities for SamKoo and the Taste Tea facility. Figure 11: *Existing Project Site Uses* graphically illustrate the relative location of onsite uses and facilities.

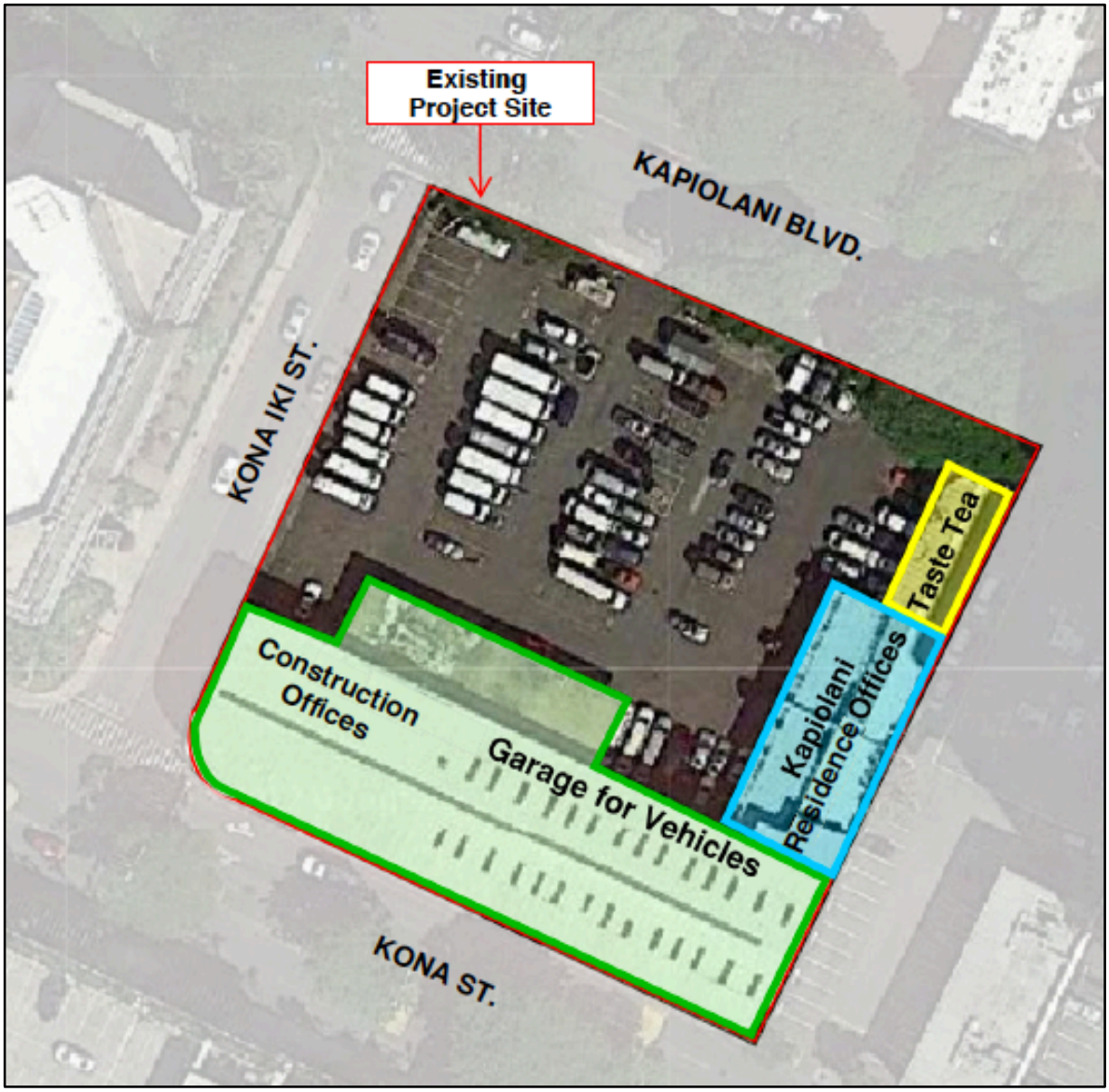


Figure 11: Existing Project Site Uses

Along its Kapiolani Boulevard edge, the expansive canopies of the monkeypod trees which shade the Boulevard driving surface benefit the project site as well with their shade and softening lines, creating an arched canopy for passersby along the public sidewalk and a softening frame for views of the parcel from the street. In these ways, they provide welcome shade for pedestrians and vehicles and a distinctive and differentiating identity for the street.

Figure 12: *The Canopy of Monkeypods Fronting the Project Site* illustrates the profoundly softening effect these trees have on both the street and sidewalk, creating canopies of shade for motorists and pedestrians alike.

Figure 12: The Canopy of Monkeypods Fronting the Project Site

While recognizing these important beneficial qualities, it should also be kept in mind that because of their maturity, the monkeypods are both an asset and a potential liability. Their presence and appearance give Kapiolani Boulevard its distinctive character while their maturity or position may present challenges requiring caution or creative action.

For this reason, while the distinctive visual qualities of Kapiolani's monkeypods should be respected and utilized wherever possible, these trees may best be treated as design elements in the development of properties along the street: maintained and preserved wherever possible, and, as a last resort and only if absolutely unavoidable, modified or edited to signify important entry conditions or to eliminate unavoidable hazard, while ensuring that in doing so, their collective ambience and magnitude of public benefit is not diminished or impaired.

Figures 13 - 15 show external views toward the project site. Figures 16 - 23 show project site components.

Figure 13: Project Site Looking West from Kona Iki Street at Dredging Parking Lot

Figure 14: East End of Project Site from Kapiolani Boulevard

Figure 15: Kona Street Edge of Project Site (The Beige and Blue Wall)

Figure 16: East Buildings

Figure 17: Garage Building (with Storage)

Figure 18: Closeup of SamKoo Offices

Figure 19: Fence with Dredging Beyond

Figure 20: Dredging Offices & Lot

Figure 21: Dredging Lot Toward Kapiolani

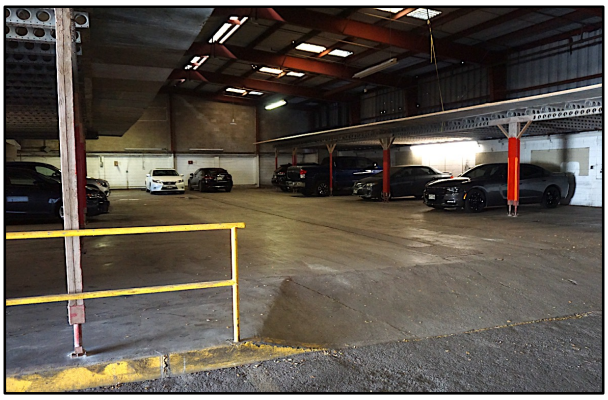


Figure 22: Parking in Garage Interior

Figure 23: Storage in Garage Interior

2.1.3 A Summary of the Institutional Context

This subject, which is offered here as a quick summary for the reviewer's reference, will be covered in more detail in Chapter 4: *Land Use Policies and Controls*.

State Land Use

The project site is located in the State Urban District. This district covers virtually all of the established neighborhood areas in and around the project site location. The Urban District allows for the development of facilities to establish and sustain communities and the built environment needed to support them. Uses allowed within this district correspond to uses allowed by County zoning and other County land use regulations and standards. Figure 24: *State Land Use Designation*, below, shows the project site within the larger State Urban District which covers most of Central Honolulu's coastal plain.

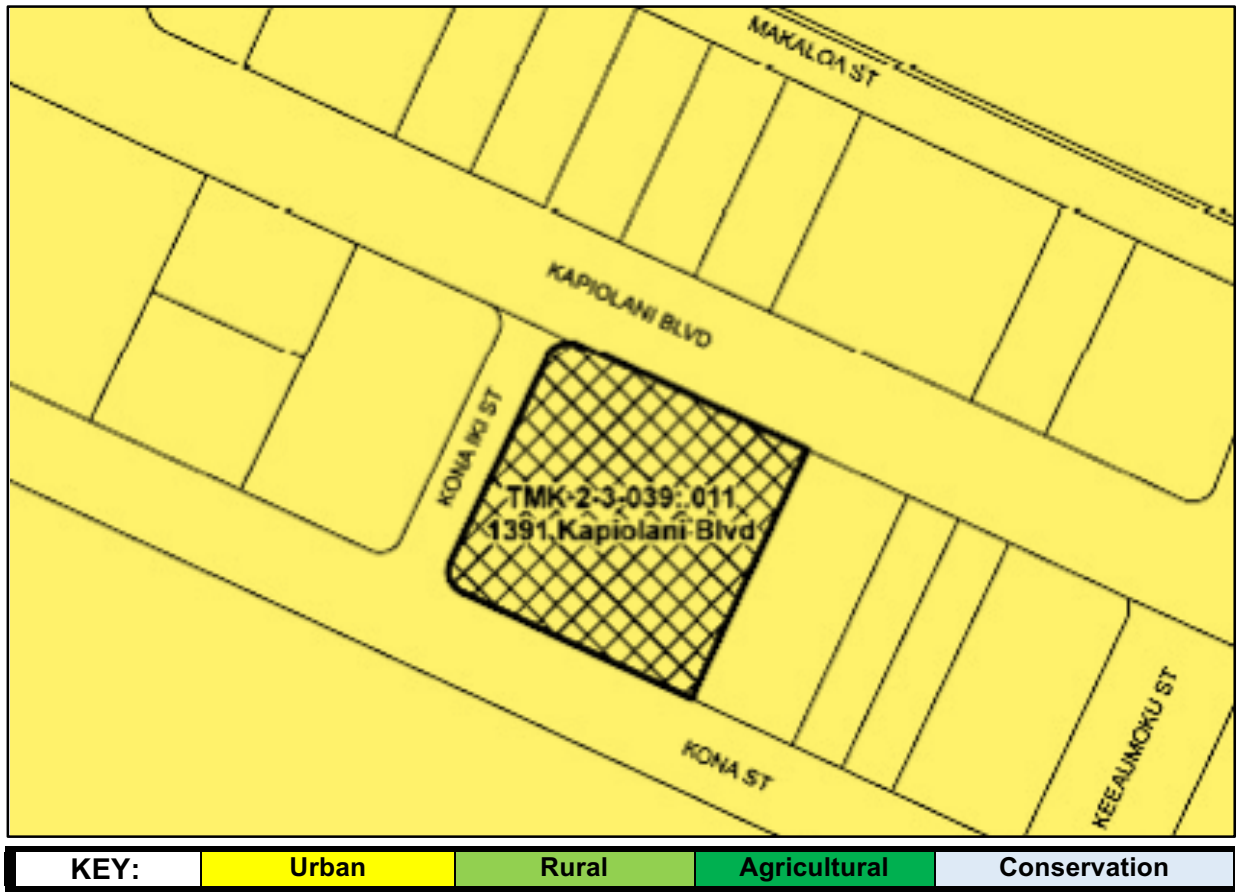


Figure 24: State Land Use Designation

City and County of Honolulu

Development Plan Land Use Designation

The project is located within the Primary Urban Center in an area designated “District Commercial”. As stated by the Primary Urban Center Development Plan, "District Commercial" refers to:

> *commercial uses and related activities intended to serve district-, regional- and/or islandwide populations. Uses typically include major office buildings, shopping centers, professional and business services, municipal services, and commercial activities located along major streets. Mixed uses, including appropriately integrated medium or higher-density residential facilities and higher densities are encouraged in these areas.*

This definition allows for and encourages integrated mixtures of uses that enhance the lifestyle quality of urban communities. In this context, "medium or higher-density residential facilities are allowed. The Central would contribute a large and productive residential component capable of supporting and enlivening the mixture of uses envisioned by the City's Transit-Oriented Neighborhood Plan for Ala Moana. Figure 25 below illustrates the Primary Urban Center Development Plan for the general project area. The color red indicates "District Commercial" areas. The project site is located in the red portion of the area labelled "Ala Moana".

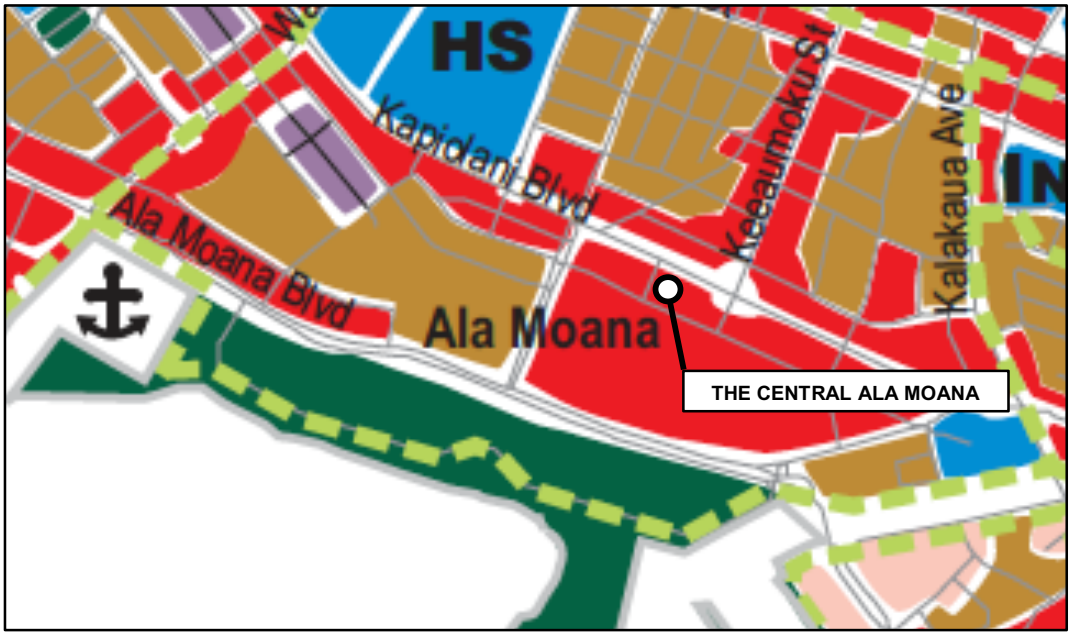


Figure 25: Portion of Primary Urban Center Land Use Map

Land Use Ordinance: Zoning

Zoning on the project site and adjacent parcels is BMX-3: Community Business Mixed Use. The intent of this designation is to provide areas for both commercial and residential uses outside the central business district, and at a lower intensity than permitted in that district.

Current Building Envelope restrictions at the site under this zoning designation limits building height to 250 feet, with a base building floor area allowance of 2.5 times the area of the site (Floor Area Ratio, or "FAR") and a maximum building floor area of 3.5 FAR. Building Height Setbacks from the centerline of bordering streets are also in effect, further limiting the volume of any tall structures built at the site. Since there are streets on three sides of the project site, the limitations imposed by building height setbacks could be significant, with the potential to heavily constrain project capacity and resultant feasibility. Figure 26 illustrates the project site's zoning designation in the context of the area zoning patterns.

As a proposed Transit-Oriented neighborhood, future City and County policy and regulations are likely to change to allow for higher densities and larger building envelopes than currently permitted.

Ala Moana Transit-Oriented Development (“TOD”) Neighborhood Plan Final Draft

A transit-oriented development plan for the Ala Moana neighborhood in which the project will be located is under review by the Honolulu City Council. It outlines the kinds of improvements in the public domain that are considered desirable to increase neighborhood livability and to support transit ridership, and proposes increases in development capacity that may be possible in exchange for a project applicant’s contribution of public benefits.

In the area in which the project site is located, the pending Ala Moana TOD Plan proposes a maximum building height of four hundred (400) feet and a maximum floor area ratio of 10.0 (ten times the parcel area) in exchange for developer contributions of approved public benefits, to be determined and negotiated on a project-by-project basis. After a final TOD plan has been developed and adopted, regulations to implement it will be developed, publicly reviewed, refined, and adopted. At present, a TOD Plan and regulations are not in effect.

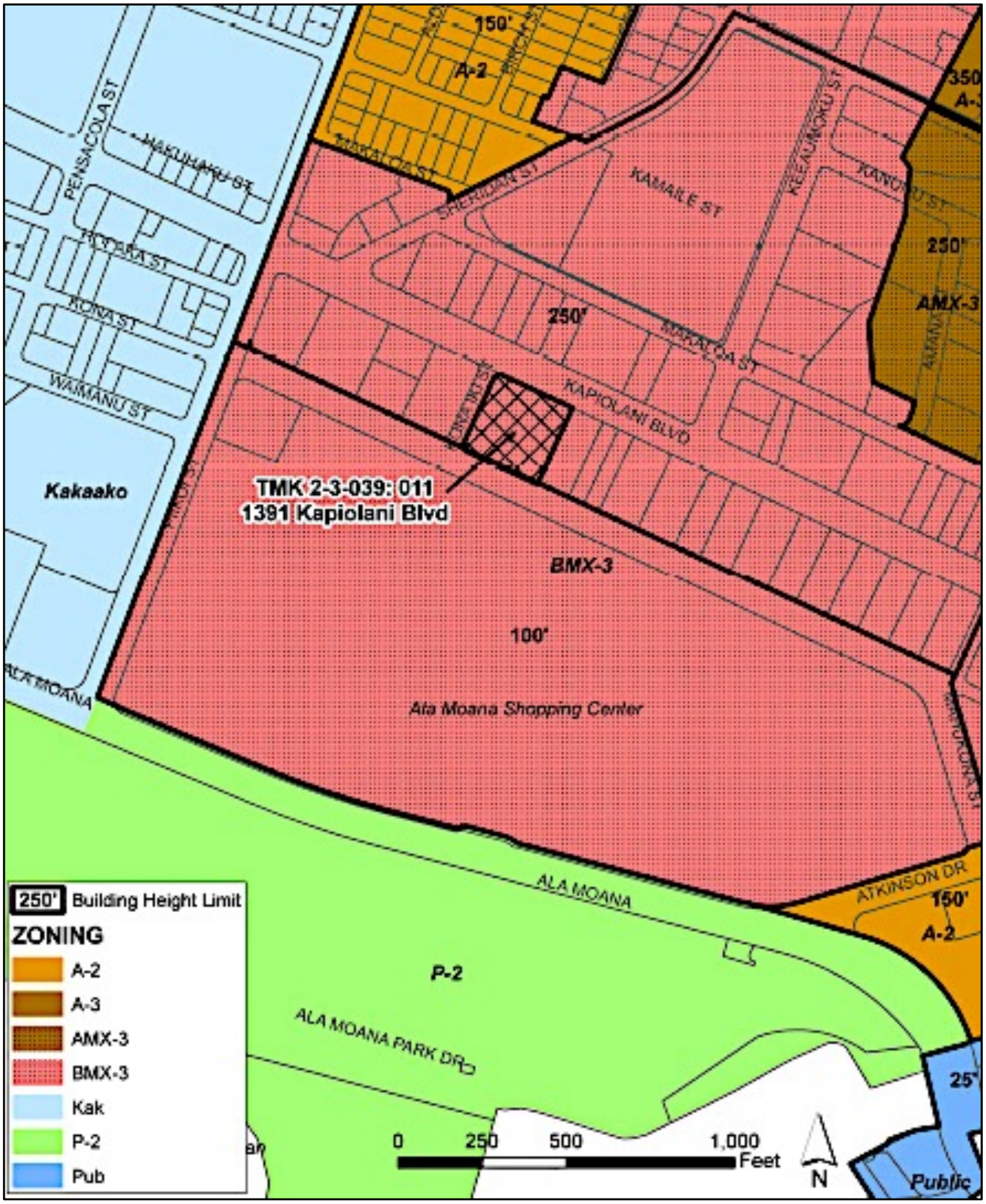


Figure 26: Zoning Map in Project Area

2.2 THE PROJECT

2.2.1 Statement of Purpose and Need

The Central Ala Moana project ("The Central") intends to provide quality affordable and market-rate for sale housing in the Ala Moana district of Central Honolulu in close proximity to urban lifestyle support facilities and services.

It will be located in convenient proximity to shopping, dining, employment, business opportunities and services, multiple transportation opportunities, and the lifestyle offerings both needed and preferred by contemporary urban dwellers. The project's strategic location will provide access to the unique and often showcase-quality attractions in both its Ala Moana neighborhood and the Kakaako District next door.

Public Policy: Through the latter half of the 20th Century, the City and County of Honolulu's ("the City's") directed growth policies have emphasized the concentration of population growth in two urban concentrations: Oahu's already well-established "Primary Urban Center" and Kapolei on the Ewa plain, designated by the City as the island's Secondary Urban Center. Its current Development Plan system reflects this. Since 1998, only two of the island's development plans, which are the primary land use policy plans for each of Oahu's eight regions, have retained their original designations as "Development Plans", indicating the City's policy intent for those regions. The other six regions were renamed "Sustainable Communities Plans", focusing on environmental and external design policies and provisions, infrastructure, and resource management that would maintain the existing distinctive characteristics and assets of those regions and the communities located there.

Within the Primary Urban Center as in other locations along the City's future rail ("HART") line, plans for the areas in the vicinity of HART transit stations have been completed or are currently in process. These plans will be followed by the development and adoption of implementing regulations. In general, increases in development density, public amenities, access to multiple forms of transportation to promote resident mobility, and housing for a mix of income groups are envisioned in these neighborhoods. The Ala Moana neighborhood in which The Central Ala Moana will be located is one of these future "transit-oriented development" ("TOD") neighborhoods.

Market Preferences: While many active families with growing children prefer suburban environments in which to raise families, there has been a growing preference for intown living among younger members of the workforce, “empty nesters”, and individuals of various ages.

An example of this is the value often placed by working age persons on the quality of the environment in which they find livelihood. Many prefer excellent work or business opportunities coupled with “cool places to live”, often associating this pair of assets with the stimulating intensities of urban environments. At the other end of the spectrum are older members of the population who value the benefits of well-managed multi-family housing, conveniently located services and diversions, and proximity to health care facilities.

The Scarcity of Affordable and Moderately-Priced Urban Housing: Public policy promotes affordable and moderately-priced housing. However, there is difficulty in providing such housing. New residential development on raw land may require costly infrastructure development. In central urban areas, where most of the land is already developed, existing development intensity and land values are characteristically high. As a result, most new projects in central Honolulu must occur as infill redevelopment efforts involving the demolition and replacement of existing structures. Such efforts may be more expensive to undertake than development on vacant land.

Under past and current economic conditions, the real estate market in Hawaii in general has been one of high demand and tight supply by virtue of the positive image and lifestyle attractions associated with Hawaii and the physical, institutional, and economic conditions which influence the creation of housing supply. In urban areas where business and lifestyle attractions and the scarcity and value of land converge, this phenomenon is conspicuously prominent.

Because of the high cost of land and heavily burdened infrastructure systems, it has been difficult to provide housing to low and moderate/mid-market sectors in most central Honolulu locations. The Ala Moana and adjacent Kakaako area are cases in point. Each has been targeted for growth and intensification of development, with concomitant effects on land values there. While projects offering units in the affordable category have been recently completed or are in progress, development activity for the higher end of the housing market has predominated.

The State of Hawaii definition of “affordable housing” includes income levels at or below 140% AMI. Given the prevalent pricing of market rate units, this leaves persons at income levels at or below 140% AMI with limited access to housing. The Central intends to fill this largely neglected “affordable” housing market.

The purpose and intent of The Central is to provide quality housing opportunities to meet a portion of the affordable housing demand for those earning 100% – 140% of Area Median Income and to provide reasonably priced market rate units as well.

Figure 27: Street Level Leisure at The Central Ala Moana

2.2.2 Project Affordability

Sixty percent (60%) or 310 of The Central’s residential units will be priced within the “affordable housing” range, targeting households earning between 100% - 140% of AMI. The remainder of the units will be offered for sale as market-rate units. The distribution of affordable units by unit type is displayed in the next section: “Facility Description”.

As an affordable housing project, The Central will be processed for approvals under the affordable housing provisions of Chapter 201H, HRS, which allows for greater design flexibility, exemptions from certain statutes, ordinances, rules, and fees relating to planning, zoning, and construction. This flexibility is sought to achieve the cost effectiveness needed for project economic feasibility.

Hawaii Housing Finance and Development Corporation (HHFDC) will be processing the 201H application for this project. Communications with DPP at project inception in 2014 determined this project's ineligibility for DPP processing. A copy of the DPP letter to this effect is presented in Appendix B of this document. HHFDC will process this environmental assessment and the 201H application. The City and County of Honolulu City Council will review and may approve the project's request for exemptions pursuant to HRS Section 201H-38. The City Council may also disapprove the project, or approve the project with modifications.

As specified in Section 201H-47, HRS and required by HHFDC, there will be a 10-year buyback restriction for the affordable units. If the purchaser of an affordable unit sells the unit prior to the end of the 10-year period, HHFDC has the first option to purchase the unit. If the HHFDC waives its first option to purchase the affordable unit, a qualified non-profit housing trust has the option to purchase the unit. Resale of affordable units is also subject to shared appreciation clauses as provided in Section 201H-47, HRS.

This Draft Environmental Assessment serves as the project's disclosure and public comment document, meeting the content and submittal requirements under Chapter 343, HRS, and Chapter 11-200, Hawaii Administrative Rules (HAR). Relevant 201H application information and requested project-related exemptions are also included in this document. A complete 201H application will be submitted to HHFDC.

2.2.3 Facility Description

Facility Overview

The Central Ala Moana consists of two independent, freestanding structures: a 43-story residential tower fronting Kapiolani Boulevard and a 10-story parking garage with an 11th-story

recreation deck running along Kona Street. The two structures will be connected by upper level bridges.

Major project elements will include:

- Residential Units
- Residential Support Spaces and Amenities
- Staff Support Spaces
- Ground Level Commercial Spaces
- Outdoor Publicly Accessible, Furnished Street Level Leisure Spaces
- Enhanced (Widened) Public Sidewalk Space Along Kapiolani Boulevard and Kona Iki Street
- Landscaped, Elevated Recreation Deck with Pool and Deck, Cabanas, Barbeque Facilities, Fitness Center, Multipurpose Pavilion, and Landscaped Park and Play Areas
- Building Technical Support Spaces
- Parking and Loading Spaces

Kapiolani Boulevard will provide primary vehicular access to the project, using exclusively right turn entry and exit patterns. Kona Street will provide secondary vehicular access, as a secondary exit for passenger vehicles and as a means of access and through circulation for service and emergency vehicles.

The primary pedestrian access to residential units will be from Kapiolani Boulevard. An entry from the project's Kona Iki Street edge will provide a secondary pedestrian access to these units and public access to public bicycle racks. Pedestrian sidewalks will be generously proportioned, in excess of City standard requirements, to facilitate the large volumes of pedestrian traffic the City's intended Transit-Oriented neighborhood and HART station are expected to produce.

Along Kapiolani Boulevard, a widened, landscaped planter strip along the outboard edge of the public sidewalk and the Boulevard's driving surface will provide more generous root space for the existing monkeypod trees and an acoustic, visual, and psychological buffer between pedestrian and vehicular zones. A publicly accessible plaza furnished for sitting and leisure interludes will run along the inboard edge of the Kapiolani Boulevard sidewalk zone. It will offer residents a convenient and protected outdoor space for social interaction or solitude, and for

those passing by, a welcome respite from the often more frenetic pace of the public sidewalk zone.

While the project's Kapiolani Boulevard commercial storefronts will enjoy ready visibility from passersby and direct contact with people in the plaza, the Kona Iki Street storefronts will enjoy more immediate exposure to the walking public. They will directly front on the public sidewalk, and toward the quieter Kona Street end, the sidewalk will expand visually with the addition of an arcade fronting the commercial spaces, allowing pedestrians shade and a sheltered "window shopping" zone separate from the sidewalk from which to view the offerings of the establishments lining this section of the street.

The tower will house five hundred thirteen (513) studio, one-bedroom, two-bedroom, and three-bedroom residential units. Residential floors will rise to a height of approximately 400 feet, with rooftop mechanical and elevator overrun spaces rising an additional 18 feet above the highest residential roof surface. The project floor area ratio (FAR) will be approximately 10.0.

The tower will present The Central's "front" or public face, while the parking structure will be its service element housing the necessary parking, loading, and utility facilities. Both the tower and parking structure run parallel to their respectively fronting streets. This will allow the tower to orient its residents to distant mauka and makai views, to set back sufficiently from Kapiolani Boulevard to accommodate space for ample sidewalk and plaza areas, and to provide for a generous planting buffer strip between pedestrian and vehicular zones.

The result will be a generously proportioned public sidewalk, a furnished pedestrian plaza, and the ability to avoid intruding on the wide canopies of the existing monkeypod trees which give both the Boulevard and its adjacent sidewalks the signature character they have long enjoyed. Aligning the parking garage along Kona Street positions its elevated recreation deck along a more private, quieter zone of the project site and allows the consolidation of parking garage service functions along a service roadway rather than along a "front door" face of the project.

Figure 28: Site (Street Level) Plan

Figure 28 displays the conceptual site plan showing the organization and deployment of facilities, vehicular and pedestrian circulation zones, the plaza along the Kapiolani frontage, and the relationship of all street level project elements to each other and their immediate surroundings.

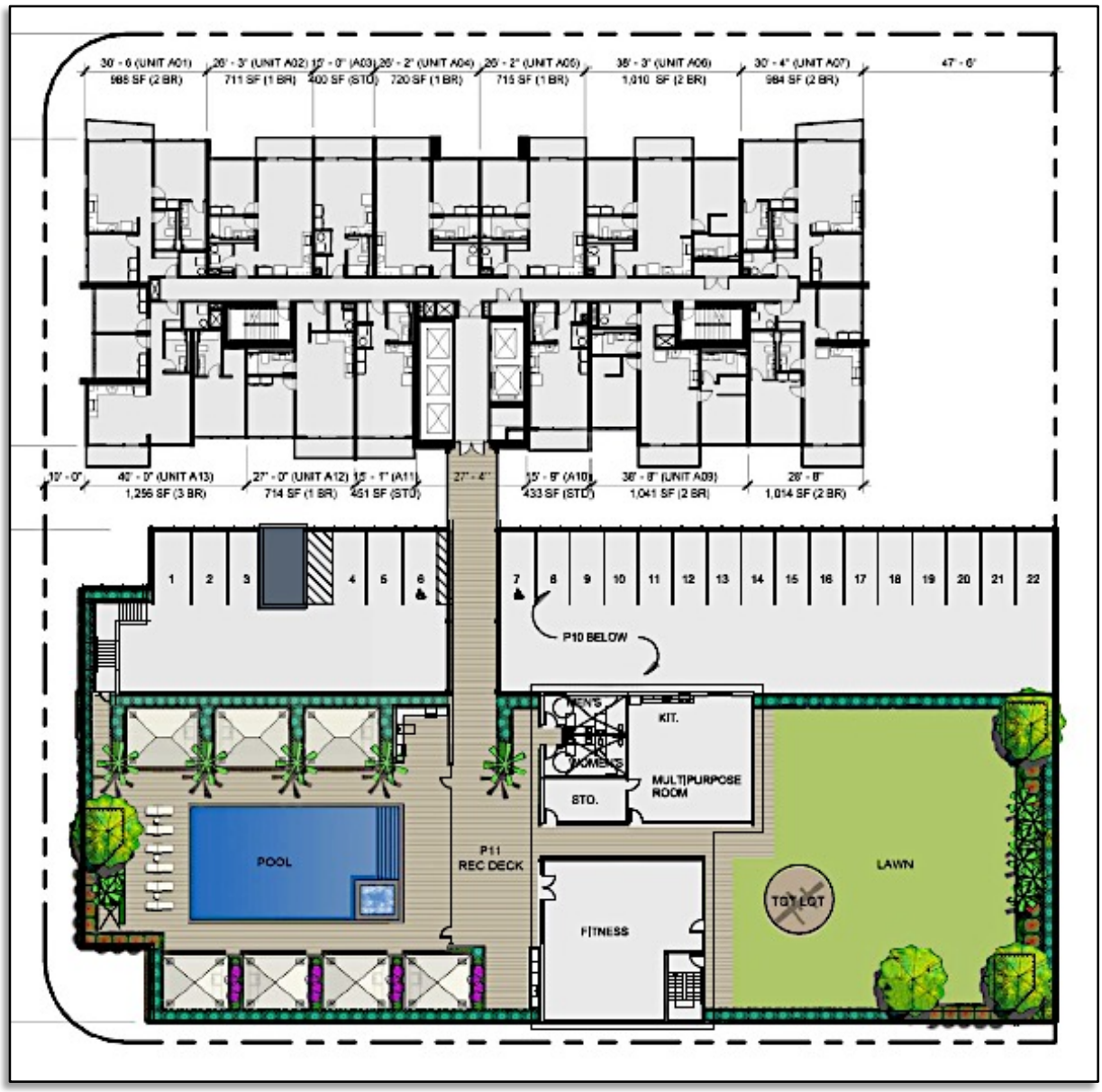


Figure 29: Elevated (11th Floor) Recreation Deck

Figure 29 illustrates a conceptual plan for the approximately 19,300 square foot elevated recreation deck and its facilities. Figure 30 presents a conceptual illustration of the Kapiolani Boulevard face of the project. Figure 31 illustrates the relative heights of the project's tower and parking garage elements and their relationships to the adjacent streets.

Figure 30: The Central Ala Moana Viewed Along its Kapiolani Boulevard Frontage

Figure 31: Project Looking West (Ewa), Showing Approximate Heights of Tower & Garage

The Central Ala Moana Program Summary

During its development, the program for The Central Ala Moana has been studied rigorously from market, physical, contextual, and financial perspectives in an effort to create the kind of balance required for a successful project that meets market needs, enhances its surroundings, creates in itself an asset to the emerging identity of the District, and meets the demanding requirements of financial feasibility. Table 1: *Preliminary Space Program Summary* gives a useful programmatic overview of The Central Ala Moana as it has been defined to date as an overview perspective of the proposed project and an introduction to its major component parts.

While further detailed development of critical project elements remain, Project design targets a 10.0 FAR. Areas below are in gross square feet.

USAGE TYPE	APPROXIMATE AREA ALLOCATIONS		
	FAR-Subject Area (sf)	Non-FAR Area (sf)	Total Area (sf)
Residential Units (Included walls and excluded Manager's unit)	480,811	0	**480,811 SF**
Residential Balconies	8,900	37,081	**45,981 SF**
Residential Floor Circulation	90,300	0	**90,300 SF**
Residential Common Area & Circulation	6,597	0	**6,597 SF**
Resident Manager's Unit	1,014	0	**1,014 SF**
Staff Spaces	1,361	0	**1,361 SF**
Total Residential	**588,983 SF**	**37,081 SF**	**626,064 SF**
Commercial Spaces			
Tower Commercial Space	5,853	0	**5,853 SF**
Parking Garage Commercial Space	4,669	0	**4,669 SF**
Total Commercial	**10,522 SF**	**0 SF**	**10,522 SF**
Recreation and Leisure			
Public and Resident Amenities			
Public Plaza & Leisure Space	0	4,355	**4,355 SF**
Open Landscape Area	0	5,806	**5,806 SF**
Public Circulation Space	0	9,157	**9,157 SF**
Resident Amenities			
Recreation Deck			
Multi-Purpose Room	1,729	0	**1,729 SF**
Fitness Center	1,826	0	**1,826 SF**
Pool Cabanas	1,064	0	**1,064 SF**
Park, Landscaping, & Hardscaping	326	14,344	**14,670 SF**
Total Recreation and Leisure	**4,945 SF**	**33,662 SF**	**38,607 SF**
Building Support (Utility) Spaces			
Tower Utility Spaces	9,460	0	**9,460 SF**
Parking Garage Utility Spaces	3,248	0	**3,248 SF**
Total Building Support	**12,708 SF**	**0 SF**	**12,708 SF**
Parking Facilities: 803 Stalls		278,355	**278,355 SF**
Parking Stair	1,034	2,920	**3,954 SF**
Total Parking Support	**1,034 SF**	**281,275 SF**	**282,309 SF**
Space Totals	**618,192 SF**	**352,018 SF**	**970,210 SF**

Table 1: Preliminary Space Program Summary

The Tower

The 43-story tower houses the project's 513 residential units, resident support spaces, commercial spaces, a portion of needed building systems support spaces, and a resident manager's unit. 60% or 310 of the project's total 513 units will be affordable to households earning 100% - 140% of the Area Median Income (AMI). 202 units will be offered to the open market. One unit will not be sold, but retained for use by the project's Resident Manager. Unit distribution will be as follows:

Unit Type	Affordable 100 - 140% AMI	Open Market	Totals
Studio/1 Bath	93	0	93
1 – Bedroom/1 Bath	107	38	145
2 – Bedroom/2 Bath	101	121	222+1 Manager
3 – Bedroom/2 Bath	9	43	52
Totals	**310**	**202**	**512+1 Manager**

Table 2: Unit Distribution by Bedroom and Market Type

The tower presents the project's "front" or public face toward Kapiolani Boulevard, with a generous street setback that:

- Provides an adequate visual foreground to establish a setting for the project's public or primary "face", its streetlevel commercial enterprises, and its generously furnished and proportioned, publicly accessible plaza which runs along the tower's entire Kapiolani frontage;
- Achieves maximum acoustical buffering from vehicular street traffic;
- Provides sufficient space for the accommodation of a widened streetside planter zone, a generously proportioned public sidewalk, and a furnished, publicly accessible plaza;
- Maintains a compatible, non-intrusive relationship between the tower and the monkeypod tree canopies;
- Achieves a site plan organization which places the project's "front door" toward its primary public face and avoids the placement of major service elements along or at the Kapiolani Boulevard frontage.

An additional feature of the tower shared by its parking garage along their street frontages is the generous projecting canopy which runs along their street front faces at a height just above the level of the tower's doorways and storefront windows. This canopy, in combination with the tower storefronts, the furnishings, landscaping, and the Kona Iki Street arcade, establishes a comfortably proportioned street level environment for shoppers, strollers, passersby, and those who may choose to take advantage of the shade and respite it offers. Figure 27: *Streetlevel Leisure at The Central Ala Moana* illustrates this effect.

The tower's street level floor houses the main and secondary pedestrian entrances to the residential units, the street front commercial spaces, resident support facilities, staff services and support facilities and a proportion of the building's technical support systems. Resident and customer access to this level are from Kapiolani Boulevard and Kona Iki Street while "back of house:" service functions such as loading zones, solid waste management, life safety, and technical support functions are accessed along the "back side" of the tower from the parking garage.

Resident support services include the residential elevators, mail room, and building management offices. Staff support services include back of house staff facilities and the building fire/security center. Building technical support facilities will include solid waste ("trash") management spaces and transfer areas, master electrical, telephone, and fire control centers, all with direct access to loading/unloading stalls easily accessible to service vehicles.

The tower will contain four residential floor types hosting 3 different unit plan distributions. They are presented in *Appendix D: Architectural Drawings.* These residential floor types will host 11 – 13 units each. Unit distributions for each residential floor type are shown in Tables 3.1 – 3.4 below and on the following page.

Unit Type	No.	Approximate Net Interior Living Area w/out Balcony (SF)
Studio/1 Bath	57	394 ~ 446
1-Bedroom/1 Bath	76	688 ~ 702
2-Bedroom/2 Bath	95	979 ~ 1,044
3-Bedroom/2 Bath	19	1,240
Total	**247**	

Table 3.1: Unit Distribution, Residential Floors 2 – 20

Unit Type	No.	Approximate Net Interior Living Area w/out Balcony (SF)
Studio/1 Bath	16	394 ~ 446
1-Bedroom/1 Bath	24	694 ~ 702
2-Bedroom/2 Bath	48	979 ~ 1,160
3-Bedroom/2 Bath	8	1,240
Total	**96**	

Table 3.2: Unit Distribution, Residential Floors 21 – 28

Unit Type	No.	Approximate Net Interior Living Area w/out Balcony (SF)
Studio/1 Bath	10	394 ~ 446
1-Bedroom/1 Bath	15	694 ~ 702
2-Bedroom/2 Bath	30	979 ~ 1,160
3-Bedroom/2 Bath	5	1,240
Total	**60**	

Table 3.3: Unit Distribution, Residential Floors 29 – 33

Unit Type	No.	Approximate Net Interior Living Area w/out Balcony (SF)
Studio/1 Bath	10	394
1-Bedroom/1 Bath	30	694 ~ 702
2-Bedroom/2 Bath	50	979 ~ 1,160
3-Bedroom/2 Bath	20	1,240 ~ 1,512
Total	**110**	

Table 3.4: Unit Distribution, Residential Floors 34 – 43

It will be useful to review these tables in tandem with the architectural drawings presented in Appendix D.

The Parking Structure

The parking structure will hold a portion of the project's streetfront commercial spaces, its parking stalls, loading spaces, resident bicycle and surfboard storage, building maintenance spaces and equipment, and the remainder of the building's technical support equipment. As

previously cited, a recreation deck with a range of resident leisure and recreational amenities will occupy its eleventh level. All upper parking levels will be dedicated to resident parking spaces and connected by 9 bridges: one at each elevated parking garage floor, to elevator lobbies in the residential tower to simplify resident access between their vehicles and residences. An additional bridge will connect the elevated recreation deck with its corresponding tower elevator lobby. All studio, one-bedroom, and two-bedroom units will be assigned at least one parking stall. Three-bedroom units will each be assigned two parking stalls. While the 2-bedroom units will have a single parking stall assigned as a basic complement to their purchase packages, the parking distribution table on the following page will show an allocation of 1.5 stall/2-bedroom unit. This has been done to enable 2-bedroom unit purchasers the option to purchase one additional parking stall on a "first come, first served" basis. It is recognized that while it is not possible to predict precisely what future transportation preferences will be, it is also recognized that future market and societal conditions may see a conversion of parking stall assignments to integrated car-share or bicycle uses, the use of surplus parking for offsite district parking needs, or for other than parking uses. Table 4 presents the currently programmed distribution of parking.

PROPOSED DISTRIBUTION OF PARKING STALLS BY USAGE TYPE		
USAGE TYPE	**Stalls by Unit Type**	**Stalls by Usage Type**
RESIDENTIAL UNITS		
STUDIO (1 Stall/Unit x 93 Units)	93	
1- BEDROOM (1 Stall/Unit x 145 Units)	145	
2 – BEDROOM (1.5 Stalls/Unit x 223 Units)	335	
3 – BEDROOM (2 Stalls/Unit x 52 Units)	104	
COMMERCIAL		18
GUEST PARKING		26
ELECTRIC CAR PARKING		8
HANDICAP ACCESSIBLE STALLS (2% of total parking count)		16
ADDITIONAL STALLS FOR RESIDENT OR OTHER PROJECT USES		58
PARKING STALL SUBTOTALS	**677**	**126**
TOTAL PARKING STALLS	**803**	

Table 4: Distribution of Parking Stalls by Usage Type

As a 201H project to be built within a future TOD neighborhood, The Central supports TOD's advocacy of multiple transportation alternatives and its thrust toward increased usage of modes of transport other than the private automobile. However, actual personal preferences usually do

not change overnight, but rather, over time, and The Central's potential market will probably consist of individuals with a range of attitudes toward urban living, a range of preferences toward modes of transportation, and consequently a range of preferences with regard to parking spaces available for personal automobiles. Given this, parking as proposed by The Central Ala Moana has been considered the wisest course of action to take for satisfying the potential range of actual customer preferences and facilitating project viability.

Therefore, to maintain the project's attractiveness and marketability to its intended target markets, The Central proposes parking in lower quantities than specified by the City's existing Land Use Ordinance (LUO) but higher than those proposed by the Ala Moana TOD Plan to allow for this range of customer preferences. As preferences change, parking stalls not already assigned or otherwise irrevocably committed could be converted to other necessary or desired uses.

Recreation and Leisure Spaces

The Central will occupy a central location in the Ala Moana district of Central Honolulu, an area which has undergone succeeding waves of activity and development intensifications since the early 20th Century. City policy foresees further intensifications of the area as a "Transit-Oriented Neighborhood", a form of mixed use community with a range of mobility choices enhanced by public transit systems.

In this context, the project will occupy a typically high-value, physically constrained site. The Central's tower and parking garage will necessarily occupy nearly all of its approximately 1.4 acre (62,328 square feet) site. Despite this, The Central proposes to provide approximately 38,600 square feet or nearly an acre of street level and elevated recreation and leisure space within the project site.

It accomplishes this by providing approximately 4,355 square feet of publicly accessible plaza and approximately 14,963 square feet for leisure or "passive recreation" activities at the street level and approximately 19,300 square feet of elevated recreation facilities on a recreation deck located above the 10th parking garage floor, to be accessible to project residents via a bridge connecting it directly to a tower elevator lobby. The combined total of all these areas are equal to approximately 62% of the total project site area.

The plaza will be part of a layering of pedestrian-oriented amenities or “zones” between the tower and the street. It will run the length of the tower’s Kapiolani Boulevard frontage adjacent to the storefront commercial spaces, complementing an enhanced public sidewalk (widened beyond City standards) that will be buffered from street traffic by the wide monkeypod tree planter strip. The plaza will be furnished for sitting and taking refreshment, and will be oriented to support both social interaction and solitude. In addition to the spread of the monkeypod tree canopies, a canopy projecting from the tower along the Kapiolani Boulevard and Kona Iki Street frontages, as illustrated in Figure 27, will provide additional shade and protection from the elements. Spatial enhancements to the sidewalk zone to create a less intensive, promenade-like atmosphere, public bicycle storage facilities, and landscaping to complement these spaces and to "soften" the built environment will complete the recreational and leisure amenities at the street level.

The elevated recreation deck will offer a range of recreation and leisure opportunities. A pool deck with a pool and whirlpool bath, reclining lounge chairs, cabanas, and barbeque facilities will occupy the west or Ewa end of the recreation deck. Its central portion will offer a fitness center, a multipurpose room equipped with kitchen, storage, and restroom facilities, while a tot lot, a lawned park for informal play will anchor its Diamond Head end. The entire deck will be landscaped to enhance the leisure experience and to provide environmentally “soft edges” along the perimeter of this amenity as a counterbalance to the “built” environment of adjacent structures.

In this way, despite its high value, highly constrained physical context, The Central will provide a variety of onsite recreational and leisure amenities, occupying space equivalent to over half its project site area, to meet a range of recreational preferences its residents may have.
Figure 28: *Site (Street Level) Plan* shows the public plaza and open spaces fronting the tower.
Figure 29: *Elevated (11th Floor) Recreation Deck* illustrates the recreation deck and its relationship with the tower.

Sustainability Features in Project Design

While sustainable design measures will be further defined during more detailed phases of project development, a number of provisions and concepts have been adopted or provisionally

defined by the developer and architectural design team, pending more detailed project definition. They include:

1. Maximizing individual residential unit exposure to the outdoors: Window openings to maximize visual exposure to the outside and opportunities for natural lighting are provided at all or most of the exterior walls of all habitable spaces in the residential units except where solid walls are needed for structural integrity. Most of these openings consist of operable windows to enable the entry of fresh air into the units. In addition, every unit has a balcony with sliding doors to increase ventilation and natural lighting opportunities.

   All glazing will employ a high-performance glazing system with low emissivity (Low-E) insulated glass windows.

2. Where artificial lighting is needed, LED lighting will be used where appropriate to reduce energy consumption.

3. Appliances that will be supplied with units are projected to be Energy Star-rated to reduce energy consumption.

4. Low-flow flush toilets will be selected for installation.

5. Low VOC materials and finishes will receive priority during materials and finishes selection.

6. Material with recycled content will be incorporated where appropriate.

7. The project developer will work with the general contractor to develop a construction waste management program to reduce the amount of building material to be deposited in a landfill.

These are some of the sustainable design provisions included or being considered for inclusion in the project. More detail on these efforts will evolve as the project enters advanced stages of design and the development of construction documents.

Low Impact Development Measures

As with provisions for Sustainable Design Measures, detailed design will more specifically account for LID (low-impact development). Given the current project site development approach, storm water runoff is not expected to increase due to construction of The Central. Where necessary, biofiltration devices will be used to filter stormwater drainage during the construction period.

After construction, although the tower, parking garage, circulation spaces, and plaza will necessarily occupy the greater of the site's available area, ground level landscaping has been designed to occupy as much of the remaining site area as possible to reduce the amount of otherwise impervious surface and to instead create areas of permeability.

Where possible, mitigation measures using natural runoff control including bio-infiltration areas in addition to the planned landscaping treatment have been planned for consideration. Storm water quality features will be finalized as necessary during advanced phases of design to comply with agency requirements.

At the present time, the following additional intended measures, to be more fully defined in detailed design, have been identified for implementation:

- Treatment systems will be used to capture sediments from entering the adjacent City system.
- Final grades and topography of the site will be such that the design storm water runoff will be contained onsite as required by City and County regulations.
- As mentioned briefly above, the design of the site's grassed or permeable areas will be specifically designed, in addition to meeting their aesthetic and functional requirements to also reduce the amount of runoff produced as compared to existing conditions, in keeping with storm water management and low impact development strategies.

2.3 PRELIMINARY MARKET DISTRIBUTION OF RESIDENTIAL UNITS

As previously cited, The Central is a project emphasizing residential offerings to affordable markets. As such, 60% of its units will be affordable, priced to be accessible to households earning 100% - 140% AMI while the remaining 40% of its units will priced at market rates.

While the determination of affordable unit AMI and possible pricing is still in progress and will be defined precisely with the start of the sales program. Table 5: *Preliminary Market Distribution of Residential Units* displays preliminary unit target market distribution as developed to date, using 2017 HUD income and sales price guidelines.

UNIT TYPE	AFFORDABLE UNITS			# MARKET UNITS
	AMI CATEGORY & HHFDC PRICE RANGE		UNIT TOTALS	
	100% - 120% AMI	121% - 140% AMI		
STUDIO	93	0	93	0
Price Range	$286,000 ~ $399,500			
1-BEDROOM/1 BATH	27	80	107	38
Price Range	$396,000 ~ $485,000	$486,000 ~ $566,000		
2-BEDROOM/2 BATHS	41	60	101	123
Price Range	$493,000 ~ $544,000	$547,000 ~ $637,000		
3-BEDROOM/2 BATHS	0	9	9	41
Price Range	N/A	$700,000 ~ $708,000		
TOTALS	**161**	**149**	**310**	**202**

Table 5: Preliminary Market Distribution of Residential Units

2.4 DEVELOPMENT TIMETABLE

Table 6 displays the project's targeted development schedule given known factors pertinent to the development process and product delivery. While external factors may influence the details of projected dates and durations indicated, such adjustments are expected to be minor. The timetable as shown is expected to remain substantively unchanged through the duration of the project.

PROCESS	PROJECTED DATES	DURATION
Entitlement	September 2016 – October 2018	+/- 13 months
Design	April 2018 - February 2019	+/- 10 months
Foundation Permit	December 2018	+/- 3 months
Construction Permits	November 2018 - September 2019	+/- 10 months
Sales Program	December 2018 - March 2019	+/- 3 months
Construction	April 2019 - June 2021	+/- 26 months

Table 6: Preliminary Development Time Table

2.5 NEARBY RESIDENT SERVICES AND FACILITIES

The Central Ala Moana's location is uniquely central to many services and facilities its future residents will both need and desire. It enjoys exceptionally convenient proximity to shopping, dining, entertainment, family and business services, financial institutions, private and public educational facilities, and convenient access to public transportation.

Some of Honolulu's most unique and stylish as well as some of its most popular shopping, dining, and entertainment establishments are located within walking distance of The Central. They include the myriad retail and dining establishments housed in Ala Moana Center and Ward Village, the budget-oriented offerings at Walmart, and the wide variety of restaurants, clubs, shops, and services located along Keeaumoku Street, Kapiolani Boulevard, and in the Pawaa area.

Six major banking institutions are located nearby. They include a major branch of American Savings Bank just across the street from the project on its west or Ewa side. Bank of Hawaii is just 500 feet or less than a 5 minute walk in the other (Diamond Head) direction from the project's front door. Territorial Savings Bank is located just a little further in Ala Moana Center

and First Hawaiian Bank is about a quarter of a mile away on Kapiolani Boulevard. Two other American Savings Bank branches are located at Walmart a block away and at the Pan Am building a little over a quarter of a mile away.

Medical services are located throughout the project's environs. Straub Clinic and Hospital, Kaiser Permanente Clinic, and Kapiolani Medical Center are all within a mile of the project, while a large concentration of medical and dental services is located a short walk away in the Ala Moana Building on Keeaumoku Street. Other clinics and medical offices are located along King Street from Keeaumoku Street to Kalakaua Avenue.

At least seven major grocery supermarkets are also nearby, with Foodland Farms at Ala Moana Center and Sam's Club a block away the closest, and Safeway, Times, and Foodland Supermarkets, all located along Beretania Street, being that farthest.

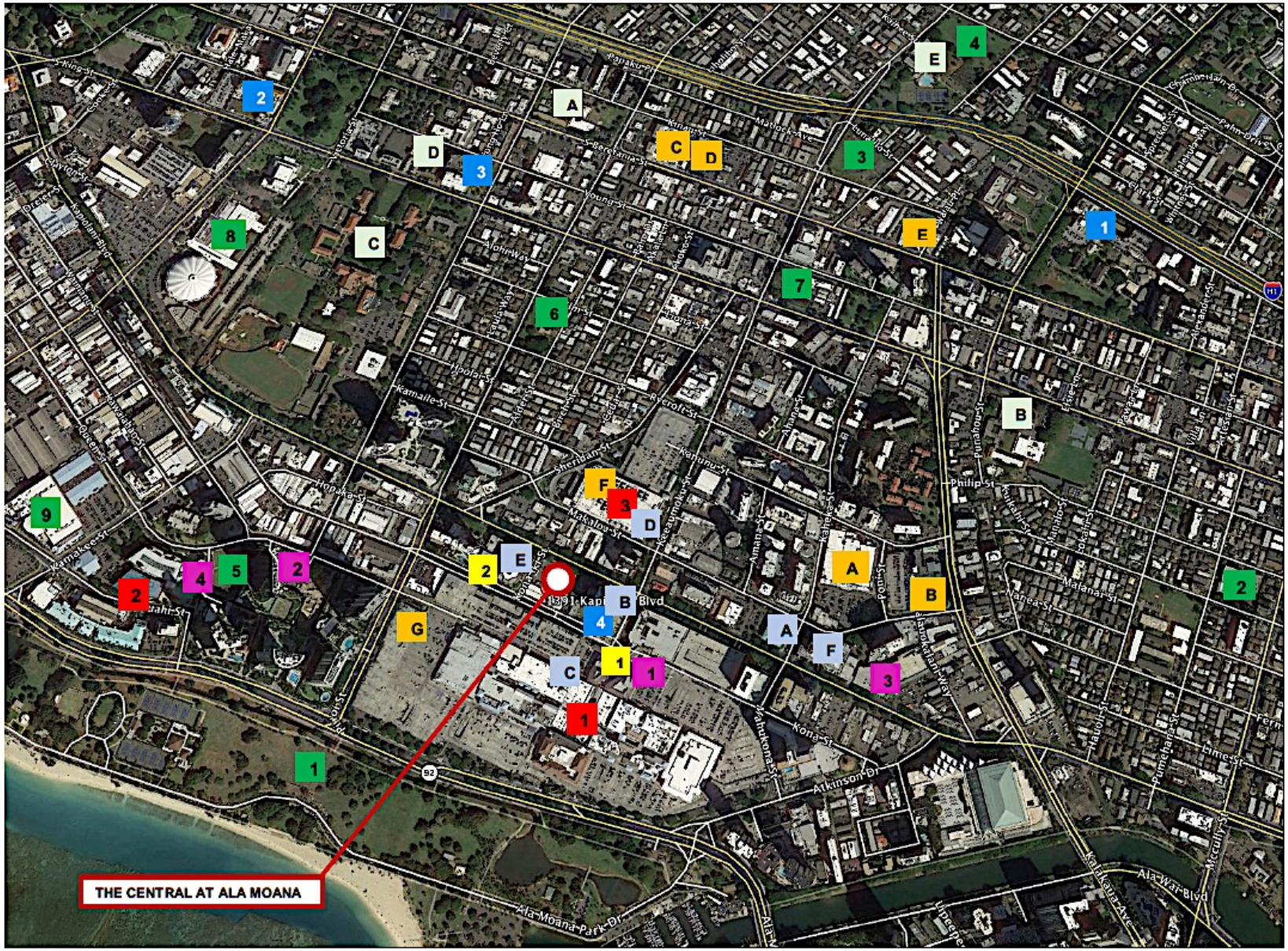
Educational facilities are also located nearby. McKinley High School, which provides high school and adult educational programs, is located two blocks or about one half mile Ewa of The Central. Kaahumanu School, which serves elementary education needs, is located about one half mile mauka on Beretania Street, and Washington Middle School which serves students in that transitional period between elementary and high school is located a little over a half mile away on South King Street.

At least seven public parks, from Queen Park in Kakaako to McCully District Park are within a mile of the project, with most located within a half to three-fifths of a mile of the project site in the Sheridan, Makiki, and Pawaa areas. The richly landscaped Ala Moana Regional Park, which offers beach and water recreation as well as numerous informal sport fields, multiple tennis courts, picnicking areas, and a garden pavilion with large indoor function spaces and landscaped courtyards, capable of hosting major community, professional, or civic events is only about a quarter of a mile, a leisurely walk for many, from the project. In addition to these public recreation resources, Blaisdell Center, which offers a wide range of cultural and civic performances at its multiple venues is located just beyond McKinley High School. Finally, the Ward Entertainment Center, reachable by car or a leisurely walk, provides a year-round, wide-ranging selection of first run movies. Both are a little over a half-mile from the project site.

Table 7 lists some of these services and facilities and their approximate linear distances from the project site. Figure 32 shows their locations.

Facility Type		Facility Name	Distance	KEY
Supermarket/Grocery Store		Don Quijote	0.36 mi.	A
		Palama Market	0.42 mi.	B
		Safeway Supermarket	0.60 mi.	C
		Times Supermarket	0.61 mi.	D
		Foodland Supermarket (Beretania Street)	0.62 mi.	E
		Sam's Club	0.12 mi.	F
		Foodland Farms (Ala Moana Center)	0.16 mi.	G
Major Retail Shopping		Ala Moana Center	0.06 mi.	1
		The Ward Centres	0.44 mi.	2
		Walmart	0.12 mi.	3
Schools	Elementary	Kaahumanu Elementary School	0.59 mi.	A
	Middle	Washington Middle School	0.58 mi.	B
	High	McKinley High School	0.48 mi.	C
Child Care		First Chinese Church of Christ	0.57 mi.	D
Public Library		Makiki Library	0.57 mi.	E
Healthcare		Kapiolani Medical Center for Women & Children	0.80 mi.	1
		Straub Clinic and Hospital	0.75 mi.	2
		Kaiser Permanente Honolulu Clinic	0.47 mi.	3
		Private Medical Services (Ala Moana Building.)	0.09 mi.	4
Park/Playground/ Entertainment		Ala Moana Regional Park	0.25 mi.	1
		McCully District Park	0.80 mi.	2
		Cartwright Park	0.66 mi.	3
		Makiki District Park	0.65 mi.	4
		Queen Park	0.40 mi.	5
		Sheridan Community Park	0.29 mi.	6
		Pawaa Park	0.44 mi.	7
		Neal Blaisdell Center	0.60 mi.	8
		Ward Entertainment Center	0.63 mi.	9
Personal Training		Planet Fitness	0.12 mi.	1
		Island Club and Spa	0.33 mi.	2
		24-Hour Fitness Kapiolani	0.32 mi.	3
		Core Power Yoga	0.43 mi.	4
Bank/Financial Institution		First Hawaiian Bank	0.26 mi.	A
		Bank of Hawaii (Ala Moana Building)	0.09 mi.	B
		Territorial Savings Bank (Ala Moana Center)	0.11 mi.	C
		American Savings Bank (Walmart)	0.12 mi.	D
		American Savings Bank (Kona Iki Street)	0.04 mi.	E
		American Savings Bank (Pan Am Building)	0.31 mi.	F
Public Transportation		Current Bus Transfer & Distribution Center (Ala Moana Center: Kona and Keeaumoku Sts.)	0.11 mi.	1
		Proposed HART Ala Moana Station	0.06 mi.	2
Employment Centers		Kakaako	0.45 mi.	A
		Ala Moana Center	0.06 mi.	B

Table 7: Proximity to Services, Schools, Shopping and Recreational Opportunities (Keyed to Figure 32: The Central Ala Moana Location Map)


THE CENTRAL AT ALA MOANA
1341 Kapiolani Blvd
Ala Moana Park Dr
Atkinson Dr
Kona St
Ala Wai Blvd
Kalakaua Ave
Kamakee St
Kamaile St
Piikoi St
Keeaumoku St
Makaloa St
Sheridan St
Ryerson St
Kawaiahao St
Kapuaiwa St
Alohea St
Hopaka St
Hoolai St
Young St
Beretania St
Kinau St
Makee Rd
Punahou St
Philip St
Kaiulani St
Kaheka St
Ala Moana Blvd
Ala Wai Blvd
Kuhio Ave
Kalakaua Ave
Lipeepe
Ala Wai
Kapahulu Ave
Paoakalani Ave
Kuhio Ave
Kalakaua Ave
Kapahulu Ave
Kapahulu Ave
Kalakaua Ave
Kuhio Ave
Kapahulu Ave
Kalakaua Ave
Kuhio Ave
Kapahulu Ave
Kalakaua Ave
Kuhio

3. THE AFFECTED ENVIRONMENT, POTENTIAL IMPACTS AND MITIGATIVE MEASURES

This chapter documents existing environmental conditions at and adjacent to the project site, any potential project-related impacts that may occur, and any mitigative measures that may be necessary.

3.1 CLIMATE

The Central is located on the southern coastal plain of the island of Oahu, in the lee of the Koolau Mountains which partially shelter it from some of the strongest effects of the Hawaiian Island chain's historically prevalent northeast winds ("tradewinds") and a portion of the precipitation they often carry. With this protection, the coastal plain generally enjoys the "gentler" effects of the tradewinds, while the relatively warm ocean water nearby contributes to its prevalently warm general climate. With minor variations, climatic conditions remain relatively constant throughout the year, with somewhat cooler periods during fall and winter months and warmer periods occurring during late spring and summer. Temperatures generally range between 70 to 90 degrees Fahrenheit, with an average annual temperature of 77.6 degrees Fahrenheit. Average annual rainfall is 17.13 inches per year. Average high temperatures range between 80 – 90 degrees Fahrenheit while average low temperatures range between 65 – 75 degrees Fahrenheit.

With its location near the coast, The Central's project site experiences less rain and more sunlight and warmth than occur in the higher and more inland valleys and ridges overlooking the city. The warmer conditions which typify this location are emphasized by the highly urbanized character of the general area, in which the reflective surfaces of the built environment can have a noticeably warming effect on their immediately surrounding environs.

(*Source: National Oceanic and Atmospheric Administration, usclimatedata.com, rss weather.com, redorbit.com)*

Potential Impacts and Mitigative Measures

The Central will be located in an already highly developed area characterized by a mixture of low rise buildings and numerous high rise structures, where the high presence of reflective surfaces accentuate coastal Honolulu's typically warmer climatic conditions. Intended City policy for urban intensification of the Ala Moana area, if implemented, will increase development intensity, creating a greater frequency of taller structures and reflective surfaces. Numerous

proposals at various stages of development involving tall structures and intense utilization of their sites have emerged in the immediate vicinity of the project and the Ala Moana area in general in response to this anticipated City policy. Given the existing development pattern, intended City policy, and the presence of numerous development proposals in the area, the Project, by itself, is not expected to significantly alter the area's general climatic conditions.

A preliminary study of project shadow patterns with descriptive summaries of its findings conducted in 2017 is presented as Appendix M of this document. The intent of the solar study is to visualize shadows cast by the building and to understand the sun's position in relation to The Central throughout the day and year. The study simulates the solar effects the building would have on its context after completion. This solar study simulates the sun's position from 8:00am to 6:00pm on each equinox (March 21st and September 21st) and solstice (June 21st and December 21st). The studies show that during the early morning hours (approximately 8:00am) of the Spring (March) and Autumn (September) equinox and the summer solstice (June), principal shadows would be cast approximately southwest toward Kona Street and the American Savings Tower. During the afternoon hours of both equinoxes and the summer solstice, shadows would be cast generally northeast across Kapiolani Boulevard. During the winter solstice (December) when the sun is lowest in the sky, principal shadows would be cast northward in an arc from west (in the morning) across properties already occupied by tall buildings (the American Savings Bank and Uraku Tower) to east (in the afternoon), where shadows would be cast mostly directly across Kapiolani Boulevard. Where shadows cross the surfaces of adjacent towers, it is expected that they will have cooling effects on the interiors of those buildings, possibly mitigating the warming effects of urbanization in the immediate area.

A preliminary wind study, presented as Appendix L of this document, developed a preliminary assessment of the effects of pedestrian-level wind at the project site, based on meteorological data for Honolulu, preliminary analyses of the site, and the wind consultant's experience with other wind studies for high-rise structures in Honolulu. The study acknowledged that wind speed comfort is subjective, but offered the following criteria that the investigators had applied successfully to projects involving similar uses:

- Wind speed of 7 miles per hour ("mph") not exceeded more than 10% of the time: comfortable for outdoor seating and quiet activities;
- Wind speed of 11 mph not exceeded more than 10% of the time: comfortable for standing and leisure walking
- Wind speed of 12 – 15 mph: suitable for walking or other active uses

The study found that the existing site in its current condition, like those adjacent to it, already experiences naturally breezy conditions with typical wind speeds of 7.5 – 12.5 mph. These conditions fall into the first three wind speed comfort criteria.

After analysis of the project as currently proposed, the study found that “the proposed development is anticipated to have a wind speed range of 7 - 15 mph, a range that covers an accommodation of activities ranging from outdoor seating/quiet activities to walking or other active uses. It anticipated no points at the site after development that would be close to "exceeding the hazard condition (ie.: mean exceedence speed of 36 mph.)",

As a result, the study found that "the proposed development is anticipated to have a generally benign impact on the off-site and on-site PLW (pedestrian-level wind environment)”, for the following reasons:

1. *The building has a heavily articulated facade that can be expected to limit acceleration of downwashing wind...The east and west facades do not have balconies, but the ribbing and fins on these sides of the building should help disrupt downwashing wind. The articulation on each facade of the building is expected to limit wind speed acceleration at the ground level and on the podium.*
2. *There is a significant ‘eyebrow’ (the projecting canopy just above storefront windows and door openings) at the approximate ground floor ceiling line. These offsets or eyebrows (along the street faces of the tower and parking garage) are expected to disrupt the downwashing wind and reduce direct impact to pedestrians at ground level.*
3. *Although there are other high-rise buildings in the vicinity, there is also a significant amount of open space around each building as well as a mix of varying building heights. Both factors help prevent wind acceleration. Wind tunnel tests in similar environments show that the influence of tall structures is usually limited to areas immediately adjacent to or directly on the site.*
4. *For the most part, the amenity deck is shielded from prevailing winds by the residential tower.*

The study also found that the distance between the recreation deck and tower would assist in disrupting any downwashing wind effects on the deck and that the depth of the space between the parking garage and the tower might help “stagnate” downwashing wind.

Further considerations in studying the potential effects of wind on the project site are the proposed planting areas which define the plaza space and distinguish it from the public sidewalk along the Kapiolani frontage, and the perimeter landscaping on the recreation deck. Both sets of landscaping can employ tall, closely planted linear landscape material that can serve as wind screens to mitigate the effects of onsite breezes.

3.2 TOPOGRAPHY

The site is predominantly a paved parking lot occupied by two single-story buildings. It is very flat with ground elevations ranging from 5.3 to 6.1 feet above mean sea level ("MSL") as defined by the Hawaii state plane coordinate grid system, Zone III. The average existing parking lot surface elevation is 5.5 feet MSL.

Potential Impacts and Mitigative Measures

As the project's finished grading will result in a relatively flat site, it is not expected that any major alterations to existing topographic characteristics or export/import of soil will be necessary.

3.3 SOILS

The soil type at the project site is identified in the U.S. Department of Agriculture, Soil Conservation Service Survey as "Fill Land, mixed (FL)". This type of soil occurs mostly near Pearl Harbor and Honolulu areas adjacent to the ocean. It consists of areas filled with material dredged from the ocean or hauled from nearby areas or other offsite locations. As this type of soil is present in the coastal plain where much urbanization is and will continue to be, it is present in many urban development settings as surface layers and is used for those purposes.

The surface fill layer generally consists of soft to medium stiff silty clays and loose to medium dense clayey gravel extending to depths of about 4.5 – 6 feet below existing ground surface. Lagoonal deposits generally consisting of very loose to loose silty and/or clayey sands and gravel occur under this fill layer to depths of approximately 18 – 22 feet below existing grade. Coralline materials occur below the lagoonal deposits, generally consisting of interbedded loose to dense sandy and gravelly coralline detritus and soft to medium hard coral formation. These coralline materials were found at depths of 151 feet by the project geotechnical consultant.

Onsite geotechnical borings encountered groundwater at 3.8 – 4.5 feet below existing ground level. With the site's proximity to the ocean, groundwater level fluctuations probably occur in response to tidal fluctuations or introductions of water onto the site as a result of varying surface conditions such as precipitation, surface water runoff, or other factors. Figure 33 displays a soils map of the general project area.

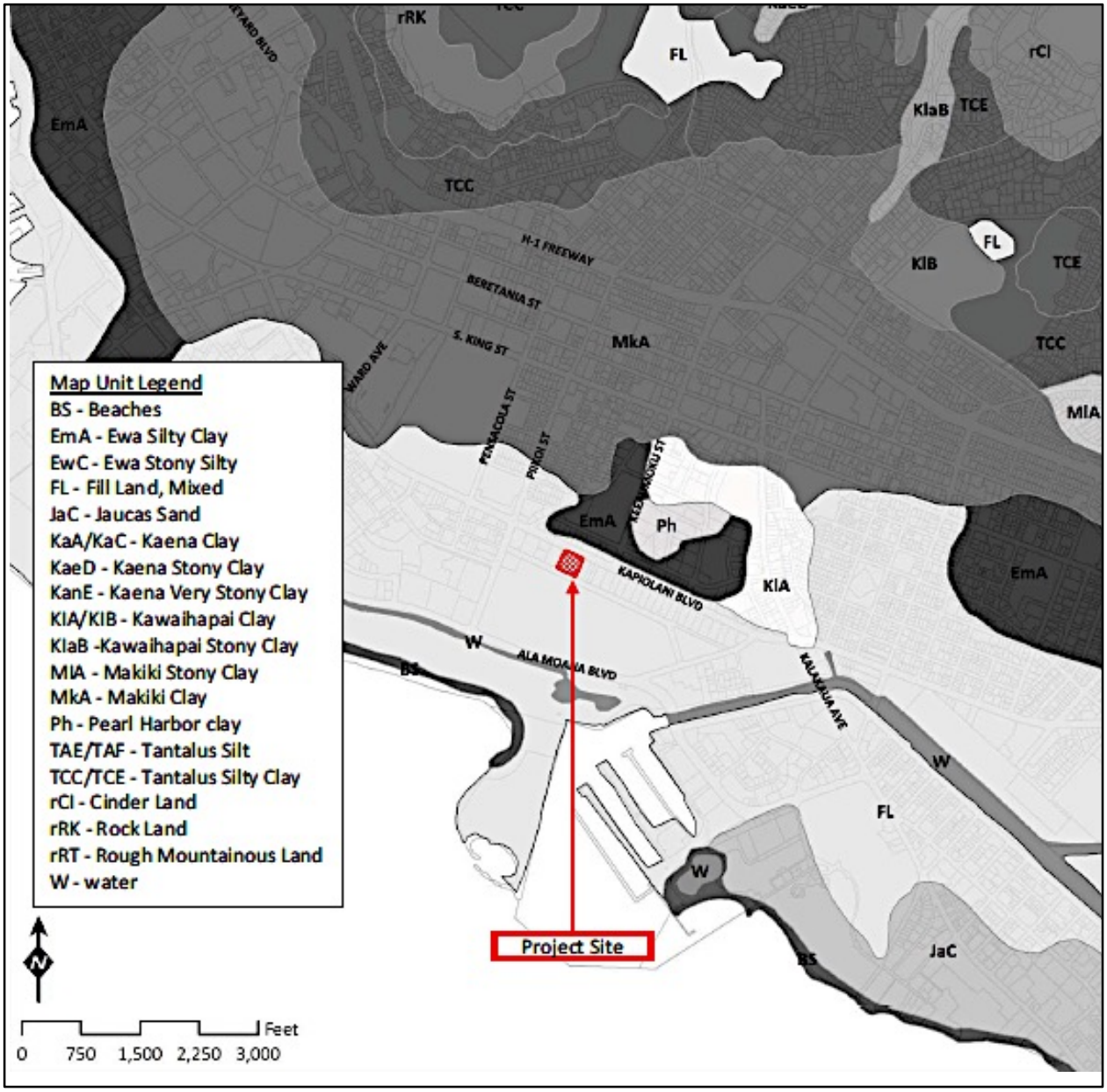


Figure 33: Soils Map of the General Project Area

Predictive studies have postulated that climate change may cause future elevations of sea levels and groundwater in areas near the coast. However, estimates of sea level rise vary

widely among existing sources. The United States Army Corps of Engineers ("USACE") Sea Level Change Curve Calculator for the Honolulu area provides low, intermediate, and high estimates of sea level rise between the years 2000 – 2100. The low estimate is 0.5 feet; the intermediate estimate is approximately 1.6 feet. The high estimate is approximately 4.8 feet.

The School of Ocean and Earth Science and Technology ("SOEST") at the University of Hawaii at Manoa estimates best and worst cases of sea level rise. It estimates a 1-foot sea level rise by 2040 ("worst case") or 2050 ("best case). It estimates a 2-foot sea level rise by 2050 ("worst case") or 2070 ("best case"). Finally it estimates a 3-foot sea level rise by 2070 ("worst case") or 2090 ("best case"). *The Hawaii Sea Level Rise Vulnerability and Adaptation Report*, adopted by the Hawaii Climate Commission in December 2017, projects a climate change-driven sea level rise of 3.2 feet over the next 30 - 70 years (approximately, years 2050 - 2090).

Given this significantly divergent range of projections, it is difficult to predict the precise magnitude of sea level and corresponding groundwater rise at this time. In view of this, it is understandable that no regulations applicable to project design are yet in place to accommodate these potential occurrences. However, the awareness of these possibilities is useful as considerations in further development of the project.

With respect to potential specific to future sea level rise, the project site is located approximately 2,700 feet from the shoreline and its topography ranges from 5.3 – 6.1 feet above current mean sea level. Based on the current ground surface elevation and the Project site's distance from the ocean, it is anticipated that a rise in the level of the ocean itself will not impact the site surface in the foreseeable future. Furthermore, a number of major intervening structures between the project site and the ocean, such as the large horizontal expanses of Ala Moana Center retail and parking structures and the luxury Park Lane housing complex that wraps the Center's Ewa Makai corner will probably buffer any kinetic effects of sea level change.

<u>Potential Impacts and Mitigative Measures</u>

The proposed project will involve grading and site preparation for new paved areas and building footings, but as cited in the Topography discussion above, no major topographical changes are anticipated. Detailed design of the site will take ground water level into consideration. It is anticipated that the new underground wet utility systems that will be installed (water, sewer, and drainage) will not be impacted by sea level rise, due to the design of final site topography and finished grades and the relatively protected, inland location of the site. Building finished floor

elevations will be raised above the base flood elevation, currently established at 6 feet msl, to meet the City's National Flood Insurance Program (NFIP) requirements.

Short term impacts may involve minor soil loss or erosion that may occur during construction, but these potential effects will be controlled as cited below. After construction and the establishment of onsite planting, the site will be stabilized, and soil loss, if any, would be minimal.

All grading operations will be conducted in full compliance with dust, erosion control, and other requirements of the City and County of Honolulu Grading Ordinance and its Administrative Rules related to water quality, and the State of Hawaii Administrative Rules, Section 11-60, 1-33 applicable to fugitive dust. Best Management Practices will be included in construction plans to mitigate dust and/or silt emissions.

3.4 FLORA AND FAUNA

The project site has been highly modified for decades for urban uses, eradicating pre-European natural features and resources. The U.S. Fish and Wildlife Service (USFWS) files and mapped date pertinent to federally “listed species” and designated critical habitat has found no federally listed species or critical habitat “within the immediate vicinity” of the project area of a nearby site. However, its records did indicate a probability that migratory white terns “may nest or transit through the area”. These birds are protected by the Migratory Bird Treaty Act (MBTA) (16 U.S.C. pp. 703-712). USFWS states that these birds often nest in urban parks and residential areas from Hawaii Kai to Hickam Air Force Base. They do not build nests, but lay eggs directly on a ledge, branch, or other suitable location. The young hatchlings take 45 days to be able to leave their hatching location. USFWS recommends examining existing trees or structures slated for disturbance for the presence of white tern prior to commencing activity, and notifying USFWS if such presence is detected. This practice will be followed at the current Project site.

All existing onsite vegetation is introduced. It is sparse and confined for the most part to the mauka site perimeters. Monkeypod trees are the most prominent vegetative features at the project site. One Monkeypod tree stands in a location that will be occupied by the future primary Kapiolani Boulevard driveway access to the project parking garage.

Potential Impacts and Mitigative Measures

Visual inspections to date have not detected the presence of white terns at onsite buildings or trees. However, site inspections will be conducted to determine the presence of white terns prior to existing building demolition and other construction activity.

Project site planning has identified the need to remove the Monkeypod tree standing where the Kapiolani Boulevard project driveway is planned. Through consultation with the City and County of Honolulu, Division of Urban Forestry, Department of Parks and Recreation, the project proposes to replace this tree with another Monkeypod tree to be planted onsite in the Kapiolani Boulevard planting strip at a location Ewa of the existing tree and the proposed driveway.

3.5 ARCHAEOLOGICAL AND HISTORIC RESOURCES

An archaeological inventory survey of the project site, which included an examination of the site's historic and cultural context, was conducted in August 2014 by Cultural Surveys Hawaii, Inc. through document research and onsite surveys via 22 trenches approximately 5.38 - 8.53 feet in depth. Findings are summarized below.

Context

Document research placed the project site in a region identified as Kewalo on early historic maps, an area located between Cooke and Sheridan Streets, mauka of Queen Street. Kewalo is an *ili* located within the Kakaako Ahupuaa. From pre-European accounts of the area, it can be deduced that Kewalo was marshier and less populated than the population centers of Kou (Honolulu) to the west and Waikiki to the east, both of which possessed an abundance of homes, coastal fishponds and large expanses of irrigated farmlands fed by numerous streams originating in the valleys behind these two coastal centers.

Although less populated than its neighboring districts, Kewalo was known for its fishponds, the marshlands where pili grass could be harvested, for ceremonial sites, including sites for human sacrifice, for salt production, and for its connecting trails linking Honolulu with Waikiki. While it supported a resident population, it may have been more a place for the foraging, gathering, production, and possible distribution of resources for living. Figure 34 is an 1817 map showing the salt pans, taro loi, and fishponds in Honolulu and Waikiki, in contrast with the less

developed, marshier character of Kakaako. Figure 35 is an 1887 photograph from Honolulu toward Waikiki, showing the flat expanse of the project area marshlands between them.

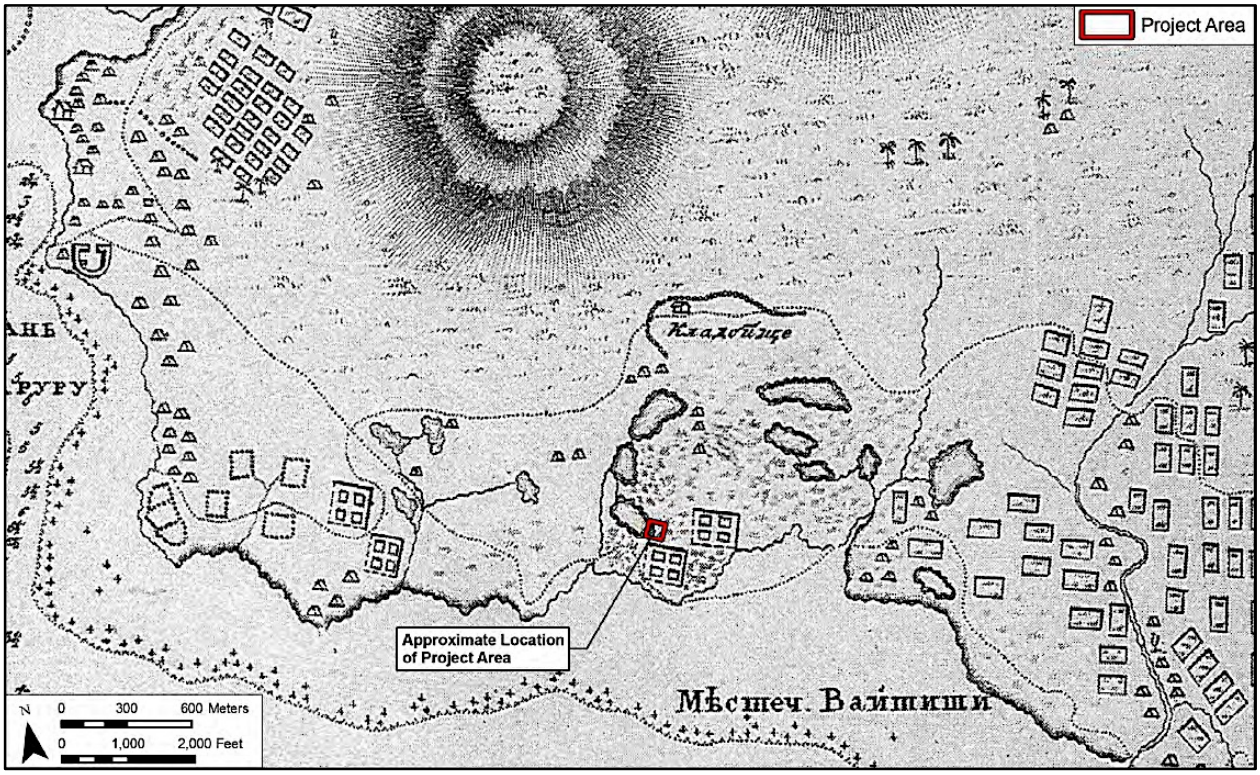


Figure 34: 1817 Map of Oahu from Kou (Honolulu) to Waikiki, Showing Project Site

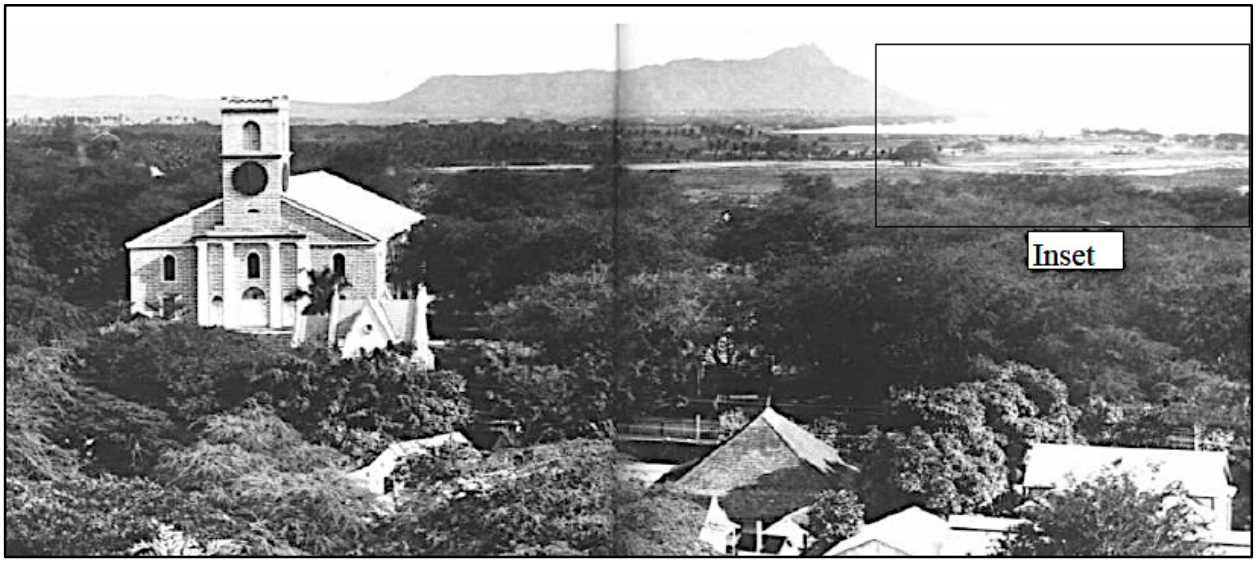


Figure 35: Photo from Kawaiahao Church Toward Diamond Head Showing Project Area

By the mid 1850's, the abandonment of salt pans, the draining of the marshlands had begun. By 1880's, Honolulu began to encroach into areas mauka of Kewalo, and the filling of mud flats, marshes, and salt ponds in Kewalo and the larger Kakaako district was started in order to raise ground levels to prevent the washing away of roadway improvements and to provide drainage to improve sanitary conditions around residential settlements. During the first half of the 20th Century, Kewalo lands were filled to accommodate the further urban expansion of Honolulu. This urbanization has and continues to occur with increasing intensity until present times.

Figure 36 is a 1931 photograph showing the white crushed coral dredging material used in the construction of Kapiolani Boulevard and the filling in of marshy areas. Figure 37 is a 1936 aerial photograph of the project vicinity, reclaimed and developed. Today, lands surrounding the general project area are a record of Honolulu's evolving urbanization.

Figure 36: Crushed Coral Fill in Kewalo Near Project Site, 1931

Figure 37: Project Area, Future Ala Moana Center, and Ala Moana Regional Park, 1936

Findings and Recommendations

Onsite trenching work has revealed heavy disturbance of the project site by past land use activities. Large volumes of imported material had been deposited on the site, reflecting past land reclamation activities. The layers of earth excavated consisted of various manmade surfaces, such as asphalt and concrete over construction grading and fill layers, which lay in turn above historic deposits of trash and sandy clay. Under all these layers, a coral shelf was discovered at the base of all site borings.

A single "historic property" was identified with the project area. It is a subsurface trash layer, consisting of whole and fragmented glass bottles and jars, unidentified metal fragments, wires, ceramic fragments, red brick and ceramic tiles, cinder blocks, lumber, nails, metal barrel remnants, and tire remnants. The site dates to a period around the 1930's - 1950's. The large volume of trash and fill material in the project area reflects past trash disposal and land reclamation activities. Such deposits have been identified throughout the larger Kakaako area. This "historic property" was not determined eligible to the Hawaii Register of Historic Places. It has been designated with SIHP# 50-80-14-7193 and determined "Not Significant". No further cultural resource management work was deemed necessary by the archaeological consultant.

Potential Impacts and Mitigative Measures

The archaeological consultant has found that "the project will not affect a significant historic property"; therefore, CSH's (*Cultural Surveys Hawaii's*) "effect recommendation" for the current project is "no historic properties affected" (in accordance with HAR 13-284-7).

Mitigation Recommendations: Cultural Surveys Hawaii has stated, under this topic: "As there is no project effect, there is no need for any mitigation measures. No further cultural resource management work is recommended.

3.6 CULTURAL RESOURCES

A *Cultural Impact Assessment for the Kakaako Community Development District Mauka Area Plan, Waikiki Ahupuaa, Honolulu (Kona) District, Oahu Island* was prepared in May 2009 as part of the Environmental Impact Statement for the Hawaii Community Development Authority in support of the Kakaako Community District Mauka Area Plan. The “Area of Potential Effect” (APE) for a Cultural Impact Assessment (CIA) is substantially larger than for archaeological

studies. This CIA “extends [from the currently designated Kakaako Mauka Area] to wider associations throughout Waikiki Ahupuaa, Kona District, and beyond”. The Central Ala Moana site lies within a block of the Kakaako District's eastern Piikoi Street boundary, well within this area of coverage.

The study found that the general area between Honolulu and Waikiki was characterized by fishponds, salt ponds, occasional taro loi, and trails connecting Honolulu and Waikiki. The study also noted that Kewalo and the adjacent Kaakaukui and Kukuluaeo districts were traditionally noted for fishponds, salt pans, and marshlands where pili grass grew. Religious rites and resource gathering were also practiced in this general area. Since the APE covers a very wide area, the specific location of these activities and sites may often be elusive.

Potential Impacts and Mitigative Measures:

Activities at and adjacent to the project site have consisted predominantly of increasingly intense urban uses, purposes, facilities and urban character since the early 20th Century. The archaeological inventory, in finding that "the project will not affect a significant historic property", determined that "there is no need for any mitigation measures".

In keeping with the recommendations of the Mauka Area CIA, efforts to avoid impacts on view corridors and existing green spaces should be made, any infrastructure concerns, if they arise, should be addressed with the community prior to development, and community members should be consulted to address and integrate any community concerns that may arise in the design of site improvements.

The Project has identified and addressed its relationship to significant public view corridors identified by the City’s Primary Urban Center Development Plan, which covers the region in which the Project is located. An examination of this relationship found that the Project has no significant impact on these corridors. A summary of this can be found in Section 3.7, *Visual Resources*, immediately following. At present, there are no infrastructure concerns. To address previous wastewater transmission issues, the project owner, SamKoo, was part of a group of property owners which funded improvements to sewer line capacity in and adjacent to the project area to enable adequate sewer line capacity for those properties. SamKoo and its consultants plan to formally consult with the community through the Ala Moana/Kakaako Neighborhood Board to present and discuss the project.

Further community access to the project review process will be possible as the project continues through its requisite entitlement processes, through the formal public review and comment period for this Environmental Assessment and the subsequent Honolulu City Council review process for the 201H application.

3.7 VISUAL RESOURCES

The Central Ala Moana project is located in the Ala Moana District of Central Honolulu, within the region covered by the City and County of Honolulu Primary Urban Center (PUC) Development Plan. The protection of visual resources is included in the first of the Plan's "Key Elements". It states: "*Honolulu's natural, cultural, and scenic resources are protected and enhanced".* Pertinent to this project are the Plan's discussion of panoramic views and the city skyline. Pertinent PUC Development Plan sections addressing this are as follows:

Section 3.1.1.2 Scenic Views

PANORAMIC VIEWS OF NATURAL FEATURES AND LANDMARKS

"Panoramic views are broad vistas from distant vantage points. "

Significant views noted by the Plan are:

- *The Koolau and Waianae Mountain Ranges and their foothills (notably Red Hill and Pu-u Ualakaa, or Round Top);*
- *The Pacific Ocean, Pearl Harbor's East Loch, Ford Island, Honolulu Harbor, Ke-ehi Lagoon and Kewalo Basin, and their respective shorelines; and*
- *The craters of Leahi (Diamond Head), Puowaina (Puchbowl) and Aliamanu.*

Section 3.1.2 Policies

"Establish and maintain an integrated open space network throughout the Primary Urban Center comprised of the following elements:

- **Preserve panoramic views of natural landmarks and the urban skyline.** Preserve views of the Koolau and Waianae Mountain Ranges, Punchbowl, Diamond Head, Pearl Harbor and other natural landmarks. Maintain important view corridors within and across urban Honolulu and keep Downtown as the most prominent feature of the urban skyline.

Section 3.1.3.3 Urban Skyline and Mauka-Makai Views

- Preserve the following panoramic views…
  - From Ala Wai Canal Promenade toward the Koolau Range
  - From Ala Moana Beach Park toward the Koolau Range
  - From Kewalo Basin toward the Koolau Range and Punchbowl
  - From Kakaako Waterfront Park toward Punchbowl and the Koolau Range
  - From Punchbowl Lookout toward Diamond Head

<u>Potential Impacts and Mitigating Measures</u>

Figure 38, taken from the Primary Urban Center Development Plan, illustrates important Central Honolulu view corridors. The applicable view corridor is the mauka view of the Koolaus from Magic Island at Ala Moana Park. The Central will be visible from the shoreline, but it will be among a cluster of tall buildings that will include the Ala Moana Building, American Savings Bank and Uraku Tower east of Piikoi Street, and Hawaii Iki Tower, 1350 Ala Moana, Nauru Tower, Hokua, Koolani, Waihonua, Anaha, Waiea, and Aeo in eastern Kakaako.

It should be noted that with the exception of 1350 Ala Moana, the towers identified in eastern Kakaako are at least 400 feet tall and therefore at least equal in height to the proposed height of The Central Ala Moana. As one addition to an area already characterized by tall buildings, many of which are as tall as it will be, The Central's individual visual impact, by its addition to this grouping, should not be significant. In addition, its location does not fall within or near the two nearest key view corridors of Ward Avenue or the view from Magic Island and it does not stand near the two nearest view

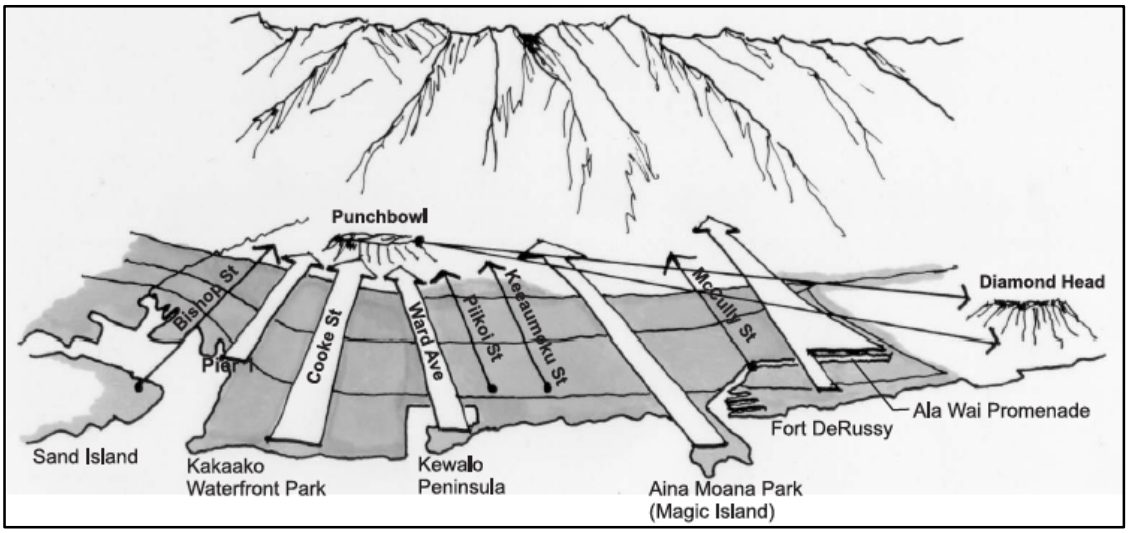


Figure 38: Primary Urban Center Development Plan View Corridor Diagram

corridors of Piikoi or Keeaumoku Streets. Within this context of already tall buildings nearby, The Central Ala Moana as proposed will not be a conspicuous addition to the Honolulu skyline in this area.

The Ewa-Diamond Head orientation of The Central Ala Moana's tower parallel to Kapiolani Boulevard was selected to maximize view opportunities for its residents and to avoid the near-view impacts of a mauka-makai orientation. In the context of the project's surroundings this would not vary from the predominant pattern of orientations already existing in the Ala Moana and nearby Kakaako Districts. Immediately east of the project site, the broad profile of the American Savings Tower and the Ewa-Diamond Head orientations of Uraku Tower and the Hawaii National Bank Building have already established a pattern of presenting broad mauka-makai profiles. Further Ewa in the nearby Kakaako District, this presentation of broad profiles toward the mauka or makai direction is continued with the diagonally oriented (in comparison to mauka-makai or Ewa-Diamond Head orientations) Waihonua, Koolani, and Moana Pacific towers and the Ewa-Diamond Head orientations of Hokua and Nauru towers.

Additional considerations in the selection of The Central Ala Moana's tower orientation were project function, financial feasibility, and potential near-view and privacy impacts on its own and neighboring future occupants. To achieve financial feasibility, the project's residential tower and parking structure are separate, free-standing structures connected only by bridges between elevated parking garage floors and corresponding tower elevator lobbies. This avoids the added costs of accommodating differing structural requirements and the more involved routing of technical support systems (mechanical, electrical, etc.) through buildings with differing technical requirements if the tower and parking garage were merged vertically, one on top of the other. Making the tower an independent, freestanding structure in which construction is allowed to start at-grade also allows for the use of a highly economical tunnel form construction system to be employed in the most economical way. This strategy is essential to the financial feasibility of the project as a predominantly affordable housing offering featuring generously proportioned, quality living units.

If the tower were to be oriented mauka-makai, the entire project configuration would have to be rotated 90 degrees. This would bring an end wall of the parking structure very close to Kapiolani Boulevard, thus presenting the large mass of a service element (an end wall of the parking garage) to the "front door" face of the project, and close enough to the street to conflict with the canopies of the existing monkeypod trees. In this orientation, the tower would stand

very close to Kona Iki Street and probably less than 100 feet from the American Savings Bank Tower if it were to be placed Ewa of the parking structure, or very close to a neighboring tower to the east if the adjacent three parcels Diamond Head of the project site were to be consolidated and developed to hold a tower of its own. If that latter option were to occur, a tower on the adjacent parcel to the east would probably be centered on the site to maximize its distance from neighboring towers to either side of it. If that were to happen, that tower would be about 70 feet from the face of The Central Ala Moana, or less than one-fifth the width of the height of the two towers (assuming tower heights of 400 feet), creating a proportionally "closet like" visual separation between the long "faces" of two tall buildings, in which the predominant near-view experience for occupants in the facing sides of both towers would be the tower next door. The potential view and privacy impacts could be substantial.

If The Central Ala Moana were to be oriented mauka-makai and centered on its site to maximize its distance from neighboring towers to the east and west, it would have to be placed on top of its parking garage in order for both project elements to fit. Given the height of the parking garage, this would increase the building's height by at least about 100 feet, resulting in a project approximately 500 instead of 400 feet tall in order to maintain the unit count needed for financial feasibility, creating a far greater skyline impact than The Central Ala Moana's currently proposed site positioning. In addition, employing this configuration would necessitate the accommodation of two different sets of structural requirements, a more involved routing of ductwork for necessary building technical systems, and the employment of a different, probably more expensive method of construction. As a result, despite maintaining the needed unit count, these functional consequences would severely impact and by themselves probably eliminate the economic feasibility of The Central Ala Moana as an affordable housing project offering 60% of its units as affordable.

In view of these considerations, the current orientation of The Central Ala Moana as proposed minimizes its impact, if any, on the Honolulu skyline, enables its economic feasibility, and maximizes its benefit to its future residents and neighbors.

3.8 ROADS AND TRAFFIC

The Central Ala Moana will be located in an area of high vehicular and pedestrian activity. The immediate area has been proposed for increased densities under the City’s draft Ala Moana

Neighborhood Transit-Oriented Development Plan. To assess future traffic in the immediate project area and the potential effect the project may have on it, a *multi-modal* Traffic Impact Analysis Study which considered motorized vehicular traffic, public transit, bicycle, and pedestrian patterns of use was commissioned. Its findings and recommendations are included in this document as Appendix H: *Traffic Impact Analysis* (TIA), completed December 27, 2017. The following narratives addressing existing and future conditions are based on this Study.

The Existing Context

Transportation Network

Vehicular Facilities: The surrounding transportation network consists of a gridded network of streets. The Ala Moana Neighborhood Transit-Oriented Development Plan, Existing Conditions Report (RTKL, August 2012) states that the transportation network is disrupted by the existence of "superblocks" (large blocks that interrupt the street grid). These superblocks concentrate vehicular volumes at major intersections resulting in long signal timing cycle lengths of 120 seconds and strained capacity. They also make it difficult to maintain connectivity and mobility for other transportation modes.

Buses and Heavy Vehicles: Ala Moana Center is the primary transfer point for TheBus system with a transit center located along Kona Street, adjacent to the Ala Moana Center. Buses that service this area include Routes: C, 6, 8, 23, 40, 52, 53, 55, 56, 57, 57A, 62, 65, and 88A. Additional buses that stop along Kapiolani Boulevard in the project area include Routes: A, 3, 9, 13, 17, and 18. Private buses and trolley services also have stops within the Ala Moana Center parking garages.

Pedestrian Facilities: Sidewalks with landscaped planter strips separating vehicular travel lanes from pedestrian line both sides of Kapiolani Boulevard along most of its length. Along Kona Iki Street, unlandscaped sidewalks run along both sides of the street. Marked crosswalks exist at most major intersections, equipped with pedestrian-actuated walk signals.

At two locations adjacent to TheBus transit center at either side of the Keeaumoku Street intersection, fences along the raised street median are intended to prevent pedestrians from crossing at unmarked locations.

The sidewalk fronting the project site is narrow. It has a landscaped planter strip on its outboard edge, separating pedestrian and vehicular zones of traffic. The City and County of Honolulu is systematically implementing its "Complete Streets" program as part of an initiative to make Oahu more "pedestrian-friendly". Under this program, sidewalks in busy, pedestrian-heavy areas like Kapiolani Boulevard would have 5-foot sidewalks.

Bicycle Facilities: *The Oahu Bike Plan, A Bicycle Master Plan* (2012) has no designated bike paths, lanes, or routes on Kapiolani Boulevard. However, the Urban Core Complete Streets project has future bicycle accommodations planned for Kapiolani Boulevard.

Ease of bicycling in the project vicinity is not optimal because of the lack of designated bikeways, the presence of heavy traffic, and narrow sidewalk widths. King Street, the next major street mauka of Kapiolani Boulevard, has a two-way protected bikeway for east-west travel. A bike route exists along Young Street and a bike path is adjacent to Ala Moana Boulevard. The latter two facilities are one quarter of a mile mauka and makai from the site. Future mauka-makai bikeways on Piikoi and Keeaumoku Streets are indicated in the Oahu Bike Plan. The absence of existing designated/dedicated bikeways in the project area and the fact that bicycles in the TIAR study area must share travel surfaces with pedestrians or other types of vehicles makes it difficult to measure specifically bicycle-attributable patterns of uses.

Geometric Configuration

Intersection Configuration: Considering existing traffic movements in the project area and the anticipated impact of the proposed development, the following 6 intersections were selected for study:

- Kapiolani Boulevard and Piikoi Street
- Kapiolani Boulevard and Kona Iki Street
- Kapiolani Boulevard and Keeaumoku Street
- Kona Street and Piikoi Street
- Kona Street and Kona Iki Street
- Kona Street and Keeaumoku Street

Roadway Configuration: Kapiolani Boulevard is an urban arterial owned by the City and County of Honolulu ("City") that runs Ewa-Diamond Head. In the project vicinity, it is a six-lane, undivided signalized arterial with a 35 mph posted speed limit. On-street parking is prohibited from 6:00AM - 6:30PM. During the AM peak period the corridor is coned for contraflow operations, providing an additional lane for approximately 2.3 miles in the Ewa-bound direction between the H-1 Freeway near South King Street to west of Ward Avenue. Left turns are prohibited for the Diamond Head direction during the AM contraflow. During the PM peak period, an additional contraflow lane is provided in the Diamond Head-bound direction between Pensacola Street to McCully Street. Left turns are prohibited for the Ewa-bound direction during the PM contraflow.

Driveway accesses to existing properties in the project area, including the subject project site, are prevalent along Kapiolani Boulevard and have no mid-block dedicated turn lanes. Kapiolani Boulevard serves as a major bus route with no bus pullouts. Fronting the property, sidewalks exist along both sides of the street, with various widths and an 11-foot landscaped area providing a buffer from vehicular travel lanes.

Keeaumoku Street runs mauka-makai between Kona Street and Nehoa Street. Between Kapiolani Boulevard and Nehoa Street, it is a six-lane, undivided minor City arterial with a 30 mph posted speed limit. At the Kapiolani Boulevard intersection, two of its lanes continue as a ramp into Ala Moana Center as a private driveway, with the remaining lanes continuing at grade into the Center to Kona Street.

Keeaumoku Street also provides access to the westbound lanes of the H-1 freeway via Lunalilo Street. Parking is permitted in sections along both sides of the street except for some restrictions during the PM peak traffic periods. Wide sidewalks line both sides of the street.

Kona Street between Piikoi Street and Keeaumoku Street is a four-lane roadway owned by General Growth (owners of Ala Moana Center) that runs Ewa-Diamond Head with a posted 15 mph speed limit. It serves as a primary access to most of the Center's mauka parking garages.

The Ala Moana bus transit center is located along Kona Street between Kona Iki and Keeaumoku Streets. It contributes to a high volume of bus and pedestrian traffic along Kona Street. Stop signs, cross walks, and speed bumps have been located at various points along the street to slow traffic. Sidewalks exist along both sides of the street, but frequent driveways

create numerous conflicting circulation situations. Sidewalk widths range from four feet near store fronts and business entrances to up to 25 feet at bus stop locations.

Kona Iki Street is a two-lane, General Growth-owned road which connects Kona Street with Kapiolani Boulevard, primarily serving as an access road for Ala Moana Center parking garages and adjacent properties. Sidewalks line both sides of the street. Parking is prohibited along Kona Iki Street.

Traffic Volumes

The area in which the project is located has high vehicle and multi-modal "movements". The Ala Moana area is considered to have a high concentration of transit-dependent households.

Vehicular Volumes: Traffic volumes which included passenger and other motorized vehicles along Kapiolani Boulevard have been recorded at 41,300 vehicles during a 24-hour period during November 1 and 2, 2017. Peak traffic hours occurred during 7:45 - 9:45 AM and 4:45 - 6:45 PM during this period.

Bus and Heavy Vehicle Volumes: Heavy vehicle traffic movement comes primarily from TheBus public transit service, tourist buses and trolleys, and delivery trucks. Daily volumes are considerable.

Pedestrian and Bicycle Volumes: Large pedestrian volumes were recorded at the study intersections during the AM and PM peak traffic hours. This was considered a result of the area being an urban district with high employment and residential accessibility. A large number of pedestrians were observed generated at TheBus transit center at Ala Moana Center. The lack of designated bikeways in the traffic impact study area resulted in bicycles often using sidewalks as routes.

Quantitative traffic volume tables are presented in the Traffic Impact Analysis in Appendix H of this document.

Levels of Service

"Level of Service" is a traffic operational analysis intended to measure the effectiveness of roadway operating conditions. Appropriate LOS levels for urban roads as defined by *A Policy on Geometric Design of Highways and Streets* (AASHTO, 2011), and as defined by the Highway Capacity Manual, is shown in *Table 8: LOS Definitions*. LOS evaluations which follow are taken from the *Traffic Impact Analysis* presented in this document as Appendix H.

LEVEL OF SERVICE	DEFINITION
A	Free Flow; Traffic flows at or above the posted speed limit and motorists have complete mobility between lanes; high level of physical and psychological comfort.
B	Reasonably Free Flow; LOS A speeds are maintained, maneuverability within the traffic stream is slightly restricted.
C	Stable Flow, at or near free flow; Ability to maneuver through lanes is noticeably restricted and lane changes require more driver awareness.
D	Approaching Unstable Flow; Speeds slightly decrease as traffic volume slightly increases. Freedom to maneuver within the traffic stream is much more noticeably limited and driver comfort levels decrease.

Table 8: LOS Definitions

The Traffic Analysis Report assessed existing (2017) and projected future circulation (traffic) operational efficiencies for existing and future conditions in the area of the project site. It projected 2024 conditions, when the project would be completed, and 2030 conditions, 5 years after the projected build-out of the Honolulu Rail Transit System.

For 2030, the study assumed that Ala Moana would continue to be a dominant bus transfer center on Oahu, and that with the rail system in place, there would be a need for a substantial increase in the number of buses serving the location. It also assumed improved pedestrian facilities for rail access, increased sidewalk capacity, and enhanced street crossing safety. Finally, the study assumed improved facilities for bicycle circulation and storage.

The tables which follow display levels of service for vehicles and pedestrians at unsignalized and signalized intersections for existing (2017) conditions and future (2024) conditions when project completion is estimated. Level of Service categories have been specifically defined for unsignalized (4-way stops) and signalized intersections. These categories are explained in Appendix H: *Traffic Impact Analysis.* Additional qualitative analyses of bus and heavy vehicle traffic conditions are also presented there.

In summary, the Level of Service categories were determined by a "volume to capacity" (v/c) ratio: the ratio of the volume of traffic using the intersection compared to the maximum volume of vehicles that can be accommodated by the intersection during a specific period of time. A v/c ratio under 0.85 meant that an intersection was operating under capacity and excessive delays were not experienced. A v/c ratio of 0.85 - 0.95 meant an intersection was operating near capacity. Unstable traffic flows were expected when the v/c ratio was between 0.95 - 1.0. Any v/c ratio equal to or greater than 1.0 indicated that the intersection was operating at or above its capacity. This would result in an LOS of "F".

Vehicular Levels of Service

The tables below indicate LOS criteria for unsignalized and signalized intersections.

Average Control Delay (sec./vehicle)	LOS by v/c Ratio	
	</=1.0	**>1.0**
</=10.0	**A**	**F**
>10 & </=15	**B**	**F**
>15 & </=25	**C**	**F**
>25 & </=35	**D**	**F**
>35 & >/=50	**E**	**F**
>50	**F**	**F**

Table 9: LOS Criteria for Unsignalized Intersections

Average Control Delay (sec./vehicle)	LOS by v/c Ratio	
	</=1.0	**>1.0**
</=10.0	**A**	**F**
>10 & </=20	**B**	**F**
>20 & </=35	**C**	**F**
>35 & </=55	**D**	**F**
>55 & </=80	**E**	**F**
>80	**F**	**F**

Table 10: LOS Criteria for Signalized Intersections

Intersection LOS analysis distinguished between the different movements made through intersections. Diagrams of the various possible movements that were analyzed are presented in the actual Traffic Impact Analysis in Appendix H. For brevity, this summary will present only

the LOS scores corresponding to the range of movements that took place at the report's Study Intersections.

Movements through the Study Intersections were indicated as follows:

- T: Through
- R: Right
- LT: Shared Left/Through
- TR: Shared Through/Right
- LTR: One Lane for all Movements (usually describes a driveway or minor street)

Existing and Projected 2024 Vehicular LOS scores are shown in Tables 11 and 12:

Vehicular LOS Comparisons: Unsignalized Intersections								
INTERSECTION			EXISTING CONDITIONS		2024 CONDITIONS			
					W/out Project		With Project	
Name	Approach	Movem't	AM	PM	AM	PM	AM	PM
Kona Street & Kona Iki Street	Northbound	LT	A	B	B	B	B	C
		TR	A	B	A	B	A	B
	Eastbound	LT	A	B	B	B	B	B
		TR	A	B	A	B	B	B
	Westbound	LT	B	B	B	C	B	C
		TR	B	B	B	C	B	C
	Southbound	LTR	B	B	B	C	B	C
Kona Street & Keeaumoku Street	Northbound	T	B	B	B	C	B	C
		TR	B	C	B	C	B	C
	Eastbound	T	B	C	B	D	B	D
		TR	B	C	B	C	B	C
	Westbound	T	B	C	B	D	B	E
		TR	B	C	B	E	B	F
	Southbound	LT	B	C	B	C	C	C
		T	B	B	B	C	B	C
		R	A	B	B	C	B	C

Table 11: Current and 2024 Levels of Service at Unsignalized Intersections

Vehicular LOS Comparisons: Signalized Intersections								
INTERSECTION			EXISTING CONDITIONS		2024 CONDITIONS			
					W/out Project		With Project	
Name	Approach	Movem't	AM	PM	AM	PM	AM	PM
Piikoi Street & Kapiolani Boulevard	Eastbound	T	B	C	B	C	B	C
		TR	B	C	B	C	B	C
	Westbound	LT	B	P*	A	P*	A	P*
		T	B	A	A	A	A	A
		TR	B	A	A	A	A	A
	Northbound	L	C	A	C	B	C	A
		T	D	B	D	B	D	B
		R	C	B	C	B	C	B
Kona Iki Street & Kapiolani Boulevard	Eastbound	T	B	A	A	A	A	A
	Westbound	R	C	A	A	A	A	A
	Northbound	LR	D	C	D	C	D	C
Keeaumoku Street & Kapiolani Boulevard	Eastbound	T	D	B	C	C	C	C
		R	E	A	C	A	C	A
	Westbound	T	C	C	C	C	C	C
	Northbound	T	C	D	C	D	C	D
		R	C	C	C	D	C	D
	Southbound	LT	C	D	C	D	C	D
Piikoi Street & Kona Street	Eastbound	TR	C	C	C	C	C	B
	Westbound	L	C	C	C	C	C	C
		LT	C	C	C	C	C	C
		R	C	C	C	C	C	C
	Northbound	LTR	B	C	B	C	C	C
	Southbound	TR	C	C	C	C	C	C

Table 12: Current and 2024 Levels of Service at Signalized Intersections

***P =** prohibited

Pedestrian Levels of Service

The evaluation of pedestrian facilities considered pedestrian speed and perceived comfort as represented by available pedestrian space, delay, and LOS. At signalized intersections performance was evaluated separately for each crosswalk and intersection corner to consider the pedestrian's travel through an intersection. Performance measures included corner circulation area, crosswalk circulation area, pedestrian delay, and pedestrian LOS score. Table 13 displays the range of scores associated with each LOS for a pedestrian facility. The relationship between the LOS score value and the designated LOS was based on pedestrian perception research, with "A" representing the best and "F" representing the worst quality of

service. Bicycle levels of service could be calculated in the same way if there were designated bikeways to evaluate. However, at present, there are none.

LOS Score	LOS
</=2.00	**A**
>2.00 - 2.75	**B**
>2.75 - 3.50	**C**
>3.50 - 4.25	**D**
>4.25 - 5.00	**E**
>5.00	**F**

Table 13: LOS Criteria for Pedestrian Travel Modes

Pedestrian Levels of Service at crosswalks for existing and future conditions are displayed in Table 14 below.

Pedestrian LOS Comparisons: Signalized Intersections							
INTERSECTION		EXISTING CONDITIONS		2024 CONDITIONS			
				W/out Project		With Project	
Name	Approach	AM	PM	AM	PM	AM	PM
Piikoi Street & Kapiolani Boulevard	Eastbound	C	C	C	C	C	C
	Westbound	C	C	C	C	C	C
	Northbound	C	C	C	C	C	C
	Southbound	C	C	C	C	C	C
Kona Iki Street & Kapiolani Boulevard	Eastbound	C	C	C	C	C	C
	Westbound	C	C	C	C	C	C
	Northbound	B	B	B	B	B	B
Keeaumoku Street & Kapiolani Boulevard	Eastbound	C	C	C	C	C	C
	Westbound	C	C	C	C	C	C
	Northbound	C	C	C	C	C	C
	Southbound	C	C	C	C	C	C
Piikoi Street & Kona Street	Eastbound	B	B	B	B	B	B
	Westbound	B	B	B	B	B	B
	Northbound	C	C	C	C	C	C
	Southbound	C	C	C	C	C	C

Table 14: Current & 2024 Pedestrian Levels of Service at Signalized Crosswalks

Summary of Traffic Conditions Over Time

Existing Conditions

The Ala Moana area is heavily travelled, with all travel surfaces and intersections experiencing high volumes of use by vehicular traffic, public and private transit, and pedestrians. Bicycle use was also observed, but with no dedicated bikeway facilities, it is difficult to measure. Bicycles currently share streets with vehicles, thus sharing the same levels of traffic performance as motorized vehicles, and sidewalks with pedestrians, requiring maneuvering to avoid collisions with them.

Although the already high volumes of traffic are reflected in the existing Level of Service (LOS) values, all intersections were judged to have appropriate LOS values by the Traffic Impacts Analysis Study. The Study noted "problems for pedestrians at two major roads", citing long crossing distances, turning conflicts, high speeds, (in)sufficient crossing signal time, roadway width, and the number of travel lanes which had to be crossed.

As previously cited, bicycle travel conditions, because they could not be isolated, could not be calculated. However, the Study noted that "with heavy vehicular volumes along Kapiolani Boulevard during peak periods, conditions for bikes [there] are not optimal", citing Kona Street as a possible alternative east-west bicycle route, although weaving to avoid buses would be necessary. Bicycle use of sidewalks, which currently occurs, experiences conflicts with pedestrian use.

Mitigation of existing non-optimum traffic conditions was suggested, including the optimization and synchronization of vehicular traffic signals, the use of signage and other visual devices at the Kona/Keeaumoku Street intersection to notify vehicles of crossing pedestrians, and extended vehicle green light signals at the Kapiolani Boulevard/Keeaumoku Street intersection to allow vehicles time to make their turns after the end of the pedestrian crossing period. Finally, a marked crosswalk was suggested at the intersection of Kona and Kona Iki Streets.

2024 Future Conditions, Potential Impacts, and Mitigative Measures

2024: Conditions After Project Build-out:

The Traffic Impact Analysis (TIA) Study for this period assumed that the mitigation measures suggested for optimizing existing conditions would be implemented and completed by 2024. As previously cited, it assumed a 2% "background" growth in traffic of all modes by 2024. This was considered in line with other studies for the area. In comparison, the City's draft *Ala Moana Neighborhood Transit-Oriented Development Plan* assumed a 1.75% growth in traffic.

The study also assumed that transportation mode usage would be as follows:

- Private Vehicle: 76.9%
- Transit: 12.8%
- Bicycle: 02.3%
- Walking: 08.0%

The Study also assumed that Ala Moana would remain the primary transfer point for TheBus operations.

Finally, the Study noted that the difference in Average Daily Traffic ("ADT") on the project area contributed by the Project was "anticipated to be negligible" (TIA, p. 33).

2024 Conditions Without the Project: Optimized traffic signal timing for vehicles at signalized intersections to accommodate projected traffic increases had been assumed under existing conditions. With this accomplished, 2024 LOS values remained constant with or better than those of existing conditions at those intersections.

At unsignalized intersections, intersection performance declined at the Keeaumoku/Kona Street intersection, which also serves as the central mauka entrance to Ala Moana Center. Of particular note is the "shared through/right" movement on the westbound approach during the PM peak period, which declined from an LOS of "C" under existing conditions to "E" under projected 2024 conditions. However, even with this value this intersection retains adequate

capacity. Other Keeaumoku/Kona movements and the approaches at the other unsignalized intersection at Kona and Kona Iki Street remained appropriate (at sufficient capacity), with sufficient capacity for growth.

Pedestrian LOS values at signalized crosswalks remained unchanged from those under existing conditions. This assumes optimization of crossing signals to accommodate pedestrian traffic increases.

The Study assumes that bicycle facilities will be added to the project area to improve the bicycling experience, and that slower vehicular speeds during peak hours will make roads more navigable by bicycles.

2024 Conditions With the Project: The Project is expected to add to vehicular and multimodal traffic in the project area, but it should be kept in mind that the difference in Average Daily Traffic ("ADT") on the project area as a result of the Project was "anticipated to be negligible".

The study also found that with the project, all intersections will maintain adequate traffic capacity and thus appropriate LOS, although there will be LOS declines in one movement at the signalized Piikoi/Kona Street intersection and in five movements at the two unsignalized Study intersections. Of particular note is the decline in the through movement on the westbound approach to the busy Kona/Keeaumoku Street intersection, a mauka "front door" entrance to Ala Moana Center, which declined from D to E during the PM peak period for "through" movements and from E to F for "shared through right" movements. However, LOS E is considered "appropriate" or under capacity for the intersection and that although the "shared through right movement LOS score of F is projected to experience over 50 seconds in delay, its v/c score was calculated by the Study at 0.88: still below but nearing capacity (A v/c ratio of 0.85 - 0.95 signifies that an intersection is operating *near* capacity).

Pedestrian LOS values remained constant through all three conditions calculated: existing, 2024 Without Project, and 2024 With Project.

Possible 2024 Mitigative Measures:

Measures for Motorized Vehicles: Completion and occupancy of the The Central Ala Moana will add multi-modal forms traffic ranging from private and transit vehicular to pedestrian forms of travel to the surrounding area. To mitigate traffic disruptions and in compliance with a request of the City and County of Honolulu's Department of Transportation Services, project vehicular access along Kapiolani Boulevard will be limited to right turns in and out at the project's Kapiolani Boulevard driveway. Using this access pattern, vehicles entering or exiting the project will always be moving in the direction of traffic on the Boulevard's travel lanes.

A secondary, full-access driveway to Kona Street will provide access primarily for retail and delivery vehicles. The Kapiolani Boulevard and Kona Street driveways will form a straight, continuous route connecting both streets to enable direct emergency vehicle access to and through the project.

2024 traffic will experience an increase in traffic in the project area. The Study has conservatively estimated a general background traffic increase to be on the order of 2%, to which the Project would contribute a minor part in terms of 24-hour volume ("average daily traffic", or "ADT"). Since right-of-way constraints prevent road widenings, mitigations would need to focus on intersection operations. The optimizing of signal timing and the coordination of traffic signals is one method available for improving intersection operations.

With heavy bus volumes and high bus ridership along Kapiolani Boulevard, the optimization of traffic signal timing to favor bus travel ("transit signal priority" or "TSP") could improve bus travel times, facilitating the transport of significant passenger volumes and possibly encouraging the choice of the bus as a means of travel. If implemented, this measure would be consistent with City intent to emphasize modes other than the private automobile as preferred transportation choices.

Given the above considerations, it appears that traffic signal timing and coordination would be potentially effective available actions for maintaining adequate functional capability of the area's surface circulation system.

Measures for Pedestrians: Existing pedestrian volumes in the project area and the City's draft TOD plan for Ala Moana suggests that pedestrian accessibility is important in the immediate

vicinity of the project site. With the proposed HART Ala Moana Station less than a block away on Kona Street at the current J.D. Watamull site, with Kapiolani Boulevard fronting the project expected to receive high volumes of pedestrian through as well as HART commuter traffic, and with Kona Iki Street being an important connection between Kapiolani Boulevard and Kona Street, provisions along both Project frontages to accommodate potentially high volumes of pedestrian traffic would seem to be a desirable accommodation to make available.

The project provides generous pedestrian sidewalks (exceeding City and County standards) on both street frontages to facilitate smooth pedestrian circulation. In addition, its Kapiolani Boulevard frontage offers a generously proportioned plaza as a publicly available open space "inboard" and distinct from the sidewalk and visually separated from it with landscaping. This plaza is intended to allow pedestrians the opportunity for social interaction or respite from the more frenetic urban pace the Ala Moana Neighborhood is expected to assume in a space that would be separate from the sidewalk, to free the sidewalk for "through" traffic while allowing respite in a separate space for those wanting it. Along Kona Iki Street, the commercial spaces near Kona Street "step back" behind an arcade which provides a space for shoppers outside the sidewalk zone, thus optimizing the circulation capacity of the public sidewalk along this stretch of street.

On the outboard or street side of the public sidewalk along the Kapiolani Boulevard frontage, a wide landscaped planter strip in which the monkeypod trees will stand will provide a physical and visual buffer from the intense Kapiolani traffic. This buffering can enable the sidewalk to become a psychological as well as physical "safe zone" for its pedestrians.

Measures for Bicycles: The Oahu Bike Plan proposes future bikeway facilities along Piikoi and Keeaumoku Streets, but none on Kapiolani Boulevard or Kona Street. The closest east-west bike routes are proposed for Ala Moana Boulevard, while King Street features an existing two-way bike lane. The Ala Moana TOD Plan proposes a 2-way bike lane along Kapiolani Boulevard and the City's Complete Streets program also proposes to add bicycle facilities in the project area.

However, although it is anticipated that future vehicular speeds on Kapiolani Boulevard will be slower and more compatible with bicycle speeds, the Boulevard is already heavily travelled by motorized vehicles, particularly during weekdays and peak hours. It is anticipated that any reduction of motorized vehicular capacity of this thoroughfare will have to undergo thorough

and objective evaluation before the addition of an onstreet bike lane is considered. With respect to offstreet bicycle use, given the inherent conflicts between a shared pedestrian and bicycle use of a public sidewalk and the hazardous potential this creates, it does not seem prudent to assume near-term bicycle use of a common sidewalk as a sanctioned bicycle route.

The Study suggests project provision of bicycle storage facilities. Although conditions for bicycle travel in the immediate Project vicinity are currently less than optimal, they may improve with the design and implementation of appropriate forms of bikeways along with measures for making them safe for bicyclists and those around them. Therefore, to accommodate future bicycle use in the Project area, public bicycle storage facilities accessible from Kona Iki Street have been incorporated into the Project.

2030 Future Conditions, Potential Impacts, and Mitigative Measures
(After Ala Moana Station buildout, which is currently projected at 2025)

Transportation Network

Passenger Vehicles: As TOD development progresses, changes will favor multi-modal travel.

Bus and Heavy Vehicles: The Ala Moana Transit Facility will continue to be a dominant transfer island location for bus and rail activity. With the rail system in place, the Transit Facility will need a substantial increase in volume of buses.

Pedestrian Facilities: Escalators and elevators will be available at the Ala Moana Station. Sidewalk widenings and improved safety at street crossings are anticipated.

It is appropriate to note here that The Central will have already provided wide sidewalks in excess of current standards to accommodate large pedestrian traffic volumes along both its street frontages.

Bicycle Facilities: Bicyclist facilities will be accommodated at the Ala Moana Station. The station will have facilities for bike storage and rail cars will be designed for accommodating bicycles during off-peak hours.

Traffic Volumes:

Background Growth: The Honolulu High-Capacity Transit Corridor (HHCTC) Transportation Technical Report, Addendum 2 rail station will provide an added transit alternative that is expected to attract substantial ridership from local bus access points and from people walking to the station. Currently forecasted Ala Moana Station total daily ridership is 22,610 riders per day.

Project-Related Traffic Growth: The addition of the Ala Moana Station is not likely to change Project-related traffic volumes or trip distribution. Most of the Project's rail users will have been using The Bus before the completion of the rail station. The completion of the Ala Moana Station a very short distance from TheBus Transit Center will simply result in a change of commuter destination and a very minor local shift in circulation.

Future Peak Hour Volumes: The HHCTC Transportation Technical Report, Addendum 2 forecasted that during the AM two-hour peak period, 1,839 riders would board and 7,700 riders would depart the train at the Ala Moana Station. Table 15 shows the total peak hour vehicle trips generated at the Ala Moana Station as a result of the rail system.

TRANSPORTATION MODE	AM PEAK		PM PEAK	
	IN	OUT	IN	OUT
Bus Transit Vehicle Trips	74	74	74	74
Spillover Parking	87	0	0	87
Kiss and Ride	354	354	354	354
TOTAL	515	428	428	515

Table 15: Ala Moana Station Peak Hour Vehicle Trip Generation

Level of Service: The HHCTC Technical Report, Addendum 2 identified four intersections that would experience large increases in bus activity, spillover parking, and kiss and ride activities. Three of the intersections are project study intersections. Level of Service scores for these intersections are displayed in Table 16.

INTERSECTION	TRAFFIC CONTROL TYPE	PEAK HR. LOS	
		AM	PM
Kona Street/Keeaumoku Street	Unsignalized	F	F
Kona Street/Piikoi Street	Signalized	D	D
Kapiolani Boulevard/Keeaumoku Street	Signalized	C	F

Table 16: 2030 Intersection Peak Hour Levels of Service (LOS)

Possible Mitigation Measures:

The HHCTC Transportation Technical Report estimated that for the Ala Moana Station area, traffic conditions would experience added delay and would require consideration of mitigation measures. It stated that the signalization of the Kona/Keeaumoku Street intersection would reduce delay but not alleviate the poor LOS (F) there during the AM peak hour. Because that set of traffic signals would be so close to the Keeaumoku Street/Kapiolani Boulevard intersection signals, signal coordination to enhance traffic flows and to prevent effects at other intersections would be needed.

Summary

Existing conditions already require mitigation measures independent of the Project. 2024 conditions would experience an estimated 2% increase in traffic volume. Although the Project's share of this increase is estimated to be negligible, there will be some deterioration of level of service at some intersections. Given the already restricted roadway rights-of-way, operational modifications would seem to be the best way to address larger traffic volume and level of service issues. They would include optimization of traffic signal timing and the coordination of traffic signals in the project area. These are activities conducted by the City and County of Honolulu.

The completion and operation of the Ala Moana rail station would generate its own set of LOS declines. The most severe of these would occur at the Keeaumoku/Kona Street intersection, just inside the mauka entrance to Ala Moana Center. The Study has suggested signalization of this intersection coordinated with the Keeaumoku Street/Kapiolani Boulevard intersection traffic signals to reduce the delay anticipated at the Keeaumoku/Kona Street intersection.

3.9 NOISE

Daily noise levels in the project vicinity are relatively high as a result of heavy daily vehicular traffic during the day and evening hours. Vehicular traffic is a mixture of private automobiles, buses, heavy trucks and semi-trailers, and emergency vehicles. Local and federal agencies

have established standards and guidelines for assessing environmental noise impacts and have set noise limits related to land uses.

Noise from HART operations at the planned Ala Moana Station located approximately a block (about 320 feet) away may be audible to persons located outside at the project site. However, during the day, rail operations noises will be part of a mixture of loud noises created by passenger cars, buses, service, and emergency vehicles and personal outdoor interactions. HART operations may be more identifiably audible during evening and nightime hours. However, the insulated glazing that will be used in The Central's residential tower should block all or a good part of any rail and other noises that reach the project site;

Potential Impacts and Mitigative Measures:

Project construction activities will create short-term noise impacts. Most of this noise will be generated by construction equipment. Most of these impacts will be experienced by occupants of adjacent buildings.

Proper mitigation measures will be implemented to minimize noise impacts. All work will comply with the State of Hawaii Department of Health noise limits. Construction activity will be limited to daylight hours.

Post construction noise resulting from project occupancy is expected to be minimal and virtually unnoticeable in the project's busy urban environment. Sounds made by resident external activities at the recreation deck will be largely contained (mitigated) by the project's residential tower immediately mauka of the deck and the large Ala Moana parking structure located along the makai edge of Kona Street.

3.10 NATURAL HAZARDS

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map shows the Project site to be located partially within the AE flood inundation hazard area and partially within Zone X, which indicates less than 1% annual chance of flood plain, sheetflow, or stream flooding (there is no nearby stream). Base flood elevation for the area within the AE

zone is 6 feet, mean sea level (msl). Figure 39 displays the Flood Insurance Rate Map showing the area in which the Project site is located.

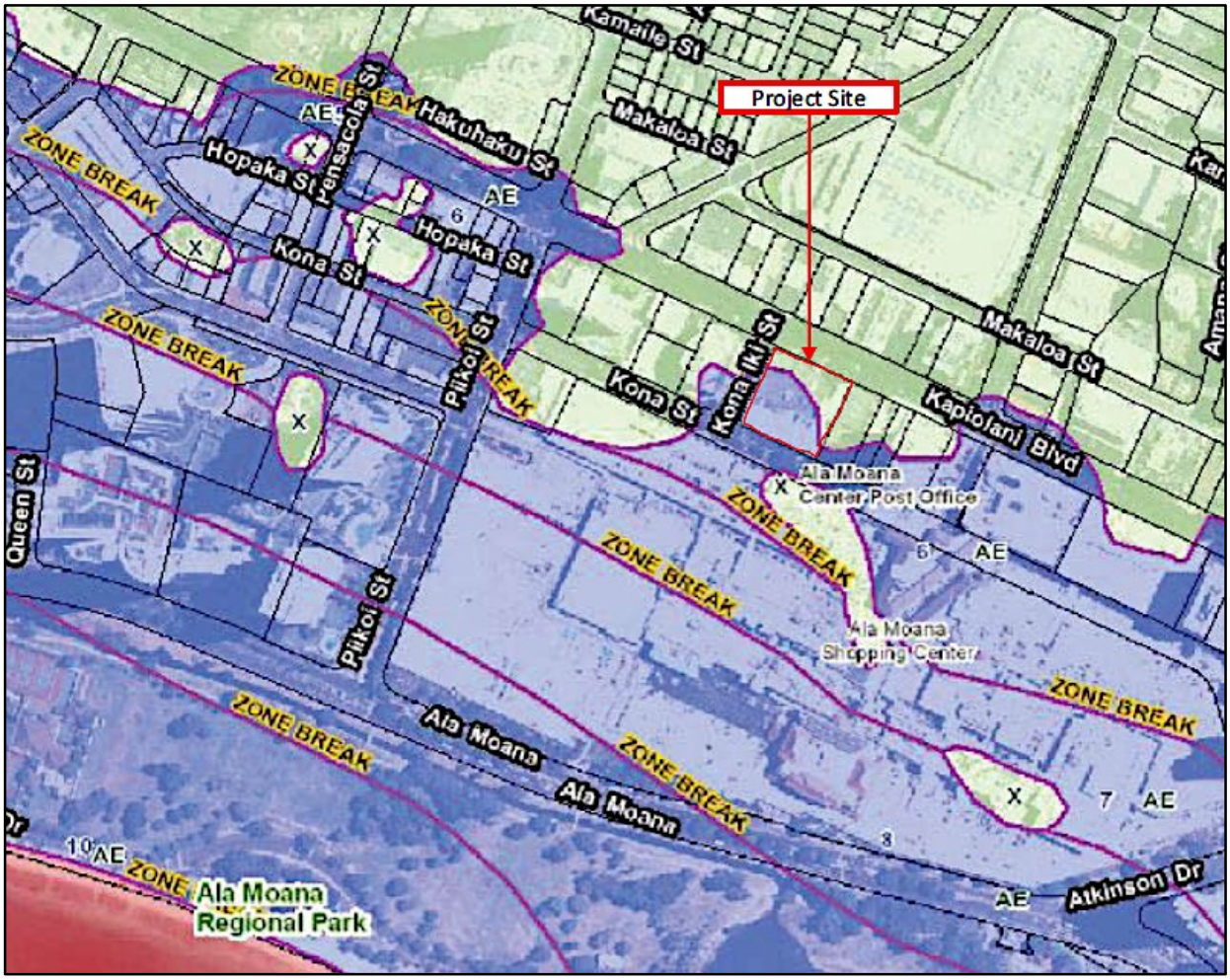


Figure 39: Flood Insurance Rate Map

The Project site lies outside the City and County of Honolulu Tsunami Evacuation Zone, but within its Extreme Tsunami Evacuation Zone. However, the site does not lie within a FEMA VE zone, which indicates potential hazard due to wave action, and it is shielded from direct exposure to wave action by the expanse of Ala Moana Regional Park, the substantial retail and parking structures of Ala Moana Center, and the Park Lane luxury residential project.

Figure 40 displays the City and County of Honolulu's Tsunami Zone Map for the area in which the Project site is located.

No other natural hazards have been identified at the project site.

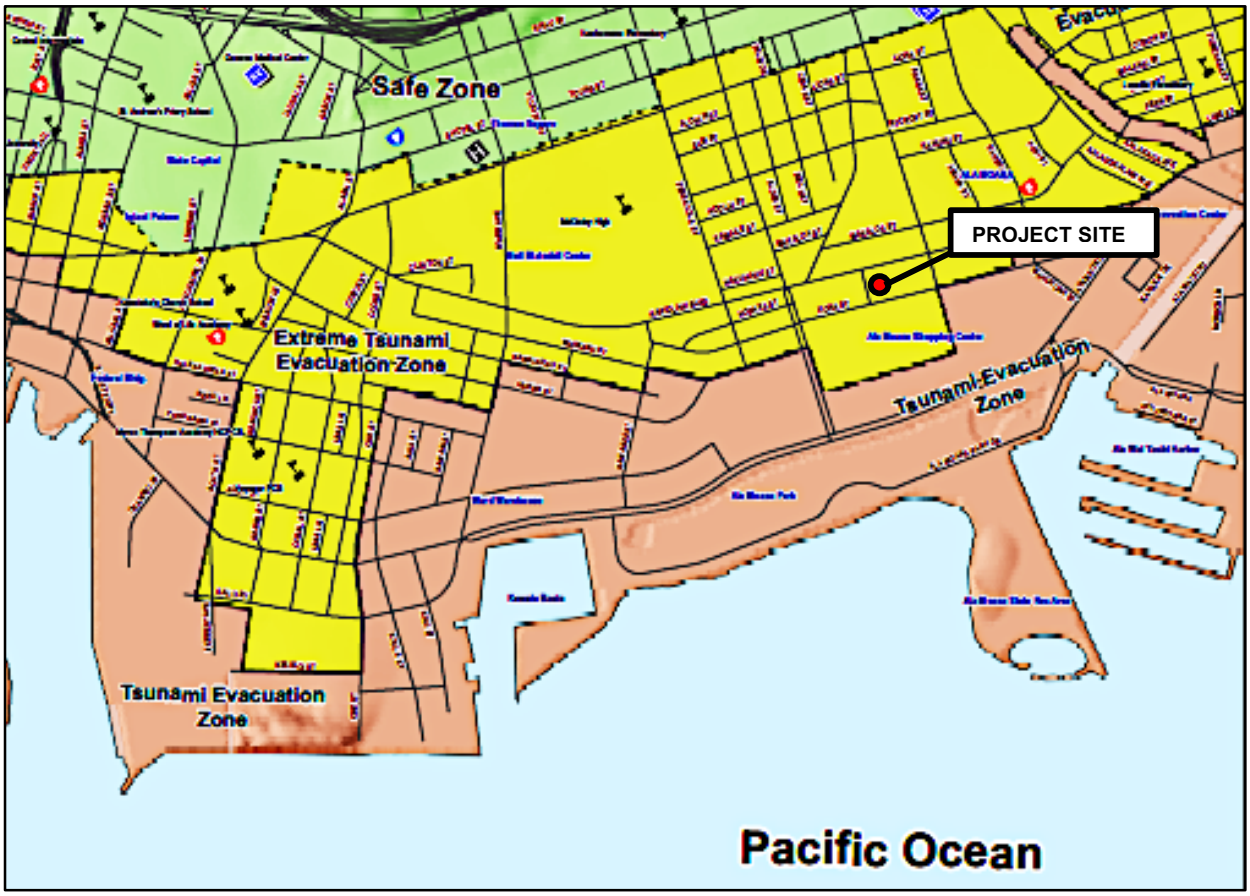


Figure 40: City and County of Honolulu Tsunami Zone Map

Potential Impacts and Mitigative Measures:

Inundation potential as shown on the FEMA maps and subsurface conditions are among the factors that will influence project design. Project finish floor elevations will be located above the base flood elevation, in compliance with the City's National Flood Insurance Program (NFIP) requirements. Because of its distance from the ocean and the presence of extensive intervening structures between it and the coastline, the project appears to be effectively shielded from wave-driven forces.

3.11 MAN-MADE HAZARDS

A *Phase I Environmental Site Assessment* (ESA) to assess the potential presence of hazardous onsite materials was prepared on September 2014 by Central Planet Repair, LLC for The Central Ala Moana site. A followup *Soil and Groundwater Management Plan* outlining

approaches for dealing with hazardous materials that may be encountered during construction was prepared in December 2017. The findings of this Phase 1 study were that the following Recognized Environmental Conditions (RECs) were currently present on the subject property:

- The subject property had been used for automobile repair, including battery service, since at least 1949.
- A pool of wastewater in which a floor drain was located was observed at the auto repairing section of the building along Kona Street. The drain was considered a Recognized Environmental Condition ("REC") because it was unknown where the drain discharged and there was a possibility that the "residuals" associated with the automobile repair and car washing may have been discharged into the drain.
- A former collector trench which probably contains an oil and water separator is located in the same auto-repairing section of the building. It probably collected discharges from within the former service/wash area. The condition and/or contents of the trench and associated oil/water separator have not been determined.

The Phase I Study also found a number of historic (past) Recognized Environmental Conditions that had been previously satisfactorily addressed and for which no adverse effects were anticipated. They were:

- A 500-gallon used oil tank that had been closed September 2, 1995.
- A hydraulic lift, classified as a State Hazardous Waste Site (SHWS).
- A formerly leaking underground storage tank (LUST), for which cleanup had been completed.
- Two hydraulic auto storage lift racks, reported leaking and removed in 1999.
- Two hydraulic lift systems removed in 2006.
- A former battery storage area in which a leak had been detected.

The Study also identified the following other environmental conditions which were not considered Recognized Environmental Conditions as defined by ASTM:

- Because the existing buildings were built prior to 1980, the presence of asbestos containing materials was suspected as a potential issue
- Because the buildings were built prior to 1978, lead based paint could be a potential issue

The Study also identified a Sanborn Map documentation of a Recognized Environmental Condition consisting of a facility marked "gas and oil" on an adjoining property immediately west

of the site (the American Savings Bank tower). However, it expected no adverse effects from this former facility since this condition was probably remediated when the American Savings Tower was built.

Potential Impacts and Mitigative Measures:

Based on the findings of the Phase I study, no additional environmental actions were considered warranted for the property at the date of the report (2014). However, it recommended that the following actions be considered during the site development process:

- Retention of an environmental professional to draft a Construction Management Plan to enable construction contractors' awareness of environmental health and safety issues in the event that a sump, drain, underground storage tank (UST), buried drums, and/or "smelly soils" are encountered during site development. The professional should monitor the potential presence of such items to effect proper removal and disposal should they be encountered.
- Evaluation of the condition and status of the sump (trench) containing the oil and water separator for environmental impacts and its proper removal or closure if there is no intended use for it.
- Evaluation of the floor drain in the vicinity of the former hydraulic lift and car repair area for environmental impacts and its proper removal or closure during existing building demolition if there is no intended use for it.
- Reservation of a budget for addressing potential environmental issues should they be encountered.

Based on this study, the environmental consultant performed a follow up *Soil and Groundwater Management Plan in 2017,* focusing on methods for managing contaminated materials should they be discovered during the site development/construction process. This plan is presented as Appendix F of this document.

3.12 SOCIO-ECONOMIC CHARACTERISTICS

As a City-designated TOD neighborhood, the Ala Moana area is slated for change. It is a mixture of business and residential uses, and currently hosts a major concentration of retail,

dining, entertainment, and residential facilities as well as a rich mixture of ethnic groups and age cohorts. According to information developed by *Claritas Prizm* and presented in the 2012 *Market Opportunities Study* supplement to the Ala Moana TOD Plan, the area within the half-mile radius of the projected Ala Moana HART Station had a projected 2018 resident population of about 17,300 persons and approximately 9,164 households with an average household size of 1.87. Median 2018 annual household income was projected at about $48,500, while average household income was projected at approximately $75,050.

The area immediately mauka of the project is characterized by businesses and a mixture of rental or purchased residential apartments in mid- and high-rise buildings occupied by modest- to middle-income households. The immediate project area along Kapiolani Boulevard and East Kakaako is a mixture of office buildings and residential towers. Occupants of most of the nearby residential towers and the recently completed and occupied Park Lane medium rise townhouse complex are typically higher-income households hosting a mixture of local and offshore residents. Ala Moana Center, other dining and retail establishments, and the numerous office buildings in the immediate project area draw visitors, workers and business owners into the area daily.

With its daily draw of resident, working, and visitor populations, the Ala Moana area is a center of activity in Central Honolulu that, if TOD moves forward, will see further increases in resident and business concentrations.

Potential Impacts and Mitigative Measures

The Central Ala Moana, with its mix of affordable and market rate residential units, will provide a much needed accessible housing opportunity for persons working in the area and those wanting access to urban housing conveniently located near places of employment, support services, and facilities.

In contrast to much of the recently completed luxury residential offerings in the Ala Moana and Kakaako neighborhoods, The Central Ala Moana will offer housing to those with more moderate levels of income who desire the benefits of generously accommodated living spaces, rich urban settings and proximity to needed services and employment. It will offer a uniquely central location for professionals and entrepreneurs desiring efficient and time-saving access to businesses, work, and supporting resources as well as for mature

individuals and households requiring proximity to vital health and other needed lifestyle support services.

The people who will live at The Central Ala Moana will become a substantial component of the residential element essential to the City's intended Ala Moana TOD mixed-use neighborhood. While the Project will not act as one of the economic engines of this neighborhood, its implementation will bring residents who will help to fuel its economic activity. It will house individuals and households whose employment, business endeavors, lifestyle needs, and consumption of merchandise and services will help drive the economic life of this emerging TOD neighborhood.

Excepting the cost of the land and using the Economic Benefit Multipliers developed by the Hawaii Department of Business, Economic Development, and Tourism, the economic benefits created by the project based on currently estimated project development costs of $270 million are expected to include approximately 890 directly created construction jobs, 2,590 indirectly created jobs, $170 million in generated income, and about $34 million in State tax revenues.

Given these anticipated results, the economic contributions potentially attributable to the development of The Central Ala Moana are substantial.

3.13 INFRASTRUCTURE

The following sections address infrastructure elements pertinent to The Central Ala Moana.

3.13.1 WATER

The Board of Water Supply (BWS) system provides water service to the Project site. Their as-built plans indicate that potable water service is provided by a 1-inch lateral (meter no. 09030660) connected to a 12-inch water main running below Kapiolani Boulevard. The fire protection system for the existing building is provided via the same Kapiolani Boulevard 12-inch water main. Landscape irrigation water will be provided with its own meter to measure actual landscape irrigation water usage.

Onsite fire protection requirements will be coordinated with the Fire Prevention Bureau of the Honolulu Fire Department. Fire service will be provided by a new fire protection lateral to the project buildings and the installation of a fire sprinkler system meeting National Fire Protection Association (NFPA) standards. Two existing fire hydrants on Kapiolani Boulevard and one hydrant located on the median in Kona Street will be used to serve the project. Additional analyses will be conducted during detailed design to determine whether additional hydrant service will be required.

Potential Impacts and Mitigative Measures:

Potable and Fire Protection: Water demands will include service to the proposed project buildings, fire protection, and landscaping irrigation. A preliminary review of the existing system for its adequacy to accommodate the proposed development has been coordinated with BWS. The Project's average daily water demand has been estimated at 0.075 million gallons per day (MGD), or 75,327 gallons per day. Fire protection needs are projected at 2,000 gallons per minute for a 2 hour period, assuming hydrant spacing of 250 feet. In accordance with BWS guidelines, the capacity of the water system should be able to deliver the maximum daily demand simultaneously with the required fire flow.

Landscape Irrigation: Landscaping will be irrigated using a permanently installed irrigation system coordinated with the project landscape architect and furnished with a submeter to measure actual irrigation water usage. Water conservation practices will be followed wherever practical. During design and landscape materials selection, drought tolerant plants, xeriscape landscaping, and high efficiency irrigation systems will be considered.

BWS has provided preliminary confirmation that its existing water system is adequate to provide the Project with peak hour pressures and fire protection. Further coordination with BWS, including the coordination of onsite fire requirements, will be required during the project's design phase. The final decision on water availability will be confirmed during the building permit approval process.

3.13.2 WASTEWATER

An existing 6-inch gravity system lateral currently connects the project site to a 36-inch sewer trunk line under Kapiolani Boulevard which then conveys sewage to the Sand Island Wastewater Treatment Facility where it is processed and discharged.

Potential Impacts and Mitigative Measures:

Design and construction of Project sewer facilities will be in accordance with City & County of Honolulu Wastewater Standards, dated July 2017. Preliminary estimated sewer flows are as follows:

Usage Category	Average Wastewater Flow Rate (gallons/day or gpd)
Residential (513 units)	100,548 gpd
Commercial	3,080 gpd
Total	**103,628 gpd**
Assume	**0.104 MGD**

Table 17: Estimated Wastewater Flows

Given the above, the Project assumes Base Sanitary Flow at 0.104 MGD and a system Design Flow of 0.315 MGD. An application for sewer connection (No. 2017/SCA-1598) has been submitted to the City Department of Planning and Permitting, Wastewater Branch and has received preliminary approval. The final determination of availability of sewer capacity will be confirmed during the building permit approval process.

Prior to this project, SamKoo Pacific, LLC and SamKoo Hawaii, LLC (formerly Sam House Development) were part of a group of developers known as “Kalakaua Relief Line, LLC” that partnered to build a 2,000-foot sewer line along Kalakaua Avenue to relieve the strain on the City’s Kapiolani Boulevard sewer main that was threatening to delay contemplated projects in the Ala Moana and Waikiki areas. A Memorandum of Understanding and Agreement (MOUA) dated December 19, 2007 and amended September 22, 2011 was signed by Kalakaua Relief Line members and the City and County of Honolulu Departments of Environmental Services (ENV) and Planning and Permitting, Wastewater Branch (DPP).

Under this agreement, Kalakaua Relief Line members were to design and construct the sewer line based on plans and specifications approved by the City in return for sewer credits corresponding to the actual amounts committed by each member to the effort. In October 2011, the City issued letters to each member under the MOUA. This would reduce SamKoo's cost of connection to the City's sewer system.

SamKoo Hawaii, LLC , under its former name Sam House Development, received 167.79 Wastewater System Facility Charge (WSFC) credits and SamKoo Pacific, LLC received 128.13 WSFC credits. On February 28, 2017, SamKoo Hawaii, LLC allocated all of its 167.79 WSFC credits to SamKoo Pacific, LLC for use toward its Kapiolani Residence project. It is intended that any credits not used by the Kapiolani Residence project would be applied to The Central Ala Moana project.

3.13.3 DRAINAGE

Under current conditions, the majority of runoff sheet flows across the Project site's asphalt pavement towards Kapiolani Boulevard and is intercepted by a catch basin at the adjacent property. Preliminary as-built research indicates runoff from the site is conveyed via a network of existing concrete box drains running under Kapiolani Boulevard to an existing 36-inch drain line under Atkinson Drive. From there it goes into a drain line under Kahakai Drive, from which it discharges into the Ala Wai Canal.

Some of the runoff from the existing building adjacent to Kona Street is collected in roof downspouts and piped under the existing Kona Street sidewalk. Runoff then flows into existing drainage infrastructure under Kona Street, is conveyed to a box culvert under Piikoi Street in which it moves makai to empty into the canal running along the mauka edge of Ala Moana Regional Park.

Project at-grade landscaped areas are expected to reduce the amount of current onsite impervious surface. As a result, increases in stormwater runoff are not expected. Where possible, bio-filtration methods will be considered along with the landscape treatments to enhance quality of stormwater while allowing for a portion of it to percolate onsite. No drainage infrastructure upsizing is anticipated outside the site, since the proposed Project improvements are not expected to increase stormwater flows.

Potential Impacts and Mitigative Measures:

Storm drain related short-term impacts related to construction may include traffic disturbances and inconveniences to motorists along Kapiolani Boulevard, Kona Street, and Kona Iki Street. These short-term impacts can be mitigated by limiting construction to off-peak traffic hours, implementing an approved traffic control plan, and coordinating construction with other construction or events in the area. Generation of erosion, dust, and noise due to construction operations will be mitigated by compliance with the applicable Administrative Rules of the State Department of Health. Further mitigation measures will be identified during the design and construction phases.

Post-construction impacts may involve storm water runoff from the project site after construction is completed and occupancy begins.

Sheet flows toward surrounding roadways will be directed through vegetative buffers (such as the widened Monkeypod Tree planting strip and other landscaping features along Kapiolani Boulevard, the landscaped areas between the tower and parking garage, and the landscaped buffer fronting the Kona Street face of the parking garage) or subjected to other pretreatment methods where possible to provide water quality pretreatment. Drainage inlets will be placed within the property where runoff will not be able to sheet flow offsite. The onsite drainage network will discharge to the existing City storm drain system on Kapiolani Boulevard or Kona Street. An extension of the drainage system across Kona Street will be required to enable connection to its existing drainage infrastructure. In addition, water treatment facilities will be planned to pretreat water to conform to City and County of Honoluu storm water quality standards prior to discharge into City drainage facilities.

Onsite retention and offsite disposal are two frequently used methods of stormwater management. Given the potential for sea level rise and the accompanying potential rise in groundwater elevation, the optimum long-term method of storm water management may be a balanced combination of these methodologies with the disposal of pretreated storm water into the municipal drainage system rather than a focused reliance on storm water interception, detention, filtration, and percolation, since a potential rise in groundwater could eventually impede effective percolation of storm water detained onsite. The Central Ala Moana plans to use all of these approaches as needed to manage storm water effectively.

3.13.4 SOLID WASTE

A private refuse company currently serves existing occupants at the Project site. Solid waste will continue to be generated during and after Project construction. During construction, solid wastes will consist primarily of debris and construction related materials. During initial demolition and site development operations, rocks, pavement fragments, refuse, and other debris will be produced and will need removal. Finally, during Project operations and occupancy, household and commercial waste generated daily by Project occupants will require proper and timely removal. The Project is expected to generate an estimated 3.14 tons of solid waste per day, equivalent to approximately 25 cubic yards per day. It is anticipated that the City and County of Honolulu will be selected for garbage collection services.

Potential Impacts and Mitigative Measures

Construction waste production is expected to be a short-term impact that should not cause major impact to existing landfills.

City and County solid waste disposal is conducted at the H-POWER waste energy recovery plant and at the Waimanalo Landfill. It is understood that the City is also currently exploring alternative means of handling solid wastes.

Long-term post-construction management of onsite solid waste management and recycling programs are issues customarily addressed and decided by the AOAO formed by project unit owners, although initial waste disposal activities can be arranged by the property management company.

Therefore, while project design and construction can provide for the means and space for collection of solid waste and proper access to solid waste containers, how the waste is collected or disposed of, whether and how it is separated into recyclable and non-recyclable wastes, or whether any of it is recycled for conversion to project needs remains the province of future project unit owners.

3.13.5 ELECTRICAL AND TELECOMMUNICATIONS

Electrical

The Hawaiian Electric Company (HECO) will furnish power to the project. It will furnish underground service from the existing HECO-owned 25kV circuit located in the existing HECO manhole on Kona Street. A new underground duct line will terminate onsite at a HECO vault, a new pad-mounted HECO switchgear, and a HECO transformer at a location on the Project's ground floor.

The power distribution system will consist of a pad-mounted switchboard equipped with separate commercial and residential service, metering and distribution systems. The Project will be equipped and designed for step-down transformers and vertical power distribution risers. Two vertical bus duct risers will distribute electrical power to each residential floor's distribution panel boards and individual units.

An emergency power distribution system will provide power to emergency and stand-by systems, elevators, and other systems needed during power emergencies. Safety switches will be NEMA 1 rated for interior areas and NEMA 3R or NEMA 4X rated for exterior areas. Residential units will have dedicated load centers.

A new 600kW generator with a sub-base fuel tank will be sized to accommodate emergencies, stand-by loads, elevators, and other common area loads. It will be pad-mounted in a generator room located on the ground level of the parking structure.

The project will use an LED lighting system. Emergency lighting will meet NFPA 101 Life Safety Code requirements. Emergency lighting fixtures will have emergency generator connections. Lighting will be provided with automatic lighting controls in parking and office areas.

Power will be provided to residential and common area technical support spaces, including mechanical equipment, electric water heaters, air conditioning equipment, building management systems, communications and security systems, and fire alarm and protection systems.

Telecommunications

Resident and common areas will be equipped with telecommunications capabilities for telephone, CATV, and internet. Service locations for their connections will be determined by the service provider selected. Empty primary concrete-encased ductlines will be provided from the service provider's starting location to the telecommunications room in the project. Infrastructure such as conduit, raceways and pathways will be provided by the contractor to enable the support of the following services to both the residents and the operations staff of the building:

- Residential Services
  - Telephone service (traditionally from Hawaiian Telcom)
  - Cable TV access (CATV) (traditionally from Spectrum (formerly Oceanic Time Warner), Dish or DirectTV).
  - Internet Access

- AOAO Services
  - Internal Telephone network and access to telephone service
  - Internal Data network
  - Internet Access
  - CATV Service
  - Security
    - CCTV
    - Access Control
  - Entry Phone
  - Parking Garage Access

3.13.6 GAS

Gas service will be provided by Hawaii Gas from its line under Kapiolani Boulevard. The service location within the project for the connection to the Hawaii Gas system will be determined by Hawaii Gas.

3.2 PUBLIC SERVICES

3.2.1 SCHOOLS

The Hawaii Department of Education (DOE) estimates that when the project is fully occupied, it will house approximately 60 DOE students. DOE schools currently serving the project are Kaahumanu Elementary School, Washington Middle School, and McKinley High School. Kaahumanu Elementary and Washington Middle School each have classroom capacity for about 200 additional students, and that excess capacity is expected to remain for the next five years. McKinley High School currently has capacity for 115 additional students but that excess capacity is expected to decline in the next five years. The availability of excess capacity will change as additional residential projects also serviced by these schools, are completed.

Potential Impacts and Mitigative Measures

In 2007 the Hawaii State Legislature enacted a school impact fee program allowing for the collection of impact fees from residential projects within School Impact Fee Districts designated by the Board of Education (BOE). School Impact Fee Districts are designated for areas of high growth that require the expansion of existing school facilities or the construction of new schools to accommodate increased school enrollment from residential development. The proposed Project is located in the designated Kalihi to Ala Moana (KAM) School Impact Fee District. Communications from DOE have stated that proposed KAM impact fee amount is currently being deliberated by the BOE.

3.2.2 POLICE

Police protection and services are provided by the Honolulu Police Department. Police Headquarters are located at 801 South Beretania Street near the City's Civic Complex.

Potential Impacts and Mitigative Measures

Police Department concerns during construction will center on modifications to traffic as a result of construction activity and the transport of materials to and from the site. The Police

Department has customarily noted the need for maintaining a safe flow of vehicular traffic, parking in the project area, and security during project construction. They recommend effective traffic control devices to enable a safe means of ingress/egress for large construction vehicles, motorists, and pedestrians, and adequate site security measures during and after construction. Such measures will be developed and implemented to address both the construction and post-construction periods. In addition, HPD will be notified when construction begins so that they may prepare for increased traffic-related calls for service created by possible construction-related traffic pattern alterations.

The Police Department transmitted preliminary comments during the Environmental Assessment Pre-consultation process, focusing on parking and crime prevention. They included the following recommendations:

- Provision of designated storage areas for alternative means of transportation, such as bicycles and mopeds. They should include racks or posts for the securing of bicycles and mopeds.
- Provision of closed circuit television camera surveillance at facility entrances and exits and in vehicle, bicycle, and moped parking areas to deter criminal activity, preferably a system that enables readable images of vehicle license plates or facial features to aid in the investigation of criminal activities. Preference was stated for digital video downloadable to CD-R OR DVD-R.
- Furnishing of the maximum number of parking stalls allowed by the Transit-Oriented Development Plan to reduce illegal parking hazards caused by this parking-scarce area.

The Project currently offers public bicycle storage facilities accessible from Kona Iki Street. Closed circuit surveillance equipment will be part of the Project's security system, the images from which will be viewable from the Fire & Security Office on the ground level of the residential tower.

Finally, as a pioneer TOD project that is likely to experience a degree of continuing buyer preference for private automobiles, the Project proposes to furnish less parking stalls than required by the existing Land Use Ordinance but more than recommended by the Ala Moana TOD Neighborhood Plan in recognition of probable current preferences and anticipation of possible changes in them. This is intended to accommodate buyers with existing preferences for the private automobile while accommodating a potentially growing number of urbanites who have begun to explore or prefer the use of alternative modes of transportation.

3.2.3 FIRE

The Honolulu Fire Department Station 2, the Pawaa Station, is the closest to The Central Ala Moana's location. It is equipped with two engine trucks, 2 ladder trucks, and 1 rescue vehicle.

Potential Impacts and Mitigative Measures

The Fire Department transmitted requirements for the adequate accommodation of Fire Department services in its response to this document's Preconsultation Notification. In summary, they are:

- The Project or a portion of its exterior wall should be at or within 150 feet from Fire Department access roads;
- A Fire Department access road should extend to within 50 feet of an exterior Project door that can be opened from the outside;
- A City-approved fire flow-capable water supply should be provided to all parts of the Project buildings; the source of the water supply should be within 150 feet of every part of the Project buildings; if this is not the case, onsite fire flow capable fire hydrants and mains should be provided;
- The unobstructed width and vertical clearance of a fire apparatus access road should meet City requirements.

The Project will be served by fire flow-capable water sources consisting of two hydrants along Kapiolani Boulevard and one hydrant in the Kona Street median. A straight line vehicular access with dimensions and clearances qualifying it as a fire apparatus access road will run through the Project, connecting Kapiolani Boulevard with Kona Street through the Project parking structure. It will meet width and clear height requirements for adequately accommodating fire department vehicles.

3.2.4 MEDICAL FACILITIES

Numerous healthcare facilities and private medical offices are located in or near The Central Ala Moana. Nearby facilities with hospital services include Straub Clinic and Hospital on South King

Street, the Kaiser Hospital Downtown Clinic on South King and Pensacola Streets, Kapiolani Medical Center for Women and Children on Punahou Street near Central Union Church, and The Queen's Medical Center on Punchbowl Street near the Hawaii State Capitol. The Ala Moana Building just a short distance away at the Keeaumoku Street entrance to Ala Moana Center houses a concentration of medical and dental offices, as does the Blackfield Building Ewa of the Project on Kapiolani Boulevard between Piikoi and Pensacola Streets and the Medical Arts Building, further Ewa and mauka of the Project on the corner of King and Victoria Streets. Numerous smaller buildings along King Street from Piikoi Street to Kalakaua Avenue also house medical offices and laboratories.

Potential Impacts and Mitigative Measures

Although there may be occasional needs for emergency health care services and regular needs for customary levels of routine medical care generated by occupants of The Central Ala Moana, the proposed project, with its anticipated mixture of young professionals, active families, and older adults is not expected to substantially increase demands for medical services or have long-term adverse impacts on emergency medical providers or their ability to adequately serve the general community.

3.2.5 RECREATIONAL FACILITIES

There are numerous recreational assets in Central Honolulu, Waikiki, and its immediately mauka valleys within convenient reach of the proposed Project. Facilities include a wide variety of public parks, recreation areas, personal training and fitness facilities, and entertainment venues. Significant public parks, fitness facilities, and entertainment venues located within a mile of The Central Ala Moana are itemized in Table 7: *Proximity to Services, Schools, Shopping and Recreational Opportunities.*

Major resource-oriented recreation facilities include the beach parks at Waikiki, Kapiolani Park, Ala Moana Regional Park (which includes Magic Island), Kewalo Basin, Kakaako Waterfront Park, Ala Wai Boat Harbor, Round Top (Puu Ualakaa) State Recreation Area, Diamond Head State Park, and Lyon Arboretum.

Ala Moana Regional Park is both a resource-oriented park and an activity-based recreation facility capable of accommodating informal sports and picnics. Other nearby parks and recreation areas include the well-used Queen Park near the Diamond Head edge of Kakaako adjacent to the Hokua and Koolani residential condominium towers, Sheridan Community Park, Cartwright Neighborhood Park, Makiki District Park, McCully District Park. and Pawaa Park on King Street near Kalakaua Avenue.

Other recreationally oriented facilities in the area include health and fitness clubs. They include Planet Fitness in Ala Moana Center and Core Power Yoga, UFC Gym, and Island Club and Spa in nearby Kakaako. Also available are a 24 Hour Fitness facility on Kapiolani Boulevard near the Convention Center, and the Honolulu Club near Thomas Square.

Potential Impacts and Mitigative Measures

The proposed Project will create some level of demand for recreation, although the actual levels of demand are not known and will depend on the actual composition of the Project's future occupants. Active families will desire play areas for children at ages from toddler to teen as well as competitive sports training and game venues for children and teenagers entering organized amateur sports. Adult populations may have needs ranging from organized and informal sports to concerts, exhibitions, and social gatherings to more passive, contemplative settings in sheltered surroundings. Others may feel the need for yoga, meditation, personal training, or physical fitness programs. Facilities meeting these needs can be found among those cited above.

In addition to accessible offsite recreational facilities, the Central Ala Moana will feature onsite recreational offerings of its own, some available to residents, and some available to all. It will offer a total of 38,607 square feet, nearly an acre, of recreation within its grounds.

The Central will provide approximately 4,355 square feet of publicly accessible plaza and approximately 14,963 square feet for leisure or "passive recreation" activities at the street level and approximately 19,300 square feet of elevated recreation facilities on a recreation deck located above the 10th parking garage floor, to be accessible to project residents via a bridge connecting it directly to a tower elevator lobby. The combined total of all these areas are equal to approximately 62% of the total project site area.

The plaza will be part of a layering of pedestrian-oriented amenities or “zones” between the tower and the street. It will run the length of the tower’s Kapiolani Boulevard frontage adjacent to the storefront commercial spaces, complementing an enhanced public sidewalk (widened beyond City standards) that will be buffered from street traffic by the wide monkeypod tree planter strip. The plaza will be furnished for sitting and taking refreshment, and will be oriented to support both social interaction and solitude. In addition to the spread of the monkeypod tree canopies, a canopy projecting from the tower along the Kapiolani Boulevard and Kona Iki Street frontages, as illustrated in Figure 27, will provide additional shade and protection from the elements. Spatial enhancements to the sidewalk zone to create a less intensive, promenade-like atmosphere, public bicycle storage facilities, and landscaping to complement these spaces and to "soften" the built environment will complete the recreational and leisure amenities at the street level.

The elevated recreation deck will offer a range of recreation and leisure opportunities. A pool deck with a pool and whirlpool bath, reclining lounge chairs, cabanas, and barbeque facilities will occupy the west or Ewa end of the recreation deck. Its central portion will offer a fitness center, a multipurpose room equipped with kitchen, storage, and restroom facilities, while a tot lot, a lawned park for informal play will anchor its Diamond Head end. The entire deck will be landscaped to enhance the leisure experience and to provide environmentally “soft edges” along the perimeter of this amenity as a counterbalance to the “hard edges" of adjacent structures.

Figure 41: Schematic Bird's Eye View of The Central Ala Moana's Recreation Deck

Despite its highly constrained physical context, The Central, with these amenities, will provide a variety of onsite recreational and leisure amenities equivalent in extent to over half its project site area, to meet a range of recreational preferences its residents may have.

Residents of The Central Ala Moana will have not only access to the wide range of Honolulu's rich palette of recreational, entertainment and leisure venues, but they will also have a selection of fulfilling recreational and leisure opportunities on site.

Figure 28: *Site (Street Level) Plan* shows the public plaza and open spaces fronting the tower. Figure 29: *Elevated (11th Floor) Recreation Deck* illustrates the recreation deck and its relationship with the tower. Figure 41: *Schematic Bird's Eye of The Central Ala Moana's Recreation Deck* is a rendered aerial perspective of the recreation deck.

4. THE INSTITUTIONAL CONTEXT: LAND USE POLICIES AND CONTROLS

The Central at Ala Moana ("The Central") is in compliance within pertinent statutory requirements of the State of Hawaii and the City and County of Honolulu. The narratives below summarize this compliance.

4.1 STATE OF HAWAII

4.1.1 HAWAII STATE PLAN (Chapter 226, Hawaii Revised Statutes [HRS])

The Hawaii State Planning Act (Chapter 226, HRS) establishes a statewide planning system with goals, objectives, policies, and priorities to guide future long-range development of the State. The Central is consistent with the State Plan objectives and policies related to housing and facility systems as cited below:

> ***Ch. 226-19 Objectives and policies for socio-cultural advancement – housing.*** *(a) 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 individual, 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) To achieve the housing objectives, it shall be the policy of this State to:*
>
> *(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.

The Central proposes to provide affordable and market priced housing at a premium, highly coveted site in a uniquely central location within the Ala Moana neighborhood of urban Honolulu. This site, located at the corner of Kapiolani Boulevard near existing and projected transportation hubs and separated only by a single service street from Ala Moana Center, provides exceptional proximity to jobs, business opportunities, shopping, dining, recreation, entertainment, family and business services, public transportation, and other vital lifestyle support facilities.

Of its proposed 513 units, 60% or 310 of them will be made available to households earning 100 – 140% of the Area Median Income. The remainder will be market-rate units emphasizing pricing levels to promote "continuity" between "affordable" and "market" unit residents, and to avoid affordable/market group pricing "gaps" that could result in wide economic differences and potential social disparities between members of these respective groups. The intent is to

encourage, among as many of The Central's future residents as possible, the creation of a harmonious residential community at The Central Ala Moana.

A large proportion of recent residential projects in the Ala Moana and Kakaako districts have targeted luxury markets. Others, currently under development or consideration, have begun to include affordable housing units in varying but predominantly minor proportions of their respective unit mixes. The Central Ala Moana will provide a clear majority of its residential units at affordable prices, which, along with the project's market-priced units, offer quality products, materials, and finishes and generous space accommodations configured to meet the functional lifestyle needs of its residents.

In addition, by developing these housing opportunities under the State of Hawaii HHFDC 201H program, the developer has in effect chosen to proceed in partnership with the State of Hawaii, thus directly participating *in dialogue* with the State in meeting State housing policies and objectives.

Ch. 226-108 (2) – Sustainability. (2): *Encouraging planning that respects and promotes living within the natural resources and limits of the state;*

The Central is located within the Primary Urban Center, in keeping with State and City directed growth policies intended to concentrate growth within Oahu's urban centers to take advantage of an already established infrastructure network and to facilitate the maintenance of important agricultural lands, natural and cultural resources and open space, and the maintenance of the greater natural water recharge capabilities concentrated in open, less urbanized lands where percolation is not as intensely impeded by the creation of non-porous ground surfaces, as extensively interrupted by large or extensive structures, or as vulnerable to potentially polluting runoff and infiltration that may result from industrial and commercial uses in urban areas.

The consolidation of new development in already established or designated urban areas has the additional advantage that infrastructure upgrades in these locations, while time consuming, inconvenient and costly, often required far less expenditure of public financial resources than the construction of new infrastructure systems in non-urban "greenfield" locations.

In addition, as summarized in the Project Description section of this document, the design and construction of project facilities will emphasize sustainable design choices and low-impact development to minimize adverse environmental effects on the project site, its residents, adjacent areas, and the larger environmental context.

Finally and in summary, the creation of a significant opportunity for urban residential living within an established urban area can assist in reducing housing demand in suburban, rural, or agricultural areas and the concomitant consumption or elimination of resources located there. As suggested above, it can also help to reduce the levels of energy consumption, public investment on infrastructure, and the magnitude of carbon footprint which living and commuting over significant distances creates.

4.1.2 STATE LAND USE LAW – State Land Use Classifications (Chapter 205, HRS)

State Land Use Districts are established by the State Land Use Commission in accordance with Chapter 205, HRS. The purpose of the districts is to regulate the use of lands within the state to accommodate population growth and development as needed, and to protect important agricultural and natural resources areas. There are four classifications of land under this districting system: Urban, Rural, Agricultural, or Conservation. According to Chapter 205,

> *Urban Districts shall include activities or uses as provided by ordinances or regulations of the county within which the urban district is situated.*

The land on which The Central Ala Moana is located is within the Urban District, and is consistent with the intent of the State Land Use Law.

4.1.3 COASTAL ZONE MANAGEMENT (CZM) PROGRAM (Chapter 205A, Hawaii Revised Statutes)

As HRS 205A defines the coastal zone as “all the 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 United States territorial sea”. The CZM program's purpose is "to provide for the effective management, beneficial use, protection, and development of the coastal zone. CZM areas of focus include studies and programs addressing ocean and coastal area resource management, factors

inducing climate change and ways to understand, respond to, and adapt to its impacts, and, through the state's respective counties, the regulation of land uses and development actions that are proposed within areas with the potential for interaction with coastal resources. Such areas are designated Special Management Areas ("SMA's").

The Project site is not located within a Special Management Area, and is not likely, under current environmental conditions, to influence or be materially influenced by coastal conditions. It is located approximately 2,700 feet from the shoreline in an inland location behind numerous major intervening manmade structures and complexes (including the Park Lane luxury residential complex, Ala Moana Center, and its mauka parking structure), on partially reclaimed land in a location remote from direct contact with customary shoreline processes. The site does not currently influence coastal processes or conditions, nor is influenced by them. However, it is situated in the extreme tsunami evacuation zone and might have to respond to potential extreme tsunami events.

Ongoing research and scientific observation have projected noticeable climate change-driven sea level rise during this century. While the site is located some distance from the ocean, sea level rise and a corresponding rise in groundwater could eventually have a material effect on the Project site and actions considered for it. The site's existing ground elevation ranges between 5.3 to 6.1 feet above mean sea level (msl), with an average elevation of 5.5 feet msl. Onsite groundwater soil borings have encountered groundwater at 3.8 - 4.5 feet below existing grade.

While multiple studies have projected climate-change driven sea level rise, the various estimates of that rise are significantly divergent. As presented in Chapter 3 in the Section 3.3: *Soils*, estimates by the U.S. Army Corps of Engineers ("USACE") Sea Level Change Curve Calculator projects a range of sea level rise of between 0.5 - 4.8 feet by the year 2100. The University of Hawaii School of Ocean and Earth Science Technology ("SOEST") estimates "worst case" increases in sea level elevation from 1 foot in 2040 to 3 feet by 2070 and "best case" increases in sea level elevation of 1 foot by 2050 to 3 feet by 2090. A third projection in *The Hawaii Sea Level Rise Vulnerability and Adaptation Report,* produced by the Hawaii Department of Land and Natural Resources and adopted by the Hawaii Climate Commission in December, 2017 projects a climate change-driven sea level rise of 3.2 feet over the next 30 - 70 years (approximately years 2050 - 2090).

It is expected that Coastal Zone Management Program policies and Special Management Area regulatory programs administered by the counties will respond to such information as it becomes definitive enough to provide guidance for actions in the SMA and enable appropriate public sector regulatory responses.

4.2 CITY AND COUNTY OF HONOLULU

4.2.1 GENERAL PLAN

The General Plan for the City and County of Honolulu is a collection of broad objectives and policies supported by the City and County of Honolulu government to guide the future of Oahu toward a desirable and attainable future. The existing General Plan is currently being updated to include recognition of significant current issues and concerns regarding sustainability and climate change. The Central Ala Moana is consistent with the following General Plan objectives and policies, as cited below:

I. POPULATION

Objective C: To establish a pattern of population distribution that will allow the people of Oahu to live and work in harmony.

Policy 1: Facilitate full development of the Primary Urban Center

The Central is located in the Primary Urban Center ("PUC). It will facilitate opportunities for lower- and moderate-income households to live in the Primary Urban Center near business and lifestyle support opportunities and near public as well as private forms of transportation. By doing so, it facilitates full development of the PUC by providing opportunities for an important and often underserved portion of the residential market to live in the PUC and in locating near both commercial and family-oriented facilities and services.

IV. HOUSING

Objective A: To provide decent housing for all the people of Oahu at prices they can afford.

Policy 3: Encourage innovative residential development which will result in lower costs, added convenience and privacy, and the more efficient use of streets and utilities.

Policy 5: Make full use of State and Federal programs that provide financial assistance for low- and moderate-income homebuyers.

Objective C: *To provide the people of Oahu with a choice of living environments which are reasonably close to employment, recreation, and commercial centers and which are adequately served by public utilities.*

Policy 1: *Encourage residential developments that offer a variety of homes to people of different income levels and to families of various sizes.*

Policy 3: *Encourage residential development near employment centers.*

Policy 4: *Encourage residential development in areas where existing roads, utilities, and other community facilities are not being used to capacity.*

The Central will provide housing to affordable and market priced segments. 60% of its 513 units will be available to persons with incomes ranging from 100 – 140% of Area Median Income (AMI). In addition, the proposed project is close to employment, business, commercial, and recreation facilities.

Further, as a project located

- Within an area where pedestrian travel amenities are intended for emphasis, and is
- Near the primary Bus transfer point on Oahu and the City's planned HART rail transportation system,

it will support a more efficient use of the area street system.

Finally, as a project being done under the Hawaii Housing and Finance Corporation 201H program, it engages a State program which facilitates the availability of housing to affordable and market income groups.

VII. PHYSICAL DEVELOPMENT AND URBAN DESIGN

Objective A: *To coordinate changes in the physical environment of Oahu to ensure that all new developments are timely, well-designed, and appropriate for the areas in which they will be located.*

Policy 2: *Coordinate the location and timing of new development with the availability*

of adequate water supply, sewage treatment, drainage, transportation, and public safety facilities.

Policy 5: *Provide for more compact development and intensive use of urban lands where compatible with the physical and social character of existing communities.*

Policy 6: *Encourage the clustering of developments to reduce the cost of providing utilities and other public services.*

As a proposed residential tower in a dense urban neighborhood that has been slated by City policy for further development intensification as one of Honolulu's Transit-Oriented Development (TOD) neighborhoods, *The Central Ala Moana* tower is an appropriate building type appropriately located, and one that sets a level of quality that further intensification of the area can use as a baseline with which to reference future actions.

It represents the kind of land-conserving, compact development that supports the concentration of facilities and services which make livable urban neighborhoods possible. It will be an added asset that will enhance its surroundings and serve the Ala Moana neighborhood's already urban population.

Finally, in addition to locating in an area with existing infrastructure availability, the project owner had also previously joined with other developers to increase sewer capacity in the project and adjacent areas to provide the expanded sewer capacities needed by existing and contemplated developments.

Objective B: *To develop Honolulu (Waialae-Kahala to Halawa), Aiea, and Pearl City as the Island's Primary Urban Center.*

Policy 5: *Encourage the development of attractive residential communities in downtown and other business centers.*

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

Policy 4: *Require the consideration of urban design principles in all development projects.*

The Central Ala Moana, as one of the first major new structures to be developed in an intensifying node of activity at Ala Moana, will contribute, along with other buildings in this area and the neighboring Kakaako District, to the ongoing development of Oahu's Primary Urban Center. It is being designed to be attractive as well as practical, and to take advantage of existing environmental elements as well as developing its own attractive and memorable sense of place. In its plaza and its selective combining of Kapiolani's unique monkeypod frontage with its own exterior design measures and amenities is intended to help establish a fabric and vocabulary of urban design for Kapiolani in keeping with developing City TOD concepts and probable future preferences of an emerging public pedestrian presence.

4.2.2 THE PRIMARY URBAN CENTER DEVELOPMENT PLAN

The City and County of Honolulu's Development and Sustainable Communities Plans apply General Plan provisions to each of Oahu's eight "development plan" regions. These plans respond to the specific characteristics and community values of each region and are the first physical application of the more programmatic General Plan. They are the primary land use policy plan for each region. Each also offer some degree of general physical design prescription in response to its region's unique qualities, character, and community values.

The Central Ala Moana is located within Oahu's Primary Urban Center (PUC), a region covered by the Primary Urban Center Development Plan (PUCDP). It is consistent with the intent of land use policies objectives, and policies of the PUCDP, as follows:

LAND USE DESIGNATION

The Central Ala Moana is located in an area designated "District Commercial". The PUCDP describes "District Commercial" as follows:

> *District commercial areas, which are shaded in red on the maps, refer to a wide variety of commercial uses and related activities intended to serve district-, regional- and/or islandwide populations. Uses typically include major office buildings, shopping centers, professional and business services, municipal services, and commercial activities located along major streets. Mixed uses, including appropriately integrated medium or higher-density residential facilities, and higher densities are encouraged in these areas.*

Given this definition, The Central Ala Moana is clearly consistent with PUCDP land use policies.

3.3 In-Town Housing Choices

"The PUC of the future offers in-town housing choices for people of all ages and incomes." This third element of the Vision addresses the need for affordable housing, both rental and for-sale, in the PUC to serve families with young children as well as young adults, elderly residents, and multi-generational households.

3.3.1.1 Housing Stock and Occupancy

In the 1980's and early '90's, the City and the State carried out aggressive low-moderate income housing development not only in Ewa but also in Downtown Honolulu and Kakaako. As of 2000, however, most of the government-owned in-town sites had been developed and funding for new housing had been drastically reduced, making preservation and retention of existing affordable units an integral and essential component of fulfilling the housing needs of PUC residents.

3.3.1.2 Development of New Housing

The PUC is essentially "built out" – i.e., there is no reservoir of vacant land designated for future urban use. New housing is developed on lands which are underutilized or where it is not economical to maintain the existing uses or structures. This occurs primarily in older in-town districts where land values are relatively high, and there is a strong market demand for higher use.

Higher Prices. *Prices for all types of housing – both sale and rental prices – are extremely high in the PUC, with single-family houses clearly beyond the affordable range. Prices for apartments are generally high because of higher costs for land and for construction of high rise structures.*

Higher Risks. *Development of a multifamily, high-rise structure carries more developer risk than lower-density housing because the structure must be completed (and the*

investors fully extended) before any sales are closed. Honolulu's Uniform Building Code requires "Type 1" construction for large apartment buildings. Type 1 standards essentially demand a reinforced concrete structure, which is very expensive. With the high carrying costs of a completed building, slow absorption can cut into or eliminate profits. The higher risk makes it more difficult and costly to obtain development financing.

Zoning Regulations. *Zoning regulations strictly limit the floor area and the lot coverage of apartment buildings. High minimum parking requirements, combined with limitations on lot coverage, force the development of costly structured parking. In addition to substantially increasing project design and construction costs, existing regulations force apartment buildings into a tower configuration with a parking pedestal.*

Despite the PUCDP's Vision for more in-town housing, PUC housing prices have been high and beyond the reach of a very large number of consumers. Because of existing prices, the need for affordable homes appears severe. The Central Ala Moana is a project oriented toward meeting a portion of that need.

3.3.2 Policies

- *Provide incentives and cost savings for affordable housing. Provide exemptions from zoning and building codes for housing projects that meet established standards of affordability, on a case-by-case basis.*

The Central Ala Moana intends to make 60% of its units affordable to households earning 100 – 140% of Area Median Income. In view of the foregoing descriptions of existing conditions influencing the cost of housing, incentives and exemptions are clearly needed to facilitate and genuinely enable the achieving of the proposed project's intent. The HHFDC-administered 201H program is the program which most effectively holds the incentives, allows the exemptions, and which is intended, equipped, and implemented to enable affordable housing to be possible.

- *Provide for high-density housing options in mixed-use developments around transit stations. This type of transit-oriented development" facilitates transit use and allows for increased densities without generating increased vehicular congestion.*

The Central Ala Moana is a high-density affordable housing project with street level commercial offerings located at Honolulu's primary bus transfer hub and within easy walking distance of the City's future Ala Moana Transit Station. Its generous setbacks along Kapiolani Boulevard provide unobstructed circulation for pedestrian traffic while also offering a landscaped, furnished plaza readily accessible to pedestrians who wish to rest, gather for social interaction, or patronize one of the proposed project's commercial establishments without impeding the flow of the pedestrian traffic. The proposed project will also offer bicycle storage facilities for bicyclers. Finally, in addition to these circulation-promoting improvements which avoid or minimize conflict with vehicular traffic, the project's own vehicular traffic provisions will observe one-way access and egress along Kapiolani Boulevard. Kona street vehicular access will be used only for secondary and service access to the building.

With these provisions, The Central Ala Moana, by locating near transit nodes, facilitating transit use, providing facilities for non-vehicular travel, and implementing vehicular flow practices which minimize conflicts between project-generated and passing vehicular traffic, will not only facilitate the use of public transit facilities, but will do so in a way that minimizes contributions to vehicular congestion.

4.2.3 CITY AND COUNTY OF HONOLULU LAND USE ORDINANCE

The purpose of the Land Use Ordinance (LUO) of the City and County of Honolulu is "to regulate land use in a manner that will encourage orderly development in accordance with adopted land use policies, including the [General Plan] and development plans…" Its intent is to provide "reasonable development and design standards for the location, height, bulk and size of structures, yard areas, off-street parking facilities, and open spaces, and the use of structures and land for agriculture, industry, business, residences or other purposes."

The LUO designates and defines categories or zoning districts of land use as well as allowable developments and design criteria within each category or zoning district. The Central Ala Moana is located in the BMX-3 (Community Business Mixed Use) District. The purpose of the BMX-3 district is to provide areas for both commercial and residential uses outside the Central Business District (historically, Downtown Honolulu) at a lower intensity than that of the Central Business District. It requires a minimum lot size of 35,000 square feet, a minimum lot width and depth of 50 feet and building height setbacks along street frontages. In this location, the

allowable building height is 250 feet, and the allowable maximum density (FAR) is 3.5 (Total building floor area can be 3.5 times the area of the lot).

As an affordable housing project, the building envelope (maximum height allowance and building height setbacks from the street) and density allowances of the BMX-3 zoning district provide insufficient building envelope and floor area for the project to achieve economic feasibility. In addition, in an area slated for increased development intensity (as proposed by the draft Ala Moana TOD Neighborhood Development Plan), these constraints will become inconsistent with City policy once the intended new provisions are in place.

To achieve the floor area and building volume required for project feasibility, The Central requires exemptions from existing City regulations and would additionally benefit from financial incentives to assist with this feasibility. The HHFDC 201H Affordable Housing program offers well-defined opportunities for acquiring The Central Ala Moana's needed exemptions and incentives. It is therefore clear that the HRS 201H provisions are the preferred avenues currently in force for achieving this. For this reason, The Central Ala Moana will pursue the 201H Affordable Housing program and through it, request exemptions from City zoning and other constraints. It should be kept in mind that the Honolulu City Council will have a direct role in supporting, modifying, or rejecting the proposals embodied in The Central Ala Moana. See Chapter 5 for the required exemptions needed for the project.

4.2.4 THE ALA MOANA NEIGHBORHOOD TRANSIT-ORIENTED DEVELOPMENT PLAN and ORDINANCE 14-010, THE INTERIM TOD ORDINANCE

The proposed Ala Moana Neighborhood Transit-Oriented Development (TOD) Plan is one of nine TOD plans being created in response to the opportunities and requirements associated with the stations of the City's Honolulu Authority for Rapid Transit (HART) system now under construction. The City's TOD website shows the nine TOD Plans completed or now in progress.

Principal proposals of the Ala Moana TOD Plan addressing project building envelope and density include the possible amendment of building height setback requirements. It also proposes height and density allowances in excess of currently existing zoning provisions, including possible building heights of up to 400 feet with possible densities of 10.0 FAR in exchange for "public contributions", to be evaluated and negotiated on a project-by-project

basis. In areas along the Kapiolani Boulevard frontage, it proposes a “build-to” or “setback” line (the line to which the front of a building must align) of 12 feet from the edge of a parcel.

Once it is adopted, the City will need to draft, review, and adopt enabling ordinances to implement this plan. As an interim measure, the City drafted and adopted Ordinance 14-010, which creates a temporary process for pending TOD areas, based on its “Planned Development” review procedure. This process could be selected by a project applicant proposing development in a pending TOD area for processing a TOD-oriented project until a permanent TOD Plan and enabling ordinance are in effect. Like the Ala Moana TOD Plan, building envelope and density allowances would be negotiated in exchange for “public contributions” on a project-by-project basis.

Although the planning and design of The Central Ala Moana voluntarily supports elements of the TOD program in multiple ways, the discretionary nature of the TOD program's process with its attendant uncertainty in time and outcome compares incompatibly with the extreme importance of certainty and timely execution demanded by the financial constraints and time-sensitive nature of an affordable housing project. In view of this, the 201H Affordable Housing program has been judged by the applicant as a preferred method for processing and executing The Central Ala Moana affordable housing project.

4.3 APPROVALS AND PERMITS

Table 18 below displays permits required for the review and implementation of the proposed Central Ala Moana project.

Permit or Approval	Responsible Agency
Chapter 201H, HRS	Hawaii Housing Finance and Development Corporation (HHFDC) & City and County of Honolulu City Council
Chapter 343, HRS	State HHFDC & State of Hawaii Office of Environmental Quality Control (OEQC)
Building Permit for building, electrical, plumbing, sidewalk/driveway and demolition work (variance for building permit when work done in setbacks)	City and County of Honolulu, Department of Planning and Permitting
Grubbing, grading/trenching, Street Usage, and Stockpiling Permit	City and County of Honolulu, Department of Planning and Permitting
Sewer Connection Permits	City and County of Honolulu, Department of Planning and Permitting
Water Connection	Honolulu Board of Water Supply
Water Quality	State of Hawaii Department of Health

Table 18: Approvals and Permits Summary

5. CHAPTER 201H REQUESTED EXEMPTIONS

5.1 INTRODUCTION

Hawaii Revised Statutes (HRS) Section 201H-38, "Housing development; exemption from statutes, ordinances, charter provision, and rules" allows for eligible 201H projects to seek exemptions from all statutes, ordinances, and rules of any governmental agency relating to planning, zoning, and construction standards that do not negatively affect the health and safety of the general public in exchange for providing affordable housing.

The Central Ala Moana will be a 513-unit for-sale, predominantly affordable housing project that will offer 60% or 310 of its units to households earning 100% - 140% of the Area Median Income (AMI). It is centrally located in the Ala Moana district of Central Honolulu, where already high property values are expected to rise further in anticipation of the City's pending Ala Moana Transit-Oriented Neighborhood and the increased development potential that this will bring.

Current market activity, including a 2014 sale of a nearby property which amounted to $600 per square foot indicates a value for the 62,328 square foot project site at well in excess of $37 million. In response to this context: high construction and land costs combined with efforts to provide the above quantum of affordable units, exemptions from customary fees and Land Use Ordinance regulations and permits are necessary and are therefore being sought.

The exemption requests which follow are necessary to achieve and maintain the financial feasibility of the project. The primary objective is to reduce the per-unit cost of development sufficiently to achieve financial feasibility. In addition to the sets of exemptions cited above, the project also intends to seek a GET tax exemption by providing 60% of its units as affordable units accessible to those with incomes of 140% and below Area Median Income (AMI). If these exemptions are achieved, both SamKoo and the State of Hawaii will be able to maximize the number of quality affordable units that will be delivered to the public in a timely, soundly built, aesthetically pleasing, and efficiently configured building at this very central location. The building will be in convenient proximity to many of the facilities and services required to support the urban lifestyle needs and preferences of its occupants. Project residents will have convenient access to employment, shopping, dining, family services, and access to multiple forms of transportation with which to reach other Oahu destinations.

The following is a description of the exemptions being requested for The Central Ala Moana. A summary of these exemptions, presented in tabular form in Section 5.3, follows these narratives.

5.2 REQUESTED EXEMPTIONS

Exemption from Revised Ordinances of Honolulu, Land Use Ordinance Section 21-3.120-2(b) (Table 21-3.4) and 21-3.120-2(c) Business Mixed Use Districts and Development Standards

- Exemption from Land Use Ordinance Sec. 21-3.120-2(b)(Table 21-3.4) is sought to allow The Central Ala Moana to exceed the current allowable maximum height of 350 feet. Its residential tower component is projected to be approximately 400 feet in height.

  This additional height has no visual impact on distant views toward the Koolau Mountains from Diamond Head or Punchbowl, two key view corridors cited by the Primary Urban Center Development Plan (PUCDP). In addition, the Project's location does not fall within or near the nearest designated view corridors along Piikoi and Keeaumoku Street. Furthermore, The Central Ala Moana Tower height conforms to and is therefore consistent with the draft Ala Moana Neighborhood TOD Plan, which proposes a maximum tower height of 400 feet in this area.

  The Central Ala Moana may be visible from the shoreline, but it will be among a cluster of tall buildings that will include the Ala Moana Building, American Savings Bank, Uraku Tower in the immediate project area, and Hawaii Iki Tower, 1350 Ala Moana, Nauru Tower, Hokua, Koolani, Waihonua, Anaha, Waiea, and Aeo in eastern Kakaako. With respect to this, it should be noted that with the exception of 1350 Ala Moana, the towers identified in eastern Kakaako are at least 400 feet tall and therefore at least equal in height to the proposed height of The Central Ala Moana. As one addition to an area already characterized by tall buildings, many of which are already as tall as it will be, The Central Ala Moana's individual visual impact, by its addition to this grouping, should not be significant.

  In addition, by setting back considerably from Kapiolani Boulevard and orienting parallel to the street, the tower, additionally shielded by the large monkeypod trees along its

frontage, has effectively minimized its visual presence to motorists along Kapiolani Boulevard.

In summary, the proposed height of The Central Ala Moana Tower is already consistent with the scale set in 1970 by the Ala Moana Hotel and the clusters of towers in Kakaako. It is consistent as well with the draft Ala Moana Neighborhood TOD Development Plan heights and is therefore consistent with the future development scale the draft Plan proposes for this part of the Ala Moana "Neighborhood".

- Exemption from Land Use Ordinance Sec. 21-3.120-2(c)(5) is sought to exempt The Central Ala Moana from height setback requirements from the street. Height setbacks as outlined in this ordinance would significantly restrict both the tower and parking garage building envelopes and prevent them from achieving the volume needed to house the number of units and supporting parking stalls needed to make the proposed project physically and financially feasible. It would also result in a more complicated and hence more expensive building geometry that would materially jeopardize the cost efficiencies that The Central Ala Moana, as an affordable housing project requires for economic feasibility.

- Exemption from Land Use Ordinance Sec. 21-3.120-2(b)(Table 21-3.4) is sought to allow The Central Ala Moana to exceed the maximum (bonus-generated) density of FAR 3.5 (the maximum allowed in exchange for public open space and arcade contributions) permitted by the BMX-3 zoning district. In order to achieve financial feasibility while making 60% of its units affordable to households earning 100%-140% of Area Median Income, the proposed project must have the magnitude of floor area required to do so. The Central Ala Moana's proposed FAR 10.0 helps make this possible.

- Exemption from Land Use Ordinance Sec. 21-3.120-2(b)(Table 21-3.4) is sought to allow The Central Ala Moana parking garage structure and the parking garage entry ramp to encroach into the 10-foot side and rear yard setbacks in order to enable the inclusion of the necessary facilities the garage has been programmed and designed to house.

- Exemption from Land Use Ordinance Sec. 21-3.120-2(c)(1) is sought to exempt The Central Ala Moana from landscaping all front yards. In keeping with the spirit of the Ala

Moana Neighborhood Transit Oriented Development (TOD) Plan which seeks to accommodate increased volumes of pedestrian traffic by creating a streetlevel environment in which the pedestrian is the preferred mode of local mobility, the Project proposes to provide widened sidewalks and an integrated plaza along the Project's Kapiolani frontage to accommodate anticipated increases in pedestrian through traffic while also providing an open publicly accessible plaza conducive to social interactions, leisure, and rest for an enlivened Ala Moana Neighborhood. In addition, it proposes to maximize available free sidewalk space along Kona Iki Street to facilitate anticipated increases in pedestrian traffic that would occur with the completion of the planned Ala Moana rail station. While proposing a more generous pedestrian circulation space and plaza along Kapiolani Boulevard, the project also proposes a widened planter zone along the outboard edge of the sidewalk as an enhanced buffer from automotive traffic and a more generous root zone for the existing Monkeypod trees, and as a green counterbalance to the pedestrian hardscape. In addition, the Kapiolani Boulevard driveway will be framed with landscaping, areas between the residential tower and parking garage will include strategically placed landscaped areas, and the entire Kona Street face of the parking garage will feature a landscape edge between it and the Kona Street sidewalk.

<u>Exemption from Revised Ordinances of Honolulu, Land Use Ordinance (LUO) Section 21-6.20 (Table 21-6.1), Off-street Parking Requirements</u>

- Exemption from Land Use Ordinance Sec. 21.6.20 (Table 21-6.1) is sought to allow for less than the minimum required off-street parking spaces. The LUO would require that the proposed project provide a total of 950 parking stalls: 861 resident stalls, 27 commercial stalls, 52 guest stalls, and 10 electric car stalls. The Central Ala Moana proposes to provide a total of 803 parking stalls: 677 resident stalls, 18 commercial stalls, 26 guest stalls, 8 electric car stalls, 16 handicap accessible stalls, and 58 stalls for other project uses, possibly as additional residential stalls, to be determined at a later date. The Central Ala Moana's proximity to multiple City bus lines, the future Ala Moana HART station, and places of employment and lifestyle services are anticipated to reduce the need for personal automobiles. The reduced parking count also supports PUCDP recommendations for promotion of alternative forms of transportation and recognizes the draft Ala Moana TOD Plan's even lower parking requirements for similar reasons. In reducing its parking count in the way proposed, The Central Ala Moana supports

prevailing City urban transportation policies while maintaining a sufficiently attractive number of resident-oriented stalls to facilitate the marketability of project units while current individual transportation preferences for private automobile use transition to coincide eventually with emerging public policy.

Exemption from Revised Ordinances of Honolulu, Chapter 22, Article 7, Park Dedication Ordinance

- Exemption from Park Dedication requirements as set forth in Chapter 22, Article 7, Revised Ordinances of Honolulu is sought. The Park Dedication Ordinance would require the provision of land equal to 110 square feet for each residential unit or an in-lieu fee payment for the required amount of land based on the market value of the project site.

  Meeting this requirement would result in the provision of 56,430 square feet of park land or in-lieu fees equivalent to the value of the same quantity of land based on the per square foot market value of the project site. The amount of land that would be required is nearly as large as the 62,328 square foot project site, which, as a premium central Honolulu property, commanded a very high price when it was purchased. In the intervening years, its value has risen. Given the size of the project site and its very high value, both versions of this requirement are impossible to achieve onsite and are cost-prohibitive for an affordable housing project. In order to achieve financial feasibility, the buildings of The Central Ala Moana have to occupy nearly the entire site except for the approximately 19,318 square feet of recreational, leisure, circulation spaces and landscaping created to accommodate resident and public enjoyment spaces and their linking circulation. Provision of the required land onsite is not possible and payment of an in-lieu fee based on the market value of this project site or any other urban parcel would be prohibitive given the project's affordable housing orientation.

  The numerous nearby parks and fitness centers cited previously in this document under *Nearby Resident Services and Facilities* in Chapter 2 and *Recreation Facilities* in Chapter 3 are available, are in convenient proximity, offer a wide spectrum of recreational experiences for project residents, and can be used to help fulfill their various recreation requirements.

In addition, The Central Ala Moana proposes to provide recreational and leisure space amenities of its own in the space available at the site. It proposes an approximately 19,289 square foot elevated recreation deck that is projected to include approximately 14,670 square feet of open lawn and furnished hardscape for its residents adjacent to swimming pool cabanas, a resident health club and party room totaling an additional 4,619 square feet of indoor recreation opportunity. At the street level, its approximately 4,355 square foot public plaza fronting Kapiolani Boulevard provides leisure and social gathering space for residents, customers, and passersby alike, while the approximately 14,963 square-feet it has committed for public bicycle storage and landscaped open space to accommodate comfortable strolling in a socially oriented, promenade-like atmosphere is intended to promote a relaxing setting to the overall outdoor environment for both residents and the community at large.

These onsite facilities total approximately 38,607 square feet or nearly an acre of recreational and leisure spaces and facilities. They represent a genuine effort to provide for a meaningful share of the recreational and leisure needs of its future occupants in immediate proximity to their place of residence while also offering passersby with opportunities for relaxation and leisure experiences in the landscaped and open space settings fronting the Project.

Given the cost-prohibitive nature of the Park Dedication Ordinance applied to an affordable housing project on a high-value parcel of central Honolulu land, the abundance of nearby public recreational facilities, and the recreational contributions of the project itself, the applicant believes this request is justified and reasonable. Therefore, The Central Ala Moana requests exemptions from both the park dedication and in-lieu fee requirements for all project affordable and market units. Based on project unit count and the project's recreational contributions, the estimated fee amount being requested for exemption is $10,693,800.

<u>Building Permit and Plan Review Fees</u>

- Exemption from Sections 18-6.1 and 18-6.2, Revised Ordinances of Honolulu is requested to allow exemption from building permit and plan review fees including the fire

department review fee, trenching permit fee and grading permit fee to help achieve the economic feasibility of The Central Ala Moana as a 201H affordable housing project.

- Exemption from Section 20-1.1(3), amending Section 1.12.8, *Fire Plans Review Fee*, Revised Ordinances of Honolulu, is requested in conjunction with the above request. In summary, this is a request for exemption from payment of Fire Department plan review fee of 10 per cent of the building permit fee, and any related fire department plan review fee.

Public Works/Infrastructure Fees

- Exemption from Revised Ordinances of Honolulu (ROH), Sec. 14-14.4 is requested to exempt payment of grading and grubbing fees to facilitate the achievement of project economic feasibility.

- Exemption from Revised Ordinances of Honolulu (ROH), Sec. 14-12.12 is requested to exempt payment of storm drain connection fee to facilitate the achievement of project economic feasibility.

- Exemption from Revised Ordinances of Honolulu (ROH), Sec. 14-10.3 and Sec. 14-10.6 is requested to enable *all* project units sold as affordable units to qualify for the Wastewater System Facility Charge (WSFC) reduction currently applied to units sold at 80% AMI and below.

Table 12: Requested Exemptions follow in Section 5.3 on the next several pages summarize the foregoing requests.

5.3 SUMMARY TABLE OF REQUESTED EXEMPTIONS

SUMMARY OF REQUESTED EXEMPTIONS				
Requested Exemptions				
Development Standard or Requirement	**Relevant Section/ Requirement**	**Requested Exemption/ Est. Value where Appropriate**	**Applicable Agency & Comments**	**Rationale or Request**
Building Height	LUO Sec. 21-3.120-2(b) Table 21-3.4/ 350 feet	An exemption from LUO Sec. 21.3.120-2(b) (Table 21-3.4), is sought to allow the Project to exceed the current allowable maximum height of 350 feet. The proposed Project height is approximately 400 feet (+ 18 feet for customary mechanical rooftop equipment)	Department of Planning and Permitting (DPP)	Proposed height is needed to provide 513 affordable and market residential units at a cost enabling project feasibility. The proposed project height of 400 feet is consistent with the height of the adjacent Ala Moana Hotel, built in 1970, and with proposed City Ala Moana TOD Plan which proposes a maximum height of 400 feet in the area in which the project is located.
Height Setback Requirements	Sec.21-3.120-2(c)(5) At street frontages, setback at 10:1 angle after first 40 feet of height	An exemption from LUO Sec. 21-3.120-2(c)(5) is sought to exempt the Project from height setback requirements from the street. The applicant proposes no height setbacks.	DPP	This exemption is requested to enable the achievement of sufficient building volume to house project housing units and facilities and to achieve a sufficiently simple building geometry to facilitate project economic feasibility. The LUO - required setback reduces building envelope capacity and complicates building geometry and accompanying construction costs.

SUMMARY OF REQUESTED EXEMPTIONS (cont'd.)				
Requested Exemptions				
Development Standard or Requirement	**Relevant Section/ Requirement**	**Requested Exemption/ Est. Value where Appropriate**	**Applicable Agency & Comments**	**Rationale or Request**
Floor Area Ratio/Density	Sec. 21-3.120-2(b) (Table 21-3.4)/ 3.5 maximum FAR	An exemption from LUO Sec. 21-3.120-2(b) (Table 21-3.4) is sought to allow the Project to exceed the maximum allowable density of 3.5 (with open space bonus). The Project proposes a building floor area ratio (FAR) of approximately 10.0	DPP	Requested FAR is needed to provide the floor area quantum required to create the 513 residential for-sale units needed to achieve affordability targets and project economic feasibility. The provision of affordable housing at this central location and high-value site is a significant contribution and community benefit justifying this request. Residents will enjoy proximity to employment centers, shopping, parks, transportation options, and other services. The Project with proposed exemption would yield approximately 201 more total units and 123 more affordable units than would be possible under current zoning, enabling the project to offer these opportunities to a greater number of people than would have been possible under the restrictions of existing zoning. Community benefits that the project would be able to offer to the general public with this exemption would include widened sidewalks, a public plaza, and a public bicycle storage area that could become part of a district-wide bike-share program

SUMMARY OF REQUESTED EXEMPTIONS (cont'd.)				
Requested Exemptions				
Development Standard or Requirement	**Relevant Section/ Requirement**	**Requested Exemption/ Est. Value where Appropriate**	**Applicable Agency & Comments**	**Rationale or Request**
Side and Rear Yard Setbacks	Sec.21-3.120-2(b) (Table 21-3.4) 10 feet	An exemption from LUO Sec. 21-3.120-2(b) (Tablel 21-3.4) is sought to allow the parking garage structure and the parking garage entry ramp to encroach into the LUO-required10 foot setbacks. The proposed exemption is to allow for no side or rear yard setbacks.	DPP	These exemptions are requested in order to provide necessary project parking, loading, commercial, resident support and building service elements, to achieve livable proportions in the open space between the tower and parking structure, and to provide sufficient front yard setback to buffer residential units from traffic noise and enable the proposed public circulation and open space plaza amenities along Kapiolani Blvd. The project has three street frontages and no rear yards.
Front Yard Landscaping	Sec. 21-3.120-2(c)(1)	An exemption from LUO Sec. 21-3.120-2(c)(1) is sought to exempt the Project from the LUO requirement to landscape all yards except for necessary access drives and walkways on site.	DPP	This exemption is requested to enable the Project's Kapiolani Boulevard and Kona Iki Street frontages to accommodate the City's anticipated increases in pedestrian traffic in the Project area and to allow the provision of a publicly accessible plaza along the Kapiolani frontage conducive to social interaction, rest, and leisure separate from and nonconflicting with the public circulation zone. Landscaping the Project front yards would eliminate these benefits.

SUMMARY OF REQUESTED EXEMPTIONS (cont'd.)				
Requested Exemptions				
Development Standard or Requirement	**Relevant Section/ Requirement**	**Requested Exemption/ Est. Value where Appropriate**	**Applicable Agency & Comments**	**Rationale or Request**
Off-street Parking Requirements	Sec. 21-6.20 (Table 21-6.1) • Residential : 861 stalls • Commercial: 27 stalls • Guest: 52 stalls • EV: 10 stalls • Total: 950 stalls	An exemption from LUO Sec. 21-6.20 (Table 21-6.1) is sought to allow for less than the minimum required off-street parking spaces. The LOU would require a total of 950 parking stalls. The Project proposes 803 total stalls.	DPP	With public bus and future HART transportation terminals nearby and project-proposed provisions to facilitate pedestrian circulation as alternatives to private automobile transportation, this request is reasonable: The proposal to provide parking at lower than LUO requirements: • Facilitates project affordability and economic feasibility • Promotes the use of public modes of transportation • Is consistent with PUCDP intent The exemption Is consistent with the Ala Moana Neighborhood TOD Plan intent for reduced parking while recognizing that as one of the first or "pioneer" projects in an intended TOD area, future project occupants will still have a wide range of transportation preferences, including preferences for the private automobile. The proposed parking supply is intended to satisfy this range of customer preferences while respecting the City's TOD intent and facilitating project marketability.

SUMMARY OF REQUESTED EXEMPTIONS (cont'd.)				
Requested Exemptions				
Development Standard or Requirement	**Development Standard or Requirement**	**Development Standard or Requirement**	**Development Standard or Requirement**	**Development Standard or Requirement**
Park Dedication Ordinance	ROH, Chapter 22, Article 7, Park Dedication Requirements 110sf/unit x 513 units = 56,430sf – 38,607 sf onsite recreation and leisure facilities proposed onsite = 17,823 x $600.00/sf =$10,693.00	An exemption from Park Dedication requirements as set forth in Chapter 22, Article 7, ROH is requested. The request is to exempt the Project's Park Dedication liability of 56,430 sf (or 90% of the site), or equivalent in-lieu fees. *Est. Value: based on recent land sales at adjacent site in 2014 amounting to $600.00/sf, and subtracting proposed onsite recreation, leisure, & open space facilities of 38,607 sf., liability would be $600.00/sf x 17,823 sf = $10,693,800*	Department of Parks and Recreation (DPR) & DPP	Providing 110sf/unit would require land area equivalent to nearly the entire project site area (approx. 90.5%). Use of the project site to satisfy this request is infeasible. Purchase of this amount of land as an alternative site or payment of the in-lieu fee is economically prohibitive for an affordable housing project. However, there are numerous (at least seven) public parks and at least four health and personal training clubs in the area available for use by project residents. In addition, the Project proposes approximately 38,607 square feet, nearly an acre, of onsite recreational, training, leisure, and open space facilities to meet resident recreation needs.
Building Permit Fees	ROH, Sec. 18-6.2	An exemption from Sec. 18-6.2 ROH is requested, from payment of Building Permit fees Est. Fees: $723,915	DPP	To facilitate the economic feasibility of The Central Ala Moana as a 201H affordable housing project.
Plan Review Fees	ROH Sec. 18-6.1	An exemption from Sec. 18-6.1 ROH is requested from Plan Review Fees *Est. Fees: $25,000*	DPP	To facilitate the economic feasibility of The Central Ala Moana as a 201H affordable housing project.

SUMMARY OF REQUESTED EXEMPTIONS				
Requested Exemptions				
Development Standard or Requirement	**Development Standard or Requirement**	**Requested Exemption/ Est. Value where Appropriate**	**Development Standard or Requirement**	**Rationale or Request**
Fire Department Plan Review Fees	ROH Section 20-1.1(3), amending Section 1.12.8, *Fire Plans Review Fee*	An exemption from Sec. 20-1.1(3) ROH is requested, from payment of Fire Department Plan Review Fees	Honolulu Fire Department (HFD)	To facilitate the economic feasibility of The Central Ala Moana as a 201H affordable housing project. This requested exemption achieves consistency with the above exemption request for exemption from Building Permit fees. HFD plan review fees are based on the amount of the Building Permit fee.
Grading and Grubbing Fees	ROH Sec. 14-14.4	An exemption from Sec. 14-14.4 ROH is requested from Payment of Grading and Grubbing Fees *Est. Grading Permit Fee: $1,500* *Est. Bond Fee: $60,000*	DPP	To facilitate the economic feasibility of Kapiolani Residence as a 201H affordable housing project.
Storm Drain Connection Fee	ROH Sec. 14-12.12	An exemption from Sec. 14-12.12 ROH is requested from payment of Storm Drain Connection Fee *Est. Application Fee: $1,000*	DPP & Department of Environmental Services (DES)	To facilitate the economic feasibility of Kapiolani Residence as a 201H affordable housing project.
Wastewater System Facility Charge (WSFC)	ROH Sec. 14-10.3 Sec. 14-10.6	An exemption from Sec. 14-10.6(d)(1) and 14-10.6(d)(2) wherein all units sold as affordable units qualify for a reduction of WSFC per ROH Chapter 14 Appendix D (2)	DPP/Department of Environmental Services	To facilitate the economic feasibility of The Central as a 201H affordable housing project.

Table 12: Requested Exemptions

6. ALTERNATIVES TO THE PROPOSED ACTION

Three alternative scenarios for use of the project site were examined for their result and impact on the intended project:

- No Action: No development of new housing facilities is assumed at the project site.
- Development in Accordance with LUO and Park Dedication Standards and Requirements
- Development in Accordance with the Ala Moana Transit-Oriented Development ("TOD") Plan, Using Ordinance 14-010 as a Processing Vehicle

In considering the development under LUO/Park Dedication Ordinance and Transit-Oriented Development parameters, it is useful to keep in mind the rationale underlying the design configuration of the current project proposal. The design configuration proposed has been chosen as the most effective strategy for achieving project feasibility, in terms of both the needed unit count and the intended level of quality of the product to be offered.

As an affordable housing project, The Central's proposed configuration consists of an independent residential tower with a simple, prismatically rectangular overall geometry and a separate, freestanding parking structure. The simplicity of the shape of the residential tower optimizes the number of units that can be accommodated, minimizes unit geometric variations among the respective unit types provided, and simplifies construction issues, facilitating the cost efficiencies enabling project feasibility.

Making the residential tower and its parking garage separate, freestanding buildings eliminate the potential complications that can result from having to accommodate differing residential and parking garage structural requirements. It also eliminates the need to accommodate residential electrical and mechanical systems that an integrated tower and parking garage structure would require as these systems pass from the residential tower down through garage to utility connections at ground level.

Both these strategies: Simplicity of geometry and independence of the two project structures, each with its own functional, structural, and systems requirements, are fundamental to project economic feasibility.

Given these considerations, the findings of each alternative development constraint scenario are summarized below:

6.1 NO ACTION

No action would result in the creation of no units at the project site and no additional units, affordable or otherwise, in the project area. The result would be:

- Continued underutilization of the site in its present condition and level of development; This site would be considered underutilized by BMX-3 Community Business District development standards
- Conflict with the PUCDP, which prescribes full development of the Primary Urban Center, and high-density housing around transit stations
- No reduction in the scarcity of affordable and moderately priced residential units on Oahu
- Less property tax contribution compared to the other alternative scenarios

6.2 DEVELOPMENT IN ACCORDANCE WITH LUO AND PARK DEDICATION STANDARDS AND REQUIREMENTS

Development pursuant to current LUO requirements would not yield an economically feasible affordable housing project. LUO building envelope constraints (allowable density, allowable height, required height and yard setbacks) constrain project yield (number of residential units and revenue-producing spaces), resulting in a magnitude of resultant product below that required for project economic feasibility. This will be demonstrated in the narrative studies which follow. The first study will examine the number of units possible under LUO regulations if just two of the three required street-based height setbacks are imposed on the residential tower. The second study will examine the number of units possible with the addition of a parking garage to service parking requirements. The third will be a qualitative assessment of impact on site capacity if the third street setback were proposed.

The approximate dimensions used for the buildings which make up The Central Ala Moana residential project will be used.

Unit Capacity Considering the Tower Alone, with Height Setbacks from Kapiolani and Kona Only (Assuming a Tower Oriented Ewa/Diamond Head):

The project property is a square measuring 250 feet per side. Under BMX-3 standards and requirements, maximum FAR is 3.5 and maximum height is 250 feet. Setback requirements are: 10-foot front yards and 10-foot side and rear yards. BMX-3 also requires height setbacks such that a building can be no higher than twice the distance from the centerline of an adjacent street. In this study, only the tower element and only the required height setbacks from Kapiolani Boulevard and Kona Street are considered:

Although the designated building height limit is 250 feet, given the above constraints, a building height of 250 feet could not be achieved.

<u>Consideration 1: Using a Maximum Kapiolani Boulevard Setback as a Height Basis:</u>
Measured from Kapiolani Boulevard, a point 250 feet above grade could be achieved 75 feet from the front property line (at the midpoint of the site), where in combination with the additional 50 feet to the centerline of Kapiolani Boulevard, it would be 125 feet from the centerline of that street, thence enabling a height of 250 feet (2 x 125 feet = 250 feet). Given the 84-foot width (including approximate lanai dimensions) of the residential tower, that would leave only 91 feet from the rear property line, which, in combination with the 20 feet to the centerline of Kona Street, would permit a tower height of only 222 feet (91 feet + 20 feet = 111 feet) when measure from that side. If the current project design were to attempt to fit into this 222-foot height envelope, only 22 residential floors would be possible (19.3-foot first floor: public spaces and residential support spaces, with 9-foot residential "floor-to-floor" dimensions above). If one were to assume the maximum of 13 units per floor, that would yield 286 units, or only 55.6% of the currently proposed 513 units.

If the project were to maintain its proposed 60% affordable unit percentage offering, only 171 or 55% of the originally proposed 310 affordable units could be achieved. This would be a dramatic decrease in the number of affordable units deliverable under current LUO requirements when using this approach and considering the tower alone on the site. This would dramatically impact the ability of The Central to provide much needed affordable units as well as its ability to contribute substantively to the residential component essential to the success and vitality of the livable community envisioned within the proposed Ala Moana Transit-Oriented Neighborhood.

Consideration 2: Finding the Maximum Height of a Tower:

The optimum way to achieve maximum tower height is to make the tower equidistant from the centerlines of both Kapiolani Boulevard and Kona Street. The total distance between those centerlines is 320 feet. Placing the 84-foot wide tower equidistant from those centerlines would make its front and back faces each 118 feet from those centerlines, enabling a 236-foot tall tower that would be 68 feet from the Kapiolani Boulevard property line and 98 feet from the Kona Street property line.

At 236 feet in height with a 19.3-foot first floor and 9-foot residential floor-to-floor dimensions, 24 residential floors could be achieved. At 13 units per floor, 312 residential units could be achieved. If 60% of total unit count were to be made affordable, 187 affordable units would result. As a result, both the total and affordable unit counts would be about 60% of what the current 513-unit project proposal currently offers.

Given this, it is clear that developing the site in accordance with LUO standards and requirements, even if considering nothing but maximum residential tower capacity and two street height setbacks, would not only yield far fewer units than the current proposal and result in far less benefit to the community and public housing objectives, but would also defeat project economic viability.

In summary, even when considering only the tower element and two height setbacks on the project site, neither of the above scenarios could achieve more than 60 percent of the proposed unit count of the current proposal, a situation detrimental to the satisfaction of housing need, public housing policy, and project economic feasibility.

Impact on Site Capacity When Considering the Inclusion of an Onsite Parking Garage:

A Freestanding Parking Garage:

In addition to the above limitations, it would also be impossible to place a functioning, independent parking structure on the site in combination with either scenario. The parking structure as originally proposed is a simple and efficient, two-bay, 90-degree parking stall configuration in a "split plate" design made up of two parking plates consisting of two rows of

parking stalls with a central drive aisle on each plate, connected by ramps to connect each bay vertically to the other at "half level" floor height intervals. This kind of configuration requires a minimum of 120 feet of width (a minimum of 60 feet of width per plate). Assuming the required 10-foot rear yard setback, there would be only 81 feet between the rear of the tower and the Kona Street property line of the project site in Scenario 1 and 88 feet between the rear of the tower and the Kona Street property line in Scenario 2. A single two-bay parking garage is not possible under either configuration.

An independent parking structure placed parallel to Kona Street with a reasonable 20-foot separation between the parking garage and tower would only be possible if the tower were 120 feet (parking garage) + 10 feet (rear yard setback) + 20 feet (tower/parking garage assumed separation) or a total of 150 feet from the project site's rear or Kona Street property line. Given an 84-foot wide tower, that would place the front face of the tower 234 feet from the rear property line and 16 feet from the front or Kapiolani Boulevard property line. In that position, the tower face would be 66 feet from the centerline of Kapiolani Boulevard. With height setback requirements allowing a height of 2 times the distance to the centerline, the tower would be only 132 feet tall. Given the first and upper floor heights of the proposed project, that would yield only 12 residential floors hosting a total of 156 residential units, of which 94 would be affordable, with both unit counts only about 30% of the unit counts proposed by the current project proposal, to the even greater detriment to those in search of economically accessible housing and State and County objectives for meeting housing need.

Placing the Tower on Top of a Parking Garage:

The current project proposal proposes a separate tower and parking garage to simplify technical design and construction issues and to make the project cost efficient. Separate structures avoid the complications and added costs which result from comingling structural, mechanical, and electrical systems between two building with different structural requirements and functional characteristics. Combining the tower and parking garage not only introduces those complications and added costs, but also results in substantial reduction of residential units possible, as a portion of the total LUO-permitted building height is consumed by parking garage floors.

Considering the (*Also Required*) Third Building Height Setback from Kona Iki Street:

The Kona Iki Street building height setback generated by Kona Iki Street (and added to the height setbacks generated by Kapiolani Boulevard and Kona Street) further reduces unit count and also possibly reduces parking garage capacity by shortening the Ewa/Diamond length of both structures, thus further negatively impacting the economic viability of the proposed project.

Incidentally, if the tower and parking garage were oriented mauka-makai, the long dimensions of both structures would be vulnerable to building height setbacks from two sides rather than just one side: from both the Kapiolani Boulevard and Kona Street sides of the site, reducing both residential unit and parking garage capacities even further than with the currently proposed Ewa/Diamond Head orientations of both structures.

The Park Dedication Requirement:

In addition to the foregoing constraints, the imposition of existing Park Dedication requirements, which would require the provision of 110 square feet of land per unit or fees in lieu of such provision based on the current market value of the project site would further increase project costs and the economic infeasibility of the project conducted under BMX-3 development standards. As a compact, urban site, it would not be possible to satisfy the resulting parkland requirement onsite. Because of the high value of the land which constitutes the project site, substituting the provision of land with in-lieu fees would result in very high fees that would be prohibitively detrimental to the economic feasibility of this proposal.

Given these factors, it is clear that development in accordance with existing LUO and Park Dedication requirements would not lead to an economically feasible affordable housing project.

6.3 DEVELOPMENT IN ACCORDANCE WITH THE ALA MOANA TRANSIT-ORIENTED DEVELOPMENT ("TOD") PLAN USING ORDINANCE 14-010 AS A PROCESSING VEHICLE

The project is located in the "Kapiolani Corridor" subdistrict of the Ala Moana Transit-Oriented Development (TOD) Precinct. Ala Moana TOD Plan in this subdistrict envisions building heights of 400 feet in the area of the project site, mauka-makai tower orientation, 12-foot Kapiolani

Boulevard "build-to" frontages, a Floor Area Ratio ("FAR") or "building density" of 10.0 (10 times the area of the parcel(s) on which the project would be built, pedestrian-friendly streetscapes, and street-level commercial frontages. It would achieve this by allowing for departures from existing LUO requirements that would be negotiated for “community contributions” determined on a discretionary basis during the project review and permitting process. Ordinance 14-010 was enacted as a vehicle for processing TOD-oriented projects in TOD-designated locations in advance of an in-force TOD Plan and ordinance.

Provisions of Ordinance 14-010 would allow building heights of up to 450 feet and an FAR of 7.0 at the project site. However, as this Ordinance also requires that proposed TOD projects be generally consistent with the current version of the Draft Ala Moana TOD Plan, the maximum permitted height of the proposed project would more likely be 400 feet instead of 450 feet and the FAR would more likely be 10.0 instead of 7.0.

Disadvantages of a Mauka-Makai Orientation:

The Central Ala Moana project site context contains adjacent elements that would make a mauka-makai tower orientation disadvantageous, especially given the site size, adjacent development possibilities, and the parcelization pattern of the site and immediately surrounding area.

As previously cited, the project site is a 250-foot square. The American Savings Bank office tower stands immediately west of the site along the west edge of Kona Iki Street. The adjacent sites, which currently host low-rise commercial buildings but which could potentially undergo consolidation and redevelopment to more intensive urban uses consistent with TOD parameters, is 250 feet from Kapiolani Boulevard to Kona Street and 200 feet east-to-west (from the project site to the site hosting the Ala Moana office tower). If The Central's residential tower were to be oriented mauka-makai, both its long dimensions, from which its units would look out, would have another tower as the dominantly primary near view: the American Savings Bank tower to the west, and the Ala Moana office tower to the east. If the adjacent commercial site to the east were to redevelop to TOD scale and tower orientation guidelines, the primary view from The Central Ala Moana's eastward facing units would be of an even closer parallel nearby tower. Both these situations would create undesirable view aspects and possible privacy concerns for The Central's residents and residents of the adjacent tower to the east.

In addition, although a directly mauka-makai view of this series of towers may allow for mauka makai views between them, given their closeness in relation to their size as a result of the size of their parcels, it would not take too much of a diagonal view angle of this tower grouping to transform their mauka-makai "view corridors" into a solid wall of visually overlapping buildings. Therefore, the view aspects toward these towers as well as from within them could present more disadvantages than benefits for tower occupants and the general public alike, and in a sense, create the very visual experience that the mauka-makai tower orientation intended to avoid: a visual perception of a solid wall of (visually overlapping) towers.

A mauka-makai tower orientation is also disadvantageous when the siting of the project parking garage is considered. If the tower and parking garage were to remain as the separate, freestanding structures needed to facilitate project feasibility, an end-wall of the parking garage would front Kapiolani Boulevard. The garage's unavoidably utilitarian appearance, regardless of surface texturing or ornament, would create a visually undesirable front face for a considerable part of the project street frontage.

In addition, as freestanding tower/parking garage structures, the tower element would have to be located very close to one of the site's mauka-makai property lines, bringing tower occupants into even closer proximity to existing nearby towers. If the adjacent commercial site to the east were to be redeveloped to TOD parameters and The Central's parking garage were to be sited on the west side of the project site, the Central's residential tower proximity to an eastern neighbor would be increased, potentially accentuating near-view and potential privacy concerns.

Reduction of this proximity issue could be achieved by placing the residential tower atop the parking garage, centering and aligning it along the mauka-makai axis of the project site. While the distance to towers to the east and west would be increased, the placement atop the garage, which would consume some of the permitted 400-foot building height, would increase project expense, reduce project unit count, and also potentially reduce or eliminate project economic feasibility.

<u>Proposed TOD Plan Building Setbacks:</u>

The TOD Plan proposes a 12-foot building setback from the Kapiolani Boulevard property line, with a building height setback of 20 feet above a building height of 60 feet. The Central Ala Moana's Kapiolani Boulevard frontage includes a line of mature monkeypod trees approximately

50 feet in diameter. These trees are part of a long series of monkeypod trees lining nearly the entire length of Kapiolani Boulevard, beginning with its western end at the edge of the Capitol District. The wide canopies of these monkeypods shade and soften the driving experience along this well-travelled internal urban arterial, giving it a unique identity and an ambience matched by no other major central Honolulu street. As such, Kapiolani Boulevard is a unique and highly valued "signature" thoroughfare, an orienting route giving those who travel it readily discernable clues to where they are in the city.

A building face placed at a 12-foot setback from the Kapiolani Boulevard property line would collide with the spread of the site's existing monkeypods, requiring the removal or significant pruning of their canopies. Pruning to maintain the long-term health of these trees would require a consistent reduction of canopy along its entire circumference. This would significantly alter the appearance of the monkeypods and their streetside presence and coverage along the length of the site.

If the project were to extend only a single story beneath the existing monkeypod canopies to meet the 12-foot setback line, disruption of the canopies may still occur to enable construction of this extension. If this single story could be extended without disruption of the existing canopies, the result would be the presence of a part of the project under the mature branches of existing trees, creating a situation of potential liability for the city and hazard to the building should a branch fall on the building beneath it.

Summary:

In summary, developing The Central at Ala Moana in accordance with the Ala Moana TOD Plan and Ordinance 14-010 in a way that provides as much separation between towers and as much respect for occupant privacy as possible is not likely to yield the appropriate unit count or to meet cost parameters needed for project economic feasibility. In addition, because of existing and potential neighboring towers, the mauka-makai tower orientation is also likely to produce a project with less than optimum attractiveness to a potential buyer, resulting in a potentially considerable competitive disadvantage in the marketplace. Further, building to the 12-foot setback line conflicts with the City's existing monkeypod tree canopies, could alter the ambience they would lend over Kapiolani Boulevard, and could create potential City liability and hazards to the project's building should it be attempted.

Finally, despite the defined review times prescribed by Ordinance 14-010, the discretionary nature of the negotiations and possible applicant or project contributions that may be required to achieve needed relief from existing LUO requirements creates uncertainty in project cost and schedule. These are important factors which are severely critical in the development of an affordable housing project on a very high value urban site where construction activities, already complex in an urban high-rise project, are further complicated by the need to maintain onsite and adjacent area safety in a confined setting.

6.4 CONCLUSION

Given the examination of the above alternative scenarios, the selected alternative: development of the proposed 513 units in a 43-story residential tower in accordance with Section 201H-38 exemptions appears to be the most feasible alternative. In addition, the HRS Section 201H-38 approach carries with it the greatest amount of certainty of all available alternative processes, helping to achieve the cooperative relationship and timeliness important to facilitating project success.

7. DETERMINATION OF FINDINGS, AND SUPPORTING REASONS FOR DETERMINATION

7.1 SIGNIFICANCE CRITERIA

A. *Involves an irrevocable commitment to loss or destruction of any natural or cultural resource.*

This document includes evaluations of existing natural and cultural (archaeological/historic) resources. Findings of these evaluations were that no known natural resources had been found, and that monitoring of the existing monkeypod trees and onsite buildings prior to actual construction would prevent disturbance or destruction of migratory white terns, their eggs, or young should they be present at the site.

Site functional requirements necessitate the removal and replacement of one mature monkeypod tree and its replacement onsite with another monkeypod tree at a location west of its current position. The replacement tree would be planted in the site's widened street tree planter strip adjacent to Kapiolani Boulevard, between an existing monkeypod tree and the project's planned access driveway. This decision was reached in consultation with the City Department of Parks and Recreation, Division of Urban Forestry, which will continue in consultation with the project's design and other technical professionals to ensure proper handling and placement of the replacement tree.

Finally, no archaeological or historic site of significance was discovered during the site archaeological inventory survey. As a result of this and the nature of the surface and subsurface composition of soils at the site, no further archaeological work was recommended for the Project site.

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

The Central Ala Moana's proposed use is consistent with State and City and County plans and land use designations. Rather than curtailing the range of beneficial uses of the environment, its implementation would enhance and expand them by converting a currently underutilized site which is predominantly a paved parking lot with two old, low-rise commercial storage and commercial buildings containing a parking garage, materials storage area, one commercial

beverage establishment, and two small business offices into a fully developed site offering quality affordable and market housing opportunities and an enlivened streetscape consisting of commercial storefronts, widened public sidewalks, and a publicly accessible plaza. It will offer an enhanced environment and provisions for pedestrians and bicyclists. Most significantly, it will offer 513 quality affordable and market rate housing units on a premium site in one of the most highly valued activity nodes in Central Honolulu at a location that will feature exceptionally convenient proximity to some of the city's best lifestyle support services, facilities, and urban attractions.

In accomplishing this, The Central Ala Moana project will convert a site operating at a marginal level of use into a site operating at an optimal level of use offering abundant and multiple benefits to its future occupants, customers, and the community at large. Its implementation and operation will physically and aesthetically enhance its immediate context, and with its resident population and the high levels of activity generated by the commercial enterprises it will host, it will provide an enhanced level of security, commerce, and economic benefit to its portion of the emerging Ala Moana TOD neighborhood.

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

An applicable policy of Chapter 344 states: "Develop communities which provide a sense of identity and social satisfaction in harmony with the environment and provide internal opportunities for shopping, employment, education, and recreation." The Central Ala Moana is located in an area already rich in shopping, employment, education, and recreation opportunities and facilities, an area which is intended for further development along similar lines as a richly vibrant, urban mixed-use "neighborhood" in which opportunities for interaction with other areas and inhabitants of urban Honolulu and even rural Oahu will be increased.

With its residential tower set behind an open public plaza and enhanced sidewalks, the Project achieves a harmonious relationship with the public domain in ways that both preserve and make full use of the uniquely widespread canopies of the site's existing monkeypod trees. In addition, the Central Ala Moana, by contributing residential and storefront commercial components to this

already lively commercial context, will, in doing so, operate in concert with its urban environment and with existing and emerging public policy.

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

The Central Ala Moana, when complete, will beneficially affect the economic and social welfare of the immediate and larger community. Its positive aesthetic presence will enhance the visual character of its immediate area and set the tone for beneficial development of the future neighborhood. Its mixture of storefront commercial and residential facilities and its public spaces will enhance neighborhood shopping, residential, and lifestyle options. The magnitude of its 513 affordable and market rate units will meet a severe and widespread need for such housing on Oahu and provide future residents an opportunity to locate in a part of the city that has been often economically out of reach for some of its constituent market segments.
In the short term, its construction will provide jobs and increasing sales and income volume in the construction industry and the businesses which service it. As previously cited under "Socio-Economic Characteristics", the completed project will increase public tax revenues as a result of employment, sales-driven higher personal and business incomes and the increased property value that will result from the property improvements that the new facility will bring.

A *Cultural Impact Assessment for the Kakaako Community Development District Mauka Area Plan, Waikiki Ahupuaa, Honolulu (Kona) District, Oahu Island* was prepared as part of the Environmental Impact Statement for the Hawaii Community Development Authority in support of the Kakaako Community District Mauka Area Plan. The "Area of Potential Effect" (APE) for a Cultural Impact Assessment (CIA) is substantially larger than for archaeological studies. This CIA "extends [from the currently designated Kakaako Mauka Area] to wider associations throughout Waikiki Ahupuaa, Kona District, and beyond". The Central Ala Moana site lies within this area of coverage.

The CIA found that the general area between Honolulu and Waikiki was characterized by fishponds, salt ponds, occasional taro loi, and trails connecting Honolulu and Waikiki. The study also noted that Kewalo and the adjacent Kaakaukui and Kukuluaeo districts were traditionally noted for fishponds, salt pans, and marshlands where pili grass grew. Religious rites and

resource gathering were also practiced in this general area. Since the APE covers a very wide area, the specific locations of these activities and sites are elusive.

The project site has been part of the urban Honolulu business and social context for more than a century in an area in which extensive and systematic filling in of lands and progressively intensifying urban uses have and continue to occur. At present, no pre-European cultural practices exist at the site and an archaeological inventory survey conducted there found no significant archaeological or historic remains.

In keeping with recommendations of the Mauka Area CIA, efforts to avoid impacts on view corridors and existing green spaces should be made, any infrastructure concerns, if they arise, should be addressed with the community prior to development, and community members should be consulted to address and integrate any community concerns that may arise in the design of site improvements.

The Project has identified and addressed its relationship to significant public view corridors identified by the City's Primary Urban Center Development Plan, which covers the region in which the project is located. An examination of this relationship found that, given its specific context within the existing and emerging urban pattern, the project does not by itself have impact on this view corridor. At present, there are no infrastructure concerns. To address previous wastewater transmission issues, the project owner, SamKoo, was part of a group of property owners which funded improvements to sewer line capacity in and adjacent to the project area to enable adequate sewer line capacity for those properties.

SamKoo and its consultants have previously consulted with the community through the Ala Moana/Kakaako Neighborhood Board to present and discuss the project during its development as a TOD-oriented project. SamKoo plans further consultations with the Ala Moana Neighborhood Board to present the project again, this time in its present orientation and form as a 201H Affordable Housing project.

Further community access to the project review process will be possible as the project continues through its requisite entitlement processes, through the formal public review and comment period for this Environmental Assessment and the subsequent Honolulu City Council review process.

E. Substantially affects public health.

Construction of The Central Ala Moana may create temporary noise increases and impacts to air quality as a result of site development and building construction activities. However, these potential impacts will be short-term and will be monitored and conscientiously managed to avoid adverse public health impacts. All such activities will comply with applicable regulations and appropriate mitigation measures will be implemented as required.

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

The creation of 513 new residential units in the Ala Moana area will have secondary impacts. Its impact on population will be positive and consistent with public policy intent to fully develop the Primary Urban Center and to create Ala Moana as an activity node in Central Honolulu.

As shown in Chapter 3 of this document, the proposed project is anticipated to have no or minimal impact on public facilities. It will not cause public facilities to exceed their respective capacities. In the case of public wastewater facilities, the applicant was a major contributor to the increasing of the City's wastewater transmission infrastructure capacity by participating in the construction of a 2,000-foot sewer line along Kalakaua Avenue to relieve the strain on the City's Kapiolani Boulevard sewer main.

G. Involves a substantial degradation of environmental quality.

There are no anticipated substantial degradations of environmental quality. While construction activity is anticipated to have short-term impacts on noise, air quality, and traffic levels in the immediate vicinity of the project site, Best Management Practices and other mitigating measures as outlined previously in this document will be undertaken to minimize and mitigate such impacts. The Central Ala Moana's post-construction long term presence and use is not expected to result in long term degradation of environmental quality.

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

No major cumulative effects or commitments to larger actions are anticipated as a result of this project. Its location and purpose is consistent with existing and already long-standing public policies for the concentration of populations in the Primary Urban Center and the intensification of the Ala Moana district. This intensification is likely to result in increased use of public services and facilities. However, intensification of the Ala Moana district will not by itself necessarily create public commitments for larger actions.

Urban intensification is intended by public policy along the future HART rail transit route in the Central Honolulu *region,* in the Kalihi to Ala Moana portion of the first phase of the planned HART route. Public agencies at both the State and City levels are preparing for the results of this policy when implemented, some of which would include increased demands for public services as a result of a cumulative *regional* intensification rather than any intensification of a single district. In view of this, any need for larger commitments of action would be the result of widespread increases in the total spectrum of urban uses over a large area rather than from the individual effects of a single use, site, or district.

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

The project site exists in an intensely urban environment, has been repeatedly modified by human use for over two hundred years, and is currently occupied by commercial enterprises. Threatened or endangered species neither frequent the site nor make it their home. This has been confirmed by the U.S. Fish and Wildlife Service. Information in their files have indicated no federally listed species or designated critical habitat within the immediate vicinity of a nearby site and will probably indicate the same for The Central Ala Moana's site. However, Project personnel are looking forward to a formal response from that agency with respect to this site.

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

Demolition and construction activities will have adverse impacts on air, and water quality and increase noise levels in the immediate vicinity of the site, but both demolition and construction

activity will observe Best Management Practices, comply with applicable regulations and mitigation measures, and take all other practical steps to minimize impacts and noise level increases. Furthermore, these adverse effects will be temporary and will not result in long-term degradation of air or water quality or noise level increases.

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

The Central Ala Moana is located in a highly developed area of Central Honolulu that has been intensely modified for urban uses for over a hundred years. It is located approximately 2,700 feet or 0.51 miles from the coastline and protected by extensive adjacent structures from virtually any direct coastal influence except in the case of an extreme tsunami event, in which case evacuation is recommended by the City. There are no known environmentally sensitive areas in its immediate proximity. In this location, there is no adjacent estuary, beach, or body of fresh or coastal water. The site is partially within the FEMA "AE" flood zone, which indicates inundation flood hazard. The base flood elevation calculated for this zone is 6 feet above mean sea level (msl). However, this hazard will be effectively mitigated by constructing finished floor elevations higher than this elevation, in accordance with applicable City regulations.

Sea level rise has been projected by multiple environmental monitoring and research agencies and organizations. While recent research has concluded that sea level rise as a result of changing climatic conditions is a certainty, the divergence of their respective projections makes it difficult to determine a precise response at this time. Project design and building construction, however, will respond to available definitive information. As cited previously in the foregoing paragraph, project design will place finished floor elevations above defined base flood elevations in conformance with the most current applicable City and County regulations.

While the project site is located within the City and County of Honolulu extreme tsunami evacuation zone, the site is not located within a FEMA “VE” zone, which indicates potential wave hazard. In addition, the site is surrounded by relatively intense urban development and larger urban structures, including the extensive garage and retail structures of Ala Moana Center and the Park Lane luxury housing project. The fact that the site is not located in a FEMA “VE” zone, its very inland location, and the presence of major intervening structures

between the site and coastline suggest that tsunami hazard except in "extreme" conditions is remote.

Preliminary geotechnical analyses of the site have found no geologically hazardous conditions.

L. Substantially affects scenic vistas and view planes identified in county or state plans or studies.

The Central Ala Moana does not impact important views cited by the Primary Urban Center Development Plan (PUCDP). This has been discussed at length in paragraphs five and six in item "D." of this chapter.

M. Requires substantial energy consumption.

There will be an initially substantial use of energy during demolition of existing structures, site development, and initial construction of the project. However, most of the following construction phases and attendant practices, which now use more energy-efficient construction techniques and procedures, will use normal or minimally increased levels of energy.

Post-construction energy usage will not require higher than historically normal energy consumption. LED lighting systems, energy-efficient appliances, low-flow toilets, and low-flow sinks will be installed in the residential units and other project facilities.

7.2 DETERMINATION

Based on the examination of potential impacts, the intended application of pertinent mitigation measures, and the analysis of the project in terms of the foregoing criteria, The Central Ala Moana is not anticipated to have significant impacts on local, Countywide, or Statewide physical or human environments. Pursuant to Chapter 343, HRS, the Hawaii Housing Finance and Development Corporation, the Approving Agency for this project, is anticipated to issue a Finding of No Significant Impact (FONSI)

8. CONSULTATION

SamKoo Pacific, LLC solicited public and agency comments on the The Central Ala Moana project through letters and meetings requesting input prior to development of this EA. It received responses from a number of agencies and other parties consulted.

8.1 AGENCIES CONSULTED

The public agencies listed below were sent preconsultation letters prior to the development of this DEA. All agencies and other interested parties have had access to the DEA via the Office of Environmental Quality Control website. Comments from those who responded to the DEA will be noted with an asterisk (*) in the Final Environmental Assessment. Response letters and replies to them will be provided in Appendix N that will be added to this document.

United States of America

- U.S. Fish and Wildlife Service

State of Hawaii

- Department of Education
- Department of Land and Natural Resources
  - Land Division
  - Division of Forestry and Wildlife
- Office of Environmental Quality Control
- Department of Health, Environmental Health Administration
- Disability and Communication Access Board
- Hawaii Housing Finance and Development Corporation
- Department of Transportation
- Department of Business, Economic Development, and Tourism, Energy Office
- Department of Defense
- Office of Planning
- Hawaii Community Development Authority
- University of Hawaii Environmental Center

City and County of Honolulu

- Board of Water Supply
- Department of Community Services
- Department of Design and Construction
- Department of Environmental Services
- Department of Facility Maintenance
- Department of Parks and Recreation
- Department of Transportation Services
- Honolulu Authority for Rapid Transit (HART)
- Department of Planning and Permitting (DPP)
    - DPP – Community Planning Branch
    - DPP - Land Use Approvals Branch
    - DPP – Traffic Review Branch
    - DPP – Zoning Plan Review Branch
    - DPP – Civil Engineering Branch
    - DPP – Subdivision Branch
    - DPP – Wastewater Branch
- Fire Department
- Police Department

Private Organizations and Individuals

- Hawaiian Electric Company
- Councilmember and Chair Ernie Martin
- Councilmember Ann Kobayashi
- Councilmember Carol Fukunaga
- Councilmember Stanley Chang
- State Senator Brickwood Galuteria

8.2 ADDITIONAL CONSULTATION

Parties consulted in addition to those on the above list will include the Ala Moana/Kakaako Neighborhood Board No. 11

9. REFERENCES

Richard Paul Cassiday, *Affordable Housing Market Study* (2018)

Central Planet Repair, LLC; *Phase I Environmental Assessment:* TMK:(1)2-3-039:011. 1391 Kapiolani Boulevard; Sept. 29, 2014

Central Planet Repair, LLC ; Contaminated Materials in Construction Management: Soil and Groundwater Management Plan: TMK:(1)2-3-039:011; 1391 Kapiolani Boulevard; Oct. 16, 2017

City and County of Honolulu, *Proposed Revised* Oahu *General Plan*; Dec. 2017

City and County of Honolulu. Honolulu Land Information System (HOLIS)

City and County of Honolulu, *Primary Urban Center Development Plan* (2004)

City and County of Honolulu, *Land Use Ordinance & Updates*

Cultural Surveys Hawaii; Archaeological Inventory Survey Report for the 1391 Kapiolani Boulevard Parcel; August 2014

Englekirk Structural Engineers; *Preliminary Wind Study, The Central Ala Moana*; Dec. 2017

Geolabs, Inc., *Technical Memorandum: Preliminary Geotechnical Recommendations; Feb., 2014*

Hawaii Community Development Authority, Final Supplemental Environmental Impact Statement – Volume III, Appendix D: Cultural Impact Assessment, (Prepared by EDAW, Inc., 2009)

Hawaii Department of Land and Natural Resources; *Hawaii Sea Level Rise Vulnerability and Adaptation Report*; 2017

Nims, Steve & Associates, Inc.; 1391 Monkeypod Tree Assessment; Oct. 2017

School of Ocean and Earth Science and Technology, University of Hawaii at Manoa; *Sea Level Rise in Hawaii;* 2018

SSFM, *Preliminary Engineering Report for The Central Ala Moana; Dec. 2017*

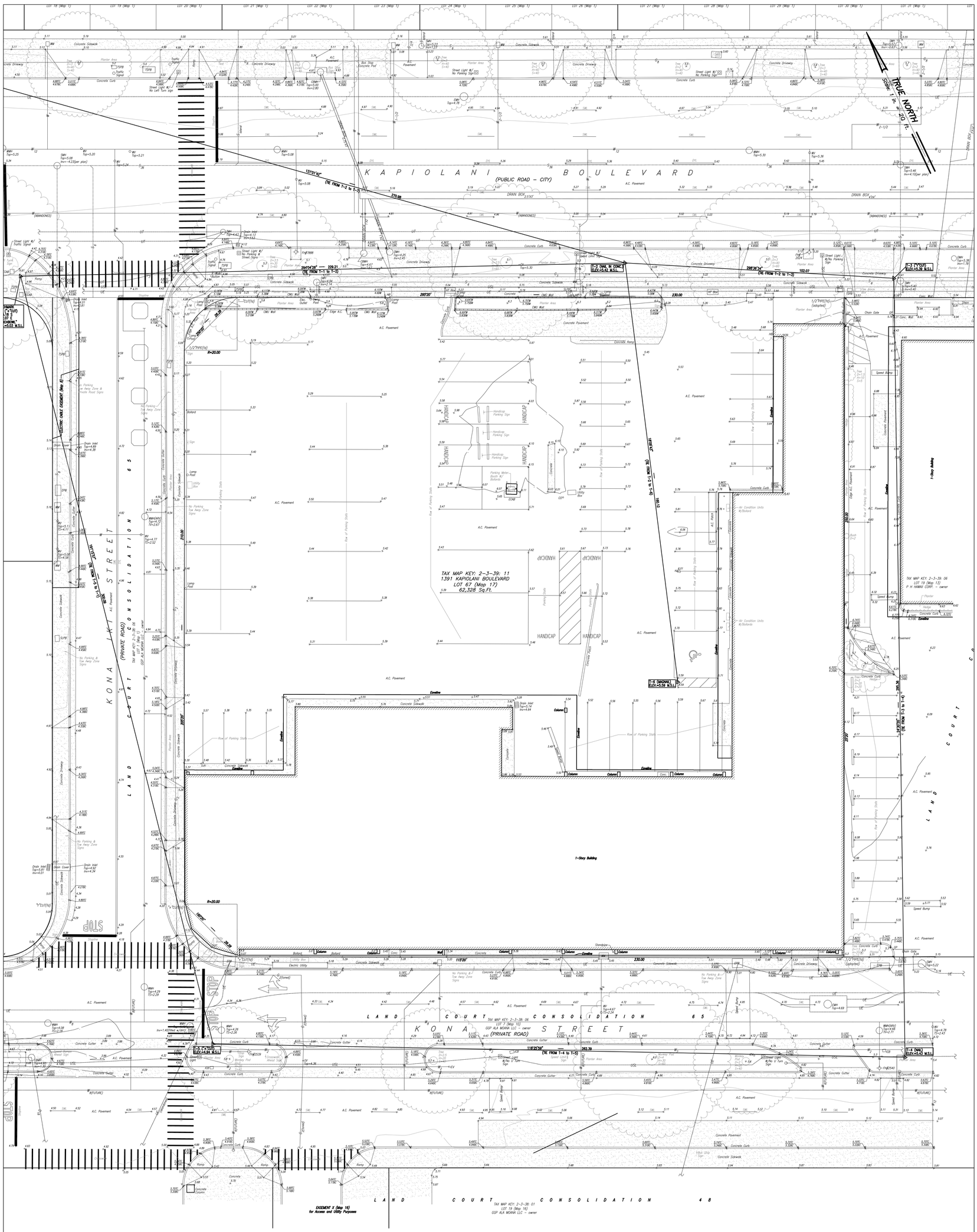
SSFM, *The Central Ala Moana Traffic Impact Analysis Report;* Dec. 27, 2017

State of Hawaii, *Hawaii State Plan*, Chapter 226, HRS

State of Hawaii, *State Land Use Law*, Chapter 205, HRS

United States Army Corps of Engineers; Sea Level Change Calculator, Version 2017.55

A. TOPOGRAPHIC SURVEY MAP



TOPOGRAPHIC SURVEY

LOTS 49 TO 52, INCLUSIVE, MAP 2
AND LOT 53-A, MAP 8
OF LAND COURT CONSOLIDATION 20
TMK: 2-3-41: 06 & 09
KALIA, WAIKIKI, HONOLULU, OAHU, HAWAII

20 10 0 20 40 60
GRAPHIC SCALE IN FEET

Abbreviation

A.C. Pav't	Asphalt Concrete Pavement	Inv.	Invert
AC Unit	Air Conditioning Unit	LP	Lamp Post
BC	Bottom Concrete Curb	N	Northing
BFP	Backflow Preventer	Mon.	Monument
Bold	Bollard	PM	Parking Meter
Bot.	Bottom	PP	Power Pole
Bx.	Box	S=	Approximate Spread
BW	Bottom Wall	SB	Speed Bump
CATV	Cable TV Box	SLB	Street Light Box
CBMH	Catch Basin Manhole	SMH	Sewer Manhole
CLF	Chain Link Fence	St.	Street
CRM	Concrete Rock Masonry Wall	Sta.	Station
CO	Sewer Cleanout	SWL	Solid White Line Pavement Stripe
Conc.	Concrete	UP	Utility Pole
CPB	Communication Pullbox	TC	Top Concrete Curb
D=	Approximate Diameter	TP	Top Pipe
DMH	Drainage Manhole	TSPB	Traffic System Pullbox
DYL	Double Yellow Line Pavement Stripe	T/Arv	Top Air Relief Valve
E	Easting	TS	Top Stem
EMH	Electrical Manhole	TW	Top Wall
ELEV.	Elevation	Util.	Utility
EO	Electrical Outlet	w/	With
EPB	Electrical Pullbox	W=	Width
FABX	Fire Alarm Pullbox	WMB	Water Meter Box
FH	Fire Hydrant	WMH	Water Manhole
Flr.	Floor	WV	Water Valve
Guy	Guy Wire	2nd	Second
GV	Gas Valve		
H=	Approximate Height		
HB	Hose Bibb		
H.E.C.O.	Hawaiian Electric Cooperative		
Hdcp	Handicapped		

Notes:

1. Azimuths are referred to Land Court Consolidation 20 & Government Survey Triangulation Station "PUNCHBOWL".
2. Coordinates are ASSUMED. Traverse Point "T-1" held at 5000.00 N, 5000.00 E.
3. Owners of adjoining lands as shown on map are from available records filed at the Real Property Tax Mapping Branch.
4. Map is compiled from records found at the State Survey Office, Real Property Tax Mapping Branch and Bureau of Conveyances. Recorded data has not been verified by an actual survey on the ground.
5. The underground utilities shown have been located from field survey information and existing drawings. The surveyor make no guarantees that the underground utilities shown comprise all such utilities in the area, either in service or abandoned. The surveyor further does not warrant that the underground utilities shown are in the exact location indicated although he does certify that they are located as accurately as possible from information available. The surveyor has not physically located the underground utilities.
6. Elevations are referred to City & County Street Monument at the intersection of Kona Street & Kaheko Street, Elev. = 3.87 ft. M.S.L.
7. Date of Survey: July 25, 2014

Legend:

20	Major Contour
21	Minor Contour
SL	Existing Sewer Line
DL	Existing Drainage Line
WL	Existing Water Line
12	Traverse Line
	Traverse Station
	Tree
	Fire Hydrant
	Lamp Post
	Sign

1001 Bishop Street
Suite 1600
Honolulu, Hawaii
October 2, 2014

AECOM

Licensed Professional Land Surveyor
Certificate No. 2927/Expires 4/30/16

Job Number: 60328002.0250
Field Book: 14-2516/05

AECOM
Engineers & Surveyors

1001 Bishop Street, Suite 1600
Honolulu, Hawaii 96813

B. DPP CORRESPONDENCE

August 12, 2014

Mr. George I. Atta, FAICP
Director
Department of Planning and Permitting
650 S. King Street
7th Floor
Fasi Municipal Building
City and County of Honolulu
Honolulu, Hawaii 96813

Attention: Land Use Permits Division

SUBJECT: Inquiry: Eligibility of Affordable Housing Exemptions
Chapter 201H-38, Hawaii Revised Statutes (HRS)
Sam Koo Hawaii, LLC
1391 Kapiolani Boulevard
Honolulu, Hawaii 96814
TMK: 2-3-041:009 & 2-3-041:006

Dear Mr. Atta:

Sam Koo Hawaii is intending to undertake an Affordable Housing project along Kapiolani Boulevard, in the Ala Moana area adjacent to Ala Moana Center. The project site is zoned BMX-3. The project's target market is households in the 100 to 140 percent range of median income for Honolulu.

This letter is an inquiry into the eligibility of this project for processing by the Department of Planning and Permitting (DPP) under the Chapter 201H-38 (HRS) program. Please inform us of your determination of the project's eligibility for DPP processing.

If you have any questions, please feel free to contact me via the contact information below. Thank you, in advance, for your determination in this matter.

Sincerely yours,

Lowell K.W. Chun
President
Pacific Catalyst, LLC
Phone: 808.593.9596 (office)
808.386.9596 (mobile)
Email: pacificcatalyst@gmail.com

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

KIRK CALDWELL
MAYOR

GEORGE I. ATTA, FAICP
DIRECTOR

ARTHUR D. CHALLACOMBE
DEPUTY DIRECTOR

2014/ELOG-1519 (JP)

August 27, 2014

Mr. Lowell K.W. Chun, President
Pacific Catalyst, LLC
1296 Kapiolani Boulevard, Suite 1907
Honolulu, Hawaii 96814

Dear Mr. Chun:

SUBJECT: Sam Koo Affordable Housing Project
Eligibility for Affordable Housing Exemptions
Chapter 201H-38, Hawaii Revised Statutes (HRS)
1391 Kapiolani Boulevard - Kalia
Tax Map Key 2-3-39: 11

This responds to your request, received August 13, 2014, concerning whether a planned affordable housing project on the subject 1.431-acre property, which is in the BMX-3 Community Business Mixed Use District with a 250-foot zoning height limit, will be eligible for processing by the Department of Planning and Permitting (DPP). We understand that the project will involve the development of multi-family dwellings for households earning 100-140 percent of the median income for Honolulu. Under those particular circumstances, the project will not be eligible for processing by the DPP.

To be eligible for processing by the DPP, projects must include a minimum of 10 percent of the total units being affordable to households earning annual incomes which do not exceed 80 percent of the median income. And, a minimum of 20 percent of the total units must be affordable to households earning between 81 to 120 percent of the median income. The remaining affordable units to be provided may be affordable to gap group (i.e., 121 to 140 percent) households. A maximum of 50 percent of the total units can be sold at market rates. It is our understanding that the eligibility requirements for processing requests for exemptions pursuant to Chapter 201H-38, HRS by the Hawaii Housing Finance and Development Corporation are less restrictive than our own.

I hope this clarifies the matter. Please contact Jamie Peirson of our Land Use Permits Division at 768-8011 if you have any questions.

Very truly yours,

George I. Atta, FAICP
Director

C. MARKET STUDY

I. INTRODUCTION

RESEARCHER: Ricky Cassiday is a market researcher who specializes in analyzing residential real estate markets has been retained to describe and analyze the market and to justify the market demand for apartment units in the urban core of Honolulu, particularly in and around Downtown and Kakaako. This study was done in tandem with a memo that described the differential between the market's prices and the future pricing of similar units to be marketed under the affordable housing rules and regulations.

II. SCOPE OF WORK

- Describe and analyze the sales and price trends in the overall market for one, two and three bedroom properties over the last real estate cycle.
- Identify where we are in the market cycle, what is behind and ahead in terms of economic forces, demographic changes and market supply and demand these units.
- Justify market demand/market analysis.
- Describe and analyze the recent sales and listings for the set of comparable units for this product set.

III. METHODOLOGY

In the first sections, we described the housing supply, housing demand and the general housing market and used that to describe the current market cycle, and the trend.

Then, in the last section, we defined and described the specific market, relative to the context of the study. Here, we assumed that the target market in terms of buyer demand would be in the Downtown, Kakaako, Ala Moana and Kapiolani area.

Thus, we looked at the buildings built in the last 17 years, or after 2000. This was assumed because the issue at hand concerns the pricing of newly built units, and a 20 year old building is less appealing than a new project.

These comparables for the one bedroom unit included Capitol Place, 801 South Street, Keola Lai, Symphony and the Collections. The two and the three bedroom comparables included the same set, plus 400 Keawe (with the caveat that it's a low-rise building) and with unusually spacious units (developer decision, to strengthen its appeal in an unknown market).

Finally, in order to best describe the current prices, we only included transactional data for all units resold in the Downtown and Kakaako areas in sales in the 22 months since 1/1/2016 and the 10 months 1/1/2017.

IV. MARKET DEFINITION AND DESCRIPTION

MARKET DEFINITION

The subject property studied is the City and County of Honolulu, located on the Island of Oahu, in the state of Hawaii. Oahu is the third largest of the Hawaiian Islands and the most populous island in the state. Oahu has a total land area of 896.7 square miles.

Honolulu is the state's business and financial center. It also encompasses Waikiki, the state's largest resort, which draws millions of visitors each year. This resort is one of the premier visitor destinations worldwide, thanks to Hawaii's diverse culture, subtropical weather, American jurisprudence, a pristine landscape and the "aloha spirit" of the people. By the same token, the quality of visitor experience equates to the quality of life: so as Honolulu has long been considered at top vacation destination, it also has long been considered among the world's most desirable places to live.

It also encompasses one of the nation's largest national defense installations, both in terms of personnel and hardware. It has the second largest concentration of service personal in the world.

In the narrowest sense, the competitive market area consists of housing demand from Honolulu to west Oahu. In the broadest sense, the market area could extend to being island-wide, state-wide and nation-wide. The facts that support this definition of market area are:

- That the entire island's population is within a 20-mile radius;
- There is very large housing need island-wide and state-wide;
- A large percentage of the current housing stock on the island is old, worn, poorly designed and constructed;
- That there is a clear and present demand for housing from outside the island and state (as exemplified by the high percentage of dwellings that are investor units, i.e., not as owner-occupied).

DESCRIPTION OF HOUSING DEMAND:

Simply put, the high quality of life, especially in comparison with other locations, is the foundation of demand, both for residents and migrants, which supplement housing demand significantly. Hawaiian lifestyle is our comparative advantage, and is based on a unique combination of attributes, which include temperate climate, beautiful surroundings, accommodating society and culture, American jurisprudence and a dollar-denominated economy.

Numerous factors affect the demand for housing, the primary being population, household formations and job creation. In the short run, job creation is the most important, as it leads to in-migration (meaning population growth and household formation).

JOB CREATION & TREND: Currently, job creation (as well as income generation, mainly wages) in the island economy is very strong. The upcoming section on Economic Conditions shows that the rate of unemployment has been steadily falling since 2009-2010. This coincides with the rise in hotel occupancy as well as hotel room rates and is in synch with the general excise tax trend, which is an indicator of overall business activity.

SELECTED HONOLULU ECONOMIC TRENDS

	Unemployment Rate	Hotel Occupancy	Hotel Room Rates	Ave GE Tax ($000)
1990	2.1%	86%	$93	$86,948
1995	4.6%	80%	$102	$97,433
2000	4.1%	76%	$115	$110,441
2005	2.8%	86%	$139	$158,946
2006	2.5%	83%	$156	$171,301
2007	2.6%	77%	$168	$180,857
2008	3.9%	75%	$170	$178,448
2009	6.0%	73%	$169	$161,174
2010	6.0%	78%	$150	$168,270
2011	5.9%	81%	$150	$187,260
2012	5.4%	85%	$165	$203,370
2013	4.4%	84%	$183	$208,946
2014	4.1%	85%	$207	$213,399
2017	3.4%	86%	$211	$227,377
2016	3.1%	87%	$221	$231,377

Such growth in economic activity has led to growing demand for housing, both for-sale and for-rent units. In addition, this growth exerts pressure on for-sale prices and for-rent rental rates. This makes it more difficult for households with fixed or low-incomes to secure affordable shelter. There are other factors which serve to increase housing demand overall such as vacationers and military households.

In the medium and the long term (also in the short-term, but less so) housing demand is driven by population growth, which includes in-migration, births and deaths. It also encompasses demographic trends and changes in lifestyle or living attitudes

In both cases, rising economic activity and faster population growth means greater housing demand, which brings with it higher land and housing values.

POPULATION BASED HOUSING DEMAND: Here, we look backwards and forwards at the potential housing needs in the county. Looking backwards is useful in terms of understanding the history of housing production (supply) and the market's ability to meet housing needs (demand).

And, by the same token, it is useful to carry that understanding forward by projecting into the future.

The tables below show population growth per annum, starting in 2000 and ending in 2013, the last year we have population data for. This time frame roughly encompasses an entire real estate cycle, as 2000 was a few years into the upswing of the 1998-2006 market, as 2013 is a few years past the bottom of this residential market cycle, which rebounded in 2010-2011.

The population change per annum is changed into a household change per annum by factoring it by the average number of people in a household, as determined by the US Census. This then is new households in the market, and that equates to housing need.

It is then compared to a number of homes available to them that were produced that year. If there were more homes produced than households were formed (an assumption), then there would be a surplus of supply (homes) over demand (population growth), and vice versa.

A note here: the number of homes shown as produced are actual new homes created, as defined in the tax assessor's data base as 'Year Built.' However, not all those new homes were available to them, particularly those at the lower income levels. As seen in this report, a preponderance of new homes are produced for households making higher incomes, as they are a more profitable and less risky market segment.

Therefore, total housing production is reduced by a factor that reflects whether these new homes were available to local families or not. This factor is related to the by the percentage of housing stock in the county that is owner-occupied (i.e., whether they were sold to households that occupy the dwelling unit, or to those who do not, meaning second home owners and investors). When the entire stock of housing of condominiums and single-family homes in the county was considered, 37% of condominiums and 28% single-family homes were not owner-occupants. In addition, when just the consideration was just for the housing produced during this period, 2000-2012, the non-owner percentages rose to 61% of condominiums and 39% of single-family homes.

Given that, we determined the factor should be set at a level that was less than half the percentage of non-owners. This was because some of these non-owner units would be rented out by their owner-investors, and thus they would be available as rental units. We deemed this to be conservative, as it is our experience that most newly created housing is not absorbed by investors, save at the higher price ranges.

Thus, housing production was compared to households created, and the difference was calculated per annum, showing housing need surplus or deficit, and then calculated cumulatively.

POPULATION GROWTH TO HOUSING DEMAND, 2001 to 2013

	Population	Annual Change	Persons Per Household	Households Created	Housing Production	Need vs. Production	Cumulative Need
2000	876,629		2.95	0			
2001	882,755	6,126	2.95	2,077	1,488	(589)	(589)
2002	890,473	7,718	2.95	2,616	1,584	(1,032)	(1,621)
2003	894,311	3,838	2.95	1,301	2,031	730	(891)
2004	907,997	13,686	2.95	4,639	2,153	(2,487)	(3,378)
2005	918,181	10,184	2.95	3,452	2,040	(1,412)	(4,790)
2006	926,954	8,773	2.95	2,974	2,235	(739)	(5,529)
2007	925,335	-1,619	2.95	(549)	2,108	2,657	(2,872)
2008	933,680	8,345	2.95	2,829	1,551	(1,278)	(4,150)
2009	943,177	9,497	2.95	3,219	1,563	(1,657)	(5,807)
2010	956,166	12,989	2.95	4,403	771	(3,632)	(9,438)
2011	965,629	9,463	2.95	3,208	586	(2,621)	(12,060)
2012	974,990	9,361	2.95	3,173	553	(2,620)	(14,680)
2013	983,429	8,439	2.95	2,861	664	(2,197)	(16,877)

Under these assumptions, the model indicates that every year in this time period, save for two, there was greater household growth than housing production, or an imbalance favoring higher prices (and thus higher rental rates). Further, this imbalance, or unmet housing need, gets carried forward to the next year, and added to the next year's differential. As seen, the accumulation of the potential for unmeet housing need, just over the last 12 years, is over 16,800 units.

Next, we look into the future. Going forward, the following table extends the baseline from 2000-2013 to 2014-2030. Of note are the population projections – they are exactly what DBEDT projected for 2020, 2025 and 2030 (and they are NOT what was projected for 2015, and that is because, in their report, the 2015 projection was for 976,200 residents – and that is number has already been exceeded in the US Census' 2013 population projection, 983,429 people, used in the table above). As seen, the annual population data, 2014-2030, shows a consistent and smooth projection between the given data points for 2020, 2025 and 2030.

Next, the housing production projection data is based on information collected from developers, public agencies and landowners, many of whom have commissioned studies. It encompasses the entire island, and extends outward beyond 2030, particularly for the master planned communities (Hoopili, Koa Ridge, etc.).

2015-2021: The current housing projection model was used, based on the announced or expected developments island-wide. As seen, in 2022, housing production comes to a second peak in this time frame (alongside the earlier one in 2017), and it is based on an expectation that there will be an extraordinary amount of housing produced in this 2015-2022 cycle, relative to earlier ones, because of the development of the fixed rail system (which will stimulate condo development in and around the urban core, particularly the Kakaako area, governed by HCDA).

That said, please note that even this extraordinary growth does not make much of a dent in the pent-up, cumulated housing demand of 2013, because (again) there is so much to begin with; because much of it will go to offshore demand (or be unaffordable to local families)(this is predicated on the assumption that household income and worker wages, on average, will not keep pace with housing prices); and because our local population will continue to grow (and be added to by immigration domestically and internationally).

2022-2030; This component of the projection assumes the onset of the next real estate down

cycle, itself fed by the decline externally in the economic conditions of Oahu's major trading partners – the US, Canada, and Pacific Rim Asian countries. Usually, an economic downturn takes a year or so to affect housing production, as seen in the earlier data 2007-2010, in which the two years following the implosion in 2007 of housing and the onslaught of the Great Recession showed very respectable production.

The projection for the 2022-2030 time frame utilized a factor of 1.15, which entailed taking the historic data from 2008 onward and increasing it by 15% every year. Note that it continues onward beyond the 2013 historical and uses 2015 to 2016 assumed data (which, since these two years exhibit very strong housing production, is conservative). Note also that 2008 was the second to the last year for peak production in the real estate up cycle, 2000-2006, which was a very strong one.

POPULATION GROWTH TO HOUSING DEMAND, 2013 to 2030, BASELINE HOUSING INPUT

	Population	Annual Change	Persons Per Household	Households Created	Housing Production	Need vs. Production	Cumulative Need
2013	983,429	8,439	2.95	2,861	664	(2,197)	-16,877
2014	986,319	2,890	2.95	980	891	(89)	-16,966
2015	989,209	2,890	2.94	983	1,771	788	-16,178
2016	992,099	2,890	2.94	983	1,360	377	-15,801
2017	994,989	2,890	2.94	983	2,261	1,278	-14,523
2018	997,879	2,890	2.94	983	989	6	-14,517
2019	1,000,769	2,890	2.94	983	1,368	385	-14,132
2020	1,003,700	2,931	2.94	997	1,265	268	-13,864
2021	1,008,800	5,100	2.94	1,735	1,874	139	-13,725
2022	1,013,900	5,100	2.94	1,735	1,655	(80)	-13,805
2023	1,019,000	5,100	2.94	1,735	1,600	(135)	-13,940
2024	1,024,100	5,100	2.94	1,735	887	(848)	-14,788
2025	1,029,400	5,300	2.94	1,803	674	(1,128)	-15,916
2026	1,034,200	4,800	2.94	1,633	636	(997)	-16,913
2027	1,039,000	4,800	2.94	1,633	763	(869)	-17,782
2028	1,043,800	4,800	2.94	1,633	1,025	(608)	-18,390
2029	1,048,600	4,800	2.94	1,633	2,037	404	-17,986
2030	1,052,100	3,500	2.94	1,190	1,564	373	-17,613

Given these considerations and assumptions, the cumulative projection shows there is a sufficient demand for housing produced, by this and all projects.

CURRENT DEMAND BASED ON DEMOGRPAHIC DATA:

BACKGROUND: This section looks at the demographic data for housing, based on household incomes, household sizes and household head ages. This data comes from Ribbon Demographics, a firm that specializes in taking the 2010 US Census data and representing it in ways that are meaningful to those seeking to understand the demographic demand for housing. Ribbon Demographics uses, to quote their website: "a custom four-way cross tabulation of household data designed specifically for affordable housing analysis that has been built by Nielsen (formerly Claritas)". It is based on actual cross tabulation of Census (ACS) Data.

OAHU CURRENT POTENTIAL DEMAND: The table below describes total population of households in the county (meaning, on the island) that are renting. It breaks this into income brackets by the number of people in the household (note: this is a projection to 2017, using the info given by those polled in the 2010 Census).

OWNER ONLY HOUSEHOLD COUNTS BY INCOME AND FAMILY SIZE, 2017

AMI	1 Person	2 Person	3 Person	4 Person	5 Person	6 Person	7 Person
$60,000-70,000	2,475	3,834	2,052	1,359	634	331	425
$70,000-75,000	1,238	1,917	1,026	680	317	165	213
$75,000-80,000	695	1,826	1,177	751	455	237	305
$80,000-90,000	1,564	4,108	2,648	1,689	1,024	534	687
$90,000-100,000	1,216	3,195	2,060	1,314	796	415	534
$100,000-112,500	1,656	4,380	3,315	2,938	1,405	733	943
$112,500-125,000	1,104	2,920	2,210	1,959	936	489	628
$125,000-150,000	1,329	5,369	4,151	3,721	2,199	1,148	1,476
$150,000-200,000	1,529	5,552	4,304	4,567	2,907	1,517	1,951
$200,000+	1,561	5,955	3,895	4,082	3,296	1,721	2,212

Then, the income limits per family, according to the HUD 2017 AMI definition, is shown below.

MULTIFAMILY TAX SUBSIDY PROJECT INCOME LIMITS, 2017

AMI	1 Person	2 Person	3 Person	4 Person	5 Person	6 Person	7 Person
60%	$43,980	$50,220	$56,520	$62,760	$67,800	$72,840	$77,880
80%	$58,640	$66,960	$75,360	$83,680	$90,400	$97,120	$103,840
100%	$73,300	$83,700	$94,200	$104,600	$113,000	$121,400	$129,800
120%	$87,960	$100,440	$113,040	$125,520	$135,600	$145,680	$155,760
140%	$102,620	$117,180	$131,880	$146,440	$158,200	$169,960	$181,720
160%	$117,280	$133,920	$150,720	$167,360	$180,800	$194,240	$207,680
180%	$131,940	$150,660	$169,560	$188,280	$203,400	$218,520	$233,640
200%	$146,600	$167,400	$188,400	$209,200	$226,000	$242,800	$259,600

Source: HHFDC, Hawaii

We then took this income data and defined the AMI ranges. Using that, we arrived at the number of households who could potentially purchase units. The table shows these numbers, starting at 60% and running up to 200% AMI.

OWNER ONLY HOUSEHOLDS BY AMI AND FAMILY SIZE, 2017

AMI	1-Person	2-Person	3-Person	4-Person	5-Person	6-Person	7+-Prsn	Total
60%	2,359	3,591	1,648	799	697	400	600	10,094
80%	4,651	5,526	2,737	3,044	474	1,075	1,717	19,224
100%	3,296	7,295	4,643	3,733	2,247	1,181	1,803	24,199
120%	2,769	5,785	4,689	3,620	1,732	1,080	1,081	20,755
140%	1,784	4,609	2,814	1,563	1,785	1,246	1,365	15,166
160%	1,322	3,545	3,456	3,254	1,860	759	1,275	15,471
180%	2,664	4,521	1,636	1,827	1,076	526	774	13,024
200%	798	1,388	1,550	1,913	659	413	387	7,107

Next, we refined this data by using household size to specify bedroom count, relative to owner household incomes.

OWNER ONLY HOUSEHOLDS BY AMI AND FAMILY SIZE, 20177

AMI	Studios	One Bed	Two Bed	Three Bed	Four Bed	Total
80%	4,651	5,526	2,737	3,518	2,792	19,224
100%	3,296	7,295	4,643	5,980	2,984	24,199
120%	2,769	5,785	4,689	5,352	2,160	20,755
140%	1,784	4,609	2,814	3,347	2,611	15,166
160%	1,322	3,545	3,456	5,114	2,033	15,471
180%	2,664	4,521	1,636	2,903	1,300	13,024
200%	798	1,388	1,550	2,572	800	7,107
200%+	1,691	11,039	5,943	7,737	749	27,159

When you include renter households by AMI, the size of the potential demand increases further. The table shows this:

OWNER & RENTER HOUSEHOLDS BY AMI AND FAMILY SIZE, 20177

AMI	Studios	One Bed	Two Bed	Three Bed	Four Bed	Total
80%	11,347	9,973	5,942	7,678	4,826	39,766
100%	7,050	13,180	7,706	10,046	4,445	42,426
120%	5,370	9,789	6,812	7,551	2,918	32,441
140%	3,327	7,205	3,842	4,426	3,242	22,042
160%	2,434	5,375	4,564	6,523	2,460	21,356
180%	4,786	6,188	2,039	3,585	1,546	18,143
200%	1,548	1,879	1,931	3,121	945	9,424
200%+	2,902	14,921	8,088	10,486	924	37,320

Clearly, the table shows that there is significant demand for the units offered by this project.

V. ANALYSIS OF HOUSEHOLD TYPES IN THE MARKET

The following table describes the types of housing on Oahu, their location and the number of units.

HOUSING STOCK, OAHU, BY AREA, BY TYPE AND BY UNIT COUNT

	Ewa	Kahuku-Kaawa	East Oahu	Central Oahu	North Shore	Waianae	Honolulu	East Honolulu	Total
Single	175,128	2,796	26,403	22,967	11,082	5,658	72,708	13,744	330,485
Condo'	44,375	369	1,628	1,378	423	1,668	35,790	1,237	86,867
Townhous	23,240	0	2,604	6,737	1,859	595	5,159	1,184	41,378
Apartment	44,436	192	2,315	4,823	1,822	1,622	30,147	813	86,169
Duplex	21,705	30	2,279	842	2,540	2,065	12,897	141	42,499
Co-op	1,661	0	398	38	258	0	967	0	3,322
Other	6,540	302	543	1,493	258	47	3,385	512	13,080
Unreportd	374	0	0	0	166	12	161	35	748
Total	317,459	3,688	36,169	38,278	18,408	11,666	161,214	17,666	604,548

Since the project is categorized as attached housing, the study will focus on this type of dwelling. Our analysis of household types and sizes will employ housing statistics provided by the City and County of Honolulu's Real Property Assessment and Property Assessment Division.

CONDOMINIUM HOUSING PRODUCTION TRENDS, ISLAND WIDE

	Units	Ave. Sq Ftg	Ave. Assessed Values	Ave. Values Per Sq Ft
1955 or less	1,571	572	$195,901	$342
1960 - 1964	3,645	647	$366,296	$566
1965 - 1969	11,850	743	$362,800	$488
1970 - 1974	22,839	827	$339,371	$411
1975 - 1979	17,952	756	$331,105	$438
1980 - 1984	9,002	842	$377,857	$449
1985 - 1989	5,981	838	$370,058	$441
1990 - 1994	8,236	917	$378,212	$413
1995 - 1999	4,831	863	$452,023	$524
2000 - 2004	2,563	1,242	$494,249	$398
2005 - 2009	6,755	1,078	$684,065	$634
2010 - 2014	1,193	1,080	$404,052	$374
2015+	1,019	808	$707,385	$874

When examining the attached housing stock by bedroom count, one can see that it is comprised primarily of one and two bedroom units.

CONDOMINIUM HOUSING BEDROOM TYPES, ISLAND WIDE

	Units	Ave. Sq Ftg	Ave. Assessed Values	Ave. Values Per Sq Ft
Studios	8,439	361	$202,080	$561
1 Bed	23,800	582	$309,853	$533
2 Bed	45,103	882	$412,141	$467
3 Bed	16,882	1,245	$493,991	$397
4 Bed	1,623	1,517	$525,142	$346

Hawaii has one of the lowest percentage ownership housing markets in the nation and is among

one of the least affordable. Such can be attributed to the limited supply of land, very high costs of production and very strong housing demand, resulting in low housing production and high prices. The problem is exacerbated by the fact that housing prices have exceeded household incomes for over 25 years.

HOUSEHOLD CONDITIONS, SIZE AND OWNERSHIP: A major effect of high housing costs on families is that they re-rent part of their shelter to friends or family. The US Census measures evidence of this, and they define crowding as 2 or more persons per bedroom.

They also measure doubling up via surveys and define that as 'more than one family group' in a household. In the last Housing Planning Study, such a survey was performed and the results from Oahu show the following:

CROWDING & DOUBLING UP, ALL OAHU HOUSEHOLDS SURVEYED

	Owners	Renter
Crowded	5.00%	21.60%
Doubled up	12.30%	10.70%
Crowded & Doubled Up	16.50%	26.80%

The following tables show the data by area.

HOUSEHOLDS DOUBLING UP, BY AREA

	Ewa	Central Oahu	Waianae	Honolulu	Total
Yes	4,495	4,096	2,298	18,378	37,778
No	25,875	34,182	9,368	142,836	279,681

OAHU HOUSEHOLDS CROWDING, BY AREA

People / Bedroom	Ewa	Central Oahu	Waianae	Honolulu	Total
Less than 2	27,880	35,445	10,091	137,354	281,269
More than 2	2,490	2,833	1,575	23,860	36,190

Another way that this condition is made apparent is the measurement of household size. Indeed, as households cannot afford housing, then overtime pent-up demand increases, household formation is delayed, and the average household size grows. The statewide average for household size increased by 2.8% from 2.88 persons per household to 3.11. This is consistent with a housing market where demand was greater than supply. The following table shows that Oahu had highest increase in average household size over the 10-year period.

HOUSEHOLDS DOUBLING UP & CROWDING, BY AREA

	Population Growth	Household Growth	Housing Size Growth
Hawaii	19.1%	17.0%	0.3%
Honolulu	10.9%	3.5%	8.8%
Kauai	14.3%	11.7%	2.3%
Maui	19.3%	12.5%	5.8%

VI. THE ECONOMIC BACKGROUND

Simply put, real estate sales and values move closely in synch with an area's economic growth, and the mechanism by which this growth occurs is via rising incomes and higher job counts. Both feed directly into demand for housing.

In the short run, economic growth is determined by trading activity, the most important of which is the level and balance of trade between the area and it's major trading partners. In the case of Oahu, the major trade is in recreational goods and services, the largest of which is the visitor industry. The health of this industry is tied to the health of the economies that send visitors to Oahu. The second most important industry Is federal spending, mainly national security items, as Oahu has the second largest concentration of service personal globally. Then, in the longer run, economic growth is also determined by population changes (both migration and demographic) and lifestyle preferences.

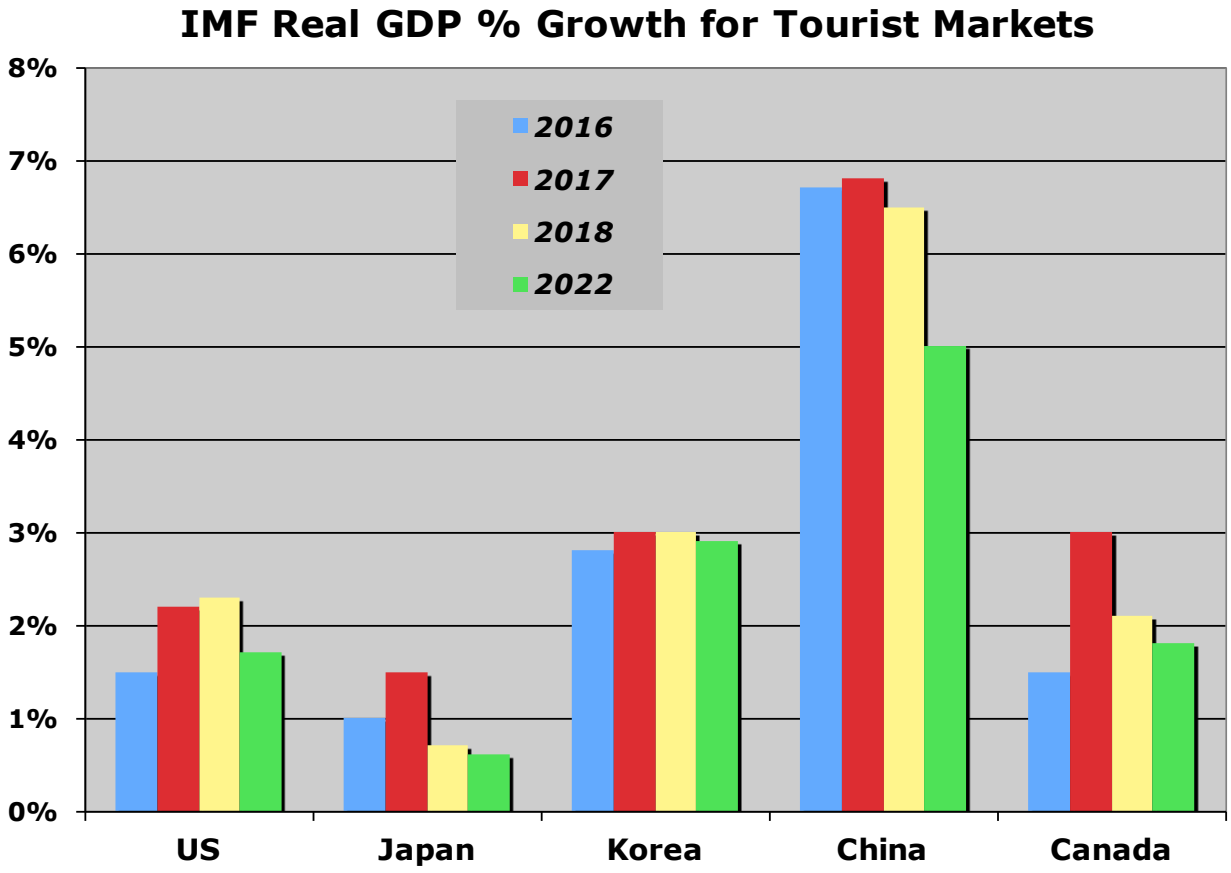
As Oahu's major industry is tourism, the major trading partners here would be the US, Canada and Asia (mainly Japan) on the international level: then California, and the west coast states, on the national level: and finally on the state level. As such, we examine the economic health of these trading partners in order to get an understanding of their ability to trade (send visitors, home owners and capital funding) with Oahu, currently and for the future.

Global Economy

The overall global economic forecast by the IMF was raised in October 2017. They now expect global growth projected to rise to 3.6 percent in 2017 and 3.7 percent in 2018. Broad-based upward revisions in the euro area, Japan, emerging Asia, emerging Europe, and Russia more than offset downward revisions for the United States and the United Kingdom.

But the recovery is not complete: while the baseline outlook is strengthening, growth remains weak in many countries, and inflation is below target in most advanced economies. Commodity exporters, especially of fuel, are particularly hard hit as their adjustment to a sharp stepdown in foreign earnings continues. And while short-term risks are broadly balanced, medium-term risks are still tilted to the downside.

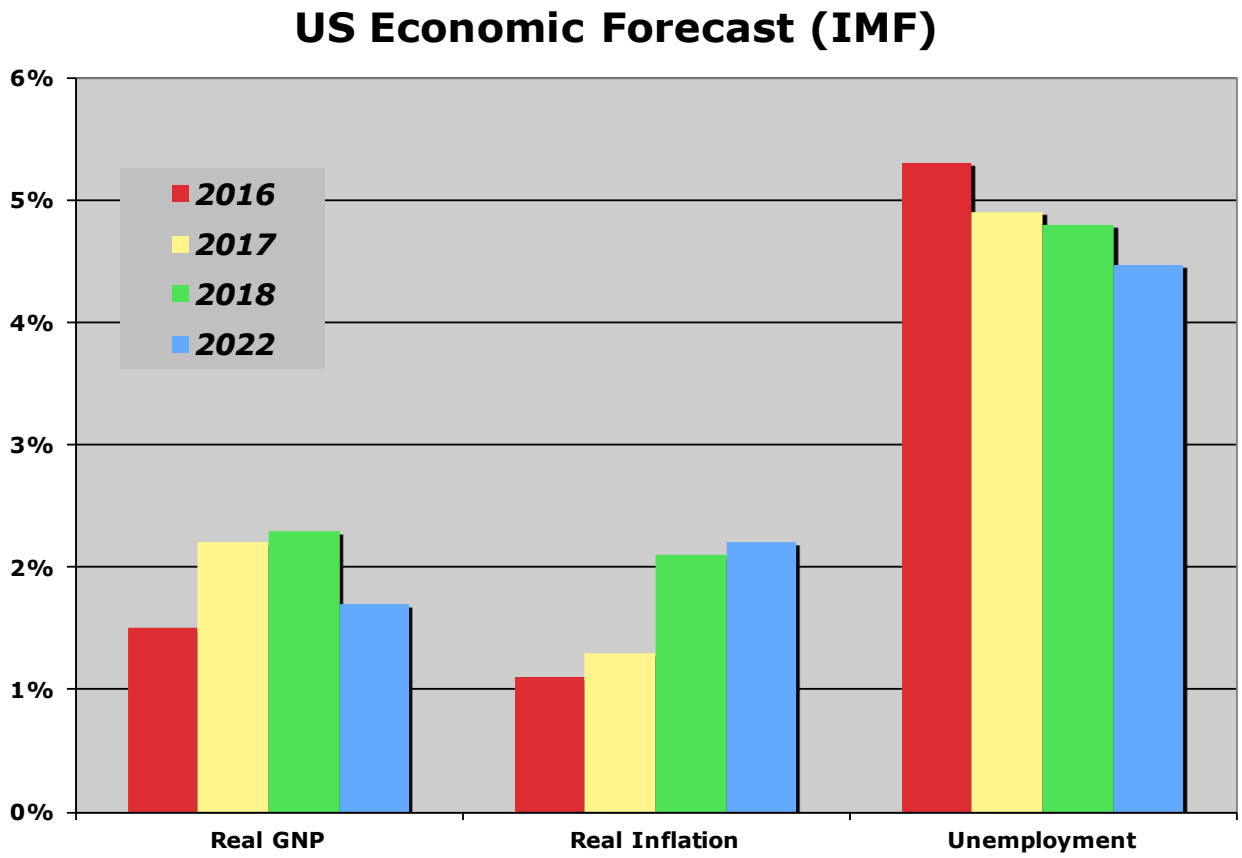
Notable pickups in investment, trade, and industrial production, coupled with stronger business and consumer confidence, are supporting the recovery. With early 2017 growth generally stronger than expected, upward revisions to projections are broad based, including for the euro area, Japan, China, emerging Europe, and Russia, more than offsetting downward revisions for the United States, the United Kingdom, and India. After disappointing global growth over the past few years, this recent pickup provides an ideal window of opportunity for policymakers to undertake critical reform.



United States

Economists have noted that there was better-than-expected activity in the second half of 2017 in terms of job growth, and its momentum going forward underwrites a healthy consumer spending and a growing housing market. In 2018, growth is expected to pick up, as the drag from lower energy prices and past appreciation of the U.S. dollar fades.

Additional to that, changes in the tax structure look to stimulate the economy and lead to higher consumer spending, particularly at the high-end. Medium term potential growth could be held down by an aging population, but only if there is a continuation of the recent trend of low total factor productivity growth.



Thanks to that, the key markets for Hawaii, the higher income households in the western part of North America, remain positioned to spend more and more of their discretionary income on vacationing and second homes, particularly to the outer islands.

State of Hawaii

According to state economists, Hawaii's economy looks to grow steadily for 2017 and the following 3 years. Inflation-adjusted growth has ratchet downwards from 3.2% in 2015 to 1.7% forecast for this year. They predict it will remain stable through 2020. Essentially, this is a rate of growth that is more easily sustainable.

For the first 10 months of 2017, the tourism industry has been performing better than expected.

Visitor arrivals increased 4.9% and visitor spending increased 7.1%. The industry is on track towards another record level of visitors this year. Scheduled air seats, the supply side, has increased by 8.5% for 2018, with a strong possibility there will be more in 2019. This growth is favoring the neighbor islands mainly, themselves up 20% for the year.

The state labor market was the tightest in the nation In October 2017, with the unemployment rate at a record low rate of 2.2%. Year-to-date, Hawaii ranked the third lowest in terms of seasonally adjusted unemployment rate and ranked the lowest in terms of not seasonally adjusted rate. The increase in jobs mostly occurred in tourism-related industries - retail trade and food services.

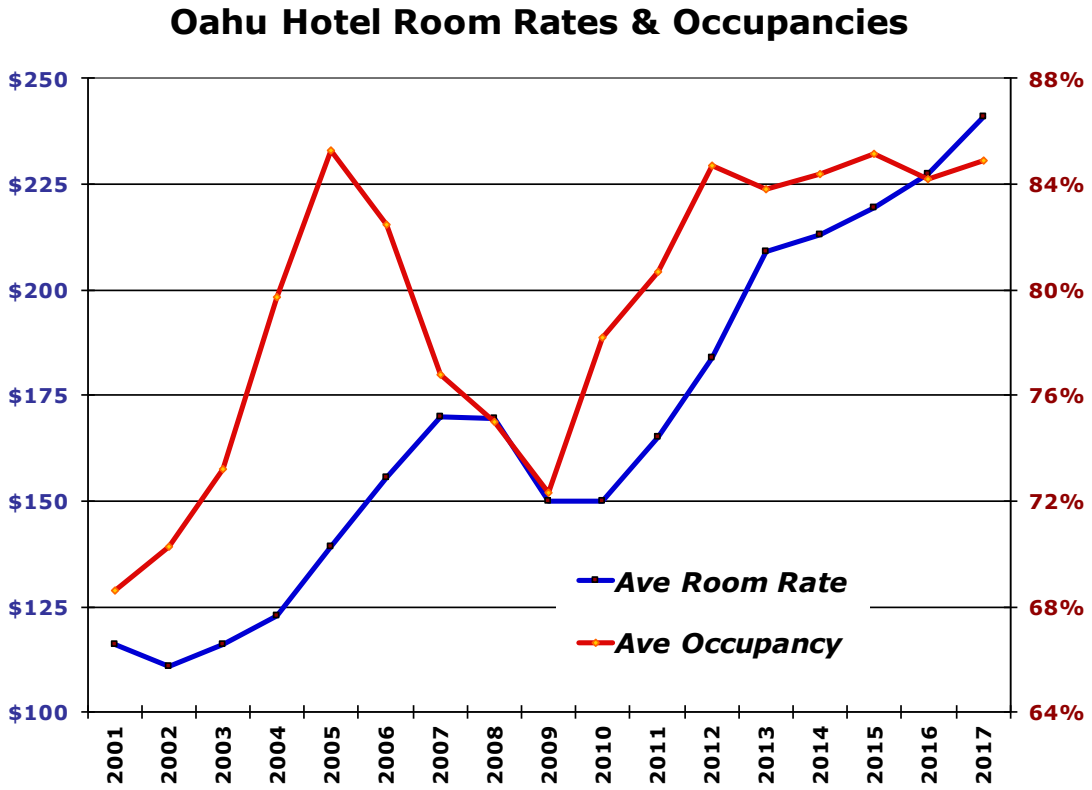
Real estate and construction activity is looking to grow, also. For 2017, the value of residential permits increased 14.6%, and commercial and industrial permit values increased 119.4. This increase will be reflected in construction activities next year.

DBEDT revised its projection of Hawaii's economic growth upward from the last third quarter projection to 1.7%t for 2017, 1.5% for both 2018 and 2019, and 1.4% for 2020.

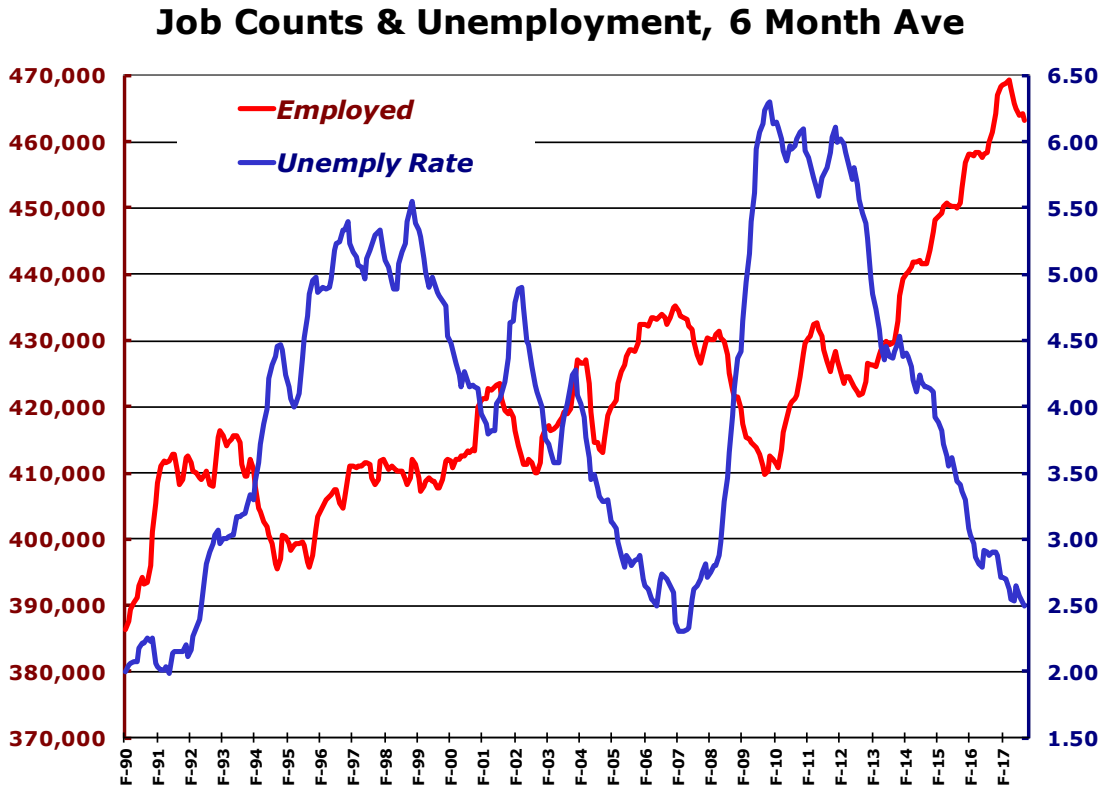
City & County of Honolulu

Honolulu draws almost 5.5 million visitors last year and expects 3% more this year. There are more than 2,600 businesses involved in the leisure and hospitality sector. It also is home to the United States Pacific Command headquarters, which contributes approximately 90 percent of the $12.2 billion in military economic impact in the state. Together, the growth in these two sectors fuel economic growth in Honolulu.

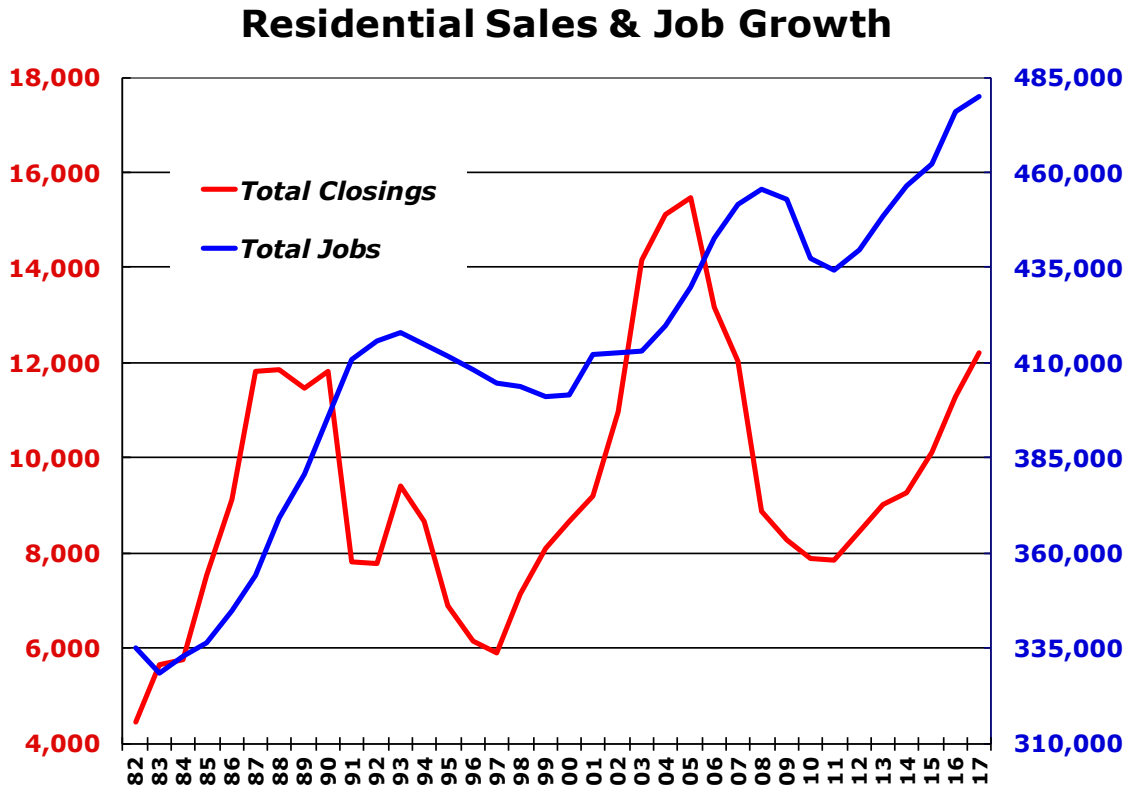
To date, visitor spending keeps pushing higher, with Waikiki hotels setting records for occupancy, daily room rates, and revenue per available room.



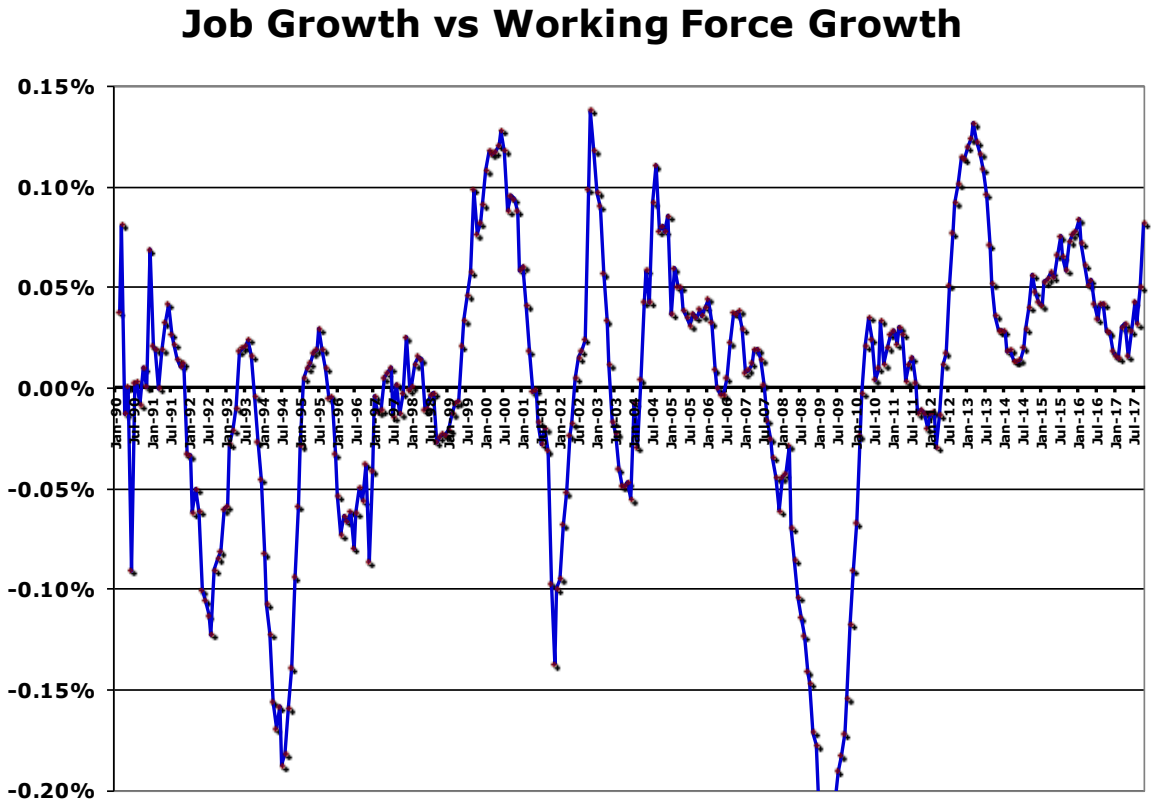
This has spurred hotels to build and renovate and coupled with increasing multifamily activity has firmed construction employment. Last year, tourism-related employment surpassed its pre-recession peak, and looks to continue again this year. Another sign of economic growth is the latest unemployment figures: Honolulu's unemployment rate declined since 2009, and is currently within the top six lowest jobless rates among 372 metropolitan areas nationwide, per the Hawaii Department of Labor.



In addition, the job growth has increased faster than the working force, meaning both that local workers looking for jobs have choice, and that leads to either higher wages, better satisfaction, and that job seekers could immigrate to Oahu. Inasmuch as housing demand is driven by the creation of jobs, we expect housing sales to rise in the near future (this linkage is best illustrated in the Residential Sales & Job Growth Chart).



What is notable is how job creation was quite steady up until 2008, when the sub-prime inspired financial conflagration globally infected Oahu's economy. Around 2010, the economy stabilized, then started to grow, with more and more job creation in the ensuing five years.


Job Growth vs Working Force Growth
0.15%
0.10%
0.05%
0.00%
-0.05%
-0.10%
-0.15%
-0.20%

VII. HONOLULU'S CONDOMINIUM MARKET

OVERVIEW:

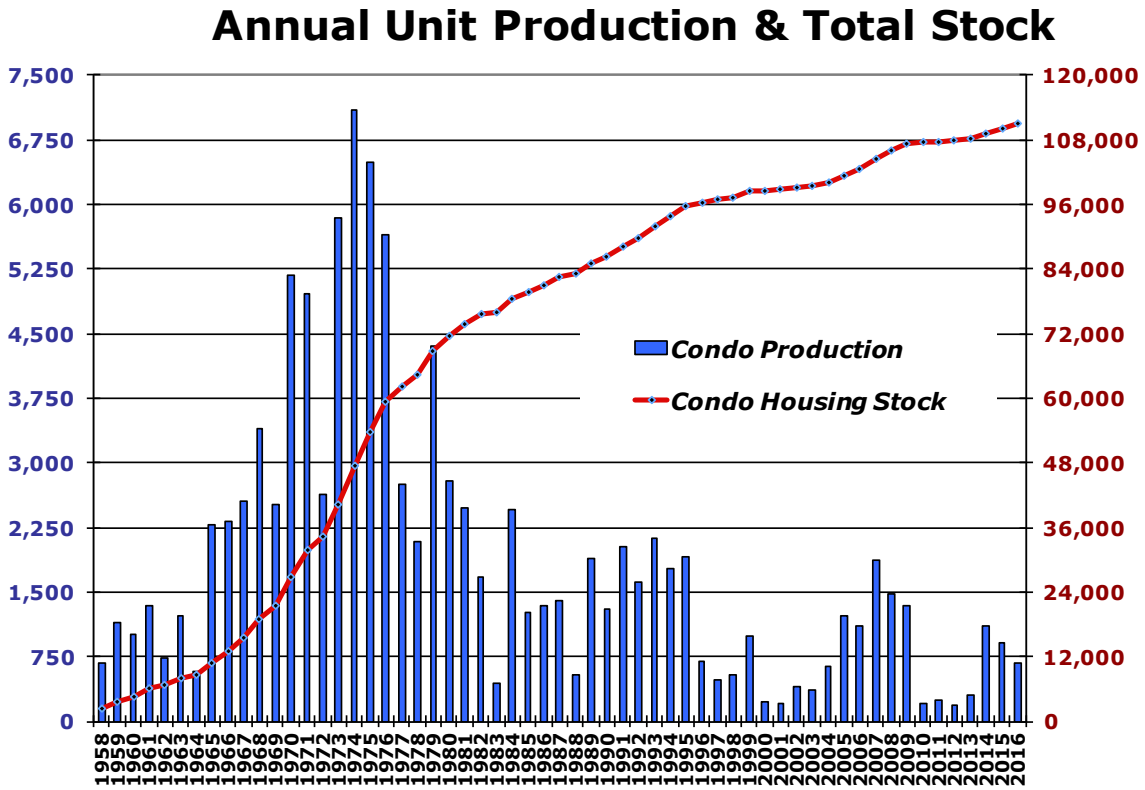
The Hawaiian real estate market has been, is, and will be characterized by tight supply and high demand, it will experience dramatic swings in sales and values.

High Demand: Simply put, the high quality of life, especially in comparison with other locations, is the foundation of demand, both for residents and migrants, which supplement housing demand significantly. Hawaiian lifestyle is our comparative advantage, and is based on a unique combination of attributes, which include temperate climate, beautiful surroundings, accommodating society and culture, American jurisprudence and a dollar-denominated economy.

Tight Supply: By national and international standards, Hawaii's, and Oahu's, housing development process is extremely restrictive: it is uncertain, time consuming and expensive. As such, the supply of entitled units is thin and tight. This is firstly due to geography: land is limited, rugged and isolated. Secondly, the body politic and its elected representatives have implemented a set of laws that making zoning and building a very lengthy process, as well as one fraught with controversy, by dint of having to consult with the public. In the third place, building is costly: labor is in small supply and therefore expensive; the cost of inputs is driven up because of a long supply chain, plus expensive warehousing; and the weather.

The combination of inelastic supply and elastic demand makes this market extremely volatile: over the swing between the bottom and the top of the market, sales can more than triple and prices can more than double. Furthermore, the length of the cycle is usually 5 to 8 years, depending often on external conditions: the direction of interest rates, economic growth in the visitor and offshore buyer markets, and the costs of materials.

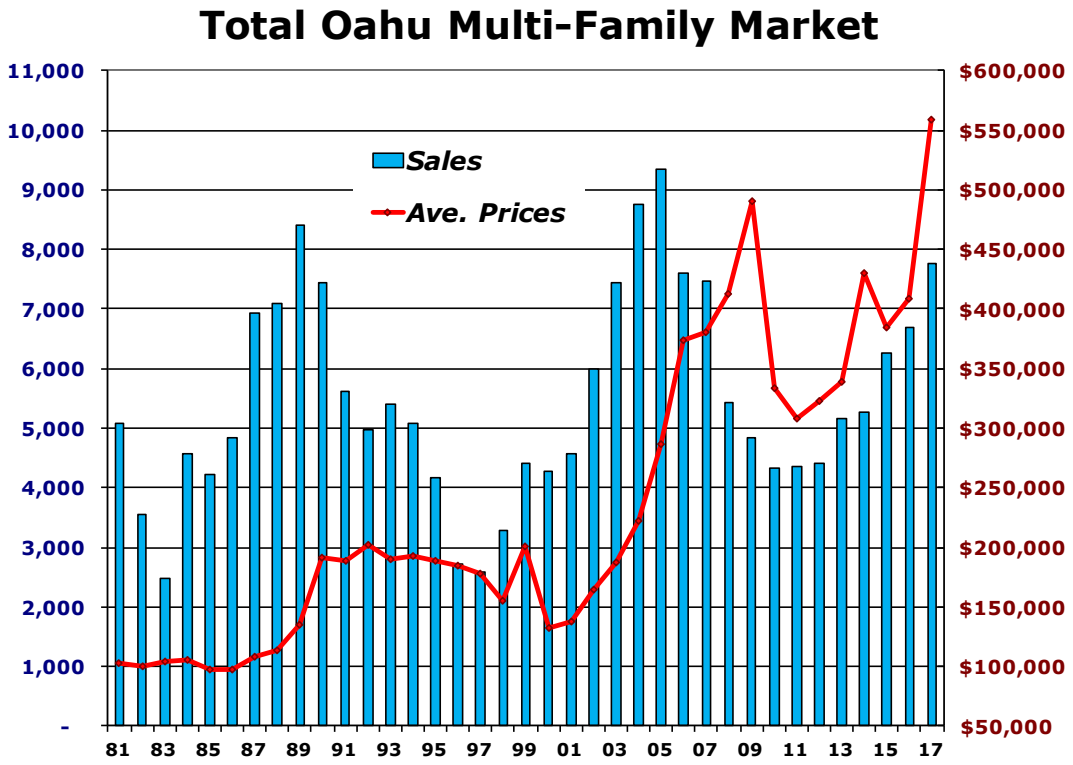
As seen in the chart below, condo production has been declining since the 1970s, for reasons noted above. This is true both island-wide and urban core.

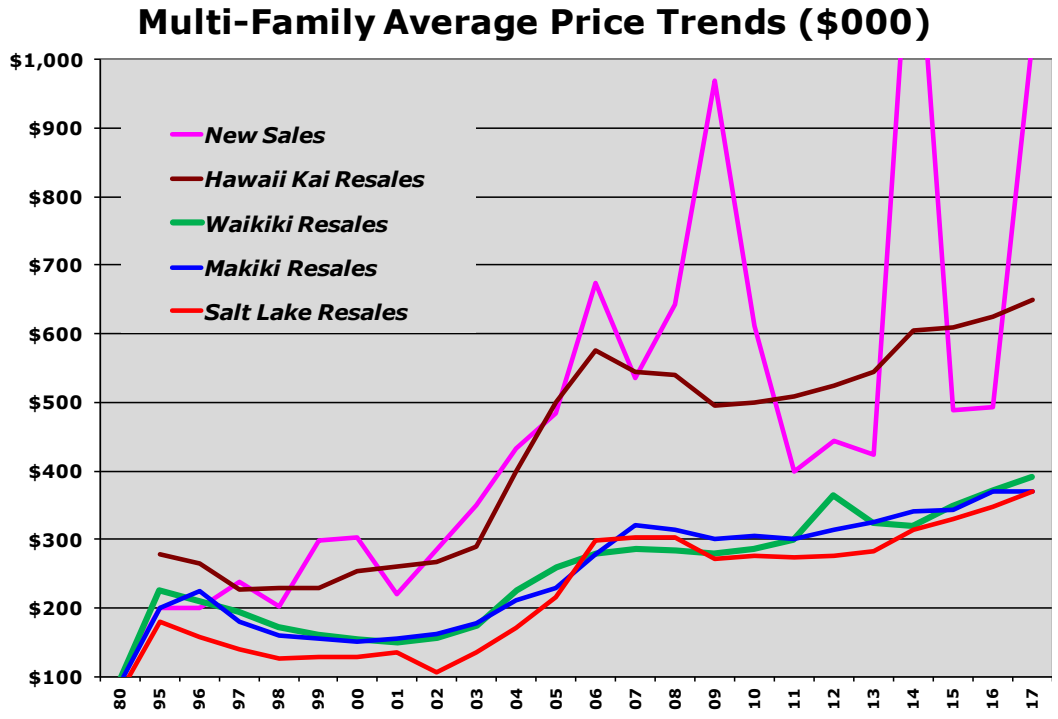


CURRENT MARKET:

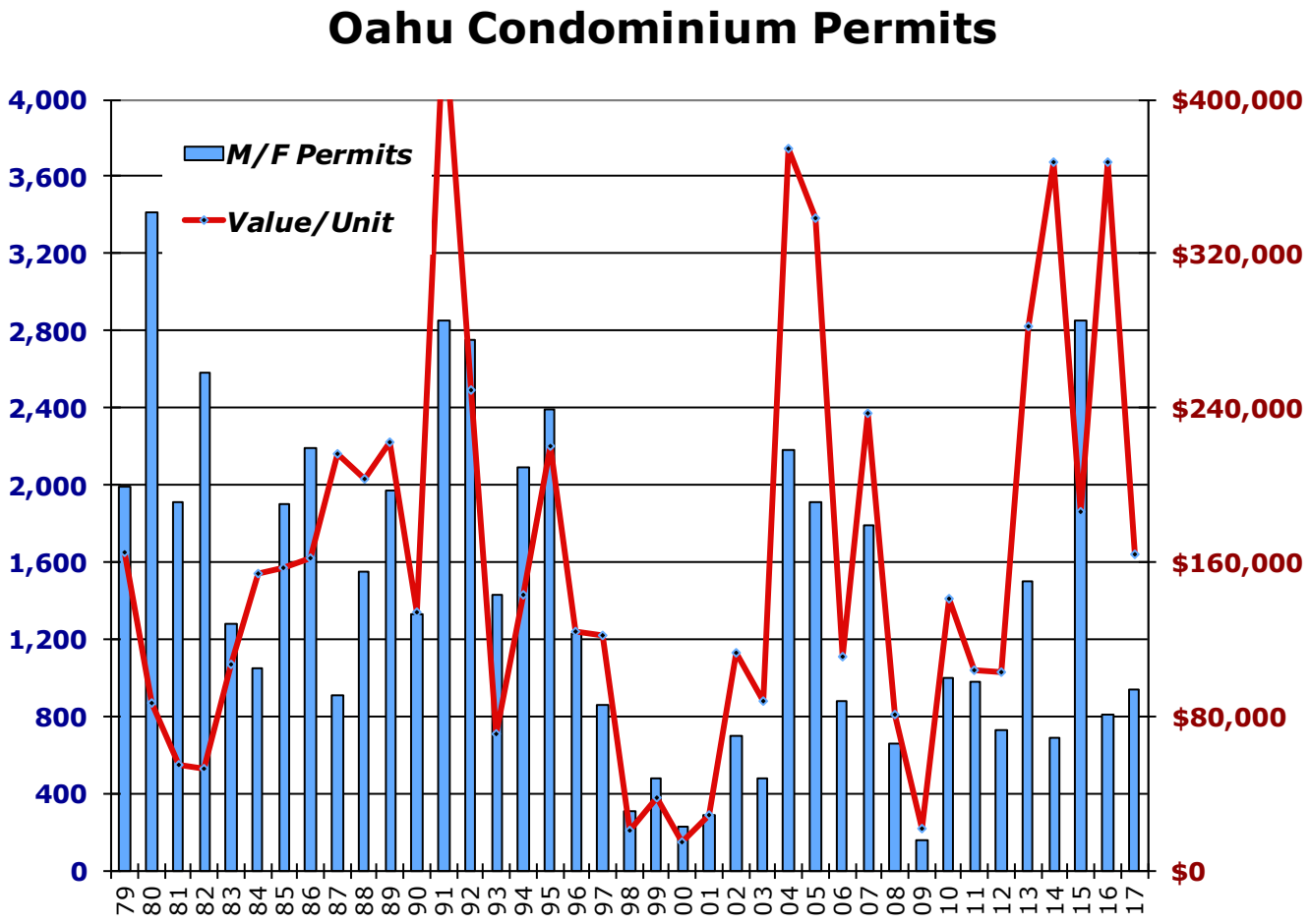
Oahu's market for residential property is well into a cyclical upswing, with the likelihood that a new record for total closings will be set in 2018+. In terms of the pricing trend, this is but the 4th year of the up cycle, so the percentage rise to-date is small. The last such swing started in 1998 and ended in 2005, ran for some 7-8 years and then had 4-5 years of falling sales and prices. It turned in 2011-2012, with a reversal of the trend for lower sales and prices, as demand grew at a time of shrinking inventory.

Going forward, we foresee that this cycle's sales and price levels will run for the next several years, and exceed the peaks of the last cycle. The chart below shows the actual activity through 4Q 2017, with 2017 extrapolated for the full year.


Total Oahu Multi-Family Market
Sales
Ave. Prices
11,000
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
-
$600,000
$550,000
$500,000
$450,000
$400,000
$350,000
$300,000
$250,000
$200,000
$150,000
$100,000
$50,000
81 83 85 87 89 91 93 95 97 99 01 03 05 07 09 11 13 15 17


Multi-Family Average Price Trends ($000)
New Sales
Hawaii Kai Resales
Waikiki Resales
Makiki Resales
Salt Lake Resales
$1,000
$900
$800
$700
$600
$500
$400
$300
$200
$100
80 95 96 97 98 99 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17

HOUSING SUPPLY:



VIII. CURRENT PRICING IN THE MARKET

Earlier, we noted that we produced a memo that addressed the question of: "What is the market price of a unit in and around downtown Honolulu today?" The context was the contemplated pricing of a new project targeting workforce housing in Kakaako. This is reproduced below.

In order to do this, we used transactional data for all units resold in the Downtown and Kakaako areas in buildings built in the last 17 years, or after 2000. The comparable buildings sales for the one-bedroom unit included Capitol Place, 801 South Street, Keola Lai, Symphony and the Collections. The two-bedroom comparables included the same set, plus 400 Keawe (with the caveat that it's a low-rise building).

The tables below show the lowest, the average and the highest sales prices for two time frames, the first being the 22 months since 1/1/2016 and second being the 12 months 1/1/2017. There was no price limit or filter (or floor) placed at the low-end of the sales data. And the lowest price for a one bedroom was $400,000. We put a price filter (or ceiling) on the

sales at the high-end at $999,999 (as there were several sales above it, mainly in the $1 million range).

The data showed:

STUDIO RESALES, SINCE 1/1/2016

Since	Closed	Lowest Price	Ave Price	Max Price	Yr. Built	Low Floor	Ave. Floor	Hi Floor
2016	4	$365,000	$383,250	$393,000	2015	4	29	42
2017	6	$375,000	$454,833	$549,000	2016	4	17	28

ONE-BEDROOM RESALES, SINCE 1/1/2016

Since	Closed	Lowest Price	Ave Price	Max Price	Yr. Built	Low Floor	Ave. Floor	Hi Floor
2016	18	$400,000	$588,489	$710,000	2012	3	20	41
2017	26	$500,000	$603,885	$735,000	2012	4	21	41

TWO-BEDROOM RESALES, SINCE 1/1/2016

Since	Closed	Lowest Price	Ave Price	Max Price	Yr. Built	Low Floor	Ave. Floor	Hi Floor
2016	60	$584,000	$747,816	$970,000	2011	2	23	44
2017	55	$629,000	$806,697	$999,999	2013	2	25	43
2018	2	$695,000	$757,500	$820,000	2012	4	7	10

THREE-BEDROOM RESALES, SINCE 1/1/2016

Since	Closed	Lowest Price	Ave Price	Max Price	Yr. Built	Low Floor	Ave. Floor	Hi Floor
2016	15	$581,000	$855,006	$971,170	2012	2	18	36
2017	6	$970,000	$985,500	$998,000	2012	10	18	31
2018								

IX. CONCLUSION

Currently, the residential real estate market is midway up its cycle, with shrinking supply of listings and no abatement of demand – to wit: steadily rising prices. Per usual, the home building industry is ramping up to meet this demand, but with higher input costs… as well as a lag time in production.

Thus, relative to demand, driven by job creation and population growth, the supply side of the market will certainly fall short of fulfilling current pent-up housing need. This is so especially for those families making 140% of AMI (workforce housing) and below for the for-sale affordable units.

Ultimately, there will be more than ample demand for the units of this project, given will be for this project.

Rick Cassiday Memorandum

SCOPE:
"What is the market price of a unit in and around downtown Honolulu today?"

CONTEXT:
The pricing of a new project targeting workforce housing in Kakaako.

METHODOLOGY: We used transactional data for all units resold in the Downtown and Kakaako areas in buildings built in the last 17 years, or after 2000. The comparable buildings sales for the one bedroom unit included Capitol Place, 801 South Street, Keola Lai, Symphony and the Collections. The two bedroom comparables included the same set, plus 400 Keawe (with the caveat that it's a low-rise building).

The tables below show the lowest, the average and the highest sales prices for three time frames, the first being the 12 months since 1/1/2016 and second being the 12 months to 1/1/2017 and the third being to 1/29/18. There was no price limit or filter (or floor) placed at the low-end of the sales data. And the lowest price for a one bedroom was $400,000. We put a price filter (or ceiling) on the sales at the high-end at $899,999 (as there were several sales above it, mainly in the $1 million range). The data showed:

STUDIO RESALES, SINCE 1/1/2016

Since	Closed	Lowest Price	Ave Price	Max Price	Yr. Built	Low Floor	Ave. Floor	Hi Floor
2016	4	$365,000	$383,250	$393,000	2015	4	29	42
2017	6	$375,000	$454,833	$549,000	2016	4	17	28

ONE-BEDROOM RESALES, SINCE 1/1/2016

Since	Closed	Lowest Price	Ave Price	Max Price	Yr. Built	Low Floor	Ave. Floor	Hi Floor
2016	18	$400,000	$588,489	$710,000	2012	3	20	41
2017	26	$500,000	$603,885	$735,000	2012	4	21	41

TWO-BEDROOM RESALES, SINCE 1/1/2016

Since	Closed	Lowest Price	Ave Price	Max Price	Yr. Built	Low Floor	Ave. Floor	Hi Floor
2016	60	$584,000	$747,816	$970,000	2011	2	23	44
2017	55	$629,000	$806,697	$999,999	2013	2	25	43
2018	2	$695,000	$757,500	$820,000	2012	4	7	10

THREE-BEDROOM RESALES, SINCE 1/1/2016

Since	Closed	Lowest Price	Ave Price	Max Price	Yr. Built	Low Floor	Ave. Floor	Hi Floor
2016	15	$581,000	$855,006	$971,170	2012	2	18	36
2017	6	$970,000	$985,500	$998,000	2012	10	18	31
2018								

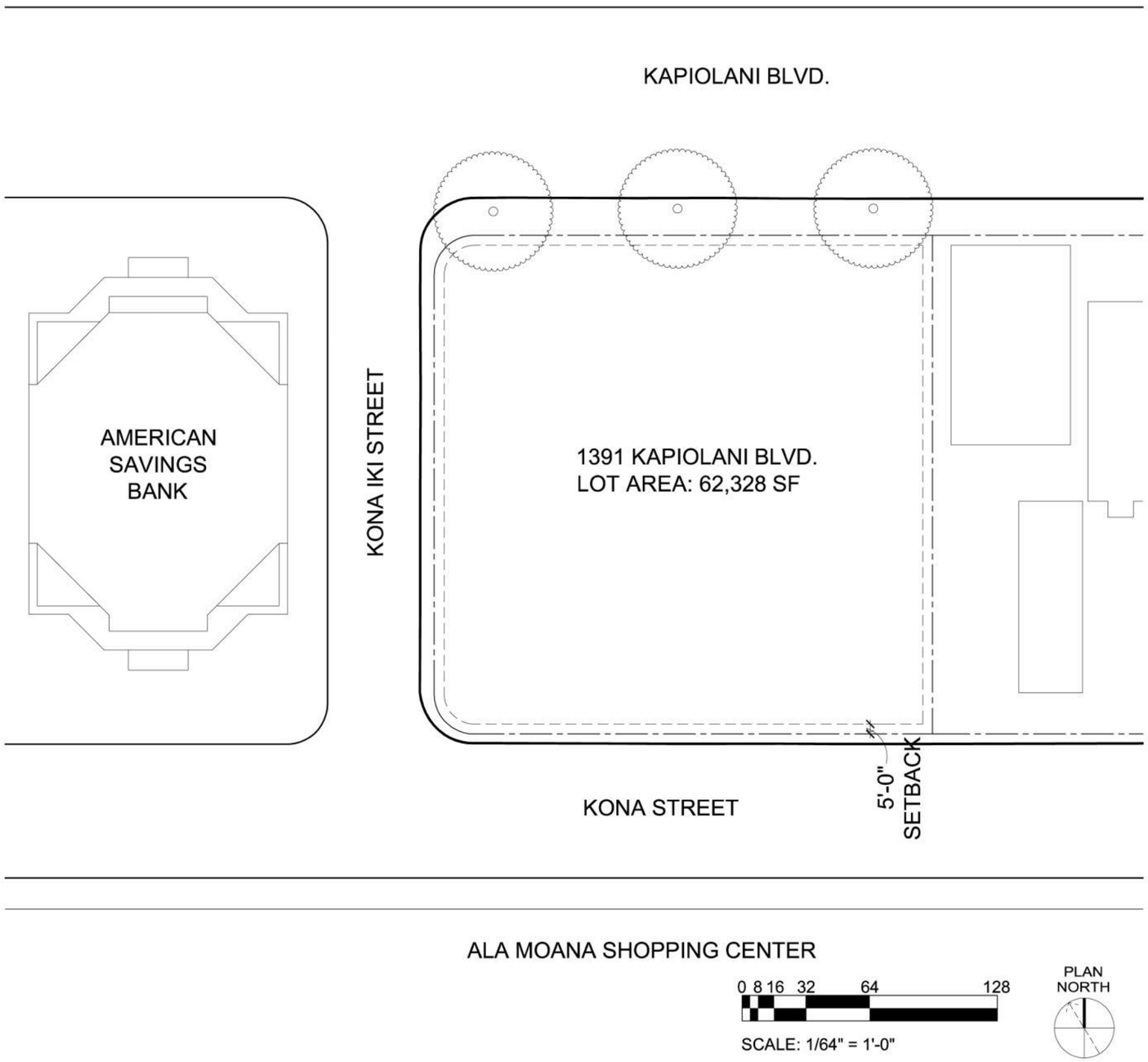
INTEREST RATES:
As interest rates are the vital component for calculating prices for units sold to households under the affordable guidelines, we considered the trend and have the following observations:

- The October IMF forecast said: "the recovery is not complete: while the baseline outlook is strengthening, growth remains weak in many countries, and inflation is below target in most advanced economies."
- ULI Fall Meeting October 23 panel on the economy noted that the prediction that interest rates would rise gradually next year could be wrong (since then, rates have fallen).

- ULI Hawaii Capital Market Presentation November 20 by former Fed Staffer Brad Case showed said that upward pressure on rates are easing so much that 2018 may only see one such increase.
- A NYT article about Fed Head Yellin noted the structural changes in the economy coming out of the recession were such that "… the Fed has undershot its goal of 2 percent annual inflation in each of the past five years. After getting close early this year, inflation has swooned again."
- FREDDIE MAC's 2018 interest rate forecast this September for 2018 is 4.4%, up from their expectation that it will be 4% at the end of 2017 (WSJ quoted 3.91% today, 3.92 last week).

D. ARCHITECTURAL DRAWINGS

THE CENTRAL
ALA MOANA



PROJECT SITE INFORMATION

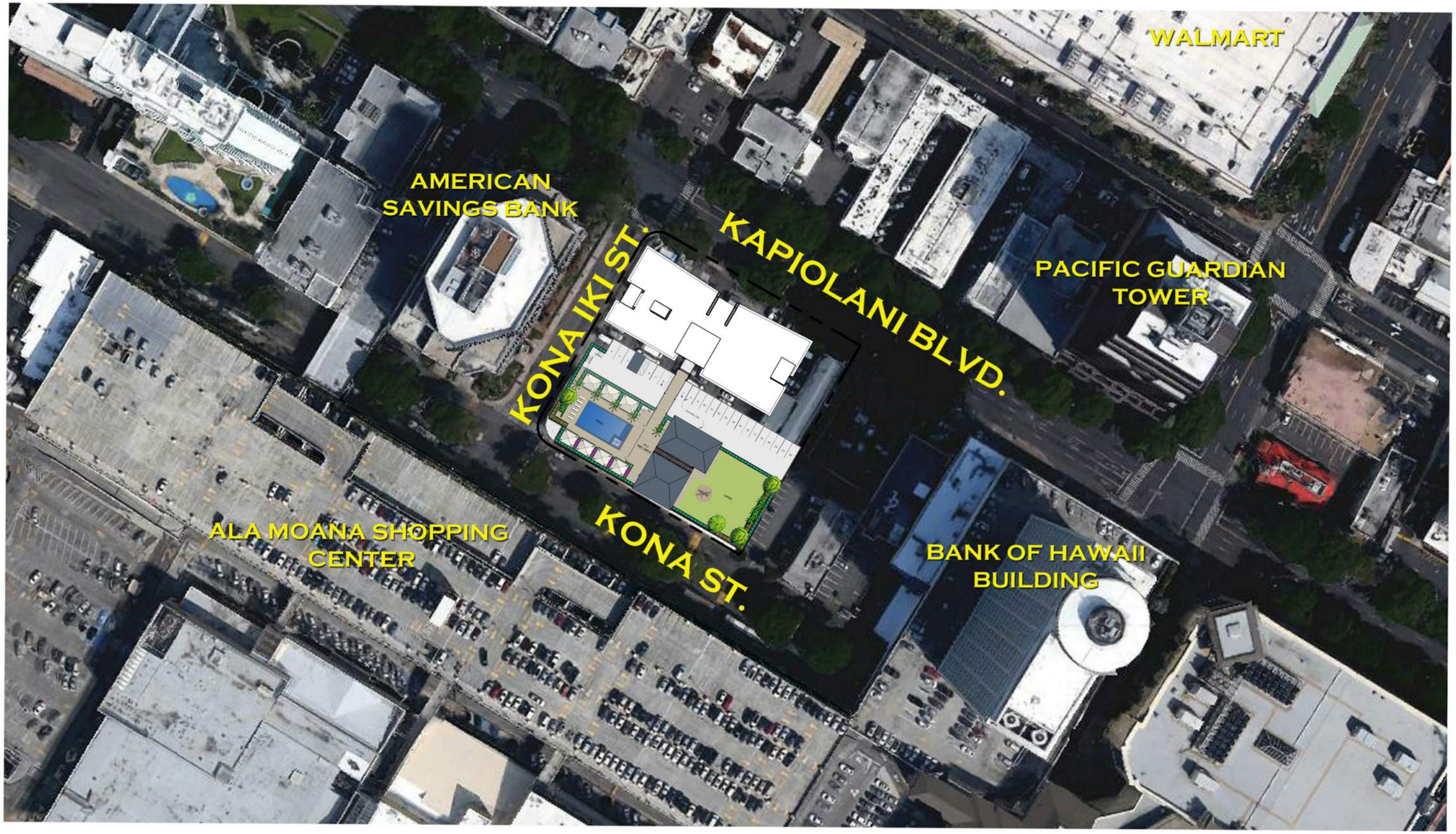
TAX MAP KEY NO:	2-3-039:011
SITE ADDRESS:	1391 KAPIOLANI BLVD. HONOLULU, HAWAII

LOT INFORMATION

LOT AREA:	
ACRES	1.431 ACRES
SQUARE FEET (SF)	62,328 SF
LOT DIMENSIONS:	
LENGTH:	250 FT.
DEPTH:	250 FT.

LAND CONTROL CODES & DEVELOPMENT STANDARDS

ZONING:	BMX-3 COMMUNITY BUSINESS DISTRICT
FLOOR ZONE:	AE / X
HISTORIC SITE REGISTRY:	NONE
LOT RESTRICTIONS:	NONE
SMA / SHORELINE:	NOT IN SMA
SPECIAL DISTRICT:	NOT IN SPECIAL DISTRICT
STATE LAND USE:	URBAN DISTRICT
HEIGHT LIMIT:	250 FT.
HEIGHT SETBACKS:	NO PORTION OF A STRUCTURE SHALL EXCEED A HEIGHT EQUAL TO TWICE THE DISTANCE FROM THE STRUCTURE TO THE VERTICAL PROJECTION OF THE CENTER LINE OF ANY STREET
STREET SETBACKS	
FRONT:	10 FT. FOR DWELLINGS; 5 FT. FOR OTHER USES
SIDE & REAR:	10 FT. FOR MULTI-FAMILY DWELLINGS; 0 FT. FOR OTHER USES
MAX. BUILDING AREA:	NOT REGULATED (PERCENT OF ZONING LOT)
MAX. DENSITY (FAR):	2.5 (OR 155,815 SF)
OPEN SPACE BONUS:	FOR EACH SQUARE FOOT OF PUBLIC OPEN SPACE PROVIDED, FIVE SQUARE FEET OF FLOOR AREA CAN BE ADDED, EXCLUSIVE OF ALL REQUIRED YARDS; FOR EACH SQUARE FOOT OF ARCADE AREA PROVIDE, THREE SQUARE FEET OF FLOOR AREA CAN BE ADDED, EXCLUSIVE OF ALL REQUIRED YARDS;
MAX. FAR WITH OPEN SPACE BONUS:	3.5 (OR 218,148 SF)
OFF-STREET PARKING:	REQUIREMENTS VARY BY USAGE
OFF-STREET LOADING:	REQUIREMENTS VARY BY USAGE



PLAN NORTH

THE CENTRAL
ALA MOANA

VICINITY MAP

The Central Condominium | Address: 1391 KAPIOLANI BOULEVARD | Project Number: 17037 | Date: 03/06/18

SAMKOO

DESIGN PARTNERS INCORPORATED

THE CENTRAL
ALA MOANA

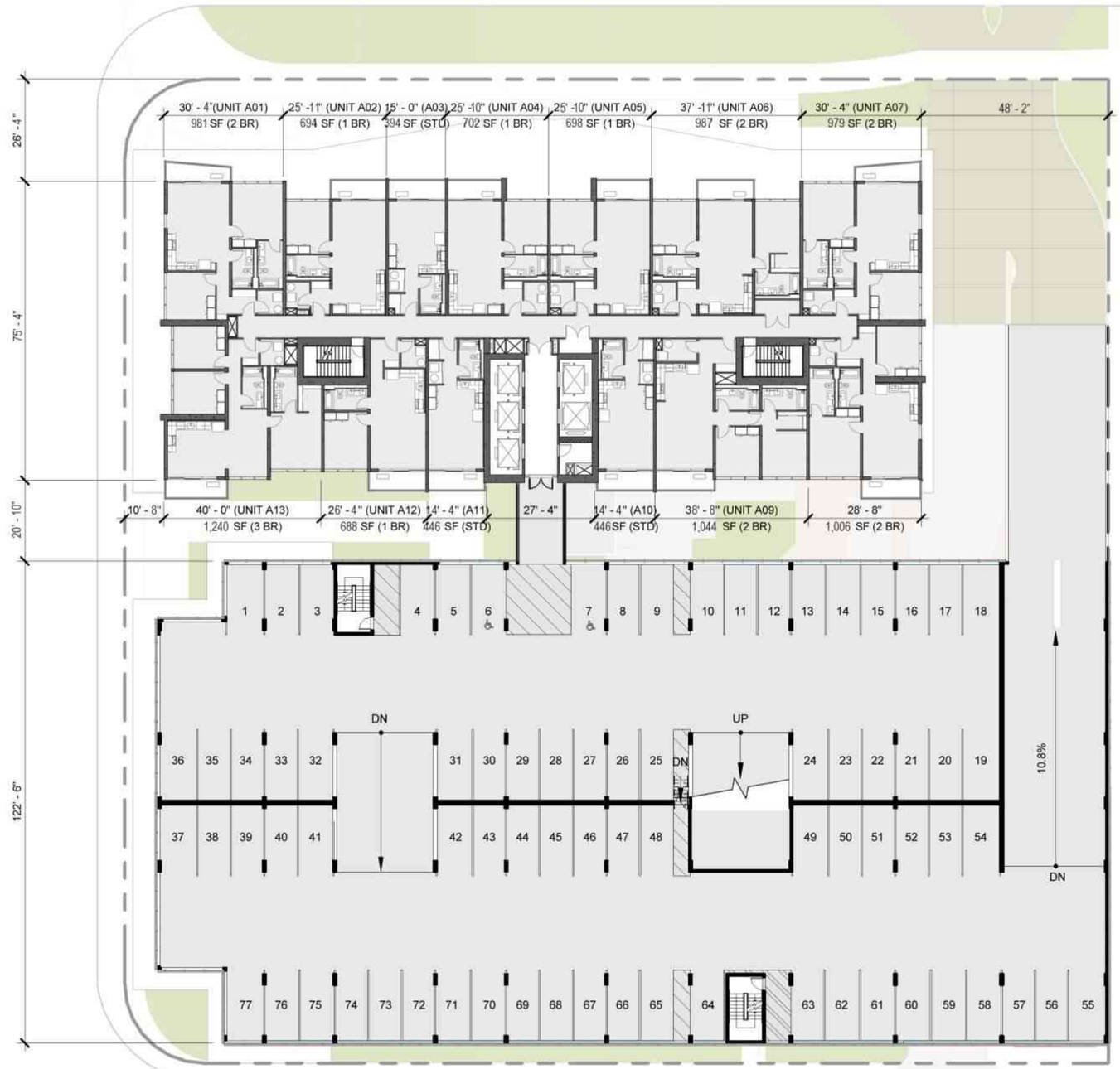
SITE PLAN

The Central Condominium | Address: **1391 KAPIOLANI BOULEVARD** | Project Number: **17037** | Date: 03/06/18

SCALE: 1/32" = 1'-0" 0 16' 32' 64'

SAMKOO

DESIGN PARTNERS INCORPORATED



PLAN NORTH

OVERALL 2ND FL

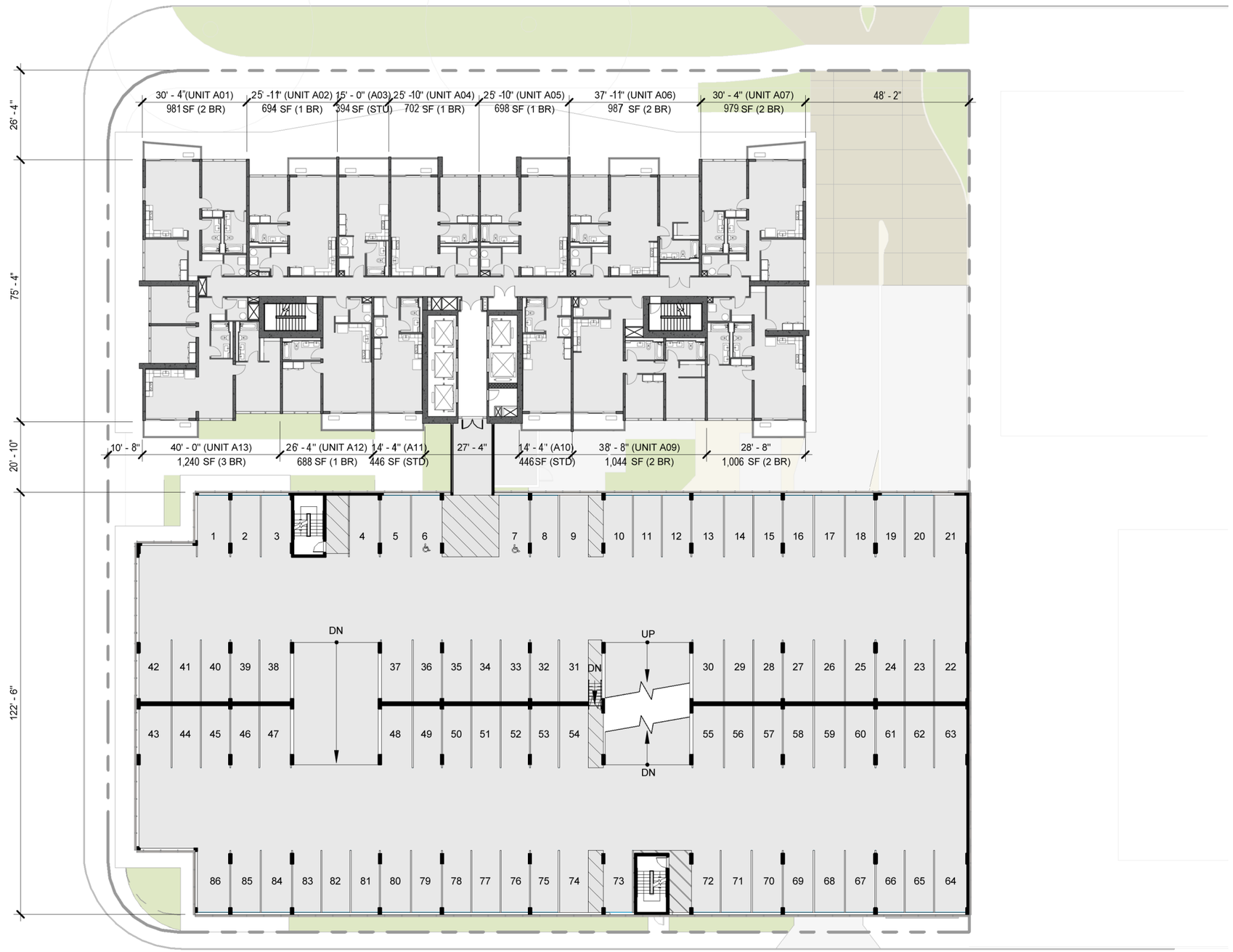
THE CENTRAL
ALA MOANA

The Central Condominium | Address: **1391 KAPIOLANI BOULEVARD** | Project Number: **17037** | Date: 03/06/18

SCALE: 1/32" = 1'-0" 0 16' 32' 64'

SAMKOO

DESIGN PARTNERS INCORPORATED



PLAN NORTH

OVERALL 3RD FL - 9TH FL

THE CENTRAL
ALA MOANA

The Central Condominium | Address: **1391 KAPIOLANI BOULEVARD** | Project Number: **17037** | Date: 03/06/18

SCALE: 1/32" = 1'-0" 0 16' 32' 64'

SAMKOO

DESIGN PARTNERS INCORPORATED

PLAN NORTH

OVERALL 10TH FL

THE CENTRAL
ALA MOANA

The Central Condominium | Address: **1391 KAPIOLANI BOULEVARD** | Project Number: **17037** | Date: 03/06/18

SCALE: 1/32" = 1'-0" 0 16' 32' 64'

SAMKOO

DESIGN PARTNERS INCORPORATED

PLAN NORTH

THE CENTRAL
ALA MOANA

OVERALL 11TH FL AND REC DECK

The Central Condominium | Address: **1391 KAPIOLANI BOULEVARD** | Project Number: **17037** | Date: 03/06/18

SCALE: 1/32" = 1'-0" 0 16' 32' 64'

SAMKOO

DESIGN PARTNERS INCORPORATED

STUDIO UNIT	3
1 BEDROOM UNIT	4
2 BEDROOM UNIT	5
3 BEDROOM UNIT	1
TOTAL UNIT	13

0 8' 16' 32'

SCALE: 1/16" = 1'-0"

PLAN NORTH

TYPICAL UNITS PLAN - 2ND FL - 20TH FL

THE CENTRAL

The Central Condominium | Address: **1391 KAPIOLANI BOULEVARD** | Project Number: **17037** | Date: 03/06/18

Scale: 1/16"=1'-0"

SAMKOO

DESIGN PARTNERS INCORPORATED

STUDIO UNIT	2
1 BEDROOM UNIT	3
2 BEDROOM UNIT	6
3 BEDROOM UNIT	1
TOTAL UNIT	12

0 8' 16' 32'

SCALE: 1/16" = 1'-0"

PLAN NORTH

TYPICAL UNITS PLAN - 21ST - 28TH FL

THE CENTRAL

The Central Condominium | Address: **1391 KAPIOLANI BOULEVARD** | Project Number: **17037** | Date: 03/06/18

Scale: 1/16"=1'-0"

SAMKOO

DESIGN PARTNERS INCORPORATED

STUDIO UNIT	2
1 BEDROOM UNIT	3
2 BEDROOM UNIT	6
3 BEDROOM UNIT	1
TOTAL UNIT	12

0 8' 16' 32'

SCALE: 1/16" = 1'-0"

PLAN NORTH

TYPICAL UNITS PLAN - 29TH FL - 33RD FL

THE CENTRAL

The Central Condominium | Address: **1391 KAPIOLANI BOULEVARD** | Project Number: **17037** | Date: 03/06/18

Scale: 1/16"=1'-0"

SAMKOO

DESIGN PARTNERS INCORPORATED

STUDIO UNIT	1
1 BEDROOM UNIT	3
2 BEDROOM UNIT	5
3 BEDROOM UNIT	2
TOTAL UNIT	11

0 8' 16' 32'

SCALE: 1/16" = 1'-0"

PLAN NORTH

TYPICAL UNITS PLAN - 34TH FL - 43RD FL

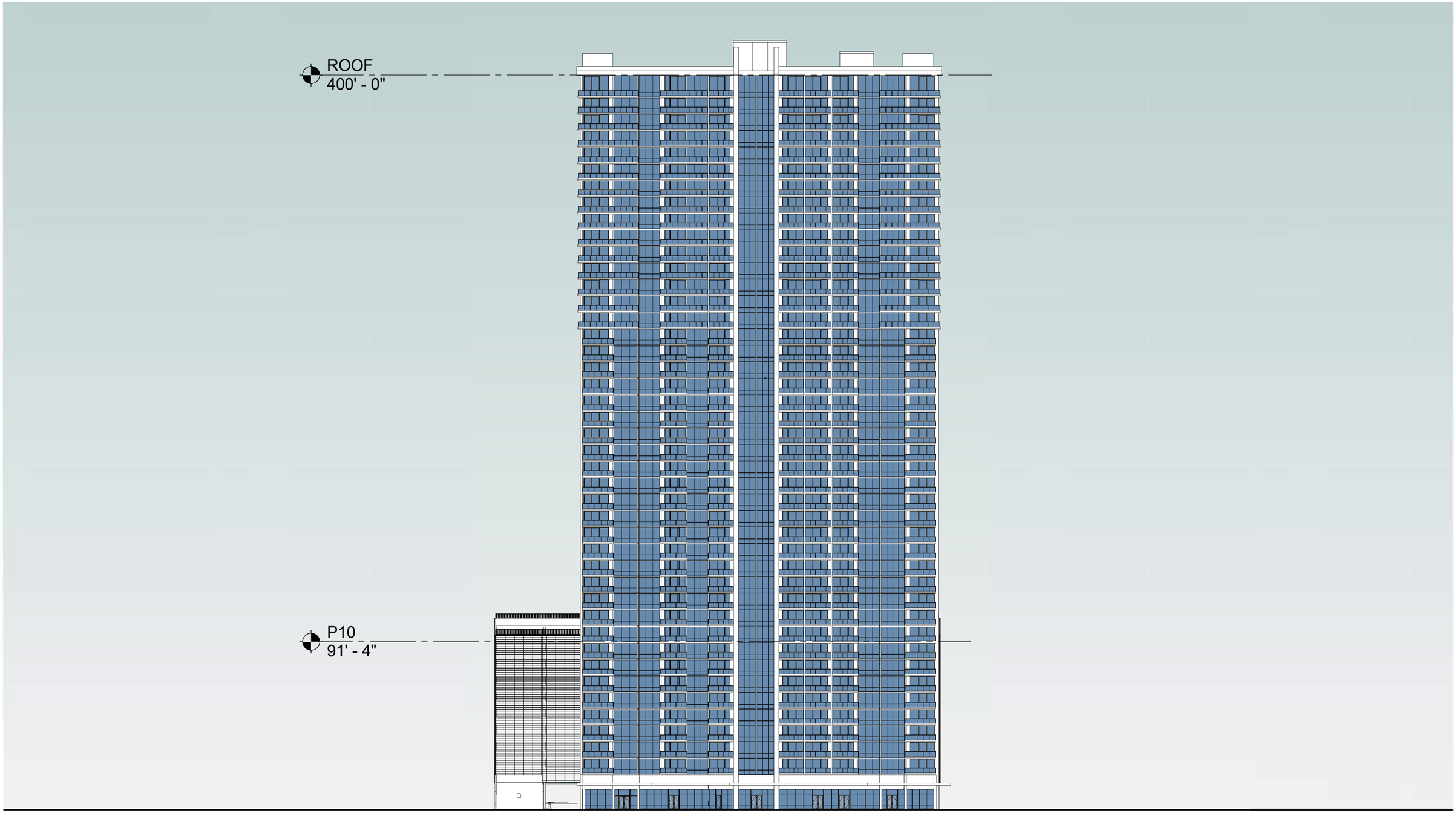
THE CENTRAL

The Central Condominium | Address: **1391 KAPIOLANI BOULEVARD** | Project Number: **17037** | Date: 03/06/18

Scale: 1/16"=1'-0"

SAMKOO

DESIGN PARTNERS INCORPORATED



THE CENTRAL
ALA MOANA

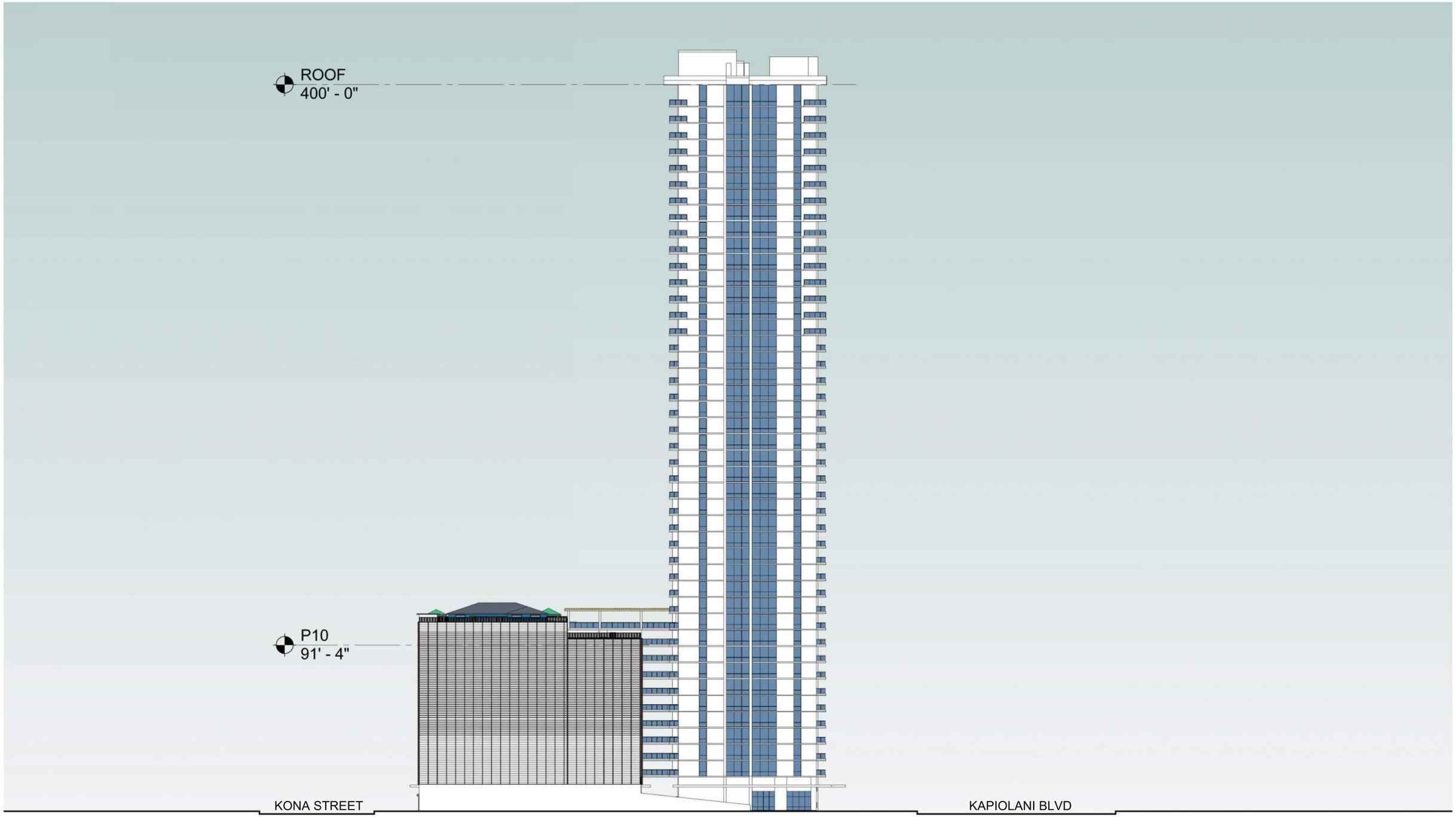
NORTH ELEVATION

The Central Condominium | Address: **1391 KAPIOLANI BOULEVARD** | Project Number: **17037** | Date: 03/06/18

Scale: 1" = 50'-0"

SAMKOO

DESIGN PARTNERS INCORPORATED



THE CENTRAL
ALA MOANA

EAST ELEVATION

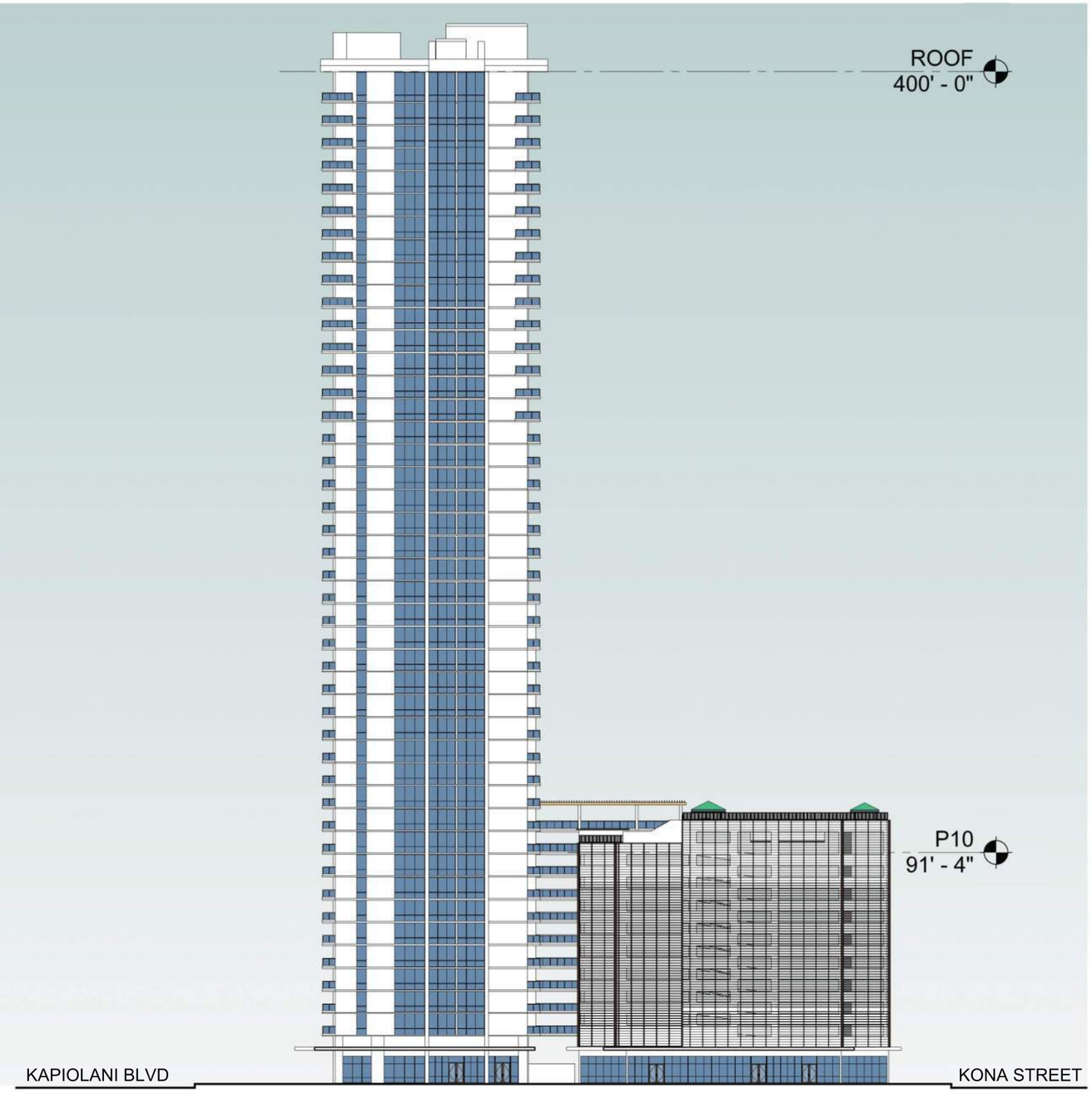
The Central Condominium | Address: 1391 KAPIOLANI BOULEVARD | Project Number: 17037 | Date: 03/06/18

Scale: 1" = 50'-0"

SAMKOO

DESIGN PARTNERS INCORPORATED

SOUTH ELEVATION



WEST ELEVATION

THE CENTRAL
ALA MOANA

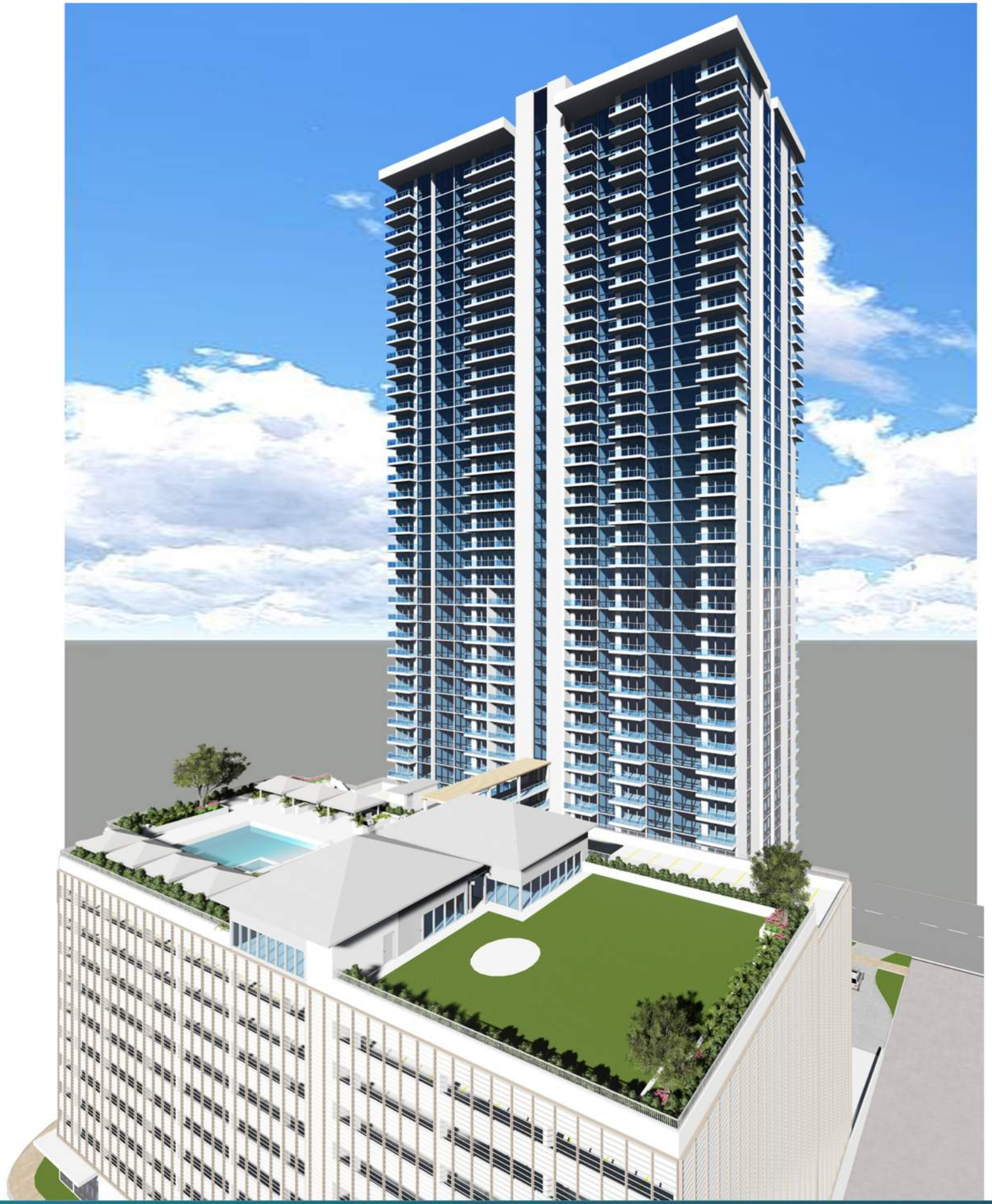
SOUTH AND WEST ELEVATION

The Central Condominium | Address: 1391 KAPIOLANI BOULEVARD | Project Number: 17037 | Date: 03/06/18

Scale: 1" = 50'-0"

SAMKOO

DESIGN PARTNERS INCORPORATED



THE CENTRAL
ALA MOANA

The Central Condominium | Address: **1391 KAPIOLANI BOULEVARD** | Project Number: **17037** | Date: 03/06/18

SAMKOO

DESIGN PARTNERS INCORPORATED

THE CENTRAL
ALA MOANA

The Central Condominium | Address: **1391 KAPIOLANI BOULEVARD** | Project Number: **17037** | Date: 03/06/18

SAMKOO

DESIGN PARTNERS INCORPORATED

THE CENTRAL
ALA MOANA

The Central Condominium | Address: **1391 KAPIOLANI BOULEVARD** | Project Number: **17037** | Date: 03/06/18

SAMKOO

DESIGN PARTNERS INCORPORATED

THE CENTRAL CONDOMINIUM

Building Summary

3/6/2018

| BUILDING | | | RESIDENTIAL UNITS | | |

E. PHASE 1 ENVIRONMENTAL ASSESSMENT

PHASE I
ENVIRONMENTAL SITE ASSESSMENT

TMK: (1) 2-3-039:011
1391 KAPIOLANI BOULEVARD
HONOLULU, OAHU, HAWAII

Prepared For:

Sam Koo Pacific, LLC & Sam Koo Hawaii, LLC
1631 Kapiolani Boulevard, Suite 200
Honolulu, Hawaii 96814

September 29, 2014

Prepared By:

Central Planet Repair, LLC.
236 Kuahiwi Avenue
Wahiawa, HI 96786
808/216-6555
www.geochemist.net

CPR PROJECT 74-1

Central Planet Repair, LLC
Comprehensive Environmental Services
www.geochemist.net
236 Kuahiwi Avenue, Wahiawa, Hawaii 96786
Phone: 808/216-6555

Sam Koo Pacific, LLC
Sam Koo Hawaii, LLC
1631 Kapiolani Boulevard, Suite 200
Honolulu, Hawaii 96814

September 29, 2014

Attention: Mr. Timothy Yi, General Manager

Subject: **Phase I Environmental Site Assessment**
TMK: (1) 2-3-039:011
1391 Kapiolani Boulevard
Honolulu, Oahu, Hawaii
CPR Project: 74-1

Dear Mr. Yi:

Central Planet Repair, LLC (CPR) has performed a Phase I Environmental Site Assessment (ESA) of the subject site. The purpose of this investigation was to evaluate the presence or likely presence of materials considered hazardous to human health and the environment that may impact the site.

Our Phase I ESA was conducted in accordance with the scope of work contained in our proposal dated August 19, 2014. A Phase I ESA comprises a number of individual elements whose basic nature and extent are determined in accordance with the standard of care applicable to Phase I ESAs. The standard of care is commonly defined as the care applied by the ordinary practitioner at the time and in the area where the ESA was performed. We believe that we have complied with the applicable standard of care within the limits of our scope of service described in our proposal and repeated below.

The accompanying report is an instrument of service of CPR. The report summarizes our findings and relates our opinions with respect to the site and potential sources of contamination at the site. Note that our findings and opinions are based on information that we obtained on given dates through records review, site review, and related activities. It is possible that other information exists or subsequently has become known, just as it is possible for conditions we observed to have changed after our observation. For these and associated reasons, CPR and many of its peers routinely advise clients for ESA services that it would be a mistake to place unmerited faith in findings and opinions conveyed via ESA reports. CPR cannot under any circumstances warrant or guarantee that not finding indicators of hazardous materials means that hazardous materials do not exist on the site.

-oOo-

Please contact us at (808) 216-6555 with any questions or comments regarding this project.

Sincerely,
Central Planet Repair, LLC

Ned Murphy
Consulting Geochemist

Three copies submitted

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY 1
2.0 INTRODUCTION 7
2.1 OVERVIEW 7
2.2 PURPOSE 7
2.3 SCOPE OF WORK 8
2.4 SIGNIFICANT ASSUMPTIONS 9
2.5 LIMITATIONS AND EXCEPTIONS OF ASSESSMENT 9
2.5.1 Data Gaps 10
2.6 SPECIAL TERMS AND CONDITIONS 11
2.7 USER RELIANCE 11
3.0 SITE DESCRIPTION 11
3.1 LOCATION AND LEGAL DESCRIPTION 11
3.2 CURRENT USES OF THE PROPERTY 12
3.3 STRUCTURES, ROADS, AND OTHER IMPROVEMENTS ON THE SITE 12
3.4 CURRENT USES OF ADJOINING PROPERTIES 12
4.0 USER PROVIDED INFORMATION 13
4.1 TITLE RECORDS 13
4.2 ENVIRONMENTAL LIENS OR ACTIVITY AND USE LIMITATIONS 13
4.3 SPECIALIZED KNOWLEDGE OR EXPERIENCE 13
4.4 COMMONLY KNOWN OR REASONABLY ASCERTAINABLE INFORMATION 13
4.5 OWNER, PROPERTY MANAGER, AND OCCUPANT INFORMATION 14
4.6 REASON FOR PERFORMING THIS PHASE I ASSESSMENT 14
4.7 OTHER USER PROVIDED INFORMATION 14
5.0 RECORDS REVIEW 15
5.1 STANDARD ENVIRONMENTAL RECORD SOURCES 15
5.1.1 Overview 15
5.1.2 U.S. EPA National Priorities List 17
5.1.3 U.S. EPA Delisted National Priorities List 18
5.1.4 U.S. EPA CERCLIS List 18
5.1.5 Federal CERCLIS NFRAP site list 18
5.1.6 U.S. EPA CORRACTS Lists 19
5.1.7 Federal RCRA non-CORRACTS TSD facilities list 19
5.1.8 U.S. EPA RCRA-LQG, RCRA-SQG, and RCRA-CESQG Lists 19

5.1.9 U.S. ENG CONTROLS List....21
5.1.10 U.S. INST CONTROL List....22
5.1.11 U.S. EPA ERNS List....22
5.1.12 State of Hawaii DOH Hazardous Waste Sites (SHWS)....22
5.1.13 State of Hawaii Landfill/Solid Waste Disposal Sites (SWF/LF)....26
5.1.14 State of Hawaii DOH Leaking UST List (LUST)....26
5.1.15 State of Hawaii DOH UST Section Database Listing....29
5.1.16 State and Tribal Institutional Control / Engineering Control Registries....31
5.1.17 State of Hawaii DOH Brownfield Sites....33
5.1.18 Other Regulatory Databases....33
5.2 ADDITIONAL ENVIRONMENTAL RECORDS SOURCES....36
5.3 PHYSICAL SETTING SOURCES....37
5.3.1 Topography....37
5.3.2 Geology and Soil....37
5.3.3 Groundwater....38
5.4 PAST USES OF THE PROPERTY....38
5.4.1 Sanborn Maps....39
5.4.2 USGS Maps....39
5.4.3 Historic Aerial Photographs....40
5.4.4 Prior Environmental Investigations....40
5.5 PAST USES OF THE ADJOINING PROPERTIES....51
5.5.1 Sanborn Maps....51
5.5.2 USGS Maps....52
5.5.3 Historic Aerial Photographs....52
5.5.4 Prior Environmental Investigations....53
6.0 SITE RECONNAISSANCE....54
6.1 METHODOLOGY AND LIMITING CONDITIONS....54
6.2 GENERAL SITE SETTING....54
6.2.1 Current Use(s) of the Property....54
6.2.2 Past Use(s) of the Property....54
6.2.3 Current Use(s) of Adjoining Properties....54
6.2.4 Past Use(s) of Adjoining Properties....55
6.2.5 Current or Past Uses in the Surrounding Area....55
6.2.6 Geologic, Hydrologic, and Topographic Conditions....55
6.2.7 General Description of Structures and Roads....55
6.2.8 Potable Water Supply....56
6.2.9 Sewage Disposal System....56

6.3 EXTERIOR OBSERVATIONS 56
6.3.1 Hazardous Substances, Wastes and Materials 56
6.3.2 Storage Tanks 56
6.3.3 Odors…… 56
6.3.4 Pools of Liquid 57
6.3.5 Drums…… 57
6.3.6 Containers of Hazardous Materials and Petroleum Products 57
6.3.7 Unidentified Substance Containers 57
6.3.8 Indications of PCBs 57
6.3.9 Pits, Ponds, or Lagoons 57
6.3.10 Stained Soil or Pavement 58
6.3.11 Stressed Vegetation 58
6.3.12 Solid Waste 58
6.3.13 Waste Water 58
6.3.14 Wells…….. 58
6.3.15 Septic Systems 58
6.3.16 Migration of Off-Site Contamination 58
6.3.17 Air Emissions 59
6.3.18 Dry-Cleaning Operations 59
6.4 INTERIOR OBSERVATIONS 59
6.4.1 Heating/Cooling 59
6.4.2 Stains or Corrosion 59
6.4.3 Drains and Sumps 59
6.5 NON-ASTM ISSUES 59
6.5.1 Radon Concentrations in Buildings 59
6.5.2 Asbestos-Containing Materials 60
6.5.3 Lead-Based Paint 60
7.0 INTERVIEWS 61
7.1 OWNER INTERVIEW 61
7.2 ARCHITECT INTERVIEW 61
8.0 FINDINGS 62
9.0 OPINION 66
9.1 VALUATION REDUCTION FOR ENVIRONMENTAL ISSUES 67
10.0 CONCLUSIONS 67
11.0 DEVIATIONS 72
12.0 ADDITIONAL SERVICES 72
13.0 REFERENCES 73
14.0 QUALIFICATIONS 73

15.0 SIGNATURES 74

APPENDICES

Appendix A Figure 1 - Site Location Map
Appendix B Figure 2 - Tax Map
Appendix C Figure 3 - Site Plan
Appendix D Site Photographs
Appendix E Historical Research Documentation (Sanborn® Map Report, Historical USGS Maps, and Historic Aerial Photographs)
Appendix F Environmental Data Resources, Inc. The EDR Radius Map™ Report with GeoCheck®
Appendix G Interview Documentation
Appendix H Qualifications of the Environmental Professionals

LIST OF STANDARD ACRONYMS

ASTM	American Society for Testing and Materials
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CERCLIS	Comprehensive Environmental Response Compensation and Liability Information System
CFR	Code of Federal Regulations
CPR	Central Planet Repair, LLC
DOCKET	Civil Enforcement cases
EPA	U.S. Environmental Protection Agency
ERNS	Emergency Response Notification System
ESA	Environmental Site Assessment
FIRM	Flood Insurance Rate Map
HDOH	State of Hawaii, Department of Health
HEER	Department of Health, Hazard Evaluation and Emergency Response Office
LUST	leaking underground storage tank
NASA	National Aeronautical and Space Administration
NFA	No Further Action
NPL	National Priorities List (Superfund sites)
PADS	PCB Activity Database
PAH	Polynuclear aromatic hydrocarbon
PCB	Polychlorinated biphenyl
RCRA	Resource Conservation and Recovery Act
SOSC NFA	State On-Scene Coordinator No Further Action
SSTS	Section Seven Tracking System (pesticide producers)
TMK	Tax Map Key
TRI	Toxic Release Inventory
TSCA	Toxic Substances Control Act
TSD	Treatment, storage or disposal (category of RCRA facility)
UIC	Underground Injection Control
U.S.	United States
USC	United States Code
USDA	United States Department of Agriculture
USGS	United States Geological Survey (US Dept. of the Interior)
UST	Underground storage tank
VCP	Voluntary Response Program

PHASE I
ENVIRONMENTAL SITE ASSESSMENT
TMK: (1) 2-3-039:011
1391 KAPIOLANI BOULEVARD
HONOLULU, OAHU, HAWAII

1.0 EXECUTIVE SUMMARY

This report presents the results of Central Planet Repair, LLC's (CPR's) Phase I Environmental Site Assessment (ESA) of TMK: (1) 2-3-039:011, 1391 Kapiolani Boulevard, Honolulu, Oahu, Hawaii (the "subject property").

CPR has performed this Phase I Environmental Site Assessment in accordance with the scope and limitations of ASTM Practice E1527-13 (ASTM E1527-13) and All Appropriate Inquiry (AAI) which includes 40 CFR Part 312, §312.21 and §312.31. Any exceptions to, or deletions from, this practice are described in Section 2.5 of this report.

The findings of this Phase I ESA are that the following recognized environmental conditions (RECs) are present on the subject property.

- A review of the RCRA-CESQG list, as provided by EDR, and dated 03/11/2014 has revealed that there is 1 RCRA-CESQG site at the target property (The RCRA database is compiled by the EPA and contains those regulated facilities that have notified the EPA as being hazardous waste generators, transporters, or treatment, storage or disposal facilities under RCRA. Conditionally Exempt Small Quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month):

  Cutter Chevrolet-Geo-Pontiac. Violation Status: No violations found.

  The RCRA-CESQG site will not affect the environmental condition of the subject property if it is operated and maintained in accordance with the Federal and State of Hawaii rules and regulations.

- The subject property was used as an auto repairing facility including battery service at least since 1949 as that shown on the reviewed Sanborn Maps.

- The pool of wastewater at the auto-wash area was observed at the auto-repairing section of the site building located along Kona Street (Appendix D, Photo 10). A floor drain was observed in the pool area. This drain is considered a REC because it was unknown where the drain discharged and there was a possibility that "residuals" associated with the automobile repair and car washing may have discharged to this drain.

- There is a former collector trench probably containing an oil-water separator (Appendix D, Photo 11). The sump probably collected discharges from within the former service/wash area via. The condition and/or contents of the trench and associated oil-water separator were never determined.

The findings of this Phase I ESA are that the following historical recognized environmental conditions were present on the subject property:

- A review of the UST list, as provided by EDR, and dated 06/30/2014 has revealed the following (The Underground Storage Tank (UST) database contains information regarding registered USTs):

  Cutter Chevrolet-Geo-Pontiac. 500-gallon Used Oil Tank. Tank Status: Permanently Out of Use. Tank Closure: September 2, 1995.

  No adverse effect on the subject property is anticipated due to the UST site was closed and its status is NFA (October 26, 1999 HDOH Letter).

- A review of the SHWS list, as provided by EDR, and dated 01/04/2014 has revealed that there was 1 SHWS site at the target property (The State Hazardous Waste Sites (SHWS) records are the states' equivalent to CERCLIS):

  Cutter Chevrolet-Geo-Pontiac. Environmental Interest: Cutter Chevrolet Hydraulic Lift. Hazard Priority: NFA. Document Date: 09/09/2005.

No adverse effect on the subject property is anticipated due to the SHWS site status (NFA).

- A review of the LUST list, as provided by EDR, and dated 06/30/2014 has revealed that there was 1 LUST site at the target property (The Leaking Underground Storage Tank (LUST) Incident Reports contain an inventory of reported leaking underground storage tank incidents):

  Cutter Chevrolet-Geo-Pontiac. Facility Status: Site Cleanup Completed (NFA letter dated by 10/26/1999).

  No adverse effect on the subject property is expected from the LUST site due to the site status (NFA).

- A review of the SPILLS list, as provided by EDR has revealed that there is 1 record for the target property (SPILS: Release Notifications. Releases of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988).

  Cutter Chevrolet-Geo-Pontiac. 1391 Kapiolani Blvd. Subject property. Two former hydraulic auto storage lift racks were reported as leaking and removed in 1999. Result: SOSC NFA by the DOH HEER Office.

  No adverse effect on the subject property is expected from the SPILLS site due to the site status (NFA).

- In April 2006, Clayton supervised the removal of two hydraulic lift systems, each consisting of two cylinders (front and rear) and a supply tank vault (Clayton Group Services, Inc. *Hydraulic Lift System Removal Activities, Former Cutter Chevrolet Facility, 1391 Kapiolani Boulevard, Honolulu, Oahu, Hawaii.* May 22, 2006. Prepared for Motor Supply, Ltd.). During removal activities, the concrete vaults were observed to contain standing oil and water. The visually impacted soil in the vicinity of the former cylinders were subsequently excavated and disposed. A total of four soil samples were collected from the excavation walls and analyzed for total petroleum hydrocarbons (TPH) as residual range organics (RRO), benzene, toluene, ethylbenzene, and xylenes (BTEX), polynuclear aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs). Two groundwater samples were collected from the open

excavations (one from each lift system excavation). Although several constituents were detected in both the soil and groundwater samples, analytical data from Clayton's removal activities indicated that constituents were either below detectable limits or below their respective Hawaii Department of Health (DOH) May 2005 Environmental Action Levels (EALs). Consequently, Clayton concluded that "no further action" was necessary regarding the former lift systems.

- The former used battery storage area was identified as a REC due to the fact that visual inspection revealed evidence of leakage of an unknown substance on the bare soil in this area (Clayton Group Services, Inc. *Phase I Environmental Site Assessment, 1391 Kapiolani Boulevard, TMK: (1) 2-3-039: Parcel 011, Honolulu, Oahu, Hawaii.* September 26, 2005. Prepared for Grubb & Ellis/CBI, Inc.). As a result of the September 2005 Phase I ESA, Clayton performed a Phase II Environmental Investigation to "(1) assess the presence or absence of petroleum and related chemical impacts to shallow soil and groundwater, and (2) compare the concentrations of chemical compounds in soil and groundwater to the DOH Interim Final Environmental Action Levels (EALs)." (Clayton Group Services, Inc. *Phase II Environmental Investigation, Former Cutter Chevrolet Facility, 1391 Kapiolani Boulevard, Honolulu, Oahu, Hawaii.* May 22, 2006. Prepared for Motor Supply, Ltd.). The subsurface investigation included the advancement of four soil borings and conversion of two boreholes into temporary monitoring wells to address potential petroleum impacts associated with the concerns identified in the Phase I ESA. Four soil samples were collected at the soil-groundwater interface of each borehole. In addition, one near surface soil sample was collected in the former used battery storage area. Analytical data from Clayton's investigation indicated that constituents were either below detectable limits or below their respective DOH EALs.

The following environmental conditions, which are not considered to be *recognized environmental conditions*, as defined by ASTM, were revealed during this assessment:

- Because the buildings on the subject property were built prior to 1980, suspect asbestos-containing materials (ACM) may be an issue at the subject property.

- Because the buildings on the subject property were built prior to 1978, lead-based paint (LBP) could be an issue at the subject property.

The findings of this Phase I ESA are that the following Recognized Environmental Conditions (RECs) were present on the adjoining properties:

- Facility marked as "gas & oil" shown at the west adjoining area on the 1973 Sanborn Map.

  No adverse effect on the subject property is expected from the former "gas & oil" facility due to the likely excavation of the potentially contaminated soil at the area of the facility during a construction of multi-level building at that location.

Based on the findings of this Phase I ESA, no additional environmental actions are warranted for the subject property at the date of this report. However, CPR confirms recommendations of environmental consultants investigated the subject property in previous years. These recommendations are the following:

- An environmental professional should be retained to draft a Construction Management Plan such that contractors are aware of environmental health and safety issues in the event that a drain, sump, UST, buried drums, and/or stained smelly soils are encountered during site development. Monitoring should be conducted by an environmental professional during construction activities and that if underground storage tanks, buried debris, stained soils, waste drums or odorous soils are encountered during construction, they should be removed and properly disposed in accordance with regulatory requirements.

- There is a former sump containing an oil-water separator. The sump reportedly collected discharges from within the former service/wash area via a trench drain. The condition and/or contents of the sump and associated oil-water separator were never determined. The condition and status of the sump and associated oil-water separator should be specifically evaluated for environmental impacts, and if the sump has no intended usage, it should be properly removed and/or closed.

- There is a floor drain located within the vicinity of the former hydraulic lifts and car wash area. The drain should be evaluated for environmental impacts, and if the drain has no intended usage, it should be properly removed and/or closed during demolition of the current improvements.

2.0 INTRODUCTION

2.1 OVERVIEW

This report presents the results of Central Planet Repair, LLCs (CPR's) Phase I Environmental Site Assessment (ESA) for the subject site. The general location of the site is shown on the Site Location Map in Appendix A, Figure 1.

Our work was performed as summarized in our proposal, dated August 19, 2014, which constitutes the contractual agreement between CPR and Sam Koo Pacific, LLC & Sam Koo Hawaii, LLC for the services provided. Our Phase I investigation was performed in general accordance with the American Society for Testing and Materials (ASTM) "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process" (ASTM Designation E1527-13) and All Appropriate Inquiry (AAI).

Good commercial and customary practice for conducting environmental site assessments has the goal of providing an independent, professional opinion regarding recognized environmental conditions, as defined by ASTM, associated with the subject property. The term *recognized environmental conditions* means the presence or likely presence of any *hazardous substances* or *petroleum products* in, on, or at a *property*: (*1*) due to any *release* to the *environment*; (*2*) under conditions indicative of a *release* to the *environment*; or (*3*) under conditions that pose a *material threat* of a future *release* to the *environment*. *De minimis* conditions are not *recognized environmental conditions*.

The term includes hazardous substances or petroleum products even under conditions in compliance with laws. The term is not intended to include *de minimis* conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. Conditions determined to be *de minimis* are not RECs.

2.2 PURPOSE

CPR conducted this ESA to evaluate whether materials considered hazardous to human health and the environment, present on the site or in the surrounding area,

may impact the subject site. We conducted the environmental assessment using available information sources with the potential to identify past or on-going problems at the subject property or adjacent properties. The ASTM Standard prescribes that the goal of the ESA process is to identify "Recognized Environmental Conditions" (RECs) which are defined as the "presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property, or into the ground, groundwater, or surface water of the property."

2.3 SCOPE OF WORK

CPR performed the following scope of work for this ESA:

- **Review of site history.** CPR examined readily available documents, consisting of previous environmental reports, topographic maps, and insurance maps.

- **Review of regulatory records.** We examined government records regarding environmental conditions, citations, complaints, and permits at the site and at neighboring properties. We reviewed records from or contacted the following agencies: U.S. Environmental Protection Agency (EPA), State of Hawaii Department of Health (DOH) Hazardous Waste Program, DOH Underground Storage Tank (UST) Program, DOH Underground Injection Control Program, and DOH Hazard Evaluation and Emergency Response (HEER) Program.

- **Review of site geology and hydrogeology.** We reviewed readily available published information on surface and subsurface conditions at the site and surrounding area. We used this information to assess topography, drainage, surface water bodies, anticipated subsurface geology, and groundwater occurrence and usage in the area.

- **Site reconnaissance.** We performed a site reconnaissance of the site to note visual signs of contamination, and conducted a brief assessment of neighboring properties. During our site reconnaissance we specifically looked for stained soil, dead or stressed vegetation, hazardous materials, electrical transformers and capacitors, above ground and underground storage tanks, disposal areas,

maintenance areas, groundwater wells, sumps, storm drains, and cesspools/sewers.

- **Data evaluation and report preparation.** We evaluated the information collected and prepared this report documenting our assessment and providing our conclusions.

2.4 SIGNIFICANT ASSUMPTIONS

While this report provides an overview of potential environmental conditions, both past and present, the environmental assessment is limited by the availability of information at the time of the assessment. It is possible that unreported disposal of waste or illegal activities impairing the environmental status of the property may have occurred which could not be identified. The conclusions and recommendations regarding environmental conditions that are presented in this report are based on the scope of work authorized by Sam Koo Pacific, LLC & Sam Koo Hawaii, LLC. Note, however, that virtually no scope of work, no matter how exhaustive, can identify all contaminants or all conditions above and below ground.

No assumptions apply to the findings of this Phase I ESA other than specifically referenced in the individual sections of text or as provided in the ASTM E1527-13 Standard (ASTM E1527-13).

2.5 LIMITATIONS AND EXCEPTIONS OF ASSESSMENT

The report has been prepared in accordance with generally accepted environmental methodologies referred to in ASTM E1527-13, and contains all of the limitations inherent in these methodologies. No other warranties, expressed or implied, are made as to the professional services provided under the terms of our contract and included in this report.

The conclusions of this report are based in part, on the information provided by others. The possibility remains that unexpected environmental conditions may be encountered at the site in locations not specifically investigated. Should such an event occur, CPR must be notified in order that we may determine if modifications to our conclusions are necessary.

The services performed and outlined in this report were based, in part, upon visual observations of the site and attendant structures. Our opinion cannot be extended to portions of the site that were unavailable for direct observation, reasonably beyond the control of CPR.

The objective of this report was to assess environmental conditions at the site, within the context of our contract and existing environmental regulations within the applicable jurisdiction. Evaluating compliance of past or future owners with applicable local, provincial and federal government laws and regulations was not included in our contract for services.

Our observations relating to the condition of environmental media at the site are described in this report. It should be noted that compounds or materials other than those described could be present in the site environment.

Phase I ESAs, by their very nature, are limited. CPR has endeavored to meet what it believes is the applicable standard of care and, in so doing, is obliged to advise Sam Koo Pacific, LLC & Sam Koo Hawaii, LLC of Phase I ESA limitations. This ESA did not include any investigation with respect to site geotechnical concerns, and did not include any sampling or laboratory testing for mold or bioaerosols, radon, methane, asbestos-containing building materials, or lead-based paint. No subsurface environmental investigation or sampling was performed. Our investigation was limited to the procedures described in the Phase I ESA Standard Practice ASTM E1527-13 and AAI.

CPR has made one exception to the Phase I ESA procedures specified by ASTM E1527-13. Because the State of Hawaii does not compile a list of hazardous waste sites identified for investigation or remediation (NPL or CERCLIS equivalents), we are unable to include such a list in our records review. The database search firm reviewed the HDOH HEER *Sites of Interest Database* instead (see section 5.1.12).

2.5.1 Data Gaps

The following data gaps were identified during the investigation:

- No significant data gaps were identified during the investigation.

2.6 SPECIAL TERMS AND CONDITIONS

Sam Koo Pacific, LLC & Sam Koo Hawaii, LLC contracted CPR to perform this Phase I ESA. The ESA was conducted and this report was prepared for the sole use of Sam Koo Pacific, LLC & Sam Koo Hawaii, LLC. This report shall not be relied upon by or transferred to any other party without express written authorization from CPR.

2.7 USER RELIANCE

The conclusions presented in this report are professional opinions based solely upon visual observations of the site and vicinity, and our interpretation of the available historical and regulatory information and documents reviewed. They are intended exclusively for the purpose outlined herein and apply only to the site location and Sam Koo Pacific, LLC & Sam Koo Hawaii, LLC. The scope of services performed in execution of this investigation may not be appropriate to satisfy the needs of other users, and any use or re-use of this document or the findings, conclusions, or recommendations presented herein is at the sole risk of said user.

Opinions and recommendations presented herein apply to site conditions existing at the time of our investigations and those reasonably foreseeable; they cannot necessarily apply to site changes of which this office is not aware and has not had the opportunity to evaluate.

3.0 SITE DESCRIPTION

3.1 LOCATION AND LEGAL DESCRIPTION

The subject property is located in Honolulu, Oahu, Hawaii (Figure 1 - Site Location Map in Appendix A). The subject property is depicted on Figure 2 - Tax Map in Appendix B and on Figure 3 – Site Plan in Appendix C. The TMK: (1) 2-3-039:011 parcel is located at 1391 Kapiolani Boulevard, Honolulu and contains an area of 1.4309 Acres.

Site photographs are provided in Appendix D. Historical research documentation is provided in Appendix E.

3.2 CURRENT USES OF THE PROPERTY

Two buildings are located at TMK: (1) 2-3-039:011 parcel of land. The buildings are occupied by "Taste Tea" restaurant, Auto X-Change, Inc., "King's Pizza" restaurant, auto-repairing/detailing facility, and a warehouse (Appendix C, Figure 3).

The rest of the property is use as parking.

3.3 STRUCTURES, ROADS, AND OTHER IMPROVEMENTS ON THE SITE

Two buildings and parking for personal, customers, and vehicles for sale are located at the TMK: (1) 2-3-039:011 parcel (Appendix C, Figure 3).

Utilities provided to the subject sites include water, sanitary sewer, electricity, and telephone. There is a drainage catch basin along Kapiolani Blvd. All three street frontages - Kapiolanl Blvd., Kona lki St., and Kona St. - have driveways.

3.4 CURRENT USES OF ADJOINING PROPERTIES

The current uses of the adjoining properties are (Figures 3, Appendix C):

South	Kona Street. Ala Moana Center is located across Kona Street.
West	Kona Iki Street. Multi-story office building and condos are located across the street.
North	Kapiolani Boulevard. Numerous commercial facilities are located across the boulevard.
East	Building located at the Kapiolani Boulevard side of the east adjoining area is vacant. Other buildings at the east adjoining property are occupied by restaurants, shops, and a tattoo salon.

4.0 USER PROVIDED INFORMATION

4.1 TITLE RECORDS

No title report was provided by the client to review recorded land title records and lien records. The property ownership information was obtained from the City and County of Honolulu's Real Property Assessment and Tax Billing Information web site. Chain of Title information was not provided. The property ownership is discussed in Section 4.5 below.

4.2 ENVIRONMENTAL LIENS OR ACTIVITY AND USE LIMITATIONS

CPR is not aware of any environmental cleanup liens against the property that are filed or recorded under federal, tribal, state or local law.

CPR is not aware of any Activity and Use Limitations, such as engineering controls, land use restrictions or institutional controls that are in place at the site and/or have been filed or recorded in a registry.

4.3 SPECIALIZED KNOWLEDGE OR EXPERIENCE

CPR does not have any specialized knowledge or experience related to the property or nearby properties.

4.4 COMMONLY KNOWN OR REASONABLY ASCERTAINABLE INFORMATION

The past uses of the property were obtained from review of publicly available information.

4.5 OWNER, PROPERTY MANAGER, AND OCCUPANT INFORMATION

Based on knowledge obtained from the City and County of Honolulu's Real Property Assessment and Tax Billing Information web site, the property is owned by Sam Koo Hawaii, LLC.

TMK: (1) 2-3-039:011 parcel of land is occupied by "Taste Tea" restaurant, Auto X-Change, Inc., Pizza restaurant, auto-repairing/detailing facility, and a warehouse.

4.6 REASON FOR PERFORMING THIS PHASE I ASSESSMENT

The Phase I ESA was prepared by CPR at the request of Sam Koo Pacific, LLC & Sam Koo Hawaii, LLC. This Phase I ESA was requested for the following reasons:

- Due diligence for project financing to develop the property.

4.7 OTHER USER PROVIDED INFORMATION

Sam Koo Pacific, LLC provided the previous environmental and engineering reports for the subject property. See Section 5.4.4 for details.

5.0 RECORDS REVIEW

5.1 STANDARD ENVIRONMENTAL RECORD SOURCES

5.1.1 Overview

CPR used a regulatory database search service, Environmental Data Resources, Incorporated (EDR), to review standard federal and state government databases of known or potential sources of hazardous materials or waste. The site assessment report provided to CPR by EDR is attached as Appendix F. ASTM E1527-13 (ASTM, 2013) specifies a minimum search distance for specific environmental record sources. The following record sources were searched for incidents or sites within the listed search distances of the proposed project site.

Standard Environmental Record Sources	**Search Distance (miles)**
Federal NPL (National Priorities List)	1.0
Federal Proposed NPL (Proposed National Priorities List)	1.0
Federal Delisted NPL Site List	0.5
Federal NPL LIENS (Superfund Liens)	Target Property
Federal CERCLIS (Comprehensive Environmental Response, Compensation and Liability Information System)	0.5
Federal CERCLIS NFRAP (CERCLIS sites where no further remedial action is planned under CERCLA)	0.5
Federal LIENS 2 (CERCLA Lien Information)	Target Property
Federal CORRACTS (Corrective Action Report)	1.0
Federal RCRA-TSDF (Resource Conservation and Recovery Act – Transportation, Storage and Disposal)	0.5
Federal RCRA-LQG (RCRA – Large Quantity Generators)	0.25
Federal RCRA-SQG (RCRA – Small Quantity Generators)	0.25
Federal US ENG CONTROLS (Engineering Controls Sites List)	0.5

Federal US INST CONTROL (Sites with Institutional Controls)	0.5
Federal ERNS (Emergency Response Notification System)	Target Property
Federal HMIRS (Hazardous Materials Information Reporting System)	Target Property
Federal DOT OPS (Incident and Accident Data)	Target Property
Federal US CDL (Clandestine Drug Labs)	Target Property
Federal US BROWNFIELDS (A Listing of Brownfields Sites)	0.5
Federal DOD (Department of Defense Sites)	1.0
Federal FUDS (Formerly Used Defense Sites)	1.0
Federal LUCIS (Land Use Control Information System)	0.5
Federal CONSENT (Superfund (CERCLA) Consent Decrees)	1.0
Federal ROD (Records Of Decision)	1.0
Federal UMTRA (Uranium Mill Tailings Sites)	0.5
Federal DEBRIS REGION 9 (Torres Martinez Reservation Illegal Dump Site Locations)	0.5
Federal ODI (Open Dump Inventory)	0.5
Federal MINES (Mines Master Index File)	0.25
Federal TRIS (Toxic Chemical Release Inventory System)	Target Property
Federal TSCA (Toxic Substances Control Act)	Target Property
Federal FTTS (FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)	Target Property
Federal HIST FTTS (FIFRA/TSCA Tracking System Administrative Case Listing)	Target Property
Federal SSTS (Section 7 Tracking Systems)	Target Property
Federal ICIS (Integrated Compliance Information System)	Target Property
Federal PADS (PCB Activity Database System)	Target Property
Federal MLTS (Material Licensing Tracking System)	Target Property
Federal RADINFO (Radiation Information Database)	Target Property
Federal RAATS (RCRA Administrative Action Tracking System)	Target Property
PWS (Public Water System Data)	Target Property

State DRYCLEANERS (Permitted Drycleaner Facility Listing)	0.25
State SCRD DRYCLEANERS (State Coalition for Remediation of Drycleaners Listing)	Target Property
State BROWNFIELDS (Brownfields Sites)	0.5
State AIRS (List of Permitted Facilities)	Target Property
State HWS (Hazardous waste sites, NPL or CERCLA equivalents) *	1.0
State LUST (Leaking underground storage tank) list	0.5
State registered UST list	0.25
State and tribal institutional control / engineering control registries (ENG CONTROLS, INST CONTROL)	0.5
Facility Index System/Facility Registry System (FINDS)	Target Property
Release Notifications (SPILS)	Target Property
State and tribal landfill and/or solid waste disposal site lists (SWF/LF)	0.5
State and tribal voluntary cleanup sites(VCP)	0.5

* Since there is no State database of NPL or CERCLA equivalents, this database was not included in EDR's report. EDR reviewed the State of Hawaii Department of Health (DOH) Office of Hazard Evaluation and Emergency Response (HEER) "Sites of Interest" database instead.

The Subject Property and surrounding sites were identified in the following databases.

5.1.2 U.S. EPA National Priorities List

The NPL is a list of properties with the highest priority for cleanup under the EPA Hazard Ranking System (40 CFR Part 300). The list is compiled by the EPA pursuant to CERCLA 42 USC §9605 (a)(8)(B).

EDR found no listed or proposed NPL facilities in the area vicinity of the site.

5.1.3 U.S. EPA Delisted National Priorities List

The delisted NPL is a list of properties that have undergone ranking for the NPL and initially scored high enough to be on the NPL. These sites subsequently have either been cleaned up to applicable standards or have been reevaluated with additional information to be removed or "delisted" from the NPL.

EDR found no delisted NPL facilities in the area vicinity of the site.

5.1.4 U.S. EPA CERCLIS List

This list is compiled by EPA and contains sites that EPA has investigated or is currently investigating for potential hazardous substance contamination for possible inclusion on the NPL.

EDR found no listed or proposed CERCLIS facilities within one-half mile of the subject property.

5.1.5 Federal CERCLIS NFRAP site list

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned. Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

EDR found no listed or proposed CERCLIS NFRAP facilities within one-half mile of the subject property.

5.1.6 U.S. EPA CORRACTS Lists

The CORRACTS list is compiled by the EPA and contains those regulated facilities that have notified EPA as facilities regulated by RCRA. The RCRA list is compiled by the EPA and contains those regulated facilities that have notified EPA as hazardous waste generators, transporters or treatment, storage or disposal facilities under RCRA.

EDR found no CORRACTS site within one mile of the subject property.

5.1.7 Federal RCRA non-CORRACTS TSD facilities list

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

EDR found no RCRA-TSDF Facilities within one-half mile of the subject property.

5.1.8 U.S. EPA RCRA-LQG, RCRA-SQG, and RCRA-CESQG Lists

The RCRA database is compiled by the EPA and contains those regulated facilities that have notified the EPA as being hazardous waste generators, transporters, or treatment, storage or disposal facilities under RCRA. Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month. Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month. Conditionally Exempt Small Quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

A review of the RCRA-LQG list, as provided by EDR, and dated 03/11/2014 has revealed that there is 1 RCRA-LQG site within approximately 0.25 miles of the target property.

Keeaumoku Superblock South. 669 Sheridan Street N 0.140 mi. Violation Status: No violations found.

The RCRA-LQG sites will not affect the environmental condition of the subject property if they are operated and maintained in accordance with the Federal and State of Hawaii rules and regulations.

A review of the RCRA-SQG list, as provided by EDR, and dated 03/11/2014 has revealed that there are 6 RCRA-SQG sites within approximately 0.25 miles of the target property.

Walgreens Store No. 12072. 1470 Kapiolani Blvd. E 0.128 mi. Violation Status: No violations found.

Green Mill Food Manufacturer Ltd. 730 Sheridan St NNE 0.186 mi. Area of violation: Generators - Records/Reporting. Date violation determined: 01/25/2007. Date achieved compliance: 05/18/2007.

Walmart No 3478. 700 Keeaumoku St NE 0.188 mi. Violation Status: No violations found.

Red Bag 3, LLC. 750 Keeaumoku St NE 0.221 mi. Violation Status: No violations found.

Sears Automotive Center. 1450 Ala Moana Blvd SSW 0.233 mi. Violation Status: No violations found.

Sephora Store No 100. 1450 Ala Moana Blvd NO SSW 0.233 mi. Violation Status: No violations found.

The RCRA-SQG sites will not affect the environmental condition of the subject property if they are operated and maintained in accordance with the Federal and State of Hawaii rules and regulations.

A review of the RCRA-CESQG list, as provided by EDR, and dated 03/11/2014 has revealed that there are 5 RCRA-CESQG sites within approximately 0.25 miles of the target property.

Cutter Chevrolet-Geo. Subject Property. Violation Status: No violations found.

Unocal 76 SS L 2877. 1322 Kapiolani Blvd NW 0.114 mi. Violation Status: No violations found.

Longs Drug Store No 9206. 1450 Ala Moana Blvd SSW 0.233 mi. Violation Status: No violations found.

Macys West Ala Moana. 1450 Ala Moana Blvd SSW 0.233 mi. Area of violation: Generators – General. Date violation determined: 03/06/1996. Date achieved compliance : 05/14/1996.

Ala Moana Center. 1450 Ala Moana Blvd STE SSW 0.233 mi. Violation Status: No violations found.

The RCRA-CESQG sites will not affect the environmental condition of the subject property if they are operated and maintained in accordance with the Federal and State of Hawaii rules and regulations.

5.1.9 U.S. ENG CONTROLS List

U.S. ENG CONTROLS: Engineering Controls Sites List. A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

EDR found no listed or proposed ENG CONTROLS facilities within one-half mile of the subject property.

5.1.10 U.S. INST CONTROL List

US INST CONTROL: Sites with Institutional Controls. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

EDR found no listed or proposed INST CONTROL facilities within one-half mile of the subject property.

5.1.11 U.S. EPA ERNS List

This list is compiled by the EPA and contains reported CERCLA hazardous substance releases or spills in quantities greater than the reportable quantity, as maintained at the National Response Center.

EDR examined this list, and found no reported incidents to have occurred on the subject site.

5.1.12 State of Hawaii DOH Hazardous Waste Sites (SHWS)

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

A review of the SHWS list, as provided by EDR, and dated 01/04/2014 has revealed that there are 56 SHWS sites within approximately 1 mile of the target property.

Cutter Chevrolet-Geo-Pontiac. 1391 Kapiolani Blvd. Subject property. Environmental Interest: Cutter Chevrolet Hydraulic Lift. Hazard Priority: NFA

Walgreens Keeamoku. 1460 Kapiolani Boulevar E 0.116 mi. Potential Hazards and Controls: Hazard Undetermined.

Cenpac Properties - Office Building. 615 Piikoi St NW 0.175 mi. Potential Hazards and Controls: Hazard Undetermined.

Motor Supply. 726 Sheridan St NNE 0.186 mi. Hazard Priority: NFA

Hakuyosha Hawaii, Inc. 730 Sheridan ST NNE 0.186 mi. Site Closure Type: No Further Action Letter - Restricted Use

HECO Substation: Makaloa Substation. 1544 Makaloa ST E 0.213 mi. Site Closure Type: No Further Action Letter - Restricted Use

Durant Properties. 1235 Kona ST WNW 0.239 mi. Hazard Priority: NFA

Sears Ala Moana. 1450 Ala Moana Blvd SSW 0.240 mi. Hazard Priority: NFA

New Office Lounge. 1551 Kapiolani Blvd ESE 0.244 mi. Use Restrictions: No Hazard Present for Unrestricted Residential Use

Evershine X 1230. Kapiolani Blvd WNW 0.248 mi. Hazard Priority: NFA

Like Like Plaza Petroleum Contamination. 745 Keeaumoku St NE 0.249 mi. Hazard Priority: NFA

Koolani Tower Project. 1189 Waimanu St W 0.355 mi. Hazard Priority: NFA

Yacht Harbor Towers. 1600 Ala Moana Blvd SE 0.388 mi. Hazard Priority: NFA

Reserve Housing Tower Soil Contamination. 1141 Waimanu St WNW 0.404 mi. Hazard Priority: NFA

1012 Piikoi Street, Anin-Piikoi Building. 1012 Piikoi St N 0.459 mi. Hazard Priority: NFA

Self Storage 1. 438 Kamakee ST WNW 0.464 mi. Hazard Priority: NFA

Former Kalakaua Transmission Inc. 1665 Kalakaua Ave E 0.475 mi. Hazard Priority: NFA

Grace Otsuka Apartment Complex. 1233 Young St N 0.493 mi. Hazard Priority: NFA

Roger's Repair Inc. 1687 Kalakaua Ave E 0.493 mi. Hazard Priority: NFA

Meadow Gold Dairies (Ice Cream Plant). 1418 Young St NE 0.505 mi. Hazard Priority: NFA

Jas W Glover Ltd. 1046 Waimamu St WNW 0.512 mi. Hazard Priority: NFA

Pacifica Condominium. 1009 Kapiolani Blvd WNW 0.546 mi. Hazard Priority: NFA

Aloha Motors 1777 Kapiolani Blvd. 1777 Kapiolani Blvd ESE 0.546 mi. Hazard Priority: NFA

1609 Ala Wai Diesel Release. 1609 Ala Wai Blvd SE 0.556 mi. Hazard Priority: NFA

Aloha/King Self Storage. 1414 Kalakaua Ave NE 0.570 mi. Hazard Priority: NFA

Hawaii Convention Center. 1801 Kalakaua Ave ESE 0.578 mi. Hazard Priority: NFA

Schuman Carriage Motors, Ltd. 1234 S Beretania St N 0.579 mi. Hazard Priority: NFA

7-11 Kalakaua. 1323 Kalakaua Ave NE 0.611 mi. Hazard Priority: NFA

Hawaii Opera Theater Sets & Props Warehouse. 962 Kawaiahao St WNW 0.658 mi. Hazard Priority: NFA

Hobron Hotel. 1744 Kaioo Dr SE 0.670 mi. Hazard Priority: NFA

Cartwright Neighborhood Park. Keeaumoku St & Matlock NNE 0.671 mi. Hazard Priority: NFA

Symphony Park. 850 Kapiolani Blvd NW 0.674 mi. Hazard Priority: NFA

1310 Pensacola Street. 1310 Pensacola St N 0.689 mi. Hazard Priority: NFA

HECO Soil Contamination Chapin Ln & Kapiolani Bvrd. Chapin Ln & Kapiolani Bvrd NW 0.746 mi. Hazard Priority: NFA

K&Y Auto Service and Wayne's Auto Electric. 902 Kawaiahao St & 539 WNW 0.747 mi. Hazard Priority: Low

Chuei Shokoh, Inc. 825 Kapiolani Blvd NW 0.767 mi. Hazard Priority: NFA

Kapiolani Women's & Children's Medical Center. 1319 Punahou St NE 0.787 mi. Hazard Priority: NFA

Bmw of Honolulu. 777 Kapiolani Blvd NW 0.806 mi. Hazard Priority: NFA

American Linen Warehouse. 837 Kawaiahao St WNW 0.815 mi. Hazard Priority: NFA

836 Kawaiahao Street. 836 Kawaiahao St WNW 0.826 mi. Hazard Priority: Low

Continental Auto Services. 1918 Algaroba St E 0.827 mi. Hazard Priority: NFA

One Archer Lane. 801 S King St NW 0.840 mi. Hazard Priority: NFA

WRAF - Hawaiian Tuna Packers. 1011 Ala Moana Blvd W 0.841 mi. Hazard Priority: NFA

801 South Hotel Street. 801 South Hotel St NW 0.847 mi. Hazard Priority: Medium

The Pavillion. 1925 Kalakaua Ave SE 0.848 mi. Hazard Priority: NFA

Hawaii Instrumentation & Controls, Inc. 822 Halekauwila St WNW 0.867 mi. Hazard Priority: Medium

HD&C, 725 Kapiolani Boulevard. 725 Kapiolani Blvd NW 0.880 mi. Hazard Priority: NFA

Wallys Garden Center. 1935 S Beretania St ENE 0.906 mi. Hazard Priority: Medium

Rubber Stamp Plantation. 746 Ilaniwai St WNW 0.912 mi. Hazard Priority: NFA

Chevron 2002 Kalakaua. 2002 Kalakaua Ave SE 0.949 mi. Hazard Priority: NFA

HECO Pad-Mounted #65844 Transformer. 650 Kapiolani Blvd NW 0.961 mi. Hazard Priority: NFA

Mccully Union Service. 2105 S King St E 0.980 mi. Hazard Priority: NFA

Hawaii Newspaper Agency Inc. 605 Kapiolani Blvd NW 0.988 mi. Hazard Priority: Medium

McDonald's Restaurant Soil & Groundwater Contamination. 2121 S King St E 0.989 mi. Hazard Priority: Low

Cooke Street Lead Contamination. 501 Cooke St WNW 0.993 mi. Hazard Priority: NFA

Underground Hoists. 744 Ala Moana Blvd WNW 0.994 mi. Hazard Priority: NFA

No adverse effect on the subject property is anticipated due to the SHWS site status (NFA) and/or distance to the subject property.

5.1.13 State of Hawaii Landfill/Solid Waste Disposal Sites (SWF/LF)

EDR examined DOH Solid and Hazardous Waste Branch's list of permitted landfills in the State of Hawaii for landfills or disposal sites located within one-half (0.5) mile of the subject site. None of the permitted landfills on the Island of Oahu are within one-half (0.5) mile of the subject site.

5.1.14 State of Hawaii DOH Leaking UST List (LUST)

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

A review of the LUST list, as provided by EDR, and dated 06/30/2014 has revealed that there are 34 LUST sites within approximately 0.5 miles of the target property.

Cutter Chevrolet-Geo-Pontiac. 1391 Kapiolani Blvd. Subject property. Facility Status: Site Cleanup Completed (NFA letter dated10/26/1999).

Superblock Properties. South Block (Bldg S25) NNE 0.098 mi.
Facility Status: Site Cleanup Completed (NFA)

Superblock Properties. South Block (Bldg S20) NE 0.103 mi.
Facility Status: Site Cleanup Completed (NFA)

Ala Moana Unocal. 1322 Kapiolani Blvd NW 0.114 mi.
Facility Status: Site Cleanup Completed (NFA)

Superblock Properties. North Block (Bldg N15) N 0.117 mi.
Facility Status: Site Cleanup Completed (NFA)

Superblock Properties. North Block (Bldg N8) / Keeaumoku St NE 0.126 mi.
Facility Status: Site Cleanup Completed (NFA)

Superblock Properties. South Block (Bldg S1) / Sheridan St NNE 0.145 mi.
Facility Status: Site Cleanup Completed (NFA)

Aloha Ala Moana. 451 Piikoi St W 0.168 mi.
Facility Status: Site Cleanup Completed (NFA)

Superblock Properties. South Block (Bldg S13) NNE 0.168 mi.
Facility Status: Site Cleanup Completed (NFA)

Cenpac Properties - Office Building. 615 Piikoi St NW 0.175 mi.
Facility Status: Site Cleanup Completed (NFA)

Nauru Phosphate Royalties Trust. 404 Piikoi St/1330 Ala Moana Blvd W 0.183 mi.
Facility Status: Site Cleanup Completed (NFA)

Rainbow Chevrolet Inc. 630 Piikoi St NW 0.201 mi.
Facility Status: Site Cleanup Completed (NFA)

Sears Roebuck & Company 1158. 1450 Ala Moana Blvd #1000 SSW 0.233 mi.

Facility Status: Site Cleanup Completed (NFA)

New Office Lounge. 1551 Kapiolani Blvd ESE 0.244 mi.
Facility Status: Site Cleanup Completed (NFA)

Wens Life Co., Inc. 808 Sheridan St NNE 0.269 mi.
Facility Status: Site Cleanup Completed (NFA)

Wes's Kapiolani Shell SS. 1204 Kapiolani Blvd WNW 0.276 mi.
Facility Status: Site Cleanup Completed (NFA)

GTE Hawaiian Tel Waimanu Base. 1192 Waimanu St W 0.298 mi.
Facility Status: Site Cleanup Completed (NFA)

Firestone Store. 801 Kaheka St E 0.316 mi.
Facility Status: Site Cleanup Completed (NFA)

C&CH Pawaa Fire Station. 1610 Makaloa St E 0.342 mi.
Facility Status: Site Cleanup Completed (NFA)

Koolani Tower. 1189 Waimanu Street W 0.355 mi.
Facility Status: Site Cleanup Completed (NFA)

Bob Cisco. 1152 Waimanu St W 0.362 mi.
Facility Status: Site Cleanup Completed (NFA)

McKinley Car Wash. 1139 Kapiolani Blvd WNW 0.370 mi.
Facility Status: Site Cleanup Completed (NFA)

Gasco, Inc. 515 Kamakee St WNW 0.402 mi.
Facility Status: Site Cleanup Completed (NFA)

Texaco Station 61-100-0051. 1111 Kapiolani Blvd WNW 0.411 mi.
Facility Status: Site Cleanup Completed (NFA)

Yajima Oil of USA Inc. 1375 S King St NNE 0.430 mi.
Facility Status: Site Cleanup Completed (NFA)

Texaco Station 611000090. 1239 S King St N 0.433 mi.
Facility Status: Site Cleanup Completed (NFA)

Honolulu Hawaii Auto Repair. 1111 Waimanu St WNW 0.434 mi.
Facility Status: Site Cleanup Completed (NFA)

Piikoi Chevron SS. 1201 S King St N 0.447 mi.
Facility Status: Site Cleanup Completed (NFA)

Gas 'N Glo Inc. 1670 Makaloa St E 0.449 mi.
Facility Status: Site Cleanup Completed (NFA)

Mark's Piikoi Service L-3667. 1180 S King St N 0.460 mi.
Facility Status: Site Cleanup Completed (NFA)

Honolulu Laundry Co., Ltd. 438 Kamakee St WNW 0.464 mi.
Facility Status: Site Cleanup Completed (NFA)

Kodak Building. 1065 Kapiolani Blvd WNW 0.472 mi.
Facility Status: Site Cleanup Completed (NFA)

Aloha Marine. 1651 Ala Moana Blvd SSE 0.480 mi.
Facility Status: Site Cleanup Completed (NFA)

San Auto Body and Painting. 1058 Waimanu St WNW 0.497 mi.
Facility Status: Site Cleanup Completed (NFA)

No adverse effect on the subject property is expected from the LUST sites due to the site status (NFA) and/or distance to the subject property.

5.1.15 State of Hawaii DOH UST Section Database Listing

The Underground Storage Tank database contains information regarding registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data comes from the Department of Health's Listing of Underground Storage Tanks.

A review of the UST list, as provided by EDR, and dated 06/30/2014 has revealed that there are 28 UST sites within approximately 0.25 miles of the target property.

Cutter Chevrolet-Geo-Pontiac. 1391 Kapiolani Blvd. Subject property. 500-gallon Used Oil Tank. Tank Status: Permanently Out of Use. Tank Closure: September 2, 1995.

Superblock Properties. South Block (Bldg S25) NNE 0.098 mi.

Rainbow Chevrolet, Inc. 1341 Kapiolani Blvd NW 0.101 mi.

Superblock Properties. South Block (Bldg S20) NE 0.103 mi.

Treasures of the East. 1310 Makaloa St NNW 0.112 mi.

Ala Moana Unocal. 1322 Kapiolani Blvd NW 0.114 mi.

Superblock Properties. North Block (Bldg N15) N 0.117 mi.

Superblock Properties. North Block (Bldg N8) / Keeaumoku St NE 0.126 mi.

Superblock Properties. South Block (Bldg S1) / Sheridan St NNE 0.145 mi.

Superblock Properties. 666 Keeaumoku St / South Bloc (S9) NNE 0.167 mi.

Superblock Properties. South Block (Bldg S14) NNE 0.167 mi.

Superblock Properties. South Block (Bldg S11) NNE 0.167 mi.

Superblock Properties. South Block (Bldg S6) / Kamaile St NNE 0.167 mi.

Superblock Properties. South Block (Bldg S22) NNE 0.167 mi.

Superblock Properties. South Block (Bldg S10) NNE 0.167 mi.

Superblock Properties. North Block (Bldg N4) / Keeaumoku St NNE 0.167 mi.

Superblock Properties. North Block (Bldg N12) NNE 0.167 mi.

Superblock Properties. South Block (Bldg S24) NNE 0.167 mi.

Aloha Ala Moana. 451 Piikoi St W 0.168 mi.

Superblock Properties. South Block (Bldg S13) NNE 0.168 mi.

Cenpac Properties - Office Building. 615 Piikoi St NW 0.175 mi.

Durant Realty Corp. 450 Piikoi St W 0.176 mi.

Motor Supply Ltd. 726 Sheridan St NNE 0.186 mi.

Green Mill Food Manufacturer Ltd. 730 Sheridan St NNE 0.186 mi.

Rainbow Chevrolet Inc. 630 Piikoi St NW 0.201 mi.

Sears Roebuck & Company 1158. 1450 Ala Moana Blvd #10 SSW 0.233 mi.

New Office Lounge. 1551 Kapiolani Blvd ESE 0.244 mi.

Likelike Drive in. 745 Keeaumoku St NE 0.249 mi.

The UST sites will not affect the environmental condition of the subject property if they are operated and maintained in accordance with the Federal and State of Hawaii rules and regulations.

5.1.16 State and Tribal Institutional Control / Engineering Control Registries

ENG CONTROLS: A listing of sites with engineering controls in place.
INST CONTROL: Voluntary Remediation Program and Brownfields sites with institutional controls in place.

A review of the ENG CONTROLS list, as provided by EDR, and dated 01/04/2014 has revealed that there are 4 ENG CONTROLS sites within approximately 0.5 miles of the target property.

Koolani Tower Project. 1189 Waimanu St W 0.355 mi. Hazard Priority: NFA

Yacht Harbor Towers. 1600 Ala Moana Blvd SE 0.388 mi. Hazard Priority: NFA

Former Kalakaua Transmission Inc. 1665 Kalakaua Ave E 0.475 mi. Hazard Priority: NFA

Grace Otsuka Apartment Complex. 1233 Young St N 0.493 mi. Hazard Priority: NFA

No adverse effect on the subject property is expected from the EMG CONTROL sites due to the site status (NFA) and distance to the subject property.

A review of the INST CONTROL list, as provided by EDR, and dated 01/04/2014 has revealed that there are 8 INST CONTROL sites within approximately 0.5 miles of the target property.

Motor Supply. 726 Sheridan St NNE 0.186 mi. Hazard Priority: NFA

Hakuyosha Hawaii, Inc. 730 Sheridan St NNE 0.186 mi. Site Closure Type: No Further Action Letter - Restricted Use

HECO Substation: Makaloa Substation. 1544 Makaloa St E 0.213 mi. Hazard Priority: Low

Durant Properties. 1235 Kona St WNW 0.239 mi. Hazard Priority: NFA

Koolani Tower Project. 1189 Waimanu St W 0.355 mi. Hazard Priority: NFA

Yacht Harbor Towers. 1600 Ala Moana Blvd SE 0.388 mi. Hazard Priority: NFA

Former Kalakaua Transmission Inc. 1665 Kalakaua Ave E 0.475 mi. Hazard Priority: NFA

Grace Otsuka Apartment Complex. 1233 Young St N 0.493 mi. Hazard Priority: NFA

No adverse effect on the subject property is expected from the INST CONTROL sites due to the site status (NFA) and distance to the subject property.

5.1.17 State of Hawaii DOH Brownfield Sites

This list is compiled by the State DOH Solid and Hazardous Waste Branch UST Section. The ASTM designated search area for Brownfield sites is 0.5 miles of the subject site.

EDR searched and found no Brownfield sites within one-half (0.5) miles of the subject sites.

5.1.18 Other Regulatory Databases

A number of other regulatory databases, not specified by ASTM guidance, are included in the attached EDR report.

EDR reported listed sites in the vicinity of the subject property in the following databases:

RGA HWS: Recovered Government Archive State Hazardous Waste Facilities List The EDR Recovered Government Archive State Hazardous Waste database provides a list of SHWS incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Health in Hawaii.

Cutter Chevrolet. 1391 Kapiolani Blvd. Subject Property.

VCP: Voluntary Response Program Sites. Sites participating in the Voluntary Response Program. The purpose of the VRP is to streamline the cleanup process in a way that will encourage prospective developers, lenders, and purchasers to voluntarily cleanup properties.

A review of the VCP list, as provided by EDR, and dated 01/04/2014 has revealed that there is 1 VCP site within approximately 0.5 miles of the target property.

Evershine X. 1230 Kapiolani Blvd WNW 0.248 mi. Hazard Priority: NFA

No adverse effect on the subject property is expected from the VCP site due to the site status (NFA) and distance to the subject property.

RCRA-NonGen: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

A review of the RCRA NonGen / NLR list, as provided by EDR, and dated 03/11/2014 has revealed that there are 6 RCRA NonGen / NLR sites within approximately 0.25 miles of the target property.

Cutter of Maui Inc. DBA-Rainbow Mitsubishi. 1341 Kapiolani Blvd NW 0.101 mi. Violation Status: No violations found.

Keeaumoku Superblock North. 705 Sheridan St NNE 0.161 mi. Violation Status: No violations found.

Masas Foreign Car Svc Inc. 706 Sheridan St NNE 0.165 mi. Violation Status: No violations found.

Nauru Phosphate. 404 Piikoi St W 0.183 mi. Violation Status: No violations found.

Rainbow Chevrolet Inc. 630 Piikoi St NW 0.201 mi. Violation Status: No violations found.

Asahi Jyuken Hawaii Inc. 630 Piikoi St NW 0.201 mi. Violation Status: No violations found.

The RCRA NonGen sites will not affect the environmental condition of the subject property if they are operated and maintained in accordance with the Federal and State of Hawaii rules and regulations.

FINDS: Facility Index System. The Facility Index System contains both facility information and "pointers" to other sources of information that contain more detail. These include: RCRIS; Permit Compliance System (PCS); Aerometric Information Retrieval System (AIRS); FATES (FIFRA [Federal Insecticide Fungicide Rodenticide Act] and TSCA Enforcement System, FTTS [FIFRA/TSCA Tracking System]; CERCLIS; DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes); Federal Underground Injection Control (FURS); Federal Reporting Data System (FRDS); Surface Impoundments (SIA); TSCA Chemicals in Commerce Information System (CICS); PADS; RCRA-J (medical waste transporters/disposers); TRIS; and TSCA. The source of this database is the U.S. EPA/NTIS.

A review of the FINDS list, as provided by EDR has revealed that there is 1 record for the target property.

Cutter Chevrolet-Geo-Pontiac. 1391 Kapiolani Blvd. Subject property.

SPILS: Release Notifications. Releases of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988.

A review of the SPILLS list, as provided by EDR has revealed that there is 1 record for the target property.

Cutter Chevrolet-Geo-Pontiac. 1391 Kapiolani Blvd. Subject property. Substances: Engine Degreaser or Hand Soap. Result: SOSC NFA

No adverse effect on the subject property is expected from the SPILLS site due to the site status (NFA).

EDR US Hist Auto Stat: EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers.

A review of the EDR US Hist Auto Stat list, as provided by EDR, has revealed that there are 8 EDR US Hist Auto Stat sites within approximately 0.25 miles of the target property.

641 KEEAUMOKU ST ENE 0.146 mi.
1311 KAPIOLANI BLVD NW 0.153 mi.
1500 KAPIOLANI BLVD ESE 0.163 mi.
710 SHERIDAN ST NNE 0.171 mi.
661 KEEAUMOKU ST ENE 0.171 mi.
726 SHERIDAN ST NNE 0.186 mi.
742 SHERIDAN ST NNE 0.202 mi.
1450 ALA MOANA BLVD SSW 0.233 mi.

No adverse effect on the subject property is expected from the EDR US Hist Auto Stat sites due to the site distances to the subject property.

EDR US Hist Cleaners: EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers.

A review of the EDR US Hist Cleaners list, as provided by EDR, has revealed that there are 4 EDR US Hist Cleaners sites within approximately 0.25 miles of the target property.

650 SHERIDAN ST N 0.130 mi.
1518 MAKALOA ST E 0.163 mi.
1450 ALA MOANA BLVD SSW 0.233 mi.
1450 ALA MOANA BLVD ST SSW 0.233 mi.

No adverse effect on the subject property is expected from the EDR US Hist Cleaners sites due to the site distances to the subject property.

5.2 ADDITIONAL ENVIRONMENTAL RECORDS SOURCES

CPR searched and found no additional records sources for the subject site.

5.3 PHYSICAL SETTING SOURCES

CPR reviewed published geologic and hydrogeologic reports, maps, and the site assessment report provided by EDR (Appendix F) to obtain information regarding surface and subsurface conditions in the general area of the site.

5.3.1 Topography

The elevation of the subject sites is approximately 3 feet above mean sea level (Appendix F). The center of the site is located at approximately 21° 17' 36.1" north latitude and 157° 50' 38.7" west longitude. The site is flat.

The project site is located in the Metro Oahu region. The climate is relatively warm and dry. Trade winds from the northeast occur much of the time, with occasional Kona winds. The normal temperature range for the region varies from the high 60's (degrees Fahrenheit) to the low 90's. Rainfall is light, with mean annual rainfall of about 28 inches in Honolulu.

5.3.2 Geology and Soil

The island of Oahu is formed by the remnants of two coalesced shield volcanoes, the Koolau Volcano to the east and the Waianae Volcano to the west. A shield volcano is formed by eruptions of very fluid lava originating on the ocean floor that builds a dome-shaped structure resembling a shield. Submarine volcanic deposits include pillow lavas, hyaloclastite, and flow-foot breccia. Building of the Waianae and Koolau Volcanoes occurred during the Pliocene and Pleistocene epochs.

The subject property is located on the southeast side of the Oahu Island of Hawaii, in Honolulu (Appendix A). The site soils consist of silty clay. The soil hydrologic group is Class C – slow infiltration rates (Appendix F).

See Section 5.4.4 for detailed site soil description.

5.3.3 Groundwater

The groundwater in the area is part of the Nuuanu Aquifer System of the Honolulu Aquifer Sector as classified by Mink and Lau (1990). The groundwater is basal, freshwater in contact with seawater, unconfined, and is hosted in horizontally extensive lavas. The groundwater is classified as potentially used, drinking, fresh (<250 mg/L chloride), irreplaceable, and highly vulnerable to contamination. The hydrogeologic gradient is expected to be toward the Pacific Ocean. This assumption is based on the area topographic profile.

The site is located below (downgradient) of the Underground Injection Control (UIC) line as shown on the UIC map of Oahu, HDOH. This typically indicates that the underlying aquifer is not considered a drinking water source, limited types of injection wells are allowed, and injection wells need a UIC Permit or Permit Exemption.

The site groundwater was encountered at depths ranging from about 3.8 to 4.5 feet below the existing ground surface. Based on the proximity of the project site to the Pacific Ocean, groundwater levels are expected to vary with tidal fluctuations. In addition, groundwater levels may change due to seasonal precipitation, surface water runoff, and other factors.

The site location is within flood zones AE and X under the Federal Emergency Management Agency (FEMA). See Section 5.4.4 for details.

5.4 PAST USES OF THE PROPERTY

Information regarding past uses of the subject site was obtained from our review of Sanborn Fire Insurance Company maps (1949, 1951, 1955, 1973, 1975, 1980, 1985, 1991, and 1993), U.S. Geological Survey (USGS) topographic maps (USGS, 1928, 1953, 1954, 1959, 1969, 1970, 1983, and 1998), and Historic Aerial Photographs (1952, 1959, 1963, 1968, 1978, 1993, and 2000) (Appendix E).

5.4.1 Sanborn Maps

The 1949 Sanborn Map shows the property as "used auto sales" facility with one small office structure and one small auto repairing structure located in the center of the property.

The 1951 Sanborn Map appeared similar to the 1949 Sanborn Map.

The 1955 Sanborn Map shows one more structure in the center of the property (at the north area) and four structures at the east property area. The structure in the center is marked as "Auto Sales" and probably used as an office. The structures at the east area were used for tire and battery services.

The 1973 Sanborn Map shows that the entire south part of the property is occupied by two structures used as a parts department and an auto repairing facility. The repairing structure shown in the center of the property on the 1949-1955 maps is not shown on the 1973 map.

The 1975, 1980, and 1985 Sanborn Maps appeared similar to the 1973 Sanborn Map.

The 1991 Sanborn Map does not show office structures in the north part of the property.

The 1993 Sanborn Map shows no change since 1991.

No readily apparent evidence of recognized environmental conditions at the subject property was noted on the Sanborn Maps reviewed, except that the property was used as an auto repairing facility from 1949 through 1993 including battery service that is shown on the 1955 map.

5.4.2 USGS Maps

The subject site USGS maps are provided in Appendix E. The 1928-1998 USGS map shows the site area as the built-up area.

No readily apparent evidence of recognized environmental conditions at the subject property was noted on the topographic maps reviewed.

5.4.3 Historic Aerial Photographs

1952 Photo: The photograph shows two structures at the north area of the property. There are numerous vehicles at the northeast and east parts of the property. The west and south parts are vacant.

1959 and 1963 Photos: Details of the project site were obscured by poor photographic resolution.

1968 Photo: The photograph shows that the entire south and east parts of the property are occupied by structures. One small structure is shown at the north area of the property. The rest of the property is filled with vehicles.

1978 Photo: The aerial photograph shows no significant change at the property since 1968.

1993 Photo: The photograph does not show the structures in the north part of the property shown on the 1968 and 1978 photographs.

2000 Photo: The photograph shows no change since 1993.

No readily apparent evidence of recognized environmental conditions at the subject property was noted on the historic aerial photograph reviewed except numerous vehicles at the property that confirm use of the property for automobile sales and repair.

5.4.4 Prior Environmental Investigations

CPR reviewed the following prior environmental reports provided by Sam Koo Pacific, LLC:

1. *Environmental Document Review. 1391 Kapiolani Boulevard Property, Honolulu, Oahu, Hawaii.* EnviroServices & Training Center, LLC (ETC), May 10, 2007.

ETC's findings were based on the three (3) environmental reports provided by Ushijima Architects, Inc. The reports are listed below:

• Clayton Group Services, Inc. *Phase I Environmental Site Assessment, 1391 Kapiolani Boulevard, TMK: (1) 2-3-039: Parcel 011, Honolulu, Oahu, Hawaii.* September 26, 2005. Prepared for Grubb & Ellis/CBI, Inc.
• Clayton Group Services, Inc. *Hydraulic Lift System Removal Activities, Former Cutter Chevrolet Facility, 1391 Kapiolani Boulevard, Honolulu, Oahu, Hawaii.* May 22, 2006. Prepared for Motor Supply, Ltd.
• Clayton Group Services, Inc. *Phase II Environmental Investigation, Former Cutter Chevrolet Facility, 1391 Kapiolani Boulevard, Honolulu, Oahu, Hawaii.* May 22, 2006. Prepared for Motor Supply, Ltd.

Clayton Group Services Phase I Environmental Site Assessment, September 26. 2005

Clayton Group Services (Clayton) prepared a Phase I Environmental Site Assessment (ESA), dated September 26, 2005. It was noted that Cutter Chevrolet formerly used a portion of the subject property for car washing activities. Based on the Phase I ESA, Clayton identified four recognized environmental conditions (RECs), as follows:

1. Historical records and site reconnaissance findings indicated that the subject property was used for automobile repair activities. In addition, evidence of spills related to the past engine repair activities was observed on the concrete floor throughout the building located along Kona Street. This finding was considered a REC due to the potential impact from petroleum compounds associated with automobile repair activities.

2. Five underground lifts were formerly present at the subject property. It was not known if the underground portion of one hydraulic lift systems was removed, and it was not known if hydraulic fluid within the cylinder of the lift may have contained PCBs. This finding was considered a REC because of the potential impacts from the hydraulic fluid associated with the former hydraulic lifts.

3. A floor drain was observed in the vicinity of several of the former underground hydraulic lifts. This drain was considered a REC because it was unknown where the drain discharged and there was a possibility that

"residuals" associated with the former site activities (automobile repair and car washing) may have discharged to this drain.
4. The former used battery storage area was identified as a REC due to the fact that visual inspection revealed evidence of leakage of an unknown substance on the bare soil in this area.

Clayton also identified the following historical environmental conditions. Note that these conditions were not considered RECs:

1. The subject property was identified as a leaking underground storage tank (LUST) facility, however, this finding was not considered a REC since the site had been remediated and a letter of "no further action" was issued by the DOH SHWB.

2. Two former hydraulic auto storage lift racks were reported as leaking and removed in 1999. This finding was not considered a REC since the site was reportedly remediated and given a "no further action" status by the DOH HEER Office.

3. Clayton's Phase I ESA identified several areas which may contain suspect asbestos containing materials (ACM) and presumed asbestos containing materials (PACM). These areas included the ceiling panels, vinyl floor tiles and sheet flooring observed within the small office area of the operations building. In addition, since the buildings were built prior to 1978, Clayton indicated that lead-based paint (LBP) may be a concern. Since ACM and LBP are "not considered an ASTM issue," the potential presence of ACM and LBP was not considered a REC.

4. Suspect PCB-containing fluorescent light fixtures were identified throughout the buildings, however the fixtures were not considered RECs since there was no evidence of a release from the associated ballasts.

In addition, Clayton's Phase I ESA stated that there was a sump containing an oil-water separator. The sump reportedly collected discharges from within the former service/wash area via a trench drain. The condition and/or contents of the sump and associated oil-water separator were never determined, and Clayton did not identify the sump as a REC.

Clayton Group Services Hydraulic Lift System Removal Activities. May 22. 2006

As a result of the September 2005 Phase I ESA, Clayton conducted hydraulic lift removal activities. In April 2006, Clayton supervised the removal of two hydraulic lift systems, each consisting of two cylinders (front and rear) and a supply tank vault. During removal activities, the concrete vaults were observed to contain standing oil and water. The oil and water was removed along with the front cylinders, supply tank and associated piping. The concrete vaults were subsequently pressure washed. Clayton noted that the interiors of the concrete vaults appeared intact with no signs of seepage from the walls or floors of the vaults. As such, no soil samples were collected from the vault areas. During removal activities of the two rear cylinders, a limited quantity of hydraulic oil (<1 gallon) was released into the excavation. In addition, stained soil was noted on the sidewalls of both of the rear cylinder excavations. This staining was suspected to be residual impacts from the former UST release. The visually impacted soil in the vicinity of the former cylinders was subsequently excavated and disposed. The bottom of each lift system was located at an approximate depth of 8 feet below ground surface (bgs). Groundwater was observed at approximately 4.5 feet bgs, therefore, confirmation soil samples were collected at the soil-groundwater interface. A total of four soil samples were collected from the excavation walls and analyzed for total petroleum hydrocarbons (TPH) as residual range organics (RRO), benzene, toluene, ethylbenzene, and xylenes (BTEX), polynuclear aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs). Two groundwater samples were collected from the open excavations (one from each lift system excavation). Although several constituents were detected in both the soil and groundwater samples, analytical data from Clayton's removal activities indicated that constituents were either below detectable limits or below their respective Hawaii Department of Health (DOH) May 2005 Environmental Action Levels (EALs). Consequently, Clayton concluded that "no further action" was necessary regarding the former lift systems.

Clayton Group Services Phase II Environmental Investigation. May 22. 2006

As a result of the September 2005 Phase I ESA, Clayton also performed a Phase II Environmental Investigation to "(1) assess the presence or absence of petroleum and related chemical impacts to shallow soil and groundwater, and (2) compare the concentrations of chemical compounds in soil and

groundwater to the DOH Interim Final Environmental Action Levels (EALs)." The subsurface investigation included the advancement of four soil borings and conversion of two boreholes into temporary monitoring wells to address potential petroleum impacts associated with the concerns identified in the Phase I ESA. Four soil samples were collected at the soil-groundwater interface of each borehole. In addition, one near surface soil sample was collected in the former used battery storage area. A total of five soil samples and two groundwater samples were collected during investigation activities. The soil and groundwater samples were analyzed for hydrocarbon scan/fuel characterization (TPH as fuel scan), PAHs, PCBs, cadmium, and lead. In addition to cadmium and lead, the soil and groundwater samples collected in the vicinity of the former used battery storage area were analyzed for the metals arsenic, barium, chromium, mercury, selenium and silver. Analytical data from Clayton's investigation indicated that constituents were either below detectable limits or below their respective DOH EALs. In addition, "based on the history and location" of the subject property, Clayton recommended that "monitoring be conducted by an environmental professional during construction activities" and that "if underground storage tanks, buried debris, stained soils, waste drums or odorous soils are encountered during construction, they should be removed and properly disposed in accordance with regulatory requirements."

Based on the document review, ETC believes that there are no regulatory requirements to perform any additional environmental investigation at this time. However, there are several environmental conditions that may impact development activities; and such conditions are further described below. Review of Clayton's Phase I ESA indicated that there was a sump containing an oil-water separator. The sump reportedly collected discharges from within the former service/wash area via a trench drain. The condition and/or contents of the sump and associated oil-water separator were never determined. Based on review findings, ETC recommends that the condition and status of the sump and associated oil-water separator be specifically evaluated for environmental impacts, and if the sump has no intended usage, it should be properly removed and/or closed.

Clayton's Phase I also identified a floor drain located within the vicinity of the former hydraulic lifts as a REC. Subsequently, an attempt to determine the environmental impact of the drain was conducted, but, was unsuccessful due

to the small diameter of the pipe. ETC recommends that the drain be evaluated for environmental impacts, and if the drain has no intended usage, it should be properly removed and/or closed. PACM/ACM and lead-based paint were suspected to be present. Asbestos materials can become a hazard when they are damaged, disturbed, or deteriorated such as during demolition activities. The same idea applies to lead-based paint in certain cases, the ACM or LBP has to be abated prior to demolition. Moreover, high concentrations of lead may cause the demolition debris to be considered a hazardous waste. ETC recommends that a qualified Industrial Hygienist be contracted to perform a survey of the buildings in order to better ascertain demolition costs. Similarly, other hazardous materials such as fluorescent lamps and ballasts should be surveyed to more accurately determine demolition costs.

ETC recommends that an environmental professional be retained to draft a Construction Management Plan such that contractors are aware of environmental health and safety issues in the event that a drain, sump, UST, buried drums, and/or stained smelly soils are encountered during site development. In addition, ETC recommends that an environmental professional be retained to monitor excavation activities should environmental impacts be encountered.

2. *Samkoo Hawaii Condominium Preliminary Engineering Report.* SSFM International, Inc. August 2013.

The site location is within flood zones AE and X under the Federal Emergency Management Agency (FEMA). Zone AE corresponds to the flood hazard area subject to the 1% annual chance flood (100-year flood), also known as the base flood, which is defined as the flood that has a 1% chance of being equaled or exceeded in any given year. Zone X corresponds to the flood to areas outside the 1% annual chance floodplain, areas of 1% annual chance sheet flow flooding where average depths are less than 1 ft., areas of 1% annual chance stream flooding where the contributing drainage area is less than 1 square mile, or areas protected from the 1% annual chance flood by levees. The soil type within the project site is identified in the U.S. Department of Agriculture, Soil Conservation Service Survey as Fill Land, mixed (FL). This type of soil occurs mostly near Pearl Harbor and the Honolulu areas adjacent to the ocean. It consists of areas filled with material

dredged from the ocean or hauled from nearby areas and general materials from several other sources. This type of land type is used for urban development including airports, housing areas, and industrial facilities.

3. *Technical Memorandum. Samkoo Hawaii Condominium Preliminary Geotechnical Recommendations.* Geolabs, Inc. February 26, 2014

   The subsurface conditions at the site were explored by drilling and sampling four borings, designated as Boring Nos. 101 through 104, extending to depths of about 121.5 to 151.5 feet below the existing ground surface. Based on the available soil boring data, the project site generally is underlain by surface fill materials placed over lagoonal deposits followed by coralline deposits. The surface fills encountered generally consist of soft to medium stiff silty clays and loose to medium dense clayey gravel extending to depths of about 4.5 to 6 feet below the existing ground surface. Lagoonal deposits generally consisting of very loose to loose silty and/or clayey sands and gravel were encountered underlying the surface fill layer to depths of about 18 to 22 feet below the existing ground surface. Coralline materials were encountered below the lagoonal deposits and generally consist of interbedded loose to dense sandy and gravelly coralline detritus and soft to medium hard coral formation extending down to the maximum depth explored of about 151.5 feet below the ground surface. Groundwater was encountered at depths ranging from about 3.8 to 4.5 feet below the existing ground surface. Based on the proximity of the project site to the Pacific Ocean, groundwater levels are expected to vary with tidal fluctuations. In addition, groundwater levels may change due to seasonal precipitation, surface water runoff, and other factors. Based on the subsurface materials encountered and our engineering analyses, the project site is underlain by potentially liquefiable soils.

4. *Final Archaeological Inventory Survey Report for the 1391 Kapiʻolani Boulevard Parcel, Waikīkī Ahupuaʻa, Honolulu District, Island of Oʻahu TMK: [1] 2-3-039:011.* Cultural Surveys Hawaiʻi, Inc. (CSH), August 2014.

   A single historic property was identified within the project area, SIHP # 50-80-14-7193, which consists of a layer of historic trash. This layer was seen in nine trenches within the northern and eastern portions of the project area. The proposed project will not affect a significant historic property. CSH's effect

recommendation for the current project is "no historic properties affected" (in accordance with HAR 13-284-7).

Photographs of the late 1940s and early 1950s show the project area cleared of all vegetation shown in the photographs from the 1930s. As indicated in a ca. 1946 photograph, the project area is clearly defined by Kapiʻolani Boulevard and the nascent alignment of Kona Street. Especially evident is the bare coral fill comprising the future Ala Moana Shopping Center property. The photograph suggests that the land between Kona Street and Kapiʻolani Boulevard may have resulted from a separate, less intensive landfill project. The land between Kona Street and Kapiʻolani Boulevard remains generally undeveloped. A 1948 aerial photograph shows the project area filled with large warehouses, as well as the newly filled area for the Ala Moana Shopping Center. By 1952, however, as indicated by a subsequent aerial photograph, the lands between Kapiʻolani Boulevard and Kona Street are being developed and are occupied by low-rise commercial buildings. However, it appears that no buildings had as yet been constructed within the project area itself by the mid-twentieth century.

In summary, documentary evidence suggests that the project area, before being filled and graded toward the middle of the twentieth century to create the present land surface, comprised a portion of Kewalo that included habitation sites, taro, and ponds situated amid the encompassing marshlands of the plain of Honolulu. The documentation suggests a more dry land environment than a ponded one. Based on the historic documentation, no named ponds were within the project area.

A single historic property (SIHP # 50-80-14-7193) was identified within the project area during the current AIS investigation. SIHP # 50-80-14-7193 is a subsurface trash layer, consisting of whole and fragmented glass bottles and jars, unidentified metal fragments, wires, ceramic fragments, red brick and ceramic tiles, red bricks, cinder blocks, lumber, nails, metal barrel remnants, and tire remnants. This site is dated to ca. the 1930s to 1950s. The large volume of trash and fill material imported into the project area corresponds with trash disposal and/or historic land reclamation activities.

CPR reviewed the following prior environmental reports provided by HDOH:

1. *Underground Storage Tank Closure Report. 1391 Kapiolani Boulevard, Honolulu, Hawaii 96814. Facility I.D. No.: 9-100185.* Muranaka Environmental Consultants, Inc. (MEC), October 1995.

   This report documents the closure of one 500-gallon, waste oil, underground storage tank (UST) located at Cutter Chevrolet-Geo-Pontiac at 1391 Kapiolani Boulevard, Honolulu, Hawaii. The tank was decommissioned on September 2, 1995. The UST and associated vent pipe were emptied of their contents, cleaned, and permanently removed from the ground. There was visible contamination in the soil, floating product on the surface of the groundwater in the pit, and there was a petroleum product odor emanating from the excavated soil. There were also holes in the tank. Ionized gas (head space) readings, which were collected from the soil above the tank at depths of 6 inches and 24 inches, and at the soil and groundwater interface at a depth of 70 inches, indicated that there had been a petroleum product release at the site. MEC collected two soil samples and one water sample during the closure according to the State of Hawaii, Department of Health (DOH) guidelines. The laboratory analyses of both soil samples indicated high concentrations of TPH-oil. The laboratory analyses of the water sample detected PCBs, lead, and fluoranthene at concentrations above the DOH recommended criteria for PCBs, lead, and fluoranthene in water. Benzo(a)pyrene was also detected in the water (there is no recommended guideline limit for benzo(a)pyrene in water). TPH-oil/grease was also detected in the water.

2. *Phase II Site Assessment. Soil And Water Survey, Long-Term Release Response Report. 1391 Kapiolani Boulevard, Honolulu, Hawaii 96814. Facility I.D. No.: 9-100185.* Muranaka Environmental Consultants, Inc. (MEC), March 1996.

   Four boreholes, each positioned four feet from the sides of the former UST pit excavation were drilled on January 13, 1996. MEC collected two soil samples (one above the water table and one at 19 inches below surface grade), and one water sample from each boring. The samples were analyzed at certified, independent laboratories for: total petroleum hydrocarbons measured as oil and grease (TPH-o/g); PAHs (benzo(a)pyrene, acenaphthene, fluoranthene, and naphthalene); PCBs (polychlorinated biphenyls); and lead. TPH-oil/grease was detected in one soil sample collected from borehole 1 at a concentration

(256 parts per million [ppm]) well below the DOH's (1995) 5,000 ppm action level. TPH-oil/grease was not detected in any of the other seven soil samples. The other constituents tested for were not detected in any of the soil samples. Floating product was present in all of the boreholes. The laboratory analysis of the water samples collected from borehole 2 and borehole 3 indicated that the groundwater contained TPH-oil/grease at 962 ppm and *55* ppm respectively. The DOH considers any amount of TPH in groundwater as contamination. PCBs (0.0027 ppm in borehole 2) and lead (0.15 ppm in borehole 3) were detected at concentrations above the DOH (1995) Tier 1 action levels (0.002 ppm and 0.0056 ppm respectively). Based on these findings it is apparent that petroleum hydrocarbon product contamination of the groundwater at the site extends to some unknown distance beyond the locations of the four boreholes.

3. *Phase II Site Assessment, Groundwater Survey, Long-Term Release Response Report III, Cutter Chevrolet-Geo-Pontiac. 1391 Kapiolani Boulevard, Honolulu, Hawaii 96814. Facility I.D. No.: 9-100185.* Muranaka Environmental Consultants, Inc. (MEC), September 17, 1997.

   This report presents results for the second round of groundwater testing for the Cutter-Chevrolet site. MEC's responsibilities included: drilling another borehole to substitute for monitoring well (MW7) which had been decommissioned; the collection and laboratory analysis of groundwater samples from the three remaining monitoring wells and the new borehole; and the preparation of a long-term release response report. The borehole was drilled on July 12, 1997, and groundwater samples were collected from each monitoring well and the borehole on July 12-13, 1997. The samples were analyzed for total petroleum hydrocarbons measured as oil and grease, benzo(a)pyrene, acenaphthene, fluoranthene, naphthalene, the polychlorinated biphenyls, and total lead. There were no olfactory or visual indications that the soil and water in the monitoring wells and the borehole were contaminated with petroleum hydrocarbons. The laboratory results indicated that none of the constituents tested for were present in the groundwater samples at concentrations above the laboratory detection limits.

4. *Phase II Site Assessment, Groundwater Survey, Long-Term Release Response Report III. Cutter Chevrolet-Geo-Pontiac. 1391 Kapiolani Boulevard, Honolulu, Hawaii*

96814. Facility I.D. No.: 9-100185. Muranaka Environmental Consultants, Inc. (MEC), January 13, 1999.

This report presents results for the third round of groundwater testing at the site. Groundwater samples were collected from the four wells on December 1, 2, and 7, 1998. The samples were analyzed for Total Petroleum Hydrocarbons measured as oil and grease (TPH-o/g); the Polynuclear Aromatic Hydrocarbons (PAHs) benzo(a)pyrene, acenaphthene, fluoranthene, naphthalene; the Polychlorinated Biphenyls (PCBs); and total lead. There were no olfactory or visual indications of petroleum hydrocarbon contamination in any of the water samples. The laboratory analysis indicated the following: the PAHs and the PCBs were not detected in any of the samples; TPH-o/g was detected in a sample collected from one monitoring well; TPH-o/g was not detected in any of the other three monitoring wells; lead was detected in samples collected from three of the monitoring wells.

5. *Phase II Site Assessment, Groundwater Survey, Long-Term Release Response Report IV. Cutter Chevrolet-Geo-Pontiac. 1391 Kapiolani Boulevard, Honolulu, Hawaii 96814. Facility I.D. No.: 9-100185.* Muranaka Environmental Consultants, Inc. (MEC), March 22, 1999.

   Four groundwater samples were collected from the existing monitoring wells on February 23, 1999. There were no olfactory or visual indications of petroleum hydrocarbon contamination in any of the water samples. The four groundwater samples were analyzed for total lead. Laboratory analyses indicated that none of the four samples contained lead at concentrations above the 1996 DOH action levels.

6. *Phase II Site Assessment, Groundwater Survey, Long-Term Release Response Report V. Cutter Chevrolet-Geo-Pontiac. 1391 Kapiolani Boulevard, Honolulu, Hawaii 96814. Facility I.D. No.: 9-100185.* Muranaka Environmental Consultants, Inc. (MEC),

   Groundwater samples were collected from four existing monitoring wells on August 31, 1999. The samples were analyzed for Total Petroleum Hydrocarbons measured as oil (TPH-oil); the Polynuclear Aromatic Hydrocarbons (PAHs) acenaphthene, benzo(a)pyrene, fluoranthene, naphthalene; the Polychlorinated Biphenyls (PCBs); and total lead. The results

indicated that none of the chemicals tested exceeded the current DOH action levels. The results were as follows:

• TPH-oil, PCBs, total lead, acenaphthene, and fluoranthene were not detected in any of the samples.

• Naphthalene was detected in sample 950549.7-02 collected from monitoring well (MW6) at a concentration of 0.0002 milligrams/liter (mg/1), below the DOH 0.77 mg/l action level. Naphthalene was not detected in the other three samples.

• Benzo(a)pyrene was detected in sample 950549.7-01 collected from MW5, at a concentration of 0.0002 mg/I, at the DOH 0.0002 mg/l action level. Benzo(a)pyrene was not detected in any of the other three samples.

5.5 PAST USES OF THE ADJOINING PROPERTIES

Information regarding past uses of the adjoining properties was obtained from our review of Sanborn Fire Insurance Company maps (1949, 1951, 1955, 1973, 1975, 1980, 1985, 1991, and 1993), U.S. Geological Survey (USGS) topographic maps (USGS, 1928, 1953, 1954, 1959, 1969, 1970, 1983, and 1998), and Historic Aerial Photographs (1952, 1959, 1963, 1968, 1978, 1993, and 2000) (Appendix E).

5.5.1 Sanborn Maps

The 1949 Sanborn Map shows office buildings at the north adjoining area across Kapiolani Boulevard and a printing building at the east adjoining area. The west adjoining property is marked as "used auto sale". The south adjoining areas across Kona street is vacant.

The 1951 Sanborn Map shows no change since 1949 except a new furniture facility at the east adjoining area and storage structure at the north adjoining area.

The 1955 Sanborn Map shows no change since 1951, except the west adjoining area that is shown as vacant.

The 1973 Sanborn Map shows additional office buildings at the north adjoining area, Ala Moana Center at the south adjoining area, bank offices at the east area and the facility marked as "gas & oil" at the west adjoining area.

The 1975 Sanborn Map appeared similar to the 1973 Sanborn Map.

The 1980 Sanborn Map does not show "gas & oil" facility at the west adjoining area. It is substituted with a one-level building.

The 1985 Sanborn Map appeared similar to the 1980 Sanborn Map.

The 1991 Sanborn Map shows a 14-level tower at the west adjoining area.

The 1993 Sanborn Map appeared similar to the 1991 Sanborn Map.

No readily apparent evidence of recognized environmental conditions at the adjoining properties was noted on the maps reviewed except the facility marked as "gas & oil" shown on the 1973 Sanborn Map.

5.5.2 USGS Maps

The USGS maps are provided in Appendix E. The 1928-1998 USGS maps shows the area surrounding the properties as the built-up areas except the Ala Moana Center that is shown on the maps since 1959.

No readily apparent evidence of recognized environmental conditions at the adjoining properties was noted on the topographic maps reviewed.

5.5.3 Historic Aerial Photographs

1952 Photo: This photograph shows the north adjoining area located across the Kapiolani Boulevard, the west adjoining area and the east adjoining area as developed with commercial uses. The south adjoining area across Kona Street is shown as construction area.

1959, 1963, 1968, 1978, 1993, and 2000 Photos: This photographs show the adjoining areas as areas with a significant amount of commercial structures. Details of the areas around the project site were obscured by poor photographic resolution.

No readily apparent evidence of recognized environmental conditions at the adjoining properties was noted on the historic aerial photograph reviewed.

5.5.4 Prior Environmental Investigations

No documentation of prior environmental investigations was available for review for the surrounding area.

6.0 SITE RECONNAISSANCE

6.1 METHODOLOGY AND LIMITING CONDITIONS

The subject property was inspected by CPR personnel on September 10, 2014. The exterior of adjoining properties was visually evaluated for the presence of recognized environmental conditions (RECs).

6.2 GENERAL SITE SETTING

6.2.1 Current Use(s) of the Property

The TMK: (1) 2-3-039:011 parcel of land is occupied by "Taste Tea" restaurant, Auto X-Change, Inc., "King's Pizza" restaurant, auto-repairing facility, and a warehouse (Appendix C, Figure 3).

6.2.2 Past Use(s) of the Property

The TMK: (1) 2-3-039:011 site was a "used auto sale" facility as it shown at the 1949 Sanborn Map. Recycling facility operated by "Reynolds Recycling, Inc. provided collections of cans, bottles, and non-ferrous metals" in the west wing of the building (former parts department) located along Kona Street between 2008 and 2013.

6.2.3 Current Use(s) of Adjoining Properties

The current uses of the adjoining properties are (Figure 3, Appendix C):

South	Kona Street. Ala Moana Center is located across Kona Street.
West	Kona Iki Street Multi-story office building and condos are located across the street.
North	Kapiolani Boulevard. Numerous commercial facilities are located across the boulevard.
East	Building located at the Kapiolani Boulevard side of the east adjoining area is vacant. Other buildings at the east adjoining property are occupied by restaurants, shops, and a tattoo salon.

No recognized environmental conditions (RECs) were identified on the adjoining properties.

6.2.4 Past Use(s) of Adjoining Properties

No recognized environmental conditions (RECs) from past uses were identified on the adjoining properties during the site visit.

6.2.5 Current or Past Uses in the Surrounding Area

The general area in the vicinity of the property is used for commercial purposes.

6.2.6 Geologic, Hydrologic, and Topographic Conditions

The topography of the property and the surrounding areas is relatively flat.

6.2.7 General Description of Structures and Roads

General description of structures was obtained from the City and County of Honolulu's Real Property Assessment and Tax Billing Information web site. The following building is located on the subject property:

Building No.	Construction Date (Age)	Number of Stories	Use	Construction
1	1953 (Effective year: 1971)	1	Auto Showroom/Office	Masonry
2	1967	1	Auto Showroom/Office Warehouse	Steel/Masonry

Parking facilities are located on the property. There are no roads on the parcels.

6.2.8 Potable Water Supply

Potable water on the property is supplied by the municipal water distribution system from the Honolulu Board of Water Supply.

6.2.9 Sewage Disposal System

Sanitary sewage is discharged into the municipal sanitary sewer system.

6.3 EXTERIOR OBSERVATIONS

During the site reconnaissance conducted on September 10, 2014, CPR personnel visually inspected the subject site and limited portions of adjacent properties. The following are observations noted during the site inspection.

6.3.1 Hazardous Substances, Wastes and Materials

No hazardous substances, wastes, or materials were observed on the subject property.

6.3.2 Storage Tanks

None

6.3.3 Odors

No strong, pungent or noxious odors were observed.

6.3.4 Pools of Liquid

A pool of water at the auto-wash area was observed in the auto-repairing section of the site building located along Kona Street (Appendix D, Photo 10). A floor drain was observed in the pool area. This drain was considered a REC because it was unknown where the drain discharged and there was a possibility that "residuals" associated with the automobile repair and car washing may have discharged to this drain.

6.3.5 Drums

No drums with hazardous substances, wastes, or materials were observed.

6.3.6 Containers of Hazardous Materials and Petroleum Products

None

6.3.7 Unidentified Substance Containers

None

6.3.8 Indications of PCBs

None

6.3.9 Pits, Ponds, or Lagoons

No pits, ponds, or lagoons were observed. There is a former collector trench probably containing an oil-water separator (Appendix D, Photo 11). The sump probably collected discharges from within the former service/wash area. This system was discussed in Section 5.4.4, above. The condition and/or contents of the trench and associated oil-water separator were never determined.

6.3.10 Stained Soil or Pavement

None

6.3.11 Stressed Vegetation

No areas of stressed vegetation were observed.

6.3.12 Solid Waste

None

6.3.13 Waste Water

The pool of wastewater at the car-wash area was observed in the auto-repairing section of the site building located along Kona Street (Appendix D, Photo 10).

6.3.14 Wells

Groundwater monitoring wells were installed at the site during previous environmental investigation. CPR did not find any documents about well closure in the HDOH files reviewed or in the owner provided files.

6.3.15 Septic Systems

No septic systems or cesspools were observed on the property.

6.3.16 Migration of Off-Site Contamination

No migration of off-site contamination was observed

6.3.17 Air Emissions

No onsite sources of air emissions were noted.

6.3.18 Dry-Cleaning Operations

This site assessment did not reveal information that would indicate the site may have been used for dry-cleaning operations.

6.4 INTERIOR OBSERVATIONS

6.4.1 Heating/Cooling

The office and restaurant sections of the property are cooled by central air conditioning units.

6.4.2 Stains or Corrosion

There was corroded paint on the floor in the offices located in the warehouse. Probably this is related to releases from lead-acid batteries during the former operations of the Parts Department.

6.4.3 Drains and Sumps

No drains and sumps were observed.

6.5 NON-ASTM ISSUES

6.5.1 Radon Concentrations in Buildings

Two studies were conducted by the State of Hawaii DOH, in coordination with the EPA, to investigate radon concentrations in private residences (1989-1990) and in

public elementary schools (1993-1996). The residential study included over 500 homes located throughout the state and found the average radon concentration to be 0.5 picoCuries per liter (pCi/L) (Takata, 1998). The school study included 97 schools on Hawaii, Maui, Molokai, Oahu, and Kauai and found the average concentration to be 0.1 pCi/L (Takata, 1998). The HDOH concluded that no further research into the potential health effects of radon exposure was required because the study results were well below the EPA action level of 4 pCi/L (Takata, 1998).

The EDR report lists that 209 sites were tested in the Honolulu County with all testing below the 4 pCi/L action level for living area (Appendix F). Therefore, potential human health risks due to elevated radon concentrations are not anticipated to be an issue at the subject site.

6.5.2 Asbestos-Containing Materials

Physical sampling and analysis of suspect ACM was not conducted during the assessment as it is not a scope item for a Phase I ESA under ASTM E1527-13.

Because the buildings on the subject property were built prior to 1980, ACM may be present. Prior to any activities (i.e., repair, renovation, demolition) which may disturb ACM, the building owner or leased space tenant may be required to comply with applicable United States Environmental Protection Agency (USEPA) National Emissions Standards for Hazardous Air Pollutants (NESHAPS), Occupational Safety and Health Administration (OSHA), and state and local regulations. If suspect ACM will be disturbed, these and similar materials should be sampled and analyzed for possible asbestos content.

6.5.3 Lead-Based Paint

Physical sampling and analysis of suspect Lead-based paint was not conducted during the assessment as it is not a scope item for a Phase I ESA under ASTM E1527-13.

Lead-based paint was commonly used for corrosion protection in the 1960s, and in prime, intermediate, and finish coats well into the 1970s. Regulations specifically

addressing lead-based paint include Housing and Urban Development (HUD) (1995) guidelines and the Consumer Product Safety Act (1977).

These regulations define lead-based paint as containing 0.5% lead by weight (5,000 ppm) for housing products. There are specific testing methods for sampling and analyzing lead in paint.

Because the buildings on the subject property were built prior to 1978, lead-based paint could be an issue at the subject property. Prior to any activities (i.e., repair, renovation, demolition) which may disturb painted building surfaces, sampling should be conducted to determine the presence or absence of lead in the painted surfaces.

7.0 INTERVIEWS

The purpose of interviews is to obtain information indicating recognized environmental conditions in connection with the property. Copies of the interview documentation can be found in Appendix G.

7.1 OWNER INTERVIEW

CPR interviewed Mr. Timothy Yi of Sam Koo Hawaii, LLC regarding his knowledge of the site history and development plans for the property. According to Mr. Yi, the subject property has been owned by Sam Koo for 7 years. Mr. Yi has been involved with the properties for 7 years. Mr. Yi does not have knowledge of the site use prior to acquisition of the property by Sam Koo. Mr. Yi does not have knowledge of the environmental history of the subject property.

In regard to the proposed site development, the building foundation details for the subject property are provided by Mr. Johnny Wu in Section 7.2, below.

7.2 ARCHITECT INTERVIEW

Mr. Yi asked Mr. Wu, the project architect with Design Partners Incorporated, to provide details on the proposed subsurface construction features for the site

development. Mr. Wu provided the information to CPR in emails dated September 23 and 24, 2014.

According to Mr. Wu, the building foundation will be a reinforced concrete pile system (September 23, 2014).

Additionally, in reply to questions regarding subsurface excavation and potential dewatering Mr. Wu provided the following information on September 24, 2014:

We anticipate the following:

1. For the elevator pit, we anticipate the contractor will excavate up to 10 feet deep (potential 5 feet into the water table). The contractor will sheet pile around all the elevator core to prepare for elevator foundation / waterproofing work. Dewatering will be anticipated, and the contractor will likely dig another hole, adjacent to the elevator pit, and pump any water into that hole. The pit can be semi-dry when installing re-bars and form work. This work process typically lasts 6 to 8 weeks.

2. Other than the elevator pit, excavations are anticipated for pile caps, grade beams and underground building utilities (sewer line, water line, power, communication etc). If any of the above require excavation down to and below the water table, minimized and localized dewatering will be anticipated. This involves temporary pumping water from one hole / trench to the adjacent one. No sheet piles are anticipated / required to perform these work.

8.0 FINDINGS

The findings of this Phase I ESA are that the following recognized environmental conditions (RECs) are present on the subject property.

- A review of the RCRA-CESQG list, as provided by EDR, and dated 03/11/2014 has revealed that there is 1 RCRA-CESQG site at the target property (The RCRA database is compiled by the EPA and contains those regulated facilities that have notified the EPA as being hazardous waste generators, transporters, or treatment, storage or disposal facilities under RCRA. Conditionally Exempt Small Quantity generators (CESQGs) generate

less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month):

Cutter Chevrolet-Geo-Pontiac. Violation Status: No violations found.

The RCRA-CESQG site will not affect the environmental condition of the subject property if it is operated and maintained in accordance with the Federal and State of Hawaii rules and regulations.

- The subject property was used as an auto repairing facility including battery service at least since 1949 as that shown on the reviewed Sanborn Maps.

- The pool of wastewater at the auto-wash area was observed at the auto-repairing section of the site building located along Kona Street (Appendix D, Photo 10). A floor drain was observed in the pool area. This drain is considered a REC because it was unknown where the drain discharged and there was a possibility that "residuals" associated with the automobile repair and car washing may have discharged to this drain.

- There is a former collector trench probably containing an oil-water separator (Appendix D, Photo 11). The sump probably collected discharges from within the former service/wash area via. The condition and/or contents of the trench and associated oil-water separator were never determined.

The findings of this Phase I ESA are that the following historical recognized environmental conditions were present on the subject property:

- A review of the UST list, as provided by EDR, and dated 06/30/2014 has revealed that there are 28 UST sites within approximately 0.25 miles of the target property (The Underground Storage Tank (UST) database contains information regarding registered USTs):

  Cutter Chevrolet-Geo-Pontiac. 500-gallon Used Oil Tank. Tank Status: Permanently Out of Use. Tank Closure: September 2, 1995.

  No adverse effect on the subject property is anticipated due to the UST site was closed and its status is NFA (October 26, 1999 HDOH Letter).

- A review of the SHWS list, as provided by EDR, and dated 01/04/2014 has revealed that there was 1 SHWS site at the target property (The State Hazardous Waste Sites (SHWS) records are the states' equivalent to CERCLIS):

  Cutter Chevrolet-Geo-Pontiac. Environmental Interest: Cutter Chevrolet Hydraulic Lift. Hazard Priority: NFA. Document Date: 09/09/2005.

  No adverse effect on the subject property is anticipated due to the SHWS site status (NFA).

- A review of the LUST list, as provided by EDR, and dated 06/30/2014 has revealed that there was 1 LUST site at the target property (The Leaking Underground Storage Tank (LUST) Incident Reports contain an inventory of reported leaking underground storage tank incidents):

  Cutter Chevrolet-Geo-Pontiac. Facility Status: Site Cleanup Completed (NFA letter dated by 10/26/1999).

  No adverse effect on the subject property is expected from the LUST site due to the site status (NFA).

- A review of the SPILLS list, as provided by EDR has revealed that there is 1 record for the target property (SPILS: Release Notifications. Releases of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988).

  Cutter Chevrolet-Geo-Pontiac. 1391 Kapiolani Blvd. Subject property. Two former hydraulic auto storage lift racks were reported as leaking and removed in 1999. Result: SOSC NFA by the DOH HEER Office.

  No adverse effect on the subject property is expected from the SPILLS site due to the site status (NFA).

- In April 2006, Clayton supervised the removal of two hydraulic lift systems, each consisting of two cylinders (front and rear) and a supply tank vault (Clayton Group Services, Inc. *Hydraulic Lift System Removal Activities, Former*

Cutter Chevrolet Facility, 1391 Kapiolani Boulevard, Honolulu, Oahu, Hawaii. May 22, 2006. Prepared for Motor Supply, Ltd.). During removal activities, the concrete vaults were observed to contain standing oil and water. The visually impacted soil in the vicinity of the former cylinders were subsequently excavated and disposed. A total of four soil samples were collected from the excavation walls and analyzed for total petroleum hydrocarbons (TPH) as residual range organics (RRO), benzene, toluene, ethylbenzene, and xylenes (BTEX), polynuclear aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs). Two groundwater samples were collected from the open excavations (one from each lift system excavation). Although several constituents were detected in both the soil and groundwater samples, analytical data from Clayton's removal activities indicated that constituents were either below detectable limits or below their respective Hawaii Department of Health (DOH) May 2005 Environmental Action Levels (EALs). Consequently, Clayton concluded that "no further action" was necessary regarding the former lift systems.

- The former used battery storage area was identified as a REC due to the fact that visual inspection revealed evidence of leakage of an unknown substance on the bare soil in this area (Clayton Group Services, Inc. *Phase I Environmental Site Assessment, 1391 Kapiolani Boulevard, TMK: (1) 2-3-039: Parcel 011, Honolulu, Oahu, Hawaii.* September 26, 2005. Prepared for Grubb & Ellis/CBI, Inc.). As a result of the September 2005 Phase I ESA, Clayton performed a Phase II Environmental Investigation to "(1) assess the presence or absence of petroleum and related chemical impacts to shallow soil and groundwater, and (2) compare the concentrations of chemical compounds in soil and groundwater to the DOH Interim Final Environmental Action Levels (EALs)." (Clayton Group Services, Inc. *Phase II Environmental Investigation, Former Cutter Chevrolet Facility, 1391 Kapiolani Boulevard, Honolulu, Oahu, Hawaii.* May 22, 2006. Prepared for Motor Supply, Ltd.). The subsurface investigation included the advancement of four soil borings and conversion of two boreholes into temporary monitoring wells to address potential petroleum impacts associated with the concerns identified in the Phase I ESA. Four soil samples were collected at the soil-groundwater interface of each borehole. In addition, one near surface soil sample was collected in the former used battery storage area. Analytical data from Clayton's investigation indicated that constituents were either below detectable limits or below their respective DOH EALs.

The following environmental conditions, which are not considered to be *recognized environmental conditions*, as defined by ASTM, were revealed during this assessment:

- Because the buildings on the subject property were built prior to 1980, suspect asbestos-containing materials (ACM) may be an issue at the subject property.

- Because the buildings on the subject property were built prior to 1978, lead-based paint (LBP) could be an issue at the subject property.

The findings of this Phase I ESA are that the following Recognized Environmental Conditions (RECs) were present on the adjoining properties:

- Facility marked as "gas & oil" shown at the west adjoining area on the 1973 Sanborn Map.

  No adverse effect on the subject property is expected from the former "gas & oil" facility due to the likely excavation of the potentially contaminated soil at the area of the facility during a construction of multi-level building at that location.

9.0 OPINION

Based on the findings of this Phase I ESA, no additional environmental actions are warranted for the subject property at the date of this report. However, CPR confirms recommendations of environmental consultants investigated the subject property in previous years. These recommendations are the following:

- An environmental professional should be retained to draft a Construction Management Plan such that contractors are aware of environmental health and safety issues in the event that a drain, sump, UST, buried drums, and/or stained smelly soils are encountered during site development. Monitoring should be conducted by an environmental professional during construction activities and that if underground storage tanks, buried debris, stained soils, waste drums or odorous soils are encountered during construction, they

should be removed and properly disposed in accordance with regulatory requirements.

- There is a former sump containing an oil-water separator. The sump reportedly collected discharges from within the former service/wash area via a trench drain. The condition and/or contents of the sump and associated oil-water separator were never determined. The condition and status of the sump and associated oil-water separator should be specifically evaluated for environmental impacts, and if the sump has no intended usage, it should be properly removed and/or closed.

- There is a floor drain located within the vicinity of the former hydraulic lifts and car wash area. The drain should be evaluated for environmental impacts, and if the drain has no intended usage, it should be properly removed and/or closed during demolition of the current improvements.

9.1 VALUATION REDUCTION FOR ENVIRONMENTAL ISSUES

Based on the evaluation of the recognized environmental condition presented in this report, no substantial reduction in valuation for environmental issues is warranted. This evaluation has considered the information obtained from the Purchaser and Seller, and the compiled information assembled for the Subject Property and study area during the performance of this Phase I ESA. However, due to the historical use of the property and the identified landfilling and hydrocarbon issues on the site, CPR recommends that Sam Koo budget a reserve for environmental issues to be encountered during demolition and construction at the site.

10.0 CONCLUSIONS

CPR has performed a Phase I Environmental Site Assessment (ESA) of TMK: (1) 2-3-039:011, 1391 Kapiolani Boulevard, Honolulu, Oahu, Hawaii.

CPR has performed this Phase I Environmental Site Assessment in accordance with the scope and limitations of ASTM Practice E1527-13 (ASTM E1527-13) and All Appropriate Inquiry (AAI). Any exceptions to, or deletions from, this practice are described in Section 2.5 of this report.

The findings of this Phase I ESA are that the following recognized environmental conditions (RECs) are present on the subject property.

- A review of the RCRA-CESQG list, as provided by EDR, and dated 03/11/2014 has revealed that there is 1 RCRA-CESQG site at the target property (The RCRA database is compiled by the EPA and contains those regulated facilities that have notified the EPA as being hazardous waste generators, transporters, or treatment, storage or disposal facilities under RCRA. Conditionally Exempt Small Quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month):

  Cutter Chevrolet-Geo-Pontiac. Violation Status: No violations found.

  The RCRA-CESQG site will not affect the environmental condition of the subject property if it is operated and maintained in accordance with the Federal and State of Hawaii rules and regulations.

- The subject property was used as an auto repairing facility including battery service at least since 1949 as that shown on the reviewed Sanborn Maps.

- The pool of wastewater at the auto-wash area was observed at the auto-repairing section of the site building located along Kona Street (Appendix D, Photo 10). A floor drain was observed in the pool area. This drain is considered a REC because it was unknown where the drain discharged and there was a possibility that "residuals" associated with the automobile repair and car washing may have discharged to this drain.

- There is a former collector trench probably containing an oil-water separator (Appendix D, Photo 11). The sump probably collected discharges from within the former service/wash area via. The condition and/or contents of the trench and associated oil-water separator were never determined.

The findings of this Phase I ESA are that the following historical recognized environmental conditions were present on the subject property:

- A review of the UST list, as provided by EDR, and dated 06/30/2014 has revealed the following (The Underground Storage Tank (UST) database contains information regarding registered USTs):

  Cutter Chevrolet-Geo-Pontiac. 500-gallon Used Oil Tank. Tank Status: Permanently Out of Use. Tank Closure: September 2, 1995.

  No adverse effect on the subject property is anticipated due to the UST site was closed and its status is NFA (October 26, 1999 HDOH Letter).

- A review of the SHWS list, as provided by EDR, and dated 01/04/2014 has revealed that there was 1 SHWS site at the target property (The State Hazardous Waste Sites (SHWS) records are the states' equivalent to CERCLIS):

  Cutter Chevrolet-Geo-Pontiac. Environmental Interest: Cutter Chevrolet Hydraulic Lift. Hazard Priority: NFA. Document Date: 09/09/2005.

  No adverse effect on the subject property is anticipated due to the SHWS site status (NFA).

- A review of the LUST list, as provided by EDR, and dated 06/30/2014 has revealed that there was 1 LUST site at the target property (The Leaking Underground Storage Tank (LUST) Incident Reports contain an inventory of reported leaking underground storage tank incidents):

  Cutter Chevrolet-Geo-Pontiac. Facility Status: Site Cleanup Completed (NFA letter dated by 10/26/1999).

  No adverse effect on the subject property is expected from the LUST site due to the site status (NFA).

- A review of the SPILLS list, as provided by EDR has revealed that there is 1 record for the target property (SPILS: Release Notifications. Releases of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988).

Cutter Chevrolet-Geo-Pontiac. 1391 Kapiolani Blvd. Subject property. Two former hydraulic auto storage lift racks were reported as leaking and removed in 1999. Result: SOSC NFA by the DOH HEER Office.

No adverse effect on the subject property is expected from the SPILLS site due to the site status (NFA).

- In April 2006, Clayton supervised the removal of two hydraulic lift systems, each consisting of two cylinders (front and rear) and a supply tank vault (Clayton Group Services, Inc. *Hydraulic Lift System Removal Activities, Former Cutter Chevrolet Facility, 1391 Kapiolani Boulevard, Honolulu, Oahu, Hawaii.* May 22, 2006. Prepared for Motor Supply, Ltd.). During removal activities, the concrete vaults were observed to contain standing oil and water. The visually impacted soil in the vicinity of the former cylinders were subsequently excavated and disposed. A total of four soil samples were collected from the excavation walls and analyzed for total petroleum hydrocarbons (TPH) as residual range organics (RRO), benzene, toluene, ethylbenzene, and xylenes (BTEX), polynuclear aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs). Two groundwater samples were collected from the open excavations (one from each lift system excavation). Although several constituents were detected in both the soil and groundwater samples, analytical data from Clayton's removal activities indicated that constituents were either below detectable limits or below their respective Hawaii Department of Health (DOH) May 2005 Environmental Action Levels (EALs). Consequently, Clayton concluded that "no further action" was necessary regarding the former lift systems.

- The former used battery storage area was identified as a REC due to the fact that visual inspection revealed evidence of leakage of an unknown substance on the bare soil in this area (Clayton Group Services, Inc. *Phase I Environmental Site Assessment, 1391 Kapiolani Boulevard, TMK: (1) 2-3-039: Parcel 011, Honolulu, Oahu, Hawaii.* September 26, 2005. Prepared for Grubb & Ellis/CBI, Inc.). As a result of the September 2005 Phase I ESA, Clayton performed a Phase II Environmental Investigation to "(1) assess the presence or absence of petroleum and related chemical impacts to shallow soil and groundwater, and (2) compare the concentrations of chemical compounds in soil and groundwater to the DOH Interim Final Environmental Action Levels (EALs)." (Clayton Group Services, Inc. *Phase II Environmental Investigation,*

Former Cutter Chevrolet Facility, 1391 Kapiolani Boulevard, Honolulu, Oahu, Hawaii. May 22, 2006. Prepared for Motor Supply, Ltd.). The subsurface investigation included the advancement of four soil borings and conversion of two boreholes into temporary monitoring wells to address potential petroleum impacts associated with the concerns identified in the Phase I ESA. Four soil samples were collected at the soil-groundwater interface of each borehole. In addition, one near surface soil sample was collected in the former used battery storage area. Analytical data from Clayton's investigation indicated that constituents were either below detectable limits or below their respective DOH EALs.

The following environmental conditions, which are not considered to be *recognized environmental condition*s, as defined by ASTM, were revealed during this assessment:

- Because the buildings on the subject property were built prior to 1980, suspect asbestos-containing materials (ACM) may be an issue at the subject property.

- Because the buildings on the subject property were built prior to 1978, lead-based paint (LBP) could be an issue at the subject property.

The findings of this Phase I ESA are that the following Recognized Environmental Conditions (RECs) were present on the adjoining properties:

- Facility marked as "gas & oil" shown at the west adjoining area on the 1973 Sanborn Map.

  No adverse effect on the subject property is expected from the former "gas & oil" facility due to the likely excavation of the potentially contaminated soil at the area of the facility during a construction of multi-level building at that location.

Based on the findings of this Phase I ESA, no additional environmental actions are warranted for the subject property at the date of this report. However, CPR confirms recommendations of environmental consultants investigated the subject property in previous years. These recommendations are the following:

- An environmental professional should be retained to draft a Construction Management Plan such that contractors are aware of environmental health and safety issues in the event that a drain, sump, UST, buried drums, and/or stained smelly soils are encountered during site development. Monitoring should be conducted by an environmental professional during construction activities and that if underground storage tanks, buried debris, stained soils, waste drums or odorous soils are encountered during construction, they should be removed and properly disposed in accordance with regulatory requirements.

- There is a former sump containing an oil-water separator. The sump reportedly collected discharges from within the former service/wash area via a trench drain. The condition and/or contents of the sump and associated oil-water separator were never determined. The condition and status of the sump and associated oil-water separator should be specifically evaluated for environmental impacts, and if the sump has no intended usage, it should be properly removed and/or closed.

- There is a floor drain located within the vicinity of the former hydraulic lifts and car wash area. The drain should be evaluated for environmental impacts, and if the drain has no intended usage, it should be properly removed and/or closed during demolition of the current improvements.

11.0 DEVIATIONS

CPR has made one exception to the Phase I ESA procedures specified by ASTM E1527-13. Because the State of Hawaii does not compile a list of hazardous waste sites identified for investigation or remediation (NPL or CERCLIS equivalents), we are unable to include such a list in our records review. We reviewed the DOH HEER *Sites of Interest Database* instead (see Section 5.1.12).

12.0 ADDITIONAL SERVICES

No additional services beyond the standard practice were performed as part of this project.

13.0 REFERENCES

ASTM, 2013. Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (ASTM Designation E1527-13). American Society for Testing and Materials (ASTM), Washington, 2013.

Macdonald et al., 1983. G.A. Macdonald, A.T. Abbott, F.L. Peterson. Volcanoes in the Sea. The Geology of Hawaii. Second Edition, 1983. University of Hawaii Press, Honolulu.

Mink J.F. and L.S. Lau, 1990. Aquifer Identification and Classification for Oahu: Groundwater Protection Strategy for Hawaii. Water Resources Research Center, University of Hawaii at Manoa.

Takata, 1998. Telecommunication with Mr. Russell Takata, Radon Section Supervisor for the Department of Health Radiation Section, June 4, 1998.

14.0 QUALIFICATIONS

We declare that, to the best of our professional knowledge and belief, we meet the definition of Environmental Professional as defined in §312.10 of 40 CFR Part 312. We have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. We have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

A listing of the qualifications of the environmental professionals involved with this report is supplied in Appendix H.

15.0 SIGNATURES

We appreciate the opportunity to work with you on this project. If you have any questions concerning the findings and conclusions contained in this report, please call Mr. Ned Murphy at (808) 216-6555.

Prepared by:

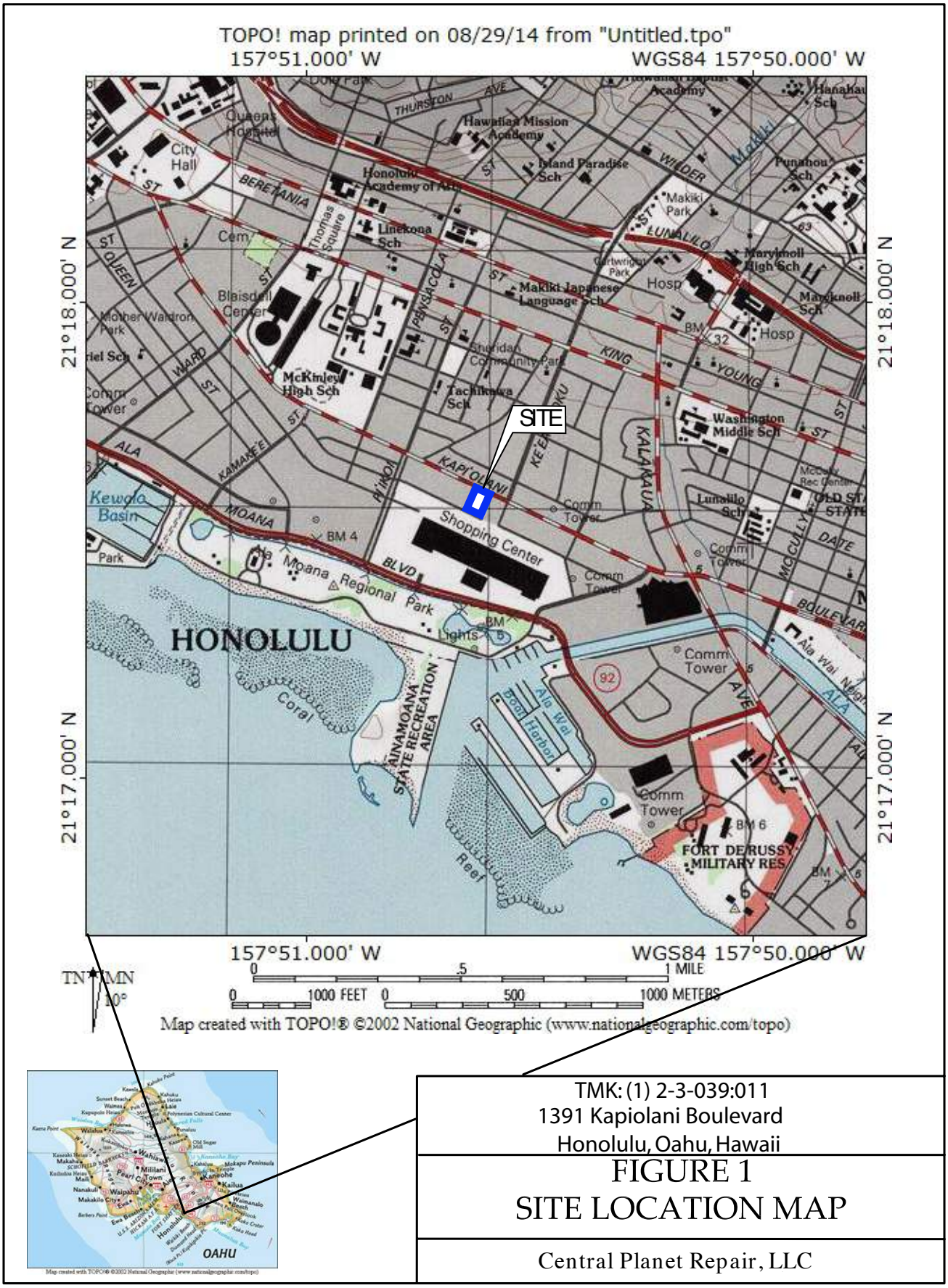
Alexander Grafchikov
Environmental Specialist

Reviewed by:

Ned Murphy
Consulting Geochemist

APPENDIX A

Figure 1 - Site Location Map



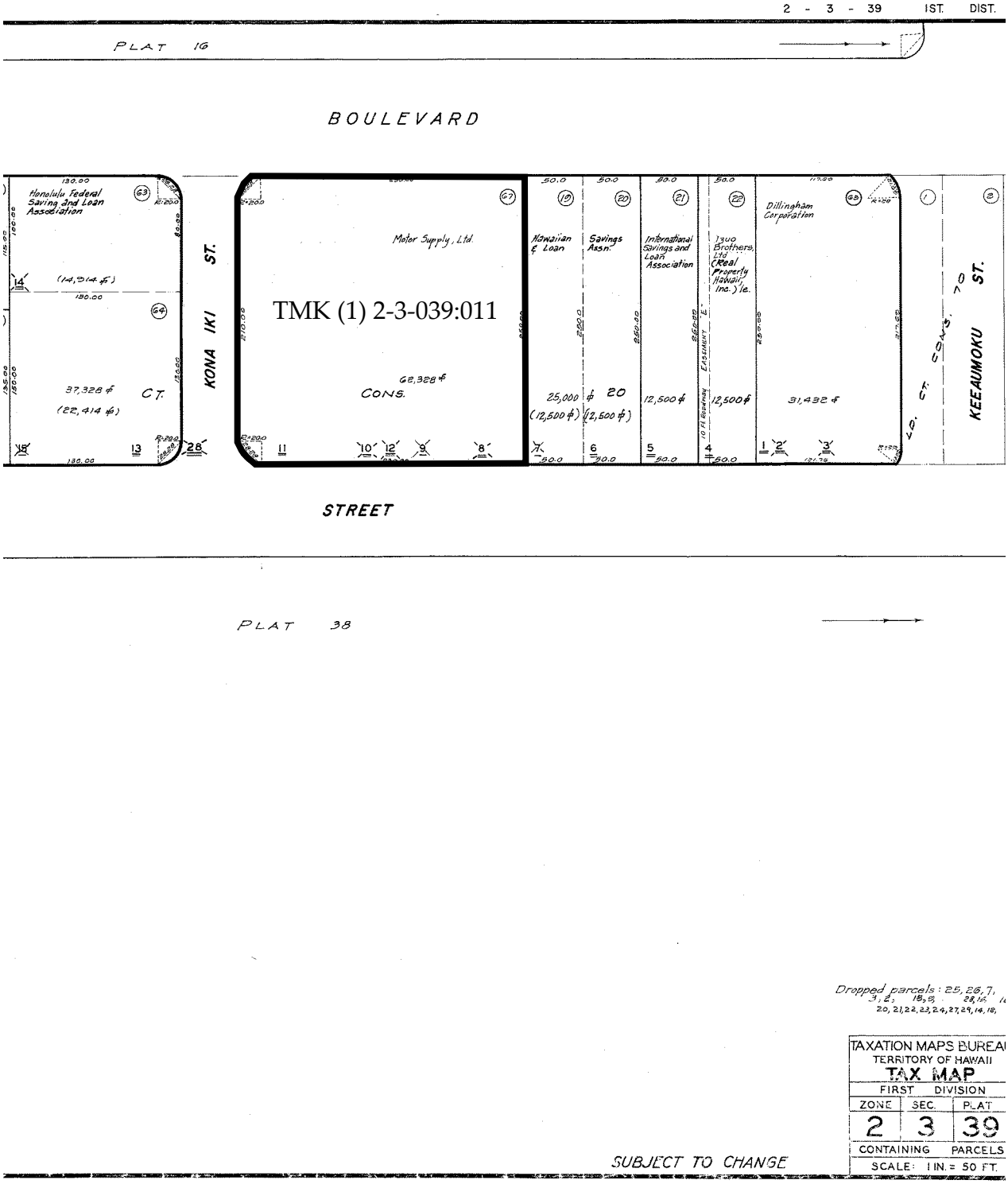
TMK: (1) 2-3-039:011
1391 Kapiolani Boulevard
Honolulu, Oahu, Hawaii

FIGURE 1
SITE LOCATION MAP

Central Planet Repair, LLC

APPENDIX B

Figure 2 - Tax Map



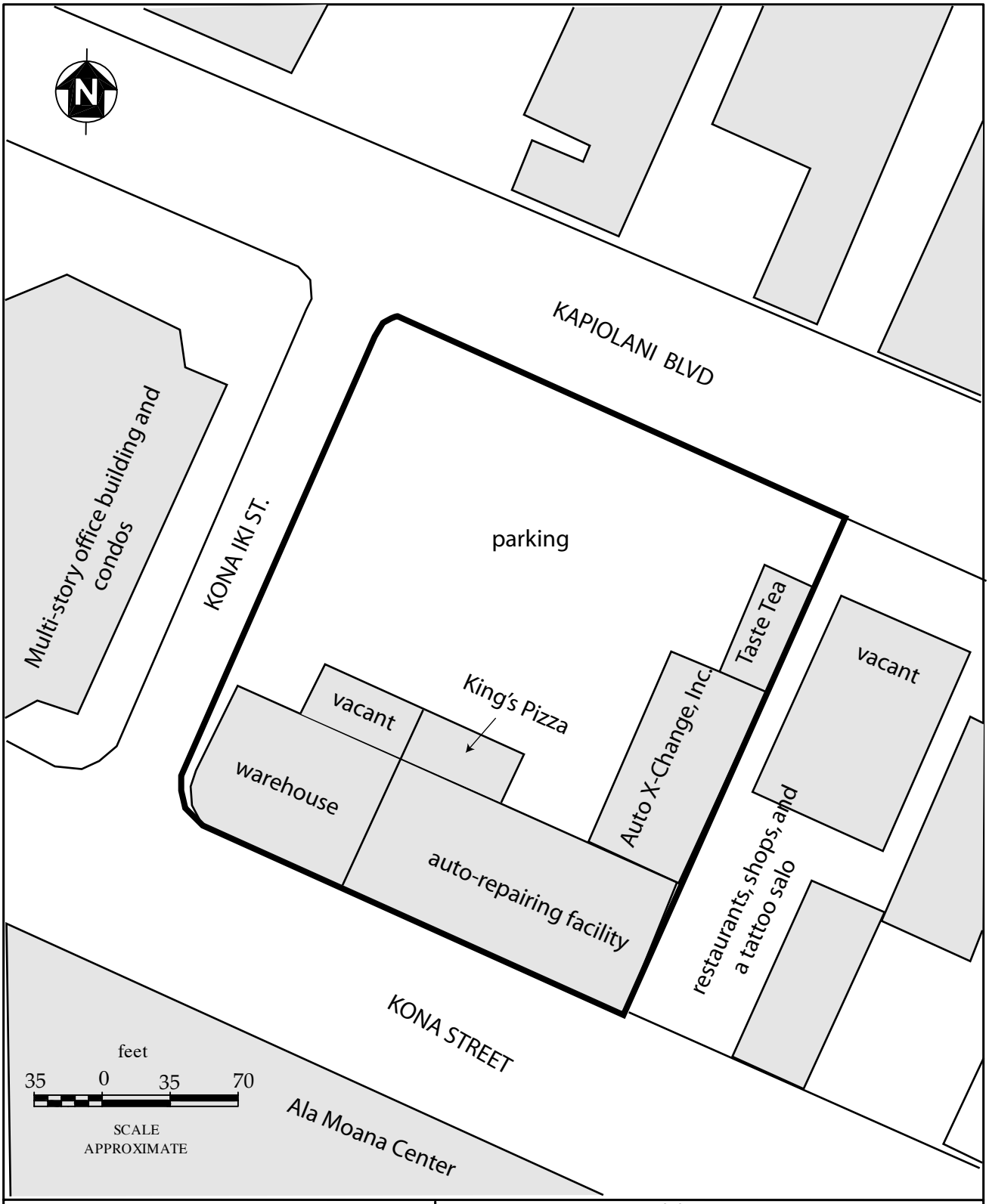
TMK: (1) 2-3-039:011
1391 Kapiolani Boulevard
Honolulu, Oahu, Hawaii

FIGURE 2
TAX MAP

Central Planet Repair, LLC

APPENDIX C

Figure 3 - Site Plan



LEGEND:

Site Boundaries

Buildings and Structures

TMK: (1) 2-3-039:011
1391 Kapiolani Boulevard
Honolulu, Oahu, Hawaii

FIGURE 3
SITE PLAN

Central Planet Repair, LLC

APPENDIX D

Site Photographs

Photo 1. Subject Property Viewed from the Ala Moana Center.

Photo 2. View of the East Boundary of the Subject Property from the Adjoining Property.

Photo 3. View of the Subject Property Looking Southwest along Kona Iki Street.

Photo 4. View of the Subject Property Looking Southeast from Kapiolani Boulevard.

Photo 5. "Taste Tea" Restaurant at the Northeast corner of the Subject Property.

Photo 6. The Office of Auto X-Change, Inc. at the east part of the Subject Property.

Photo 7. Parking for of Auto X-Change, Inc. Vehicles.

Photo 8. The Restaurant Next to the Entrance to the Auto-repairing Section of the South Building at the Subject Property.

Photo 9. The Auto-repairing Section of the South Building.

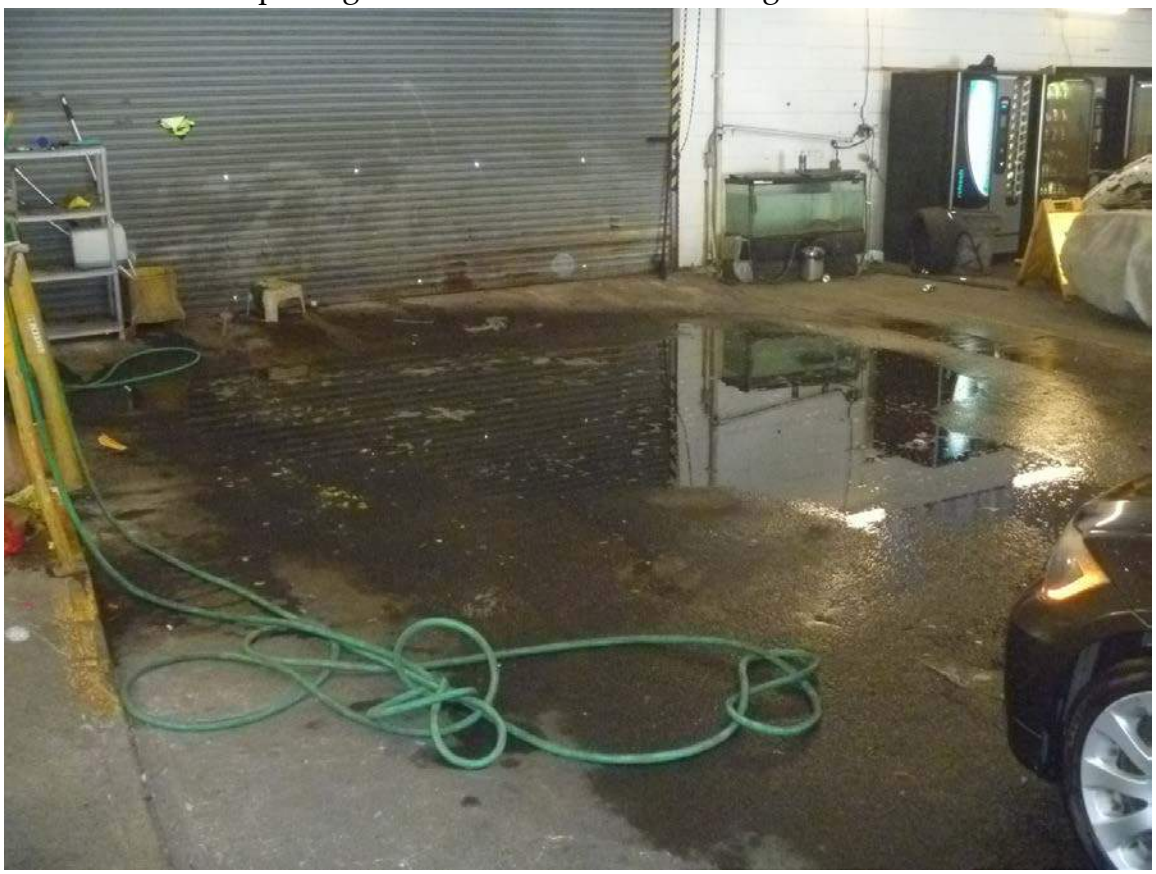


Photo 10. The Pool of Car-wash Water at the Auto-repairing Section.

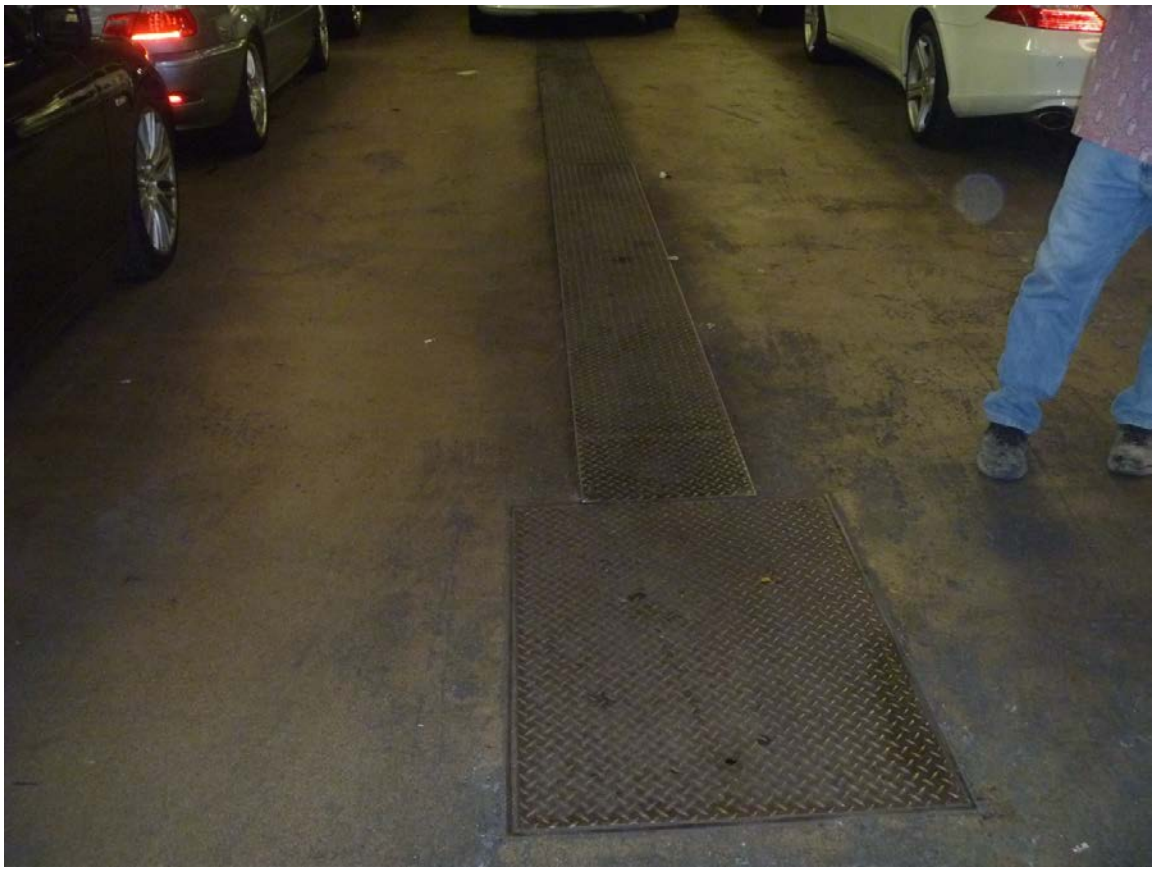


Photo 11. Probably the Former Collector Trench and Oil-Water Separator in the Auto-repairing Section.

Photo 12. The Groundwater Monitoring Well in the Former UST area.

Photo 13. The Warehouse Section (West Section) of the South Building at the Subject Property.

Photo 14. Looking Northwest to the West Adjoining Property Located Across Kona Iki Street.

Photo 15. Looking North to the North Adjoining Property Located Across Kapiolani Boulevard.

APPENDIX E

Historical Research Documentation (Sanborn® Map Report, Historical USGS Maps, and Historic Aerial Photographs)

Sam Koo Pacific, LLC
1631 and 1637 Kapiolani Boulevard
Honolulu, HI 96814

Inquiry Number: 4046277.3
August 25, 2014

Certified Sanborn® Map Report

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

Certified Sanborn® Map Report

8/25/14

Site Name:	**Client Name:**
Sam Koo Pacific, LLC	Central Planet Repair
1631 and 1637 Kapiolani	236 Kuahiwi Avenue
Honolulu, HI 96814	Wahiawa, HI 96786
EDR Inquiry # 4046277.3	Contact: Ned Murphy

The Sanborn Library has been searched by EDR and maps covering the target property location as provided by Central Planet Repair were identified for the years listed below. The Sanborn Library is the largest, most complete collection of fire insurance maps. The collection includes maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow, and others. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by the Sanborn Library LLC, the copyright holder for the collection. Results can be authenticated by visiting www.edrnet.com/sanborn.

The Sanborn Library is continually enhanced with newly identified map archives. This report accesses all maps in the collection as of the day this report was generated.

Certified Sanborn Results:

Site Name: Sam Koo Pacific, LLC
Address: 1631 and 1637 Kapiolani Boulevard
City, State, Zip: Honolulu, HI 96814
Cross Street:
P.O. # CPR 74-2
Project: Sam Koo Pacific 1631 & 1637 Ka
Certification # 1B31-4A39-A6DE

Maps Provided:

1993	1955
1991	1951
1985	1949
1980	
1975	
1973	

Sanborn® Library search results
Certification # 1B31-4A39-A6DE

The Sanborn Library includes more than 1.2 million fire insurance maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow and others which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ✔ Library of Congress
- ✔ University Publications of America
- ✔ EDR Private Collection

The Sanborn Library LLC Since 1866™

Limited Permission To Make Copies

Central Planet Repair (the client) is permitted to make up to FIVE photocopies of this Sanborn Map transmittal and each fire insurance map accompanying this report solely for the limited use of its customer. No one other than the client is authorized to make copies. Upon request made directly to an EDR Account Executive, the client may be permitted to make a limited number of additional photocopies. This permission is conditioned upon compliance by the client, its customer and their agents with EDR's copyright policy; a copy of which is available upon request.

Disclaimer - Copyright and Trademark notice

This Report contains certain information obtained from a variety of public and other sources reasonably available to Environmental Data Resources, Inc. It cannot be concluded from this Report that coverage information for the target and surrounding properties does not exist from other sources. NO WARRANTY EXPRESSED OR IMPLIED, IS MADE WHATSOEVER IN CONNECTION WITH THIS REPORT. ENVIRONMENTAL DATA RESOURCES, INC. SPECIFICALLY DISCLAIMS THE MAKING OF ANY SUCH WARRANTIES, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. ALL RISK IS ASSUMED BY THE USER. IN NO EVENT SHALL ENVIRONMENTAL DATA RESOURCES, INC. BE LIABLE TO ANYONE, WHETHER ARISING OUT OF ERRORS OR OMISSIONS, NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSS OF DAMAGE, INCLUDING, WITHOUT LIMITATION, SPECIAL, INCIDENTAL CONSEQUENTIAL, OR EXEMPLARY DAMAGES. ANY LIABILITY ON THE PART OF ENVIRONMENTAL DATA RESOURCES, INC. IS STRICTLY LIMITED TO A REFUND OF THE AMOUNT PAID FOR THIS REPORT. Purchaser accepts this Report "AS IS". Any analyses, estimates, ratings, environmental risk levels or risk codes provided in this Report are provided for illustrative purposes only, and are not intended to provide, nor should they be interpreted as providing any facts regarding, or prediction or forecast of, any environmental risk for any property. Only a Phase I Environmental Site Assessment performed by an environmental professional can provide information regarding the environmental risk for any property. Additionally, the information provided in this Report is not to be construed as legal advice.

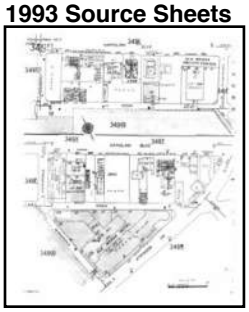
Copyright 2014 by Environmental Data Resources, Inc. All rights reserved. Reproduction in any media or format, in whole or in part, of any report or map of Environmental Data Resources, Inc., or its affiliates, is prohibited without prior written permission.

EDR and its logos (including Sanborn and Sanborn Map) are trademarks of Environmental Data Resources, Inc. or its affiliates. All other trademarks used herein are the property of their respective owners.

Sanborn Sheet Thumbnails

This Certified Sanborn Map Report is based upon the following Sanborn Fire Insurance map sheets.

1993 Source Sheets

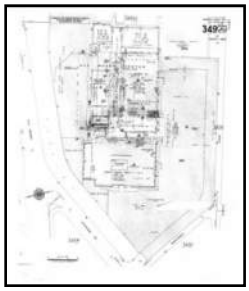


Volume 3, Sheet 355

Volume 3, Sheet 349w

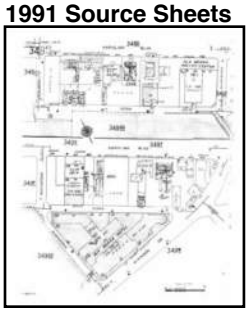
Volume 3, Sheet 349x

Volume 3, Sheet 349y



Volume 3, Sheet 349g

1991 Source Sheets

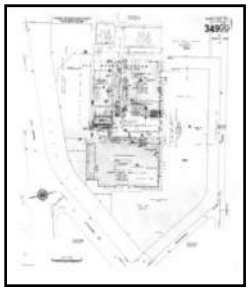


Volume 3, Sheet 349f

Volume 3, Sheet 349w

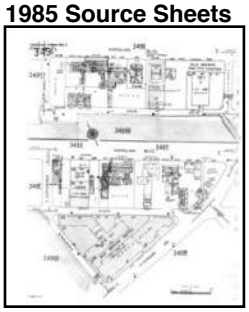
Volume 3, Sheet 349x

Volume 3, Sheet 349y



Volume 3, Sheet 349gg

1985 Source Sheets



Volume 3, Sheet 349f

Volume 3, Sheet 349w

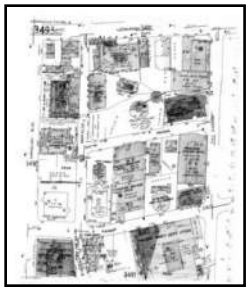
Volume 3, Sheet 349x

Volume 3, Sheet 349y

Volume 3, Sheet 349gg

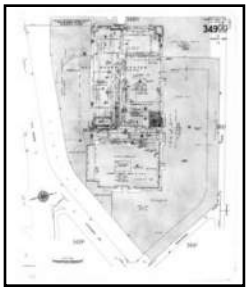
1980 Source Sheets

Volume 3, Sheet 349f



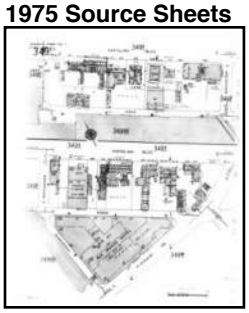
Volume 3, Sheet 349x

Volume 3, Sheet 349y

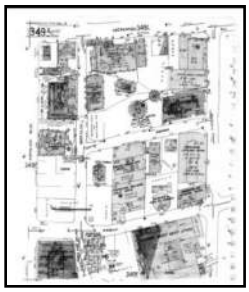


Volume 3, Sheet 349gg

1975 Source Sheets

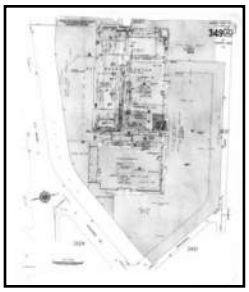


Volume 3, Sheet 349f



Volume 3, Sheet 349x

Volume 3, Sheet 349y

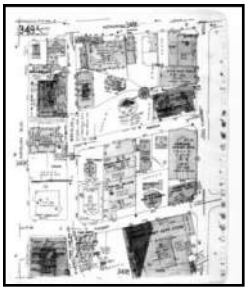


Volume 3, Sheet 349gg

1973 Source Sheets

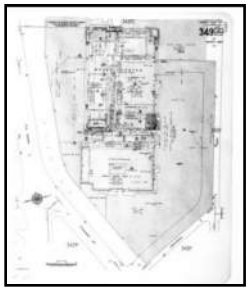
Volume 3, Sheet 349f

Volume 3, Sheet 349w



Volume 3, Sheet 349x

Volume 3, Sheet 349y



Volume 3, Sheet 349gg

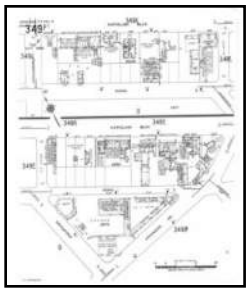
1955 Source Sheets

Volume 3, Sheet 349f

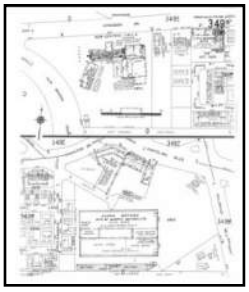
Volume 3, Sheet 349w

Volume 3, Sheet 349x

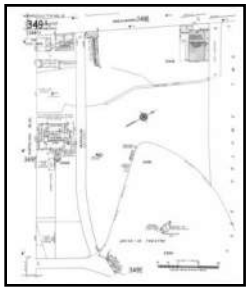
Volume 3, Sheet 349y



Volume 3, Sheet 349f



Volume 3, Sheet 349w



Volume 3, Sheet 349x

Volume 3, Sheet 349y

1951 Source Sheets

Volume 3, Sheet 349f

1949 Source Sheets

Volume 3, Sheet 349f

1993 Certified Sanborn Map

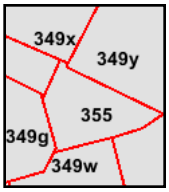
The certified Sanborn Library search results in this report can be authenticated by visiting www.edrnet.com/sanborn and entering the certification number. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by The Sanborn Library LLC, the copyright holder for the collection.

Certification # 1B31-4A39-A6DE

Site Name:	Sam Koo Pacific, LLC
Address:	1631 and 1637 Kapiolani Boulevard
City, ST, ZIP:	Honolulu HI 96814
Client:	Central Planet Repair
EDR Inquiry:	4046277.3
Order Date:	8/25/2014 8:47:00 PM
Certification #	1B31-4A39-A6DE
Copyright:	1993

This Certified Sanborn Map combines the following sheets.
Outlined areas indicate map sheets within the collection.

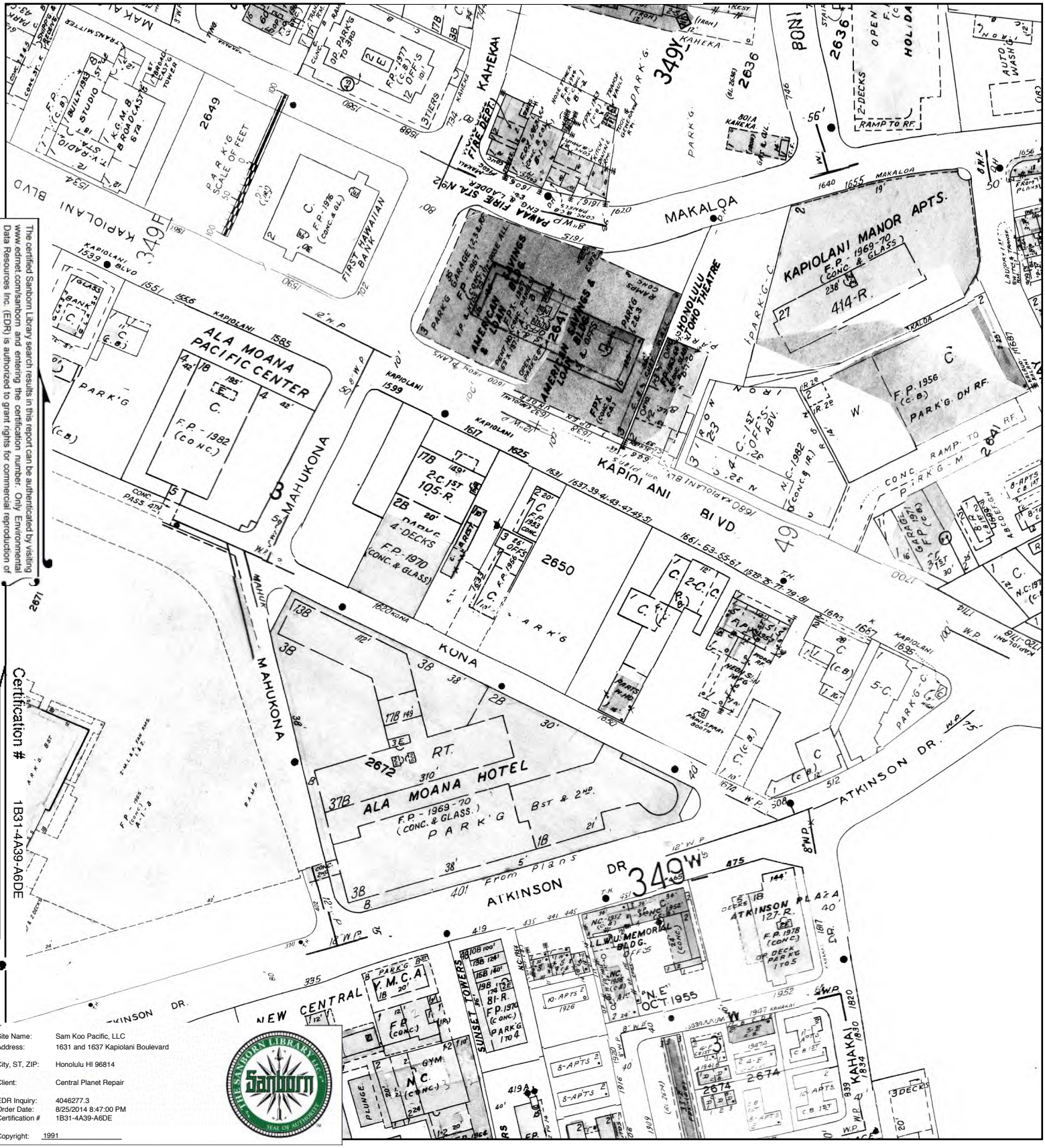
0 Feet 150 300 600



Volume 3, Sheet 355
Volume 3, Sheet 349w
Volume 3, Sheet 349x
Volume 3, Sheet 349y
Volume 3, Sheet 349g

N

1991 Certified Sanborn Map



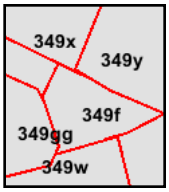
The certified Sanborn Library search results in this report can be authenticated by visiting www.edmet.com/sanborn and entering the certification number. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by The Sanborn Library LLC, the copyright holder for the collection.

Certification # 1B31-4A39-A6DE

Site Name:	Sam Koo Pacific, LLC
Address:	1631 and 1637 Kapiolani Boulevard
City, ST, ZIP:	Honolulu HI 96814
Client:	Central Planet Repair
EDR Inquiry:	4046277.3
Order Date:	8/25/2014 8:47:00 PM
Certification #	1B31-4A39-A6DE
Copyright:	1991

This Certified Sanborn Map combines the following sheets.
Outlined areas indicate map sheets within the collection.

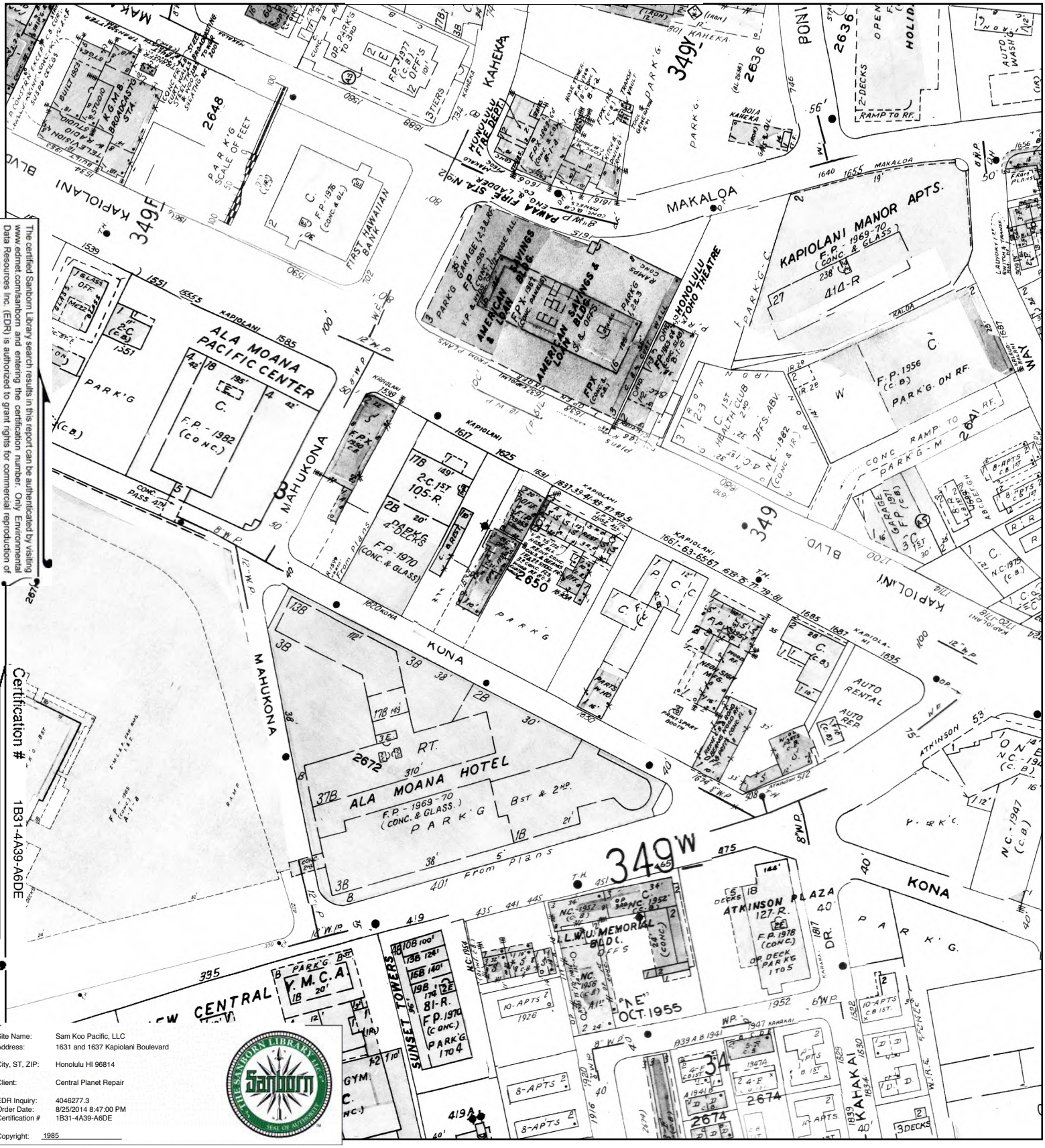
0 Feet 150 300 600



Volume 3, Sheet 349f
Volume 3, Sheet 349w
Volume 3, Sheet 349x
Volume 3, Sheet 349y
Volume 3, Sheet 349gg

N

1985 Certified Sanborn Map



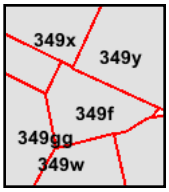
The certified Sanborn Library search results in this report can be authenticated by visiting www.edmet.com/sanborn and entering the certification number. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by The Sanborn Library LLC, the copyright holder for the collection.

Certification # 1B31-4A39-A6DE

Site Name:	Sam Koo Pacific, LLC
Address:	1631 and 1637 Kapiolani Boulevard
City, ST, ZIP:	Honolulu HI 96814
Client:	Central Planet Repair
EDR Inquiry:	4046277.3
Order Date:	8/25/2014 8:47:00 PM
Certification #	1B31-4A39-A6DE
Copyright:	1985

This Certified Sanborn Map combines the following sheets.
Outlined areas indicate map sheets within the collection.

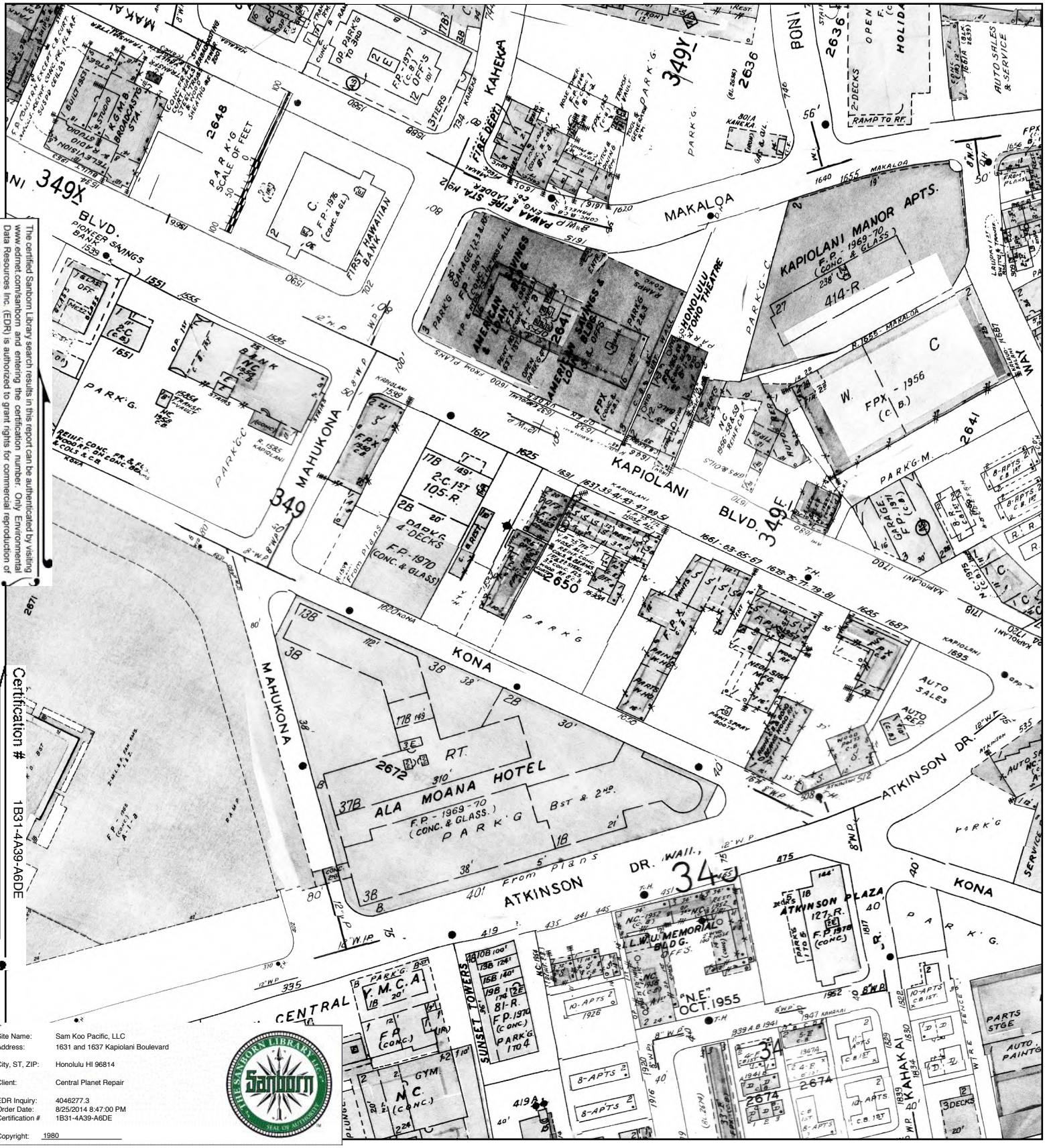
0 Feet 150 300 600



Volume 3, Sheet 349f
Volume 3, Sheet 349w
Volume 3, Sheet 349x
Volume 3, Sheet 349y
Volume 3, Sheet 349gg

N

1980 Certified Sanborn Map

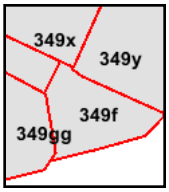


The certified Sanborn Library search results in this report can be authenticated by visiting www.edmet.com/sanborn and entering the certification number. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by The Sanborn Library LLC, the copyright holder for the collection.

Certification # 1B31-4A39-A6DE

Site Name:	Sam Koo Pacific, LLC
Address:	1631 and 1637 Kapiolani Boulevard
City, ST, ZIP:	Honolulu HI 96814
Client:	Central Planet Repair
EDR Inquiry:	4046277.3
Order Date:	8/25/2014 8:47:00 PM
Certification #	1B31-4A39-A6DE
Copyright:	1980

This Certified Sanborn Map combines the following sheets.
Outlined areas indicate map sheets within the collection.

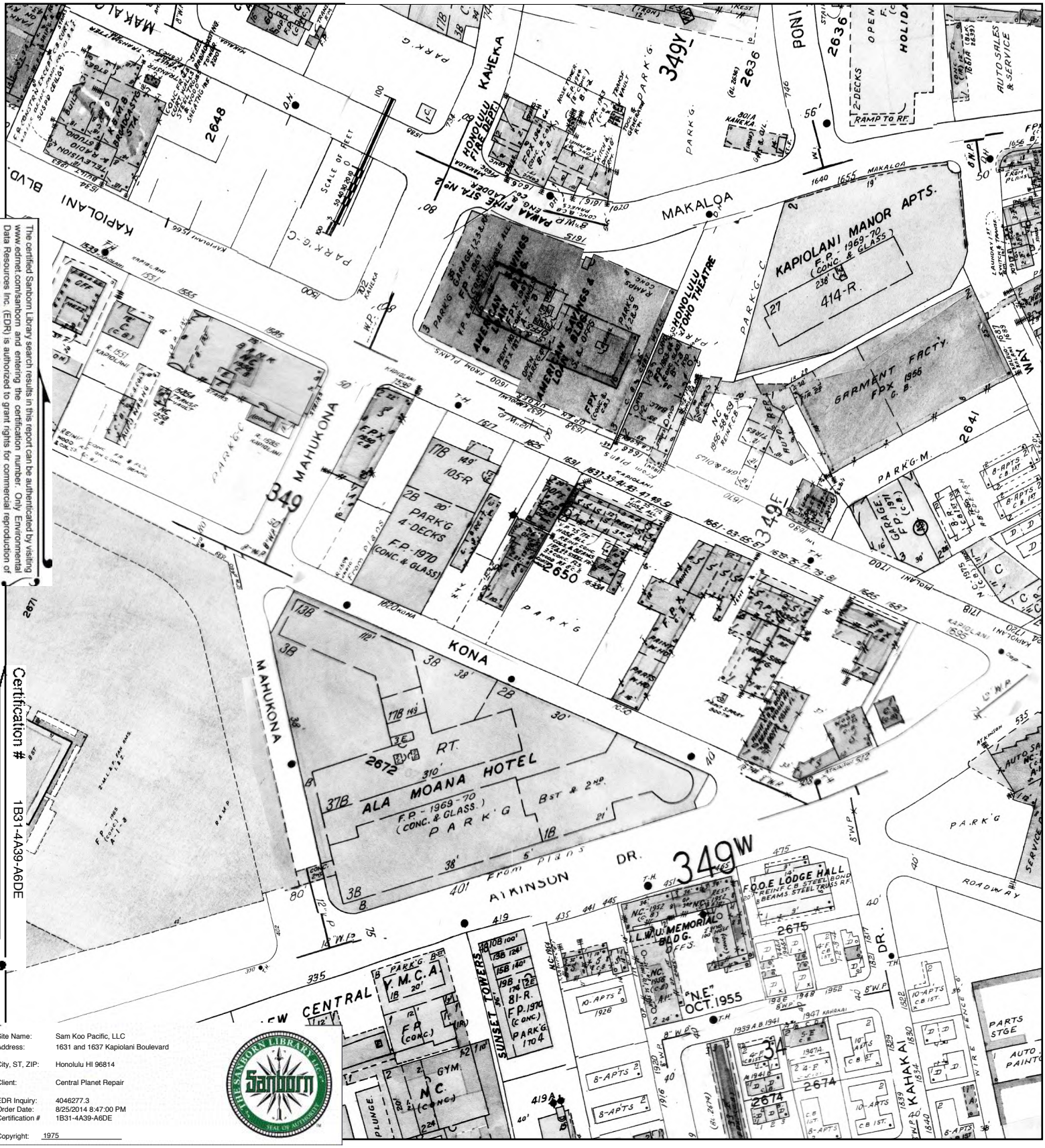


Volume 3, Sheet 349f
Volume 3, Sheet 349x
Volume 3, Sheet 349y
Volume 3, Sheet 349gg

0 Feet 150 300 600

N

1975 Certified Sanborn Map



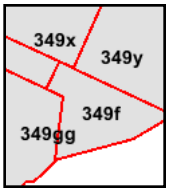
The certified Sanborn Library search results in this report can be authenticated by visiting www.edmet.com/sanborn and entering the certification number. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by The Sanborn Library LLC, the copyright holder for the collection.

Certification # 1B31-4A39-A6DE

Site Name:	Sam Koo Pacific, LLC
Address:	1631 and 1637 Kapiolani Boulevard
City, ST, ZIP:	Honolulu HI 96814
Client:	Central Planet Repair
EDR Inquiry:	4046277.3
Order Date:	8/25/2014 8:47:00 PM
Certification #	1B31-4A39-A6DE
Copyright:	1975

This Certified Sanborn Map combines the following sheets.
Outlined areas indicate map sheets within the collection.

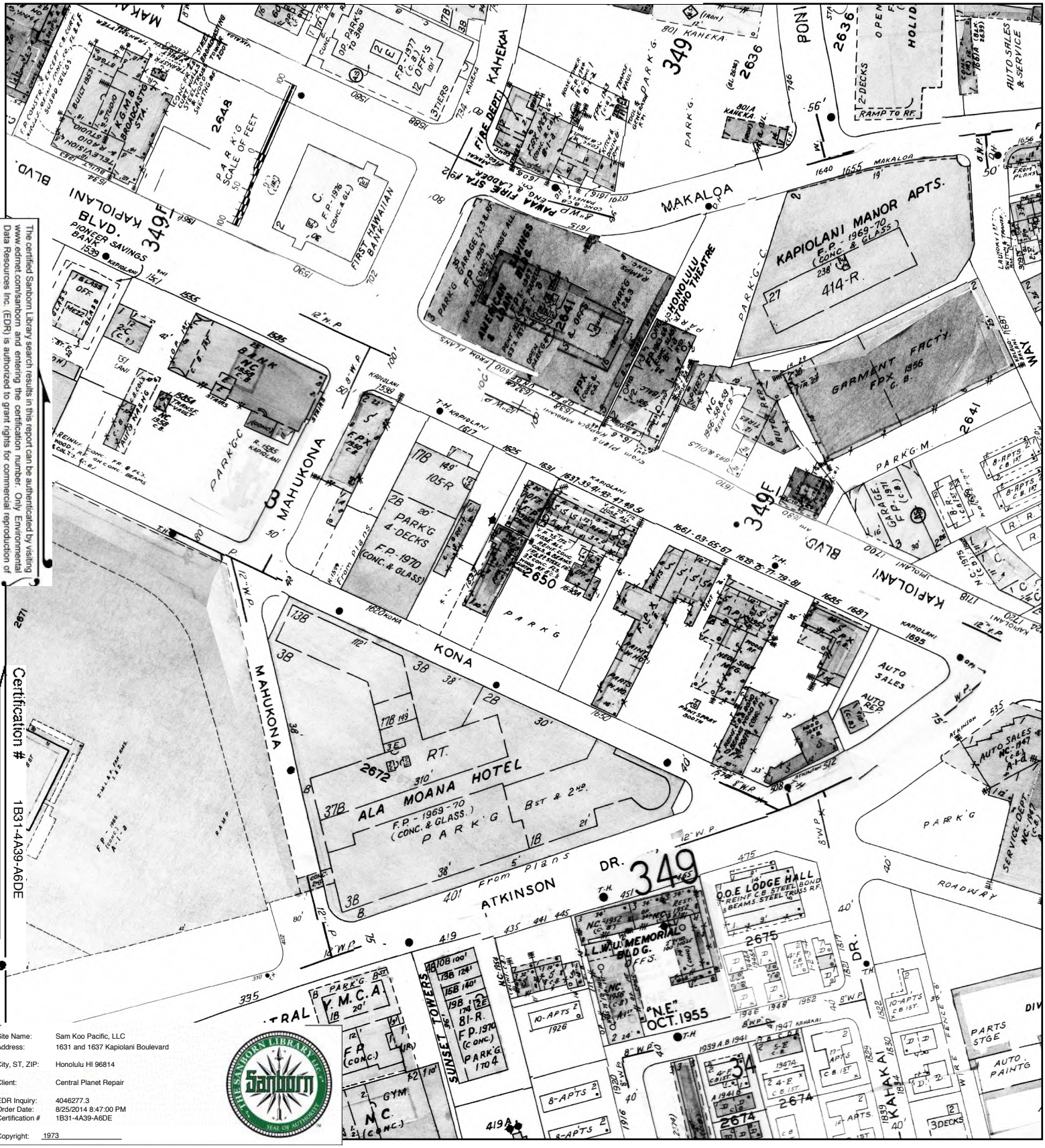
0 Feet 150 300 600



Volume 3, Sheet 349f
Volume 3, Sheet 349x
Volume 3, Sheet 349y
Volume 3, Sheet 349gg

N

1973 Certified Sanborn Map

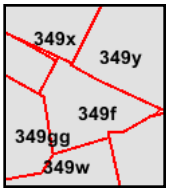


The certified Sanborn Library search results in this report can be authenticated by visiting www.edrnet.com/sanborn and entering the certification number. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by The Sanborn Library LLC, the copyright holder for the collection.

Certification # 1B31-4A39-A6DE

Site Name:	Sam Koo Pacific, LLC
Address:	1631 and 1637 Kapiolani Boulevard
City, ST, ZIP:	Honolulu HI 96814
Client:	Central Planet Repair
EDR Inquiry:	4046277.3
Order Date:	8/25/2014 8:47:00 PM
Certification #	1B31-4A39-A6DE
Copyright:	1973

This Certified Sanborn Map combines the following sheets.
Outlined areas indicate map sheets within the collection.

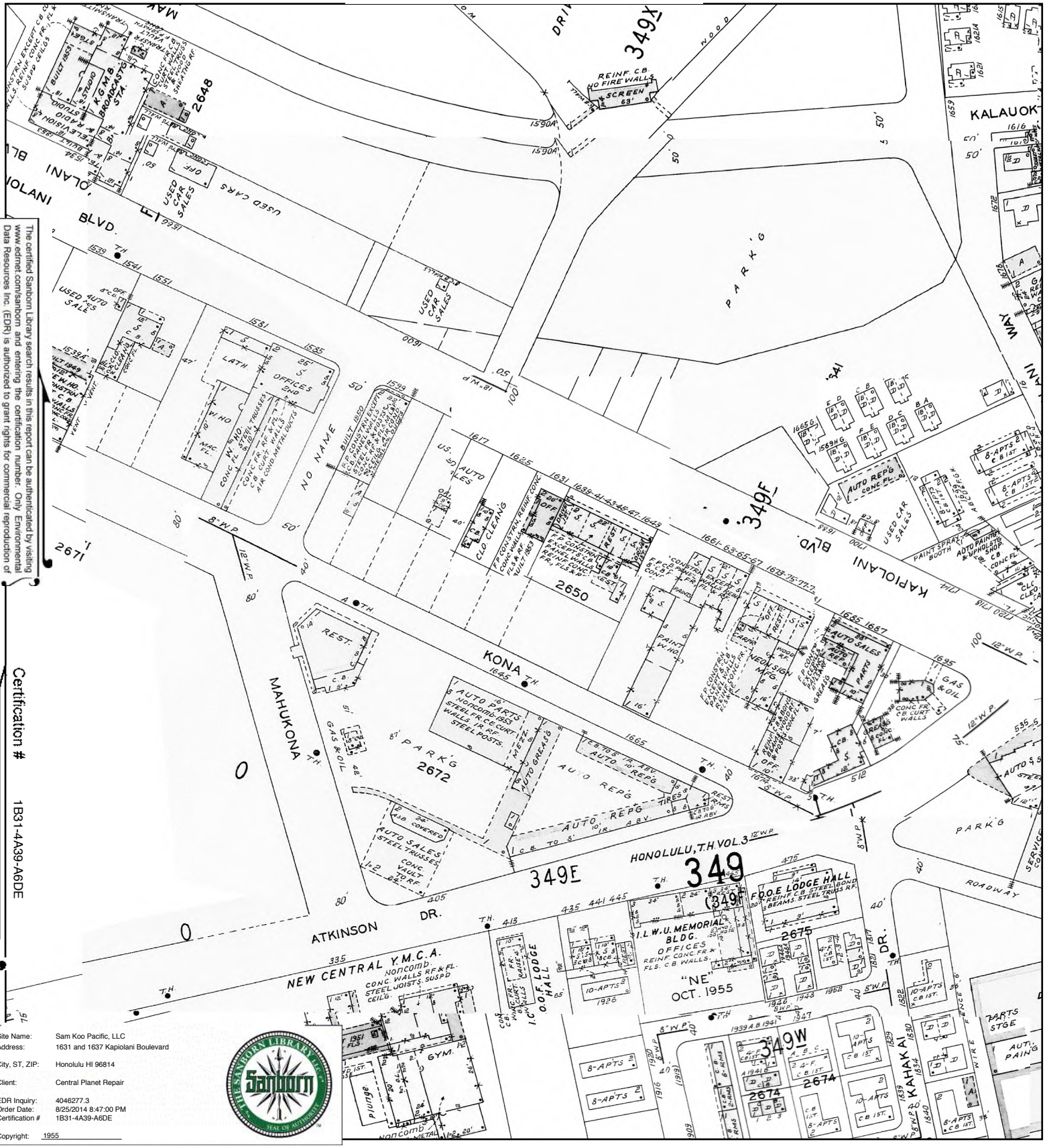


Volume 3, Sheet 349f
Volume 3, Sheet 349w
Volume 3, Sheet 349x
Volume 3, Sheet 349y
Volume 3, Sheet 349gg

0 Feet 150 300 600

N

1955 Certified Sanborn Map



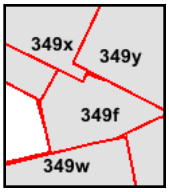
The certified Sanborn Library search results in this report can be authenticated by visiting www.edrnet.com/sanborn and entering the certification number. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by The Sanborn Library LLC, the copyright holder for the collection.

Certification # 1B31-4A39-A6DE

Site Name:	Sam Koo Pacific, LLC
Address:	1631 and 1637 Kapiolani Boulevard
City, ST, ZIP:	Honolulu HI 96814
Client:	Central Planet Repair
EDR Inquiry:	4046277.3
Order Date:	8/25/2014 8:47:00 PM
Certification #	1B31-4A39-A6DE
Copyright:	1955

This Certified Sanborn Map combines the following sheets.
Outlined areas indicate map sheets within the collection.

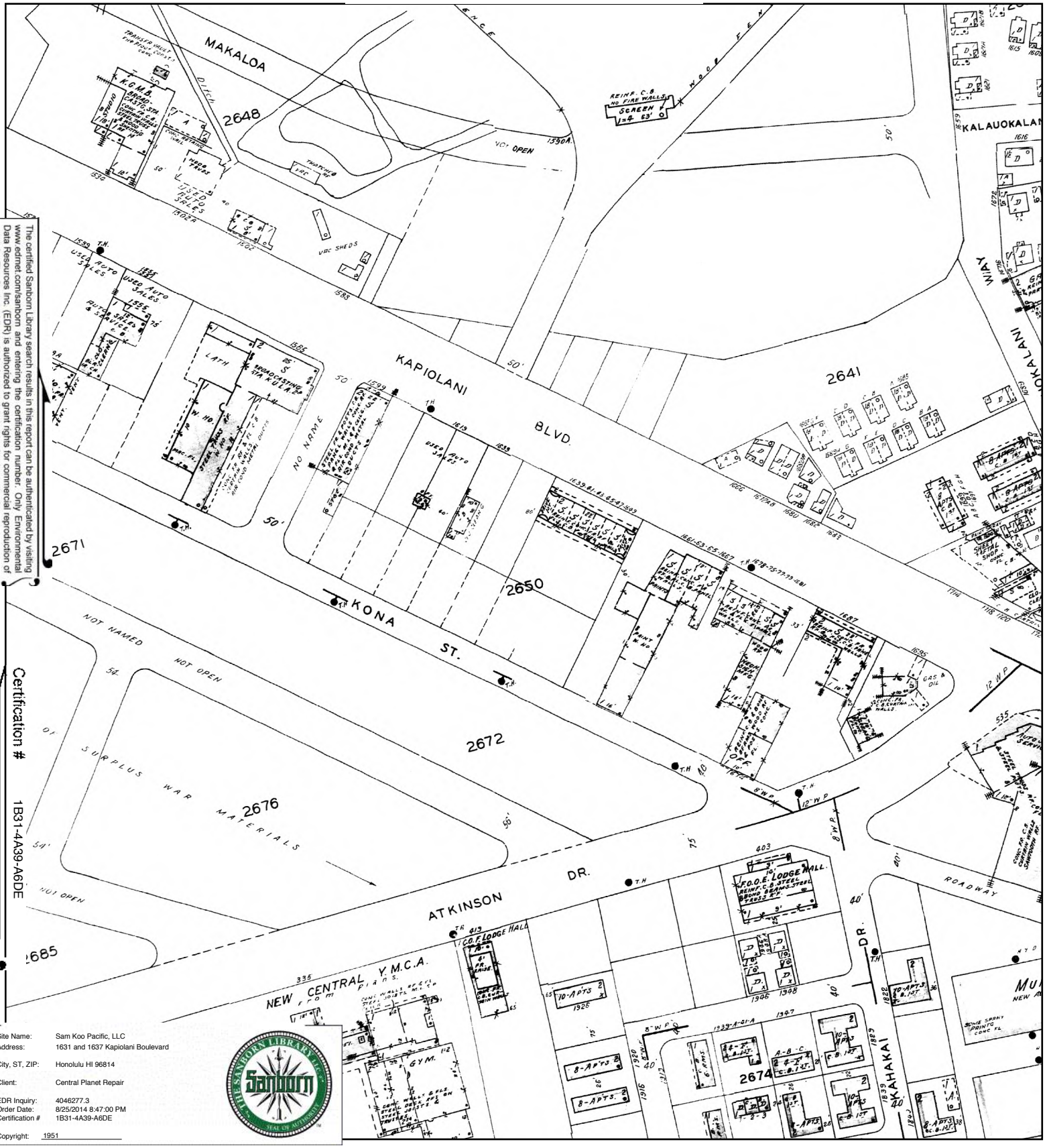
0 Feet 150 300 600



Volume 3, Sheet 349f
Volume 3, Sheet 349w
Volume 3, Sheet 349x
Volume 3, Sheet 349y
Volume 3, Sheet 349f
Volume 3, Sheet 349w
Volume 3, Sheet 349x
Volume 3, Sheet 349y

N

1951 Certified Sanborn Map



The certified Sanborn Library search results in this report can be authenticated by visiting www.edmet.com/sanborn and entering the certification number. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by The Sanborn Library LLC, the copyright holder for the collection.

Certification # 1B31-4A39-A6DE

Site Name:	Sam Koo Pacific, LLC
Address:	1631 and 1637 Kapiolani Boulevard
City, ST, ZIP:	Honolulu HI 96814
Client:	Central Planet Repair
EDR Inquiry:	4046277.3
Order Date:	8/25/2014 8:47:00 PM
Certification #	1B31-4A39-A6DE
Copyright:	1951

This Certified Sanborn Map combines the following sheets.
Outlined areas indicate map sheets within the collection.

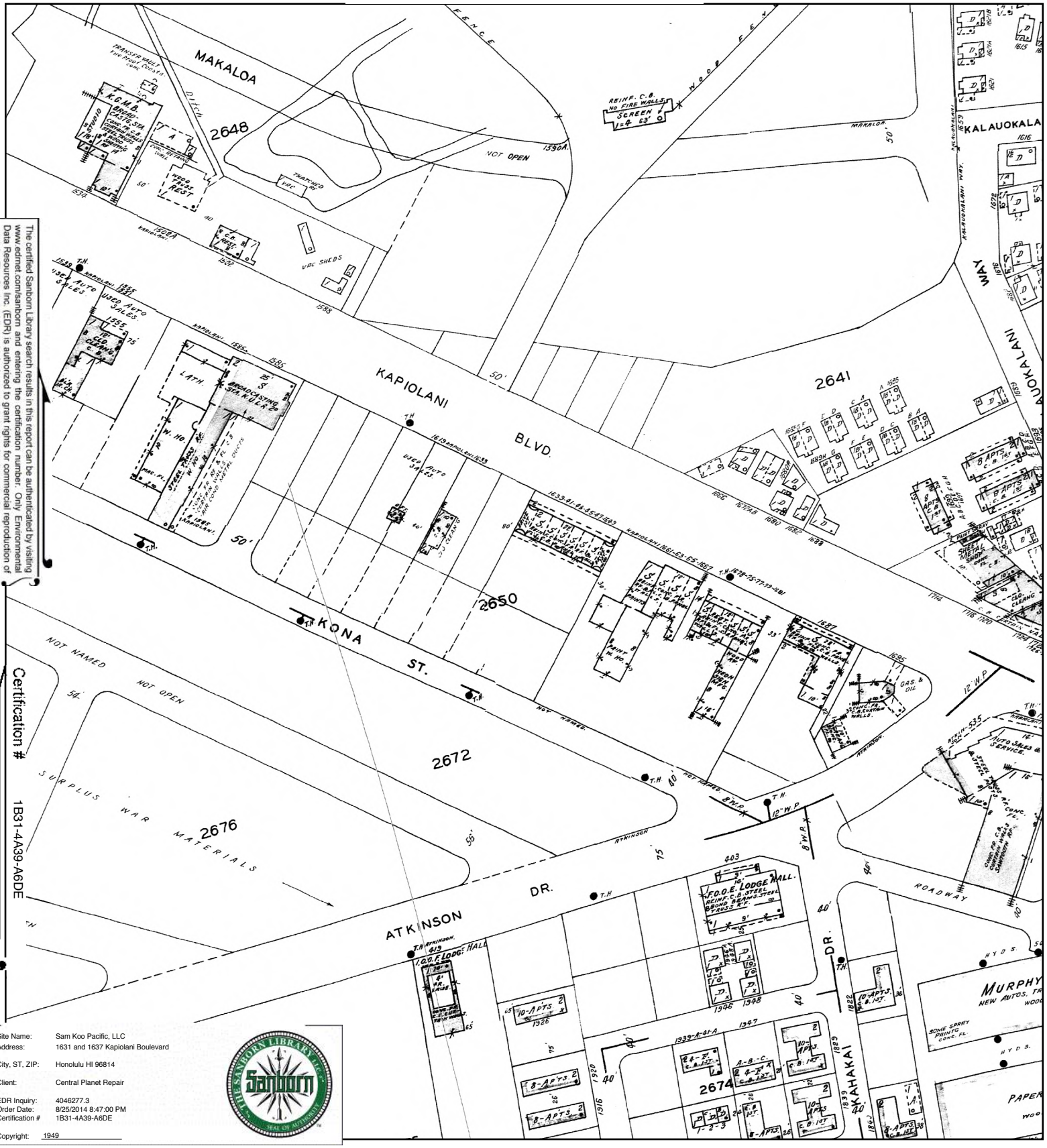
0 Feet 150 300 600

349f

Volume 3, Sheet 349f

N

1949 Certified Sanborn Map



The certified Sanborn Library search results in this report can be authenticated by visiting www.edmet.com/sanborn and entering the certification number. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by The Sanborn Library LLC, the copyright holder for the collection.

Certification # 1B31-4A39-A6DE

Site Name:	Sam Koo Pacific, LLC
Address:	1631 and 1637 Kapiolani Boulevard
City, ST, ZIP:	Honolulu HI 96814
Client:	Central Planet Repair
EDR Inquiry:	4046277.3
Order Date:	8/25/2014 8:47:00 PM
Certification #	1B31-4A39-A6DE
Copyright:	1949

This Certified Sanborn Map combines the following sheets.
Outlined areas indicate map sheets within the collection.

0 Feet 150 300 600

349f

Volume 3, Sheet 349f

N

Sam Koo Pacific, LLC
1631 and 1637 Kapiolani Boulevard
Honolulu, HI 96814

Inquiry Number: 4046277.4
August 25, 2014

EDR Historical Topographic Map Report

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

EDR Historical Topographic Map Report

Environmental Data Resources, Inc.s (EDR) Historical Topographic Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topographic Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the early 1900s.

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

Disclaimer - Copyright and Trademark Notice

This Report contains certain information obtained from a variety of public and other sources reasonably available to Environmental Data Resources, Inc. It cannot be concluded from this Report that coverage information for the target and surrounding properties does not exist from other sources. **NO WARRANTY EXPRESSED OR IMPLIED, IS MADE WHATSOEVER IN CONNECTION WITH THIS REPORT. ENVIRONMENTAL DATA RESOURCES, INC. SPECIFICALLY DISCLAIMS THE MAKING OF ANY SUCH WARRANTIES, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. ALL RISK IS ASSUMED BY THE USER. IN NO EVENT SHALL ENVIRONMENTAL DATA RESOURCES, INC. BE LIABLE TO ANYONE, WHETHER ARISING OUT OF ERRORS OR OMISSIONS, NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSS OF DAMAGE, INCLUDING, WITHOUT LIMITATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES. ANY LIABILITY ON THE PART OF ENVIRONMENTAL DATA RESOURCES, INC. IS STRICTLY LIMITED TO A REFUND OF THE AMOUNT PAID FOR THIS REPORT.** Purchaser accepts this Report AS IS. Any analyses, estimates, ratings, environmental risk levels or risk codes provided in this Report are provided for illustrative purposes only, and are not intended to provide, nor should they be interpreted as providing any facts regarding, or prediction or forecast of, any environmental risk for any property. Only a Phase I Environmental Site Assessment performed by an environmental professional can provide information regarding the environmental risk for any property. Additionally, the information provided in this Report is not to be construed as legal advice.

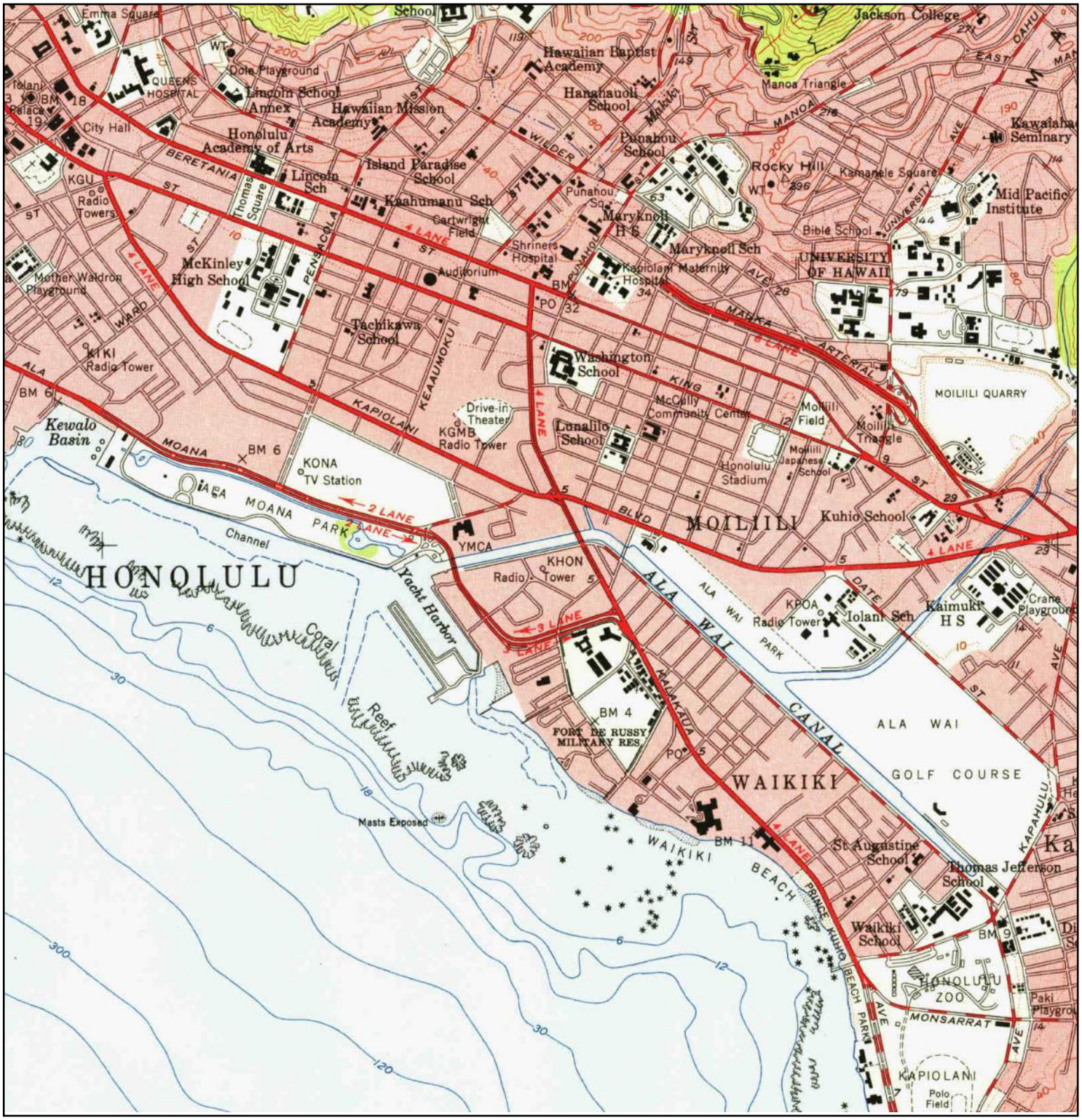
Copyright 2014 by Environmental Data Resources, Inc. All rights reserved. Reproduction in any media or format, in whole or in part, of any report or map of Environmental Data Resources, Inc., or its affiliates, is prohibited without prior written permission.

EDR and its logos (including Sanborn and Sanborn Map) are trademarks of Environmental Data Resources, Inc. or its affiliates. All other trademarks used herein are the property of their respective owners.

Historical Topographic Map

N	TARGET QUAD NAME: HONOLULU MAP YEAR: 1928 SERIES: 7.5 SCALE: 1:20000	SITE NAME: Sam Koo Pacific, LLC ADDRESS: 1631 and 1637 Kapiolani Boulevard Honolulu, HI 96814 LAT/LONG: 21.2911 / -157.8392	CLIENT: Central Planet Repair CONTACT: Ned Murphy INQUIRY#: 4046277.4 RESEARCH DATE: 08/25/2014

Historical Topographic Map

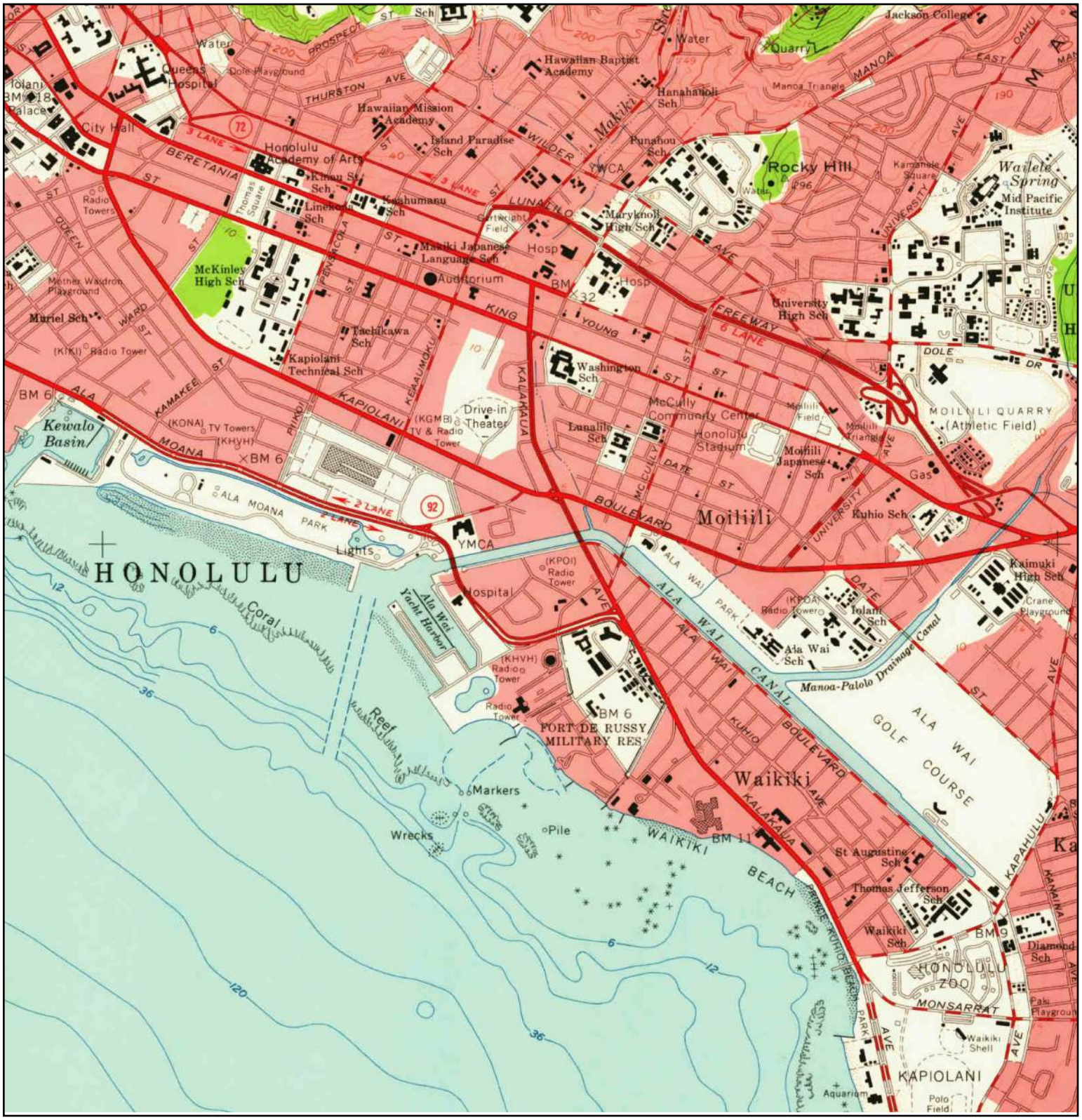


N	TARGET QUAD NAME: HONOLULU MAP YEAR: 1953 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Sam Koo Pacific, LLC ADDRESS: 1631 and 1637 Kapiolani Boulevard Honolulu, HI 96814 LAT/LONG: 21.2911 / -157.8392	CLIENT: Central Planet Repair CONTACT: Ned Murphy INQUIRY#: 4046277.4 RESEARCH DATE: 08/25/2014

Historical Topographic Map

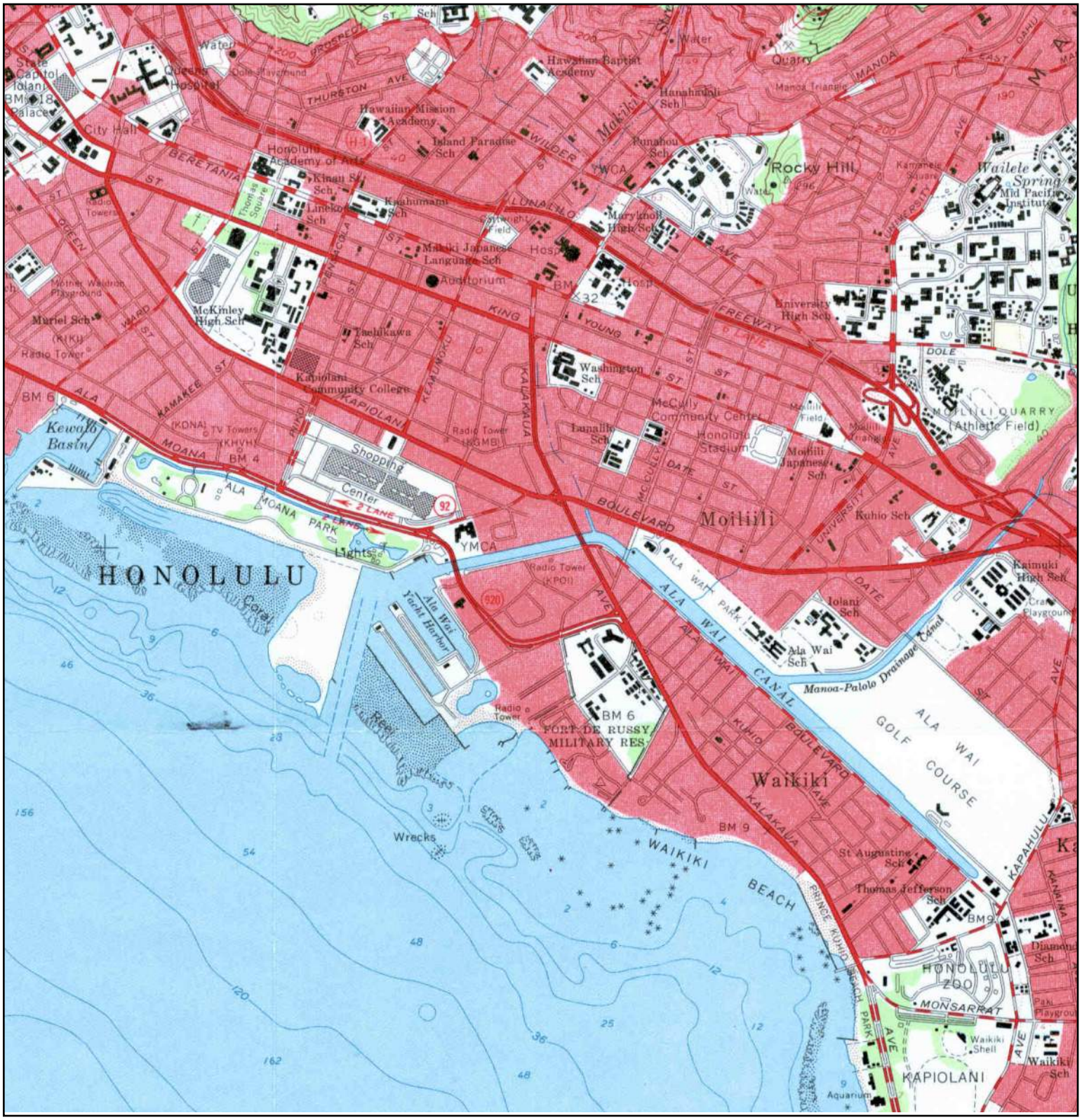
N	TARGET QUAD NAME: HONOLULU VICINITY SOUTH MAP YEAR: 1954 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Sam Koo Pacific, LLC ADDRESS: 1631 and 1637 Kapiolani Boulevard Honolulu, HI 96814 LAT/LONG: 21.2911 / -157.8392	CLIENT: Central Planet Repair CONTACT: Ned Murphy INQUIRY#: 4046277.4 RESEARCH DATE: 08/25/2014

Historical Topographic Map



N	TARGET QUAD NAME: HONOLULU MAP YEAR: 1959 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Sam Koo Pacific, LLC ADDRESS: 1631 and 1637 Kapiolani Boulevard Honolulu, HI 96814 LAT/LONG: 21.2911 / -157.8392	CLIENT: Central Planet Repair CONTACT: Ned Murphy INQUIRY#: 4046277.4 RESEARCH DATE: 08/25/2014

Historical Topographic Map

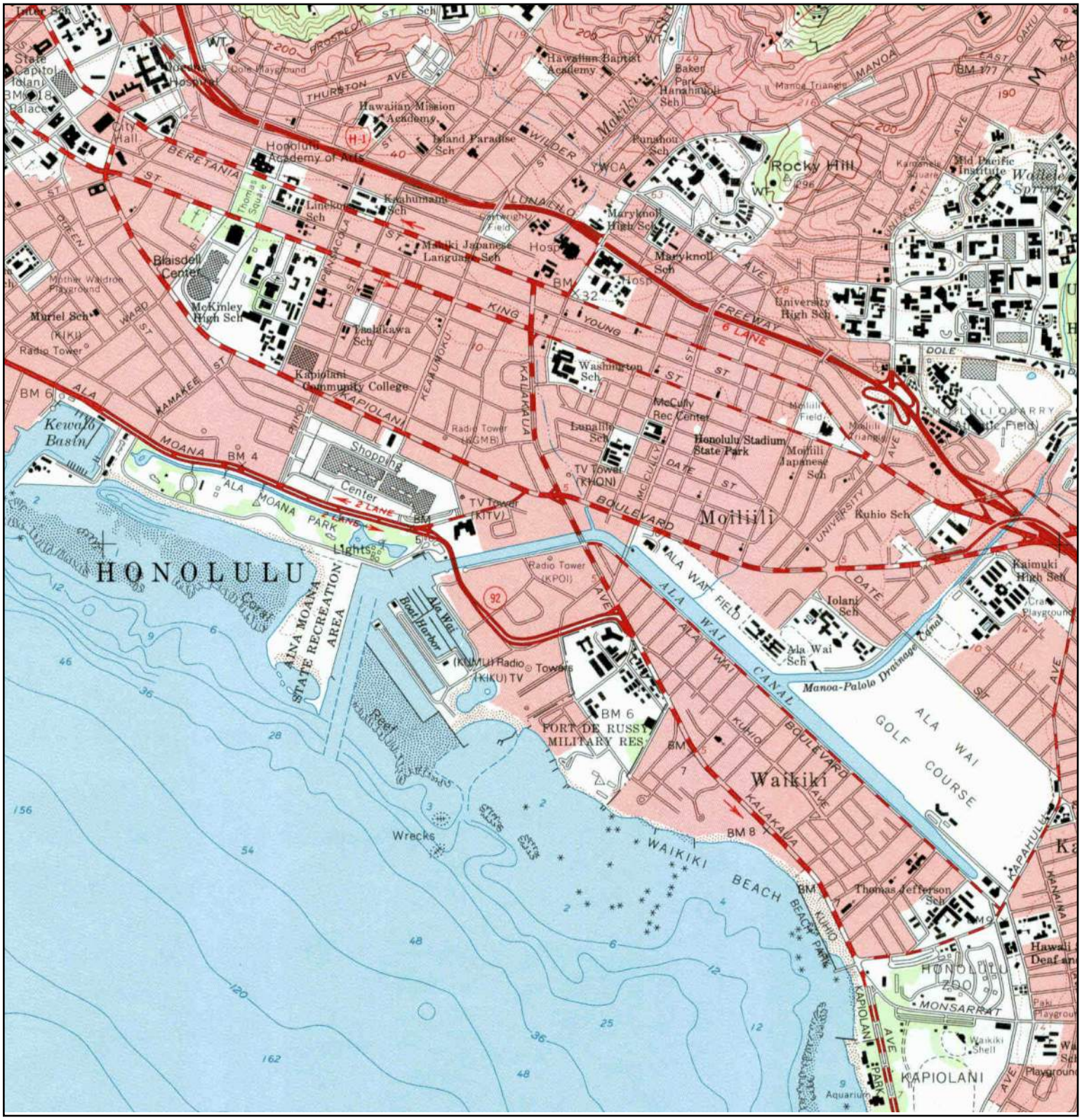


N	**TARGET QUAD** NAME: HONOLULU MAP YEAR: 1969 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Sam Koo Pacific, LLC ADDRESS: 1631 and 1637 Kapiolani Boulevard Honolulu, HI 96814 LAT/LONG: 21.2911 / -157.8392	CLIENT: Central Planet Repair CONTACT: Ned Murphy INQUIRY#: 4046277.4 RESEARCH DATE: 08/25/2014

Historical Topographic Map

N	TARGET QUAD NAME: OAHU MAP YEAR: 1970 REVISED FROM :1954 SERIES: 15 SCALE: 1:62500	SITE NAME: Sam Koo Pacific, LLC ADDRESS: 1631 and 1637 Kapiolani Boulevard Honolulu, HI 96814 LAT/LONG: 21.2911 / -157.8392	CLIENT: Central Planet Repair CONTACT: Ned Murphy INQUIRY#: 4046277.4 RESEARCH DATE: 08/25/2014

Historical Topographic Map

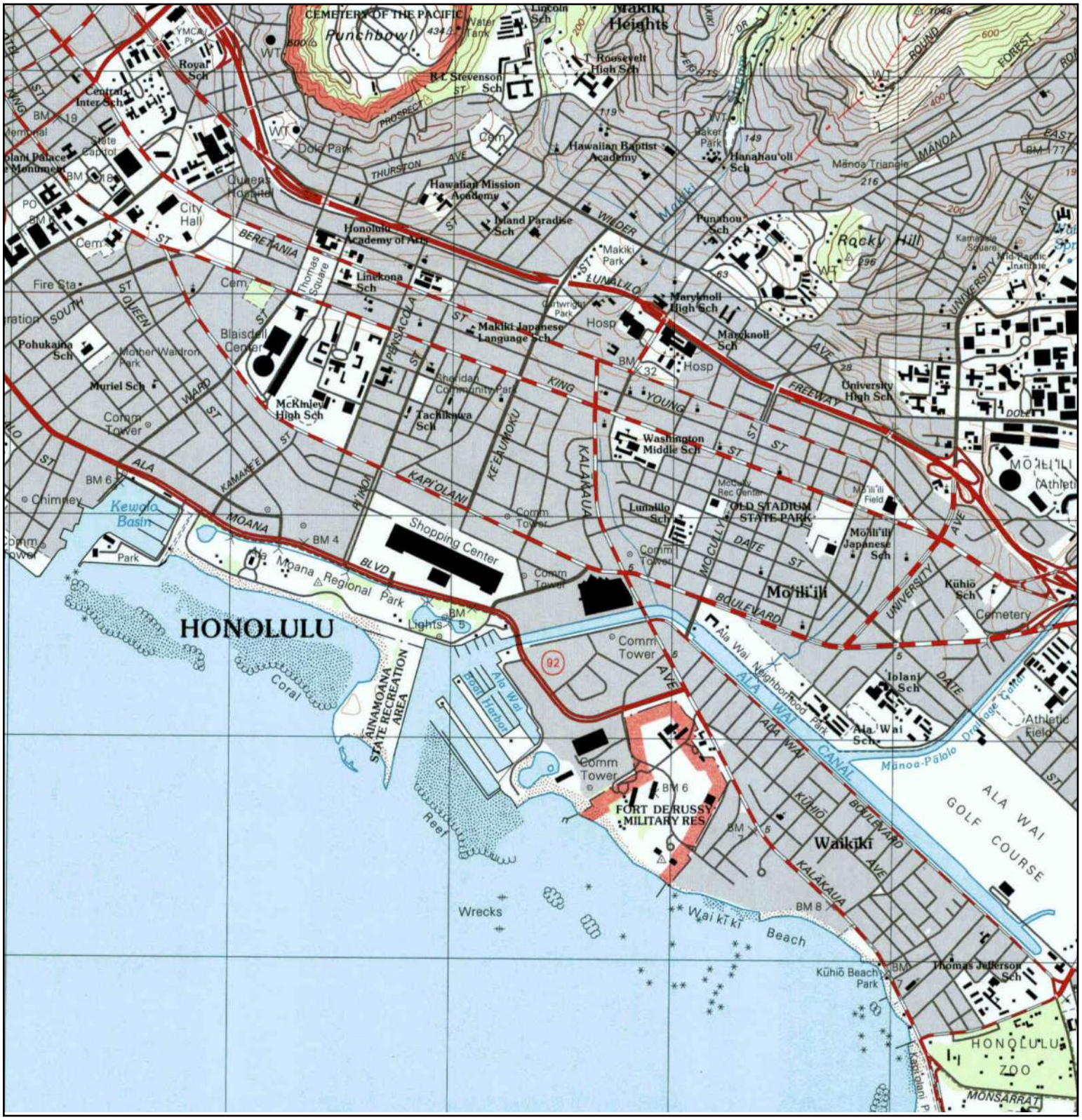


N	TARGET QUAD NAME: HONOLULU MAP YEAR: 1983 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Sam Koo Pacific, LLC ADDRESS: 1631 and 1637 Kapiolani Boulevard Honolulu, HI 96814 LAT/LONG: 21.2911 / -157.8392	CLIENT: Central Planet Repair CONTACT: Ned Murphy INQUIRY#: 4046277.4 RESEARCH DATE: 08/25/2014

Historical Topographic Map

N	TARGET QUAD NAME: HONOLULU MAP YEAR: 1983 SERIES: 15 SCALE: 1:50000	SITE NAME: Sam Koo Pacific, LLC ADDRESS: 1631 and 1637 Kapiolani Boulevard Honolulu, HI 96814 LAT/LONG: 21.2911 / -157.8392	CLIENT: Central Planet Repair CONTACT: Ned Murphy INQUIRY#: 4046277.4 RESEARCH DATE: 08/25/2014

Historical Topographic Map



N	TARGET QUAD NAME: HONOLULU MAP YEAR: 1998 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Sam Koo Pacific, LLC ADDRESS: 1631 and 1637 Kapiolani Boulevard Honolulu, HI 96814 LAT/LONG: 21.2911 / -157.8392	CLIENT: Central Planet Repair CONTACT: Ned Murphy INQUIRY#: 4046277.4 RESEARCH DATE: 08/25/2014

1952

1959

1963

1968

1978

1993

2000

APPENDIX F

Environmental Data Resources, Inc. EDR Radius Map with GeoCheck®

Sam Koo Pacific, LLC
1631 and 1637 Kapiolani Boulevard
Honolulu, HI 96814

Inquiry Number: 4046277.2s
August 25, 2014

The EDR Radius Map™ Report with GeoCheck®

EDR® Environmental Data Resources Inc

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

TABLE OF CONTENTS

SECTION	PAGE
Executive Summary	ES1
Overview Map	2
Detail Map	3
Map Findings Summary	4
Map Findings	7
Orphan Summary	136
Government Records Searched/Data Currency Tracking	GR-1

GEOCHECK ADDENDUM

Physical Setting Source Addendum	A-1
Physical Setting Source Summary	A-2
Physical Setting SSURGO Soil Map	A-5
Physical Setting Source Map	A-12
Physical Setting Source Map Findings	A-14
Physical Setting Source Records Searched	PSGR-1

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

Disclaimer - Copyright and Trademark Notice

This Report contains certain information obtained from a variety of public and other sources reasonably available to Environmental Data Resources, Inc. It cannot be concluded from this Report that coverage information for the target and surrounding properties does not exist from other sources. **NO WARRANTY EXPRESSED OR IMPLIED, IS MADE WHATSOEVER IN CONNECTION WITH THIS REPORT. ENVIRONMENTAL DATA RESOURCES, INC. SPECIFICALLY DISCLAIMS THE MAKING OF ANY SUCH WARRANTIES, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. ALL RISK IS ASSUMED BY THE USER. IN NO EVENT SHALL ENVIRONMENTAL DATA RESOURCES, INC. BE LIABLE TO ANYONE, WHETHER ARISING OUT OF ERRORS OR OMISSIONS, NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSS OF DAMAGE, INCLUDING, WITHOUT LIMITATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES. ANY LIABILITY ON THE PART OF ENVIRONMENTAL DATA RESOURCES, INC. IS STRICTLY LIMITED TO A REFUND OF THE AMOUNT PAID FOR THIS REPORT.** Purchaser accepts this Report "AS IS". Any analyses, estimates, ratings, environmental risk levels or risk codes provided in this Report are provided for illustrative purposes only, and are not intended to provide, nor should they be interpreted as providing any facts regarding, or prediction or forecast of, any environmental risk for any property. Only a Phase I Environmental Site Assessment performed by an environmental professional can provide information regarding the environmental risk for any property. Additionally, the information provided in this Report is not to be construed as legal advice.

Copyright 2014 by Environmental Data Resources, Inc. All rights reserved. Reproduction in any media or format, in whole or in part, of any report or map of Environmental Data Resources, Inc., or its affiliates, is prohibited without prior written permission.

EDR and its logos (including Sanborn and Sanborn Map) are trademarks of Environmental Data Resources, Inc. or its affiliates. All other trademarks used herein are the property of their respective owners.

EXECUTIVE SUMMARY

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

TARGET PROPERTY INFORMATION

ADDRESS

1631 AND 1637 KAPIOLANI BOULEVARD
HONOLULU, HI 96814

COORDINATES

Latitude (North):	21.2911000 - 21˚ 17' 27.96''
Longitude (West):	157.8392000 - 157˚ 50' 21.12''
Universal Tranverse Mercator:	Zone 4
UTM X (Meters):	620413.1
UTM Y (Meters):	2354669.2
Elevation:	3 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	21157-C7 HONOLULU, HI
Most Recent Revision:	Not reported

TARGET PROPERTY SEARCH RESULTS

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

DATABASES WITH NO MAPPED SITES

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

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

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

Federal Delisted NPL site list

Delisted NPL..... National Priority List Deletions

EXECUTIVE SUMMARY

Federal CERCLIS list

CERCLIS ..... Comprehensive Environmental Response, Compensation, and Liability Information System
FEDERAL FACILITY ..... Federal Facility Site Information listing

Federal RCRA CORRACTS facilities list

CORRACTS ..... Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF ..... RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-LQG ..... RCRA - Large Quantity Generators

Federal institutional controls / engineering controls registries

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

Federal ERNS list

ERNS ..... Emergency Response Notification System

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

HI SWF/LF ..... Permitted Landfills in the State of Hawaii

State and tribal leaking storage tank lists

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

State and tribal registered storage tank lists

INDIAN UST ..... Underground Storage Tanks on Indian Land
FEMA UST ..... Underground Storage Tank Listing

State and tribal voluntary cleanup sites

INDIAN VCP ..... Voluntary Cleanup Priority Listing

State and tribal Brownfields sites

HI BROWNFIELDS ..... Brownfields Sites

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS ..... A Listing of Brownfields Sites

EXECUTIVE SUMMARY

Local Lists of Landfill / Solid Waste Disposal Sites

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

Local Lists of Hazardous waste / Contaminated Sites

US CDL	Clandestine Drug Labs
HI CDL	Clandestine Drug Lab Listing
US HIST CDL	National Clandestine Laboratory Register

Local Land Records

LIENS 2	CERCLA Lien Information

Records of Emergency Release Reports

HMIRS	Hazardous Materials Information Reporting System
HI SPILLS 90	SPILLS 90 data from FirstSearch

Other Ascertainable Records

DOT OPS	Incident and Accident Data
DOD	Department of Defense Sites
FUDS	Formerly Used Defense Sites
CONSENT	Superfund (CERCLA) Consent Decrees
ROD	Records Of Decision
UMTRA	Uranium Mill Tailings Sites
US MINES	Mines Master Index File
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
SSTS	Section 7 Tracking Systems
ICIS	Integrated Compliance Information System
PADS	PCB Activity Database System
MLTS	Material Licensing Tracking System
RADINFO	Radiation Information Database
RAATS	RCRA Administrative Action Tracking System
RMP	Risk Management Plans
HI UIC	Underground Injection Wells Listing
HI DRYCLEANERS	Permitted Drycleaner Facility Listing
INDIAN RESERV	Indian Reservations
SCRD DRYCLEANERS	State Coalition for Remediation of Drycleaners Listing
EPA WATCH LIST	EPA WATCH LIST
COAL ASH DOE	Steam-Electric Plant Operation Data
US FIN ASSUR	Financial Assurance Information
COAL ASH EPA	Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER	PCB Transformer Registration Database
US AIRS	Aerometric Information Retrieval System Facility Subsystem
PRP	Potentially Responsible Parties
2020 COR ACTION	2020 Corrective Action Program List

EXECUTIVE SUMMARY

LEAD SMELTERS..... Lead Smelter Sites

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP..... EDR Proprietary Manufactured Gas Plants

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

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

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

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

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

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

STANDARD ENVIRONMENTAL RECORDS

Federal CERCLIS NFRAP site List

CERC-NFRAP: Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

A review of the CERC-NFRAP list, as provided by EDR, and dated 10/25/2013 has revealed that there is 1 CERC-NFRAP site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
FIRST DEVELOPMENT INC	***1777 KAPIOLANI BLVD***	***E 1/8 - 1/4 (0.173 mi.)***	***I27***	***32***

EXECUTIVE SUMMARY

Federal RCRA generators list

RCRA-SQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

A review of the RCRA-SQG list, as provided by EDR, and dated 03/11/2014 has revealed that there are 4 RCRA-SQG sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
ALAMOANA HOTEL	***410 ATKINSON DR***	***SSW 0 - 1/8 (0.080 mi.)***	***B4***	***9***
HOLIDAY ACTION GAS	801 KAHEKA ST	N 1/8 - 1/4 (0.130 mi.)	C7	13
WALGREENS STORE NO. 12072	1470 KAPIOLANI BLVD.	NW 1/8 - 1/4 (0.205 mi.)	H36	43
STATE OF HAWAII DLNR DOBOR	1651 ALA MOANA BLVD	SSW 1/8 - 1/4 (0.238 mi.)	K42	53

RCRA-CESQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

A review of the RCRA-CESQG list, as provided by EDR, and dated 03/11/2014 has revealed that there are 7 RCRA-CESQG sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
PAN AM BLDG	***1600 KAPIOLANI BLVD***	***NW 0 - 1/8 (0.036 mi.)***	***A1***	***7***
AOAO YACHT HARBOR TOWERS	1600_1650 ALA MOANA BLV	SSW 1/8 - 1/4 (0.145 mi.)	F13	20
ROGERS REPAIR INC	***1687 KALAKAUA AVE***	***ENE 1/8 - 1/4 (0.149 mi.)***	***D15***	***22***
KALAKUA TRANSMISSION INC	***1665 KALAKUA AVE***	***NE 1/8 - 1/4 (0.162 mi.)***	***D21***	***26***
FIRST DEVELOPMENT INC	***1777 KAPIOLANI BLVD***	***E 1/8 - 1/4 (0.173 mi.)***	***I27***	***32***
HAWAII CONVENTION CENTER	1801 KALAKAUA AVENUE	E 1/8 - 1/4 (0.204 mi.)	I35	41
ALA MOANA UNOCAL	***1651 ALA MOANA BLVD***	***SSW 1/8 - 1/4 (0.238 mi.)***	***K41***	***48***

State- and tribal - equivalent CERCLIS

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

A review of the HI SHWS list, as provided by EDR, and dated 01/04/2014 has revealed that there are 48 HI SHWS sites within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
NEW OFFICE LOUNGE	***1551 KAPIOLANI BLVD***	***NW 0 - 1/8 (0.086 mi.)***	***A5***	***11***
HECO SUBSTATION: MAKALOA SUBST	***1544 MAKALOA ST***	***NW 1/8 - 1/4 (0.144 mi.)***	***E12***	***18***
ROGER'S REPAIR INC	1687 KALAKAUA AVE	ENE 1/8 - 1/4 (0.149 mi.)	D14	21
FORMER KALAKAUA TRANSMISSION I	***1665 KALAKAUA AVE***	***NE 1/8 - 1/4 (0.159 mi.)***	***D19***	***25***
YACHT HARBOR TOWERS	***1600 ALA MOANA BLVD***	***SSW 1/8 - 1/4 (0.164 mi.)***	***F22***	***28***

EXECUTIVE SUMMARY

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
ALOHA MOTORS 1777 KAPIOLANI BL	***1777 KAPIOLANI BLVD***	***E 1/8 - 1/4 (0.173 mi.)***	***I26***	***30***
1609 ALA WAI DIESEL RELEASE	***1609 ALA WAI BLVD***	***SSE 1/8 - 1/4 (0.204 mi.)***	***J32***	***36***
HAWAII CONVENTION CENTER	***1801 KALAKAUA AVE***	***E 1/8 - 1/4 (0.204 mi.)***	***I33***	***38***
WALGREENS KEEAMOKU	1460 KAPIOLANI BOULEVAR	NW 1/8 - 1/4 (0.216 mi.)	H37	45
LIKE LIKE PLAZA PETROLEUM CONT	745 KEEAUMOKU ST	NNW 1/4 - 1/2 (0.315 mi.)	49	58
CUTTER CHEVROLET	***1391 KAPIOLANI BLVD***	***WNW 1/4 - 1/2 (0.328 mi.)***	***50***	***59***
HOBRON HOTEL	1744 KAIOO DR	SSE 1/4 - 1/2 (0.354 mi.)	N53	62
MOTOR SUPPLY	***726 SHERIDAN ST***	***NW 1/4 - 1/2 (0.372 mi.)***	***O56***	***65***
HAKUYOSHA HAWAII, INC	***730 SHERIDAN ST***	***NW 1/4 - 1/2 (0.372 mi.)***	***O57***	***66***
SEARS ALA MOANA	1450 ALA MOANA BLVD	W 1/4 - 1/2 (0.396 mi.)	M62	70
ALOHA/KING SELF STORAGE	***1414 KALAKAUA AVE***	***NNE 1/4 - 1/2 (0.470 mi.)***	***Q68***	***81***
THE PAVILLION	***1925 KALAKAUA AVE***	***SE 1/4 - 1/2 (0.473 mi.)***	***69***	***82***
CENPAC PROPERTIES - OFFICE BUI	***615 PIIKOI ST***	***WNW 1/4 - 1/2 (0.496 mi.)***	***73***	***86***
CONTINENTAL AUTO SERVICES	***1918 ALGAROBA ST***	***ENE 1/2 - 1 (0.520 mi.)***	***74***	***88***
MEADOW GOLD DAIRIES (ICE CREAM	***1418 YOUNG ST***	***N 1/2 - 1 (0.520 mi.)***	***75***	***89***
7-11 KALAKAUA	***1323 KALAKAUA AVE***	***NNE 1/2 - 1 (0.531 mi.)***	***76***	***91***
DURANT PROPERTIES	***1235 KONA ST***	***WNW 1/2 - 1 (0.564 mi.)***	***77***	***93***
EVERSHINE X	***1230 KAPIOLANI BLVD***	***WNW 1/2 - 1 (0.574 mi.)***	***78***	***94***
CHEVRON 2002 KALAKAUA	***2002 KALAKAUA AVE***	***SE 1/2 - 1 (0.578 mi.)***	***79***	***95***
GRACE OTSUKA APARTMENT COMPLEX	***1233 YOUNG ST***	***NNW 1/2 - 1 (0.639 mi.)***	***80***	***96***
WALLYS GARDEN CENTER	***1935 S BERETANIA ST***	***NE 1/2 - 1 (0.649 mi.)***	***81***	***97***
1012 PIIKOI STREET, ANIN-PIIKO	***1012 PIIKOI ST***	***NNW 1/2 - 1 (0.649 mi.)***	***82***	***98***
MCCULLY UNION SERVICE	***2105 S KING ST***	***ENE 1/2 - 1 (0.663 mi.)***	***S83***	***100***
KAPIOLANI WOMEN'S & CHILDREN'S	***1319 PUNAHOU ST***	***NNE 1/2 - 1 (0.668 mi.)***	***84***	***106***
MCDONALD'S RESTAURANT SOIL & G	***2121 S KING ST***	***ENE 1/2 - 1 (0.670 mi.)***	***S85***	***108***
KOOLANI TOWER PROJECT	***1189 WAIMANU ST***	***WNW 1/2 - 1 (0.672 mi.)***	***T86***	***109***
CARTWRIGHT NEIGHBORHOOD PARK	KEEAUMOKU ST & MATLOCK	N 1/2 - 1 (0.696 mi.)	87	111
SCHUMAN CARRIAGE MOTORS, LTD.	***1234 S BERETANIA ST***	***NNW 1/2 - 1 (0.717 mi.)***	***88***	***111***
ROYAL GARDENS HOTEL DIESEL	***440 OLOHANA ST***	***SE 1/2 - 1 (0.723 mi.)***	***89***	***115***
KING KALAKAUA PLAZA	***2080 KALAKAUA AVE***	***SE 1/2 - 1 (0.724 mi.)***	***90***	***116***
RESERVE HOUSING TOWER SOIL CON	***1141 WAIMANU ST***	***WNW 1/2 - 1 (0.726 mi.)***	***T91***	***118***
SELF STORAGE 1	***438 KAMAKEE ST***	***WNW 1/2 - 1 (0.787 mi.)***	***92***	***119***
ALA WAI COVE CONDOMINIUM APART	***509 UNIVERSITY AVE***	***ESE 1/2 - 1 (0.820 mi.)***	***93***	***121***
JAS W GLOVER LTD	***1046 WAIMAMU ST***	***WNW 1/2 - 1 (0.839 mi.)***	***94***	***122***
1310 PENSACOLA STREET	1310 PENSACOLA ST	NNW 1/2 - 1 (0.872 mi.)	95	124
PACIFICA CONDOMINIUM	***1009 KAPIOLANI BLVD***	***WNW 1/2 - 1 (0.872 mi.)***	***96***	***125***
WAIKIKI BAZAAR	***2174 KALAKAUA AVE***	***SE 1/2 - 1 (0.896 mi.)***	***97***	***126***
HALE PUA NUI UST REMOVAL	***228 BEACH WALK***	***SSE 1/2 - 1 (0.901 mi.)***	***U98***	***127***
WAIKIKI BEACH WALK RESORT	***205 BEACH WALK AVE***	***SSE 1/2 - 1 (0.925 mi.)***	***U99***	***128***
IOLANI SCHOOL PETROLEUM ODOR	***563 KAMOKU ST***	***ESE 1/2 - 1 (0.945 mi.)***	***100***	***129***
HAWAII OPERA THEATER SETS & PR	***962 KAWAIAHAO ST***	***WNW 1/2 - 1 (0.986 mi.)***	***101***	***131***
SYMPHONY PARK	850 KAPIOLANI BLVD	WNW 1/2 - 1 (0.995 mi.)	102	132
PUNAHOU SCHOOL - BARWICK PLAYG	***1601 PUNAHOU ST***	***NNE 1/2 - 1 (0.999 mi.)***	***103***	***133***

State and tribal leaking storage tank lists

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

A review of the HI LUST list, as provided by EDR, and dated 06/30/2014 has revealed that there are 29

EXECUTIVE SUMMARY

HI LUST sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
C&CH PAWAA FIRE STATION Facility Status: Site Cleanup Completed (NFA)	1610 MAKALOA ST	NNE 0 - 1/8 (0.061 mi.)	3	9
NEW OFFICE LOUNGE Facility Status: Site Cleanup Completed (NFA)	***1551 KAPIOLANI BLVD***	***NW 0 - 1/8 (0.086 mi.)***	***A5***	***11***
FIRESTONE STORE Facility Status: Site Cleanup Completed with EHE/EHMP Facility Status: Site Cleanup Completed (NFA)	***801 KAHEKA ST***	***N 1/8 - 1/4 (0.130 mi.)***	***C8***	***14***
GAS 'N GLO INC Facility Status: Site Cleanup Completed (NFA)	***1670 MAKALOA ST***	***NE 1/8 - 1/4 (0.139 mi.)***	***D11***	***17***
ALOHA MOTORS Facility Status: Site Cleanup Completed (NFA)	***KAPIOLANI BLVD X KALAKA***	***ESE 1/8 - 1/4 (0.193 mi.)***	***I29***	***35***
THE WATERMARK WAIKIKI Facility Status: Confirmed Release	1551 ALA WAI BLVD	S 1/8 - 1/4 (0.201 mi.)	31	36
FUNAI'S UNION SERVICE L-5583 Facility Status: Site Cleanup Completed (NFA)	***1810 KAPIOLANI BLVD***	***E 1/8 - 1/4 (0.220 mi.)***	***I38***	***45***
LING BROTHERS, LTD. Facility Status: Site Cleanup Completed (NFA)	1819-E LIPEEPEE ST	SSE 1/8 - 1/4 (0.223 mi.)	J39	47
ALOHA MARINE Facility Status: Site Cleanup Completed (NFA)	***1651 ALA MOANA BLVD***	***SSW 1/8 - 1/4 (0.238 mi.)***	***K43***	***54***
SUPERBLOCK PROPERTIES Facility Status: Site Cleanup Completed (NFA)	***SOUTH BLOCK (BLDG S20)***	***NW 1/4 - 1/2 (0.302 mi.)***	***L47***	***57***
SUPERBLOCK PROPERTIES Facility Status: Site Cleanup Completed (NFA)	***NORTH BLOCK (BLDG N8) /***	***NW 1/4 - 1/2 (0.309 mi.)***	***L48***	***57***
CUTTER CHEVROLET Facility Status: Site Cleanup Completed (NFA)	***1391 KAPIOLANI BLVD***	***WNW 1/4 - 1/2 (0.328 mi.)***	***50***	***59***
SUPERBLOCK PROPERTIES Facility Status: Site Cleanup Completed (NFA)	***SOUTH BLOCK (BLDG S25)***	***NW 1/4 - 1/2 (0.337 mi.)***	***L51***	***60***
SEARS ROEBUCK & COMPANY 1158 Facility Status: Site Cleanup Completed (NFA)	***1450 ALA MOANA BLVD #10***	***WSW 1/4 - 1/2 (0.342 mi.)***	***M52***	***61***
SUPERBLOCK PROPERTIES Facility Status: Site Cleanup Completed (NFA)	***SOUTH BLOCK (BLDG S13)***	***NW 1/4 - 1/2 (0.364 mi.)***	***O54***	***63***
ILIKAI HOTEL Facility Status: Site Cleanup Completed (NFA)	***1777 ALA MOANA BLVD***	***S 1/4 - 1/2 (0.366 mi.)***	***55***	***64***
SUPERBLOCK PROPERTIES Facility Status: Site Cleanup Completed (NFA)	***NORTH BLOCK (BLDG N15)***	***NW 1/4 - 1/2 (0.373 mi.)***	***58***	***68***
SUPERBLOCK PROPERTIES Facility Status: Site Cleanup Completed (NFA)	***SOUTH BLOCK (BLDG S1) /***	***NW 1/4 - 1/2 (0.374 mi.)***	***O59***	***68***
WENS LIFE CO., INC Facility Status: Site Cleanup Completed (NFA)	***808 SHERIDAN ST***	***NNW 1/4 - 1/2 (0.393 mi.)***	***60***	***69***
DISCOVERY BAY Facility Status: Site Cleanup Completed (NFA)	***1778 ALA MOANA BLVD***	***S 1/4 - 1/2 (0.395 mi.)***	***N61***	***70***
TESORO 2GO 61018 Facility Status: LUST Cleanup Initiated	***1549 S KING ST***	***NNE 1/4 - 1/2 (0.407 mi.)***	***P63***	***71***
GAS PLUS Facility Status: Site Cleanup Completed (NFA)	***1524 S KING ST***	***NNE 1/4 - 1/2 (0.420 mi.)***	***Q64***	***76***
MID PAC PETROLEUM 253943 (PREV Facility Status: Site Cleanup Completed (NFA)	***1505 S. KING ST.***	***N 1/4 - 1/2 (0.422 mi.)***	***Q65***	***77***

EXECUTIVE SUMMARY

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
PUNAHOU REPAIR SHOP	***1558 S KING ST***	***NNE 1/4 - 1/2 (0.423 mi.)***	***P66***	***79***
Facility Status: Site Cleanup Completed (NFA)				
ALA MOANA UNOCAL	***1322 KAPIOLANI BLVD***	***WNW 1/4 - 1/2 (0.431 mi.)***	***67***	***80***
Facility Status: Site Cleanup Completed (NFA)				
YAJIMA OIL OF USA INC	***1375 S KING ST***	***N 1/4 - 1/2 (0.484 mi.)***	***70***	***83***
Facility Status: Site Cleanup Completed (NFA)				
ALOHA ALA MOANA	***451 PIIKOI ST***	***WNW 1/4 - 1/2 (0.486 mi.)***	***R71***	***85***
Facility Status: Site Cleanup Completed (NFA)				
NAURU PHOSPHATE ROYALTIES TRUS	404 PIIKOI ST/1330 ALA	WNW 1/4 - 1/2 (0.495 mi.)	R72	86
Facility Status: Site Cleanup Completed (NFA)				
CENPAC PROPERTIES - OFFICE BUI	***615 PIIKOI ST***	***WNW 1/4 - 1/2 (0.496 mi.)***	***73***	***86***
Facility Status: Site Cleanup Completed (NFA)				

State and tribal registered storage tank lists

HI UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the Department of Health's Listing of Underground Storage Tanks.

A review of the HI UST list, as provided by EDR, and dated 06/30/2014 has revealed that there are 8 HI UST sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
NEW OFFICE LOUNGE	***1551 KAPIOLANI BLVD***	***NW 0 - 1/8 (0.086 mi.)***	***A5***	***11***
FIRESTONE STORE	***801 KAHEKA ST***	***N 1/8 - 1/4 (0.130 mi.)***	***C8***	***14***
GAS 'N GLO INC	***1670 MAKALOA ST***	***NE 1/8 - 1/4 (0.139 mi.)***	***D11***	***17***
KALAKAUA TRANSMISSION INC.	1665 KALAKAUA AVE	NE 1/8 - 1/4 (0.159 mi.)	D18	24
ALOHA MOTORS	***KAPIOLANI BLVD X KALAKA***	***ESE 1/8 - 1/4 (0.193 mi.)***	***I29***	***35***
FUNAI'S UNION SERVICE L-5583	***1810 KAPIOLANI BLVD***	***E 1/8 - 1/4 (0.220 mi.)***	***I38***	***45***
ALOHA MARINE	***1651 ALA MOANA BLVD***	***SSW 1/8 - 1/4 (0.238 mi.)***	***K43***	***54***
MOANA PARK WASTEWATER PUMP STA	***1501 ALA MOANA BLVD***	***WSW 1/8 - 1/4 (0.245 mi.)***	***45***	***56***

State and tribal institutional control / engineering control registries

HI ENG CONTROLS: A listing of sites with engineering controls in place.

A review of the HI ENG CONTROLS list, as provided by EDR, and dated 01/04/2014 has revealed that there are 3 HI ENG CONTROLS sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
FORMER KALAKAUA TRANSMISSION I	***1665 KALAKAUA AVE***	***NE 1/8 - 1/4 (0.159 mi.)***	***D19***	***25***
YACHT HARBOR TOWERS	***1600 ALA MOANA BLVD***	***SSW 1/8 - 1/4 (0.164 mi.)***	***F22***	***28***
ALOHA/KING SELF STORAGE	***1414 KALAKAUA AVE***	***NNE 1/4 - 1/2 (0.470 mi.)***	***Q68***	***81***

Voluntary Remediation Program and Brownfields sites with institutional controls in place.

A review of the HI INST CONTROL list, as provided by EDR, and dated 01/04/2014 has revealed that there are 6 HI INST CONTROL sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
HECO SUBSTATION: MAKALOA SUBST	***1544 MAKALOA ST***	***NW 1/8 - 1/4 (0.144 mi.)***	***E12***	***18***
FORMER KALAKAUA TRANSMISSION I	***1665 KALAKAUA AVE***	***NE 1/8 - 1/4 (0.159 mi.)***	***D19***	***25***
YACHT HARBOR TOWERS	***1600 ALA MOANA BLVD***	***SSW 1/8 - 1/4 (0.164 mi.)***	***F22***	***28***
MOTOR SUPPLY	***726 SHERIDAN ST***	***NW 1/4 - 1/2 (0.372 mi.)***	***O56***	***65***
HAKUYOSHA HAWAII, INC	***730 SHERIDAN ST***	***NW 1/4 - 1/2 (0.372 mi.)***	***O57***	***66***
ALOHA/KING SELF STORAGE	***1414 KALAKAUA AVE***	***NNE 1/4 - 1/2 (0.470 mi.)***	***Q68***	***81***

State and tribal voluntary cleanup sites

HI VCP: Voluntary Response Program Sites.

A review of the HI VCP list, as provided by EDR, and dated 01/04/2014 has revealed that there is 1 HI VCP site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
ALOHA/KING SELF STORAGE	***1414 KALAKAUA AVE***	***NNE 1/4 - 1/2 (0.470 mi.)***	***Q68***	***81***

ADDITIONAL ENVIRONMENTAL RECORDS

Other Ascertainable Records

RCRA NonGen / NLR: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

A review of the RCRA NonGen / NLR list, as provided by EDR, and dated 03/11/2014 has revealed that there are 4 RCRA NonGen / NLR sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
I L W U LOCAL 142	451 ATKINSON DR	S 0 - 1/8 (0.048 mi.)	B2	8
B & S AUTOMOTIVE TECHNICIANS	***1789 KAPIOLANI***	***E 1/8 - 1/4 (0.188 mi.)***	***I28***	***34***
FUJI PHOTO FILM U S A INC	***1801 KALAKAUA AVE***	***E 1/8 - 1/4 (0.204 mi.)***	***I34***	***40***
UNOCAL 76 SS L 5583	***1818 KAPIOLANI BLVD***	***E 1/8 - 1/4 (0.231 mi.)***	***I40***	***47***

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EXECUTIVE SUMMARY

EDR US Hist Auto Stat: EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

A review of the EDR US Hist Auto Stat list, as provided by EDR, has revealed that there are 8 EDR US Hist Auto Stat sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
Not reported	801 KAHEKA ST	N 1/8 - 1/4 (0.130 mi.)	C6	12
Not reported	1735 KALAKAUA AVE	ENE 1/8 - 1/4 (0.157 mi.)	G16	24
Not reported	1712 KALAKAUA AVE	ENE 1/8 - 1/4 (0.158 mi.)	G17	24
Not reported	1665 KALAKAUA AVE	NE 1/8 - 1/4 (0.159 mi.)	D20	26
Not reported	1500 KAPIOLANI BLVD	NW 1/8 - 1/4 (0.168 mi.)	H23	29
Not reported	1750 KALAKAUA AVE	E 1/8 - 1/4 (0.169 mi.)	G25	30
Not reported	641 KEEAUMOKU ST	NW 1/8 - 1/4 (0.245 mi.)	44	56
Not reported	1830 KAPIOLANI BLVD	E 1/8 - 1/4 (0.246 mi.)	46	56

EDR US Hist Cleaners: EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

A review of the EDR US Hist Cleaners list, as provided by EDR, has revealed that there are 4 EDR US Hist Cleaners sites within approximately 0.25 miles of the target property.

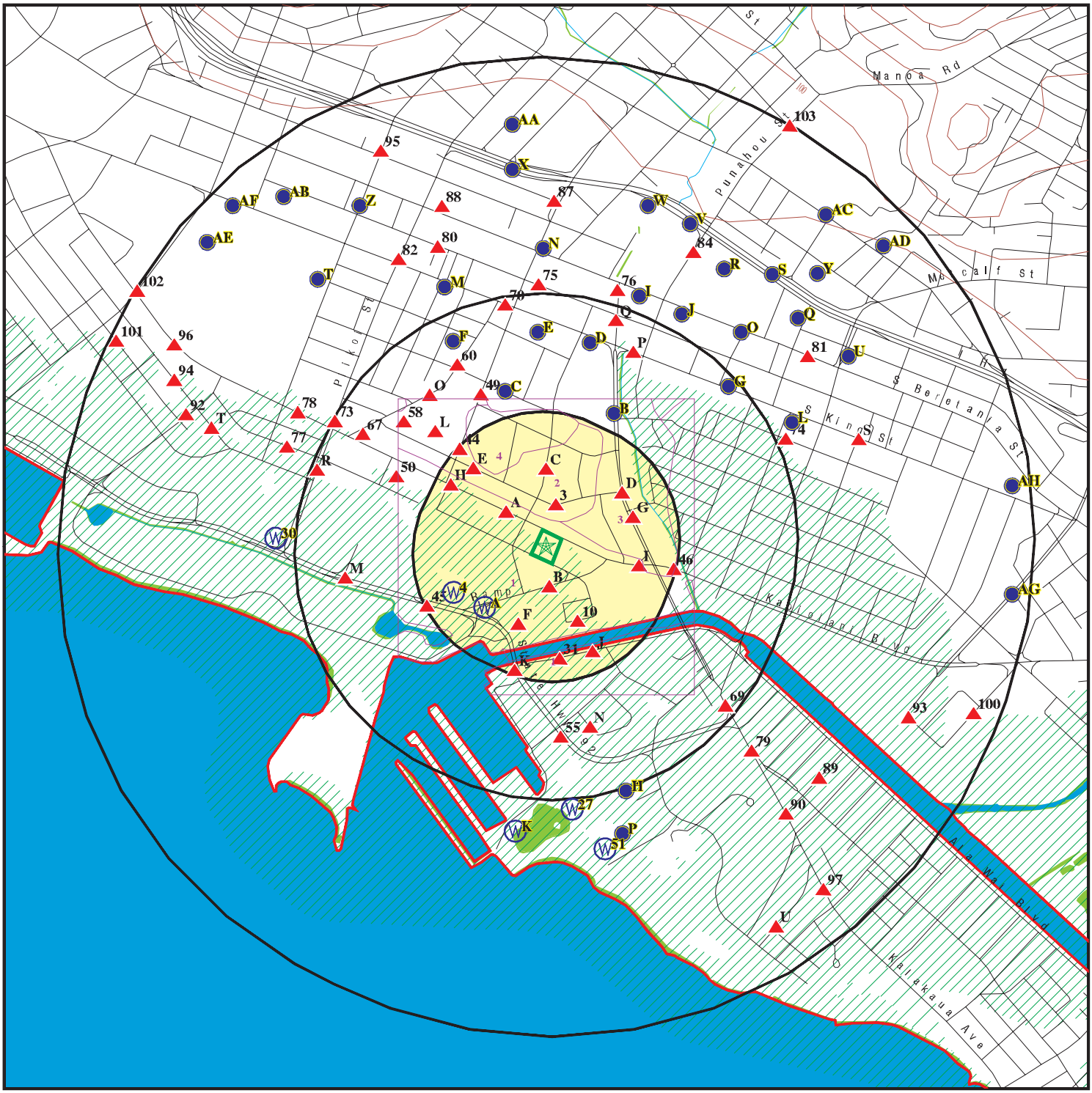
Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
Not reported	801 KAHEKA ST	N 1/8 - 1/4 (0.130 mi.)	C9	17
Not reported	1868 KAHAKAI DR	SSE 1/8 - 1/4 (0.132 mi.)	10	17
Not reported	1750 KALAKAUA AVE	E 1/8 - 1/4 (0.169 mi.)	G24	29
Not reported	1518 MAKALOA ST	NW 1/8 - 1/4 (0.197 mi.)	E30	36

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 20 records.

Site Name	Database(s)
CITIZENS ENERGY SERVICES PIER 38	HI SHWS, HI SPILLS, HI ENG CONTROLS, HI INST CONTROL
KAKAAKO MAKAI GATEWAY	HI SHWS
FORMER KAPALAMA MILITARY RESERVATI	HI SHWS
HAWAIIAN BITUMULS PAVING & PRECAST	HI SHWS
HAWAII BITUMULS & PAVING CO.	CERC-NFRAP
KEWALO BASIN HARBOR	RCRA NonGen / NLR, CA HAZNET
MRC ROOFING, LLC	FINDS
PACIFIC COMMERICIAL SERVICES, LLC	FINDS
PENDELTON FLOUR MILLS, LLC DBA HAW	FINDS
PACIFIC AVIATION MUSEUM PEARL HARB	FINDS
SUN PACIFIC SERVICES	FINDS
HORIZON LINES, LLC	FINDS
INSTITUTE OF PACIFIC ISLANDS	FINDS
PACIFIC HEIGHTS WSI, PART 1	FINDS
HORIZON LINES LLC	FINDS
PACIFIC SHIPYARDS INTERNATIONAL	FINDS
HONOLULU MARINE, LLC	FINDS
HORIZON LINES, LLC	FINDS
ALLIED PACIFIC COMPANY OF HAWAII	FINDS
NOAA PACIFIC REGIONAL CENTER FORD	FINDS

OVERVIEW MAP - 4046277.2s



Target Property

Sites at elevations higher than or equal to the target property

Sites at elevations lower than the target property

Manufactured Gas Plants

National Priority List Sites

Dept. Defense Sites

0 1/4 1/2 1 Miles

Indian Reservations BIA

County Boundary

Oil & Gas pipelines from USGS

100-year flood zone

500-year flood zone

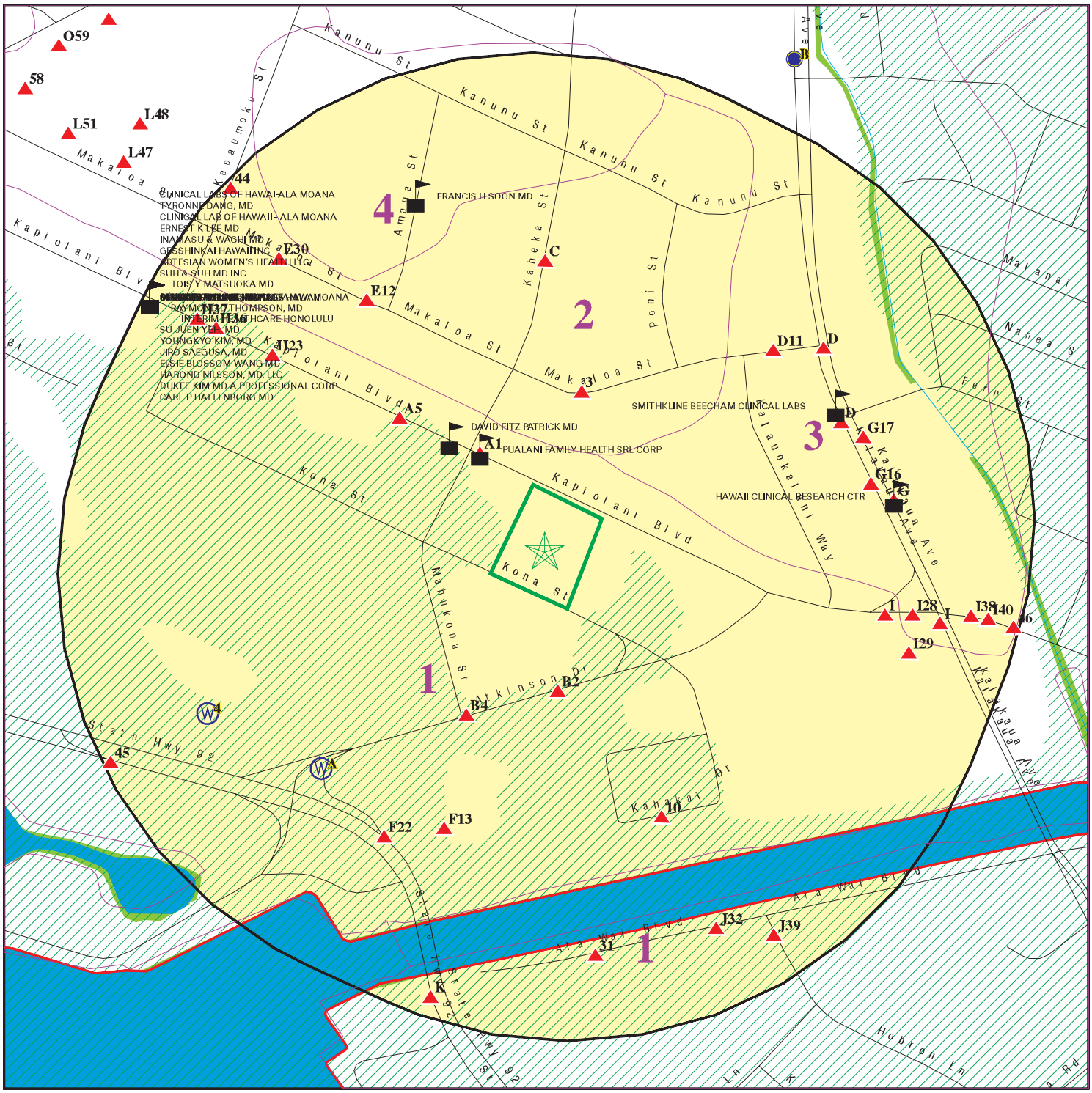
National Wetland Inventory

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

SITE NAME: Sam Koo Pacific, LLC	CLIENT: Central Planet Repair
ADDRESS: 1631 and 1637 Kapiolani Boulevard Honolulu HI 96814	CONTACT: Ned Murphy INQUIRY #: 4046277.2s
LAT/LONG: 21.2911 / 157.8392	DATE: August 25, 2014 1:47 pm

Copyright © 2014 EDR, Inc. © 2010 Tele Atlas Rel. 07/2009.

DETAIL MAP - 4046277.2s



Target Property

Sites at elevations higher than or equal to the target property

Sites at elevations lower than the target property

Manufactured Gas Plants

Sensitive Receptors

National Priority List Sites

Dept. Defense Sites

Indian Reservations BIA

County Boundary

Oil & Gas pipelines from USGS

100-year flood zone

500-year flood zone

National Wetland Inventory

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

SITE NAME: Sam Koo Pacific, LLC	CLIENT: Central Planet Repair
ADDRESS: 1631 and 1637 Kapiolani Boulevard Honolulu HI 96814	CONTACT: Ned Murphy
LAT/LONG: 21.2911 / 157.8392	INQUIRY #: 4046277.2s
	DATE: August 25, 2014 1:47 pm

Copyright © 2014 EDR, Inc. © 2010 Tele Atlas Rel. 07/2009.

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	TP		NR	NR	NR	NR	NR	0
Federal Delisted NPL site list								
Delisted NPL	1.000		0	0	0	0	NR	0
Federal CERCLIS list								
CERCLIS	0.500		0	0	0	NR	NR	0
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
Federal CERCLIS NFRAP site List								
CERC-NFRAP	0.500		0	1	0	NR	NR	1
Federal RCRA CORRACTS facilities list								
CORRACTS	1.000		0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		1	3	NR	NR	NR	4
RCRA-CESQG	0.250		1	6	NR	NR	NR	7
Federal institutional controls / engineering controls registries								
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROL	0.500		0	0	0	NR	NR	0
LUCIS	0.500		0	0	0	NR	NR	0
Federal ERNS list								
ERNS	TP		NR	NR	NR	NR	NR	0
State- and tribal - equivalent CERCLIS								
HI SHWS	1.000		1	8	9	30	NR	48
State and tribal landfill and/or solid waste disposal site lists								
HI SWF/LF	0.500		0	0	0	NR	NR	0
State and tribal leaking storage tank lists								
HI LUST	0.500		2	7	20	NR	NR	29
INDIAN LUST	0.500		0	0	0	NR	NR	0
State and tribal registered storage tank lists								
HI UST	0.250		1	7	NR	NR	NR	8

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
INDIAN UST	0.250		0	0	NR	NR	NR	0
FEMA UST	0.250		0	0	NR	NR	NR	0
State and tribal institutional control / engineering control registries								
HI ENG CONTROLS	0.500		0	2	1	NR	NR	3
HI INST CONTROL	0.500		0	3	3	NR	NR	6
State and tribal voluntary cleanup sites								
HI VCP	0.500		0	0	1	NR	NR	1
INDIAN VCP	0.500		0	0	0	NR	NR	0
State and tribal Brownfields sites								
HI BROWNFIELDS	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US CDL	TP		NR	NR	NR	NR	NR	0
HI CDL	TP		NR	NR	NR	NR	NR	0
US HIST CDL	TP		NR	NR	NR	NR	NR	0
Local Land Records								
LIENS 2	TP		NR	NR	NR	NR	NR	0
Records of Emergency Release Reports								
HMIRS	TP		NR	NR	NR	NR	NR	0
HI SPILLS	TP		NR	NR	NR	NR	NR	0
HI SPILLS 90	TP		NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		1	3	NR	NR	NR	4
DOT OPS	TP		NR	NR	NR	NR	NR	0
DOD	1.000		0	0	0	0	NR	0
FUDS	1.000		0	0	0	0	NR	0
CONSENT	1.000		0	0	0	0	NR	0
ROD	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
TRIS	TP		NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
TSCA	TP		NR	NR	NR	NR	NR	0
FTTS	TP		NR	NR	NR	NR	NR	0
HIST FTTS	TP		NR	NR	NR	NR	NR	0
SSTS	TP		NR	NR	NR	NR	NR	0
ICIS	TP		NR	NR	NR	NR	NR	0
PADS	TP		NR	NR	NR	NR	NR	0
MLTS	TP		NR	NR	NR	NR	NR	0
RADINFO	TP		NR	NR	NR	NR	NR	0
FINDS	TP		NR	NR	NR	NR	NR	0
RAATS	TP		NR	NR	NR	NR	NR	0
RMP	TP		NR	NR	NR	NR	NR	0
HI UIC	TP		NR	NR	NR	NR	NR	0
HI DRYCLEANERS	0.250		0	0	NR	NR	NR	0
CA HAZNET	TP		NR	NR	NR	NR	NR	0
HI AIRS	TP		NR	NR	NR	NR	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
HI Financial Assurance	TP		NR	NR	NR	NR	NR	0
EPA WATCH LIST	TP		NR	NR	NR	NR	NR	0
COAL ASH DOE	TP		NR	NR	NR	NR	NR	0
US FIN ASSUR	TP		NR	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	TP		NR	NR	NR	NR	NR	0
US AIRS	TP		NR	NR	NR	NR	NR	0
PRP	TP		NR	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
LEAD SMELTERS	TP		NR	NR	NR	NR	NR	0
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	1.000		0	0	0	0	NR	0
EDR US Hist Auto Stat	0.250		0	8	NR	NR	NR	8
EDR US Hist Cleaners	0.250		0	4	NR	NR	NR	4
EDR RECOVERED GOVERNMENT ARCHIVES								
Exclusive Recovered Govt. Archives								
HI RGA LF	TP		NR	NR	NR	NR	NR	0
HI RGA LUST	TP		NR	NR	NR	NR	NR	0
HI RGA HWS	TP		NR	NR	NR	NR	NR	0

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

A1 NW < 1/8 0.036 mi. 190 ft. | **PAN AM BLDG**
1600 KAPIOLANI BLVD
HONOLULU, HI 96814 | **RCRA-CESQG FINDS** | **1004688981 HIR000052431**

Site 1 of 2 in cluster A

Relative: Higher

Actual: 3 ft.

RCRA-CESQG:

Date form received by agency:	05/20/1999
Facility name:	PAN AM BLDG
Facility address:	1600 KAPIOLANI BLVD HONOLULU, HI 96814
EPA ID:	HIR000052431
Contact:	TIMOTHY RYCHLEC
Contact address:	1600 KAPIOLANI BLVD HONOLULU, HI 96814
Contact country:	US
Contact telephone:	(808) 944-8100
Contact email:	Not reported
EPA Region:	09
Classification:	Conditionally Exempt Small Quantity Generator
Description:	Handler: generates 100 kg or less of hazardous waste per calendar month, and accumulates 1000 kg or less of hazardous waste at any time; or generates 1 kg or less of acutely hazardous waste per calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste

Owner/Operator Summary:

Owner/operator name:	STATE TEACHERS RETIREMNT SYS
Owner/operator address:	1600 KAPIOLANI BLVD HONOLULU, HI 96814
Owner/operator country:	Not reported
Owner/operator telephone:	(808) 944-8100
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported

Handler Activities Summary:

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

PAN AM BLDG (Continued) **1004688981**

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

Violation Status: No violations found

FINDS:

Registry ID: 110005730389

Environmental Interest/Information System

NCDB (National Compliance Data Base) supports implementation of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and the Toxic Substances Control Act (TSCA). The system tracks inspections in regions and states with cooperative agreements, enforcement actions, and settlements.

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

STATE MASTER

B2 **I L W U LOCAL 142** **RCRA NonGen / NLR** **1012178202**
South **451 ATKINSON DR** **HIP000122101**
< 1/8 **HONOLULU, HI 96814**
0.048 mi.
252 ft. **Site 1 of 2 in cluster B**

Relative:
Higher

Actual:
3 ft.

RCRA NonGen / NLR:
Date form received by agency: 08/18/2009
Facility name: I L W U LOCAL 142
Facility address: 451 ATKINSON DR
HONOLULU, HI 968144796
EPA ID: HIP000122101
Contact: JAMES BAUCKHAM
Contact address: 451 ATKINSON DR
HONOLULU, HI 968144796
Contact country: US
Contact telephone: (808) 947-7233
Contact email: Not reported
EPA Region: 09
Classification: Non-Generator
Description: Handler: Non-Generators do not presently generate hazardous waste

Owner/Operator Summary:
Owner/operator name: I L W U MEMORIAL ASSOCIATION
Owner/operator address: 451 ATKINSON DR
HONOLULU, HI 96814
Owner/operator country: Not reported
Owner/operator telephone: (808) 949-4161
Legal status: Private
Owner/Operator Type: Owner

I L W U LOCAL 142 (Continued) **1012178202**

Owner/Op start date: Not reported
Owner/Op end date: Not reported

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

Historical Generators:
Date form received by agency: 06/14/2002
Site name: I L W U LOCAL 142
Classification: Small Quantity Generator

Violation Status: No violations found

---

3 NNE < 1/8 0.061 mi. 322 ft. | **C&CH PAWAA FIRE STATION** | **HI LUST** | **1006843337**
1610 MAKALOA ST | **N/A**
HONOLULU, HI 96814

Relative: Higher
Actual: 3 ft.

LUST:
Facility ID: 9-100087
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 01/06/1999
Release ID: 940137
Project Officer: Eric Sadoyama

B4 SSW < 1/8 0.080 mi. 422 ft. | **ALAMOANA HOTEL** | **RCRA-SQG FINDS** | **1001116172**
410 ATKINSON DR | **HIR000000992**
HONOLULU, HI 96814

Site 2 of 2 in cluster B

Relative: Higher
Actual: 3 ft.

RCRA-SQG:
Date form received by agency: 08/19/1996
Facility name: ALAMOANA HOTEL
Facility address: 410 ATKINSON DR
HONOLULU, HI 968144722
EPA ID: HIR000000992
Mailing address: ATKINSON DR
HONOLULU, HI 968144722
Contact: TODD SHERMAN
Contact address: 410 ATKINSON DR

ALAMOANA HOTEL (Continued) **1001116172**

HONOLULU, HI 968144722
Contact country: US
Contact telephone: (808) 955-4811
Contact email: Not reported
EPA Region: 09
Classification: Small Small Quantity Generator
Description: Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:
Owner/operator name: AZABU USA CORP
Owner/operator address: 410 ATKINSON DR
HONOLULU, HI 96814
Owner/operator country: Not reported
Owner/operator telephone: (808) 955-4811
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: Not reported
Owner/Op end date: Not reported

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

Violation Status: No violations found

FINDS:

Registry ID: 110046200366

Environmental Interest/Information System
STATE MASTER

Registry ID: 110005729694

Environmental Interest/Information System
NCDB (National Compliance Data Base) supports implementation of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and the Toxic Substances Control Act (TSCA). The system tracks inspections in regions and states with cooperative agreements, enforcement actions, and settlements.

ALAMOANA HOTEL (Continued) **1001116172**

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

STATE MASTER

A5 **NEW OFFICE LOUNGE** **HI SHWS** **1006843573**
NW **1551 KAPIOLANI BLVD** **HI LUST** **N/A**
< 1/8 **HONOLULU, HI 96814** **HI UST**
0.086 mi.
456 ft. **Site 2 of 2 in cluster A**

Relative:
Higher

Actual:
3 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Oahu
Environmental Interest:	New Office Lounge
HID Number:	Not reported
Facility Registry Identifier:	110013783469
Lead Agency:	SHWB
Program:	State
Project Manager:	Mark Sutterfield
Hazard Priority:	Medium
Potential Hazards And Controls:	No Hazard
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	New Office Lounge
HID Number:	Not reported
Facility Registry Identifier:	110013783469
Lead Agency:	SHWB
Progran Name:	State
Potential Hazard And Controls:	No Hazard
Priority:	Medium
Assessment:	Response Not Necessary
Response:	Not reported
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Not reported
Use Restrictions:	No Hazard Present for Unrestricted Residential Use
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Action Letter
Document Date:	10/26/2004
Document Number:	Not reported
Document Subject:	Not reported
Project Manager:	Mark Sutterfield
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

LUST:

Facility ID:	9-103517
Facility Status:	Site Cleanup Completed (NFA)

NEW OFFICE LOUNGE (Continued) **1006843573**

Facility Status Date: 03/10/2008
Release ID: 060012
Project Officer: Shunsheng Fu

Facility ID: 9-103517
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 03/10/2008
Release ID: 060033
Project Officer: Shunsheng Fu

UST:
Facility ID: 9-103517
Owner: CEC HAWAII INC
Owner Address: 1517 kapiolani blvD, SUITE 201
Ownder City,St,Zip: Honolulu, 96814 96814

Tank ID: r-1
Date Installed: Not reported
Tank Status: Permanently out of Use
Date Closed: 01/15/2006
Tank Capacity: 1100
Substance: Gasoline

Tank ID: r-2
Date Installed: Not reported
Tank Status: Permanently out of Use
Date Closed: 01/15/2006
Tank Capacity: 1100
Substance: Gasoline

Tank ID: r-3
Date Installed: Not reported
Tank Status: Permanently out of Use
Date Closed: 01/15/2006
Tank Capacity: 420
Substance: Gasoline

C6 **EDR US Hist Auto Stat** **1015638698**
North **801 KAHEKA ST** **N/A**
1/8-1/4 **HONOLULU, HI 96814**
0.130 mi.
686 ft. **Site 1 of 4 in cluster C**

Relative:
Higher

Actual:
3 ft.

EDR Historical Auto Stations:
Name: HOLIDAY ACTION GAS INCORPORATED STATIONS
Year: 1999
Address: 801 KAHEKA ST

Name: HOLIDAY ACTION GAS INC
Year: 2001
Address: 801 KAHEKA ST

C7 North 1/8-1/4 0.130 mi. 686 ft. | **HOLIDAY ACTION GAS**
801 KAHEKA ST
HONOLULU, HI 96814 | **RCRA-SQG** | **1000223098**
HID981577265

Site 2 of 4 in cluster C

Relative: Higher

Actual: 3 ft.

RCRA-SQG:

Date form received by agency:	11/16/1995
Facility name:	HOLIDAY ACTION GAS
Facility address:	801 KAHEKA ST HONOLULU, HI 96814
EPA ID:	HID981577265
Mailing address:	KAPIOLANI HONOLULU, HI 96814
Contact:	CHE HWAN CHANG
Contact address:	1517 KAPIOLANI HONOLULU, HI 96814
Contact country:	US
Contact telephone:	(808) 973-6688
Contact email:	Not reported
EPA Region:	09
Classification:	Small Small Quantity Generator
Description:	Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:

Owner/operator name:	DAIEI USA INC
Owner/operator address:	801 KAHEKA ST HONOLULU, HI 96814
Owner/operator country:	Not reported
Owner/operator telephone:	(808) 973-6688
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported
Owner/operator name:	NOT REQUIRED
Owner/operator address:	NOT REQUIRED NOT REQUIRED, ME 99999
Owner/operator country:	Not reported
Owner/operator telephone:	(415) 555-1212
Legal status:	Private
Owner/Operator Type:	Operator
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported

Handler Activities Summary:

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

HOLIDAY ACTION GAS (Continued) **1000223098**

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

Violation Status: No violations found

C8 North 1/8-1/4 0.130 mi. 686 ft. | **FIRESTONE STORE** | **HI LUST** | **U001235963**
801 KAHEKA ST | **HI UST** | **N/A**
HONOLULU, HI 96814 | **HI Financial Assurance**

Site 3 of 4 in cluster C

Relative: Higher

Actual: 3 ft.

LUST:

Facility ID: 9-102591
Facility Status: Site Cleanup Completed with EHE/EHMP
Facility Status Date: 09/28/2010
Release ID: 970086
Project Officer: Shaobin Li

Facility ID: 9-102591
Facility Status: Site Cleanup Completed with EHE/EHMP
Facility Status Date: 09/28/2010
Release ID: 980048
Project Officer: Shaobin Li

Facility ID: 9-102403
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 10/21/1996
Release ID: 920148
Project Officer: Janet Sherrer

UST:

Facility ID: 9-102591
Owner: HOLIDAY ACTION GAS INC.
Owner Address: 801 KAHEKA ST
Ownder City,St,Zip: Honolulu, 96814 96814

Tank ID: R-1
Date Installed: 01/01/1984
Tank Status: Permanently Out of Use
Date Closed: 02/01/1999
Tank Capacity: 10000
Substance: Gasoline

Tank ID: R-1
Date Installed: Not reported
Tank Status: Permanently Out of Use
Date Closed: 03/23/1992
Tank Capacity: 550
Substance: Used Oil

Tank ID: R-2

FIRESTONE STORE (Continued) **U001235963**

Date Installed: 01/01/1984
Tank Status: Permanently Out of Use
Date Closed: 02/01/1999
Tank Capacity: 10000
Substance: Gasoline

Tank ID: R-3
Date Installed: 01/01/1978
Tank Status: Permanently Out of Use
Date Closed: 02/01/1999
Tank Capacity: 4000
Substance: Diesel

Tank ID: R-4
Date Installed: 01/01/1978
Tank Status: Permanently Out of Use
Date Closed: 02/01/1999
Tank Capacity: 4000
Substance: Gasoline

Tank ID: R-5
Date Installed: 01/01/1978
Tank Status: Permanently Out of Use
Date Closed: 02/01/1999
Tank Capacity: 4000
Substance: Gasoline

Tank ID: R-6
Date Installed: Not reported
Tank Status: Permanently Out of Use
Date Closed: 02/01/1999
Tank Capacity: 4000
Substance: Gasoline

Tank ID: R-7
Date Installed: Not reported
Tank Status: Permanently Out of Use
Date Closed: 02/01/1999
Tank Capacity: 4000
Substance: Gasoline

Tank ID: R-8
Date Installed: Not reported
Tank Status: Permanently Out of Use
Date Closed: 02/01/1999
Tank Capacity: 4000
Substance: Gasoline

HI Financial Assurance:
Alt Facility ID: 9-102403
Tank Id: R-1

FIRESTONE STORE (Continued) **U001235963**

Tank Status: Permanently Out of Use
FRTYPE: Other
Expiration Date: Not reported

Alt Facility ID: 9-102403
Tank Id: R-1
Tank Status: Permanently Out of Use
FRTYPE: Self Insured
Expiration Date: Not reported

Alt Facility ID: 9-102591
Tank Id: R-1
Tank Status: Permanently Out of Use
FRTYPE: Insurance
Expiration Date: Not reported

Alt Facility ID: 9-102591
Tank Id: R-8
Tank Status: Permanently Out of Use
FRTYPE: Insurance
Expiration Date: Not reported

Alt Facility ID: 9-102591
Tank Id: R-7
Tank Status: Permanently Out of Use
FRTYPE: Insurance
Expiration Date: Not reported

Alt Facility ID: 9-102591
Tank Id: R-6
Tank Status: Permanently Out of Use
FRTYPE: Insurance
Expiration Date: Not reported

Alt Facility ID: 9-102591
Tank Id: R-5
Tank Status: Permanently Out of Use
FRTYPE: Insurance
Expiration Date: Not reported

Alt Facility ID: 9-102591
Tank Id: R-4
Tank Status: Permanently Out of Use
FRTYPE: Insurance
Expiration Date: Not reported

Alt Facility ID: 9-102591
Tank Id: R-2
Tank Status: Permanently Out of Use
FRTYPE: Insurance
Expiration Date: Not reported

Alt Facility ID: 9-102591
Tank Id: R-3
Tank Status: Permanently Out of Use
FRTYPE: Insurance
Expiration Date: Not reported

C9
North
1/8-1/4
0.130 mi.
686 ft.

801 KAHEKA ST
HONOLULU, HI 96814

Site 4 of 4 in cluster C

EDR US Hist Cleaners **1015096937**
N/A

Relative:
Higher

Actual:
3 ft.

EDR Historical Cleaners:
Name: HOLIDAY MART LAUNDROMAT
Year: 1999
Address: 801 KAHEKA ST

10
SSE
1/8-1/4
0.132 mi.
696 ft.

1868 KAHAKAI DR
HONOLULU, HI 96814

EDR US Hist Cleaners **1015008556**
N/A

Relative:
Higher

Actual:
3 ft.

EDR Historical Cleaners:
Name: SOUTH BAY CARPET & UPHOLSTERY CLEANING
Year: 1999
Address: 1868 KAHAKAI DR

D11
NE
1/8-1/4
0.139 mi.
734 ft.

GAS 'N GLO INC
1670 MAKALOA ST
HONOLULU, HI 96814

Site 1 of 7 in cluster D

HI LUST **U001235256**
HI UST **N/A**

Relative:
Higher

Actual:
3 ft.

LUST:
Facility ID: 9-100834
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 07/22/1998
Release ID: 980097
Project Officer: Lene Ichinotsubo

UST:
Facility ID: 9-100834
Owner: GAS 'N GLO INC
Owner Address: Not reported
Ownder City,St,Zip: Honolulu, 96814 96814

Tank ID: R-1
Date Installed: 04/03/1983
Tank Status: Permanently Out of Use
Date Closed: 05/20/1998
Tank Capacity: 10000
Substance: Gasoline

Tank ID: R-2
Date Installed: 04/03/1983
Tank Status: Permanently Out of Use
Date Closed: 05/20/1998
Tank Capacity: 10000
Substance: Gasoline

Tank ID: R-3

GAS 'N GLO INC (Continued) **U001235256**

Date Installed: 04/03/1983
Tank Status: Permanently Out of Use
Date Closed: 05/20/1998
Tank Capacity: 10000
Substance: Gasoline

Tank ID: R-4
Date Installed: 04/03/1983
Tank Status: Permanently Out of Use
Date Closed: 05/20/1998
Tank Capacity: 5000
Substance: Gasoline

Tank ID: R-5
Date Installed: 04/03/1983
Tank Status: Permanently Out of Use
Date Closed: 05/20/1998
Tank Capacity: 5000
Substance: Diesel

E12 **HECO SUBSTATION: MAKALOA SUBSTATION** **HI SHWS** **S106817457**
NW **1544 MAKALOA ST** **HI SPILLS** **N/A**
1/8-1/4 **HONOLULU, HI 96814** **HI INST CONTROL**
0.144 mi.
760 ft. **Site 1 of 2 in cluster E**

Relative:
Higher

Actual:
3 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Oahu
Environmental Interest:	HECO Makaloa Substation
HID Number:	Not reported
Facility Registry Identifier:	110013790237
Lead Agency:	HEER
Program:	State
Project Manager:	Laura Young
Hazard Priority:	Low
Potential Hazards And Controls:	Hazard Managed With Controls
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	HECO Makaloa Substation
HID Number:	Not reported
Facility Registry Identifier:	110013790237
Lead Agency:	HEER
Progran Name:	State
Potential Hazard And Controls:	Hazard Managed With Controls
Priority:	Low
Assessment:	Response Necessary
Response:	Response Complete
Nature of Contamination:	Found: COCs below DOH EALs, except arsenic in soil (20.7 mg/kg in one sample)
Nature of Residual Contamination:	Soil below the pad should be investigated if the pad is ever removed or damaged. Contaminants of concern include TPH as diesel and/or transformer oil, and possible PCB.
Use Restrictions:	Controls Required to Manage Contamination

HECO SUBSTATION: MAKALOA SUBSTATION (Continued) **S106817457**

Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Government - Hawaii Dept. of Health Letter Issued
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action Letter - Restricted Use
Document Date:	03/06/2007
Document Number:	2007-109-LY
Document Subject:	No Further Action Determination
Project Manager:	Laura Young
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

HI SPILLS:

Island:	Oahu
Supplemental Loc. Text:	Not reported
Case Number:	20020815-1119
HID Number:	Not reported
Facility Registry Id:	110013790237
Lead and Program:	HEER EP&R
ER:	Site Visit
Units:	HECO Transformer 21707
Substances:	Shell Diala Oil
Less Or Greater Than:	>
Numerical Quantity:	25
Units:	Gallons
Activity Type:	Response
Activity Lead:	Terry Corpus
Assignment End Date:	Not reported
Result:	SOSC NFA
File Under:	Hawaiian Electric Co., Inc. (HECO)

Island:	Oahu
Supplemental Loc. Text:	Not reported
Case Number:	20110620-1451
HID Number:	Not reported
Facility Registry Id:	110013790237
Lead and Program:	HEER EP&R
ER:	None
Units:	HECO substation transformer #18639 release
Substances:	Transformer Oil
Less Or Greater Than:	>
Numerical Quantity:	5
Units:	Gallons
Activity Type:	Response
Activity Lead:	Curtis Martin
Assignment End Date:	Not reported
Result:	Not reported
File Under:	Hawaiian Electric Co., Inc. (HECO)

INST CONTROL:

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

F13 SSW 1/8-1/4 0.145 mi. 765 ft. | **AOAO YACHT HARBOR TOWERS** | **RCRA-CESQG** | **1004688961**
1600_1650 ALA MOANA BLVD | **HIR000037002**
HONOLULU, HI 96815

Site 1 of 2 in cluster F

Relative: Higher

Actual: 3 ft.

RCRA-CESQG:

Date form received by agency:	03/09/1998
Facility name:	AOAO YACHT HARBOR TOWERS
Facility address:	1600_1650 ALA MOANA BLVD HONOLULU, HI 96815
EPA ID:	HIR000037002
Mailing address:	1600 1650 ALA MOANA BLVD HONOLULU, HI 96815
Contact:	SCOTT LUONGO
Contact address:	1600 1650 ALA MOANA BLVD HONOLULU, HI 96815
Contact country:	US
Contact telephone:	(808) 942-5712
Contact email:	Not reported
EPA Region:	09
Classification:	Conditionally Exempt Small Quantity Generator
Description:	Handler: generates 100 kg or less of hazardous waste per calendar month, and accumulates 1000 kg or less of hazardous waste at any time; or generates 1 kg or less of acutely hazardous waste per calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste

Owner/Operator Summary:

Owner/operator name:	AOAO YACHT HARBOR TOWERS
Owner/operator address:	1600 1650 ALA MOANA BLVD HONOLULU, HI 96815
Owner/operator country:	Not reported
Owner/operator telephone:	(808) 947-1855
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported

Handler Activities Summary:

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

AOAO YACHT HARBOR TOWERS (Continued) **1004688961**

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

Hazardous Waste Summary:

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: F001
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE, TRICHLOROETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE, AND CHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Violation Status: No violations found

D14 **ROGER'S REPAIR INC** **HI SHWS** **S106820247**
ENE **1687 KALAKAUA AVE** **N/A**
1/8-1/4 **HONOLULU, HI 96826**
0.149 mi.
788 ft. **Site 2 of 7 in cluster D**

Relative:
Higher

Actual:
3 ft.

SHWS:
Organization: Not reported
Supplemental Location: Not reported
Island: Oahu
Environmental Interest: Roger's Repair Inc
HID Number: Not reported
Facility Registry Identifier: 110005723903
Lead Agency: Not reported
Program: State
Project Manager: Laura Young
Hazard Priority: NFA

ROGER'S REPAIR INC (Continued) **S106820247**

Potential Hazards And Controls:	Hazard Undetermined
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	Roger's Repair Inc
HID Number:	Not reported
Facility Registry Identifier:	110005723903
Lead Agency:	Not reported
Progran Name:	State
Potential Hazard And Controls:	Hazard Undetermined
Priority:	NFA
Assessment:	Assessment Ongoing
Response:	Not reported
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Not reported
Use Restrictions:	Undetermined
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action - Type Undetermined
Document Date:	06/04/1999
Document Number:	Not reported
Document Subject:	Not reported
Project Manager:	Laura Young
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

D15 **ROGERS REPAIR INC** **RCRA-CESQG** **1000742297**
ENE **1687 KALAKAUA AVE** **FINDS** **HID981615222**
1/8-1/4 **HONOLULU, HI 96826**
0.149 mi.
788 ft. **Site 3 of 7 in cluster D**

Relative:
Higher

Actual:
3 ft.

RCRA-CESQG:

Date form received by agency:	07/19/1993
Facility name:	ROGERS REPAIR INC
Facility address:	1687 KALAKAUA AVE HONOLULU, HI 96826
EPA ID:	HID981615222
Contact:	ROGER NISHIMURA
Contact address:	1687 KALAKAUA AVE HONOLULU, HI 96826
Contact country:	US
Contact telephone:	(808) 949-4137
Contact email:	Not reported
EPA Region:	09
Land type:	Other land type
Classification:	Conditionally Exempt Small Quantity Generator
Description:	Handler: generates 100 kg or less of hazardous waste per calendar month, and accumulates 1000 kg or less of hazardous waste at any time; or generates 1 kg or less of acutely hazardous waste per calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates at any

ROGERS REPAIR INC (Continued) **1000742297**

time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste

Owner/Operator Summary:

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

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

Handler Activities Summary:

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

Violation Status: No violations found

Evaluation Action Summary:

Evaluation date:	01/13/1997
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	State

FINDS:

Registry ID: 110005723903

ROGERS REPAIR INC (Continued) **1000742297**

Environmental Interest/Information System

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

STATE MASTER

G16 **EDR US Hist Auto Stat** **1015271300**
ENE **1735 KALAKAUA AVE** **N/A**
1/8-1/4 **HONOLULU, HI 96826**
0.157 mi.
828 ft. **Site 1 of 4 in cluster G**

Relative:
Higher

Actual:
3 ft.

EDR Historical Auto Stations:

Name:	GAS STATION TRADING POST
Year:	2001
Address:	1735 KALAKAUA AVE

G17 **EDR US Hist Auto Stat** **1015268165**
ENE **1712 KALAKAUA AVE** **N/A**
1/8-1/4 **HONOLULU, HI 96826**
0.158 mi.
836 ft. **Site 2 of 4 in cluster G**

Relative:
Higher

Actual:
3 ft.

EDR Historical Auto Stations:

Name:	ON SITE AUTO REPAIR SVC
Year:	2010
Address:	1712 KALAKAUA AVE

D18 **KALAKAUA TRANSMISSION INC.** **HI UST** **1000147228**
NE **1665 KALAKAUA AVE** **N/A**
1/8-1/4 **HONOLULU, HI 96826**
0.159 mi.
840 ft. **Site 4 of 7 in cluster D**

Relative:
Higher

Actual:
3 ft.

UST:

Facility ID:	9-100763
Owner:	IMAI BROTHERS ENTERPRISES
Owner Address:	2433 PUUNUI ST
Ownder City,St,Zip:	Honolulu, 96826 96826
Tank ID:	R-001
Date Installed:	07/26/1951
Tank Status:	**Permanently Out of Use**
Date Closed:	12/01/1989
Tank Capacity:	500
Substance:	Used Oil
Tank ID:	R-002
Date Installed:	07/26/1951

KALAKAUA TRANSMISSION INC. (Continued) **1000147228**

Tank Status:	**Permanently Out of Use**
Date Closed:	12/01/1989
Tank Capacity:	500
Substance:	Used Oil

D19 **FORMER KALAKAUA TRANSMISSION INC** **HI SHWS** **S106817112**
NE **1665 KALAKAUA AVE** **HI ENG CONTROLS** **N/A**
1/8-1/4 **HONOLULU, HI 96826** **HI INST CONTROL**
0.159 mi.
840 ft. **Site 5 of 7 in cluster D**

Relative:
Higher

Actual:
3 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Oahu
Environmental Interest:	Former Kalakaua Transmission Inc
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	Not reported
Program:	State
Project Manager:	Diane England
Hazard Priority:	NFA
Potential Hazards And Controls:	Hazard Managed With Controls
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	Former Kalakaua Transmission Inc
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	Not reported
Progran Name:	State
Potential Hazard And Controls:	Hazard Managed With Controls
Priority:	NFA
Assessment:	Assessment Ongoing
Response:	Not reported
Nature of Contamination:	Found: Petroleum and soil in groundwater.
Nature of Residual Contamination:	Not reported
Use Restrictions:	Controls Required to Manage Contamination
Engineering Control:	Engineering Control Required
Description of Restrictions:	(Concrete Cap) Building foundation must remain in place. If the foundation is disturbed/removed, additional soil and groundwater characterization must be conducted and appropriate remedial measures employed.
Institutional Control:	Government - Hawaii Dept. of Health Letter Issued
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action Letter - Restricted Use
Document Date:	03/28/2006
Document Number:	2006-1850-DE
Document Subject:	No Further Action Determination for Oil-Range Hydrocarbons in Soil and Groundwater
Project Manager:	Diane England
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

ENG CONTROLS:

Supplemental Location Text:	Not reported
Zip Suffix:	Not reported
Island:	Oahu

FORMER KALAKAUA TRANSMISSION INC (Continued) **S106817112**

Potential Hazards And Controls: Hazard Managed With Controls
Engineering Control: Engineering Control Required

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

---

D20 **EDR US Hist Auto Stat** **1015261837**
NE **1665 KALAKAUA AVE** **N/A**
1/8-1/4 **HONOLULU, HI 96826**
0.159 mi.
840 ft. **Site 6 of 7 in cluster D**

Relative:
Higher

Actual:
3 ft.

EDR Historical Auto Stations:
Name: KALAKAUA TRANSMISSION INC
Year: 2001
Address: 1665 KALAKAUA AVE

Name: KALAKAUA TRANSMISSION INC
Year: 2002
Address: 1665 KALAKAUA AVE

D21 **KALAKUA TRANSMISSION INC** **RCRA-CESQG** **1004688784**
NE **1665 KALAKUA AVE** **FINDS** **HID981637564**
1/8-1/4 **HONOLULU, HI 96826**
0.162 mi.
855 ft. **Site 7 of 7 in cluster D**

Relative:
Higher

Actual:
3 ft.

RCRA-CESQG:
Date form received by agency: 07/21/1993
Facility name: KALAKUA TRANSMISSION INC
Facility address: 1665 KALAKUA AVE
HONOLULU, HI 96826
EPA ID: HID981637564
Mailing address: KALAKUA AVE
HONOLULU, HI 96826
Contact: URAGO ISAO
Contact address: 1665 KALAKUA AVE
HONOLULU, HI 96826
Contact country: US
Contact telephone: (808) 941-9188
Contact email: Not reported
EPA Region: 09
Classification: Conditionally Exempt Small Quantity Generator
Description: Handler: generates 100 kg or less of hazardous waste per calendar month, and accumulates 1000 kg or less of hazardous waste at any time; or generates 1 kg or less of acutely hazardous waste per calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely

KALAKUA TRANSMISSION INC (Continued) **1004688784**

hazardous waste during any calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste

Owner/Operator Summary:

Owner/operator name:	IMAI BROS ENTERPRISE
Owner/operator address:	NOT REQUIRED NOT REQUIRED, ME 99999
Owner/operator country:	Not reported
Owner/operator telephone:	(415) 555-1212
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported

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

Handler Activities Summary:

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

Violation Status: No violations found

FINDS:

Registry ID: 110005724190

Environmental Interest/Information System

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

F22 SSW 1/8-1/4 0.164 mi. 864 ft. | **YACHT HARBOR TOWERS 1600 ALA MOANA BLVD HONOLULU, HI 96815** | **HI SHWS HI SPILLS HI ENG CONTROLS HI INST CONTROL** | **S106821166 N/A**

Site 2 of 2 in cluster F

Relative: Higher

Actual: 3 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Yacht Harbor Towers
Island:	Oahu
Environmental Interest:	Yacht Harbor Towers Generator
HID Number:	Not reported
Facility Registry Identifier:	110013774629
Lead Agency:	HEER
Program:	State
Project Manager:	Anna Fernandez
Hazard Priority:	NFA
Potential Hazards And Controls:	Hazard Managed With Controls
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Yacht Harbor Towers
SDAR Environmental Interest Name:	Yacht Harbor Towers Generator
HID Number:	Not reported
Facility Registry Identifier:	110013774629
Lead Agency:	HEER
Progran Name:	State
Potential Hazard And Controls:	Hazard Managed With Controls
Priority:	NFA
Assessment:	Response Necessary
Response:	Response Complete
Nature of Contamination:	Found: TPH-d
Nature of Residual Contamination:	Soil exceeding Tier 1 levels near the generator.
Use Restrictions:	Controls Required to Manage Contamination
Engineering Control:	Engineering Control Required
Description of Restrictions:	The No Further Action with Institutional Controls determination is in effect only as long as the generator and associated concrete pad remain in place. When they are removed, appropriate response action will be required.
Institutional Control:	Government - Hawaii Dept. of Health Letter Issued
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action Letter - Restricted Use
Document Date:	01/08/2009
Document Number:	2009-009-SPM
Document Subject:	No Further Action (NFA) with Institutional Controls Determination, for the Yacht Harbor Towers Gener
Project Manager:	Anna Fernandez
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

HI SPILLS:

Island:	Oahu
Supplemental Loc. Text:	Yacht Harbor Towers
Case Number:	19990301-1550
HID Number:	Not reported
Facility Registry Id:	110013774629
Lead and Program:	HEER EP&R
ER:	Referred
Units:	Yacht Harbor Tower Generator
Substances:	Unknown
Less Or Greater Than:	Not reported

YACHT HARBOR TOWERS (Continued) **S106821166**

Numerical Quantity: 60
Units: Gallons
Activity Type: Response
Activity Lead: Mike Cripps
Assignment End Date: Not reported
Result: Refer to ISST
File Under: Yacht Harbor Towers

ENG CONTROLS:
Supplemental Location Text: Yacht Harbor Towers
Zip Suffix: Not reported
Island: Oahu
Potential Hazards And Controls: Hazard Managed With Controls
Engineering Control: Engineering Control Required

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

---

H23 **EDR US Hist Auto Stat** **1015237305**
NW **1500 KAPIOLANI BLVD** **N/A**
1/8-1/4 **HONOLULU, HI 96814**
0.168 mi.
888 ft. **Site 1 of 3 in cluster H**

Relative:
Higher

Actual:
3 ft.

EDR Historical Auto Stations:
Name: AAMCO TRANSMISSIONS
Year: 2007
Address: 1500 KAPIOLANI BLVD

G24 **EDR US Hist Cleaners** **1015005226**
East **1750 KALAKAUA AVE** **N/A**
1/8-1/4 **HONOLULU, HI 96826**
0.169 mi.
893 ft. **Site 3 of 4 in cluster G**

Relative:
Higher

Actual:
3 ft.

EDR Historical Cleaners:
Name: STEFANS CARPET CLEANING
Year: 2002
Address: 1750 KALAKAUA AVE

Name: STEFANS CARPET CLEANING
Year: 2003
Address: 1750 KALAKAUA AVE

Name: STEFANS CARPET CLEANING
Year: 2004
Address: 1750 KALAKAUA AVE

Name: STEFANS CARPET CLEANING
Year: 2005
Address: 1750 KALAKAUA AVE

(Continued) **1015005226**

Name: STEFANS CARPET CLEANING
Year: 2006
Address: 1750 KALAKAUA AVE

G25 **EDR US Hist Auto Stat** **1015273014**
East **1750 KALAKAUA AVE** **N/A**
1/8-1/4 **HONOLULU, HI 96826**
0.169 mi.
893 ft. **Site 4 of 4 in cluster G**

Relative:
Higher

Actual:
3 ft.

EDR Historical Auto Stations:
Name: ALOHA MOBILE AUTO GLASS
Year: 2012
Address: 1750 KALAKAUA AVE

I26 **ALOHA MOTORS 1777 KAPIOLANI BLVD** **HI SHWS** **1006820308**
East **1777 KAPIOLANI BLVD** **HI SPILLS** **N/A**
1/8-1/4 **HONOLULU, HI 96813**
0.173 mi.
912 ft. **Site 1 of 9 in cluster I**

Relative:
Higher

Actual:
3 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Oahu
Environmental Interest:	Aloha Motors
HID Number:	HID984466060
Facility Registry Identifier:	110013782479
Lead Agency:	Not reported
Program:	State
Project Manager:	Unassigned
Hazard Priority:	NFA
Potential Hazards And Controls:	Hazard Undetermined
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	Aloha Motors
HID Number:	HID984466060
Facility Registry Identifier:	110013782479
Lead Agency:	Not reported
Progran Name:	State
Potential Hazard And Controls:	Hazard Undetermined
Priority:	NFA
Assessment:	Assessment Ongoing
Response:	Not reported
Nature of Contamination:	Found: Petroleum products
Nature of Residual Contamination:	Not reported
Use Restrictions:	Undetermined
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	ISST NFA - No Letter
Document Date:	01/19/1995
Document Number:	Not reported
Document Subject:	Not reported

ALOHA MOTORS 1777 KAPIOLANI BLVD (Continued) **1006820308**

Project Manager: Unassigned
Contact Information: (808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

HI SPILLS:

Island: Oahu
Supplemental Loc. Text: Not reported
Case Number: 19920128
HID Number: HID984466060
Facility Registry Id: 110013782479
Lead and Program: HEER EP&R
ER: Not reported
Units: Aloha Motors - Kapiolani & Kalakaua Avenues
Substances: Petroleum HyrocarbonsSpent solvents & thinners
Less Or Greater Than: Not reported
Numerical Quantity: Not reported
Units: Not reported
Activity Type: Response
Activity Lead: Not reported
Assignment End Date: Not reported
Result: SOSC NFA
File Under: Aloha Motors

Island: Oahu
Supplemental Loc. Text: Not reported
Case Number: 19900411-1
HID Number: HID984466060
Facility Registry Id: 110013782479
Lead and Program: HEER EP&R
ER: Not reported
Units: Aloha Motors, First Development Inc.
Substances: Not reported
Less Or Greater Than: Not reported
Numerical Quantity: Not reported
Units: Not reported
Activity Type: Response
Activity Lead: Sheila Mackenzie
Assignment End Date: Not reported
Result: SOSC NFA
File Under: Aloha Motors

Island: Oahu
Supplemental Loc. Text: Not reported
Case Number: 19900821-5
HID Number: HID984466060
Facility Registry Id: 110013782479
Lead and Program: HEER EP&R
ER: Not reported
Units: ALOHA MOTORS, KALAKAUA AVE.
Substances: Unknown
Less Or Greater Than: Not reported
Numerical Quantity: 15
Units: Gallons
Activity Type: Response
Activity Lead: Not reported
Assignment End Date: Not reported
Result: SOSC NFA
File Under: Aloha Motors

I27 East 1/8-1/4 0.173 mi. 912 ft. | **FIRST DEVELOPMENT INC**
1777 KAPIOLANI BLVD
HONOLULU, HI 96814 | **CERC-NFRAP**
RCRA-CESQG
FINDS | **1003879446**
HID984466060

Site 2 of 9 in cluster I

Relative: Higher

Actual: 3 ft.

CERC-NFRAP:

Site ID:	0903612
Federal Facility:	Not a Federal Facility
NPL Status:	Not on the NPL
Non NPL Status:	NFRAP-Site does not qualify for the NPL based on existing information

CERCLIS-NFRAP Site Contact Details:

Contact Sequence ID:	13037524.00000
Person ID:	9000059.00000

CERCLIS-NFRAP Assessment History:

Action:	PRELIMINARY ASSESSMENT
Date Started:	/ /
Date Completed:	04/22/91
Priority Level:	Higher priority for further assessment
Action:	ARCHIVE SITE
Date Started:	/ /
Date Completed:	03/23/92
Priority Level:	Not reported
Action:	SITE INSPECTION
Date Started:	/ /
Date Completed:	03/23/92
Priority Level:	NFRAP-Site does not qualify for the NPL based on existing information
Action:	DISCOVERY
Date Started:	/ /
Date Completed:	09/24/90
Priority Level:	Not reported

RCRA-CESQG:

Date form received by agency:	08/13/1992
Facility name:	FIRST DEVELOPMENT INC
Facility address:	1777 KAPIOLANI BLVD HONOLULU, HI 96814
EPA ID:	HID984466060
Mailing address:	FORT ST HAWAII TWR STE 1501 HONOLULU, HI 96813
Contact:	HITOSHI UCHINO
Contact address:	745 FORT ST HAWAII TWR STE 1501 HONOLULU, HI 96813
Contact country:	US
Contact telephone:	(808) 545-1953
Contact email:	Not reported
EPA Region:	09
Classification:	Conditionally Exempt Small Quantity Generator
Description:	Handler: generates 100 kg or less of hazardous waste per calendar month, and accumulates 1000 kg or less of hazardous waste at any time; or generates 1 kg or less of acutely hazardous waste per calendar month, and accumulates at any time: 1 kg or less of acutely hazardous

FIRST DEVELOPMENT INC (Continued) **1003879446**

waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste

Owner/Operator Summary:

Owner/operator name:	FIRST DEVELOPMENT INC
Owner/operator address:	745 FORT ST HAWAII TWR 1501 HONOLULU, HI 96813
Owner/operator country:	Not reported
Owner/operator telephone:	(808) 545-1953
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported

Handler Activities Summary:

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

Violation Status: No violations found

FINDS:

Registry ID: 110005727204

Environmental Interest/Information System

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

STATE MASTER

I28 East 1/8-1/4 0.188 mi. 992 ft. | **B & S AUTOMOTIVE TECHNICIANS** | **RCRA NonGen / NLR** | **1000130413**
1789 KAPIOLANI | **FINDS** | **HID981573959**
HONOLULU, HI 96814

Site 3 of 9 in cluster I

Relative: Higher

Actual: 3 ft.

RCRA NonGen / NLR:

Date form received by agency:	12/10/1993
Facility name:	B & S AUTOMOTIVE TECHNICIANS
Facility address:	1789 KAPIOLANI HONOLULU, HI 96814
EPA ID:	HID981573959
Mailing address:	KAPIOLANI HONOLULU, HI 96814
Contact:	ENVIRONMENTAL MANAGER
Contact address:	1789 KAPIOLANI HONOLULU, HI 96814
Contact country:	US
Contact telephone:	(808) 946-0677
Contact email:	Not reported
EPA Region:	09
Classification:	Non-Generator
Description:	Handler: Non-Generators do not presently generate hazardous waste

Owner/Operator Summary:

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

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

Handler Activities Summary:

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

B & S AUTOMOTIVE TECHNICIANS (Continued) **1000130413**

Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Violation Status: No violations found

FINDS:

Registry ID: 110005723770

Environmental Interest/Information System
RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

I29
ESE
1/8-1/4
0.193 mi.
1020 ft.

ALOHA MOTORS
KAPIOLANI BLVD X KALAKAUA AVE
HONOLULU, HI 96815

HI LUST **U001235755**
HI UST **N/A**

Site 4 of 9 in cluster I

Relative:
Higher

Actual:
3 ft.

LUST:
Facility ID: 9-102160
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 04/12/1993
Release ID: 890025
Project Officer: Raymond Seid

UST:
Facility ID: 9-102160
Owner: STATE DBEDT - CONVENTION CENTER AUTHORITY
Owner Address: 1833 KALAKAUA AVE, SUITE 800
Ownder City,St,Zip: Honolulu, 96815 96815

Tank ID: 1
Date Installed: Not reported
Tank Status: Permanently Out of Use
Date Closed: Not reported
Tank Capacity: Not reported
Substance: Not Listed

Tank ID: R-2
Date Installed: Not reported
Tank Status: Permanently Out of Use
Date Closed: 08/21/1995
Tank Capacity: 550
Substance: Not Listed

Tank ID: R-3
Date Installed: Not reported
Tank Status: Permanently Out of Use
Date Closed: 08/24/1995

ALOHA MOTORS (Continued) **U001235755**

Tank Capacity: 260
Substance: Not Listed

Tank ID: R-4
Date Installed: Not reported
Tank Status: Permanently Out of Use
Date Closed: 10/18/1995
Tank Capacity: 550
Substance: Not Listed

Tank ID: R-5
Date Installed: Not reported
Tank Status: Permanently Out of Use
Date Closed: 10/29/1996
Tank Capacity: 250
Substance: Not Listed

E30 **EDR US Hist Cleaners** **1014997169**
NW **1518 MAKALOA ST** **N/A**
1/8-1/4 **HONOLULU, HI 96814**
0.197 mi.
1039 ft. **Site 2 of 2 in cluster E**

Relative: Higher
Actual: 3 ft.

EDR Historical Cleaners:
Name: FANTASTIQUE DRY CLEANING
Year: 2002
Address: 1518 MAKALOA ST

---

31 **THE WATERMARK WAIKIKI** **HI LUST** **S109467327**
South **1551 ALA WAI BLVD** **N/A**
1/8-1/4 **HONOLULU, HI 96815**
0.201 mi.
1060 ft.

Relative: Higher
Actual: 3 ft.

LUST:
Facility ID: 9-103868
Facility Status: Confirmed Release
Facility Status Date: 11/04/2008
Release ID: 090003
Project Officer: Josh Nagashima

J32 **1609 ALA WAI DIESEL RELEASE** **HI SHWS** **S108008656**
SSE **1609 ALA WAI BLVD** **HI SPILLS** **N/A**
1/8-1/4 **HONOLULU, HI**
0.204 mi.
1075 ft. **Site 1 of 2 in cluster J**

Relative: Higher
Actual: 3 ft.

SHWS:
Organization: Not reported
Supplemental Location: Not reported
Island: Oahu
Environmental Interest: 1609 Ala Wai Diesel Release
HID Number: Not reported

1609 ALA WAI DIESEL RELEASE (Continued) **S108008656**

Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Program:	State
Project Manager:	Laura Young
Hazard Priority:	NFA
Potential Hazards And Controls:	No Hazard
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	1609 Ala Wai Diesel Release
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Progran Name:	State
Potential Hazard And Controls:	No Hazard
Priority:	NFA
Assessment:	Response Necessary
Response:	Response Complete
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Diesel contaminated soil
Use Restrictions:	No Hazard Present For Unrestricted Residential Use
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action Letter - Unrestricted Residential Use
Document Date:	10/07/2005
Document Number:	2005-511-LY
Document Subject:	1609 Ala Wai Diesel Release No Further Action Letter
Project Manager:	Laura Young
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

HI SPILLS:

Island:	Oahu
Supplemental Loc. Text:	Not reported
Case Number:	20050523-1552
HID Number:	Not reported
Facility Registry Id:	Not reported
Lead and Program:	HEER EP&R
ER:	Site Visit
Units:	1609 Ala Wai Diesel Release
Substances:	Diesel Fuel
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Sheen
Activity Type:	Response
Activity Lead:	Liz Galvez
Assignment End Date:	2005-06-09 00:00:00
Result:	Refer to SDAR
File Under:	Ala Wai Watermark Development , LLC

I33 East 1/8-1/4 0.204 mi. 1079 ft. | **HAWAII CONVENTION CENTER 1801 KALAKAUA AVE HONOLULU, HI 96814** | **HI SHWS** **HI SPILLS** | **1006820847** **N/A**

Site 5 of 9 in cluster I

Relative: Higher

Actual: 3 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Kalakaua Ave & Kapiolani Blvd
Island:	Oahu
Environmental Interest:	Hawaii Convention Center
HID Number:	Not reported
Facility Registry Identifier:	110013788641
Lead Agency:	SHWB
Program:	State
Project Manager:	Not reported
Hazard Priority:	NFA
Potential Hazards And Controls:	Hazard Undetermined
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Kalakaua Ave & Kapiolani Blvd
SDAR Environmental Interest Name:	Hawaii Convention Center
HID Number:	Not reported
Facility Registry Identifier:	110013788641
Lead Agency:	SHWB
Progran Name:	State
Potential Hazard And Controls:	Hazard Undetermined
Priority:	NFA
Assessment:	Response Necessary
Response:	Response Complete
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Not reported
Use Restrictions:	Undetermined
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action - Type Undetermined
Document Date:	09/03/1997
Document Number:	Not reported
Document Subject:	Letter Report Removal and Disposal of Transite Pipes, Hawaii Convention Center, Honolulu HI
Project Manager:	Not reported
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

HI SPILLS:

Island:	Oahu
Supplemental Loc. Text:	Kalakaua Ave & Kapiolani Blvd
Case Number:	19980426-1349
HID Number:	Not reported
Facility Registry Id:	110013788641
Lead and Program:	HEER EP&R
ER:	Not reported
Units:	Hawaii Convention Center Brick Sealer Odor
Substances:	Not reported
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Not reported
Activity Type:	Response

HAWAII CONVENTION CENTER (Continued) **1006820847**

Activity Lead:	Liz Galvez
Assignment End Date:	Not reported
Result:	Not reported
File Under:	State of Hawaii, Department of Business, Economic Development & Tourism, Convention Center Authority

Island:	Oahu
Supplemental Loc. Text:	Kalakaua Ave & Kapiolani Blvd
Case Number:	19960207-1016
HID Number:	Not reported
Facility Registry Id:	110013788641
Lead and Program:	HEER EP&R
ER:	No
Units:	Convention Center
Substances:	Oil
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Not reported
Activity Type:	Response
Activity Lead:	Terry Corpus
Assignment End Date:	Not reported
Result:	SOSC NFA
File Under:	State of Hawaii, Department of Business, Economic Development & Tourism, Convention Center Authority

Island:	Oahu
Supplemental Loc. Text:	Kalakaua Ave & Kapiolani Blvd
Case Number:	19960314-0000
HID Number:	Not reported
Facility Registry Id:	110013788641
Lead and Program:	HEER EP&R
ER:	Not reported
Units:	Hawaii Convention Center
Substances:	Lubricating Oil.
Less Or Greater Than:	Not reported
Numerical Quantity:	1
Units:	Gallons
Activity Type:	Response
Activity Lead:	Not reported
Assignment End Date:	Not reported
Result:	SOSC NFA
File Under:	State of Hawaii, Department of Business, Economic Development & Tourism, Convention Center Authority

Island:	Oahu
Supplemental Loc. Text:	Kalakaua Ave & Kapiolani Blvd
Case Number:	19970301-1010
HID Number:	Not reported
Facility Registry Id:	110013788641
Lead and Program:	HEER EP&R
ER:	No
Units:	Convention Center White Liquid Emptying Into Ala Wai
Substances:	UNKN white liquid
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Not reported
Activity Type:	Response

HAWAII CONVENTION CENTER (Continued) **1006820847**

Activity Lead: Terry Corpus
Assignment End Date: Not reported
Result: SOSC NFA
File Under: State of Hawaii, Department of Business, Economic Development & Tourism, Convention Center Authority

---

I34 East 1/8-1/4 0.204 mi. 1079 ft. **FUJI PHOTO FILM U S A INC** **RCRA NonGen / NLR** **1012178122**
1801 KALAKAUA AVE **FINDS** **HIP000040451**
HONOLULU, HI 96815

Site 6 of 9 in cluster I

Relative: Higher

Actual: 3 ft.

RCRA NonGen / NLR:
Date form received by agency: 06/24/2009
Facility name: FUJI PHOTO FILM U S A INC
Facility address: 1801 KALAKAUA AVE
HAWAII CONVENTION CENTER
HONOLULU, HI 96815
EPA ID: HIP000040451
Mailing address: 555 TAXTER RD
ELMSFORD, NY 10523
Contact: ANDREA MANNO
Contact address: 555 TAXTER RD
ELMSFORD, NY 10523
Contact country: US
Contact telephone: (914) 789-8793
Contact email: Not reported
EPA Region: 09
Classification: Non-Generator
Description: Handler: Non-Generators do not presently generate hazardous waste

Owner/Operator Summary:
Owner/operator name: FUJI PHOTO FILM U S A INC
Owner/operator address: 555 TAXTER RD
ELMSFORD, NY 10523
Owner/operator country: Not reported
Owner/operator telephone: (914) 789-8100
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: Not reported
Owner/Op end date: Not reported

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

FUJI PHOTO FILM U S A INC (Continued) **1012178122**

Used oil transporter: No

Historical Generators:
Date form received by agency: 06/05/1998
Site name: FUJI PHOTO FILM U S A INC
Classification: Small Quantity Generator

Violation Status: No violations found

FINDS:

Registry ID: 110005724172

Environmental Interest/Information System
RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

STATE MASTER

HAZARDOUS WASTE BIENNIAL REPORTER

I35 **HAWAII CONVENTION CENTER** **RCRA-CESQG** **1000277482**
East **1801 KALAKAUA AVENUE** **HID981633647**
1/8-1/4 **HONOLULU, HI 96815**
0.204 mi.
1079 ft. **Site 7 of 9 in cluster I**

Relative:
Higher

Actual:
3 ft.

RCRA-CESQG:
Date form received by agency: 03/25/2010
Facility name: HAWAII CONVENTION CENTER
Facility address: 1801 KALAKAUA AVENUE
HONOLULU, HI 96815
EPA ID: HID981633647
Mailing address: KALAKAUA AVENUE
HONOLULU, HI 96815
Contact: JOE DAVIS
Contact address: KALAKAUA AVENUE
HONOLULU, HI 96815
Contact country: Not reported
Contact telephone: (808) 943-3000
Contact email: JDAVIS@HCCSMG.COM
EPA Region: 09
Classification: Conditionally Exempt Small Quantity Generator
Description: Handler: generates 100 kg or less of hazardous waste per calendar month, and accumulates 1000 kg or less of hazardous waste at any time; or generates 1 kg or less of acutely hazardous waste per calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates at any

HAWAII CONVENTION CENTER (Continued) **1000277482**

time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste

Owner/Operator Summary:
Owner/operator name: STATE OF HAWAII
Owner/operator address: KALAKAUA AVENUE
HONOLULU, HI 96815
Owner/operator country: US
Owner/operator telephone: (808) 943-3000
Legal status: State
Owner/Operator Type: Owner
Owner/Op start date: 01/01/1997
Owner/Op end date: Not reported

Owner/operator name: SMG
Owner/operator address: KALAKAUA AVENUE
HONOLULU, HI 96815
Owner/operator country: Not reported
Owner/operator telephone: (808) 943-3000
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: 01/01/1997
Owner/Op end date: Not reported

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

Historical Generators:
Date form received by agency: 10/15/2009
Site name: HAWAII CONVENTION CENTER
Classification: Large Quantity Generator

Date form received by agency: 01/21/1987
Site name: DOLLAR RENT A CAR
Classification: Not a generator, verified

Hazardous Waste Summary:
Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF

HAWAII CONVENTION CENTER (Continued) **1000277482**

LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F005
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Violation Status: No violations found

H36
NW
1/8-1/4
0.205 mi.
1080 ft.

WALGREENS STORE NO. 12072 **RCRA-SQG** **1016453153**
1470 KAPIOLANI BLVD. **HIP000141887**
HONOLULU, HI 96814

Site 2 of 3 in cluster H

Relative:
Higher

Actual:
3 ft.

RCRA-SQG:
Date form received by agency: 02/18/2014
Facility name: WALGREENS STORE NO. 12072
Facility address: 1470 KAPIOLANI BLVD.
HONOLULU, HI 96814
EPA ID: HIP000141887
Mailing address: KAPIOLANI BLVD.
HONOLULU, HI 96814
Contact: JEFFREY M GRONCKI
Contact address: WILMOT ROAD MS 1630
DEERFIELD, IL 60015
Contact country: US
Contact telephone: (847) 315-3571
Contact email: JEFF.GRONCKI@WALGREENS.COM

WALGREENS STORE NO. 12072 (Continued) **1016453153**

EPA Region: 09
Classification: Small Small Quantity Generator
Description: Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:
Owner/operator name: WALGREEN CO.
Owner/operator address: WILMOT ROAD MS 1420
DEERFIELD, IL 60015
Owner/operator country: US
Owner/operator telephone: Not reported
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: 01/01/2007
Owner/Op end date: Not reported

Owner/operator name: WALGREEN CO.
Owner/operator address: WILMOT ROAD MS 1420
DEERFIELD, IL 60015
Owner/operator country: US
Owner/operator telephone: Not reported
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: 01/01/2007
Owner/Op end date: Not reported

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

Hazardous Waste Summary:
Waste code: D008
Waste name: LEAD

Violation Status: No violations found

H37 NW 1/8-1/4 0.216 mi. 1143 ft. — **WALGREENS KEEAMOKU**, **1460 KAPIOLANI BOULEVARD**, **HONOLULU, HI 96814** — **HI SHWS** — **S115488729**, **N/A**

Site 3 of 3 in cluster H

Relative: Higher

Actual: 3 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Oahu
Environmental Interest:	Walgreens Keeamoku
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Program:	Fast Track
Project Manager:	Jordan Nakayama
Hazard Priority:	Not reported
Potential Hazards And Controls:	Hazard Undetermined
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	Walgreens Keeamoku
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Progran Name:	Fast Track
Potential Hazard And Controls:	Hazard Undetermined
Priority:	Not reported
Assessment:	Assessment Ongoing
Response:	Not reported
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Not reported
Use Restrictions:	Undetermined
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	Not reported
Document Date:	Not reported
Document Number:	Not reported
Document Subject:	Not reported
Project Manager:	Jordan Nakayama
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

I38 East 1/8-1/4 0.220 mi. 1164 ft. — **FUNAI'S UNION SERVICE L-5583**, **1810 KAPIOLANI BLVD**, **HONOLULU, HI 96813** — **HI LUST**, **HI UST**, **HI Financial Assurance** — **U001235021**, **N/A**

Site 8 of 9 in cluster I

Relative: Higher

Actual: 3 ft.

LUST:

Facility ID:	9-100047
Facility Status:	Site Cleanup Completed (NFA)
Facility Status Date:	02/08/2002
Release ID:	910048
Project Officer:	Shunsheng Fu

UST:

Facility ID:	9-100047

FUNAI'S UNION SERVICE L-5583 (Continued) **U001235021**

Owner: UNOCAL CORPORATION
Owner Address: 3915 Mission Avenue #7416
Ownder City,St,Zip: Honolulu, 96813 96813

Tank ID: R-1
Date Installed: 03/26/1966
Tank Status: Permanently Out of Use
Date Closed: 06/10/1991
Tank Capacity: 8000
Substance: Gasoline

Tank ID: R-2
Date Installed: 03/26/1966
Tank Status: Permanently Out of Use
Date Closed: 06/10/1991
Tank Capacity: 6000
Substance: Gasoline

Tank ID: R-3
Date Installed: 03/26/1966
Tank Status: Permanently Out of Use
Date Closed: 06/10/1991
Tank Capacity: 250
Substance: Used Oil

HI Financial Assurance:
Alt Facility ID: 9-100047
Tank Id: R-3
Tank Status: Permanently Out of Use
FRTYPE: Risk Retention Group
Expiration Date: Not reported

Alt Facility ID: 9-100047
Tank Id: R-3
Tank Status: Permanently Out of Use
FRTYPE: Not Listed
Expiration Date: Not reported

Alt Facility ID: 9-100047
Tank Id: R-2
Tank Status: Permanently Out of Use
FRTYPE: Risk Retention Group
Expiration Date: Not reported

Alt Facility ID: 9-100047
Tank Id: R-1
Tank Status: Permanently Out of Use
FRTYPE: Not Listed
Expiration Date: Not reported

Alt Facility ID: 9-100047
Tank Id: R-1
Tank Status: Permanently Out of Use
FRTYPE: Risk Retention Group
Expiration Date: Not reported

FUNAI'S UNION SERVICE L-5583 (Continued) **U001235021**

Alt Facility ID: 9-100047
Tank Id: R-2
Tank Status: Permanently Out of Use
FRTYPE: Not Listed
Expiration Date: Not reported

J39
SSE
1/8-1/4
0.223 mi.
1178 ft.

LING BROTHERS, LTD. **HI LUST** **S108009335**
1819-E LIPEEPEE ST **N/A**
HONOLULU, HI 96815

Site 2 of 2 in cluster J

Relative:
Higher

Actual:
3 ft.

LUST:
Facility ID: 9-100819
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 10/16/2007
Release ID: 060020
Project Officer: Richard Takaba

I40
East
1/8-1/4
0.231 mi.
1218 ft.

UNOCAL 76 SS L 5583 **RCRA NonGen / NLR** **1000823237**
1818 KAPIOLANI BLVD **FINDS** **HID984468769**
HONOLULU, HI 96826

Site 9 of 9 in cluster I

Relative:
Higher

Actual:
3 ft.

RCRA NonGen / NLR:
Date form received by agency: 08/27/1993
Facility name: UNOCAL 76 SS L 5583
Facility address: 1818 KAPIOLANI BLVD
HONOLULU, HI 96826
EPA ID: HID984468769
Mailing address: PO BOX 659
HONOLULU, HI 96809
Contact: A FRITZ
Contact address: PO BOX 659
HONOLULU, HI 96809
Contact country: US
Contact telephone: (808) 522-7657
Contact email: Not reported
EPA Region: 09
Classification: Non-Generator
Description: Handler: Non-Generators do not presently generate hazardous waste

Owner/Operator Summary:
Owner/operator name: UNOCAL 76
Owner/operator address: 911 WILSHIRE BLVD STE 1010
LOS ANGELES, CA 90017
Owner/operator country: Not reported
Owner/operator telephone: (213) 977-7600
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Handler Activities Summary:

UNOCAL 76 SS L 5583 (Continued) **1000823237**

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

Violation Status: No violations found

FINDS:

Registry ID: 110005728169

Environmental Interest/Information System
RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

K41 **ALA MOANA UNOCAL** **RCRA-CESQG** **1004464898**
SSW **1651 ALA MOANA BLVD** **FINDS** **HID981969983**
1/8-1/4 **HONOLULU, HI 96815** **HI SPILLS**
0.238 mi. **CA HAZNET**
1256 ft. **Site 1 of 3 in cluster K**

Relative:
Higher

Actual:
3 ft.

RCRA-CESQG:
Date form received by agency: 07/22/1993
Facility name: ALA WAI MARINE LTD
Facility address: 1651 ALA MOANA BLVD
HONOLULU, HI 96815
EPA ID: HID981969983
Mailing address: ALA MOANA BLVD
HONOLULU, HI 96815
Contact: STEVE LEWIS
Contact address: 1651 ALA MOANA BLVD
HONOLULU, HI 96815
Contact country: US
Contact telephone: (808) 946-4213
Contact email: Not reported
EPA Region: 09
Land type: Facility is not located on Indian land. Additional information is not known.
Classification: Conditionally Exempt Small Quantity Generator
Description: Handler: generates 100 kg or less of hazardous waste per calendar month, and accumulates 1000 kg or less of hazardous waste at any time; or generates 1 kg or less of acutely hazardous waste per calendar month, and accumulates at any time: 1 kg or less of acutely hazardous

ALA MOANA UNOCAL (Continued) **1004464898**

waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste

Owner/Operator Summary:

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

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

Handler Activities Summary:

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

Violation Status: No violations found

Evaluation Action Summary:

Evaluation date:	10/23/2003
Evaluation:	FOCUSED COMPLIANCE INSPECTION
Area of violation:	Not reported
Date achieved compliance:	Not reported

ALA MOANA UNOCAL (Continued) **1004464898**

Evaluation lead agency: State

FINDS:

Registry ID: 110022917593

Environmental Interest/Information System

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

US National Pollutant Discharge Elimination System (NPDES) module of the Compliance Information System (ICIS) tracks surface water permits issued under the Clean Water Act. Under NPDES, all facilities that discharge pollutants from any point source into waters of the United States are required to obtain a permit. The permit will likely contain limits on what can be discharged, impose monitoring and reporting requirements, and include other provisions to ensure that the discharge does not adversely affect water quality.

STATE MASTER

LEAKING UNDERGROUND STORAGE TANK - ARRA

PCS (Permit Compliance System) is a computerized management information system that contains data on National Pollutant Discharge Elimination System (NPDES) permit holding facilities. PCS tracks the permit, compliance, and enforcement status of NPDES facilities.

HI SPILLS:

Island:	Oahu
Supplemental Loc. Text:	Ala Wai Yacht Harbor Slot 61/62
Case Number:	20010517-1241
HID Number:	Not reported
Facility Registry Id:	Not reported
Lead and Program:	HEER EP&R
ER:	No
Units:	Ala Wai Boat Harbor Slot 61 & 62
Substances:	Ethylene Glycol
Less Or Greater Than:	Not reported
Numerical Quantity:	1
Units:	Gallons
Activity Type:	Response
Activity Lead:	Liz Galvez
Assignment End Date:	Not reported
Result:	SOSC NFA
File Under:	Not reported

Island:	Oahu
Supplemental Loc. Text:	Ala Wai Yacht Harbor
Case Number:	19970712-0651
HID Number:	Not reported
Facility Registry Id:	Not reported

ALA MOANA UNOCAL (Continued) **1004464898**

Lead and Program:	HEER EP&R
ER:	No
Units:	Ala Wai Boat Harbor, oil sheen sighting
Substances:	Oil
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Not reported
Activity Type:	Response
Activity Lead:	Mike Cripps
Assignment End Date:	Not reported
Result:	SOSC NFA
File Under:	Not reported

Island:	Oahu
Supplemental Loc. Text:	Ala Wai Yacht Harbor
Case Number:	19980811-0758
HID Number:	Not reported
Facility Registry Id:	Not reported
Lead and Program:	HEER EP&R
ER:	Not reported
Units:	Ala Wai Boat Harbor, oil sheen
Substances:	unk oil
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Not reported
Activity Type:	Response
Activity Lead:	Not reported
Assignment End Date:	Not reported
Result:	Not reported
File Under:	Not reported

Island:	Oahu
Supplemental Loc. Text:	Ala Wai Yacht Harbor 400 Row Dock B/C
Case Number:	20021011-0736
HID Number:	Not reported
Facility Registry Id:	110013783218
Lead and Program:	HEER EP&R
ER:	No
Units:	Sheen 400 row, B-C dock
Substances:	Not reported
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Not reported
Activity Type:	Response
Activity Lead:	Ed Gomes
Assignment End Date:	Not reported
Result:	SOSC NFA
File Under:	Not reported

Island:	Oahu
Supplemental Loc. Text:	Not reported
Case Number:	20110927-0733
HID Number:	Not reported
Facility Registry Id:	Not reported
Lead and Program:	HEER EP&R
ER:	None
Units:	Unknown Sheen at Alawai Boat Harbor

ALA MOANA UNOCAL (Continued) **1004464898**

Substances:	Oil
Less Or Greater Than:	Not reported
Numerical Quantity:	0
Units:	Not reported
Activity Type:	Response
Activity Lead:	Liz Galvez
Assignment End Date:	Not reported
Result:	Not reported
File Under:	Not reported

Click this hyperlink while viewing on your computer to access
3 additional HI SPILLS: record(s) in the EDR Site Report.

HAZNET:

Year:	2002
Gepaid:	HID981969983
Contact:	STEVE LEWIS
Telephone:	8089464213
Mailing Name:	Not reported
Mailing Address:	1651 ALA MOANA BLVD
Mailing City,St,Zip:	HONOLULU, HI 968150000
Gen County:	Not reported
TSD EPA ID:	CAD028409019
TSD County:	Not reported
Waste Category:	Waste oil and mixed oil
Disposal Method:	Transfer Station
Tons:	0.45
Facility County:	99

Year:	2002
Gepaid:	HID981969983
Contact:	STEVE LEWIS
Telephone:	8089464213
Mailing Name:	Not reported
Mailing Address:	1651 ALA MOANA BLVD
Mailing City,St,Zip:	HONOLULU, HI 968150000
Gen County:	Not reported
TSD EPA ID:	CAD028409019
TSD County:	Not reported
Waste Category:	Off-specification, aged or surplus organics
Disposal Method:	Transfer Station
Tons:	0.15
Facility County:	99

Year:	2001
Gepaid:	HID981969983
Contact:	STEVE LEWIS
Telephone:	8089464213
Mailing Name:	Not reported
Mailing Address:	1651 ALA MOANA BLVD
Mailing City,St,Zip:	HONOLULU, HI 968150000
Gen County:	Not reported
TSD EPA ID:	CAD028409019
TSD County:	Not reported
Waste Category:	Waste oil and mixed oil
Disposal Method:	Transfer Station
Tons:	0.22

ALA MOANA UNOCAL (Continued) **1004464898**

Facility County: 99

Year: 2001
Gepaid: HID981969983
Contact: STEVE LEWIS
Telephone: 8089464213
Mailing Name: Not reported
Mailing Address: 1651 ALA MOANA BLVD
Mailing City,St,Zip: HONOLULU, HI 968150000
Gen County: Not reported
TSD EPA ID: AZD983473539
TSD County: Not reported
Waste Category: Not reported
Disposal Method: Recycler
Tons: 0.04
Facility County: 99

Year: 2001
Gepaid: HID981969983
Contact: STEVE LEWIS
Telephone: 8089464213
Mailing Name: Not reported
Mailing Address: 1651 ALA MOANA BLVD
Mailing City,St,Zip: HONOLULU, HI 968150000
Gen County: Not reported
TSD EPA ID: CAD028409019
TSD County: Not reported
Waste Category: Waste oil and mixed oil
Disposal Method: Treatment, Tank
Tons: 0.85
Facility County: 99

Click this hyperlink while viewing on your computer to access
1 additional CA_HAZNET: record(s) in the EDR Site Report.

K42 **STATE OF HAWAII DLNR DOBOR** **RCRA-SQG** **1001481551**
SSW **1651 ALA MOANA BLVD** **HIR000050146**
1/8-1/4 **HONOLULU, HI 96815**
0.238 mi.
1256 ft. **Site 2 of 3 in cluster K**

Relative:
Higher

Actual:
3 ft.

RCRA-SQG:
Date form received by agency: 03/15/1999
Facility name: STATE OF HAWAII DLNR DOBOR
Facility address: 1651 ALA MOANA BLVD
ALA WAI SMALL BOAT HARBOR
HONOLULU, HI 96815
EPA ID: HIR000050146
Mailing address: 333 QUEEN ST STE 300
HONOLULU, HI 96813
Contact: ROBERT RUSHFORTH
Contact address: 333 QUEEN ST STE 300
HONOLULU, HI 96813
Contact country: US
Contact telephone: (808) 973-9727
Contact email: Not reported
EPA Region: 09
Classification: Small Small Quantity Generator

STATE OF HAWAII DLNR DOBOR (Continued) **1001481551**

Description: Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:
Owner/operator name: STATE OF HAWAII DLNR DOBOR
Owner/operator address: 333 QUEEN ST STE 300
HONOLULU, HI 96813
Owner/operator country: Not reported
Owner/operator telephone: (808) 587-1973
Legal status: State
Owner/Operator Type: Owner
Owner/Op start date: Not reported
Owner/Op end date: Not reported

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

Hazardous Waste Summary:
Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Violation Status: No violations found

K43 **ALOHA MARINE** **HI LUST** **U001235075**
SSW **1651 ALA MOANA BLVD** **HI UST** **N/A**
1/8-1/4 **HONOLULU, HI 96815**
0.238 mi.
1256 ft. **Site 3 of 3 in cluster K**

Relative:
Higher

Actual:
3 ft.

LUST:
Facility ID: 9-100167
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 03/21/2012
Release ID: 110012

ALOHA MARINE (Continued) **U001235075**

Project Officer: To Heer

UST:
Facility ID: 9-100167
Owner: TEXACO REFINING & MARKETING INC.
Owner Address: ENVIRONMENTAL SERVICES800 SW FIRST AVE., SUITE 180
Ownder City,St,Zip: Honolulu, 96815 96815

Tank ID: R-1
Date Installed: 07/07/1965
Tank Status: Permanently Out of Use
Date Closed: Not reported
Tank Capacity: 1000
Substance: Used Oil

Tank ID: R-2
Date Installed: 07/07/1965
Tank Status: Permanently Out of Use
Date Closed: Not reported
Tank Capacity: 4000
Substance: Diesel

Tank ID: R-3
Date Installed: 07/07/1965
Tank Status: Permanently Out of Use
Date Closed: Not reported
Tank Capacity: 4000
Substance: Diesel

Tank ID: R-4
Date Installed: 07/07/1965
Tank Status: Permanently Out of Use
Date Closed: Not reported
Tank Capacity: 4000
Substance: Gasoline

Tank ID: R-5
Date Installed: 07/07/1965
Tank Status: Permanently Out of Use
Date Closed: Not reported
Tank Capacity: 4000
Substance: Gasoline

Tank ID: R-6
Date Installed: 07/07/1965
Tank Status: Permanently Out of Use
Date Closed: 06/01/1985
Tank Capacity: 4000
Substance: Not Listed

Tank ID: R-7

ALOHA MARINE (Continued) **U001235075**

Date Installed: 07/07/1965
Tank Status: Permanently Out of Use
Date Closed: Not reported
Tank Capacity: 4000
Substance: Not Listed

44
NW
1/8-1/4
0.245 mi.
1294 ft.

641 KEEAUMOKU ST
HONOLULU, HI 96814

EDR US Hist Auto Stat **1015587841**
N/A

Relative:
Higher

Actual:
3 ft.

EDR Historical Auto Stations:
Name: AAMCO TRANSMISSIONS
Year: 2007
Address: 641 KEEAUMOKU ST

45
WSW
1/8-1/4
0.245 mi.
1295 ft.

MOANA PARK WASTEWATER PUMP STATION
1501 ALA MOANA BLVD
HONOLULU, HI 96814

HI UST **U003762121**
HI Financial Assurance **N/A**

Relative:
Higher

Actual:
3 ft.

UST:
Facility ID: 9-103665
Owner: C&C HNL - DEPT OF ENVIRONMENTAL SERVICES
Owner Address: 1000 ULU'OHIA STREET, SUITE 308
Ownder City,St,Zip: Honolulu, 96814 96814

Tank ID: M-1
Date Installed: 12/01/1994
Tank Status: Currently In Use
Date Closed: Not reported
Tank Capacity: 600
Substance: Diesel

HI Financial Assurance:
Alt Facility ID: 9-103665
Tank Id: M-1
Tank Status: Currently In Use
FRTYPE: Other
Expiration Date: 06/30/2014

46
East
1/8-1/4
0.246 mi.
1298 ft.

1830 KAPIOLANI BLVD
HONOLULU, HI 96826

EDR US Hist Auto Stat **1015282816**
N/A

Relative:
Higher

Actual:
3 ft.

EDR Historical Auto Stations:
Name: OAHU AUTO SERVICE INCORPORATED
Year: 1999
Address: 1830 KAPIOLANI BLVD

L47
NW
1/4-1/2
0.302 mi.
1592 ft.

SUPERBLOCK PROPERTIES
SOUTH BLOCK (BLDG S20) / MAKALOA ST
HONOLULU, HI 96814

HI LUST **U001235973**
HI UST **N/A**

Site 1 of 3 in cluster L

Relative:
Higher

Actual:
3 ft.

LUST:

Facility ID:	9-102602
Facility Status:	Site Cleanup Completed (NFA)
Facility Status Date:	12/06/1993
Release ID:	920143
Project Officer:	Stanton Enomoto

UST:

Facility ID:	9-102602
Owner:	KEEAUMOKU PARTNERS
Owner Address:	820 MILILANI ST, SUITE 820
Ownder City,St,Zip:	Honolulu, 96814 96814
Tank ID:	R-ST12
Date Installed:	Not reported
Tank Status:	**Permanently Out of Use**
Date Closed:	10/22/1991
Tank Capacity:	1000
Substance:	Used Oil

L48
NW
1/4-1/2
0.309 mi.
1630 ft.

SUPERBLOCK PROPERTIES
NORTH BLOCK (BLDG N8) / KEEAUMOKU ST
HONOLULU, HI 96814

HI LUST **U003221767**
HI UST **N/A**

Site 2 of 3 in cluster L

Relative:
Higher

Actual:
3 ft.

LUST:

Facility ID:	9-102594
Facility Status:	Site Cleanup Completed (NFA)
Facility Status Date:	12/20/1993
Release ID:	920139
Project Officer:	Stanton Enomoto

UST:

Facility ID:	9-102594
Owner:	KEEAUMOKU PARTNERS
Owner Address:	820 MILILANI ST, SUITE 820
Ownder City,St,Zip:	Honolulu, 96814 96814
Tank ID:	R-NT3
Date Installed:	Not reported
Tank Status:	**Permanently Out of Use**
Date Closed:	07/23/1991
Tank Capacity:	250
Substance:	Used Oil
Tank ID:	R-NT4
Date Installed:	Not reported
Tank Status:	**Permanently Out of Use**
Date Closed:	07/23/1991
Tank Capacity:	8000
Substance:	Gasoline

SUPERBLOCK PROPERTIES (Continued) **U003221767**

Tank ID:	R-NT5
Date Installed:	Not reported
Tank Status:	**Permanently Out of Use**
Date Closed:	07/23/1991
Tank Capacity:	8000
Substance:	Gasoline

49
NNW
1/4-1/2
0.315 mi.
1664 ft.

LIKE LIKE PLAZA PETROLEUM CONTAMINATION
745 KEEAUMOKU ST
HONOLULU, HI 96814

HI SHWS **1006819347**
N/A

Relative:
Higher

Actual:
7 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Oahu
Environmental Interest:	Like Like Plaza Petroleum Contamination
HID Number:	Not reported
Facility Registry Identifier:	110013771383
Lead Agency:	HEER
Program:	State
Project Manager:	Anna Fernandez
Hazard Priority:	NFA
Potential Hazards And Controls:	No Hazard
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	Like Like Plaza Petroleum Contamination
HID Number:	Not reported
Facility Registry Identifier:	110013771383
Lead Agency:	HEER
Progran Name:	State
Potential Hazard And Controls:	No Hazard
Priority:	NFA
Assessment:	Response Necessary
Response:	Response Complete
Nature of Contamination:	Found: petroleum-impacted soils
Nature of Residual Contamination:	Petroleum impacted soil
Use Restrictions:	No Hazard Present For Unrestricted Residential Use
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action Letter - Unrestricted Residential Use
Document Date:	05/04/2006
Document Number:	2006-266-AF
Document Subject:	NFA determination
Project Manager:	Anna Fernandez
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

50 WNW 1/4-1/2 0.328 mi. 1732 ft.

CUTTER CHEVROLET
1391 KAPIOLANI BLVD
HONOLULU, HI 96814

HI SHWS
HI LUST
HI UST
HI Financial Assurance

U001235085
N/A

Relative: Higher

Actual: 3 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	2nd Driveway from Kona Iki St
Island:	Oahu
Environmental Interest:	Cutter Chevrolet Hydraulic Lift
HID Number:	Not reported
Facility Registry Identifier:	110005725028
Lead Agency:	HEER
Program:	State
Project Manager:	Steve Mow
Hazard Priority:	NFA
Potential Hazards And Controls:	No Hazard
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	2nd Driveway from Kona Iki St
SDAR Environmental Interest Name:	Cutter Chevrolet Hydraulic Lift
HID Number:	Not reported
Facility Registry Identifier:	110005725028
Lead Agency:	HEER
Progran Name:	State
Potential Hazard And Controls:	No Hazard
Priority:	NFA
Assessment:	Response Necessary
Response:	Response Complete
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Not reported
Use Restrictions:	No Hazard Present For Unrestricted Residential Use
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action Letter - Unrestricted Residential Use
Document Date:	09/09/2005
Document Number:	2005-454-SPM
Document Subject:	No Further Action Required at Cutter Chevrolet at 1391 Kapiolani Blvd
Project Manager:	Steve Mow
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

LUST:

Facility ID:	9-100185
Facility Status:	Site Cleanup Completed (NFA)
Facility Status Date:	10/26/1999
Release ID:	950131
Project Officer:	Renato Maniulit

UST:

Facility ID:	9-100185
Owner:	MOTOR SUPPLY LTD
Owner Address:	726 SHERIDAN ST
Ownder City,St,Zip:	Honolulu, 96814 96814
Tank ID:	R-1

CUTTER CHEVROLET (Continued) **U001235085**

Date Installed: 05/03/1971
Tank Status: Permanently Out of Use
Date Closed: 09/02/1995
Tank Capacity: 500
Substance: Used Oil

HI Financial Assurance:
Alt Facility ID: 9-100185
Tank Id: R-1
Tank Status: Permanently Out of Use
FRTYPE: Not Listed
Expiration Date: Not reported

Alt Facility ID: 9-100185
Tank Id: R-1
Tank Status: Permanently Out of Use
FRTYPE: Self Insured
Expiration Date: Not reported

L51
NW
1/4-1/2
0.337 mi.
1779 ft.

SUPERBLOCK PROPERTIES **HI LUST** **U001235974**
SOUTH BLOCK (BLDG S25) / MAKALOA ST **HI UST** **N/A**
HONOLULU, HI 96814

Site 3 of 3 in cluster L

Relative:
Higher

Actual:
3 ft.

LUST:
Facility ID: 9-102603
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 12/06/1993
Release ID: 920144
Project Officer: Stanton Enomoto

UST:
Facility ID: 9-102603
Owner: KEEAUMOKU PARTNERS
Owner Address: 820 MILILANI ST, SUITE 820
Ownder City,St,Zip: Honolulu, 96814 96814

Tank ID: R-6
Date Installed: Not reported
Tank Status: Permanently Out of Use
Date Closed: 01/15/2003
Tank Capacity: 250
Substance: Not Listed

Tank ID: R-ST16
Date Installed: Not reported
Tank Status: Permanently Out of Use
Date Closed: 11/21/1991
Tank Capacity: 5000
Substance: Gasoline

Tank ID: R-ST17
Date Installed: Not reported
Tank Status: Permanently Out of Use

SUPERBLOCK PROPERTIES (Continued) **U001235974**

Date Closed: 11/21/1991
Tank Capacity: 5000
Substance: Gasoline

M52 **SEARS ROEBUCK & COMPANY 1158** **HI LUST** **U001235603**
WSW **1450 ALA MOANA BLVD #1000** **HI UST** **N/A**
1/4-1/2 **HONOLULU, HI 96814** **HI SPILLS**
0.342 mi.
1804 ft. **Site 1 of 2 in cluster M**

Relative:
Higher

Actual:
3 ft.

LUST:
Facility ID: 9-101837
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 10/06/1998
Release ID: 930057
Project Officer: Eric Sadoyama

UST:
Facility ID: 9-101837
Owner: D/E HAWAII c/o EQUITABLE LIFE
Owner Address: SOCIETY OF THE U.S. / 787 SEVENTH AVENUE
Ownder City,St,Zip: Honolulu, 96814 96814

Tank ID: R-1
Date Installed: 05/07/1959
Tank Status: **Permanently Out of Use**
Date Closed: 02/01/1994
Tank Capacity: 2000
Substance: Used Oil

Tank ID: R-2
Date Installed: 05/07/1959
Tank Status: **Permanently Out of Use**
Date Closed: 02/01/1994
Tank Capacity: 2000
Substance: Other

Tank ID: R-3
Date Installed: 05/07/1959
Tank Status: **Permanently Out of Use**
Date Closed: 02/01/1994
Tank Capacity: 4000
Substance: Other

Tank ID: R-4
Date Installed: 05/07/1959
Tank Status: **Permanently Out of Use**
Date Closed: 02/01/1994
Tank Capacity: 4000
Substance: Other

Tank ID: R-5
Date Installed: 05/07/1959

SEARS ROEBUCK & COMPANY 1158 (Continued) **U001235603**

Tank Status:	**Permanently Out of Use**
Date Closed:	02/01/1994
Tank Capacity:	4000
Substance:	Other

Tank ID:	R-6
Date Installed:	05/07/1959
Tank Status:	**Permanently Out of Use**
Date Closed:	02/01/1994
Tank Capacity:	4000
Substance:	Other

Tank ID:	R-7
Date Installed:	05/07/1959
Tank Status:	**Permanently Out of Use**
Date Closed:	02/01/1994
Tank Capacity:	3000
Substance:	Other

HI SPILLS:

Island:	Oahu
Supplemental Loc. Text:	Not reported
Case Number:	20001102-1124
HID Number:	Not reported
Facility Registry Id:	Not reported
Lead and Program:	HEER EP&R
ER:	Not reported
Units:	Ala Moana Center, cleaning chemicals
Substances:	Not reported
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Not reported
Activity Type:	Response
Activity Lead:	Liz Galvez
Assignment End Date:	Not reported
Result:	Not reported
File Under:	Not reported

N53 **HOBRON HOTEL** **HI SHWS** **S106817744**
SSE **1744 KAIOO DR** **N/A**
1/4-1/2 **HONOLULU, HI 96815**
0.354 mi.
1867 ft. **Site 1 of 2 in cluster N**

Relative:
Higher

Actual:
3 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Oahu
Environmental Interest:	Hobron Hotel
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Program:	State
Project Manager:	Clarence Callahan
Hazard Priority:	NFA

HOBRON HOTEL (Continued) **S106817744**

Potential Hazards And Controls:	No Hazard
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	Hobron Hotel
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Progran Name:	State
Potential Hazard And Controls:	No Hazard
Priority:	NFA
Assessment:	Response Necessary
Response:	Response Complete
Nature of Contamination:	Found: diesel fuel from leaking UST
Nature of Residual Contamination:	Petroleum from UST
Use Restrictions:	No Hazard Present For Unrestricted Residential Use
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action Letter - Unrestricted Residential Use
Document Date:	01/15/2004
Document Number:	2004-015-CAC
Document Subject:	NFA Additional Site Assessment, Former Hobron Hotel, 1744 Kaioo Dr, Honolulu HI [TMK No. (1)2-6-012:
Project Manager:	Clarence Callahan
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

O54 **SUPERBLOCK PROPERTIES** **HI LUST** **U001235971**
NW **SOUTH BLOCK (BLDG S13) / MAKALOA ST** **HI UST** **N/A**
1/4-1/2 **HONOLULU, HI 96814**
0.364 mi.
1924 ft. **Site 1 of 4 in cluster O**

Relative:
Higher

Actual:
5 ft.

LUST:

Facility ID:	9-102600
Facility Status:	Site Cleanup Completed (NFA)
Facility Status Date:	06/28/1993
Release ID:	920142
Project Officer:	Stanton Enomoto

UST:

Facility ID:	9-102600
Owner:	KEEAUMOKU PARTNERS
Owner Address:	820 MILILANI ST, SUITE 820
Ownder City,St,Zip:	Honolulu, 96814 96814
Tank ID:	R-ST10
Date Installed:	Not reported
Tank Status:	**Permanently Out of Use**
Date Closed:	11/02/1991
Tank Capacity:	500
Substance:	Diesel

55 South 1/4-1/2 0.366 mi. 1933 ft.

ILIKAI HOTEL
1777 ALA MOANA BLVD
HONOLULU, HI 96815

HI LUST **1000267863**
HI UST **N/A**
HI SPILLS

Relative: Higher

Actual: 3 ft.

LUST:

Facility ID:	9-102181
Facility Status:	Site Cleanup Completed (NFA)
Facility Status Date:	09/26/1994
Release ID:	900084
Project Officer:	Eric Sadoyama

UST:

Facility ID:	9-102181
Owner:	ILIKAI HOTEL
Owner Address:	1777 ALA MOANA BLVD
Ownder City,St,Zip:	Honolulu, 96815 96815
Tank ID:	R-1
Date Installed:	Not reported
Tank Status:	**Permanently Out of Use**
Date Closed:	05/15/1990
Tank Capacity:	10000
Substance:	Diesel

HI SPILLS:

Island:	Oahu
Supplemental Loc. Text:	Ilikai Hotel & Suites
Case Number:	20100212-0900
HID Number:	Not reported
Facility Registry Id:	Not reported
Lead and Program:	HEER EP&R
ER:	None
Units:	Mysterious substance causing various health problems
Substances:	Unknown
Less Or Greater Than:	Not reported
Numerical Quantity:	0
Units:	Not reported
Activity Type:	Response
Activity Lead:	TC
Assignment End Date:	Not reported
Result:	Not reported
File Under:	Not reported
Island:	Oahu
Supplemental Loc. Text:	Not reported
Case Number:	20020927-1325
HID Number:	Not reported
Facility Registry Id:	Not reported
Lead and Program:	HEER EP&R
ER:	Site Visit
Units:	White substance in film canister under bed
Substances:	Unknown
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Not reported
Activity Type:	Response

ILIKAI HOTEL (Continued) **1000267863**

Activity Lead:	Terry Corpus
Assignment End Date:	Not reported
Result:	SOSC NFA
File Under:	Not reported
Island:	Oahu
Supplemental Loc. Text:	Not reported
Case Number:	19890314
HID Number:	Not reported
Facility Registry Id:	Not reported
Lead and Program:	HEER EP&R
ER:	Not reported
Units:	Ilikai Hotel, Ewa Entrance
Substances:	Oil
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Not reported
Activity Type:	Response
Activity Lead:	Not reported
Assignment End Date:	Not reported
Result:	SOSC NFA
File Under:	Not reported

O56 **MOTOR SUPPLY** **HI SHWS** **S108008592**
NW **726 SHERIDAN ST** **HI INST CONTROL** **N/A**
1/4-1/2 **HONOLULU, HI 96814**
0.372 mi.
1965 ft. **Site 2 of 4 in cluster O**

Relative:
Higher

Actual:
6 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Oahu
Environmental Interest:	Motor Supply
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Program:	State
Project Manager:	Steve Mow
Hazard Priority:	NFA
Potential Hazards And Controls:	Hazard Managed With Controls
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	Motor Supply
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Progran Name:	State
Potential Hazard And Controls:	Hazard Managed With Controls
Priority:	NFA
Assessment:	Response Necessary
Response:	Response Complete
Nature of Contamination:	Found: Tetrachloroethylene.
Nature of Residual Contamination:	Not reported
Use Restrictions:	Controls Required to Manage Contamination
Engineering Control:	Not reported
Description of Restrictions:	Prohibit Any Activity That May Disturb the Integrity of the Capping or

MOTOR SUPPLY (Continued) **S108008592**

	Monitoring Systems
Institutional Control:	Government - Hawaii Dept. of Health Letter Issued
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action Letter - Restricted Use
Document Date:	03/30/2011
Document Number:	2011-184-SPM
Document Subject:	No Further Action with Institutional Controls Determination for Clean Living - Hakuyosha Internation
Project Manager:	Steve Mow
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

INST CONTROL:

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

---

O57 **HAKUYOSHA HAWAII, INC** **HI SHWS** **S106817254**
NW **730 SHERIDAN ST** **HI SPILLS** **N/A**
1/4-1/2 **HONOLULU, HI 96814** **HI INST CONTROL**
0.372 mi. **HI AIRS**
1965 ft. **Site 3 of 4 in cluster O**

Relative:
Higher

Actual:
6 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Oahu
Environmental Interest:	Hakuyosha Hawaii, Inc.
HID Number:	Not reported
Facility Registry Identifier:	110005284414
Lead Agency:	HEER
Program:	State
Project Manager:	Steve Mow
Hazard Priority:	High
Potential Hazards And Controls:	Hazard Managed With Controls
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	Hakuyosha Hawaii, Inc.
HID Number:	Not reported
Facility Registry Identifier:	110005284414
Lead Agency:	HEER
Progran Name:	State
Potential Hazard And Controls:	Hazard Managed With Controls
Priority:	High
Assessment:	Response Necessary
Response:	Response Complete
Nature of Contamination:	Found: tetrachloroethylene
Nature of Residual Contamination:	Not reported
Use Restrictions:	Controls Required to Manage Contamination
Engineering Control:	Not reported
Description of Restrictions:	Prohibit Any Activity That May Disturb the Integrity of the Capping or Monitoring System
Institutional Control:	Government - Hawaii Dept. of Health Letter Issued
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action Letter - Restricted Use

HAKUYOSHA HAWAII, INC (Continued) **S106817254**

Document Date: 03/30/2011
Document Number: 2011-184-SPM
Document Subject: No Further Action with Institutional Controls Determination for Clean Living - Hakuyosha Internation
Project Manager: Steve Mow
Contact Information: (808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

HI SPILLS:
Island: Oahu
Supplemental Loc. Text: Not reported
Case Number: 19950303
HID Number: Not reported
Facility Registry Id: 110005284414
Lead and Program: HEER EP&R
ER: No
Units: Hakuyosha Hawaii Inc.
Substances: Diesel Fuel
Less Or Greater Than: Not reported
Numerical Quantity: Not reported
Units: Not reported
Activity Type: Response
Activity Lead: Bryce Hataoka
Assignment End Date: Not reported
Result: Refer to ISST
File Under: Hakuyosha Hawaii Inc.

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

AIRS:
Facility ID: 0564-01-C
Island: Oahu
Mailing Address: 730 Sheridan Street
Locale: Not reported
Mailing City,St,Zip: Honolulu, HI 96814
Contact Name: Carl Patton
Contact Title: Manager
Description: Petroleum Solvent Dry Cleaning EquipmentThis permit encompasses the following equipment and associated appurtenances:a.Hoyt Petro-Miser Petroleum Solvent Recovery DryerModel PET-50 Serial no. 50-519-GE Maximum capacity: 50 poundsb.Hoyt Petro-Miser Petroleum Solvent Recovery DryerModel PET-50 Serial no. 50-707-GE Maximum capacity: 50 poundsc.Hoyt Petro-Miser Petroleum Solvent Recovery DryerModel PET-50RSerial no. 50R-1074GEMaximum capacity: 50 poundsd.J & T Petroleum Solvent WasherModel 40Serial no. 1024Maximum capacity: 40 poundse.J & T Petroleum Solvent WasherModel 40Serial no. 1023Maximum capacity: 40 pounds

Facility ID: 0462-01-N
Island: Oahu
Mailing Address: 730 Sheridan Street
Locale: Not reported

HAKUYOSHA HAWAII, INC (Continued) **S106817254**

Mailing City,St,Zip: Honolulu, HI 96814
Contact Name: Carl Patton
Contact Title: Manager
Description: 100 hp Steam BoilerThis noncovered source permit, encompasses the following equipment and associated appurtenances:100 hp Steam Boiler, Cleaver-Brooks, model no. CB-200-100-150, serial no. unknown, manufactured date unknown.

58
NW
1/4-1/2
0.373 mi.
1967 ft.

SUPERBLOCK PROPERTIES
NORTH BLOCK (BLDG N15) / SHERIDAN ST
HONOLULU, HI 96814

HI LUST **U003221768**
HI UST **N/A**

Relative:
Higher

Actual:
3 ft.

LUST:
Facility ID: 9-102595
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 06/28/1993
Release ID: 920140
Project Officer: Stanton Enomoto

UST:
Facility ID: 9-102595
Owner: KEEAUMOKU PARTNERS
Owner Address: 820 MILILANI ST, SUITE 820
Ownder City,St,Zip: Honolulu, 96814 96814

Tank ID: R-NT10
Date Installed: Not reported
Tank Status: Permanently Out of Use
Date Closed: 01/07/1992
Tank Capacity: 500
Substance: Used Oil

O59
NW
1/4-1/2
0.374 mi.
1974 ft.

SUPERBLOCK PROPERTIES
SOUTH BLOCK (BLDG S1) / SHERIDAN ST
HONOLULU, HI 96814

HI LUST **U003221769**
HI UST **N/A**

Site 4 of 4 in cluster O

Relative:
Higher

Actual:
3 ft.

LUST:
Facility ID: 9-102596
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 11/29/1993
Release ID: 920141
Project Officer: Jose Ruiz

Facility ID: 9-102596
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 01/05/2004
Release ID: 030033
Project Officer: Jose Ruiz

UST:
Facility ID: 9-102596

SUPERBLOCK PROPERTIES (Continued) **U003221769**

Owner: KEEAUMOKU PARTNERS
Owner Address: 820 MILILANI ST, SUITE 820
Ownder City,St,Zip: Honolulu, 96814 96814

Tank ID: 2
Date Installed: Not reported
Tank Status: Permanently Out of Use
Date Closed: 04/28/2003
Tank Capacity: 1000
Substance: Not Listed

Tank ID: R-ST1
Date Installed: Not reported
Tank Status: Permanently Out of Use
Date Closed: 10/04/1991
Tank Capacity: 1000
Substance: Gasoline

60
NNW
1/4-1/2
0.393 mi.
2077 ft.

Relative:
Higher

Actual:
9 ft.

WENS LIFE CO., INC
808 SHERIDAN ST
HONOLULU, HI 96814

HI LUST **U001235446**
HI UST **N/A**

LUST:
Facility ID: 9-101330
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 06/25/2003
Release ID: 030035
Project Officer: Richard Takaba

UST:
Facility ID: 9-101330
Owner: WENS LIFE CO., INC
Owner Address: 441 WALINA ST. #101
Ownder City,St,Zip: Honolulu, 96814 96814

Tank ID: R-1
Date Installed: 04/22/1979
Tank Status: Permanently Out of Use
Date Closed: 01/13/1998
Tank Capacity: 4000
Substance: Gasoline

Tank ID: R-2
Date Installed: 04/22/1979
Tank Status: Permanently Out of Use
Date Closed: 01/13/1998
Tank Capacity: 2000
Substance: Gasoline

Tank ID: R-3
Date Installed: 04/22/1979
Tank Status: Permanently Out of Use

WENS LIFE CO., INC (Continued) **U001235446**

Date Closed: 01/13/1998
Tank Capacity: 500
Substance: Other

Tank ID: R-4
Date Installed: 04/22/1979
Tank Status: Permanently Out of Use
Date Closed: 01/13/1998
Tank Capacity: 500
Substance: Other

N61 South 1/4-1/2 0.395 mi. 2086 ft. | **DISCOVERY BAY** | **HI LUST** | **U001235625**
1778 ALA MOANA BLVD | **HI UST** | **N/A**
HONOLULU, HI 96815

Site 2 of 2 in cluster N

Relative: Higher

Actual: 3 ft.

LUST:
Facility ID: 9-101921
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 08/31/1995
Release ID: 900018
Project Officer: Not Assigned

UST:
Facility ID: 9-101921
Owner: DISCOVERY BAY
Owner Address: 1778 ALA MOANA BLVD
Ownder City,St,Zip: Honolulu, 96815 96815

Tank ID: R-1
Date Installed: 02/05/1977
Tank Status: Permanently Out of Use
Date Closed: 01/04/1990
Tank Capacity: 2000
Substance: Diesel

M62 West 1/4-1/2 0.396 mi. 2089 ft. | **SEARS ALA MOANA** | **HI SHWS** | **S115488724**
1450 ALA MOANA BLVD | **N/A**
HONOLULU, HI 96814

Site 2 of 2 in cluster M

Relative: Higher

Actual: 3 ft.

SHWS:
Organization: Not reported
Supplemental Location: Ala Moana Center
Island: Oahu
Environmental Interest: Sears Ala Moana
HID Number: Not reported
Facility Registry Identifier: Not reported
Lead Agency: HEER
Program: State
Project Manager: Cal Miyahara
Hazard Priority: NFA
Potential Hazards And Controls: No Hazard

SEARS ALA MOANA (Continued) **S115488724**

Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Ala Moana Center
SDAR Environmental Interest Name:	Sears Ala Moana
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Progran Name:	State
Potential Hazard And Controls:	No Hazard
Priority:	NFA
Assessment:	Assessment Ongoing
Response:	Response Complete
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Not reported
Use Restrictions:	No Hazard Present For Unrestricted Residential Use
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action Letter - Unrestricted Residential Use
Document Date:	12/30/2013
Document Number:	Not reported
Document Subject:	Final Site Investigation and Response Action Report Sears Car Care Facility, 1450 Ala Moana Boulevar
Project Manager:	Cal Miyahara
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

P63 **TESORO 2GO 61018** **HI LUST** **U003402801**
NNE **1549 S KING ST** **HI UST** **N/A**
1/4-1/2 **HONOLULU, HI 96826** **HI Financial Assurance**
0.407 mi.
2147 ft. **Site 1 of 2 in cluster P**

Relative:
Higher

Actual:
15 ft.

LUST:

Facility ID:	9-100059
Facility Status:	LUST Cleanup Initiated
Facility Status Date:	08/22/2010
Release ID:	100006
Project Officer:	Shunsheng Fu

UST:

Facility ID:	9-100059
Owner:	HIE Retail, LLC
Owner Address:	800 Gessner Road, Suite 875
Ownder City,St,Zip:	Honolulu, 96826 96826
Tank ID:	1 - 87
Date Installed:	03/07/2014
Tank Status:	**Currently In Use**
Date Closed:	Not reported
Tank Capacity:	10000
Substance:	Gasohol
Tank ID:	1 - 87
Date Installed:	03/07/2014
Tank Status:	**Currently In Use**

TESORO 2GO 61018 (Continued) **U003402801**

Date Closed: Not reported
Tank Capacity: 10000
Substance: Gasohol

Tank ID: 2 - 87
Date Installed: 03/07/2014
Tank Status: Currently In Use
Date Closed: Not reported
Tank Capacity: 10000
Substance: Gasohol

Tank ID: 2 - 87
Date Installed: 03/07/2014
Tank Status: Currently In Use
Date Closed: Not reported
Tank Capacity: 10000
Substance: Gasohol

Tank ID: 3-92
Date Installed: 03/07/2014
Tank Status: Currently In Use
Date Closed: Not reported
Tank Capacity: 10000
Substance: Gasohol

Tank ID: 3-92
Date Installed: 03/07/2014
Tank Status: Currently In Use
Date Closed: Not reported
Tank Capacity: 10000
Substance: Gasohol

Tank ID: r-3
Date Installed: 01/25/1987
Tank Status: Permanently out of Use
Date Closed: 01/19/2014
Tank Capacity: 10000
Substance: Gasoline

Tank ID: r-3
Date Installed: 01/25/1987
Tank Status: Permanently out of Use
Date Closed: 01/19/2014
Tank Capacity: 10000
Substance: Gasoline

Tank ID: r-87
Date Installed: 01/25/1987
Tank Status: Permanently out of Use
Date Closed: 01/29/2014

TESORO 2GO 61018 (Continued) **U003402801**

Tank Capacity: 10000
Substance: Gasoline

Tank ID: r-87
Date Installed: 01/25/1987
Tank Status: Permanently out of Use
Date Closed: 01/29/2014
Tank Capacity: 10000
Substance: Gasoline

Tank ID: r-92
Date Installed: 01/25/1987
Tank Status: Permanently out of Use
Date Closed: 01/29/2014
Tank Capacity: 10000
Substance: Gasoline

Tank ID: r-92
Date Installed: 01/25/1987
Tank Status: Permanently out of Use
Date Closed: 01/29/2014
Tank Capacity: 10000
Substance: Gasoline

HI Financial Assurance:
Alt Facility ID: 9-100059
Tank Id: r-3
Tank Status: Permanently out of Use
FRTYPE: Other
Expiration Date: Not reported

Alt Facility ID: 9-100059
Tank Id: 3-92
Tank Status: Currently In Use
FRTYPE: Other
Expiration Date: Not reported

Alt Facility ID: 9-100059
Tank Id: r-3
Tank Status: Permanently out of Use
FRTYPE: Trust Fund
Expiration Date: Not reported

Alt Facility ID: 9-100059
Tank Id: 2 - 87
Tank Status: Currently In Use
FRTYPE: Trust Fund
Expiration Date: Not reported

Alt Facility ID: 9-100059
Tank Id: r-92
Tank Status: Permanently out of Use
FRTYPE: Trust Fund
Expiration Date: Not reported

TESORO 2GO 61018 (Continued) **U003402801**

Alt Facility ID: 9-100059
Tank Id: r-87
Tank Status: Permanently out of Use
FRTYPE: Other
Expiration Date: Not reported

Alt Facility ID: 9-100059
Tank Id: 1 - 87
Tank Status: Currently In Use
FRTYPE: Trust Fund
Expiration Date: Not reported

Alt Facility ID: 9-100059
Tank Id: r-87
Tank Status: Permanently out of Use
FRTYPE: Trust Fund
Expiration Date: Not reported

Alt Facility ID: 9-100059
Tank Id: 1 - 87
Tank Status: Currently In Use
FRTYPE: Other
Expiration Date: Not reported

Alt Facility ID: 9-100059
Tank Id: r-92
Tank Status: Permanently out of Use
FRTYPE: Other
Expiration Date: Not reported

Alt Facility ID: 9-100059
Tank Id: 3-92
Tank Status: Currently In Use
FRTYPE: Trust Fund
Expiration Date: Not reported

Alt Facility ID: 9-100059
Tank Id: 2 - 87
Tank Status: Currently In Use
FRTYPE: Other
Expiration Date: Not reported

Alt Facility ID: 9-100059
Tank Id: r-92
Tank Status: Permanently out of Use
FRTYPE: Self Insured
Expiration Date: 03/31/2010

Alt Facility ID: 9-100059
Tank Id: r-3
Tank Status: Permanently out of Use
FRTYPE: Self Insured
Expiration Date: 03/31/2010

Alt Facility ID: 9-100059
Tank Id: r-87
Tank Status: Permanently out of Use

TESORO 2GO 61018 (Continued) **U003402801**

FRTYPE:	Self Insured
Expiration Date:	03/31/2010
Alt Facility ID:	9-100059
Tank Id:	2 - 87
Tank Status:	Currently In Use
FRTYPE:	Self Insured
Expiration Date:	03/31/2010
Alt Facility ID:	9-100059
Tank Id:	1 - 87
Tank Status:	Currently In Use
FRTYPE:	Self Insured
Expiration Date:	03/31/2010
Alt Facility ID:	9-100059
Tank Id:	3-92
Tank Status:	Currently In Use
FRTYPE:	Self Insured
Expiration Date:	03/31/2010
Alt Facility ID:	9-100059
Tank Id:	3-92
Tank Status:	Currently In Use
FRTYPE:	Guarantee
Expiration Date:	03/31/2012
Alt Facility ID:	9-100059
Tank Id:	r-87
Tank Status:	Permanently out of Use
FRTYPE:	Guarantee
Expiration Date:	03/31/2012
Alt Facility ID:	9-100059
Tank Id:	r-3
Tank Status:	Permanently out of Use
FRTYPE:	Guarantee
Expiration Date:	03/31/2012
Alt Facility ID:	9-100059
Tank Id:	r-92
Tank Status:	Permanently out of Use
FRTYPE:	Guarantee
Expiration Date:	03/31/2012
Alt Facility ID:	9-100059
Tank Id:	1 - 87
Tank Status:	Currently In Use
FRTYPE:	Guarantee
Expiration Date:	03/31/2012
Alt Facility ID:	9-100059
Tank Id:	2 - 87
Tank Status:	Currently In Use
FRTYPE:	Guarantee
Expiration Date:	03/31/2012

TESORO 2GO 61018 (Continued) **U003402801**

Alt Facility ID: 9-100059
Tank Id: 3-92
Tank Status: Currently In Use
FRTYPE: Insurance
Expiration Date: 09/25/2014

Alt Facility ID: 9-100059
Tank Id: r-87
Tank Status: Permanently out of Use
FRTYPE: Insurance
Expiration Date: 09/25/2014

Alt Facility ID: 9-100059
Tank Id: r-3
Tank Status: Permanently out of Use
FRTYPE: Insurance
Expiration Date: 09/25/2014

Alt Facility ID: 9-100059
Tank Id: 2 - 87
Tank Status: Currently In Use
FRTYPE: Insurance
Expiration Date: 09/25/2014

Alt Facility ID: 9-100059
Tank Id: r-92
Tank Status: Permanently out of Use
FRTYPE: Insurance
Expiration Date: 09/25/2014

Alt Facility ID: 9-100059
Tank Id: 1 - 87
Tank Status: Currently In Use
FRTYPE: Insurance
Expiration Date: 09/25/2014

Q64 **GAS PLUS** **HI LUST** **U001235103**
NNE **1524 S KING ST** **HI UST** **N/A**
1/4-1/2 **HONOLULU, HI 96826**
0.420 mi.
2220 ft. **Site 1 of 3 in cluster Q**

Relative:
Higher

Actual:
17 ft.

LUST:
Facility ID: 9-100224
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 06/01/2011
Release ID: 960030
Project Officer: To VRP

UST:
Facility ID: 9-100224
Owner: FIRST DISCOUNT AUTO LEASING CORP
Owner Address: 1580 MAKALOA ST., SUITE 880
Ownder City,St,Zip: Honolulu, 96826 96826

Tank ID: R-001
Date Installed: 05/16/1985

GAS PLUS (Continued) **U001235103**

Tank Status: **Permanently Out of Use**
Date Closed: 07/20/1995
Tank Capacity: 10000
Substance: Gasoline

Tank ID: R-002
Date Installed: 05/16/1985
Tank Status: **Permanently Out of Use**
Date Closed: 07/21/1995
Tank Capacity: 12000
Substance: Gasoline

Tank ID: R-003
Date Installed: 05/16/1985
Tank Status: **Permanently Out of Use**
Date Closed: 07/21/1995
Tank Capacity: 12000
Substance: Gasoline

Q65 **MID PAC PETROLEUM 253943 (PREV: LIONEL'S UNOCAL)** **HI LUST** **U001235016**
North **1505 S. KING ST.** **HI UST** **N/A**
1/4-1/2 **HONOLULU, HI 96826** **HI Financial Assurance**
0.422 mi.
2228 ft. **Site 2 of 3 in cluster Q**

Relative:
Higher

Actual:
17 ft.

LUST:
Facility ID: 9-100041
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 12/09/1998
Release ID: 960074
Project Officer: Shunsheng Fu

Facility ID: 9-100041
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 05/20/1996
Release ID: 930032
Project Officer: Shunsheng Fu

Facility ID: 9-100041
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 10/01/2007
Release ID: 070020
Project Officer: Shunsheng Fu

UST:
Facility ID: 9-100041
Owner: Mid Pac Petroleum LLC
Owner Address: 677 Ala Moana Blvd Suite 625
Ownder City,St,Zip: Honolulu, 96826 96826

Tank ID: R-3943-1
Date Installed: 08/12/1956
Tank Status: **Permanently Out of Use**
Date Closed: 07/01/1996
Tank Capacity: 5000

MID PAC PETROLEUM 253943 (PREV: LIONEL'S UNOCAL) (Continued) **U001235016**

Substance: Gasoline

Tank ID: R-3943-2
Date Installed: 08/12/1956
Tank Status: Permanently Out of Use
Date Closed: 07/01/1996
Tank Capacity: 7500
Substance: Gasoline

Tank ID: R-3943-4
Date Installed: 08/12/1956
Tank Status: Permanently Out of Use
Date Closed: 07/01/1996
Tank Capacity: 550
Substance: Used Oil

Tank ID: r-87
Date Installed: 01/01/1990
Tank Status: Permanently out of Use
Date Closed: 03/29/2007
Tank Capacity: 12000
Substance: Gasoline

Tank ID: r-92
Date Installed: 01/01/1990
Tank Status: Permanently out of Use
Date Closed: 03/29/2007
Tank Capacity: 12000
Substance: Gasoline

HI Financial Assurance:
Alt Facility ID: 9-100041
Tank Id: R-3943-4
Tank Status: Permanently Out of Use
FRTYPE: Insurance
Expiration Date: Not reported

Alt Facility ID: 9-100041
Tank Id: r-92
Tank Status: Permanently out of Use
FRTYPE: Other
Expiration Date: Not reported

Alt Facility ID: 9-100041
Tank Id: r-92
Tank Status: Permanently out of Use
FRTYPE: Insurance
Expiration Date: Not reported

Alt Facility ID: 9-100041
Tank Id: r-87
Tank Status: Permanently out of Use
FRTYPE: Other

MID PAC PETROLEUM 253943 (PREV: LIONEL'S UNOCAL) (Continued) **U001235016**

Expiration Date: Not reported

Alt Facility ID: 9-100041
Tank Id: R-3943-4
Tank Status: Permanently Out of Use
FRTYPE: Other
Expiration Date: Not reported

Alt Facility ID: 9-100041
Tank Id: R-3943-2
Tank Status: Permanently Out of Use
FRTYPE: Other
Expiration Date: Not reported

Alt Facility ID: 9-100041
Tank Id: R-3943-2
Tank Status: Permanently Out of Use
FRTYPE: Insurance
Expiration Date: Not reported

Alt Facility ID: 9-100041
Tank Id: R-3943-1
Tank Status: Permanently Out of Use
FRTYPE: Other
Expiration Date: Not reported

Alt Facility ID: 9-100041
Tank Id: R-3943-1
Tank Status: Permanently Out of Use
FRTYPE: Insurance
Expiration Date: Not reported

Alt Facility ID: 9-100041
Tank Id: r-87
Tank Status: Permanently out of Use
FRTYPE: Insurance
Expiration Date: Not reported

P66 **PUNAHOU REPAIR SHOP** **HI LUST** **1000146579**
NNE **1558 S KING ST** **HI UST** **N/A**
1/4-1/2 **HONOLULU, HI 96826**
0.423 mi.
2231 ft. **Site 2 of 2 in cluster P**

Relative:
Higher

Actual:
17 ft.

LUST:
Facility ID: 9-101387
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 09/26/1997
Release ID: 920184
Project Officer: David Hodges

UST:
Facility ID: 9-101387
Owner: PUNAHOU REPAIR SHOP
Owner Address: 1558 S KING ST
Ownder City,St,Zip: Honolulu, 96826 96826

PUNAHOU REPAIR SHOP (Continued) **1000146579**

Tank ID: R-1
Date Installed: 03/15/1951
Tank Status: Permanently Out of Use
Date Closed: 06/11/1992
Tank Capacity: 2000
Substance: Used Oil

Tank ID: R-2
Date Installed: Not reported
Tank Status: Permanently Out of Use
Date Closed: 06/11/1992
Tank Capacity: 3000
Substance: Gasoline

Tank ID: R-3
Date Installed: Not reported
Tank Status: Permanently Out of Use
Date Closed: 06/11/1992
Tank Capacity: 150
Substance: Used Oil

---

67 WNW 1/4-1/2 0.431 mi. 2276 ft. | **ALA MOANA UNOCAL 1322 KAPIOLANI BLVD HONOLULU, HI 96814** | **HI LUST HI UST** | **U001235012 N/A**

Relative: Higher

Actual: 3 ft.

LUST:
Facility ID: 9-100037
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 10/30/1998
Release ID: 900119
Project Officer: Eric Sadoyama

UST:
Facility ID: 9-100037
Owner: Tosco Marketing Company
Owner Address: P. O. Box 25376
Ownder City,St,Zip: Honolulu, 96814 96814

Tank ID: R-2877-1
Date Installed: 03/27/1967
Tank Status: Permanently Out of Use
Date Closed: 04/01/1990
Tank Capacity: 8000
Substance: Gasoline

Tank ID: R-2877-2
Date Installed: 03/27/1967
Tank Status: Permanently Out of Use
Date Closed: 04/01/1992
Tank Capacity: 8000
Substance: Gasoline

ALA MOANA UNOCAL (Continued) **U001235012**

Tank ID: R-2877-4
Date Installed: 03/27/1967
Tank Status: Permanently Out of Use
Date Closed: 04/01/1990
Tank Capacity: 285
Substance: Used Oil

Tank ID: R-2877-5
Date Installed: 05/31/1990
Tank Status: Permanently Out of Use
Date Closed: 10/06/1992
Tank Capacity: 12000
Substance: Gasoline

Tank ID: R-2877-6
Date Installed: 05/31/1990
Tank Status: Permanently Out of Use
Date Closed: 10/06/1992
Tank Capacity: 12000
Substance: Gasoline

Tank ID: R-2877-7
Date Installed: 05/31/1990
Tank Status: Permanently Out of Use
Date Closed: 10/06/1992
Tank Capacity: 520
Substance: Used Oil

Q68 **ALOHA/KING SELF STORAGE** **HI SHWS** **S106816203**
NNE **1414 KALAKAUA AVE** **HI ENG CONTROLS** **N/A**
1/4-1/2 **HONOLULU, HI** **HI INST CONTROL**
0.470 mi. **HI VCP**
2484 ft. **Site 3 of 3 in cluster Q**

Relative: Higher

Actual: 22 ft.

SHWS:
Organization: Not reported
Supplemental Location: 1524 S King St corner (property on both addresses)
Island: Oahu
Environmental Interest: 1414 Kalakaua Avenue-Aloha/King LLC
HID Number: Not reported
Facility Registry Identifier: Not reported
Lead Agency: HEER
Program: Voluntary Response Program
Project Manager: Cal Miyahara
Hazard Priority: NFA
Potential Hazards And Controls: Hazard Managed With Controls
Organization: Not reported
Island: Oahu
Supplemental Location Text: 1524 S King St corner (property on both addresses)
SDAR Environmental Interest Name: 1414 Kalakaua Avenue-Aloha/King LLC
HID Number: Not reported
Facility Registry Identifier: Not reported
Lead Agency: HEER
Progran Name: Voluntary Response Program
Potential Hazard And Controls: Hazard Managed With Controls

ALOHA/KING SELF STORAGE (Continued) **S106816203**

Priority:	NFA
Assessment:	Response Necessary
Response:	Response Complete
Nature of Contamination:	Found: TPH-GRO, Benzene, Ethylbenzene, and Xylene remain in the soil at concentrations above residential EALs. Poses Direct Exposure, Gross Contamination, and Soil Vapor hazards.
Nature of Residual Contamination:	Not reported
Use Restrictions:	Controls Required to Manage Contamination
Engineering Control:	Engineering Control Required
Description of Restrictions:	Prohibit Any Activity That May Disturb the Integrity of the Capping System
Institutional Control:	Government - Hawaii Dept. of Health Letter Issued
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	Letter of Completion - Restricted Use
Document Date:	07/27/2011
Document Number:	2011-438-CMM
Document Subject:	Memo to ASO - Refund for VRP site (Aloha/King)
Project Manager:	Cal Miyahara
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

ENG CONTROLS:

Supplemental Location Text:	1524 S King St corner (property on both addresses)
Zip Suffix:	Not reported
Island:	Oahu
Potential Hazards And Controls:	Hazard Managed With Controls
Engineering Control:	Engineering Control Required

INST CONTROL:

Potential hazards and controls:	Hazard Managed With Controls
Supplemental Location:	1524 S King St corner (property on both addresses)
Zip Suffix:	Not reported
Island:	Oahu
Institutional Control:	Government - Hawaii Dept. of Health Letter Issued

VCP:

Program:	Voluntary Response Program
Zip Suffix:	Not reported
Supplemental Location:	1524 S King St corner (property on both addresses)
Island:	Oahu

69
SE
1/4-1/2
0.473 mi.
2500 ft.

Relative:
Higher

Actual:
3 ft.

THE PAVILLION **HI SHWS** **S106820617**
1925 KALAKAUA AVE **HI SPILLS** **N/A**
HONOLULU, HI 96815

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Oahu
Environmental Interest:	The Pavillion
HID Number:	Not reported
Facility Registry Identifier:	110013773693
Lead Agency:	SHWB
Program:	State
Project Manager:	Steve Mow

THE PAVILLION (Continued) **S106820617**

Hazard Priority:	NFA
Potential Hazards And Controls:	Hazard Undetermined
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	The Pavillion
HID Number:	Not reported
Facility Registry Identifier:	110013773693
Lead Agency:	SHWB
Progran Name:	State
Potential Hazard And Controls:	Hazard Undetermined
Priority:	NFA
Assessment:	Response Not Necessary
Response:	Not reported
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Not reported
Use Restrictions:	Undetermined
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action - Type Undetermined
Document Date:	03/02/1998
Document Number:	Not reported
Document Subject:	Results of Soil Sampling and Analysis for AOAO the Pavillion
Project Manager:	Steve Mow
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

HI SPILLS:

Island:	Oahu
Supplemental Loc. Text:	Not reported
Case Number:	19980120-1455
HID Number:	Not reported
Facility Registry Id:	110013773693
Lead and Program:	HEER EP&R
ER:	No
Units:	The Pavilion at Waikiki Contaminated Soil
Substances:	Gasoline
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Not reported
Activity Type:	Response
Activity Lead:	Terry Corpus
Assignment End Date:	Not reported
Result:	Referred
File Under:	The Pavilion

---

70 North 1/4-1/2 0.484 mi. 2553 ft. **YAJIMA OIL OF USA INC** **HI LUST** **U001235254**
1375 S KING ST **HI UST** **N/A**
HONOLULU, HI 96814 **HI Financial Assurance**

Relative: Higher

Actual: 15 ft.

LUST:

Facility ID:	9-100832
Facility Status:	Site Cleanup Completed (NFA)
Facility Status Date:	04/25/2003

YAJIMA OIL OF USA INC (Continued) **U001235254**

Release ID: 030031
Project Officer: Shunsheng Fu

Facility ID: 9-100832
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 06/30/2005
Release ID: 930001
Project Officer: Shunsheng Fu

UST:
Facility ID: 9-100832
Owner: YAJIMA OIL OF USA, INC.
Owner Address: 1375 SOUTH KING ST
Ownder City,St,Zip: Honolulu, 96814 96814

Tank ID: 87
Date Installed: 10/01/1985
Tank Status: Currently in Use
Date Closed: Not reported
Tank Capacity: 8000
Substance: Gasoline

Tank ID: 87
Date Installed: 10/01/1985
Tank Status: Currently in Use
Date Closed: Not reported
Tank Capacity: 8000
Substance: Gasoline

Tank ID: 92
Date Installed: 10/01/1985
Tank Status: Currently in Use
Date Closed: Not reported
Tank Capacity: 8000
Substance: Gasoline

Tank ID: R-1
Date Installed: 01/01/1953
Tank Status: Permanently Out of Use
Date Closed: 04/29/1993
Tank Capacity: 350
Substance: Used Oil

HI Financial Assurance:
Alt Facility ID: 9-100832
Tank Id: 87
Tank Status: Currently in Use
FRTYPE: Insurance
Expiration Date: 04/01/2013

Alt Facility ID: 9-100832
Tank Id: R-1
Tank Status: Permanently Out of Use

YAJIMA OIL OF USA INC (Continued) **U001235254**

FRTYPE: Insurance
Expiration Date: 04/01/2013

Alt Facility ID: 9-100832
Tank Id: 92
Tank Status: Currently in Use
FRTYPE: Insurance
Expiration Date: 04/01/2013

R71 WNW 1/4-1/2 0.486 mi. 2568 ft. **ALOHA ALA MOANA** **HI LUST** **U001235401**
451 PIIKOI ST **HI UST** **N/A**
HONOLULU, HI 96814

Site 1 of 2 in cluster R

Relative: Higher

Actual: 3 ft.

LUST:
Facility ID: 9-101180
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 03/11/1996
Release ID: 890004
Project Officer: Roger Brewer

UST:
Facility ID: 9-101180
Owner: ALOHA PETROLEUM, LTD.
Owner Address: 1132 BISHOP STREET, SUITE 1700
Ownder City,St,Zip: Honolulu, 96814 96814

Tank ID: R-01
Date Installed: 04/04/1968
Tank Status: Permanently Out of Use
Date Closed: Not reported
Tank Capacity: 3000
Substance: Gasoline

Tank ID: R-02
Date Installed: 04/04/1968
Tank Status: Permanently Out of Use
Date Closed: Not reported
Tank Capacity: 5000
Substance: Gasoline

Tank ID: R-03
Date Installed: 04/04/1968
Tank Status: Permanently Out of Use
Date Closed: Not reported
Tank Capacity: 4000
Substance: Gasoline

Tank ID: R-04
Date Installed: 04/04/1968
Tank Status: Permanently Out of Use
Date Closed: 08/30/1988
Tank Capacity: 550

ALOHA ALA MOANA (Continued) **U001235401**

Substance: Used Oil

Tank ID: R-05
Date Installed: 04/04/1968
Tank Status: Permanently Out of Use
Date Closed: 08/30/1988
Tank Capacity: 285
Substance: Diesel

R72
WNW
1/4-1/2
0.495 mi.
2611 ft.

NAURU PHOSPHATE ROYALTIES TRUST **HI LUST** **U001235758**
404 PIIKOI ST/1330 ALA MOANA BLVD **N/A**
HONOLULU, HI 96813

Site 2 of 2 in cluster R

Relative:
Higher

Actual:
3 ft.

LUST:
Facility ID: 9-102168
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 09/07/1999
Release ID: 900009
Project Officer: Eric Sadoyama

73
WNW
1/4-1/2
0.496 mi.
2619 ft.

CENPAC PROPERTIES - OFFICE BUILDING **HI SHWS** **U003402842**
615 PIIKOI ST **HI LUST** **N/A**
HONOLULU, HI 96814 **HI UST**
HI SPILLS
HI Financial Assurance

Relative:
Higher

Actual:
3 ft.

SHWS:
Organization: Not reported
Supplemental Location: Iwilei, Honolulu Harbor
Island: Oahu
Environmental Interest: Honolulu Harbor Iwilei District Operating Parties
HID Number: Not reported
Facility Registry Identifier: 110013785868
Lead Agency: HEER
Program: State
Project Manager: Mike Cripps
Hazard Priority: Medium
Potential Hazards And Controls: Hazard Undetermined
Organization: Not reported
Island: Oahu
Supplemental Location Text: Iwilei, Honolulu Harbor
SDAR Environmental Interest Name: Honolulu Harbor Iwilei District Operating Parties
HID Number: Not reported
Facility Registry Identifier: 110013785868
Lead Agency: HEER
Progran Name: State
Potential Hazard And Controls: Hazard Undetermined
Priority: Medium
Assessment: Assessment Ongoing
Response: Not reported
Nature of Contamination: Not reported
Nature of Residual Contamination: Not reported
Use Restrictions: Undetermined

CENPAC PROPERTIES - OFFICE BUILDING (Continued) **U003402842**

Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Honolulu Harbor Iwilei Unit
Site Closure Type:	Not reported
Document Date:	Not reported
Document Number:	Not reported
Document Subject:	Not reported
Project Manager:	Mike Cripps
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

LUST:

Facility ID:	9-103438
Facility Status:	Site Cleanup Completed (NFA)
Facility Status Date:	07/07/1999
Release ID:	990205
Project Officer:	David Hodges

UST:

Facility ID:	9-103438
Owner:	CENPAC PROPERTIES
Owner Address:	1150 S KING ST SUITE 1101
Ownder City,St,Zip:	Honolulu, 96814 96814
Tank ID:	R-M-1
Date Installed:	Not reported
Tank Status:	**Permanently Out of Use**
Date Closed:	10/20/1998
Tank Capacity:	150
Substance:	Diesel

HI SPILLS:

Island:	Oahu
Supplemental Loc. Text:	Honolulu Harbor
Case Number:	20101216-1230
HID Number:	Not reported
Facility Registry Id:	110013785868
Lead and Program:	HEER EP&R
ER:	None
Units:	Potential to release OU1C
Substances:	Petroleum
Less Or Greater Than:	Not reported
Numerical Quantity:	0
Units:	Not reported
Activity Type:	Response
Activity Lead:	Liz Galvez
Assignment End Date:	Not reported
Result:	Pending
File Under:	Iwilei District Participating Parties, LLC

HI Financial Assurance:

Alt Facility ID:	9-103438
Tank Id:	R-M-1
Tank Status:	Permanently Out of Use
FRTYPE:	Insurance

CENPAC PROPERTIES - OFFICE BUILDING (Continued) **U003402842**

Expiration Date: Not reported

Alt Facility ID: 9-103438
Tank Id: R-M-1
Tank Status: Permanently Out of Use
FRTYPE: Surety Bond
Expiration Date: Not reported

74
ENE
1/2-1
0.520 mi.
2743 ft.

CONTINENTAL AUTO SERVICES
1918 ALGAROBA ST
HONOLULU, HI 96826

HI SHWS **S104534121**
HI SPILLS **N/A**

Relative:
Higher

Actual:
7 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Oahu
Environmental Interest:	Continental Auto Services
HID Number:	Not reported
Facility Registry Identifier:	110005723850
Lead Agency:	Not reported
Program:	State
Project Manager:	Charley Langer
Hazard Priority:	NFA
Potential Hazards And Controls:	Hazard Undetermined
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	Continental Auto Services
HID Number:	Not reported
Facility Registry Identifier:	110005723850
Lead Agency:	Not reported
Progran Name:	State
Potential Hazard And Controls:	Hazard Undetermined
Priority:	NFA
Assessment:	Assessment Ongoing
Response:	Not reported
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Not reported
Use Restrictions:	Undetermined
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action - Type Undetermined
Document Date:	10/08/1999
Document Number:	Not reported
Document Subject:	Not reported
Project Manager:	Charley Langer
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

HI SPILLS:

Island:	Oahu
Supplemental Loc. Text:	Not reported
Case Number:	19990119-1030
HID Number:	Not reported

CONTINENTAL AUTO SERVICES (Continued) **S104534121**

Facility Registry Id:	110005723850
Lead and Program:	HEER EP&R
ER:	No
Units:	Continental Auto Service
Substances:	Hydraulic Fluid
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Not reported
Activity Type:	Response
Activity Lead:	Liz Galvez
Assignment End Date:	Not reported
Result:	Refer to ISST
File Under:	Continental Auto Services

---

75 North 1/2-1 0.520 mi. 2743 ft. **MEADOW GOLD DAIRIES (ICE CREAM PLANT)** **HI SHWS S104657475**
1418 YOUNG ST **HI SPILLS N/A**
HONOLULU, HI 96814

Relative: Higher

Actual: 20 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Oahu
Environmental Interest:	Meadow Gold Ice Cream Plant Fuel Oil Spill
HID Number:	Not reported
Facility Registry Identifier:	110013767726
Lead Agency:	HEER
Program:	State
Project Manager:	Cal Miyahara
Hazard Priority:	NFA
Potential Hazards And Controls:	No Hazard
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	Meadow Gold Ice Cream Plant Fuel Oil Spill
HID Number:	Not reported
Facility Registry Identifier:	110013767726
Lead Agency:	HEER
Progran Name:	State
Potential Hazard And Controls:	No Hazard
Priority:	NFA
Assessment:	Response Necessary
Response:	Response Complete
Nature of Contamination:	Found: Low levels of TPH diesel and oil in soil and groundwater - no EAL exceedances.
Nature of Residual Contamination:	Residual TPH at GW smear zone located approximately 20 feet bgs.
Use Restrictions:	No Hazard Present for Unrestricted Residential Use
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action Letter - Unrestricted Residential Use
Document Date:	09/30/2008
Document Number:	2008-664-CMM
Document Subject:	Removal Action Report Former Meadow Gold Dairy 1418 Young St, Honolulu HI
Project Manager:	Cal Miyahara

MEADOW GOLD DAIRIES (ICE CREAM PLANT) (Continued) **S104657475**

Contact Information: (808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

HI SPILLS:

Island:	Oahu
Supplemental Loc. Text:	Not reported
Case Number:	19900904
HID Number:	Not reported
Facility Registry Id:	110013767726
Lead and Program:	HEER EP&R
ER:	Not reported
Units:	MEADOW GOLD DAIRY, YOUNG ST. 1418
Substances:	Ammonia
Less Or Greater Than:	Not reported
Numerical Quantity:	1200
Units:	Pounds
Activity Type:	Response
Activity Lead:	Not reported
Assignment End Date:	Not reported
Result:	SOSC NFA
File Under:	Meadow Gold Dairies, Division of Southern Foods Group, LP

Island:	Oahu
Supplemental Loc. Text:	Not reported
Case Number:	19900904-1
HID Number:	Not reported
Facility Registry Id:	110013767726
Lead and Program:	HEER EP&R
ER:	Not reported
Units:	YOUNG ST. 1418
Substances:	Ammonia
Less Or Greater Than:	Not reported
Numerical Quantity:	200
Units:	Pounds
Activity Type:	Response
Activity Lead:	Not reported
Assignment End Date:	Not reported
Result:	SOSC NFA
File Under:	Meadow Gold Dairies, Division of Southern Foods Group, LP

Island:	Oahu
Supplemental Loc. Text:	Not reported
Case Number:	19901224
HID Number:	Not reported
Facility Registry Id:	110013767726
Lead and Program:	HEER EP&R
ER:	Not reported
Units:	Meadow Gold Ammonia Leak from Chiller
Substances:	Ammonia
Less Or Greater Than:	Not reported
Numerical Quantity:	250
Units:	Pounds
Activity Type:	Response
Activity Lead:	Not reported
Assignment End Date:	Not reported
Result:	SOSC NFA
File Under:	Meadow Gold Dairies, Division of Southern Foods Group, LP

MEADOW GOLD DAIRIES (ICE CREAM PLANT) (Continued) **S104657475**

Island:	Oahu
Supplemental Loc. Text:	Not reported
Case Number:	20071212-1530
HID Number:	Not reported
Facility Registry Id:	110013767726
Lead and Program:	HEER EP&R
ER:	No
Units:	Meadow Gold oil release from a 1000-gallon tank
Substances:	Oil
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Unknown
Activity Type:	Response
Activity Lead:	Liz Galvez
Assignment End Date:	2007-12-13 00:00:00
Result:	Refer to SDAR
File Under:	Meadow Gold Dairies, Division of Southern Foods Group, LP

Island:	Oahu
Supplemental Loc. Text:	Not reported
Case Number:	19960603-1628
HID Number:	Not reported
Facility Registry Id:	110013767726
Lead and Program:	HEER EP&R
ER:	No
Units:	Meadow Gold - Hawaii
Substances:	Ammonia
Less Or Greater Than:	Not reported
Numerical Quantity:	600
Units:	Pounds
Activity Type:	Response
Activity Lead:	Terry Corpus
Assignment End Date:	Not reported
Result:	SOSC NFA
File Under:	Meadow Gold Dairies, Division of Southern Foods Group, LP

Click this hyperlink while viewing on your computer to access
4 additional HI SPILLS: record(s) in the EDR Site Report.

76
NNE
1/2-1
0.531 mi.
2806 ft.

7-11 KALAKAUA
1323 KALAKAUA AVE
HONOLULU, HI 96826

HI SHWS **U001235396**
HI UST **N/A**
HI Financial Assurance

Relative:
Higher

Actual:
29 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Kalakaua Ave & Young St
Island:	Oahu
Environmental Interest:	Aloha 7-Eleven Kalakaua
HID Number:	Not reported
Facility Registry Identifier:	110013782184
Lead Agency:	HEER
Program:	State
Project Manager:	Mark Sutterfield
Hazard Priority:	NFA
Potential Hazards And Controls:	No Hazard
Organization:	Not reported

7-11 KALAKAUA (Continued) **U001235396**

Island:	Oahu
Supplemental Location Text:	Kalakaua Ave & Young St
SDAR Environmental Interest Name:	Aloha 7-Eleven Kalakaua
HID Number:	Not reported
Facility Registry Identifier:	110013782184
Lead Agency:	HEER
Progran Name:	State
Potential Hazard And Controls:	No Hazard
Priority:	NFA
Assessment:	Assessment Ongoing
Response:	Response Complete
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Not reported
Use Restrictions:	No Hazard Present For Unrestricted Residential Use
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action Letter - Unrestricted Residential Use
Document Date:	05/20/2004
Document Number:	Not reported
Document Subject:	Not reported
Project Manager:	Mark Sutterfield
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

UST:

Facility ID:	9-101172
Owner:	Mid Pac Petroleum LLC
Owner Address:	1100 Alakea Street, 8th floor
Ownder City,St,Zip:	Honolulu, 96826 96826

Tank ID:	1a
Date Installed:	06/19/2009
Tank Status:	**Currently in Use**
Date Closed:	Not reported
Tank Capacity:	7000
Substance:	Gasoline

Tank ID:	1b
Date Installed:	06/19/2009
Tank Status:	**Currently In Use**
Date Closed:	Not reported
Tank Capacity:	5000
Substance:	Gasoline

Tank ID:	r-87
Date Installed:	04/04/1985
Tank Status:	**Permanently out of Use**
Date Closed:	06/12/2009
Tank Capacity:	8000
Substance:	Gasoline

Tank ID:	r-89
Date Installed:	04/04/1985

7-11 KALAKAUA (Continued) **U001235396**

Tank Status: **Permanently out of Use**
Date Closed: 06/12/2009
Tank Capacity: 8000
Substance: Gasoline

Tank ID: r-92
Date Installed: 04/04/1985
Tank Status: **Permanently out of Use**
Date Closed: 06/12/2009
Tank Capacity: 8000
Substance: Gasoline

HI Financial Assurance:
Alt Facility ID: 9-101172
Tank Id: 1a
Tank Status: Currently in Use
FRTYPE: Insurance
Expiration Date: 03/31/2013

Alt Facility ID: 9-101172
Tank Id: 1b
Tank Status: Currently In Use
FRTYPE: Insurance
Expiration Date: 03/31/2013

Alt Facility ID: 9-101172
Tank Id: r-87
Tank Status: Permanently out of Use
FRTYPE: Insurance
Expiration Date: 03/31/2013

Alt Facility ID: 9-101172
Tank Id: r-89
Tank Status: Permanently out of Use
FRTYPE: Insurance
Expiration Date: 03/31/2013

Alt Facility ID: 9-101172
Tank Id: r-92
Tank Status: Permanently out of Use
FRTYPE: Insurance
Expiration Date: 03/31/2013

77
WNW
1/2-1
0.564 mi.
2976 ft.

DURANT PROPERTIES
1235 KONA ST
HONOLULU, HI

HI SHWS **S109096045**
HI INST CONTROL **N/A**

Relative:
Higher

Actual:
3 ft.

SHWS:
Organization: Not reported
Supplemental Location: 1226 Waimanu St
Island: Oahu
Environmental Interest: Durant Properties
HID Number: Not reported
Facility Registry Identifier: Not reported

DURANT PROPERTIES (Continued) **S109096045**

Lead Agency:	HEER
Program:	State
Project Manager:	Cal Miyahara
Hazard Priority:	NFA
Potential Hazards And Controls:	Hazard Managed With Controls
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	1226 Waimanu St
SDAR Environmental Interest Name:	Durant Properties
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Progran Name:	State
Potential Hazard And Controls:	Hazard Managed With Controls
Priority:	NFA
Assessment:	Response Necessary
Response:	Response Complete
Nature of Contamination:	Found: Nickel above Tier 1 EAL in GW and Cadmium above Tier 1 EAL in soil.
Nature of Residual Contamination:	Not reported
Use Restrictions:	Controls Required to Manage Contamination
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Government - Hawaii Dept. of Health Letter Issued
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action Letter - Restricted Use
Document Date:	06/17/2011
Document Number:	2011-323-CMM
Document Subject:	Environmental Hazard Evaluation & Environmental Hazard Management Plan, 1235 Kona St, February 2011
Project Manager:	Cal Miyahara
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

INST CONTROL:

Potential hazards and controls:	Hazard Managed With Controls
Supplemental Location:	1226 Waimanu St
Zip Suffix:	Not reported
Island:	Oahu
Institutional Control:	Government - Hawaii Dept. of Health Letter Issued

---

78
WNW
1/2-1
0.574 mi.
3031 ft.

Relative:
Higher

Actual:
3 ft.

EVERSHINE X **HI SHWS** **S105262688**
1230 KAPIOLANI BLVD **HI VCP** **N/A**
HONOLULU, HI 96814

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Oahu
Environmental Interest:	Evershine X
HID Number:	Not reported
Facility Registry Identifier:	110013780934
Lead Agency:	HEER
Program:	Voluntary Response Program
Project Manager:	Mark Sutterfield
Hazard Priority:	NFA

EVERSHINE X (Continued) **S105262688**

Potential Hazards And Controls:	No Hazard
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	Evershine X
HID Number:	Not reported
Facility Registry Identifier:	110013780934
Lead Agency:	HEER
Progran Name:	Voluntary Response Program
Potential Hazard And Controls:	No Hazard
Priority:	NFA
Assessment:	Response Necessary
Response:	Response Complete
Nature of Contamination:	Found: Petroleum products
Nature of Residual Contamination:	Petroleum contaminated soil
Use Restrictions:	No Hazard Present For Unrestricted Residential Use
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	Letter of Completion - Unrestricted Residential Use
Document Date:	08/18/2004
Document Number:	2004-338-MS
Document Subject:	LOC for Evershine X no conditions
Project Manager:	Mark Sutterfield
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

VCP:

Program:	Voluntary Response Program
Zip Suffix:	Not reported
Supplemental Location:	Not reported
Island:	Oahu

---

79 **CHEVRON 2002 KALAKAUA** **HI SHWS** **U001235436**
SE **2002 KALAKAUA AVE** **HI LUST** **N/A**
1/2-1 **HONOLULU, HI 96815**
0.578 mi.
3054 ft.

Relative:
Higher

Actual:
3 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Oahu
Environmental Interest:	Chevron 2002 Kalakaua
HID Number:	Not reported
Facility Registry Identifier:	110013779045
Lead Agency:	Not reported
Program:	State
Project Manager:	Amy Playdon
Hazard Priority:	NFA
Potential Hazards And Controls:	No Hazard
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	Chevron 2002 Kalakaua
HID Number:	Not reported
Facility Registry Identifier:	110013779045

CHEVRON 2002 KALAKAUA (Continued) **U001235436**

Lead Agency:	Not reported
Progran Name:	State
Potential Hazard And Controls:	No Hazard
Priority:	NFA
Assessment:	Response Not Necessary
Response:	Not reported
Nature of Contamination:	Found: TPH as diesel and gasoline, BTEX, PAHs, HVOCs, PCBs, metals
Nature of Residual Contamination:	Most TPH levels below HDOH EALs
Use Restrictions:	No Hazard Present For Unrestricted Residential Use
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	Historic NFA - Incomplete Documentation
Document Date:	10/01/1997
Document Number:	Not reported
Document Subject:	Not reported
Project Manager:	Amy Playdon
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

LUST:

Facility ID:	9-101266
Facility Status:	Site Cleanup Completed (NFA)
Facility Status Date:	06/10/1997
Release ID:	920073
Project Officer:	Steven Okoji

80
NNW
1/2-1
0.639 mi.
3374 ft.

GRACE OTSUKA APARTMENT COMPLEX **HI SHWS** **S110061466**
1233 YOUNG ST **HI ENG CONTROLS** **N/A**
HONOLULU, HI 96814 **HI INST CONTROL**

Relative:
Higher

Actual:
17 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Oahu
Environmental Interest:	Grace Otsuka Apartment Complex
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Program:	State
Project Manager:	Kelton Otsuka
Hazard Priority:	NFA
Potential Hazards And Controls:	Hazard Managed With Controls
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	Grace Otsuka Apartment Complex
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Progran Name:	State
Potential Hazard And Controls:	Hazard Managed With Controls
Priority:	NFA
Assessment:	Response Necessary
Response:	Response Complete

GRACE OTSUKA APARTMENT COMPLEX (Continued) **S110061466**

Nature of Contamination:	Not reported
Nature of Residual Contamination:	Soil contaminated with diesel.
Use Restrictions:	Controls Required to Manage Contamination
Engineering Control:	Engineering Control Required
Description of Restrictions:	Not reported
Institutional Control:	Government - Hawaii Dept. of Health Letter Issued
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action Letter - Restricted Use
Document Date:	07/21/2008
Document Number:	2008-482-KO
Document Subject:	Underground Storage Tank Closure and Release Response Report, April 2008, Grace Otsuka Apartment Com
Project Manager:	Kelton Otsuka
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

ENG CONTROLS:

Supplemental Location Text:	Not reported
Zip Suffix:	Not reported
Island:	Oahu
Potential Hazards And Controls:	Hazard Managed With Controls
Engineering Control:	Engineering Control Required

INST CONTROL:

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

---

81
NE
1/2-1
0.649 mi.
3425 ft.

WALLYS GARDEN CENTER **HI SHWS** **S111678012**
1935 S BERETANIA ST **HI SPILLS** **N/A**
HONOLULU, HI

Relative:
Higher

Actual:
20 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Oahu
Environmental Interest:	Wallys Garden Center
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Program:	State
Project Manager:	Cal Miyahara
Hazard Priority:	Medium
Potential Hazards And Controls:	Hazard Present
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	Wallys Garden Center
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Progran Name:	State
Potential Hazard And Controls:	Hazard Present
Priority:	Medium

WALLYS GARDEN CENTER (Continued) **S111678012**

Assessment:	Assessment Ongoing
Response:	Not reported
Nature of Contamination:	Found: TPH diesel (326 mg/kg) and oil (2390 mg/kg) in the parking lot at 4.5 ft bgs.
Nature of Residual Contamination:	Not reported
Use Restrictions:	Controls Required to Manage Contamination
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	Not reported
Document Date:	Not reported
Document Number:	Not reported
Document Subject:	Not reported
Project Manager:	Cal Miyahara
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

HI SPILLS:

Island:	Oahu
Supplemental Loc. Text:	Not reported
Case Number:	20100518-1410
HID Number:	Not reported
Facility Registry Id:	Not reported
Lead and Program:	HEER EP&R
ER:	None
Units:	1935 South Beretania Street
Substances:	Oil
Less Or Greater Than:	Not reported
Numerical Quantity:	0
Units:	Unknown
Activity Type:	Response
Activity Lead:	Liz Galvez
Assignment End Date:	2010-06-21 00:00:00
Result:	Refer to SDAR
File Under:	Asanoma Trust

82
NNW
1/2-1
0.649 mi.
3426 ft.

1012 PIIKOI STREET, ANIN-PIIKOI BUILDING **HI SHWS** **S106815117**
1012 PIIKOI ST **HI SPILLS** **N/A**
HONOLULU, HI 96814

Relative:
Higher

Actual:
13 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Anin-Piikoi Building
Island:	Oahu
Environmental Interest:	Anin-Piikoi Building Site
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	Not reported
Program:	State
Project Manager:	Richard Palmer
Hazard Priority:	NFA
Potential Hazards And Controls:	No Hazard
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Anin-Piikoi Building

1012 PIIKOI STREET, ANIN-PIIKOI BUILDING (Continued) **S106815117**

SDAR Environmental Interest Name:	Anin-Piikoi Building Site
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	Not reported
Progran Name:	State
Potential Hazard And Controls:	No Hazard
Priority:	NFA
Assessment:	Response Necessary
Response:	Response Complete
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Not reported
Use Restrictions:	No Hazard Present for Unrestricted Residential Use
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action Letter - Unrestricted Residential Use
Document Date:	03/16/2004
Document Number:	2004-103-MS
Document Subject:	NFA Anin-Piikoi
Project Manager:	Richard Palmer
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

HI SPILLS:

Island:	Oahu
Supplemental Loc. Text:	Anin-Piikoi Building
Case Number:	20020523-1051
HID Number:	Not reported
Facility Registry Id:	Not reported
Lead and Program:	HEER EP&R
ER:	Not reported
Units:	Anin-Piikoi Building Chemical Spill
Substances:	Chlordane
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Not reported
Activity Type:	Response
Activity Lead:	Terry Corpus
Assignment End Date:	2003-10-07 00:00:00
Result:	Refer to ISST
File Under:	SCI Noel

Island:	Oahu
Supplemental Loc. Text:	Anin-Piikoi Building
Case Number:	20020523-1051
HID Number:	Not reported
Facility Registry Id:	Not reported
Lead and Program:	HEER EP&R
ER:	Not reported
Units:	Anin-Piikoi Building Chemical Spill
Substances:	dieldrin
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Not reported
Activity Type:	Response
Activity Lead:	Terry Corpus
Assignment End Date:	2003-10-07 00:00:00

1012 PIIKOI STREET, ANIN-PIIKOI BUILDING (Continued) **S106815117**

Result:	Refer to ISST
File Under:	SCI Noel
Island:	Oahu
Supplemental Loc. Text:	Anin-Piikoi Building
Case Number:	20020523-1051
HID Number:	Not reported
Facility Registry Id:	Not reported
Lead and Program:	HEER EP&R
ER:	Not reported
Units:	Anin-Piikoi Building Chemical Spill
Substances:	fluoranthene
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Not reported
Activity Type:	Response
Activity Lead:	Terry Corpus
Assignment End Date:	2003-10-07 00:00:00
Result:	Refer to ISST
File Under:	SCI Noel

S83 **MCCULLY UNION SERVICE** **HI SHWS** **U001235168**
ENE **2105 S KING ST** **HI LUST** **N/A**
1/2-1 **HONOLULU, HI 96826** **HI UST**
0.663 mi. **HI ENG CONTROLS**
3500 ft. **Site 1 of 2 in cluster S** **HI INST CONTROL**
HI Financial Assurance

Relative:
Higher

Actual:
10 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Oahu
Environmental Interest:	Former ARCO AM/PM #82111
HID Number:	Not reported
Facility Registry Identifier:	110010627660
Lead Agency:	HEER
Program:	State
Project Manager:	Eric Sadoyama
Hazard Priority:	NFA
Potential Hazards And Controls:	Hazard Managed With Controls
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	Former ARCO AM/PM #82111
HID Number:	Not reported
Facility Registry Identifier:	110010627660
Lead Agency:	HEER
Progran Name:	State
Potential Hazard And Controls:	Hazard Managed With Controls
Priority:	NFA
Assessment:	Response Necessary
Response:	Response Complete
Nature of Contamination:	Found: Petroleum in soil.
Nature of Residual Contamination:	Benzo(a)pyrene in soil.
Use Restrictions:	Controls Required to Manage Contamination
Engineering Control:	Engineering Control Required
Description of Restrictions:	Not reported
Institutional Control:	Government - Hawaii Dept. of Health Letter Issued

MCCULLY UNION SERVICE (Continued) **U001235168**

Within Designated Areawide Contamination: Not reported
Site Closure Type: No Further Action Letter - Restricted Use
Document Date: 08/24/2009
Document Number: 2009-538-ES
Document Subject: Review of Hydraulic Hoist and Clarifier Removal Report, dated November 2002 by Walker Consultants, a
Project Manager: Eric Sadoyama
Contact Information: (808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

LUST:
Facility ID: 9-100341
Facility Status: Monitored Natural Attenuation
Facility Status Date: 10/05/2006
Release ID: 020038
Project Officer: Shunsheng Fu

Facility ID: 9-100341
Facility Status: Active Remediation
Facility Status Date: 04/21/2004
Release ID: 940104
Project Officer: Shunsheng Fu

UST:
Facility ID: 9-100341
Owner: Mid Pac Petroleum LLC
Owner Address: 1100 Alakea Street, 8th floor
Ownder City,St,Zip: Honolulu, 96826 96826

Tank ID: 2A
Date Installed: 04/21/2003
Tank Status: Currently In Use
Date Closed: Not reported
Tank Capacity: 10000
Substance: Gasoline

Tank ID: 2B 92
Date Installed: 04/21/2003
Tank Status: Currently In Use
Date Closed: Not reported
Tank Capacity: 5000
Substance: Gasoline

Tank ID: 87
Date Installed: 04/21/2003
Tank Status: Currently In Use
Date Closed: Not reported
Tank Capacity: 15000
Substance: Gasoline

Tank ID: R-2
Date Installed: 02/07/1983
Tank Status: Permanently Out of Use
Date Closed: 07/19/2002

MCCULLY UNION SERVICE (Continued) **U001235168**

Tank Capacity: 10000
Substance: Gasoline

Tank ID: R-3
Date Installed: 02/07/1983
Tank Status: Permanently Out of Use
Date Closed: 07/19/2002
Tank Capacity: 10000
Substance: Gasoline

Tank ID: R-4
Date Installed: 02/07/1983
Tank Status: Permanently Out of Use
Date Closed: 07/19/2002
Tank Capacity: 10000
Substance: Gasoline

Tank ID: R-5
Date Installed: 02/07/1983
Tank Status: Permanently Out of Use
Date Closed: 07/19/2002
Tank Capacity: 10000
Substance: Gasoline

Tank ID: R-A1
Date Installed: 01/01/1968
Tank Status: Permanently Out of Use
Date Closed: 01/01/1983
Tank Capacity: Not reported
Substance: Gasoline

Tank ID: R-A2
Date Installed: 01/01/1968
Tank Status: Permanently Out of Use
Date Closed: 01/01/1983
Tank Capacity: Not reported
Substance: Gasoline

Tank ID: R-A3
Date Installed: 01/01/1968
Tank Status: Permanently Out of Use
Date Closed: 01/01/1983
Tank Capacity: Not reported
Substance: Gasoline

Tank ID: R-A4
Date Installed: 01/01/1968
Tank Status: Permanently Out of Use
Date Closed: 01/01/1983
Tank Capacity: Not reported

MCCULLY UNION SERVICE (Continued) **U001235168**

Substance: Diesel

Tank ID: R-A5
Date Installed: 01/01/1968
Tank Status: Permanently Out of Use
Date Closed: 01/01/1983
Tank Capacity: Not reported
Substance: Used Oil

Tank ID: R-I-1
Date Installed: 02/07/1983
Tank Status: Permanently Out of Use
Date Closed: 07/16/2002
Tank Capacity: 550
Substance: Used Oil

ENG CONTROLS:
Supplemental Location Text: Not reported
Zip Suffix: Not reported
Island: Oahu
Potential Hazards And Controls: Hazard Managed With Controls
Engineering Control: Engineering Control Required

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

HI Financial Assurance:
Alt Facility ID: 9-100341
Tank Id: R-2
Tank Status: Permanently Out of Use
FRTYPE: Other
Expiration Date: Not reported

Alt Facility ID: 9-100341
Tank Id: R-I-1
Tank Status: Permanently Out of Use
FRTYPE: Other
Expiration Date: Not reported

Alt Facility ID: 9-100341
Tank Id: R-5
Tank Status: Permanently Out of Use
FRTYPE: Other
Expiration Date: Not reported

Alt Facility ID: 9-100341
Tank Id: R-A1
Tank Status: Permanently Out of Use
FRTYPE: Other
Expiration Date: Not reported

MCCULLY UNION SERVICE (Continued) **U001235168**

Alt Facility ID: 9-100341
Tank Id: R-A3
Tank Status: Permanently Out of Use
FRTYPE: Other
Expiration Date: Not reported

Alt Facility ID: 9-100341
Tank Id: R-4
Tank Status: Permanently Out of Use
FRTYPE: Other
Expiration Date: Not reported

Alt Facility ID: 9-100341
Tank Id: R-3
Tank Status: Permanently Out of Use
FRTYPE: Other
Expiration Date: Not reported

Alt Facility ID: 9-100341
Tank Id: R-A4
Tank Status: Permanently Out of Use
FRTYPE: Other
Expiration Date: Not reported

Alt Facility ID: 9-100341
Tank Id: 87
Tank Status: Currently In Use
FRTYPE: Other
Expiration Date: Not reported

Alt Facility ID: 9-100341
Tank Id: R-A5
Tank Status: Permanently Out of Use
FRTYPE: Other
Expiration Date: Not reported

Alt Facility ID: 9-100341
Tank Id: 2B 92
Tank Status: Currently In Use
FRTYPE: Other
Expiration Date: Not reported

Alt Facility ID: 9-100341
Tank Id: 2A
Tank Status: Currently In Use
FRTYPE: Other
Expiration Date: Not reported

Alt Facility ID: 9-100341
Tank Id: R-A2
Tank Status: Permanently Out of Use
FRTYPE: Other
Expiration Date: Not reported

Alt Facility ID: 9-100341
Tank Id: R-A5
Tank Status: Permanently Out of Use

MCCULLY UNION SERVICE (Continued) **U001235168**

FRTYPE: Insurance
Expiration Date: 03/31/2014

Alt Facility ID: 9-100341
Tank Id: R-A4
Tank Status: Permanently Out of Use
FRTYPE: Insurance
Expiration Date: 03/31/2014

Alt Facility ID: 9-100341
Tank Id: R-A3
Tank Status: Permanently Out of Use
FRTYPE: Insurance
Expiration Date: 03/31/2014

Alt Facility ID: 9-100341
Tank Id: R-I-1
Tank Status: Permanently Out of Use
FRTYPE: Insurance
Expiration Date: 03/31/2014

Alt Facility ID: 9-100341
Tank Id: R-A1
Tank Status: Permanently Out of Use
FRTYPE: Insurance
Expiration Date: 03/31/2014

Alt Facility ID: 9-100341
Tank Id: R-5
Tank Status: Permanently Out of Use
FRTYPE: Insurance
Expiration Date: 03/31/2014

Alt Facility ID: 9-100341
Tank Id: R-4
Tank Status: Permanently Out of Use
FRTYPE: Insurance
Expiration Date: 03/31/2014

Alt Facility ID: 9-100341
Tank Id: R-2
Tank Status: Permanently Out of Use
FRTYPE: Insurance
Expiration Date: 03/31/2014

Alt Facility ID: 9-100341
Tank Id: R-3
Tank Status: Permanently Out of Use
FRTYPE: Insurance
Expiration Date: 03/31/2014

Alt Facility ID: 9-100341
Tank Id: 87
Tank Status: Currently In Use
FRTYPE: Insurance
Expiration Date: 03/31/2014

MCCULLY UNION SERVICE (Continued) **U001235168**

Alt Facility ID:	9-100341
Tank Id:	2B 92
Tank Status:	Currently In Use
FRTYPE:	Insurance
Expiration Date:	03/31/2014

Alt Facility ID:	9-100341
Tank Id:	2A
Tank Status:	Currently In Use
FRTYPE:	Insurance
Expiration Date:	03/31/2014

Alt Facility ID:	9-100341
Tank Id:	R-A2
Tank Status:	Permanently Out of Use
FRTYPE:	Insurance
Expiration Date:	03/31/2014

84
NNE
1/2-1
0.668 mi.
3528 ft.

KAPIOLANI WOMEN'S & CHILDREN'S MEDICAL CENTER
1319 PUNAHOU ST
HONOLULU, HI 96826

HI SHWS **U001235208**
HI UST **N/A**
HI AIRS
HI Financial Assurance

Relative:
Higher

Actual:
43 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Oahu
Environmental Interest:	Kapiolani Medical Center for Women and Children
HID Number:	Not reported
Facility Registry Identifier:	110005730067
Lead Agency:	Not reported
Program:	State
Project Manager:	Unassigned
Hazard Priority:	NFA
Potential Hazards And Controls:	No Hazard
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	Kapiolani Medical Center for Women and Children
HID Number:	Not reported
Facility Registry Identifier:	110005730067
Lead Agency:	Not reported
Progran Name:	State
Potential Hazard And Controls:	No Hazard
Priority:	NFA
Assessment:	Response Not Necessary
Response:	Not reported
Nature of Contamination:	Found: TPH as diesel below DOH EALs following removal of storage tanks
Nature of Residual Contamination:	No contamination remaining
Use Restrictions:	No Hazard Present For Unrestricted Residential Use
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action Letter - Unrestricted Residential Use
Document Date:	07/17/1997
Document Number:	1997-249-RK

KAPIOLANI WOMEN'S & CHILDREN'S MEDICAL CENTER (Continued) **U001235208**

Document Subject: Hazardous Waste Release Response Determination for Kapiolani Medical Center for Women and Children,
Project Manager: Unassigned
Contact Information: (808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

UST:
Facility ID: 9-100740
Owner: KAPIOLANI WOMEN'S & CHILDREN'S MEDICAL CENTER
Owner Address: 1319 PUNAHOU ST
Ownder City,St,Zip: Honolulu, 96826 96826

Tank ID: 1
Date Installed: 10/01/1995
Tank Status: Currently in Use
Date Closed: Not reported
Tank Capacity: 15000
Substance: Diesel

Tank ID: R-001
Date Installed: 03/22/1971
Tank Status: Permanently Out of Use
Date Closed: 04/16/1996
Tank Capacity: 1000
Substance: Diesel

AIRS:
Facility ID: 0588-01-N
Island: Oahu
Mailing Address: 1319 Punahou Street
Locale: Not reported
Mailing City,St,Zip: Honolulu, HI 96826
Contact Name: Francisco "Kiko" Riego De Dios
Contact Title: Facilities Management Director
Description: 125 HP Boiler and 50 HP Exempt Boiler1.Boiler No.1 - 50 HP Cleaver-Brooks boiler #1 (model no. CB 200-50, serial no. L102531, 2.09 MMBtu/hr, fired primarily on synthetic natural gas (SNG) and fuel oil no.2 as a back-up). This boiler is exempt pursuant to Directors discretion as specified in Attachment II, Special Conditions No. B.1.d.2.Boiler No.2 - 125 HP Cleaver-Brooks boiler (model no. CB 200-125-150ST, serial no. L88692, 5.23 MMBtu/hr, fired primarily on SNG and fuel oil no. 2 as back-up).

HI Financial Assurance:
Alt Facility ID: 9-100740
Tank Id: R-001
Tank Status: Permanently Out of Use
FRTYPE: Other
Expiration Date: Not reported

Alt Facility ID: 9-100740
Tank Id: 1
Tank Status: Currently in Use
FRTYPE: Other
Expiration Date: Not reported

KAPIOLANI WOMEN'S & CHILDREN'S MEDICAL CENTER (Continued) **U001235208**

Alt Facility ID:	9-100740
Tank Id:	1
Tank Status:	Currently in Use
FRTYPE:	Insurance
Expiration Date:	08/01/2014

Alt Facility ID:	9-100740
Tank Id:	R-001
Tank Status:	Permanently Out of Use
FRTYPE:	Insurance
Expiration Date:	08/01/2014

S85 **MCDONALD'S RESTAURANT SOIL & GROUNDWATER CONTAMINATION** **HI SHWS** **S105264711**
ENE **2121 S KING ST** **HI SPILLS** **N/A**
1/2-1 **HONOLULU, HI 96826**
0.670 mi.
3538 ft. **Site 2 of 2 in cluster S**

Relative:
Higher

Actual:
10 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Oahu
Environmental Interest:	McDonald's Restaurant Soil & Groundwater Contamination
HID Number:	Not reported
Facility Registry Identifier:	110013767129
Lead Agency:	SHWB
Program:	State
Project Manager:	Richard Palmer
Hazard Priority:	Low
Potential Hazards And Controls:	Hazard Present
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	McDonald's Restaurant Soil & Groundwater Contamination
HID Number:	Not reported
Facility Registry Identifier:	110013767129
Lead Agency:	SHWB
Progran Name:	State
Potential Hazard And Controls:	Hazard Present
Priority:	Low
Assessment:	Assessment Ongoing
Response:	Not reported
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Not reported
Use Restrictions:	Controls Required to Manage Contamination
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	Not reported
Document Date:	Not reported
Document Number:	Not reported
Document Subject:	Not reported
Project Manager:	Richard Palmer
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

HI SPILLS:

MCDONALD'S RESTAURANT SOIL & GROUNDWATER CONTAMINATION (Continued) **S105264711**

Island:	Oahu
Supplemental Loc. Text:	Not reported
Case Number:	19941013
HID Number:	Not reported
Facility Registry Id:	110013767129
Lead and Program:	HEER EP&R
ER:	Not reported
Units:	McDonalds
Substances:	Gasoline
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Not reported
Activity Type:	Response
Activity Lead:	Not reported
Assignment End Date:	Not reported
Result:	SOSC NFA
File Under:	McDonald's Restaurants

Island:	Oahu
Supplemental Loc. Text:	Not reported
Case Number:	19990429-1156
HID Number:	Not reported
Facility Registry Id:	110013767129
Lead and Program:	HEER EP&R
ER:	No
Units:	McDonald's Restaurant Soil & Groundwater Contamination
Substances:	Petroleum
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Not reported
Activity Type:	Response
Activity Lead:	Liz Galvez
Assignment End Date:	Not reported
Result:	Refer to ISST
File Under:	McDonald's Restaurants

T86 **KOOLANI TOWER PROJECT** **HI SHWS** **S106818609**
WNW **1189 WAIMANU ST** **HI SPILLS** **N/A**
1/2-1 **HONOLULU, HI 96814** **HI ENG CONTROLS**
0.672 mi. **HI INST CONTROL**
3550 ft. **Site 1 of 2 in cluster T**

Relative:
Higher

Actual:
3 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Oahu
Environmental Interest:	Koolani Tower Project
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Program:	State
Project Manager:	Mark Sutterfield
Hazard Priority:	NFA
Potential Hazards And Controls:	Hazard Managed With Controls
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	Koolani Tower Project

KOOLANI TOWER PROJECT (Continued) **S106818609**

HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Progran Name:	State
Potential Hazard And Controls:	Hazard Managed With Controls
Priority:	NFA
Assessment:	Response Necessary
Response:	Response Complete
Nature of Contamination:	Found: Lead
Nature of Residual Contamination:	Thin layer of lead covered by new condominium building
Use Restrictions:	Controls Required to Manage Contamination
Engineering Control:	Engineering Control Required
Description of Restrictions:	Prohibit Any Activity That May Disturb the Integrity of the Capping System. Thin layer of lead covered by new condominium building.
Institutional Control:	Government - Hawaii Dept. of Health Letter Issued
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action Letter - Restricted Use
Document Date:	02/02/2006
Document Number:	2006-059-MS
Document Subject:	NFA for footprint of building and parking lot in Area 2
Project Manager:	Mark Sutterfield
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

HI SPILLS:

Island:	Oahu
Supplemental Loc. Text:	Not reported
Case Number:	20040615-1651
HID Number:	Not reported
Facility Registry Id:	Not reported
Lead and Program:	HEER EP&R
ER:	Not reported
Units:	Koolani Tower Project
Substances:	Diesel Fuel
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Unknown
Activity Type:	Response
Activity Lead:	Liz Galvez
Assignment End Date:	Not reported
Result:	Refer to ISST
File Under:	Cresent Heights

ENG CONTROLS:

Supplemental Location Text:	Not reported
Zip Suffix:	Not reported
Island:	Oahu
Potential Hazards And Controls:	Hazard Managed With Controls
Engineering Control:	Engineering Control Required

INST CONTROL:

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

87
North
1/2-1
0.696 mi.
3676 ft.

CARTWRIGHT NEIGHBORHOOD PARK
KEEAUMOKU ST & MATLOCK AVE
HONOLULU, HI 96814

HI SHWS

1006820122
N/A

Relative:
Higher

Actual:
30 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Oahu
Environmental Interest:	Cartwright Neighborhood Park
HID Number:	Not reported
Facility Registry Identifier:	110013780257
Lead Agency:	HEER
Program:	State
Project Manager:	Steve Mow
Hazard Priority:	NFA
Potential Hazards And Controls:	No Hazard
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	Cartwright Neighborhood Park
HID Number:	Not reported
Facility Registry Identifier:	110013780257
Lead Agency:	HEER
Progran Name:	State
Potential Hazard And Controls:	No Hazard
Priority:	NFA
Assessment:	Response Necessary
Response:	Response Complete
Nature of Contamination:	Found: Transformer oil (no PCBs) found on site.
Nature of Residual Contamination:	Not reported
Use Restrictions:	No Hazard Present for Unrestricted Residential Use
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action Letter - Unrestricted Residential Use
Document Date:	05/12/2005
Document Number:	2005-257-SPM
Document Subject:	No Further Action Required at Cartwright Neighborhood Park
Project Manager:	Steve Mow
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

88
NNW
1/2-1
0.717 mi.
3787 ft.

SCHUMAN CARRIAGE MOTORS, LTD.
1234 S BERETANIA ST
HONOLULU, HI 96814

HI SHWS
HI LUST
HI UST
HI SPILLS
HI INST CONTROL
HI Financial Assurance

U003221663
N/A

Relative:
Higher

Actual:
20 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Oahu
Environmental Interest:	Safeway 1234 South Beretania Street Hydraulic Fluid
HID Number:	Not reported
Facility Registry Identifier:	110013778698
Lead Agency:	HEER
Program:	State

SCHUMAN CARRIAGE MOTORS, LTD. (Continued) **U003221663**

Project Manager:	Kelton Otsuka
Hazard Priority:	NFA
Potential Hazards And Controls:	Hazard Managed With Controls
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	Safeway 1234 South Beretania Street Hydraulic Fluid
HID Number:	Not reported
Facility Registry Identifier:	110013778698
Lead Agency:	HEER
Progran Name:	State
Potential Hazard And Controls:	Hazard Managed With Controls
Priority:	NFA
Assessment:	Response Necessary
Response:	Response Complete
Nature of Contamination:	Found: Hydraulic Fluid
Nature of Residual Contamination:	TPH-O from hydraulic lifts. NFA with IC. Contamination left at depths below 7' bgs.
Use Restrictions:	Controls Required to Manage Contamination
Engineering Control:	No Engineering Control Required
Description of Restrictions:	Not reported
Institutional Control:	Government - Hawaii Dept. of Health Letter Issued
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action Letter - Restricted Use
Document Date:	08/26/2011
Document Number:	2011-493-KO
Document Subject:	No Further Action Determination with Institutional Controls for the Safeway #2944 (former Schuman Ca
Project Manager:	Kelton Otsuka
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

LUST:

Facility ID:	9-101276
Facility Status:	Site Cleanup Completed (NFA)
Facility Status Date:	11/03/2005
Release ID:	060001
Project Officer:	Richard Takaba

Facility ID:	9-101276
Facility Status:	Site Cleanup Completed (NFA)
Facility Status Date:	04/19/2000
Release ID:	900058
Project Officer:	Richard Takaba

UST:

Facility ID:	9-101276
Owner:	SCHUMAN CARRIAGE MOTORS, LTD.
Owner Address:	1234 S BERETANIA STP.O. BOX 2420
Ownder City,St,Zip:	Honolulu, 96814 96814

Tank ID:	R-1
Date Installed:	05/05/1961
Tank Status:	**Permanently Out of Use**
Date Closed:	11/09/1999
Tank Capacity:	3000
Substance:	Gasoline

SCHUMAN CARRIAGE MOTORS, LTD. (Continued) **U003221663**

Tank ID: R-2
Date Installed: 05/05/1961
Tank Status: Permanently Out of Use
Date Closed: 11/08/1999
Tank Capacity: 550
Substance: Other

Tank ID: R-3
Date Installed: 05/05/1961
Tank Status: Permanently Out of Use
Date Closed: 11/08/1999
Tank Capacity: 550
Substance: Other

Tank ID: R-4
Date Installed: 05/05/1961
Tank Status: Permanently Out of Use
Date Closed: 12/01/1990
Tank Capacity: 500
Substance: Used Oil

Tank ID: R-6
Date Installed: 05/05/1961
Tank Status: Permanently Out of Use
Date Closed: 12/01/1990
Tank Capacity: 550
Substance: Other

Tank ID: r-5
Date Installed: 03/01/1990
Tank Status: Permanently Out of Use
Date Closed: 01/26/2005
Tank Capacity: 1000
Substance: Used Oil

HI SPILLS:
Island: Oahu
Supplemental Loc. Text: Not reported
Case Number: 19991210-1047
HID Number: Not reported
Facility Registry Id: 110013778698
Lead and Program: HEER EP&R
ER: Referred
Units: Schuman Carriage
Substances: Hydraulic Fluid
Less Or Greater Than: Not reported
Numerical Quantity: Not reported
Units: Not reported
Activity Type: Response
Activity Lead: Liz Galvez
Assignment End Date: Not reported
Result: Refer to ISST
File Under: Safeway, Inc.

SCHUMAN CARRIAGE MOTORS, LTD. (Continued) **U003221663**

INST CONTROL:

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

HI Financial Assurance:

Alt Facility ID:	9-101276
Tank Id:	R-4
Tank Status:	Permanently Out of Use
FRTYPE:	Other
Expiration Date:	Not reported

Alt Facility ID:	9-101276
Tank Id:	R-6
Tank Status:	Permanently Out of Use
FRTYPE:	Other
Expiration Date:	Not reported

Alt Facility ID:	9-101276
Tank Id:	R-6
Tank Status:	Permanently Out of Use
FRTYPE:	Insurance
Expiration Date:	Not reported

Alt Facility ID:	9-101276
Tank Id:	r-5
Tank Status:	Permanently Out of Use
FRTYPE:	Other
Expiration Date:	Not reported

Alt Facility ID:	9-101276
Tank Id:	R-4
Tank Status:	Permanently Out of Use
FRTYPE:	Insurance
Expiration Date:	Not reported

Alt Facility ID:	9-101276
Tank Id:	r-5
Tank Status:	Permanently Out of Use
FRTYPE:	Insurance
Expiration Date:	Not reported

Alt Facility ID:	9-101276
Tank Id:	R-3
Tank Status:	Permanently Out of Use
FRTYPE:	Insurance
Expiration Date:	Not reported

Alt Facility ID:	9-101276
Tank Id:	R-2
Tank Status:	Permanently Out of Use
FRTYPE:	Other
Expiration Date:	Not reported

SCHUMAN CARRIAGE MOTORS, LTD. (Continued) **U003221663**

Alt Facility ID:	9-101276
Tank Id:	R-2
Tank Status:	Permanently Out of Use
FRTYPE:	Insurance
Expiration Date:	Not reported

Alt Facility ID:	9-101276
Tank Id:	R-1
Tank Status:	Permanently Out of Use
FRTYPE:	Other
Expiration Date:	Not reported

Alt Facility ID:	9-101276
Tank Id:	R-1
Tank Status:	Permanently Out of Use
FRTYPE:	Insurance
Expiration Date:	Not reported

Alt Facility ID:	9-101276
Tank Id:	R-3
Tank Status:	Permanently Out of Use
FRTYPE:	Other
Expiration Date:	Not reported

89
SE
1/2-1
0.723 mi.
3819 ft.

ROYAL GARDENS HOTEL DIESEL **HI SHWS** **S110061800**
440 OLOHANA ST **HI SPILLS** **N/A**
HONOLULU, HI

Relative:
Higher

Actual:
3 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Dumpster alleyway right side of bldg from street.
Island:	Oahu
Environmental Interest:	Royal Gardens Hotel Diesel
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Program:	State
Project Manager:	Roger Brewer
Hazard Priority:	NFA
Potential Hazards And Controls:	No Hazard
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Dumpster alleyway right side of bldg from street.
SDAR Environmental Interest Name:	Royal Gardens Hotel Diesel
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Progran Name:	State
Potential Hazard And Controls:	No Hazard
Priority:	NFA
Assessment:	Response Not Necessary
Response:	Not reported
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Diesel in soil at less than EALs.
Use Restrictions:	No Hazard Present for Unrestricted Residential Use
Engineering Control:	Not reported

ROYAL GARDENS HOTEL DIESEL (Continued) **S110061800**

Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Action Letter
Document Date:	12/27/2007
Document Number:	2007-862-RB
Document Subject:	NFA for minor soil removal under drums (not a formal case).
Project Manager:	Roger Brewer
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

HI SPILLS:

Island:	Oahu
Supplemental Loc. Text:	Dumpster alleyway right side of bldg from street.
Case Number:	20071029-0953
HID Number:	Not reported
Facility Registry Id:	Not reported
Lead and Program:	HEER EP&R
ER:	Off Scene
Units:	Royal Gardens Hotel Diesel
Substances:	Diesel Fuel
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Unknown
Activity Type:	Response
Activity Lead:	Mike Cripps
Assignment End Date:	2008-01-07 00:00:00
Result:	SOSC NFA
File Under:	Royal Gardens Hotel

---

90 SE 1/2-1 0.724 mi. 3821 ft. | **KING KALAKAUA PLAZA**
2080 KALAKAUA AVE
HONOLULU, HI 96815

HI SHWS **U003154872**
HI LUST **N/A**
HI UST
HI SPILLS
HI INST CONTROL

Relative: Higher

Actual: 3 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Block bounded by Kalakaua/Olohana/Kuhio/Kalanimoku
Island:	Oahu
Environmental Interest:	King Kalakaua Plaza Development
HID Number:	Not reported
Facility Registry Identifier:	110013769886
Lead Agency:	HEER
Program:	State
Project Manager:	Greg Olmsted
Hazard Priority:	NFA
Potential Hazards And Controls:	No Hazard
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Block bounded by Kalakaua/Olohana/Kuhio/Kalanimoku
SDAR Environmental Interest Name:	King Kalakaua Plaza Development
HID Number:	Not reported
Facility Registry Identifier:	110013769886
Lead Agency:	HEER
Progran Name:	State
Potential Hazard And Controls:	No Hazard
Priority:	NFA

KING KALAKAUA PLAZA (Continued) **U003154872**

Assessment:	Response Necessary
Response:	Response Complete
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Confirmation samples showed maximum concentrations of contaminants including TPH at 14 mg/kg; BTX at 0.15 mg/kg. PAHs were not detected. No contamination above HDOH EALs
Use Restrictions:	No Hazard Present For Unrestricted Residential Use
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Government - Hawaii Dept. of Health Letter Issued
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action Letter - Unrestricted Residential Use
Document Date:	09/28/1998
Document Number:	1998-311-GO
Document Subject:	NFA for Waikiki Gateway Park Site (2080 Kalakaua Ave)
Project Manager:	Greg Olmsted
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

LUST:

Facility ID:	9-103235
Facility Status:	Site Cleanup Completed (NFA)
Facility Status Date:	03/17/2000
Release ID:	960085
Project Officer:	Renato Maniulit

UST:

Facility ID:	9-103235
Owner:	K. YOUNG KALAKAUA PARTNERS INC.
Owner Address:	841 BISHOP ST, SUITE 2250
Ownder City,St,Zip:	Honolulu, 96815 96815
Tank ID:	R-1
Date Installed:	Not reported
Tank Status:	**Permanently Out of Use**
Date Closed:	07/24/1996
Tank Capacity:	300
Substance:	Diesel

HI SPILLS:

Island:	Oahu
Supplemental Loc. Text:	Block bounded by Kalakaua/Olohana/Kuhio/Kalanimoku
Case Number:	20011017-1508
HID Number:	Not reported
Facility Registry Id:	110013769886
Lead and Program:	HEER EP&R
ER:	Not reported
Units:	Fed Ex boxes with white powdery substance
Substances:	Not reported
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Not reported
Activity Type:	Response
Activity Lead:	Terry Corpus
Assignment End Date:	Not reported
Result:	SOSC NFA
File Under:	K. Young-Kalakaua Partners

KING KALAKAUA PLAZA (Continued) **U003154872**

Island:	Oahu
Supplemental Loc. Text:	Block bounded by Kalakaua/Olohana/Kuhio/Kalanimoku
Case Number:	19951114-0900
HID Number:	Not reported
Facility Registry Id:	110013769886
Lead and Program:	HEER EP&R
ER:	No
Units:	Nike Town Building (2080 Kalakaua Ave)
Substances:	Gasoline
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Not reported
Activity Type:	Response
Activity Lead:	Chris Takeno
Assignment End Date:	Not reported
Result:	Refer to ISST
File Under:	K. Young-Kalakaua Partners

INST CONTROL:

Potential hazards and controls:	No Hazard
Supplemental Location:	Block bounded by Kalakaua/Olohana/Kuhio/Kalanimoku
Zip Suffix:	Not reported
Island:	Oahu
Institutional Control:	Government - Hawaii Dept. of Health Letter Issued

---

T91 **RESERVE HOUSING TOWER SOIL CONTAMINATION** **HI SHWS** **1006819959**
WNW **1141 WAIMANU ST** **HI SPILLS** **N/A**
1/2-1 **HONOLULU, HI 96813**
0.726 mi.
3834 ft. **Site 2 of 2 in cluster T**

Relative:
Higher

Actual:
3 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Oahu
Environmental Interest:	Reserve Housing Tower Soil Contamination
HID Number:	Not reported
Facility Registry Identifier:	110013778322
Lead Agency:	Not reported
Program:	State
Project Manager:	Unassigned
Hazard Priority:	NFA
Potential Hazards And Controls:	Hazard Undetermined
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	Reserve Housing Tower Soil Contamination
HID Number:	Not reported
Facility Registry Identifier:	110013778322
Lead Agency:	Not reported
Progran Name:	State
Potential Hazard And Controls:	Hazard Undetermined
Priority:	NFA
Assessment:	Assessment Ongoing
Response:	Not reported
Nature of Contamination:	Found: oil
Nature of Residual Contamination:	contaminants below HDOH EALs, and under a parking garage.

RESERVE HOUSING TOWER SOIL CONTAMINATION (Continued) **1006819959**

Use Restrictions:	Undetermined
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action - Type Undetermined
Document Date:	10/25/1995
Document Number:	Not reported
Document Subject:	Not reported
Project Manager:	Unassigned
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

HI SPILLS:

Island:	Oahu
Supplemental Loc. Text:	Not reported
Case Number:	19951025-2
HID Number:	Not reported
Facility Registry Id:	110013778322
Lead and Program:	HEER EP&R
ER:	No
Units:	Reserve Housing Tower
Substances:	oil/stained soil
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Not reported
Activity Type:	Response
Activity Lead:	Bill Perry
Assignment End Date:	Not reported
Result:	Refer to ISST
File Under:	Reserve Housing Tower

92
WNW
1/2-1
0.787 mi.
4156 ft.

SELF STORAGE 1 **HI SHWS** **1006819998**
438 KAMAKEE ST **HI SPILLS** **N/A**
HONOLULU, HI 96814

Relative:
Higher

Actual:
3 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Oahu
Environmental Interest:	Honolulu Laundry
HID Number:	Not reported
Facility Registry Identifier:	110013778769
Lead Agency:	HEER
Program:	State
Project Manager:	Mark Sutterfield
Hazard Priority:	NFA
Potential Hazards And Controls:	No Hazard
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	Honolulu Laundry
HID Number:	Not reported
Facility Registry Identifier:	110013778769
Lead Agency:	HEER
Progran Name:	State

SELF STORAGE 1 (Continued) **1006819998**

Potential Hazard And Controls:	No Hazard
Priority:	NFA
Assessment:	Response Necessary
Response:	Response Complete
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Petroleum contaminated soil. 2 tanks closed in place; suggested they be removed when site is redeveloped.
Use Restrictions:	No Hazard Present For Unrestricted Residential Use
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action Letter - Unrestricted Residential Use
Document Date:	08/26/2004
Document Number:	2004-350-MS
Document Subject:	NFA letter for Self Storage 1at 438 Kamakee St
Project Manager:	Mark Sutterfield
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

HI SPILLS:

Island:	Oahu
Supplemental Loc. Text:	Not reported
Case Number:	19981028-1300
HID Number:	Not reported
Facility Registry Id:	110013778769
Lead and Program:	HEER EP&R
ER:	Yes
Units:	Self Storage 1 (previously Volkswagon repair shop, Laundry Facility) 5 sand filled UST's onsite
Substances:	Oil/Hydraulic Fluid/Solvents
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Not reported
Activity Type:	Cost Recovery
Activity Lead:	Tricia Nagatani
Assignment End Date:	2002-11-30 00:00:00
Result:	New PM
File Under:	Self Storage 1

Island:	Oahu
Supplemental Loc. Text:	Not reported
Case Number:	19981028-1300
HID Number:	Not reported
Facility Registry Id:	110013778769
Lead and Program:	HEER EP&R
ER:	Yes
Units:	Self Storage 1 (previously Volkswagon repair shop, Laundry Facility) 5 sand filled UST's onsite
Substances:	Oil/Hydraulic Fluid/Solvents
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Not reported
Activity Type:	Response
Activity Lead:	Bill Perry
Assignment End Date:	Not reported
Result:	Refer to ISST
File Under:	Self Storage 1

93 ESE 1/2-1 0.820 mi. 4332 ft. | **ALA WAI COVE CONDOMINIUM APARTMENTS**
509 UNIVERSITY AVE
HONOLULU, HI 96815 | **HI SHWS** | **1006820430**
HI SPILLS | **N/A**

Relative: Higher

Actual: 3 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Oahu
Environmental Interest:	Ala Wai Cove Condominium Apartments
HID Number:	Not reported
Facility Registry Identifier:	110013783888
Lead Agency:	HEER
Program:	State
Project Manager:	John Peard
Hazard Priority:	Low
Potential Hazards And Controls:	Hazard Undetermined
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	Ala Wai Cove Condominium Apartments
HID Number:	Not reported
Facility Registry Identifier:	110013783888
Lead Agency:	HEER
Progran Name:	State
Potential Hazard And Controls:	Hazard Undetermined
Priority:	Low
Assessment:	Assessment Ongoing
Response:	Not reported
Nature of Contamination:	Found: Petroleum in soil.
Nature of Residual Contamination:	Not reported
Use Restrictions:	Undetermined
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	Closed - Documentation Inadequate to Evaluate Risk
Document Date:	07/14/1992
Document Number:	Not reported
Document Subject:	Site Assessment for the Removal of An Underground Storage Tank At the Ala Wai Cove Condominium Apart
Project Manager:	John Peard
Contact Information:	(808) 933-9921 Environmental Health Bldg, 1582 Kamehameha Ave, Hilo, HI 96720

HI SPILLS:

Island:	Oahu
Supplemental Loc. Text:	Not reported
Case Number:	19920714
HID Number:	Not reported
Facility Registry Id:	110013783888
Lead and Program:	HEER EP&R
ER:	Not reported
Units:	Ala Wai Cove Condominium Apartments
Substances:	Not reported
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Not reported

ALA WAI COVE CONDOMINIUM APARTMENTS (Continued) **1006820430**

Activity Type:	Response
Activity Lead:	Not reported
Assignment End Date:	Not reported
Result:	SOSC NFA
File Under:	Ala Wai Cove Condominium Apartments

94
WNW
1/2-1
0.839 mi.
4432 ft.

JAS W GLOVER LTD
1046 WAIMAMU ST
HONOLULU, HI 96814

RCRA NonGen / NLR **1000135795**
FINDS **HID981637861**
HI SHWS
HI LUST
HI UST

Relative:
Higher

Actual:
3 ft.

RCRA NonGen / NLR:

Date form received by agency:	01/09/1987
Facility name:	JAS W GLOVER LTD
Facility address:	1046 WAIMAMU ST HONOLULU, HI 96814
EPA ID:	HID981637861
Mailing address:	PO BOX 579 HONOLULU, HI 96809
Contact:	ENVIRONMENTAL MANAGER
Contact address:	1046 WAIMAMU ST HONOLULU, HI 96814
Contact country:	US
Contact telephone:	(808) 533-1777
Contact email:	Not reported
EPA Region:	09
Land type:	Other land type
Classification:	Non-Generator
Description:	Handler: Non-Generators do not presently generate hazardous waste

Owner/Operator Summary:

Owner/operator name:	JAS W GLOVER
Owner/operator address:	NOT REQUIRED NOT REQUIRED, ME 99999
Owner/operator country:	Not reported
Owner/operator telephone:	(415) 555-1212
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported

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

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No

JAS W GLOVER LTD (Continued) **1000135795**

Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Violation Status: No violations found

Evaluation Action Summary:
Evaluation date: 12/21/1995
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

FINDS:

Registry ID: 110005724252

Environmental Interest/Information System
RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

SHWS:
Organization: Not reported
Supplemental Location: Not reported
Island: Oahu
Environmental Interest: Glover Building
HID Number: Not reported
Facility Registry Identifier: 110005724252
Lead Agency: HEER
Program: State
Project Manager: Melody Calisay
Hazard Priority: NFA
Potential Hazards And Controls: Hazard Undetermined
Organization: Not reported
Island: Oahu
Supplemental Location Text: Not reported
SDAR Environmental Interest Name: Glover Building
HID Number: Not reported
Facility Registry Identifier: 110005724252
Lead Agency: HEER
Progran Name: State
Potential Hazard And Controls: Hazard Undetermined
Priority: NFA
Assessment: Response Necessary

JAS W GLOVER LTD (Continued) **1000135795**

Response:	Response Complete
Nature of Contamination:	Found: Hydraulic fluid
Nature of Residual Contamination:	unknown
Use Restrictions:	Undetermined
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	ISST NFA - No Letter
Document Date:	06/10/2004
Document Number:	Not reported
Document Subject:	Not reported
Project Manager:	Melody Calisay
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

LUST:

Facility ID:	9-100835
Facility Status:	Site Cleanup Completed (NFA)
Facility Status Date:	05/26/2004
Release ID:	020019
Project Officer:	Richard Takaba

UST:

Facility ID:	9-100835
Owner:	JAS W. GLOVER, LTD
Owner Address:	725 KAPIOLANI BLVD, SUITE 306
Ownder City,St,Zip:	Honolulu, 96814 96814
Tank ID:	R-1
Date Installed:	03/07/1937
Tank Status:	**Permanently Out of Use**
Date Closed:	11/12/1990
Tank Capacity:	600
Substance:	Gasoline

95
NNW
1/2-1
0.872 mi.
4603 ft.

Relative:
Higher

Actual:
27 ft.

1310 PENSACOLA STREET **HI SHWS** **S111704658**
1310 PENSACOLA ST **N/A**
HONOLULU, HI

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Oahu
Environmental Interest:	1310 Pensacola Street
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Program:	State
Project Manager:	Paul Chong
Hazard Priority:	NFA
Potential Hazards And Controls:	No Hazard
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	1310 Pensacola Street

1310 PENSACOLA STREET (Continued) **S111704658**

HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Progran Name:	State
Potential Hazard And Controls:	No Hazard
Priority:	NFA
Assessment:	Response Necessary
Response:	Response Complete
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Not reported
Use Restrictions:	No Hazard Present For Unrestricted Residential Use
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action Letter - Unrestricted Residential Use
Document Date:	07/26/2011
Document Number:	2011-433-PC
Document Subject:	No Further Action Determination for the Underground Storage Tank Closure and Release Report dated Ma
Project Manager:	Paul Chong
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

96
WNW
1/2-1
0.872 mi.
4603 ft.

PACIFICA CONDOMINIUM
1009 KAPIOLANI BLVD
HONOLULU, HI 96814

HI SHWS **S110765470**
HI LUST **N/A**

Relative:
Higher

Actual:
3 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Oahu
Environmental Interest:	Pacifica Condominiums
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Program:	State
Project Manager:	Paul Chong
Hazard Priority:	NFA
Potential Hazards And Controls:	No Hazard
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	Pacifica Condominiums
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Progran Name:	State
Potential Hazard And Controls:	No Hazard
Priority:	NFA
Assessment:	Response Necessary
Response:	Response Complete
Nature of Contamination:	Found: Low levels of contaminated soil left in place. Area capped with multistory building
Nature of Residual Contamination:	Not reported
Use Restrictions:	No Hazard Present For Unrestricted Residential Use
Engineering Control:	Not reported

PACIFICA CONDOMINIUM (Continued) **S110765470**

Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action Letter - Unrestricted Residential Use
Document Date:	07/19/2011
Document Number:	2011-399-PC
Document Subject:	Subsurface Soil Assessment Report, Honolulu HI dated October 28, 2010
Project Manager:	Paul Chong
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

LUST:

Facility ID:	9-103909
Facility Status:	Site Cleanup Completed (NFA)
Facility Status Date:	11/07/2011
Release ID:	110013
Project Officer:	Shunsheng Fu

97
SE
1/2-1
0.896 mi.
4730 ft.

Relative:
Higher

Actual:
3 ft.

WAIKIKI BAZAAR **HI SHWS** **1006819697**
2174 KALAKAUA AVE **HI SPILLS** **N/A**
HONOLULU, HI 96816

SHWS:

Organization:	Not reported
Supplemental Location:	2174/2190 Kalakaua Ave
Island:	Oahu
Environmental Interest:	Waikiki Bazaar
HID Number:	Not reported
Facility Registry Identifier:	110013775478
Lead Agency:	HEER
Program:	State
Project Manager:	Diane England
Hazard Priority:	NFA
Potential Hazards And Controls:	No Hazard
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	2174/2190 Kalakaua Ave
SDAR Environmental Interest Name:	Waikiki Bazaar
HID Number:	Not reported
Facility Registry Identifier:	110013775478
Lead Agency:	HEER
Progran Name:	State
Potential Hazard And Controls:	No Hazard
Priority:	NFA
Assessment:	Response Necessary
Response:	Response Complete
Nature of Contamination:	Found: Petroleum in soil
Nature of Residual Contamination:	No (petroleum in soil) contamination left on site is above EALs.
Use Restrictions:	No Hazard Present For Unrestricted Residential Use
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action Letter - Unrestricted Residential Use
Document Date:	11/09/2005
Document Number:	2005-573-DE

WAIKIKI BAZAAR (Continued) **1006819697**

Document Subject:	No Further Action Determination for Release No. 19950222-2
Project Manager:	Diane England
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

HI SPILLS:

Island:	Oahu
Supplemental Loc. Text:	2174/2190 Kalakaua Ave
Case Number:	19950222-2
HID Number:	Not reported
Facility Registry Id:	110013775478
Lead and Program:	HEER EP&R
ER:	Not reported
Units:	Waikiki Bazaar
Substances:	petroleum
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Not reported
Activity Type:	Response
Activity Lead:	Terry Corpus
Assignment End Date:	Not reported
Result:	Refer to ISST
File Under:	Yoneoka and Associates

U98 **HALE PUA NUI UST REMOVAL** **HI SHWS** **S108859671**
SSE **228 BEACH WALK** **HI SPILLS** **N/A**
1/2-1 **HONOLULU, HI 96815**
0.901 mi.
4759 ft. **Site 1 of 2 in cluster U**

Relative:
Higher

Actual:
3 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Former Hale Pua Nui Hotel
Island:	Oahu
Environmental Interest:	Hale Pua Nui UST Removal
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Program:	State
Project Manager:	Paul Chong
Hazard Priority:	Low
Potential Hazards And Controls:	Hazard Undetermined
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Former Hale Pua Nui Hotel
SDAR Environmental Interest Name:	Hale Pua Nui UST Removal
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Progran Name:	State
Potential Hazard And Controls:	Hazard Undetermined
Priority:	Low
Assessment:	Response Necessary
Response:	Response Ongoing
Nature of Contamination:	Found: Diesel Fuel.
Nature of Residual Contamination:	Not reported
Use Restrictions:	Undetermined
Engineering Control:	Not reported

HALE PUA NUI UST REMOVAL (Continued) **S108859671**

Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	Not reported
Document Date:	Not reported
Document Number:	Not reported
Document Subject:	Not reported
Project Manager:	Paul Chong
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

HI SPILLS:

Island:	Oahu
Supplemental Loc. Text:	Former Hale Pua Nui Hotel
Case Number:	20061020-1430
HID Number:	Not reported
Facility Registry Id:	Not reported
Lead and Program:	HEER EP&R
ER:	Not reported
Units:	UST Release Former Hale Pua Nui Hotel
Substances:	Unknown
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Not reported
Activity Type:	Response
Activity Lead:	Not reported
Assignment End Date:	Not reported
Result:	Not reported
File Under:	Brett Hill Management Group

U99 **WAIKIKI BEACH WALK RESORT** **HI SHWS** **S108859866**
SSE **205 BEACH WALK AVE** **HI SPILLS** **N/A**
1/2-1 **HONOLULU, HI** **HI INST CONTROL**
0.925 mi.
4882 ft. **Site 2 of 2 in cluster U**

Relative:
Higher

Actual:
3 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Waikiki
Island:	Oahu
Environmental Interest:	205 Beach Walk
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Program:	State
Project Manager:	Diane England
Hazard Priority:	NFA
Potential Hazards And Controls:	Hazard Managed With Controls
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Waikiki
SDAR Environmental Interest Name:	205 Beach Walk
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Progran Name:	State
Potential Hazard And Controls:	Hazard Managed With Controls
Priority:	NFA

WAIKIKI BEACH WALK RESORT (Continued) **S108859866**

Assessment:	Response Necessary
Response:	Response Complete
Nature of Contamination:	Found: Petroleum in groundwater and soil
Nature of Residual Contamination:	TPH D and Bis(2-theylhexy1)phthalate
Use Restrictions:	Controls Required to Manage Contamination
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Government - Hawaii Dept. of Health Letter Issued
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action Letter - Restricted Use
Document Date:	10/16/2006
Document Number:	2006-641-DE
Document Subject:	No Further Action Determination for Release ID 200511161220
Project Manager:	Diane England
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

HI SPILLS:

Island:	Oahu
Supplemental Loc. Text:	Waikiki
Case Number:	20051116-1220
HID Number:	Not reported
Facility Registry Id:	Not reported
Lead and Program:	HEER EP&R
ER:	No
Units:	Fuel Oil (Diesel) Release
Substances:	Diesel Fuel
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Not reported
Activity Type:	Response
Activity Lead:	Mike Cripps
Assignment End Date:	2005-11-17 00:00:00
Result:	SOSC NFA
File Under:	Waikiki Beach Walk Resort

INST CONTROL:

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

---

100 ESE 1/2-1 0.945 mi. 4989 ft. | **IOLANI SCHOOL PETROLEUM ODOR** | **HI SHWS** | **S106817948**
563 KAMOKU ST | **HI SPILLS** | **N/A**
HONOLULU, HI 96826

Relative: Higher

Actual: 3 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Oahu
Environmental Interest:	Iolani School Petroleum
HID Number:	Not reported
Facility Registry Identifier:	110005723208
Lead Agency:	HEER
Program:	State

IOLANI SCHOOL PETROLEUM ODOR (Continued) **S106817948**

Project Manager:	Liz Galvez
Hazard Priority:	NFA
Potential Hazards And Controls:	No Hazard
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	Iolani School Petroleum
HID Number:	Not reported
Facility Registry Identifier:	110005723208
Lead Agency:	HEER
Progran Name:	State
Potential Hazard And Controls:	No Hazard
Priority:	NFA
Assessment:	Response Necessary
Response:	Response Complete
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Not reported
Use Restrictions:	No Hazard Present For Unrestricted Residential Use
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action Letter - Unrestricted Residential Use
Document Date:	02/13/2001
Document Number:	Not reported
Document Subject:	Limited Phase II Environmental Site Assessment Report
Project Manager:	Liz Galvez
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

HI SPILLS:

Island:	Oahu
Supplemental Loc. Text:	Not reported
Case Number:	20000814-1440
HID Number:	Not reported
Facility Registry Id:	110005723208
Lead and Program:	HEER EP&R
ER:	Site Visit
Units:	Iolani School Petroleum odor
Substances:	Not reported
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Not reported
Activity Type:	Response
Activity Lead:	Liz Galvez
Assignment End Date:	Not reported
Result:	SOSC NFA
File Under:	Iolani School

101 WNW 1/2-1 0.986 mi. 5204 ft. | **HAWAII OPERA THEATER SETS & PROPS WAREHOUSE**
962 KAWAIAHAO ST
HONOLULU, HI | **HI SHWS**
HI SPILLS
HI ENG CONTROLS
HI INST CONTROL | **S115488700**
N/A

Relative: Higher

Actual: 3 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Not reported
Island:	Oahu
Environmental Interest:	Hawaii Opera Theater Sets & Props Warehouse
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	Not reported
Program:	State
Project Manager:	Steve Mow
Hazard Priority:	NFA
Potential Hazards And Controls:	Hazard Managed With Controls
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Not reported
SDAR Environmental Interest Name:	Hawaii Opera Theater Sets & Props Warehouse
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	Not reported
Progran Name:	State
Potential Hazard And Controls:	Hazard Managed With Controls
Priority:	NFA
Assessment:	Response Necessary
Response:	Response Ongoing
Nature of Contamination:	Found: Capped petroleum and lead contamination.
Nature of Residual Contamination:	Not reported
Use Restrictions:	Controls Required to Manage Contamination
Engineering Control:	Engineering Control Required
Description of Restrictions:	Not reported
Institutional Control:	Government - Hawaii Dept. of Health Letter Issued
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action Letter - Restricted Use
Document Date:	04/26/2012
Document Number:	2012-261-SPM
Document Subject:	No Further Action Determination with Institutional Controls for Hawaii Opera Theater Sets & Props Wa
Project Manager:	Steve Mow
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

HI SPILLS:

Island:	Oahu
Supplemental Loc. Text:	Not reported
Case Number:	20120201-1355
HID Number:	Not reported
Facility Registry Id:	Not reported
Lead and Program:	HEER EP&R
ER:	None
Units:	Hawaii Opera Theatre Prop Warehouse
Substances:	Benzopyrene
Less Or Greater Than:	Not reported
Numerical Quantity:	0
Units:	Not reported
Activity Type:	Response

HAWAII OPERA THEATER SETS & PROPS WAREHOUSE (Continued) **S115488700**

Activity Lead:	Curtis Martin
Assignment End Date:	Not reported
Result:	Not reported
File Under:	Hawaii Opera Theater Sets & Props Warehouse

Island:	Oahu
Supplemental Loc. Text:	Not reported
Case Number:	20120201-1355
HID Number:	Not reported
Facility Registry Id:	Not reported
Lead and Program:	HEER EP&R
ER:	None
Units:	Hawaii Opera Theatre Prop Warehouse
Substances:	TPH
Less Or Greater Than:	Not reported
Numerical Quantity:	0
Units:	Not reported
Activity Type:	Response
Activity Lead:	Curtis Martin
Assignment End Date:	Not reported
Result:	Not reported
File Under:	Hawaii Opera Theater Sets & Props Warehouse

ENG CONTROLS:

Supplemental Location Text:	Not reported
Zip Suffix:	Not reported
Island:	Oahu
Potential Hazards And Controls:	Hazard Managed With Controls
Engineering Control:	Engineering Control Required

INST CONTROL:

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

---

102
WNW
1/2-1
0.995 mi.
5255 ft.

SYMPHONY PARK **HI SHWS** **S107022567**
850 KAPIOLANI BLVD **N/A**
HONOLULU, HI 96807

Relative:
Higher

Actual:
3 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Intersection with Ward Avenue
Island:	Oahu
Environmental Interest:	Symphony Park
HID Number:	HID984467654
Facility Registry Identifier:	110013778206
Lead Agency:	HEER
Program:	State
Project Manager:	Liz Galvez
Hazard Priority:	NFA
Potential Hazards And Controls:	Hazard Undetermined
Organization:	Not reported
Island:	Oahu

SYMPHONY PARK (Continued) **S107022567**

Supplemental Location Text:	Intersection with Ward Avenue
SDAR Environmental Interest Name:	Symphony Park
HID Number:	HID984467654
Facility Registry Identifier:	110013778206
Lead Agency:	HEER
Progran Name:	State
Potential Hazard And Controls:	Hazard Undetermined
Priority:	NFA
Assessment:	Assessment Ongoing
Response:	Not reported
Nature of Contamination:	Not reported
Nature of Residual Contamination:	Not reported
Use Restrictions:	Undetermined
Engineering Control:	Not reported
Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action - Type Undetermined
Document Date:	08/31/1995
Document Number:	Not reported
Document Subject:	Not reported
Project Manager:	Liz Galvez
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

---

103 **PUNAHOU SCHOOL - BARWICK PLAYGROUND** **HI SHWS** **U003541737**
NNE **1601 PUNAHOU ST** **HI LUST** **N/A**
1/2-1 **HONOLULU, HI 96822** **HI UST**
0.999 mi. **HI Financial Assurance**
5276 ft.

Relative:
Higher

Actual:
76 ft.

SHWS:

Organization:	Not reported
Supplemental Location:	Punahou School Firing Range
Island:	Oahu
Environmental Interest:	Punahou School Firing Range
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Program:	State
Project Manager:	Kelton Otsuka
Hazard Priority:	NFA
Potential Hazards And Controls:	No Hazard
Organization:	Not reported
Island:	Oahu
Supplemental Location Text:	Punahou School Firing Range
SDAR Environmental Interest Name:	Punahou School Firing Range
HID Number:	Not reported
Facility Registry Identifier:	Not reported
Lead Agency:	HEER
Progran Name:	State
Potential Hazard And Controls:	No Hazard
Priority:	NFA
Assessment:	Response Necessary
Response:	Response Complete
Nature of Contamination:	Found: Lead in soil.
Nature of Residual Contamination:	Confirmation samples were below HDOH EALs for unrestricted use.
Use Restrictions:	No Hazard Present For Unrestricted Residential Use
Engineering Control:	Not reported

PUNAHOU SCHOOL - BARWICK PLAYGROUND (Continued) **U003541737**

Description of Restrictions:	Not reported
Institutional Control:	Not reported
Within Designated Areawide Contamination:	Not reported
Site Closure Type:	No Further Action Letter - Unrestricted Residential Use
Document Date:	04/06/2010
Document Number:	2010-228-KO
Document Subject:	No Further Action Determination at the Punahou School Firing Range Site
Project Manager:	Kelton Otsuka
Contact Information:	(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814

LUST:

Facility ID:	9-100297
Facility Status:	Site Cleanup Completed (NFA)
Facility Status Date:	02/08/2007
Release ID:	900015
Project Officer:	Shaobin Li

UST:

Facility ID:	9-101653
Owner:	PUNAHOU SCHOOL
Owner Address:	1601 Punahou Street
Ownder City,St,Zip:	Honolulu, 96822 96822

Tank ID:	87
Date Installed:	12/01/1985
Tank Status:	**Currently in Use**
Date Closed:	Not reported
Tank Capacity:	1000
Substance:	Gasoline

Tank ID:	R-1
Date Installed:	03/13/1956
Tank Status:	**Permanently Out of Use**
Date Closed:	12/11/1989
Tank Capacity:	500
Substance:	Gasoline

Tank ID:	R-1
Date Installed:	Not reported
Tank Status:	**Permanently Out of Use**
Date Closed:	12/06/1990
Tank Capacity:	Not reported
Substance:	Not Listed

Tank ID:	R-2
Date Installed:	Not reported
Tank Status:	**Permanently Out of Use**
Date Closed:	12/06/1990
Tank Capacity:	Not reported
Substance:	Not Listed

PUNAHOU SCHOOL - BARWICK PLAYGROUND (Continued) **U003541737**

Tank ID: diesel
Date Installed: 12/01/1985
Tank Status: Currently in Use
Date Closed: Not reported
Tank Capacity: 2000
Substance: Diesel

HI Financial Assurance:
Alt Facility ID: 9-101653
Tank Id: 87
Tank Status: Currently in Use
FRTYPE: Other
Expiration Date: 10/15/2004

Alt Facility ID: 9-101653
Tank Id: diesel
Tank Status: Currently in Use
FRTYPE: Other
Expiration Date: 10/15/2004

Alt Facility ID: 9-101653
Tank Id: 87
Tank Status: Currently in Use
FRTYPE: Insurance
Expiration Date: 10/15/2014

Alt Facility ID: 9-101653
Tank Id: diesel
Tank Status: Currently in Use
FRTYPE: Insurance
Expiration Date: 10/15/2014

Count: 20 records.

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
HONOLULU	1000860447	KEWALO BASIN HARBOR	ALA MOANA BLVD	96814	RCRA NonGen / NLR, CA HAZNET
HONOLULU	1015940123	MRC ROOFING, LLC	P.O BOX 17947		FINDS
HONOLULU	1012087683	PACIFIC COMMERICIAL SERVICES, LLC	PO BOX 235117		FINDS
HONOLULU	1012087673	PENDELTON FLOUR MILLS, LLC DBA HAW	PO BOX 1238		FINDS
HONOLULU	1014696910	PACIFIC AVIATION MUSEUM PEARL HARB	S-84 CONTROL TOWER, FORD ISLAN		FINDS
HONOLULU	1006820751	KAKAAKO MAKAI GATEWAY	COOKE ST & ILALO ST	96814	HI SHWS
HONOLULU	1010349165	SUN PACIFIC SERVICES	309 KOKO ISLAND CIRCLE		FINDS
HONOLULU	1008170446	HORIZON LINES, LLC	1811 LELEIONA STREEET		FINDS
HONOLULU	1008011988	INSTITUTE OF PACIFIC ISLANDS	LOT # 1A KAHAKU RD		FINDS
HONOLULU	S111704706	FORMER KAPALAMA MILITARY RESERVATI	N NIMITZ HWY		HI SHWS
HONOLULU	S108008765	CITIZENS ENERGY SERVICES PIER 38	NIMITZ HWY		HI SHWS, HI SPILLS, HI ENG CONTROLS, HI INST CONTROL
HONOLULU	1012140206	PACIFIC HEIGHTS WSI, PART 1	PACIFIC HEIGHTS RD: HAILI RD T		FINDS
HONOLULU	1016301377	HORIZON LINES LLC	PIER 51 A		FINDS
HONOLULU	1016051998	PACIFIC SHIPYARDS INTERNATIONAL	PIER 41 NIMITZ HIGHWAY		FINDS
HONOLULU	1012302702	HONOLULU MARINE, LLC	PIER 27		FINDS
HONOLULU	1008002972	HORIZON LINES, LLC	PIER 51A SAND ISLAND ACCESS RD		FINDS
HONOLULU	1015951188	ALLIED PACIFIC COMPANY OF HAWAII	232 SAND ISLAND PARKWAY RD		FINDS
HONOLULU	1015915592	NOAA PACIFIC REGIONAL CENTER FORD	1845 WASP BOULEVARD		FINDS
MOKULEIA	S106817395	HAWAIIAN BITUMULS PAVING & PRECAST	FARRINGTON HWY	96826	HI SHWS
MOKULEIA	1003879503	HAWAII BITUMULS & PAVING CO.	TMK: 6-6-1: 2, 33 & 36/FARRING	96826	CERC-NFRAP

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 11/11/2013
Date Made Active in Reports: 01/28/2014
Number of Days to Update: 78

Source: EPA
Telephone: N/A
Last EDR Contact: 07/08/2014
Next Scheduled EDR Contact: 10/20/2014
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 11/11/2013
Date Made Active in Reports: 01/28/2014
Number of Days to Update: 78

Source: EPA
Telephone: N/A
Last EDR Contact: 07/08/2014
Next Scheduled EDR Contact: 10/20/2014
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

Federal Delisted NPL site list

DELISTED NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 11/11/2013
Date Made Active in Reports: 01/28/2014
Number of Days to Update: 78

Source: EPA
Telephone: N/A
Last EDR Contact: 07/08/2014
Next Scheduled EDR Contact: 10/20/2014
Data Release Frequency: Quarterly

Federal CERCLIS list

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 11/11/2013
Date Made Active in Reports: 02/13/2014
Number of Days to Update: 94

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 05/29/2014
Next Scheduled EDR Contact: 09/08/2014
Data Release Frequency: Quarterly

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 04/01/2014
Date Data Arrived at EDR: 07/08/2014
Date Made Active in Reports: 08/22/2014
Number of Days to Update: 45

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 07/08/2014
Next Scheduled EDR Contact: 10/20/2014
Data Release Frequency: Varies

Federal CERCLIS NFRAP site List

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned

Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 11/11/2013
Date Made Active in Reports: 02/13/2014
Number of Days to Update: 94

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 05/29/2014
Next Scheduled EDR Contact: 09/08/2014
Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 03/11/2014
Date Data Arrived at EDR: 03/13/2014
Date Made Active in Reports: 04/09/2014
Number of Days to Update: 27

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 07/02/2014
Next Scheduled EDR Contact: 10/13/2014
Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

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

Date of Government Version: 03/11/2014
Date Data Arrived at EDR: 03/13/2014
Date Made Active in Reports: 04/09/2014
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 07/02/2014
Next Scheduled EDR Contact: 10/13/2014
Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 03/11/2014
Date Data Arrived at EDR: 03/13/2014
Date Made Active in Reports: 04/09/2014
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 07/02/2014
Next Scheduled EDR Contact: 10/13/2014
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 03/11/2014
Date Data Arrived at EDR: 03/13/2014
Date Made Active in Reports: 04/09/2014
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 07/02/2014
Next Scheduled EDR Contact: 10/13/2014
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 03/11/2014
Date Data Arrived at EDR: 03/13/2014
Date Made Active in Reports: 04/09/2014
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 07/02/2014
Next Scheduled EDR Contact: 10/13/2014
Data Release Frequency: Varies

Federal institutional controls / engineering controls registries

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 03/19/2014
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 07/15/2014
Number of Days to Update: 116

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 06/05/2014
Next Scheduled EDR Contact: 09/22/2014
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 03/19/2014
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 07/15/2014
Number of Days to Update: 116

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 06/05/2014
Next Scheduled EDR Contact: 09/22/2014
Data Release Frequency: Varies

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 05/28/2014
Date Data Arrived at EDR: 05/30/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 18

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 08/14/2014
Next Scheduled EDR Contact: 12/01/2014
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 09/30/2013
Date Data Arrived at EDR: 10/01/2013
Date Made Active in Reports: 12/06/2013
Number of Days to Update: 66

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 07/03/2014
Next Scheduled EDR Contact: 07/14/2014
Data Release Frequency: Annually

State- and tribal - equivalent CERCLIS

SHWS: Sites List

Facilities, sites or areas in which the Office of Hazard Evaluation and Emergency Response has an interest, has investigated or may investigate under HRS 128D (includes CERCLIS sites).

Date of Government Version: 01/04/2014
Date Data Arrived at EDR: 02/26/2014
Date Made Active in Reports: 03/07/2014
Number of Days to Update: 9

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 05/30/2014
Next Scheduled EDR Contact: 09/08/2014
Data Release Frequency: Semi-Annually

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

SWF/LF: Permitted Landfills in the State of Hawaii
Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 09/17/2012
Date Data Arrived at EDR: 04/03/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 37

Source: Department of Health
Telephone: 808-586-4245
Last EDR Contact: 07/03/2014
Next Scheduled EDR Contact: 10/13/2014
Data Release Frequency: Varies

State and tribal leaking storage tank lists

LUST: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 06/30/2014
Date Data Arrived at EDR: 07/01/2014
Date Made Active in Reports: 07/02/2014
Number of Days to Update: 1

Source: Department of Health
Telephone: 808-586-4228
Last EDR Contact: 06/13/2014
Next Scheduled EDR Contact: 09/15/2014
Data Release Frequency: Semi-Annually

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 02/01/2013
Date Data Arrived at EDR: 05/01/2013
Date Made Active in Reports: 11/01/2013
Number of Days to Update: 184

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 08/01/2014
Next Scheduled EDR Contact: 11/10/2014
Data Release Frequency: Varies

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 08/04/2014
Date Data Arrived at EDR: 08/05/2014
Date Made Active in Reports: 08/22/2014
Number of Days to Update: 17

Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 04/28/2014
Next Scheduled EDR Contact: 11/10/2014
Data Release Frequency: Varies

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 05/20/2014
Date Data Arrived at EDR: 06/10/2014
Date Made Active in Reports: 08/22/2014
Number of Days to Update: 73

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 04/28/2014
Next Scheduled EDR Contact: 11/10/2014
Data Release Frequency: Quarterly

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 03/01/2013
Date Data Arrived at EDR: 03/01/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 42

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 07/22/2014
Next Scheduled EDR Contact: 11/10/2014
Data Release Frequency: Quarterly

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 08/13/2014
Date Data Arrived at EDR: 08/15/2014
Date Made Active in Reports: 08/22/2014
Number of Days to Update: 7

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 07/22/2014
Next Scheduled EDR Contact: 11/10/2014
Data Release Frequency: Quarterly

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 04/28/2014
Date Data Arrived at EDR: 05/01/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 47

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 04/28/2014
Next Scheduled EDR Contact: 11/10/2014
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 05/14/2014
Date Data Arrived at EDR: 05/15/2014
Date Made Active in Reports: 07/15/2014
Number of Days to Update: 61

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 07/22/2014
Next Scheduled EDR Contact: 11/20/2014
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 07/30/2014
Date Data Arrived at EDR: 08/12/2014
Date Made Active in Reports: 08/22/2014
Number of Days to Update: 10

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 04/22/2014
Next Scheduled EDR Contact: 08/11/2014
Data Release Frequency: Semi-Annually

State and tribal registered storage tank lists

UST: Underground Storage Tank Database
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 06/30/2014
Date Data Arrived at EDR: 07/01/2014
Date Made Active in Reports: 07/02/2014
Number of Days to Update: 1

Source: Department of Health
Telephone: 808-586-4228
Last EDR Contact: 06/13/2014
Next Scheduled EDR Contact: 09/15/2014
Data Release Frequency: Semi-Annually

INDIAN UST R4: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 07/30/2014
Date Data Arrived at EDR: 08/12/2014
Date Made Active in Reports: 08/22/2014
Number of Days to Update: 10

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 04/22/2014
Next Scheduled EDR Contact: 08/11/2014
Data Release Frequency: Semi-Annually

INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 05/20/2014
Date Data Arrived at EDR: 06/10/2014
Date Made Active in Reports: 08/15/2014
Number of Days to Update: 66

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 07/22/2014
Next Scheduled EDR Contact: 11/10/2014
Data Release Frequency: Quarterly

INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 02/01/2013
Date Data Arrived at EDR: 05/01/2013
Date Made Active in Reports: 01/27/2014
Number of Days to Update: 271

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 08/01/2014
Next Scheduled EDR Contact: 11/10/2014
Data Release Frequency: Varies

INDIAN UST R9: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 08/14/2014
Date Data Arrived at EDR: 08/15/2014
Date Made Active in Reports: 08/22/2014
Number of Days to Update: 7

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 07/22/2014
Next Scheduled EDR Contact: 11/10/2014
Data Release Frequency: Quarterly

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 08/04/2014
Date Data Arrived at EDR: 08/05/2014
Date Made Active in Reports: 08/22/2014
Number of Days to Update: 17

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 04/28/2014
Next Scheduled EDR Contact: 11/10/2014
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 07/25/2014
Date Data Arrived at EDR: 07/28/2014
Date Made Active in Reports: 08/22/2014
Number of Days to Update: 25

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 07/22/2014
Next Scheduled EDR Contact: 11/10/2014
Data Release Frequency: Semi-Annually

INDIAN UST R7: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 05/28/2014
Date Data Arrived at EDR: 05/01/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 47

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 04/28/2014
Next Scheduled EDR Contact: 11/10/2014
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 08/13/2014
Date Data Arrived at EDR: 08/15/2014
Date Made Active in Reports: 08/22/2014
Number of Days to Update: 7

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 07/22/2014
Next Scheduled EDR Contact: 11/10/2014
Data Release Frequency: Quarterly

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 55

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 07/08/2014
Next Scheduled EDR Contact: 10/27/2014
Data Release Frequency: Varies

State and tribal institutional control / engineering control registries

ENG CONTROLS: Engineering Control Sites
A listing of sites with engineering controls in place.

Date of Government Version: 01/04/2014
Date Data Arrived at EDR: 02/26/2014
Date Made Active in Reports: 03/07/2014
Number of Days to Update: 9

Source: Department of Health
Telephone: 404-586-4249
Last EDR Contact: 05/30/2014
Next Scheduled EDR Contact: 09/08/2014
Data Release Frequency: Varies

INST CONTROL: Sites with Institutional Controls
Voluntary Remediation Program and Brownfields sites with institutional controls in place.

Date of Government Version: 01/04/2014
Date Data Arrived at EDR: 02/26/2014
Date Made Active in Reports: 03/07/2014
Number of Days to Update: 9

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 05/30/2014
Next Scheduled EDR Contact: 09/08/2014
Data Release Frequency: Varies

State and tribal voluntary cleanup sites

VCP: Voluntary Response Program Sites
Sites participating in the Voluntary Response Program. The purpose of the VRP is to streamline the cleanup process in a way that will encourage prospective developers, lenders, and purchasers to voluntarily cleanup properties.

Date of Government Version: 01/04/2014
Date Data Arrived at EDR: 02/26/2014
Date Made Active in Reports: 03/07/2014
Number of Days to Update: 9

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 05/30/2014
Next Scheduled EDR Contact: 09/08/2014
Data Release Frequency: Varies

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 05/30/2014
Date Data Arrived at EDR: 07/01/2014
Date Made Active in Reports: 08/15/2014
Number of Days to Update: 45

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 07/01/2014
Next Scheduled EDR Contact: 10/13/2014
Data Release Frequency: Varies

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng
A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

State and tribal Brownfields sites

BROWNFIELDS: Brownfields Sites
With certain legal exclusions and additions, the term 'brownfield site' means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.

Date of Government Version: 01/04/2014
Date Data Arrived at EDR: 02/26/2014
Date Made Active in Reports: 03/07/2014
Number of Days to Update: 9

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 05/30/2014
Next Scheduled EDR Contact: 09/08/2014
Data Release Frequency: Varies

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites
Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 07/01/2014
Date Data Arrived at EDR: 07/03/2014
Date Made Active in Reports: 07/28/2014
Number of Days to Update: 25

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 07/03/2014
Next Scheduled EDR Contact: 10/06/2014
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 07/25/2014
Next Scheduled EDR Contact: 11/10/2014
Data Release Frequency: No Update Planned

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 08/01/2014
Next Scheduled EDR Contact: 11/17/2014
Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

US CDL: Clandestine Drug Labs
A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 05/28/2014
Date Data Arrived at EDR: 06/20/2014
Date Made Active in Reports: 07/15/2014
Number of Days to Update: 25

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 06/04/2014
Next Scheduled EDR Contact: 09/15/2014
Data Release Frequency: Quarterly

CDL: Clandestine Drug Lab Listing
A listing of clandestine drug lab site locations.

Date of Government Version: 08/04/2010
Date Data Arrived at EDR: 09/10/2010
Date Made Active in Reports: 10/22/2010
Number of Days to Update: 42

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 07/30/2014
Next Scheduled EDR Contact: 09/15/2014
Data Release Frequency: Varies

US HIST CDL: National Clandestine Laboratory Register
A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 05/28/2014
Date Data Arrived at EDR: 06/20/2014
Date Made Active in Reports: 07/15/2014
Number of Days to Update: 25

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 06/04/2014
Next Scheduled EDR Contact: 09/15/2014
Data Release Frequency: No Update Planned

Local Land Records

LIENS 2: CERCLA Lien Information
A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 02/18/2014
Date Data Arrived at EDR: 03/18/2014
Date Made Active in Reports: 04/24/2014
Number of Days to Update: 37

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 07/22/2014
Next Scheduled EDR Contact: 11/10/2014
Data Release Frequency: Varies

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System
Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 03/31/2014
Date Data Arrived at EDR: 04/01/2014
Date Made Active in Reports: 07/15/2014
Number of Days to Update: 105

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 07/01/2014
Next Scheduled EDR Contact: 10/13/2014
Data Release Frequency: Annually

SPILLS: Release Notifications
Releases of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988.

Date of Government Version: 01/04/2014
Date Data Arrived at EDR: 02/26/2014
Date Made Active in Reports: 03/10/2014
Number of Days to Update: 12

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 05/30/2014
Next Scheduled EDR Contact: 09/08/2014
Data Release Frequency: Varies

SPILLS 90: SPILLS90 data from FirstSearch
Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 03/10/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/11/2013
Number of Days to Update: 39

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 03/11/2014
Date Data Arrived at EDR: 03/13/2014
Date Made Active in Reports: 04/09/2014
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 07/02/2014
Next Scheduled EDR Contact: 10/13/2014
Data Release Frequency: Varies

DOT OPS: Incident and Accident Data
Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 08/06/2014
Next Scheduled EDR Contact: 11/17/2014
Data Release Frequency: Varies

DOD: Department of Defense Sites
This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 07/18/2014
Next Scheduled EDR Contact: 10/27/2014
Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 02/28/2014
Date Made Active in Reports: 04/24/2014
Number of Days to Update: 55

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 06/04/2014
Next Scheduled EDR Contact: 09/22/2014
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 01/24/2014
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 31

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 06/30/2014
Next Scheduled EDR Contact: 10/13/2014
Data Release Frequency: Varies

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 11/25/2013
Date Data Arrived at EDR: 12/12/2013
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 74

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 06/10/2014
Next Scheduled EDR Contact: 09/22/2014
Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 09/14/2010
Date Data Arrived at EDR: 10/07/2011
Date Made Active in Reports: 03/01/2012
Number of Days to Update: 146

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 08/20/2014
Next Scheduled EDR Contact: 12/08/2014
Data Release Frequency: Varies

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 01/30/2014
Date Data Arrived at EDR: 03/05/2014
Date Made Active in Reports: 07/15/2014
Number of Days to Update: 132

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 06/06/2014
Next Scheduled EDR Contact: 09/15/2014
Data Release Frequency: Semi-Annually

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 07/31/2013
Date Made Active in Reports: 09/13/2013
Number of Days to Update: 44

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 05/30/2014
Next Scheduled EDR Contact: 09/08/2014
Data Release Frequency: Annually

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 09/29/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 64

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 06/25/2014
Next Scheduled EDR Contact: 10/06/2014
Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 08/19/2014
Next Scheduled EDR Contact: 12/08/2014
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 08/19/2014
Next Scheduled EDR Contact: 12/08/2014
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing

A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing

A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 07/22/2014
Next Scheduled EDR Contact: 11/10/2014
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 05/06/2014
Date Data Arrived at EDR: 05/16/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 32

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 10/09/2014
Next Scheduled EDR Contact: 10/27/2014
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 06/01/2013
Date Data Arrived at EDR: 07/17/2013
Date Made Active in Reports: 11/01/2013
Number of Days to Update: 107

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 07/18/2014
Next Scheduled EDR Contact: 10/27/2014
Data Release Frequency: Annually

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 07/22/2013
Date Data Arrived at EDR: 08/02/2013
Date Made Active in Reports: 11/01/2013
Number of Days to Update: 91

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 06/05/2014
Next Scheduled EDR Contact: 09/22/2014
Data Release Frequency: Quarterly

RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 07/07/2014
Date Data Arrived at EDR: 07/10/2014
Date Made Active in Reports: 07/28/2014
Number of Days to Update: 18

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 07/10/2014
Next Scheduled EDR Contact: 10/20/2014
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 11/18/2013
Date Data Arrived at EDR: 02/27/2014
Date Made Active in Reports: 03/12/2014
Number of Days to Update: 13

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 06/13/2014
Next Scheduled EDR Contact: 09/22/2014
Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 04/01/2014
Date Data Arrived at EDR: 05/23/2014
Date Made Active in Reports: 07/28/2014
Number of Days to Update: 66

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 07/22/2014
Next Scheduled EDR Contact: 11/10/2014
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 04/19/2013
Number of Days to Update: 52

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 05/30/2014
Next Scheduled EDR Contact: 09/08/2014
Data Release Frequency: Biennially

UIC: Underground Injection Wells Listing

A listing of underground injection well locations.

Date of Government Version: 02/07/2013
Date Data Arrived at EDR: 02/12/2013
Date Made Active in Reports: 04/09/2013
Number of Days to Update: 56

Source: Department of Health
Telephone: 808-586-4258
Last EDR Contact: 06/02/2014
Next Scheduled EDR Contact: 09/15/2014
Data Release Frequency: Varies

DRYCLEANERS: Permitted Drycleaner Facility Listing
A listing of permitted drycleaner facilities in the state.

Date of Government Version: 04/01/2014
Date Data Arrived at EDR: 05/09/2014
Date Made Active in Reports: 06/03/2014
Number of Days to Update: 25

Source: Department of Health
Telephone: 808-586-4200
Last EDR Contact: 07/02/2014
Next Scheduled EDR Contact: 10/20/2014
Data Release Frequency: Varies

AIRS: List of Permitted Facilities
A listing of permitted facilities in the state.

Date of Government Version: 07/08/2014
Date Data Arrived at EDR: 07/10/2014
Date Made Active in Reports: 08/08/2014
Number of Days to Update: 29

Source: Department of Health
Telephone: 808-586-4200
Last EDR Contact: 07/02/2014
Next Scheduled EDR Contact: 10/20/2014
Data Release Frequency: Varies

INDIAN RESERV: Indian Reservations
This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 07/18/2014
Next Scheduled EDR Contact: 10/27/2014
Data Release Frequency: Semi-Annually

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing
The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 03/07/2011
Date Data Arrived at EDR: 03/09/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 54

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 07/25/2014
Next Scheduled EDR Contact: 11/03/2014
Data Release Frequency: Varies

Financial Assurance: Financial Assurance Information Listing
A listing of financial assurance information for underground storage tank facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 06/30/2014
Date Data Arrived at EDR: 07/01/2014
Date Made Active in Reports: 07/02/2014
Number of Days to Update: 1

Source: Department of Health
Telephone: 808-586-4226
Last EDR Contact: 06/13/2014
Next Scheduled EDR Contact: 09/29/2014
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information
All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 06/19/2014
Date Data Arrived at EDR: 06/20/2014
Date Made Active in Reports: 07/28/2014
Number of Days to Update: 38

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 08/14/2014
Next Scheduled EDR Contact: 12/01/2014
Data Release Frequency: Quarterly

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 03/14/2014
Date Data Arrived at EDR: 06/11/2014
Date Made Active in Reports: 07/28/2014
Number of Days to Update: 47

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 06/11/2014
Next Scheduled EDR Contact: 09/22/2014
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 02/01/2011
Date Data Arrived at EDR: 10/19/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 83

Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 08/01/2014
Next Scheduled EDR Contact: 11/10/2014
Data Release Frequency: Varies

EPA WATCH LIST: EPA WATCH LIST
EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 08/15/2014
Next Scheduled EDR Contact: 11/24/2014
Data Release Frequency: Quarterly

LEAD SMELTER 1: Lead Smelter Sites
A listing of former lead smelter site locations.

Date of Government Version: 06/04/2014
Date Data Arrived at EDR: 06/12/2014
Date Made Active in Reports: 07/28/2014
Number of Days to Update: 46

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 07/01/2014
Next Scheduled EDR Contact: 10/20/2014
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites
A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties
A listing of verified Potentially Responsible Parties

Date of Government Version: 04/15/2013
Date Data Arrived at EDR: 07/03/2013
Date Made Active in Reports: 09/13/2013
Number of Days to Update: 72

Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 07/01/2014
Next Scheduled EDR Contact: 10/13/2014
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 11/11/2011
Date Data Arrived at EDR: 05/18/2012
Date Made Active in Reports: 05/25/2012
Number of Days to Update: 7

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 08/15/2014
Next Scheduled EDR Contact: 11/24/2014
Data Release Frequency: Varies

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 07/18/2014
Next Scheduled EDR Contact: 10/27/2014
Data Release Frequency: N/A

COAL ASH DOE: Sleam-Electric Plan Operation Data

A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 07/18/2014
Next Scheduled EDR Contact: 10/27/2014
Data Release Frequency: Varies

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)

The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/23/2013
Date Data Arrived at EDR: 11/06/2013
Date Made Active in Reports: 12/06/2013
Number of Days to Update: 30

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 06/25/2014
Next Scheduled EDR Contact: 10/13/2014
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data

A listing of minor source facilities.

Date of Government Version: 10/23/2013
Date Data Arrived at EDR: 11/06/2013
Date Made Active in Reports: 12/06/2013
Number of Days to Update: 30

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 06/25/2014
Next Scheduled EDR Contact: 10/13/2014
Data Release Frequency: Annually

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants

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

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR US Hist Auto Stat: EDR Exclusive Historic Gas Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR US Hist Cleaners: EDR Exclusive Historic Dry Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Health in Hawaii.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/03/2014
Number of Days to Update: 186

Source: Department of Health
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LF: Recovered Government Archive Solid Waste Facilities List
The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Health in Hawaii.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/17/2014
Number of Days to Update: 200

Source: Department of Health
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA HWS: Recovered Government Archive State Hazardous Waste Facilities List
The EDR Recovered Government Archive State Hazardous Waste database provides a list of SHWS incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Health in Hawaii.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/08/2014
Number of Days to Update: 191

Source: Department of Health
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

STREET AND ADDRESS INFORMATION

© 2010 Tele Atlas North America, Inc. All rights reserved. This material is proprietary and the subject of copyright protection and other intellectual property rights owned by or licensed to Tele Atlas North America, Inc. The use of this material is subject to the terms of a license agreement. You will be held liable for any unauthorized copying or disclosure of this material.

GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

SAM KOO PACIFIC, LLC
1631 AND 1637 KAPIOLANI BOULEVARD
HONOLULU, HI 96814

TARGET PROPERTY COORDINATES

Latitude (North):	21.2911 - 21˚ 17' 27.96''
Longitude (West):	157.8392 - 157˚ 50' 21.12''
Universal Tranverse Mercator:	Zone 4
UTM X (Meters):	620413.1
UTM Y (Meters):	2354669.2
Elevation:	3 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	21157-C7 HONOLULU, HI
Most Recent Revision:	Not reported

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principal investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

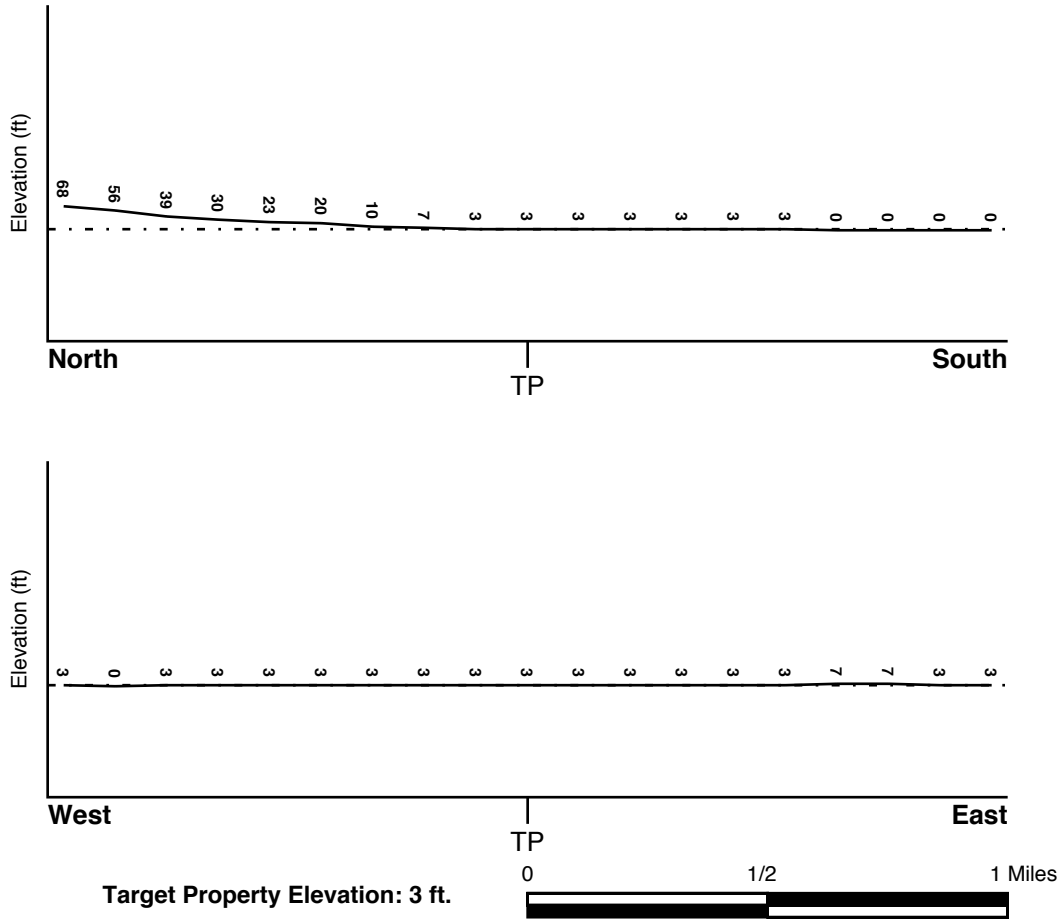
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General South

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Target Property Elevation: 3 ft.

Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Target Property County	FEMA Flood Electronic Data
HONOLULU, HI	YES - refer to the Overview Map and Detail Map

Flood Plain Panel at Target Property: 15003C - FEMA DFIRM Flood data

Additional Panels in search area: Not Reported

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
HONOLULU	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

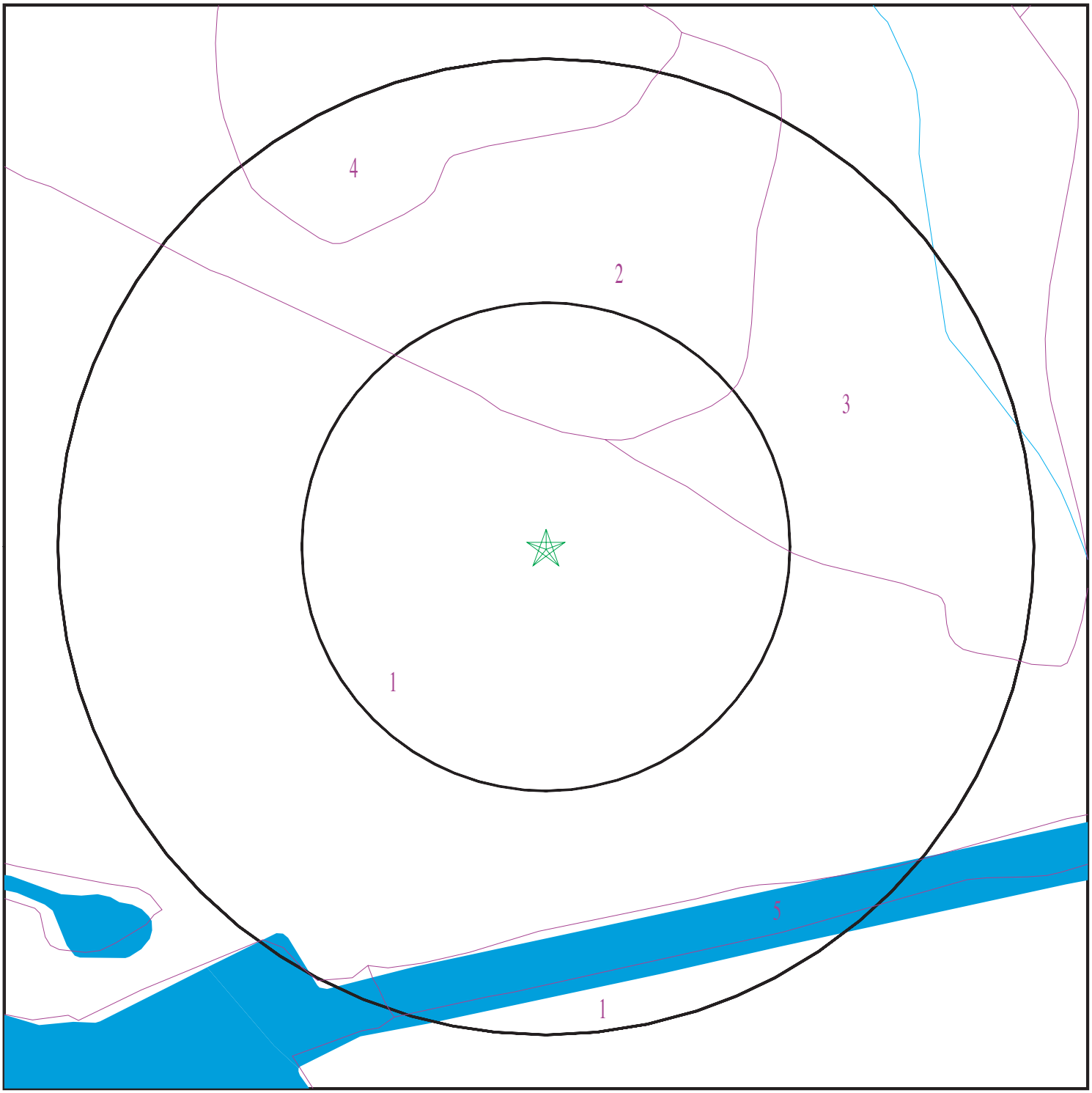
Era:	-
System:	-
Series:	-
Code:	N/A *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: -

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 4046277.2s



Target Property
SSURGO Soil
Water

0 1/16 1/8 1/4 Miles

N

SITE NAME: Sam Koo Pacific, LLC ADDRESS: 1631 and 1637 Kapiolani Boulevard Honolulu HI 96814 LAT/LONG: 21.2911 / 157.8392	CLIENT: Central Planet Repair CONTACT: Ned Murphy INQUIRY #: 4046277.2s DATE: August 25, 2014 1:48 pm

Copyright © 2014 EDR, Inc. © 2010 Tele Atlas Rel. 07/2009.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: Fill land, mixed

Soil Surface Texture: gravelly sandy loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 152 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	5 inches	gravelly sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14 Min: 1.41	Max: 7.3 Min: 6.1
2	5 inches	59 inches	fine sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14 Min: 1.41	Max: 7.3 Min: 6.1
3	59 inches	70 inches	bedrock	Not reported	Not reported	Max: 0.42 Min: 0.02	Max: Min:

Soil Map ID: 2

Soil Component Name: Ewa

Soil Surface Texture: silty clay loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	7 inches	silty clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14 Min: 4.23	Max: 7.3 Min: 6.6
2	7 inches	29 inches	silty clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14 Min: 4.23	Max: 7.3 Min: 6.6
3	29 inches	38 inches	bedrock	Not reported	Not reported	Max: 42 Min: 1	Max: Min:

Soil Map ID: 3

Soil Component Name: Kawaihapai

Soil Surface Texture: clay loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	22 inches	clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 42.34 Min: 4.23	Max: 7.3 Min: 6.6
2	22 inches	31 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141.14 Min: 14.11	Max: 7.3 Min: 6.6
3	31 inches	53 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141.14 Min: 14.11	Max: 7.3 Min: 6.6

Soil Map ID: 4

Soil Component Name: Pearl Harbor

Soil Surface Texture: clay

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Poorly drained

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 30 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	11 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit 50% or more), Fat Clay.	Max: 4.23 Min: 0.42	Max: 7.3 Min: 6.6
2	11 inches	31 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit 50% or more), Fat Clay.	Max: 1.41 Min: 0.01	Max: 8.4 Min: 6.6
3	31 inches	48 inches	muck	A-8	Highly organic soils, Peat.	Max: 0.42 Min: 0.01	Max: 7.8 Min: 7.4

Soil Map ID: 5

Soil Component Name: Water > 40 acres

Soil Surface Texture: clay

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class:
Hydric Status: Unknown

Corrosion Potential - Uncoated Steel: Not Reported

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

No Layer Information available.

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
B5	USGS40000269556	1/4 - 1/2 Mile NNE
C8	USGS40000269561	1/4 - 1/2 Mile NNW
D9	USGS40000269567	1/4 - 1/2 Mile NNE
D10	USGS40000269568	1/4 - 1/2 Mile North
D11	USGS40000269571	1/4 - 1/2 Mile North
E14	USGS40000269572	1/4 - 1/2 Mile North
F16	USGS40000269569	1/4 - 1/2 Mile NNW
G19	USGS40000269559	1/4 - 1/2 Mile NE
H23	USGS40000269497	1/2 - 1 Mile SSE
H24	USGS40000269498	1/2 - 1 Mile SSE
G25	USGS40000269562	1/2 - 1 Mile NE
I28	USGS40000269580	1/2 - 1 Mile NNE
J29	USGS40000269578	1/2 - 1 Mile NNE
L35	USGS40000269555	1/2 - 1 Mile ENE
M37	USGS40000269584	1/2 - 1 Mile NNW
N41	USGS40000269592	1/2 - 1 Mile North
O43	USGS40000269570	1/2 - 1 Mile NE
P44	USGS40000269494	1/2 - 1 Mile SSE
N50	USGS40000269603	1/2 - 1 Mile North
51	USGS40000269490	1/2 - 1 Mile South
Q53	USGS40000269575	1/2 - 1 Mile NE
R55	USGS40000269591	1/2 - 1 Mile NNE
Q57	USGS40000269583	1/2 - 1 Mile NE
Q59	USGS40000269574	1/2 - 1 Mile NE
T60	USGS40000269585	1/2 - 1 Mile NW
U63	USGS40000269566	1/2 - 1 Mile NE
Q65	USGS40000269573	1/2 - 1 Mile NE
V67	USGS40000269607	1/2 - 1 Mile NNE
W69	USGS40000269614	1/2 - 1 Mile NNE
U71	USGS40000269565	1/2 - 1 Mile ENE
S73	USGS40000269590	1/2 - 1 Mile NE
U76	USGS40000269564	1/2 - 1 Mile ENE
X79	USGS40000269632	1/2 - 1 Mile North
Y81	USGS40000269589	1/2 - 1 Mile NE
Y83	USGS40000269587	1/2 - 1 Mile NE
Z84	USGS40000269615	1/2 - 1 Mile NNW
AA87	USGS40000269642	1/2 - 1 Mile North
AB89	USGS40000269619	1/2 - 1 Mile NW
AC90	USGS40000269611	1/2 - 1 Mile NE
AB93	USGS40000269620	1/2 - 1 Mile NW
AD96	USGS40000269602	1/2 - 1 Mile NE

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
AE98	USGS40000269604	1/2 - 1 Mile NW
AE99	USGS40000269605	1/2 - 1 Mile NW
AD100	USGS40000269593	1/2 - 1 Mile NE
AF103	USGS40000269616	1/2 - 1 Mile NW
AG105	USGS40000269530	1/2 - 1 Mile East
AH107	USGS40000269543	1/2 - 1 Mile East
AH108	USGS40000269544	1/2 - 1 Mile East

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
AD95	HI0000324	1/2 - 1 Mile NE

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A1	HI8000000002088	1/8 - 1/4 Mile SW
A2	HI8000000002089	1/8 - 1/4 Mile SW
A3	HI8000000002090	1/8 - 1/4 Mile WSW
4	HI8000000002091	1/8 - 1/4 Mile WSW
B6	HI8000000002117	1/4 - 1/2 Mile NNE
C7	HI8000000002120	1/4 - 1/2 Mile NNW
D12	HI8000000002130	1/4 - 1/2 Mile NNE
D13	HI8000000002134	1/4 - 1/2 Mile North
E15	HI8000000002136	1/4 - 1/2 Mile North
F17	HI8000000002133	1/4 - 1/2 Mile NNW
D18	HI8000000002137	1/4 - 1/2 Mile NNE
G20	HI8000000002123	1/4 - 1/2 Mile NE
H21	HI8000000002053	1/2 - 1 Mile SSE
H22	HI8000000002054	1/2 - 1 Mile SSE
G26	HI8000000002125	1/2 - 1 Mile NE
27	HI8000000002049	1/2 - 1 Mile South
30	HI8000000002099	1/2 - 1 Mile West
I31	HI8000000002146	1/2 - 1 Mile NNE
K32	HI8000000002045	1/2 - 1 Mile South
K33	HI8000000002046	1/2 - 1 Mile South
J34	HI8000000002145	1/2 - 1 Mile NNE
L36	HI8000000002115	1/2 - 1 Mile ENE
M38	HI8000000002148	1/2 - 1 Mile NNW
K39	HI8000000002042	1/2 - 1 Mile South
K40	HI8000000002043	1/2 - 1 Mile South
H42	HI8000000002047	1/2 - 1 Mile SSE
K45	HI8000000002040	1/2 - 1 Mile South
O46	HI8000000002138	1/2 - 1 Mile NE
K47	HI8000000002035	1/2 - 1 Mile South
K48	HI8000000002036	1/2 - 1 Mile South

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
P49	HI8000000002037	1/2 - 1 Mile SSE
N52	HI8000000002170	1/2 - 1 Mile North
Q54	HI8000000002139	1/2 - 1 Mile NE
R56	HI8000000002156	1/2 - 1 Mile NNE
S58	HI8000000002149	1/2 - 1 Mile NE
Q61	HI8000000002140	1/2 - 1 Mile NE
T62	HI8000000002147	1/2 - 1 Mile NW
T64	HI8000000002153	1/2 - 1 Mile NW
U66	HI8000000002131	1/2 - 1 Mile NE
Q68	HI8000000002141	1/2 - 1 Mile NE
V70	HI8000000002181	1/2 - 1 Mile NNE
W72	HI8000000002187	1/2 - 1 Mile NNE
U74	HI8000000002128	1/2 - 1 Mile ENE
S75	HI8000000002157	1/2 - 1 Mile NE
T77	HI8000000002155	1/2 - 1 Mile NW
U78	HI8000000002129	1/2 - 1 Mile ENE
X80	HI8000000002209	1/2 - 1 Mile North
Y82	HI8000000002158	1/2 - 1 Mile NE
Y85	HI8000000002154	1/2 - 1 Mile NE
Z86	HI8000000002188	1/2 - 1 Mile NNW
AA88	HI8000000002222	1/2 - 1 Mile North
AB91	HI8000000002192	1/2 - 1 Mile NW
AC92	HI8000000002183	1/2 - 1 Mile NE
AB94	HI8000000002191	1/2 - 1 Mile NW
AD97	HI8000000002174	1/2 - 1 Mile NE
AE101	HI8000000002169	1/2 - 1 Mile NW
AD102	HI8000000002165	1/2 - 1 Mile NE
AF104	HI8000000002186	1/2 - 1 Mile NW
AG106	HI8000000002092	1/2 - 1 Mile East
AH109	HI8000000002105	1/2 - 1 Mile East
AH110	HI8000000002106	1/2 - 1 Mile East

PHYSICAL SETTING SOURCE MAP - 4046277.2s

County Boundary
Major Roads
Contour Lines
Airports
Earthquake epicenter, Richter 5 or greater
Water Wells
Public Water Supply Wells
Cluster of Multiple Icons

0 1/4 1/2 1 Miles

Groundwater Flow Direction
GI Indeterminate Groundwater Flow at Location
GV Groundwater Flow Varies at Location

N

SITE NAME:	Sam Koo Pacific, LLC	CLIENT:	Central Planet Repair
ADDRESS:	1631 and 1637 Kapiolani Boulevard Honolulu HI 96814	CONTACT:	Ned Murphy
		INQUIRY #:	4046277.2s
LAT/LONG:	21.2911 / 157.8392	DATE:	August 25, 2014 1:48 pm

Copyright © 2014 EDR, Inc. © 2010 Tele Atlas Rel. 07/2009.

Map ID Direction Distance Elevation	Database	EDR ID Number
A1 **SW** **1/8 - 1/4 Mile** **Higher**	**HI WELLS**	**HI8000000002088**

Objectid:	607	Wid:	3-1750-012
Island:	Oahu	Well name:	Yacht Harbor 1
Old name:	Not Reported		
Yr drilled:	1972		
Driller:	Not Reported		
Quad map:	13		
Long83dd:	-157.840833		
Lat83dd:	21.289167		
Gps:	0	Utm:	-1
Owner user:	Yacht Harbor Towers	Old number:	Not Reported
Well type:	Not Reported	Casing dia:	Not Reported
Ground el:	Not Reported		
Well depth:	0		
Solid case:	Not Reported	Perf case:	Not Reported
Use:	IND - Geothermal, Thermoelectric Cooling	Cooling:	Power De Not Reported
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	18750		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	1800		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	Not Reported
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	2.592		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 2-3-036:039
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002088

A2 **SW** **1/8 - 1/4 Mile** **Higher**	**HI WELLS**	**HI8000000002089**

Objectid:	608	Wid:	3-1750-013
Island:	Oahu	Well name:	Yacht Harbor 2
Old name:	Not Reported		
Yr drilled:	1972		
Driller:	Not Reported		
Quad map:	13		
Long83dd:	-157.840833		
Lat83dd:	21.289167		
Gps:	0	Utm:	-1
Owner user:	Yacht Harbor Towers	Old number:	Not Reported

Well type:	Not Reported	Casing dia:	Not Reported
Ground el:	Not Reported		
Well depth:	0		
Solid case:	Not Reported	Perf case:	Not Reported
Use:	IND - Geothermal, Thermoelectric Cooling	Use year:	Power De Not Reported
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	18750		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	1800		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	Not Reported
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	2.592		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 2-3-036:039
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002089

A3
WSW
1/8 - 1/4 Mile
Higher

HI WELLS **HI8000000002090**

Objectid:	605	Wid:	3-1750-010
Island:	Oahu	Well name:	Ala Moana
Old name:	Not Reported		
Yr drilled:	1967		
Driller:	NAT WHITON		
Quad map:	13		
Long83dd:	-157.841944444		
Lat83dd:	21.2894444444		
Gps:	0	Utm:	-1
Owner user:	Ala Moana Ctr	Old number:	63-2A
Well type:	Not Reported	Casing dia:	18
Ground el:	4		
Well depth:	88		
Solid case:	42	Perf case:	Not Reported
Use:	Other	Use year:	Not Reported
Init head:	2.8	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	13954		
Test date:	Not Reported	Test gpm:	600
Test ddown:	0.8	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-84
Bot solid:	-38	Bot perf:	Not Reported
Spec capac:	750		
Pump mgd:	0		

Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 2-3-038:001
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	01-JAN-67
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002090

4
WSW **HI WELLS** **HI8000000002091**
1/8 - 1/4 Mile
Higher

Objectid:	606	Wid:	3-1750-011
Island:	Oahu	Well name:	Ala Moana
Old name:	Not Reported		
Yr drilled:	1967		
Driller:	NAT WHITON		
Quad map:	13		
Long83dd:	-157.842222222		
Lat83dd:	21.2897222222		
Gps:	0	Utm:	-1
Owner user:	Ala Moana Ctr	Old number:	63-2B
Well type:	Not Reported	Casing dia:	18
Ground el:	5		
Well depth:	55		
Solid case:	37	Perf case:	Not Reported
Use:	Other	Use year:	Not Reported
Init head:	2.9	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	13451		
Test date:	Not Reported	Test gpm:	550
Test ddown:	0.5	Test chlor:	17680
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-50
Bot solid:	-32	Bot perf:	Not Reported
Spec capac:	1100		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 2-3-038:001
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	01-JAN-67
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002091

B5
NNE **FED USGS** **USGS40000269556**
1/4 - 1/2 Mile
Higher

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211754157502301		
Monloc name:	3-1750-01 W61 MCCULY		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.2951692
Longitude:	-157.8369797	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	14.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	18810101	Welldepth:	475
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

B6
NNE **HI WELLS** **HI8000000002117**
1/4 - 1/2 Mile
Higher

Objectid:	596	Wid:	3-1750-001
Island:	Oahu	Well name:	McCully
Old name:	Not Reported		
Yr drilled:	1881		
Driller:	Not Reported		
Quad map:	13		
Long83dd:	-157.836944444		
Lat83dd:	21.2952777778		
Gps:	0	Utm:	-1
Owner user:	C&C Honolulu	Old number:	61-
Well type:	Not Reported	Casing dia:	8
Ground el:	14		
Well depth:	475		
Solid case:	Not Reported	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	29.9	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	42		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-461
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		

Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002117

C7
NNW
1/4 - 1/2 Mile
Higher

HI WELLS **HI8000000002120**

Objectid:	604	Wid:	3-1750-009
Island:	Oahu	Well name:	Ala Moana
Old name:	Not Reported		
Yr drilled:	1964		
Driller:	NAT WHITON		
Quad map:	13		
Long83dd:	-157.840472		
Lat83dd:	21.295806		
Gps:	0	Utm:	-1
Owner user:	Pagoda Hotel	Old number:	63-1
Well type:	Not Reported	Casing dia:	16
Ground el:	7		
Well depth:	53		
Solid case:	21	Perf case:	Not Reported
Use:	IRR - Landscape/Water Features	Use year:	Not Reported
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	550
Test ddown:	2.9	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-46
Bot solid:	-14	Bot perf:	Not Reported
Spec capac:	190		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 2-3-017:016
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	01-MAR-64
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002120

C8
NNW
1/4 - 1/2 Mile
Higher

FED USGS **USGS40000269561**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211757157503601		
Monloc name:	3-1750-09 W63-1 KAPI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.2960026
Longitude:	-157.8405908	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	7.00
Vert measure units:	feet	Vertacc measure val:	2
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19640101	Welldepth:	53
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

D9
NNE **FED USGS** **USGS40000269567**
1/4 - 1/2 Mile
Higher

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211801157502401		
Monloc name:	3-1850-26 W59 MAKIKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.2971135
Longitude:	-157.8372574	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	15.00
Vert measure units:	feet	Vertacc measure val:	2
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19100101	Welldepth:	450
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID Direction Distance Elevation	Database	EDR ID Number
D10 **North** **1/4 - 1/2 Mile** **Higher**	**FED USGS**	**USGS40000269568**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211802157502801		
Monloc name:	3-1850-22 W62 MAKIKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.2973913
Longitude:	-157.8383685	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	16.00
Vert measure units:	feet	Vertacc measure val:	2
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	18940101	Welldepth:	521
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

D11 **North** **1/4 - 1/2 Mile** **Higher**	**FED USGS**	**USGS40000269571**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211803157502801		
Monloc name:	3-1850-21 W58 MAKIKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.2973913
Longitude:	-157.8383685	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	20.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		

Aquifer type:	Not Reported		
Construction date:	18940101	Welldepth:	409
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

D12
NNE
1/4 - 1/2 Mile
Higher

HI WELLS **HI8000000002130**

Objectid:	724	Wid:	3-1850-026
Island:	Oahu	Well name:	Makiki
Old name:	Not Reported		
Yr drilled:	1910		
Driller:	MCCANDLESS		
Quad map:	13		
Long83dd:	-157.837222222		
Lat83dd:	21.2972222222		
Gps:	0	Utm:	-1
Owner user:	Ii Estate	Old number:	59-
Well type:	Not Reported	Casing dia:	10
Ground el:	15		
Well depth:	450		
Solid case:	356	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	27.7	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	57		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	TKB		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-435
Bot solid:	-341	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	01-JAN-10
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002130

D13
North
1/4 - 1/2 Mile
Higher

HI WELLS **HI8000000002134**

Objectid:	720	Wid:	3-1850-022
Island:	Oahu	Well name:	Makiki
Old name:	Not Reported		
Yr drilled:	1894		
Driller:	AHANA		
Quad map:	13		
Long83dd:	-157.838333333		
Lat83dd:	21.2975		
Gps:	0	Utm:	-1
Owner user:	KS/Bishop Estate	Old number:	62-
Well type:	Not Reported	Casing dia:	8
Ground el:	16		
Well depth:	521		
Solid case:	419	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	27.6	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	61		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-505
Bot solid:	-403	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002134

E14
North
1/4 - 1/2 Mile
Higher

FED USGS **USGS40000269572**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211803157503201		
Monloc name:	3-1850-20 W63 MAKIKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.2976691
Longitude:	-157.8394796	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	16.00
Vert measure units:	feet	Vertacc measure val:	2
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		

Aquifer type:	Not Reported		
Construction date:	18910101	Welldepth:	437
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

E15
North
1/4 - 1/2 Mile
Higher

HI WELLS **HI8000000002136**

Objectid:	718	Wid:	3-1850-020
Island:	Oahu	Well name:	Makiki
Old name:	Not Reported		
Yr drilled:	1891		
Driller:	MCCANDLESS		
Quad map:	13		
Long83dd:	-157.839444444		
Lat83dd:	21.2977777778		
Gps:	0	Utm:	-1
Owner user:	Plews&Wichman	Old number:	63-
Well type:	Not Reported	Casing dia:	8
Ground el:	16		
Well depth:	437		
Solid case:	377	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	31	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	56		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-421
Bot solid:	-361	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002136

F16
NNW
1/4 - 1/2 Mile
Higher

FED USGS **USGS40000269569**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211802157504201		
Monloc name:	3-1850-27 W75 MAKIKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.2973914
Longitude:	-157.8422574	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	8.00
Vert measure units:	feet	Vertacc measure val:	2
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19140101	Welldepth:	552
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

F17
NNW
1/4 - 1/2 Mile
Higher

HI WELLS **HI8000000002133**

Objectid:	725	Wid:	3-1850-027
Island:	Oahu	Well name:	Makiki
Old name:	Not Reported		
Yr drilled:	1914		
Driller:	Not Reported		
Quad map:	13		
Long83dd:	-157.842222222		
Lat83dd:	21.2975		
Gps:	0	Utm:	-1
Owner user:	Meadow Gold	Old number:	75-
Well type:	Not Reported	Casing dia:	10
Ground el:	8		
Well depth:	552		
Solid case:	486	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	27	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	75		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-544
Bot solid:	-478	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		

Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	01-JAN-14
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002133

D18
NNE
1/4 - 1/2 Mile
Higher

HI WELLS **HI8000000002137**

Objectid:	719	Wid:	3-1850-021
Island:	Oahu	Well name:	Makiki
Old name:	Not Reported		
Yr drilled:	1894		
Driller:	MCCANDLESS		
Quad map:	13		
Long83dd:	-157.836944444		
Lat83dd:	21.2977777778		
Gps:	0	Utm:	-1
Owner user:	Honolulu BWS	Old number:	58-
Well type:	Not Reported	Casing dia:	8
Ground el:	20		
Well depth:	409		
Solid case:	312	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	29.8	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	62		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-389
Bot solid:	-292	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002137

G19
NE
1/4 - 1/2 Mile
Higher

FED USGS **USGS40000269559**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211756157501001		
Monloc name:	3-1750-03 W46 MCCULY		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.2957246
Longitude:	-157.8333685	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	10.00
Vert measure units:	feet	Vertacc measure val:	2
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	18900101	Welldepth:	374
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

G20
NE
1/4 - 1/2 Mile
Higher

HI WELLS **HI8000000002123**

Objectid:	598	Wid:	3-1750-003
Island:	Oahu	Well name:	McCully
Old name:	Not Reported		
Yr drilled:	1890		
Driller:	Not Reported		
Quad map:	13		
Long83dd:	-157.833333333		
Lat83dd:	21.2958333333		
Gps:	0	Utm:	-1
Owner user:	Not Reported	Old number:	Not Reported
Well type:	Not Reported	Casing dia:	8
Ground el:	10		
Well depth:	374		
Solid case:	340	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	28.2	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-364
Bot solid:	-330	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		

Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002123

H21
SSE
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002053**

Objectid:	602	Wid:	3-1750-007
Island:	Oahu	Well name:	Waikiki
Old name:	Not Reported		
Yr drilled:	1955		
Driller:	SAMSON-SMOCK		
Quad map:	13		
Long83dd:	-157.836666667		
Lat83dd:	21.2838888889		
Gps:	0	Utm:	-1
Owner user:	Hilton Hotel	Old number:	30-1
Well type:	Not Reported	Casing dia:	8
Ground el:	Not Reported		
Well depth:	120		
Solid case:	98	Perf case:	Not Reported
Use:	UNU - Unused	Use year:	Not Reported
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	Not Reported
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 2-6-009:009
Aqui code:	30101		
Latest hd:	Not Reported	Wcr:	01-JAN-55
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002053

H22
SSE
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002054**

Objectid:	603	Wid:	3-1750-008
Island:	Oahu	Well name:	Waikiki
Old name:	Not Reported		
Yr drilled:	1955		
Driller:	Not Reported		
Quad map:	13		
Long83dd:	-157.836666667		
Lat83dd:	21.2838888889		
Gps:	0	Utm:	-1
Owner user:	Not Reported	Old number:	Not Reported
Well type:	Not Reported	Casing dia:	8
Ground el:	Not Reported		
Well depth:	90		
Solid case:	42	Perf case:	Not Reported
Use:	UNU - Unused	Use year:	Not Reported
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	Not Reported
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002054

H23
SSE **FED USGS** **USGS40000269497**
1/2 - 1 Mile
Higher

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211713157502201		
Monloc name:	3-1750-07 W30-1 DERU		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.283781
Longitude:	-157.8367022	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	3.00
Vert measure units:	feet	Vertacc measure val:	2
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		

Aquifer type:	Not Reported		
Construction date:	19551107	Welldepth:	120
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

H24
SSE **FED USGS** **USGS40000269498**
1/2 - 1 Mile
Higher

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211713157502202		
Monloc name:	3-1750-08 W30-2 DERU		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.283781
Longitude:	-157.8367022	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	3.00
Vert measure units:	feet	Vertacc measure val:	2
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19551107	Welldepth:	90
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

G25
NE **FED USGS** **USGS40000269562**
1/2 - 1 Mile
Higher

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211758157500901		
Monloc name:	3-1750-05 W50 MCCULY		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.2962801
Longitude:	-157.8330907	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	15.00
Vert measure units:	feet	Vertacc measure val:	1
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		

Aquifer type:	Not Reported		
Construction date:	19530801	Welldepth:	154
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1953-08-01	12.00	

G26
NE
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002125**

Objectid:	600	Wid:	3-1750-005
Island:	Oahu	Well name:	McCully
Old name:	Not Reported		
Yr drilled:	1953		
Driller:	Not Reported		
Quad map:	13		
Long83dd:	-157.833055556		
Lat83dd:	21.2963888889		
Gps:	0	Utm:	-1
Owner user:	Not Reported	Old number:	Not Reported
Well type:	Not Reported	Casing dia:	8
Ground el:	Not Reported		
Well depth:	154		
Solid case:	70	Perf case:	Not Reported
Use:	UNU - Unused	Use year:	Not Reported
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	50
Test ddown:	8	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	Not Reported
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002125

27
South
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002049**

Objectid:	609	Wid:	3-1750-014
Island:	Oahu	Well name:	Hilton Lagoon
Old name:	Not Reported		
Yr drilled:	2003		
Driller:	BEYLIK DRLG		
Quad map:	13		
Long83dd:	-157.838333333		
Lat83dd:	21.2830555556		
Gps:	0	Utm:	-1
Owner user:	Hilton Hotels Corp.	Old number:	Not Reported
Well type:	PER	Casing dia:	14
Ground el:	Not Reported		
Well depth:	400		
Solid case:	29	Perf case:	Not Reported
Use:	UNU - Unused	Use year:	Not Reported
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	18000		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	PLS		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	Not Reported
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 2-6-009:010
Aqui code:	30101		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002049

I28
NNE
1/2 - 1 Mile
Higher

FED USGS **USGS40000269580**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211807157502001		
Monloc name:	3-1850-05 W57 MAKIKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.2987801
Longitude:	-157.8361462	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	28.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		

Aquifer type:	Not Reported		
Construction date:	18820101	Welldepth:	310
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

J29
NNE
1/2 - 1 Mile
Higher

FED USGS **USGS40000269578**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211805157501501		
Monloc name:	3-1850-18 W56 MAKIKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.2982245
Longitude:	-157.8347573	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	29.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	18900101	Welldepth:	383
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

30
West
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002099**

Objectid:	620	Wid:	3-1751-004
Island:	Oahu	Well name:	Ala Moana
Old name:	Not Reported		
Yr drilled:	1967		
Driller:	NAT WHITON		
Quad map:	13		
Long83dd:	-157.848055556		
Lat83dd:	21.2913888889		
Gps:	0	Utm:	-1
Owner user:	1350 Ala Moana	Old number:	76-1
Well type:	Not Reported	Casing dia:	Not Reported
Ground el:	5		
Well depth:	0		
Solid case:	Not Reported	Perf case:	Not Reported
Use:	Other	Use year:	Not Reported
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported

Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	RF		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	Not Reported
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 2-3-006:001
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	01-JAN-67
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002099

I31
NNE
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002146**

Objectid:	703	Wid:	3-1850-005
Island:	Oahu	Well name:	Makiki
Old name:	Not Reported		
Yr drilled:	1882		
Driller:	FESSLER		
Quad map:	13		
Long83dd:	-157.836111111		
Lat83dd:	21.2988888889		
Gps:	0	Utm:	-1
Owner user:	Rawlins M F	Old number:	57-
Well type:	Not Reported	Casing dia:	5
Ground el:	28		
Well depth:	310		
Solid case:	237	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	29.7	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	61		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-282
Bot solid:	-209	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 3-9-010:001
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002146

Map ID Direction Distance Elevation	Database	EDR ID Number
K32 **South** **1/2 - 1 Mile** **Higher**	**HI WELLS**	**HI8000000002045**

Objectid:	610	Wid:	3-1750-015
Island:	Oahu	Well name:	HHV 1
Old name:	Not Reported		
Yr drilled:	2005		
Driller:	Not Reported		
Quad map:	13		
Long83dd:	-157.84		
Lat83dd:	21.2827777778		
Gps:	-1	Utm:	0
Owner user:	Not Reported	Old number:	Not Reported
Well type:	PER	Casing dia:	16
Ground el:	Not Reported		
Well depth:	205		
Solid case:	87	Perf case:	Not Reported
Use:	UNU - Unused	Use year:	Not Reported
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	PLS		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	Not Reported
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 2-3-037:012
Aqui code:	30101		
Latest hd:	Not Reported	Wcr:	03-JUN-05
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002045

K33 **South** **1/2 - 1 Mile** **Higher**	**HI WELLS**	**HI8000000002046**

Objectid:	611	Wid:	3-1750-016
Island:	Oahu	Well name:	HHV 2
Old name:	Not Reported		
Yr drilled:	2005		
Driller:	Not Reported		
Quad map:	13		
Long83dd:	-157.84		
Lat83dd:	21.2827777778		
Gps:	-1	Utm:	0
Owner user:	Not Reported	Old number:	Not Reported

Well type:	PER	Casing dia:	16
Ground el:	Not Reported		
Well depth:	250		
Solid case:	83	Perf case:	Not Reported
Use:	UNU - Unused	Use year:	Not Reported
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	PLS		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	Not Reported
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 2-3-037:012
Aqui code:	30101		
Latest hd:	Not Reported	Wcr:	03-JUN-05
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002046

J34
NNE
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002145**

Objectid:	716	Wid:	3-1850-018
Island:	Oahu	Well name:	Makiki
Old name:	Not Reported		
Yr drilled:	1890		
Driller:	Not Reported		
Quad map:	13		
Long83dd:	-157.834722222		
Lat83dd:	21.2983333333		
Gps:	0	Utm:	-1
Owner user:	Tanner J	Old number:	56-
Well type:	Not Reported	Casing dia:	8
Ground el:	29		
Well depth:	383		
Solid case:	Not Reported	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	26.4	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-354
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		

Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002145

L35
ENE
1/2 - 1 Mile
Higher

FED USGS **USGS40000269555**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211753157500201		
Monloc name:	3-1750-02 W45 MCCULY		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.2948913
Longitude:	-157.8311463	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	8.00
Vert measure units:	feet	Vertacc measure val:	2
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	18900101	Welldepth:	416
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

L36
ENE
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002115**

Objectid:	597	Wid:	3-1750-002
Island:	Oahu	Well name:	McCully
Old name:	Not Reported		
Yr drilled:	1890		
Driller:	Not Reported		
Quad map:	13		
Long83dd:	-157.831111111		
Lat83dd:	21.295		
Gps:	0	Utm:	-1
Owner user:	Not Reported	Old number:	Not Reported

Well type:	Not Reported	Casing dia:	6
Ground el:	9		
Well depth:	416		
Solid case:	363	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	29.6	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	75		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-407
Bot solid:	-354	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002115

M37
NNW
1/2 - 1 Mile
Higher

FED USGS **USGS40000269584**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211808157504301		
Monloc name:	3-1850-15 W76 MAKIKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.299058
Longitude:	-157.8425352	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	17.00
Vert measure units:	feet	Vertacc measure val:	2
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	18840101	Welldepth:	656
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID Direction Distance Elevation	Database	EDR ID Number
M38 **NNW** **1/2 - 1 Mile** **Higher**	**HI WELLS**	**HI8000000002148**

Objectid:	713	Wid:	3-1850-015
Island:	Oahu	Well name:	Makiki
Old name:	Not Reported		
Yr drilled:	1884		
Driller:	MCCANDLESS		
Quad map:	13		
Long83dd:	-157.8425		
Lat83dd:	21.2991666667		
Gps:	0	Utm:	-1
Owner user:	Wilcox G N	Old number:	76-
Well type:	Not Reported	Casing dia:	6
Ground el:	17		
Well depth:	656		
Solid case:	455	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	19	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	TKB		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-639
Bot solid:	-438	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002148

K39 **South** **1/2 - 1 Mile** **Higher**	**HI WELLS**	**HI8000000002042**

Objectid:	612	Wid:	3-1750-017
Island:	Oahu	Well name:	HHV 3
Old name:	Not Reported		
Yr drilled:	2005		
Driller:	Not Reported		
Quad map:	13		
Long83dd:	-157.840277778		
Lat83dd:	21.2825		
Gps:	-1	Utm:	0
Owner user:	Not Reported	Old number:	Not Reported

Well type:	PER	Casing dia:	16
Ground el:	Not Reported		
Well depth:	250		
Solid case:	97	Perf case:	Not Reported
Use:	UNU - Unused	Use year:	Not Reported
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	PLS		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	Not Reported
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 2-3-037:012
Aqui code:	30101		
Latest hd:	Not Reported	Wcr:	03-JUN-05
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002042

K40
South
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002043**

Objectid:	613	Wid:	3-1750-018
Island:	Oahu	Well name:	HHV 4
Old name:	Not Reported		
Yr drilled:	2005		
Driller:	Not Reported		
Quad map:	13		
Long83dd:	-157.840277778		
Lat83dd:	21.2825		
Gps:	-1	Utm:	0
Owner user:	Not Reported	Old number:	Not Reported
Well type:	PER	Casing dia:	16
Ground el:	Not Reported		
Well depth:	255		
Solid case:	82	Perf case:	Not Reported
Use:	UNU - Unused	Use year:	Not Reported
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	PLS		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	Not Reported
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		

Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 2-3-037:012
Aqui code:	30101		
Latest hd:	Not Reported	Wcr:	03-JUN-05
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002043

N41
North
1/2 - 1 Mile
Higher

FED USGS **USGS40000269592**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211811157503201		
Monloc name:	3-1850-28 W74-1 MAKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.2998912
Longitude:	-157.8394796	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	20.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19380101	Welldepth:	71
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

H42
SSE
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002047**

Objectid:	601	Wid:	3-1750-006
Island:	Oahu	Well name:	Waikiki
Old name:	Not Reported		
Yr drilled:	1955		
Driller:	SAMSON-SMOCK		
Quad map:	13		
Long83dd:	-157.836111111		
Lat83dd:	21.2827777778		
Gps:	0	Utm:	-1
Owner user:	Hilton Hotel	Old number:	30-

Well type:	Not Reported	Casing dia:	8
Ground el:	Not Reported		
Well depth:	122		
Solid case:	93	Perf case:	Not Reported
Use:	UNU - Unused	Use year:	Not Reported
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	Not Reported
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 2-6-008:034
Aqui code:	30101		
Latest hd:	Not Reported	Wcr:	01-JAN-55
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002047

O43
NE
1/2 - 1 Mile
Higher

FED USGS **USGS40000269570**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211803157500801		
Monloc name:	3-1850-02 W51 MAKIKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.2976689
Longitude:	-157.8328129	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	25.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	18800101	Welldepth:	475
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID Direction Distance Elevation	Database	EDR ID Number
P44 **SSE** **1/2 - 1 Mile** **Higher**	**FED USGS**	**USGS40000269494**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211709157502001		
Monloc name:	3-1750-06 W30 DERUSY		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.28267
Longitude:	-157.8361467	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	5.00
Vert measure units:	feet	Vertacc measure val:	2
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19550607	Welldepth:	122
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

K45 **South** **1/2 - 1 Mile** **Higher**	**HI WELLS**	**HI8000000002040**

Objectid:	614	Wid:	3-1750-019
Island:	Oahu	Well name:	HHV 5
Old name:	Not Reported		
Yr drilled:	2005		
Driller:	Not Reported		
Quad map:	13		
Long83dd:	-157.840277778		
Lat83dd:	21.2822222222		
Gps:	-1	Utm:	0
Owner user:	Not Reported	Old number:	Not Reported
Well type:	PER	Casing dia:	16
Ground el:	Not Reported		
Well depth:	260		
Solid case:	83	Perf case:	Not Reported
Use:	UNU - Unused	Use year:	Not Reported
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported

Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	PLS		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	Not Reported
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 2-3-037:012
Aqui code:	30101		
Latest hd:	Not Reported	Wcr:	03-JUN-05
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002040

O46
NE
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002138**

Objectid:	700	Wid:	3-1850-002
Island:	Oahu	Well name:	Makiki
Old name:	Not Reported		
Yr drilled:	1880		
Driller:	PIERCE		
Quad map:	13		
Long83dd:	-157.832777778		
Lat83dd:	21.2977777778		
Gps:	0	Utm:	-1
Owner user:	KS/Bishop Trust	Old number:	51-
Well type:	Not Reported	Casing dia:	5
Ground el:	25		
Well depth:	475		
Solid case:	347	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	29.8	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	51		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	TKB		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-450
Bot solid:	-322	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 3-9-010:001
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002138

Map ID Direction Distance Elevation	Database	EDR ID Number
K47 **South** **1/2 - 1 Mile** **Higher**	**HI WELLS**	**HI8000000002035**

Objectid:	615	Wid:	3-1750-020
Island:	Oahu	Well name:	HHV 6
Old name:	Not Reported		
Yr drilled:	2005		
Driller:	Not Reported		
Quad map:	13		
Long83dd:	-157.840277778		
Lat83dd:	21.2819444444		
Gps:	-1	Utm:	0
Owner user:	Not Reported	Old number:	Not Reported
Well type:	PER	Casing dia:	16
Ground el:	Not Reported		
Well depth:	205		
Solid case:	87	Perf case:	Not Reported
Use:	UNU - Unused	Use year:	Not Reported
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	PLS		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	Not Reported
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 2-3-037:012
Aqui code:	30101		
Latest hd:	Not Reported	Wcr:	03-JUN-05
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002035

K48 **South** **1/2 - 1 Mile** **Higher**	**HI WELLS**	**HI8000000002036**

Objectid:	616	Wid:	3-1750-021
Island:	Oahu	Well name:	HHV 7
Old name:	Not Reported		
Yr drilled:	2005		
Driller:	Not Reported		
Quad map:	13		
Long83dd:	-157.840277778		
Lat83dd:	21.2819444444		
Gps:	-1	Utm:	0
Owner user:	Not Reported	Old number:	Not Reported

Well type:	PER	Casing dia:	16
Ground el:	Not Reported		
Well depth:	250		
Solid case:	82	Perf case:	Not Reported
Use:	UNU - Unused	Use year:	Not Reported
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	PLS		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	Not Reported
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 2-3-037:012
Aqui code:	30101		
Latest hd:	Not Reported	Wcr:	03-JUN-05
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002036

P49
SSE
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002037**

Objectid:	599	Wid:	3-1750-004
Island:	Oahu	Well name:	Waikiki
Old name:	Not Reported		
Yr drilled:	1950		
Driller:	SAMSON-SMOCK		
Quad map:	13		
Long83dd:	-157.837222222		
Lat83dd:	21.2819444444		
Gps:	0	Utm:	-1
Owner user:	Niumalu Hotel	Old number:	30-3
Well type:	Not Reported	Casing dia:	10
Ground el:	Not Reported		
Well depth:	62		
Solid case:	61	Perf case:	Not Reported
Use:	UNU - Unused	Use year:	Not Reported
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	230
Test ddown:	1	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	Not Reported
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	230		
Pump mgd:	0		

Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 2-6-008:034
Aqui code:	30101		
Latest hd:	Not Reported	Wcr:	01-JAN-50
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002037

N50
North
1/2 - 1 Mile
Higher

FED USGS **USGS40000269603**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211813157503101		
Monloc name:	3-1850-16 W74 MAKIKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.3004467
Longitude:	-157.8392018	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	22.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	18860101	Welldepth:	442
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

51
South
1/2 - 1 Mile
Higher

FED USGS **USGS40000269490**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211706157502401		
Monloc name:	3-1750-04 W30-3		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.2818367
Longitude:	-157.8372579	Sourcemap scale:	24000

Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	3.00
Vert measure units:	feet	Vertacc measure val:	1
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19500501	Welldepth:	62
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1950-05-01	3.00	

N52
North
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002170**

Objectid:	714	Wid:	3-1850-016
Island:	Oahu	Well name:	Makiki
Old name:	Not Reported		
Yr drilled:	1886		
Driller:	Not Reported		
Quad map:	13		
Long83dd:	-157.839166667		
Lat83dd:	21.3005555556		
Gps:	0	Utm:	-1
Owner user:	C&C Honolulu	Old number:	74-
Well type:	Not Reported	Casing dia:	6
Ground el:	22		
Well depth:	442		
Solid case:	400	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	25.8	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	53		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-420
Bot solid:	-378	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		

Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002170

Q53
NE
1/2 - 1 Mile
Higher

FED USGS **USGS40000269575**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211804157500301		
Monloc name:	3-1850-10 W49 MAKIKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.2979467
Longitude:	-157.831424	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	28.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	18830101	Welldepth:	281
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Q54
NE
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002139**

Objectid:	708	Wid:	3-1850-010
Island:	Oahu	Well name:	Makiki
Old name:	Not Reported		
Yr drilled:	1883		
Driller:	Not Reported		
Quad map:	13		
Long83dd:	-157.831388889		
Lat83dd:	21.2980555556		
Gps:	0	Utm:	-1
Owner user:	Yap Lin	Old number:	49-

Well type:	Not Reported	Casing dia:	6
Ground el:	28		
Well depth:	281		
Solid case:	234	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	30.3	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-253
Bot solid:	-206	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002139

R55
NNE
1/2 - 1 Mile
Higher

FED USGS **USGS40000269591**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211810157501001		
Monloc name:	3-1850-04 W55 MAKIKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.2996133
Longitude:	-157.8333684	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	36.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	18820101	Welldepth:	300
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID Direction Distance Elevation	Database	EDR ID Number
R56 **NNE** **1/2 - 1 Mile** **Higher**	**HI WELLS**	**HI8000000002156**

Objectid:	702	Wid:	3-1850-004
Island:	Oahu	Well name:	Makiki
Old name:	Not Reported		
Yr drilled:	1882		
Driller:	PIERCE		
Quad map:	13		
Long83dd:	-157.833333333		
Lat83dd:	21.2997222222		
Gps:	0	Utm:	-1
Owner user:	Dillingham B	Old number:	55-
Well type:	Not Reported	Casing dia:	6
Ground el:	36		
Well depth:	300		
Solid case:	Not Reported	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	30	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	TKB		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-264
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 3-9-010:001
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002156

Q57 **NE** **1/2 - 1 Mile** **Higher**	**FED USGS**	**USGS40000269583**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211808157500501		
Monloc name:	3-1850-11 W53 MAKIKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.2990577
Longitude:	-157.8319795	Sourcemap scale:	24000

Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	36.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	18830101	Welldepth:	310
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

S58
NE
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002149**

Objectid:	709	Wid:	3-1850-011
Island:	Oahu	Well name:	Makiki
Old name:	Not Reported		
Yr drilled:	1882		
Driller:	Not Reported		
Quad map:	13		
Long83dd:	-157.831944444		
Lat83dd:	21.2991666667		
Gps:	0	Utm:	-1
Owner user:	Dillingham W	Old number:	53-
Well type:	Not Reported	Casing dia:	6
Ground el:	36		
Well depth:	310		
Solid case:	267	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	24.1	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	TKB		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-274
Bot solid:	-231	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002149

Map ID Direction Distance Elevation	Database	EDR ID Number
Q59 **NE** **1/2 - 1 Mile** **Higher**	**FED USGS**	**USGS40000269574**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211804157500001		
Monloc name:	3-1850-12 W47 MAKIKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.2979466
Longitude:	-157.8305906	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	25.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	18840101	Welldepth:	311
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

T60 **NW** **1/2 - 1 Mile** **Higher**	**FED USGS**	**USGS40000269585**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211808157505801		
Monloc name:	3-1850-09 W77 MAKIKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.2990581
Longitude:	-157.8467019	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	6.00
Vert measure units:	feet	Vertacc measure val:	2
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		

Aquifer type:	Not Reported		
Construction date:	18820101	Welldepth:	620
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Q61
NE
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002140**

Objectid:	710	Wid:	3-1850-012
Island:	Oahu	Well name:	Makiki
Old name:	Not Reported		
Yr drilled:	1884		
Driller:	Not Reported		
Quad map:	13		
Long83dd:	-157.830555556		
Lat83dd:	21.2980555556		
Gps:	0	Utm:	-1
Owner user:	Howard M	Old number:	47-
Well type:	Not Reported	Casing dia:	6
Ground el:	25		
Well depth:	311		
Solid case:	305	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	30.7	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	60		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-286
Bot solid:	-280	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002140

T62
NW
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002147**

Objectid:	707	Wid:	3-1850-009
Island:	Oahu	Well name:	Makiki
Old name:	Not Reported		
Yr drilled:	1882		
Driller:	COOKE-PEDDLER		
Quad map:	13		
Long83dd:	-157.846666667		
Lat83dd:	21.2991666667		
Gps:	0	Utm:	-1
Owner user:	State Of Hawaii	Old number:	77-
Well type:	Not Reported	Casing dia:	6
Ground el:	6		
Well depth:	620		
Solid case:	Not Reported	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	29.6	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	62		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-614
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002147

U63
NE
1/2 - 1 Mile
Higher

FED USGS **USGS40000269566**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211801157495701		
Monloc name:	3-1849-08 W44 MAKIKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.2971133
Longitude:	-157.8297573	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	20.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		

Aquifer type:	Not Reported		
Construction date:	18940101	Welldepth:	397
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

T64
NW
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002153**

Objectid:	727	Wid:	3-1850-029
Island:	Oahu	Well name:	Mckinley Aqua 2
Old name:	Not Reported		
Yr drilled:	1993		
Driller:	ROSCOE MOSS		
Quad map:	13		
Long83dd:	-157.846388889		
Lat83dd:	21.2994444444		
Gps:	0	Utm:	-1
Owner user:	Mckinley H S	Old number:	Not Reported
Well type:	Not Reported	Casing dia:	8
Ground el:	10		
Well depth:	65		
Solid case:	45	Perf case:	65
Use:	AGR - Aquatic Plants and Animals	Use year:	Not Reported
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-55
Bot solid:	-35	Bot perf:	-55
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 2-3-009:001
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	17-AUG-93
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002153

Q65
NE
1/2 - 1 Mile
Higher

FED USGS **USGS40000269573**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211804157495901		
Monloc name:	3-1849-02 W48 MAKIKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.2979466
Longitude:	-157.8303129	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	25.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	18810101	Welldepth:	358
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1881-01-01	-42.00	

U66
NE
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002131**

Objectid:	690	Wid:	3-1849-008
Island:	Oahu	Well name:	Manoa Valley
Old name:	Not Reported		
Yr drilled:	1894		
Driller:	Not Reported		
Quad map:	13		
Long83dd:	-157.829722222		
Lat83dd:	21.2972222222		
Gps:	0	Utm:	-1
Owner user:	Chinn J T	Old number:	44-
Well type:	Not Reported	Casing dia:	8
Ground el:	20		
Well depth:	397		
Solid case:	337	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	30.8	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	56		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported

Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-377
Bot solid:	-317	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002131

V67
NNE **FED USGS** **USGS40000269607**
1/2 - 1 Mile
Higher

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211815157501401		
Monloc name:	3-1850-06 W64 MAKIKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.3010021
Longitude:	-157.8344795	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	47.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	18820101	Welldepth:	419
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Q68
NE **HI WELLS** **HI8000000002141**
1/2 - 1 Mile
Higher

Objectid:	684	Wid:	3-1849-002
Island:	Oahu	Well name:	Manoa Valley
Old name:	Not Reported		
Yr drilled:	1881		
Driller:	FESSLER		
Quad map:	13		
Long83dd:	-157.830277778		
Lat83dd:	21.2980555556		
Gps:	0	Utm:	-1
Owner user:	Howard M	Old number:	48-
Well type:	Not Reported	Casing dia:	8
Ground el:	25		
Well depth:	358		
Solid case:	306	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	30	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	51		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-333
Bot solid:	-281	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002141

W69
NNE
1/2 - 1 Mile
Higher

FED USGS **USGS40000269614**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211817157501901		
Monloc name:	3-1850-19 W65 MAKIKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.3015577
Longitude:	-157.8358684	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	41.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		

Aquifer type:	Not Reported		
Construction date:	18900101	Welldepth:	277
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

V70
NNE
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002181**

Objectid:	704	Wid:	3-1850-006
Island:	Oahu	Well name:	Makiki
Old name:	Not Reported		
Yr drilled:	1882		
Driller:	Not Reported		
Quad map:	13		
Long83dd:	-157.834444444		
Lat83dd:	21.3011111111		
Gps:	0	Utm:	-1
Owner user:	Dowsett J M	Old number:	64-
Well type:	Not Reported	Casing dia:	4
Ground el:	47		
Well depth:	419		
Solid case:	177	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	27.5	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-372
Bot solid:	-130	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 3-9-010:001
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002181

U71
ENE
1/2 - 1 Mile
Higher

FED USGS **USGS40000269565**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211800157495501		
Monloc name:	3-1849-07 W43 MAKIKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.2968355
Longitude:	-157.8292018	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	18.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	18910701	Welldepth:	Not Reported
Welldepth units:	Not Reported	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

W72
NNE
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002187**

Objectid:	717	Wid:	3-1850-019
Island:	Oahu	Well name:	Makiki
Old name:	Not Reported		
Yr drilled:	1890		
Driller:	Not Reported		
Quad map:	13		
Long83dd:	-157.835833333		
Lat83dd:	21.3016666667		
Gps:	0	Utm:	-1
Owner user:	Jodo Mission	Old number:	65-
Well type:	Not Reported	Casing dia:	10
Ground el:	41		
Well depth:	277		
Solid case:	220	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	30.6	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-236
Bot solid:	-179	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		

Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002187

S73
NE
1/2 - 1 Mile
Higher

FED USGS **USGS40000269590**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211810157500401		
Monloc name:	3-1850-14 W54 MAKIKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.2996132
Longitude:	-157.8317017	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	40.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	18840101	Welldepth:	271
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

U74
ENE
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002128**

Objectid:	689	Wid:	3-1849-007
Island:	Oahu	Well name:	Manoa Valley
Old name:	Not Reported		
Yr drilled:	1891		
Driller:	MCCANDLESS		
Quad map:	13		
Long83dd:	-157.829166667		
Lat83dd:	21.2969444444		
Gps:	0	Utm:	-1
Owner user:	Land Proc Serv	Old number:	43-

Well type:	Not Reported	Casing dia:	8
Ground el:	18		
Well depth:	0		
Solid case:	Not Reported	Perf case:	Not Reported
Use:	UNU - Unused	Use year:	Not Reported
Init head:	30	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	55		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	36	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	Not Reported
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 2-8-009:078
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002128

S75
NE
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002157**

Objectid:	712	Wid:	3-1850-014
Island:	Oahu	Well name:	Makiki
Old name:	Not Reported		
Yr drilled:	1884		
Driller:	Not Reported		
Quad map:	13		
Long83dd:	-157.831666667		
Lat83dd:	21.2997222222		
Gps:	0	Utm:	-1
Owner user:	King R	Old number:	54-
Well type:	Not Reported	Casing dia:	6
Ground el:	40		
Well depth:	271		
Solid case:	240	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	30.8	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	TKB		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-231
Bot solid:	-200	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		

Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002157

U76
ENE
1/2 - 1 Mile
Higher

FED USGS **USGS40000269564**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211800157495401		
Monloc name:	3-1849-06 W42 MAKIKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.2968355
Longitude:	-157.828924	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	17.00
Vert measure units:	feet	Vertacc measure val:	2
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	18910101	Welldepth:	160
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

T77
NW
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002155**

Objectid:	726	Wid:	3-1850-028
Island:	Oahu	Well name:	Mckinley Aqua 1
Old name:	Not Reported		
Yr drilled:	1990		
Driller:	PR DRILLING		
Quad map:	13		
Long83dd:	-157.846944444		
Lat83dd:	21.2997222222		
Gps:	0	Utm:	-1
Owner user:	Mckinley H S	Old number:	Not Reported

Well type:	ROT	Casing dia:	4
Ground el:	Not Reported		
Well depth:	35		
Solid case:	10	Perf case:	20
Use:	AGR - Aquatic Plants and Animals	Use year:	Not Reported
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	7/9/1990	Test gpm:	50
Test ddown:	4.5	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	Not Reported
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	11		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 2-3-009:001
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	10-JUL-90
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002155

U78
ENE
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002129**

Objectid:	688	Wid:	3-1849-006
Island:	Oahu	Well name:	Manoa Valley
Old name:	Not Reported		
Yr drilled:	1891		
Driller:	MCCANDLESS		
Quad map:	13		
Long83dd:	-157.828888889		
Lat83dd:	21.2969444444		
Gps:	0	Utm:	-1
Owner user:	Ching S S	Old number:	42-
Well type:	Not Reported	Casing dia:	8
Ground el:	17		
Well depth:	160		
Solid case:	Not Reported	Perf case:	Not Reported
Use:	UNU - Unused	Use year:	Not Reported
Init head:	30.6	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	54		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	36	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-143
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		

Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 2-8-009:080
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002129

X79
North
1/2 - 1 Mile
Higher

FED USGS **USGS40000269632**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211821157503501		
Monloc name:	3-1850-08 W73 MAKIKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.3026689
Longitude:	-157.8403128	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	34.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	18820101	Welldepth:	358
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

X80
North
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002209**

Objectid:	706	Wid:	3-1850-008
Island:	Oahu	Well name:	Makiki
Old name:	Not Reported		
Yr drilled:	1882		
Driller:	MCCANDLESS		
Quad map:	13		
Long83dd:	-157.840277778		
Lat83dd:	21.3027777778		
Gps:	0	Utm:	-1
Owner user:	Bank Of Haw	Old number:	73-

Well type:	Not Reported	Casing dia:	7
Ground el:	34		
Well depth:	358		
Solid case:	Not Reported	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	11.8	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	TKB		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-324
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002209

Y81
NE
1/2 - 1 Mile
Higher

FED USGS **USGS40000269589**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211810157500001		
Monloc name:	3-1850-13 W52 MAKIKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.2996132
Longitude:	-157.8305906	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	37.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	18840101	Welldepth:	357
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID Direction Distance Elevation	Database	EDR ID Number
Y82 **NE** **1/2 - 1 Mile** **Higher**	**HI WELLS**	**HI8000000002158**

Objectid:	711	Wid:	3-1850-013
Island:	Oahu	Well name:	Makiki
Old name:	Not Reported		
Yr drilled:	1884		
Driller:	Not Reported		
Quad map:	13		
Long83dd:	-157.830555556		
Lat83dd:	21.2997222222		
Gps:	0	Utm:	-1
Owner user:	Villada J M	Old number:	52-
Well type:	Not Reported	Casing dia:	6
Ground el:	37		
Well depth:	357		
Solid case:	254	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	42.9	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	54		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-320
Bot solid:	-217	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002158

Y83 **NE** **1/2 - 1 Mile** **Higher**	**FED USGS**	**USGS40000269587**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211809157495801		
Monloc name:	3-1849-04 W41 MAKIKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.2993354
Longitude:	-157.830035	Sourcemap scale:	24000

Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	30.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	18850101	Welldepth:	260
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1885-06-01	-42.00	

Z84
NNW
1/2 - 1 Mile
Higher

FED USGS **USGS40000269615**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211817157505301		
Monloc name:	3-1850-17 W78 MAKIKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.3015579
Longitude:	-157.8453129	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	16.00
Vert measure units:	feet	Vertacc measure val:	2
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	18870101	Welldepth:	510
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Y85
NE
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002154**

Objectid:	686	Wid:	3-1849-004
Island:	Oahu	Well name:	Manoa Valley
Old name:	Not Reported		
Yr drilled:	1885		
Driller:	Not Reported		
Quad map:	13		
Long83dd:	-157.83		
Lat83dd:	21.2994444444		
Gps:	0	Utm:	-1
Owner user:	Soon T Y	Old number:	41-
Well type:	Not Reported	Casing dia:	6
Ground el:	30		
Well depth:	260		
Solid case:	181	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	42	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	52		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	TKB		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-230
Bot solid:	-151	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002154

Z86
NNW
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002188**

Objectid:	715	Wid:	3-1850-017
Island:	Oahu	Well name:	Makiki
Old name:	Not Reported		
Yr drilled:	1887		
Driller:	Not Reported		
Quad map:	13		
Long83dd:	-157.845278		
Lat83dd:	21.301667		
Gps:	0	Utm:	-1
Owner user:	HECO	Old number:	78-
Well type:	Not Reported	Casing dia:	8
Ground el:	16		
Well depth:	510		
Solid case:	Not Reported	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	27.6	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	63		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported

Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-494
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002188

AA87
North
1/2 - 1 Mile
Higher

FED USGS **USGS40000269642**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211826157503501		
Monloc name:	3-1850-07 W72 MAKIKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.3040577
Longitude:	-157.8403128	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	37.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	18820101	Welldepth:	375
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

AA88
North
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002222**

Objectid:	705	Wid:	3-1850-007
Island:	Oahu	Well name:	Makiki
Old name:	Not Reported		
Yr drilled:	1882		
Driller:	FESSLER		
Quad map:	13		
Long83dd:	-157.840277778		
Lat83dd:	21.3041666667		
Gps:	0	Utm:	-1
Owner user:	Babcock	Old number:	72-
Well type:	Not Reported	Casing dia:	7
Ground el:	37		
Well depth:	375		
Solid case:	Not Reported	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	42	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	TKB		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-338
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 3-9-010:001
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002222

AB89
NW
1/2 - 1 Mile
Higher

FED USGS **USGS40000269619**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211818157510101		
Monloc name:	3-1851-06 W79 DWNTN		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.3018357
Longitude:	-157.847535	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	17.00
Vert measure units:	feet	Vertacc measure val:	2
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		

Aquifer type:	Not Reported		
Construction date:	18840101	Welldepth:	503
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

AC90
NE
1/2 - 1 Mile
Higher

FED USGS **USGS40000269611**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211816157495801		
Monloc name:	3-1849-05 W39 MAKIKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.3012798
Longitude:	-157.830035	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	48.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	18890101	Welldepth:	213
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

AB91
NW
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002192**

Objectid:	734	Wid:	3-1851-006
Island:	Oahu	Well name:	Young St
Old name:	Not Reported		
Yr drilled:	1883		
Driller:	Not Reported		
Quad map:	13		
Long83dd:	-157.8475		
Lat83dd:	21.3019444444		
Gps:	0	Utm:	-1
Owner user:	Vida Villa	Old number:	79-
Well type:	Not Reported	Casing dia:	6
Ground el:	17		
Well depth:	503		
Solid case:	234	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	19.2	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported

Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	TKB		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-486
Bot solid:	-217	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002192

AC92
NE
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002183**

Objectid:	687	Wid:	3-1849-005
Island:	Oahu	Well name:	Manoa Valley
Old name:	Not Reported		
Yr drilled:	1889		
Driller:	Not Reported		
Quad map:	13		
Long83dd:	-157.83		
Lat83dd:	21.3013888889		
Gps:	0	Utm:	-1
Owner user:	Punahou Sch	Old number:	39-
Well type:	Not Reported	Casing dia:	6
Ground el:	48		
Well depth:	213		
Solid case:	172	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	35.8	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	55		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-165
Bot solid:	-124	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002183

Map ID Direction Distance Elevation	Database	EDR ID Number
AB93 **NW** **1/2 - 1 Mile** **Higher**	**FED USGS**	**USGS40000269620**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211818157510301		
Monloc name:	3-1851-28 W81 DWNTN		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.3018358
Longitude:	-157.8480907	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	18.00
Vert measure units:	feet	Vertacc measure val:	.5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19130101	Welldepth:	505
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1916-09-18	-12.26	

AB94 **NW** **1/2 - 1 Mile** **Higher**	**HI WELLS**	**HI8000000002191**

Objectid:	756	Wid:	3-1851-028
Island:	Oahu	Well name:	Young St
Old name:	Not Reported		
Yr drilled:	1913		
Driller:	MCCANDLESS		
Quad map:	13		
Long83dd:	-157.848055556		
Lat83dd:	21.3019444444		
Gps:	0	Utm:	-1
Owner user:	Med Arts Bldg	Old number:	Not Reported
Well type:	Not Reported	Casing dia:	8
Ground el:	18		
Well depth:	505		
Solid case:	476	Perf case:	Not Reported
Use:	UNU - Unused	Use year:	Not Reported
Init head:	30.3	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	41		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported

Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	36	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-487
Bot solid:	-458	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 2-4-002:006
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	01-JAN-13
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002191

AD95
NE **FRDS PWS** **HI0000324**
1/2 - 1 Mile
Higher

PWS ID:	HI0000324		
Date Initiated:	Not Reported	Date Deactivated:	Not Reported
PWS Name:	PUNAHOU SCHOOL 1601 PUNAHOU ST. HONOLULU, OAHU, HI 96822		
Addressee / Facility:	System Owner/Responsible Party MR. WILLIAM METZGER PUNAHOU SCHOOL 1601 PUNAHOU STREET HONOLULU, HI 96822		
Facility Latitude:	21 18 13.0000	Facility Longitude:	157 49 52.0000
City Served:	HONOLULU		
Treatment Class:	Treated	Population:	4000

PWS currently has or had major violation(s) or enforcement: YES

VIOLATIONS INFORMATION:

Violation ID:	9400001	Source ID:	001	PWS Phone:	Not Reported
Vio. beginning Date:	04/01/94	Vio. end Date:	04/30/94	Vio. Period:	001 Months
Num required Samples:	Not Reported	Number of Samples Taken:		Not Reported	
Analysis Result:	Not Reported	Maximum Contaminant Level:		Not Reported	
Analysis Method:	Not Reported				
Violation Type:	MCL, Monthly (TCR)				
Contaminant:	COLIFORM (TCR)				
Vio. Awareness Date:	041594				

ENFORCEMENT INFORMATION:

Truedate:	03/31/2009	Pwsid:	HI0000324
Pwsname:	PUNAHOU SCHOOL		
Retpopsrvd:	4000	Pwstypecod:	NTNC
Vioid:	107	Contaminant:	COLIFORM (TCR)
Viol. Type:	MCL, Monthly (TCR)		
Complperbe:	1/1/2007 0:00:00		
Complperen:	1/31/2007 0:00:00	Enfdate:	1/26/2007 0:00:00
Enf action:	State Violation/Reminder Notice		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	HI0000324
Pwsname:	PUNAHOU SCHOOL		
Retpopsrvd:	4000	Pwstypecod:	NTNC
Vioid:	107	Contaminant:	COLIFORM (TCR)
Viol. Type:	MCL, Monthly (TCR)		
Complperbe:	1/1/2007 0:00:00		
Complperen:	1/31/2007 0:00:00	Enfdate:	2/6/2007 0:00:00
Enf action:	State Public Notif Received		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	HI0000324
Pwsname:	PUNAHOU SCHOOL		
Retpopsrvd:	4000	Pwstypecod:	NTNC
Vioid:	107	Contaminant:	COLIFORM (TCR)
Viol. Type:	MCL, Monthly (TCR)		
Complperbe:	1/1/2007 0:00:00		
Complperen:	1/31/2007 0:00:00	Enfdate:	1/26/2007 0:00:00
Enf action:	State Public Notif Requested		
Violmeasur:	Not Reported		

System Name:	PUNAHOU SCHOOL		
Violation Type:	MCL, Monthly (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1994-04-01 - 1994-04-30		
Violation ID:	9400001		
Enforcement Date:	1994-05-18	Enf. Action:	State Violation/Reminder Notice

System Name:	PUNAHOU SCHOOL		
Violation Type:	MCL, Monthly (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1994-04-01 - 1994-04-30		
Violation ID:	9400001		
Enforcement Date:	1994-05-18	Enf. Action:	State Public Notif Requested

System Name:	PUNAHOU SCHOOL		
Violation Type:	MCL, Monthly (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1994-04-01 - 1994-04-30		
Violation ID:	9400001		
Enforcement Date:	1994-05-25	Enf. Action:	State Public Notif Issued

CONTACT INFORMATION:

Name:	PUNAHOU SCHOOL	Population:	4000
Contact:	SCOTT, JAMES	Phone:	808-944-5811
Address:	Punahou School		
Address 2:	1601 Punahou Street HONOLULU, HI 96822		

AD96
NE
1/2 - 1 Mile
Higher

FED USGS **USGS40000269602**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211813157495201		
Monloc name:	3-1849-10 W37 MAKIKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.3004465
Longitude:	-157.8283683	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	44.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19091101	Welldepth:	302
Welldepth units:	ft	Wellholedepth:	315
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

AD97
NE
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002174**

Objectid:	692	Wid:	3-1849-010
Island:	Oahu	Well name:	Punahou
Old name:	Not Reported		
Yr drilled:	1909		
Driller:	MCCANDLESS		
Quad map:	13		
Long83dd:	-157.828333		
Lat83dd:	21.300556		
Gps:	0	Utm:	-1
Owner user:	Punahou High School	Old number:	37-
Well type:	Not Reported	Casing dia:	8
Ground el:	36		
Well depth:	315		
Solid case:	195	Perf case:	Not Reported
Use:	DOMN - Schools	Use year:	Not Reported
Init head:	29.1	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	48		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	TKB		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-279
Bot solid:	-159	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		

Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 2-8-018:001
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	01-JAN-09
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002174

AE98
NW
1/2 - 1 Mile
Higher

FED USGS **USGS40000269604**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211813157511101		
Monloc name:	3-1851-63 W82-2B DWN		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.300447
Longitude:	-157.8503128	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	5.00
Vert measure units:	feet	Vertacc measure val:	2
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19670701	Welldepth:	Not Reported
Welldepth units:	Not Reported	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

AE99
NW
1/2 - 1 Mile
Higher

FED USGS **USGS40000269605**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211813157511102		
Monloc name:	3-1851-62 W82-2A DWN		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.300447
Longitude:	-157.8503128	Sourcemap scale:	24000

Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	5.00
Vert measure units:	feet	Vertacc measure val:	2
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19670714	Welldepth:	65
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

AD100
NE
1/2 - 1 Mile
Higher

FED USGS **USGS40000269593**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211812157495001		
Monloc name:	3-1849-01 W38 MAKIKI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.3001687
Longitude:	-157.8278128	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	37.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	18800101	Welldepth:	295
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

AE101
NW
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002169**

Objectid:	790	Wid:	3-1851-062
Island:	Oahu	Well name:	Nbc
Old name:	Not Reported		
Yr drilled:	1967		
Driller:	NAT WHITON		
Quad map:	13		
Long83dd:	-157.850277778		
Lat83dd:	21.3005555556		
Gps:	0	Utm:	-1
Owner user:	C&C Pks&Rec	Old number:	Not Reported

Well type:	Not Reported	Casing dia:	16
Ground el:	Not Reported		
Well depth:	65		
Solid case:	14	Perf case:	Not Reported
Use:	IRR - Landscape/Water Features	Use year:	Not Reported
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	376		
Test date:	Not Reported	Test gpm:	600
Test ddown:	1.9	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	700		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	Not Reported
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	316		
Pump mgd:	1.008		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 2-3-008:001
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	14-JUL-67
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002169

AD102
NE
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002165**

Objectid:	683	Wid:	3-1849-001
Island:	Oahu	Well name:	Manoa Valley
Old name:	Not Reported		
Yr drilled:	1880		
Driller:	PIERCE		
Quad map:	13		
Long83dd:	-157.827777778		
Lat83dd:	21.3002777778		
Gps:	0	Utm:	-1
Owner user:	Marques E M	Old number:	38-
Well type:	Not Reported	Casing dia:	3
Ground el:	37		
Well depth:	295		
Solid case:	273	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	43.5	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	49		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	TKB		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-258
Bot solid:	-236	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		

Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002165

AF103
NW
1/2 - 1 Mile
Higher

FED USGS **USGS40000269616**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211817157510801		
Monloc name:	3-1851-01 W82 DWNTN		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.301558
Longitude:	-157.8494795	Sourcemap scale:	24000
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	16.00
Vert measure units:	feet	Vertacc measure val:	2
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	18810101	Welldepth:	540
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

AF104
NW
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002186**

Objectid:	729	Wid:	3-1851-001
Island:	Oahu	Well name:	H I C
Old name:	Not Reported		
Yr drilled:	1881		
Driller:	Not Reported		
Quad map:	13		
Long83dd:	-157.849444444		
Lat83dd:	21.3016666667		
Gps:	0	Utm:	-1
Owner user:	Ward C P	Old number:	82-

Well type:	Not Reported	Casing dia:	6
Ground el:	16		
Well depth:	540		
Solid case:	Not Reported	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	30.8	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	65		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	TKB		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-524
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	30102		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002186

AG105
East
1/2 - 1 Mile
Higher

FED USGS **USGS40000269530**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211734157493601		
Monloc name:	3-1749-03 W40 PALOLO		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.2896136
Longitude:	-157.8239242	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	10.00
Vert measure units:	feet	Vertacc measure val:	2
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	18820101	Welldepth:	730
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID Direction Distance Elevation	Database	EDR ID Number
AG106 **East** **1/2 - 1 Mile** **Higher**	**HI WELLS**	**HI8000000002092**

Objectid:	573	Wid:	3-1749-003
Island:	Oahu	Well name:	Kapahulu
Old name:	Not Reported		
Yr drilled:	1882		
Driller:	COOKE-PEDDLER		
Quad map:	13		
Long83dd:	-157.823888889		
Lat83dd:	21.2897222222		
Gps:	0	Utm:	-1
Owner user:	Magoon Trust	Old number:	40-
Well type:	Not Reported	Casing dia:	Not Reported
Ground el:	10		
Well depth:	730		
Solid case:	Not Reported	Perf case:	Not Reported
Use:	Other	Use year:	Not Reported
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	-720
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	30101		
Latest hd:	Not Reported	Wcr:	30-DEC-99
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002092

AH107 **East** **1/2 - 1 Mile** **Higher**	**FED USGS**	**USGS40000269543**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211746157493601		
Monloc name:	3-1749-20 W35-1A MOI		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.2929468
Longitude:	-157.823924	Sourcemap scale:	24000

Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	15.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19540101	Welldepth:	28
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

AH108
East
1/2 - 1 Mile
Higher

FED USGS **USGS40000269544**

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Center		
Monloc Identifier:	USGS-211746157493602		
Monloc name:	3-1749.01 STAR MARKET		
Monloc type:	Well		
Monloc desc:	FILE INFO FROM STATE COMPUTER PRINTOUT		
Huc code:	20060000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	21.2929468
Longitude:	-157.823924	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	9.00
Vert measure units:	feet	Vertacc measure val:	1
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic map		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19540910	Welldepth:	28
Welldepth units:	ft	Wellholedepth:	32
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1954-09-10	8.30	

Note: A nearby site that taps the same aquifer had been pumped recently.

AH109
East
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002105**

Objectid:	590	Wid:	3-1749-020
Island:	Oahu	Well name:	Moiliili
Old name:	Not Reported		
Yr drilled:	1954		
Driller:	NAT WHITON		
Quad map:	13		
Long83dd:	-157.823888889		
Lat83dd:	21.2930555556		
Gps:	0	Utm:	-1
Owner user:	Star Market	Old number:	35-1A
Well type:	Not Reported	Casing dia:	12
Ground el:	Not Reported		
Well depth:	28		
Solid case:	10	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	200
Test ddown:	2.4	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	18		
Draft mgy:	14	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	Not Reported
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	83		
Pump mgd:	.025		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 2-8-005:002
Aqui code:	30101		
Latest hd:	Not Reported	Wcr:	01-JAN-54
Pir:	1/1/1954	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002105

AH110
East
1/2 - 1 Mile
Higher

HI WELLS **HI8000000002106**

Objectid:	591	Wid:	3-1749-021
Island:	Oahu	Well name:	Moiliili
Old name:	Not Reported		
Yr drilled:	1954		
Driller:	NAT WHITON		
Quad map:	13		
Long83dd:	-157.823888889		
Lat83dd:	21.2930555556		
Gps:	0	Utm:	-1
Owner user:	Star Market	Old number:	35-1B
Well type:	Not Reported	Casing dia:	12
Ground el:	Not Reported		
Well depth:	28		
Solid case:	11	Perf case:	Not Reported
Use:	ABN - Sealed	Use year:	Not Reported
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	100
Test ddown:	1	Test chlor:	Not Reported

Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	0		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	0		
Draft yr:	Not Reported	Bot hole:	Not Reported
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	100		
Pump mgd:	0		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	(1) 2-8-005:002
Aqui code:	30101		
Latest hd:	Not Reported	Wcr:	01-JAN-54
Pir:	Not Reported	Surveyor:	Not Reported
T:	Not Reported	Site id:	HI8000000002106

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

Federal EPA Radon Zone for HONOLULU County: 3

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for HONOLULU COUNTY, HI

Number of sites tested: 209

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.015 pCi/L	100%	0%	0%
Living Area - 2nd Floor	0.125 pCi/L	100%	0%	0%
Basement	0.415 pCi/L	96%	4%	0%

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

HYDROGEOLOGIC INFORMATION

AQUIFLOW[R] Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Services, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Well Index Database
Source: Commission on Water Resource Management
Telephone: 808-587-0214
CWRM maintains a Well Index Database to track specific information pertaining to the construction and installation of production wells in Hawaii

OTHER STATE DATABASE INFORMATION

RADON

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary faultlines, prepared in 1975 by the United State Geological Survey

PHYSICAL SETTING SOURCE RECORDS SEARCHED

STREET AND ADDRESS INFORMATION

© 2010 Tele Atlas North America, Inc. All rights reserved. This material is proprietary and the subject of copyright protection and other intellectual property rights owned by or licensed to Tele Atlas North America, Inc. The use of this material is subject to the terms of a license agreement. You will be held liable for any unauthorized copying or disclosure of this material.

APPENDIX G

Interview Documentation

Central Planet Repair, LLC
Comprehensive Environmental Services
www.geochemist.net
236 Kuahiwi Avenue, Wahiawa, Hawaii 96786
USA: +1 808 216-6555
Singapore: +65 8247 9061

September 23, 2014

SamKoo Pacific, LLC
SamKoo Hawaii, LLC
1631 Kapiolani Boulevard, Suite 200
Honolulu, Hawaii 96814

Attn: Mr. Timothy Yi, General Manager, via email

Subject: **Proposal**
Phase I Environmental Site Assessments
1391 Kapiolani Boulevard
TMK: (1) 2-3-039:011
1631 & 1637 Kapiolani Boulevard
TMK: (1) 2-3-041:009
TMK: (1) 2-3-041:006
Honolulu, Oahu, Hawaii
CPR P-451

Dear Mr. Yi:

Central Planet Repair LLC (CPR) is requesting that you provide information to the extent possible regarding the subject properties for the Phase I Environmental Site Assessments. We have compiled much information during the other stages of the project including the historical document review and the site inspection.

The final few questions for inquiry are:

How long has your company owned the subject properties and how long have you been involved with the properties?

1391 Kapiolani: 7 years, 7 years

1631 Kapiolani: 7 years, 7 years

Do you have knowledge about the historical use of the properties prior to your company ownership? No

Was there any evidence of soil contamination found during the installation of the grease trap at the restaurant on the 1631 Kapiolani parcel? No

For the proposed construction on the properties, is there a preliminary design for the foundation and subgrade structures? Will the buildings be similar in concept or different? 1391 Yes, Yes
1631 No

Do you know of any other information regarding the environmental history of the properties? No

Do you know if the property values at the time of purchase were discounted due to environmental issues? No

-o0o-

Your authorization of this project can be made by signing in the appropriate space provided below. This proposal is valid for 30 days. We appreciate this opportunity to be of service to you. Please contact me at 808/216-6555, if you have any questions or comments regarding your project.

Very truly yours,
Central Planet Repair, LLC

Ned Murphy
Consulting Geochemist

PROPOSAL ACCEPTED BY:

Signature _____ Firm SamKoo Pacific, LLC
SamKoo Hawaii, LLC

Name Timothy Yi Date 9/22/14

cc: Mr. Lowell Chun, Pacific Catalyst

- **Johnny Wu** Sep 24 at 9:02 AM

To Ned Murphy
CC Timothy Yi, Lowell Chun, Vernon Inoshita

Ned,

We anticipate the following:

1. For elevator pit, we anticipate the contractor will excavate up to 10 feet deep (potential 5 feet into the water table). The contractor will sheet pile around all the elevator core to prepare for elevator foundation / waterproofing work. Dewatering will be anticipated, and the contractor will likely dig another hole, adjacent to the elevator pit, and pump any water into that hole. the pit can be semi-dry when installing re-bars and form work. This work process typically last 6 to 8 weeks.

2. other than the elevator pit, excavations are anticipated for pile caps, grade beams and underground building utilities (sewer line, water line, power, communication etc). If any of the above require excavation down to and below the water table, minimized and localized dewatering will be anticipated. This involve temporary pumping water from on hole / trench to the adjacent one. no sheet pile is anticipated / required to perform these work.

let me know if you have further questions.

Thank you,

Johnny Wu, AIA, LEED-AP
Design Partners Incorporated
PH: (808) 432-9434

On Wed, Sep 24, 2014 at 1:23 AM, Ned Murphy <ned@geochemist.net> wrote:

> Thanks Johnny,
>
> Will only pile caps and elevator sumps be excavated or will there be other substantial excavation.
>
> With the shallow water table below the site will dewatering be anticipated?
>
> Thank you,
> Ned
>
> Ned Murphy, FRGS
> Consulting Geochemist
> Central Planet Repair, LLC
> www.geochemist.net
> USA +1 808 216-6555

Singapore +65 8247 9061

From: Johnny Wu <johnny@designpartnersinc.com>
To: Timothy Yi <timyi@samkoocorp.com>; ned@geochemist.net; Lowell Chun <pacificcatalyst@gmail.com>
Sent: Tuesday, September 23, 2014 11:59 PM
Subject: Re: FW: Phase I Environmental Site Assessments

Ned,

the foundation system will be reinforced concrete pile system.

Let me now if you need further information on this.

thanks

Johnny Wu, AIA, LEED-AP
Design Partners Incorporated
PH: (808) 432-9434

On Tue, Sep 23, 2014 at 4:03 PM, Timothy Yi <timyi@samkoocorp.com> wrote:

Johnny,

Please see if you can answer Ned's question.

Thanks,
Tim

Timothy Yi
General Manager( )
SamKoo Pacific, LLC
SamKoo Hawaii, LLC
1631 Kapiolani Blvd. Ste.200
Honolulu, HI 96814
Office: (808) 941-2300
Fax: (808) 941-2339

APPENDIX H

Qualifications of the Environmental Professionals

STATEMENT OF QUALIFICATIONS

Central Planet Repair, LLC

CPR is a Hawaii-based Small Business Administration certified HUBZone small business enterprise, professional environmental services firm, offering high quality technical services to private, commercial, industrial, and government clients in Hawaii and the Pacific Rim.

Ned Murphy formed CPR in February 2002 to present a more practical and low cost approach to providing environmental consulting services to clients. The lower cost came from the ability to bypass the middle management and overhead contained in the large consulting firms by providing contact directly with the technical team and providing innovative solutions to traditional problems.

A few of the numerous industries we have worked for are petroleum, telecommunication, metal finishing, financial, recycling, construction, waste management, and automotive rental. We have been able to provide effective environmental engineering and consulting services to assist our clients in managing their environmental affairs and maintaining their compliance with regulatory agency requirements. CPR has contracted over 60 clients. Of the clients, approximately 80% have retained CPR for additional services outside of the original scope of work and approximately 50% have contracted new projects to CPR.

CPR has performed approximately 100 Phase I Due Diligence Environmental Site Assessments (ESA). These assessments included value consideration and hazard risk analysis. Additionally, CPR has performed over 80 site investigations to satisfy responses to HDOH and EPA notifications of deficiency and compliance purposes.

Documentation of CPR's five consecutive years of business existence is provided on the Certificate of Good Standing from DCCA.

CPR has not been involved in any lawsuits or complaints filed against us since our organization on January 28, 2002.

Experience and professional qualifications relevant to this project

Key personnel for this project included Mr. Ned Murphy and Dr. Alexander Grafchikov. The project was directed and managed by Mr. Murphy. Mr. Murphy also was the contractor interface.

NED MURPHY– CONSULTING GEOCHEMIST

Ned formed the company in February of 2002 and has over 26 years of environmental engineering and project management experience. He has conducted and managed a broad range of projects and is experienced in site investigations and remediation methods with an emphasis on hydrocarbon projects. He has been conducting Soil Gas investigations and remedial design including methane abatement in Hawaii since 1990.

Ned has extensive experience of the processes involved with Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), Clean Water Act (CWA), and Superfund Amendments and Reauthorization Act (SARA) compliance. He has completed multiple environmental investigations, ASTM Phase I and Phase II environmental site assessments, compliance audits, sampling and analysis, permitting, underground and aboveground storage tank (UST and AST) investigations, UST and AST removal and replacements, geotechnical and geophysical investigations, infrastructure design, utility engineering, and preparation of work plans and closure reports.

DR. ALEXANDER GRAFCHIKOV – SENIOR GEOCHEMIST

Alexander joined the company in July of 2006. Alexander has over 35 years experience in experimental and environmental geochemistry. Since joining CPR, he has been conducting the calculation of risk values and risk assessments for several sites, ASTM Phase I and Phase II environmental site assessments, computer modeling the effects of remediation designs for several sites, designing an oxygen release compound treatment system, sampling and analysis, preparation of work plans and closure reports, and developing databases of collected sampling results.

F. SOIL/GROUNDWATER MANAGMENT PLAN

CONTAMINATED MATERIALS IN CONSTRUCTION MANAGEMENT:

SOIL AND GROUNDWATER MANAGEMENT PLAN

TMK: (1) 2-3-039:011
1391 KAPIOLANI BOULEVARD
HONOLULU, OAHU, HAWAII

Prepared for:

SamKoo Hawaii, LLC
1391 Kapiolani Boulevard, Suite 103
Honolulu, Hawaii 96814

December 20, 2017

Prepared by:
Central Planet Repair, LLC
236 Kuahiwi Avenue
Wahiawa, HI 96786
808/216-6555
www.geochemist.net

CPR PROJECT 74-1.1

Central Planet Repair, LLC
Comprehensive Environmental Services
www.geochemist.net
236 Kuahiwi Avenue, Wahiawa, Hawaii 96786
Phone: 808/216-6555

SamKoo Hawaii, LLC
1391 Kapiolani Boulevard, Suite 103
Honolulu, Hawaii 96814

December 20, 2017

Attention: Mr. Timothy Yi

Subject: **Contaminated Materials in Construction Management: Soil and Groundwater Management Plan**
TMK: (1) 2-3-039:011
1391 Kapiolani Boulevard, Honolulu, Oahu, Hawaii
CPR Project: 74-1.1

Dear Mr. Yi:

Central Planet Repair, LLC (CPR) has prepared a Contaminated Materials in Construction Management: Soil and Groundwater Management Plan for the subject property at 1391 Kapiolani Boulevard, Honolulu, Hawaii. The purpose of this project is to prepare a contingency plan for the management of hazardous materials encountered during construction on the site. These materials would include known concerns identified in the 2014 Phase I ESA prepared for the property by CPR as well as unanticipated occurrences identified during construction.

This Plan was prepared in accordance with the scope of work contained in our proposal dated September 14, 2017.

-oOo-

Please contact us at (808) 216-6555 with any questions or comments regarding this project.

Sincerely,
Central Planet Repair, LLC

Ned Murphy
Consulting Geochemist

TABLE OF CONTENTS

1.0 INTRODUCTION AND PURPOSE 1
2.0 SUBJECT PROPERTY DESCRIPTION 2
2.1 LOCATION AND LEGAL DESCRIPTION 2
2.2 FORMER USES OF THE SUBJECT PROPERTY 2
2.3 CURRENT USES OF ADJOINING PROPERTIES 3
2.4 SUBJECT PROPERTY PHYSICAL SETTINGS 3
2.4.1 Topography 3
2.4.2 Geology and Soil 3
2.4.3 Groundwater 4
3.0 DEFINITIONS 6
4.0 RECOGNIZED ENVIRONMENTAL CONDITIONS 7
4.1 SUBJECT PROPERTY PHASE I ENVIRONMENTAL SITE ASSESSMENT .. 7
4.2 SUBJECT PROPERTY AREAS OF CONCERN 9
5.0 CONTAMINATED AREA IDENTIFICATION AND CONTROLS 11
5.1 CONTINGENCY ACTION PLAN FOR CONTAMINATION AND HAZARDOUS MATERIALS DISCOVERY 11
5.1.1 Contamination Indicators 11
5.1.2 Actions at Contamination Discovery 13
5.2 RELEASE NOTIFICATION 14
5.3 CONTAMINATION TESTING AND MONITORING REQUIREMENTS ... 15
5.3.1 Soil contamination testing and monitoring requirements 15
5.3.2 Groundwater and Surface Water Monitoring 16
6.0 MANAGEMENT PLAN FOR CONTAMINATED SITES 18
6.1 SOIL EXCAVATION 18
6.1.1 Pre-Excavation Procedure 18
6.1.2 Site Induction 19
6.1.3 Stormwater and Sediment Controls 19
6.1.4 Excavation and Stockpile Procedures 19
6.1.5 Contaminated groundwater and surface water controls 21
6.1.6 Contaminated dust controls 22
6.1.7 Post-excavation procedure 22
6.1.8 Imported materials 22
6.2 SOIL AND GROUNDWATER DISPOSAL 23

6.2.1 Disposal of Contaminated Non-Hazardous Soil 23
6.2.2 Disposal of Hazardous Soil 23
6.2.3 Disposal of Contaminated Water 23
7.0 HEALTH AND SAFETY GUIDELINES 24
8.0 ROLES AND RESPONSIBILITIES 25
9.0 LIMITATIONS 26
10.0 REFERENCES 27

LIST OF TABLES

Table 1. Areas of Concern 10

FIGURES

Figure 1 Subject Property Location Map
Figure 2 Subject Property Plan
Figure 3 Areas of Concern

APPENDICES

Appendix A Site Photographs

1.0 INTRODUCTION AND PURPOSE

Central Planet Repair, LLC has prepared this Contaminated Materials in Construction Management: Soil and Groundwater Management Plan (SAGMP) for TMK: (1) 2-3-039:011, 1391 Kapiolani Boulevard, Honolulu, Oahu, Hawaii (the "subject property"). The subject property location is shown on Figure 1.

The Phase I Environmental Site Assessment (ESA) for the subject property (CPR, 2014) found that recognized environmental conditions (RECs) and historical recognized environmental conditions (HRECs) are present on the subject property (recognized environmental conditions—the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property).

The purpose of this Plan is to prepare a contingency plan for the management of contaminated materials, including hazardous materials that could be encountered during construction on the subject property.

The principal purpose of this Plan is to highlight the minimum standards that must be complied with as well as best practicable options for management of contaminated soil and groundwater for the construction project at the subject property.

This Plan has been written to comply with Best Management Practices Manual for Construction Sites in Honolulu (Department of Environmental Services, 1999).

This SAGMP is not intended for direct, unmodified use by contractors for health and safety. Contractors are responsible for creating and administering their own site specific health and safety plans based on their worker safety programs. Each employer is responsible for the health and safety of its own workers.

2.0 SUBJECT PROPERTY DESCRIPTION

2.1 LOCATION AND LEGAL DESCRIPTION

The subject property is located in Honolulu, Oahu, Hawaii (Figure 1). The former facilities located at the subject property are depicted on Figure 2. The TMK: (1) 2-3-039:011 parcel is located at 1391 Kapiolani Boulevard, Honolulu and contains an area of 1.4309 Acres.

2.2 FORMER USES OF THE SUBJECT PROPERTY

Motor Supply, Ltd. owned the site since 1944, when it was purchased from the Dillingham Corporation. The site was a vacant lot until 1952 when Motor Supply, Ltd. constructed an automobile showroom and a small repair shop on the property. The buildings housed the Courtesy Pontiac/Rainbow Chevrolet dealership, which Motor Supply, Ltd. owned and operated until the dealership was sold to Cutter Chevrolet-Geo-Pontiac, on April 1, 1986. The buildings that are currently on the property were constructed in about 1967. The repair shop that was constructed in 1952 was a 3-sided, shed, which was adjacent to Kapiolani Boulevard and Kona Iki Street. The repair shop was demolished in 1967 and was replaced by the service center.

Two buildings are located on the TMK: (1) 2-3-039:011 parcel of land. At the time of the Phase I ESA (CPR, 2014) the buildings were occupied by "Taste Tea" restaurant, Auto X-Change, Inc., "King's Pizza" restaurant, auto-repairing/detailing facility, and a warehouse. The rest of the property was used as parking.

CPR revisited the site during preparation of this Plan in early November 2017. The site was occupied by "Taste Tea" restaurant, Hawaiian Dredging Construction Company, the Kapiolani Residences sales office, and the SamKoo Hawaii office. Photographs from the November 2017 Site Reconnaissance are shown in Appendix A.

2.3 CURRENT USES OF ADJOINING PROPERTIES

The current uses of the adjoining properties are:

South: Kona Street. Ala Moana Center is located across Kona Street.
West: Kona Iki Street. Multi-story office building and condos are located across the street.
North: Kapiolani Boulevard. Numerous commercial facilities are located across the boulevard.
East: Buildings on the east adjoining property are occupied by restaurants, shops, and a tattoo salon.

2.4 SUBJECT PROPERTY PHYSICAL SETTINGS

2.4.1 Topography

The elevation of the subject property is approximately 3 feet above mean sea level. The center of the property is located at approximately 21° 17' 36.1" north latitude and 157° 50' 38.7" west longitude. The property is flat.

The subject property is located in the Metro Oahu region. The climate is relatively warm and dry. Trade winds from the northeast occur much of the time, with occasional Kona winds. The normal temperature range for the region varies from the high 60's (degrees Fahrenheit) to the low 90's. Rainfall is light, with mean annual rainfall of about 28 inches in Honolulu.

2.4.2 Geology and Soil

The soil type within the subject property is identified in the U.S. Department of Agriculture, Soil Conservation Service Survey as Fill Land (SSFM, 2013). This type of soil occurs mostly near Pearl Harbor and the Honolulu areas adjacent to the

ocean. It consists of areas filled with material dredged from the ocean or hauled from nearby areas and general materials from several other sources.

The subsurface conditions at the subject property were explored by drilling and sampling four borings extending to depths of about 121.5 to 151.5 feet below the existing ground surface (Geolabs, 2014). Based on the available soil boring data, the subject property generally is underlain by surface fill materials placed over lagoonal deposits followed by coralline deposits. The surface fills encountered generally consist of soft to medium stiff silty clays and loose to medium dense clayey gravel extending to depths of about 4.5 to 6 feet below the existing ground surface. Lagoonal deposits generally consisting of very loose to loose silty and/or clayey sands and gravel were encountered underlying the surface fill layer to depths of about 18 to 22 feet below the existing ground surface. Coralline materials were encountered below the lagoonal deposits and generally consist of interbedded loose to dense sandy and gravelly coralline detritus and soft to medium hard coral formation extending down to the maximum depth explored of about 151.5 feet below the ground surface.

2.4.3 Groundwater

The groundwater in the area is part of the Nuuanu Aquifer System of the Honolulu Aquifer Sector as classified by Mink and Lau (1990). The groundwater is basal, freshwater in contact with seawater, unconfined, and is hosted in horizontally extensive lavas. The groundwater is classified as potentially used, drinking, fresh (<250 mg/L chloride), irreplaceable, and highly vulnerable to contamination. The hydrogeologic gradient is expected to be toward the Pacific Ocean. This assumption is based on the area topographic profile.

The subject property is located below (downgradient) of the Underground Injection Control (UIC) line as shown on the UIC map of Oahu, HDOH. This typically indicates that the underlying aquifer is not considered a drinking water source, limited types of injection wells are allowed, and injection wells need a UIC Permit or Permit Exemption.

The subject property groundwater was encountered at depths ranging from about 3.8 to 4.5 feet below the existing ground surface. Based on the proximity of the property to the Pacific Ocean, groundwater levels are expected to vary with tidal fluctuations. In addition, groundwater levels may change due to seasonal precipitation, surface water runoff, and other factors.

3.0 DEFINITIONS

Environmental Action Levels (EALs):
Environmental Action Levels are concentrations of contaminants in soil, soil gas and groundwater above which the contaminants could pose a potential adverse threat to human health and the environmental.

Contaminated Soil/Groundwater:
Soil/Groundwater, which contains one or more contaminants from an unintentional or intentional spill or release of a hazardous substance, hazardous waste or pollutant at a concentration, which exceeds applicable remediation standards (EALs).

Contaminated Non-hazardous Soil/Groundwater:
Contaminated Soil/Groundwater is considered to be non-hazardous when the following criteria is met:
The Soil contains levels of contaminants exceeding Hawaii Department of Health (HDOH) cleanup criteria (EALs), however, at levels not considered hazardous as per definition by Title 40 CFR.

Hazardous Soil/Fluid:
Hazardous Material is a chemical compound, or combination of compounds, posing or capable of posing a significant risk to public health, safety, or the environment as a result of its quantity, concentration, or physical/chemical/infectious properties.

Soil/Fluid is considered "hazardous" when any of the following criteria are met:
a. Soil/Fluid tests positive for characteristics of a hazardous waste defined at Title 40 CFR Part 261 Subpart 261.21-261.24.6
b. Soil/Fluid containing a listed waste as per 40 CFR 261 Subpart D 261.31-261.33.
c. Soil/Fluid containing a mixture of a non-hazardous waste and one or more hazardous wastes listed in 40 CFR261 Subpart D 261.31-261.33.

4.0 RECOGNIZED ENVIRONMENTAL CONDITIONS

4.1 SUBJECT PROPERTY PHASE I ENVIRONMENTAL SITE ASSESSMENT

The findings of Phase I Environmental Site Assessment for the site (CPR, 2014) were that the following recognized environmental conditions (RECs) are present on the subject property (*recognized environmental conditions*—the presence or likely presence of any *hazardous substances* or *petroleum products* in, on, or at a *property*: (*1*) due to release to the environment; (*2*) under conditions indicative of a *release* to the *environment*; or (*3*) under conditions that pose a *material threat* of a future *release* to the *environment*):

- The subject property was used as an auto repairing facility including battery service at least since 1949.

- The pool of wastewater at the auto-wash area was observed at the auto-repairing section of the site building located along Kona Street (Appendix A, Photo 1). A floor drain was observed in the pool area. This drain is considered a REC because it was unknown where the drain discharged and there was a possibility that "residuals" associated with the automobile repair and car washing may have discharged to this drain.

- There is a former collector trench probably containing an oil-water separator (Appendix A, Photo 2 - 2014 & Photo 7 - 2017). The sump probably collected discharges from within the former service/wash area via. The condition and/or contents of the trench and associated oil-water separator were never determined.

The findings of Phase I Environmental Site Assessment for the site (CPR, 2014) were that the following historical recognized environmental conditions were present on the subject property (*historical recognized environmental condition*—a past *release* of any *hazardous substances* or *petroleum products* that has occurred in connection with the *property* and has been addressed to the satisfaction of the applicable regulatory

authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the *property* to any required controls):

- A review of the Underground Storage Tank (UST) database, as provided by EDR, and dated 06/30/2014 has revealed that the subject property operated a 500-gallon Used Oil UST. The current tank status: Permanently Out of Use. Tank Closure: September 2, 1995.

- A review of the Leaking Underground Storage Tank (LUST) list, as provided by EDR, and dated 06/30/2014 has revealed that there was Used Oil LUST at the subject property. Facility Status: Site Cleanup Completed (HDOH *No Further Action* (NFA) letter dated by 10/26/1999).

- A review of the SPILLS list, as provided by EDR has revealed that there is 1 record for the target property (SPILS: Release Notifications. Releases of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988): Two former hydraulic auto storage lift racks were reported as leaking and removed in 1999. HDOH issued NFA letter for the site on 09/09/2005.

- In April 2006, Clayton Group Services, Inc. supervised the removal of two hydraulic lift systems, each consisting of two cylinders (front and rear) and a supply tank vault (Clayton, 2006a). During removal activities, the concrete vaults were observed to contain standing oil and water. The visually impacted soil in the vicinity of the former cylinders were subsequently excavated and disposed.

- The former used battery storage area was identified as a REC due to the fact that visual inspection revealed evidence of leakage of an unknown substance on the bare soil in this area (Clayton, 2005). Clayton performed a Phase II Environmental Investigations (Clayton, 2006b). Analytical data from Clayton's investigation indicated that chemicals of concern soil or groundwater concentrations were either below detectable limits or below their respective HDOH EALs at the time of their investigation.

4.2 SUBJECT PROPERTY AREAS OF CONCERN

Based on the findings of 2014 Phase I ESA, no additional environmental actions were warranted for the subject property at the date of the report. However, CPR recommended the following (CPR, 2014):

- An environmental professional should be retained to draft a Construction Management Plan such that contractors are aware of environmental health and safety issues in the event that a drain, sump, UST, buried drums, and/or stained smelly soils are encountered during site development. Monitoring should be conducted by an environmental professional during construction activities and that if underground storage tanks, buried debris, stained soils, waste drums or odorous soils are encountered during construction, they should be removed and properly disposed in accordance with regulatory requirements.

- There is a floor drain located within the vicinity of the former hydraulic lifts and car wash area. The drain should be evaluated for environmental impacts, and if the drain has no intended usage, it should be properly removed and/or closed during demolition of the current improvements.

- There is a former sump containing an oil-water separator at the subject property. The sump reportedly collected discharges from within the former service/wash area via a trench drain. The condition and/or contents of the sump and associated oil-water separator were never determined. The condition and status of the sump and associated oil-water separator should be specifically evaluated for environmental impacts, and if the sump has no intended usage, it should be properly removed and/or closed.

- Additionally, the site formerly operated a 500-gallon capacity used oil storage tank and hydraulic lift systems that were documented to have released petroleum to the soil and groundwater of the site. The releases received a no further action status from the Hawaii Department of Health. However, it is

likely that petroleum related to the releases remains present in the subsurface surrounding the former UST and racks locations. The discovery of petroleum in any concentration or amount will require reopening the release case with the HDOH UST Section in accordance with their requirements.

The subject property areas of concern are given in Table 1 and shown on Figure 3.

Table 1. Areas of Concern

Subject Property Area	Possible Source of Contamination	Contaminated media	Chemicals of Concern (COCs)
Auto-Repairing Section (Appendix A: Photo 1; Figure 3)	Floor Drain within the Vicinity of the Former Hydraulic Lifts and Car Wash Area.	Soil and Groundwater	Petroleum hydrocarbons, Volatile Organic Compounds, Polynuclear Aromatic Hydrocarbons, Polychlorinated biphenyls, Heavy metals
Auto-Repairing Section (Appendix A: Photo 2, Figure 3)	Former Sump (Collector Trench) and Oil-water Separator	Soil and Groundwater	
Auto-Repairing Section (Figure 3)	Former Leaking Used Oil UST	Soil and Groundwater	
Auto-Repairing Section	Former Hydraulic Lift Systems	Soil and Groundwater	
Auto-Repairing Section	Former Used Battery Storage Area	Soil	Lead, Cadmium

The exact potentially contaminated area sizes and vertical thickness of the contamination are unknown.

5.0 CONTAMINATED AREA IDENTIFICATION AND CONTROLS

5.1 CONTINGENCY ACTION PLAN FOR CONTAMINATION AND HAZARDOUS MATERIALS DISCOVERY

The potential locations of contaminated soil and groundwater are illustrated on Figure 3 and listed in Table 1. However, contaminated material can be discovered at any location at the subject property. This section outlines the steps to be taken if contaminated soils, surface water, groundwater or hazardous materials are discovered during the excavation works. The procedures outlined below provide the Project team with protocols to identify potential contamination and take appropriate action to avoid the dispersion of contaminants into the surrounding environment.

5.1.1 Contamination Indicators

During work that disturbs soil, the Environmental Specialist shall be on-site or readily available to inspect environmental conditions and implement decisions in accordance with this SAGMP during all subsurface penetration activities. Field-screening and visual inspection shall be performed during every phase of soils excavation, storage and transport on-site, including loading onto dump trucks.

Contamination indicators may include but are not limited to the following:

- Intact or broken drums and containers including underground tanks.
- Unusual odors.
- Discolored or stained water seeps and soils.
- Petroleum hydrocarbon contaminated soil and/or free product.
- Liquid waste, household refuse, and any material that normally would be sent to a permitted landfill.
- Gas bubbles in standing/pooled water.

Petroleum-contaminated soil can potentially present at the subject property. Petroleum-contaminated soil can be identified by the presence of free oil, oil staining, a petroleum odor, or any combination of these. The appearance of oil staining is not always consistent, but varies depending on the nature of the oil, the soil type, and the age of the release. Staining associated with old petroleum contamination often has a greenish hue, but may also be brown or black. The olfactory sense is the most sensitive instrument for identifying petroleum contamination in the field. Therefore, a petroleum odor may be noted although there is no visible sign of oil or staining.

This SAGMP does not prescribe all detailed means and methods of field-screening which could be available to the Environmental Specialist. As a general rule, screen at least one representative soil sample for approximately every 10 cubic yards of excavated soils, or 10 linear feet of trench. The soil screening activities and readings should be documented in the field as they are obtained. The following general field procedures shall be followed for screening soil samples within the Project Area:

- Before screening each day, calibrate photo-ionization detector (PID) according to manufacturer specifications.
- Use disposable latex or nitrile gloves and immediately place the sample in an appropriate container (e.g., sealed ziplock bag).
- Measure the sample headspace with a PID after allowing the sample to sit for approximately 10 minutes and record results.
- Decontaminate any sampling tools after each use.

Relative risk areas identified on Figure 3 may be used to plan for field screening equipment. The Environmental Specialist shall be prepared to perform field-screening in any areas where field personnel report odors or other conditions that suggest the presence of COCs.

5.1.2 Actions at Contamination Discovery

During the excavation works on site, the Environmental Management Team shall actively monitor for the conditions/materials specified above. In the event that one of these is identified, the Project team should take the following actions:

- Stop all earthworks within a 10-meter radius of the area where the suspect material/emission/discharge has been recorded.
- Immediately notify the site supervisor.
- Cordon off the area as practicable with a suitable barrier.
- Work shall not resume or commence within a 10-meter radius of the area unless authorized by the Environmental Manager.

The site supervisor shall contact the Environmental Manager who shall advise on the appropriate course of action. The Environmental Manager shall:

- Notify the regulatory authority (see Section 5.2), if required, that contamination has been discovered and contingency action is being implemented.
- Characterize the contamination by collecting samples for chemical laboratory analysis (see Section 5.3).
- If appropriate, advise the Project team to excavate the suspected contaminated material into a covered bin to allow works to continue with minimum delay.
- If excavation into a covered bin is inappropriate, advise construction work to proceed to an area clear of contamination indicators until material testing, as necessary, defines the material characteristics.
- When the material characteristics have been established, advise the site supervisor as to whether the materials may remain on site or whether materials should be disposal at a licensed landfill.
- Instruct relevant staff so that all appropriate information such as location and quantity of material are recorded.
- Record all details on an incident form, including GPS of location.

If an UST is discovered, The Project Manager will coordinate with the HDOH UST Section, and if removal or closure are undertaken, the actions will comply with all applicable Federal, state, and local laws and regulations.

5.2 RELEASE NOTIFICATION

In case of construction activities at the subject property contaminated areas of soil or groundwater with constituent concentrations above the HDOH EALs can be exposed. Hawaii Administrative Rules require a report to the HDOH within twenty-four (24) hours of the discovery of evidence that regulated substances may have been released, including *de minimis* contamination.

Failure to report a release under these laws and regulations may prompt EPA or State enforcement action including penalties not to exceed fines of $25,000 per day per violation or imprisonment. Copies of the laws and regulations may be obtained by contacting the HSERC/HEER at (808) 586-4249 or on the HDOH HEER website.

In general, the owner or operator of a facility **must immediately notify** the Hawaii State Emergency Response Commission (HSERC/HEER) ((808) 586-4249 or (808) 247-2191 after work hours) and the Local Emergency Planning Committee (LEPC) ((808) 723-8960) of the appropriate jurisdiction after the release of:

1. A listed hazardous substance designated under section 11-451-5(b), in quantities equal to or exceeding the reportable quantity criteria in section 11-451-6(b) in any 24-hour period; or
2. An unlisted hazardous substance designated under section 11-451-5(c), in quantities equal to or exceeding the reportable quantity criteria in section 11-451-6(c) in any 24-hour period.

An exception from immediate notification is provided for releases of oil of less than 25 gallons in any 24-hour period which is not contained and remedied within 72 hours. Such releases must be reported in written form only within 30 days of the discovery of the release.

The owner or operator of the facility must also provide a written follow-up notice within 30 days of the discovery of the release. If a release of a hazardous substance poses an imminent or immediate threat to public health or the environment, dial 911 to request fire, police, or emergency medical service personnel response.

The contaminated areas shall be delineated with sampling and testing conducted by qualified environmental specialists. Contaminated area exposure control is described in Section 6.0.

5.3 CONTAMINATION TESTING AND MONITORING REQUIREMENTS

In order to determine the contamination status of materials removed from or remaining within a contaminated site, a monitoring program is required. This will also allow assessment of the effects of disturbing and disposing of contaminated materials on the environment.

5.3.1 Soil contamination testing and monitoring requirements

Soil quality monitoring is required to cover three key aspects of the management of contaminated and potentially contaminated materials associated with the Project works, namely:

- Discovery testing: in response to "unknown" or unexpected contamination.
- Soil stockpile testing: targeted at the management of materials removed from site to a controlled/consented disposal site.
- Confirmation testing: targeted at documenting the concentrations of contaminants within the materials underlying the excavation works that remain in situ.

An explanation of the three types of testing is given below. Any soil testing shall be carried out by environmental professionals.

Discovery testing
If during the excavation works contamination is encountered, chemical testing may be warranted to characterize the contamination.

Soil stockpile testing
Once the earthworks and materials requirements are finalized, further information on soil condition may need to be provided to the landfill operator prior to disposal of any contaminated soils.

Confirmation testing
At any location where waste materials or contaminated soils are to be excavated, samples of material shall be collected from the base and sides in proportion to the size of the excavated areas. The samples shall be submitted for chemical characterization according to the nature of the contamination and HDOH requirements. This sampling and testing will provide information on any residual contamination of in situ soils underlying and surrounding the excavation works.

Further action at the tested locations should be carried out in concurrence with Environmental professionals and HDOH decisions.

5.3.2 Groundwater and Surface Water Monitoring

In construction areas where the works intersect groundwater and there is visual or olfactory indication of contamination of that groundwater, the groundwater shall be tested to determine whether it is contaminated. Where groundwater is found to be contaminated, the land in the vicinity within the designation shall be tested to determine if it is the source of the groundwater contamination. If the ground is found to be contaminated, the procedures for contaminated land described in Section 5.3.1 shall be followed.

Further action at the tested locations should be carried out in concurrence with Environmental Professionals and HDOH's decisions. Contaminated area exposure control is described in Section 6.0.

Groundwater or surface water that is suspected of being contaminated and needs to be removed from the excavations may require disposal at an appropriately licensed facility.

6.0 MANAGEMENT PLAN FOR CONTAMINATED SITES

This section outlines the steps to be taken if contaminated soils, groundwater or hazardous materials are discovered during the excavation works.

6.1 SOIL EXCAVATION

6.1.1 Pre-Excavation Procedure

Prior to any earthworks being undertaken at a site listed in Table 3 or at areas with confirmed contamination, a pre-earthworks site meeting shall be held and attended by the Project staff including the Construction Manager, the Environmental Manager, and personnel involved with the earthworks to discuss the risks and site procedures for handling contaminated soils and groundwater and/or potentially contaminated soils and groundwater located at the site. The Construction Manager shall ensure a Job Safety for the earthworks which shall cover exposure to contaminated soil, groundwater, and dust for construction workers and the general public.

Prior to works commencing, the Contractor shall establish the following controls:

- Access to the earthwork areas shall be restricted to authorized personnel (such as warning tape or barriers), following appropriate site induction procedures;
- Signage, including site works information, health and safety requirements, site reporting requirements;
- Dust control systems; and,
- Stormwater and sediment controls.

Procedures relating to the management of dust, stormwater, sediment and stockpiling are detailed below and shall be implemented by the Project Team. All procedures shall comply with the relevant laws and regulations.

6.1.2 Site Induction

All personnel working on the site during any intrusive ground works shall be required to undergo a site environmental awareness induction in addition to the health and safety induction. Construction worker meetings and daily briefings shall include aspects of contamination control (soil, water, and dust).

6.1.3 Stormwater and Sediment Controls

Stormwater and sediment controls shall be installed prior to earthworks commencing. The following measures shall be required at contaminated sites:

- Where the construction of earth bunds is required for directing water flow, these shall be constructed from clean materials, either imported fill or using soils from outside of the contaminated site. Topsoil from contaminated sites shall not be used in bund construction.
- Sediment retention ponds capturing runoff and sediment from contaminated sites shall have the decant mechanism raised to prevent immediate discharge.
- Contaminated water may require disposal at an appropriately licensed facility or to a sewer with permission from HDOH.
- Contaminated sediment shall be managed in the same manner as other contaminated soil.

6.1.4 Excavation and Stockpile Procedures

A suitably trained member of the Environmental Team shall be available on site during all excavation works in the areas identified as contaminated or possibly contaminated and shall be responsible, based upon the demarcation of natural ground, for defining which materials are clean or contaminated. The appointed Environmental Team member should, where necessary, undertake further contamination testing for defining the different areas of contamination.

Stockpiles of contaminated materials shall be managed by the Project Team as below:

- Stockpiled material shall be placed on plastic sheeting or similar to prevent contamination of underlying material. Stockpiles shall be sited within an area away from any surface water bodies and overland flow paths.
- A berm shall be installed around the stockpile to prevent runoff from leaving the area and stormwater from other areas entering the stockpile area.
- The stockpiled material shall be covered by a suitable material (such as polythene) to prevent the ingress of rainwater into the material and minimize the potential for generation of leachate or sediment in stormwater.
- Following removal of stockpiles placed on bare ground, the soil underneath the stockpile areas shall be tested to verify that contaminated materials have been removed.

The methodology for the working of soils containing elevated contaminant levels and to minimize transport off site is as follows:

- All trucks are to be covered before leaving site and any soils brushed off wheels to avoid tracking onto public roads. Should the site become wet and material adheres to wheels a wheel wash facility shall be installed and truck wheels washed before exiting the site.
- The Project team shall maintain a register of landfill disposal activities and records such as location of excavation, disposal location, quantity of material and off site weighbridge documents.

The landfill operator may require further testing before accepting materials, in accordance with the landfill's permit conditions.

6.1.5 Contaminated groundwater and surface water controls

Before construction activities are undertaken in any area adjacent to the area that may expose workers to the contaminated groundwater or surface water, procedures for the isolation of the work area shall be implemented. A summary of the procedures is given below. General groundwater controls include the following:

- Monitoring of groundwater elevation, flow (into an excavation) and quality, and also measure groundwater levels.
- Installation of trench stops to control groundwater flow.
- Construction of impermeable barriers such as clay (bentonite) cut-off walls or sheet piles (in locations where the water is found to be grossly contaminated) to prevent contaminants from entering excavations as required.
- Removal of groundwater from excavations by pumping and discharge into vacuum truck or sewer. Permission including permits will be required from HDOH for discharge to a storm sewer.
- In situ groundwater remediation.

If contaminated groundwater or surface water is still present in the work area (e.g. shallow water that cannot be pumped), precautions shall be taken to protect human health from the bacteria and low level contaminants in the surface water and groundwater. These include but are not limited to the following actions:

- Avoid contact with water where possible.
- Where contact cannot be avoided, use PPE to prevent contact with water such as waterproof gauntlets, chemical resistant boots, waders etc.
- No eating or drinking on site. Wash hands before breaks and at the end of the day.
- Wash any skin abrasions immediately and treat to prevent infections.
- Any additional requirements in the Contractor (Site Specific) Health and Safety Plan.

6.1.6 Contaminated dust controls

Dust suppression controls shall be rigorously implemented during earthworks at contaminated sites. Controls include but are not limited to:

- Reduction of vehicle speeds.
- Minimizing drop heights from loaders.
- Considering timing of works including prevalent wind direction.
- Regular watering of haul routes.
- Revegetating/stabilizing exposed surfaces as soon as possible.

6.1.7 Post-excavation procedure

Upon completion of excavation work, all equipment shall be cleaned and decontaminated prior to leaving the contaminated site. Water from wheel washes shall be collected and disposed in accordance with applicable requirements.

6.1.8 Imported materials

Any fill imported to reinstate the sites shall be tested for an appropriate suite of contaminants to demonstrate that levels of contaminants are acceptable for the proposed future use of that site. Imported materials can include natural uncontaminated material.

6.2 SOIL AND GROUNDWATER DISPOSAL

6.2.1 Disposal of Contaminated Non-Hazardous Soil

Contaminated soil classified as non-hazardous, can be re-used onsite (with prior approval of HDOH) or transported by a licensed hauler to a permitted facility authorized to receive solid waste.

6.2.2 Disposal of Hazardous Soil

Hazardous soil must be removed from the subject property for treatment or disposal. This material must be properly manifested; transported by a licensed, insured hauler; and go to a facility authorized to accept hazardous soil.

- Hazardous soil/waste should be stored in covered containers and protected from vandalism.
- Place hazardous waste containers in secondary containment.
- Do not mix wastes, this can cause chemical reactions and complicate disposal.
- Manifesting.

6.2.3 Disposal of Contaminated Water

Contaminated pumped groundwater must be removed from the subject property for treatment or disposal. This material must be properly manifested; transported by a licensed, insured hauler; and go to a facility authorized to accept contaminated fluids.

If the person conducting a construction project needs to dewater an excavation as part of a construction project, there are at least three potential options for managing the generated fluids, which are: 1) Discharge to a storm water system; 2) Discharge to a sanitary sewer system; and 3) Transportation to a permitted treatment facility. Discharge to a storm water system or a sanitary sewer will require permits from the

receiving utilities and HDOH. The selection of the fluid disposal method will depend on several factors, including contaminants concentrations, anticipated dewatering rates, proximity of storm sewers, and others.

Depending on the contaminants, the water may require on-site pretreatment before discharge to meet water quality standards. After the contaminated water has been treated, the sampling and analyses have been completed, and the clearance goals for treatment have been met, the water should be assessed to determine suitable disposal options in accordance with applicable laws and regulations.

Contact the Environmental Team and HDOH for assistance with the proper treatment, sampling and discharge permit requirements.

7.0 HEALTH AND SAFETY GUIDELINES

With respect to the workers (direct employees, sub-contractor personnel, and consultant personnel), the Project Team is solely responsible for complying with all applicable U.S. Department of Labor Occupational Safety & Health Administration (OSHA) rules, regulations and guidelines.

Due to the potential presence of COCs in soil and groundwater, construction workers could potentially be exposed to COCs via dermal contact, ingestion, and/or inhalation exposure pathways. Proper use of Personal Protective Equipment (PPE) is required where there are exceedances of the applicable Tier 1 EALs.

All required medical monitoring, worker health and safety monitoring, and PPE shall be provided by the Project Team. The Project's Environmental Specialist shall monitor site conditions to ensure that proper worker PPE is being used.

8.0 ROLES AND RESPONSIBILITIES

This Section details the roles and responsibilities associated with managing the Project. Specifically, the Environmental Manager and Construction Manager shall take responsibility for the implementation of the SAGMP including training personnel in the required procedures, the coordination of monitoring work by contaminated sites specialists and decision making in the event of discovery of unexpected potentially contaminated material. The Environmental Manager is responsible for liaison with the HDOH.

An Environmental Manager shall be engaged by the Project team to monitor, supervise and report on all works that may disturb contaminated land. Tasks include the following:

- Coordinate contaminated land assessments and testing;
- Advise on classification of excavated material for reuse and disposal;
- Coordinate contaminated groundwater management and disposal; and,
- Train staff in contaminated soil and groundwater identification and control procedures.

Environmental training for all staff shall be undertaken as part of the site induction program.

9.0 LIMITATIONS

Variations in the subject property conditions may exist and conditions not observed or described in this SAGMP may be encountered during subsequent activities. Please also note that this SAGMP did not include an evaluation of geotechnical conditions or potential geologic hazards.

The environmental interpretations and opinions contained in this SAGMP are based on the results of laboratory tests and analyses intended to detect the presence and concentration of specific chemical or physical constituents in samples collected from the subject property on work performed by others.

CPR disclaims responsibility for any inaccuracy in such laboratory results and work performed by others. Our conclusions and opinions are based on an analysis of the observed site conditions and work performed by others. It should be understood that the conditions of the subject property could change with time as a result of natural processes or the activities of man at the subject property or nearby sites. The recommendations of this SAGMP may therefore be invalidated over time in part or in whole by changes over which CPR has no control.

CPR should be contacted if the reader requires any additional information or has questions regarding content, interpretations presented, or completeness of this document.

This SAGMP is intended exclusively for use by the client.

10.0 REFERENCES

Clayton, 2006b. *Phase II Environmental Investigation, Former Cutter Chevrolet Facility, 1391 Kapiolani Boulevard, Honolulu, Oahu, Hawaii.* Clayton Group Services, Inc., May 22, 2006.

Clayton, 2006a. *Hydraulic Lift System Removal Activities, Former Cutter Chevrolet Facility, 1391 Kapiolani Boulevard, Honolulu, Oahu, Hawaii.* Clayton Group Services, Inc., May 22, 2006.

Clayton, 2005. *Phase I Environmental Site Assessment, 1391 Kapiolani Boulevard, TMK: (1) 2-3-039: Parcel 011, Honolulu, Oahu, Hawaii.* Clayton Group Services, Inc., September 26, 2005.

CPR, 2014. *Phase I Environmental Site Assessment. TMK: (1) 2-3-039:011, 1391 Kapiolani Boulevard, Honolulu, Oahu, Hawaii.* Central Planet Repair, LLC, September 29, 2014.

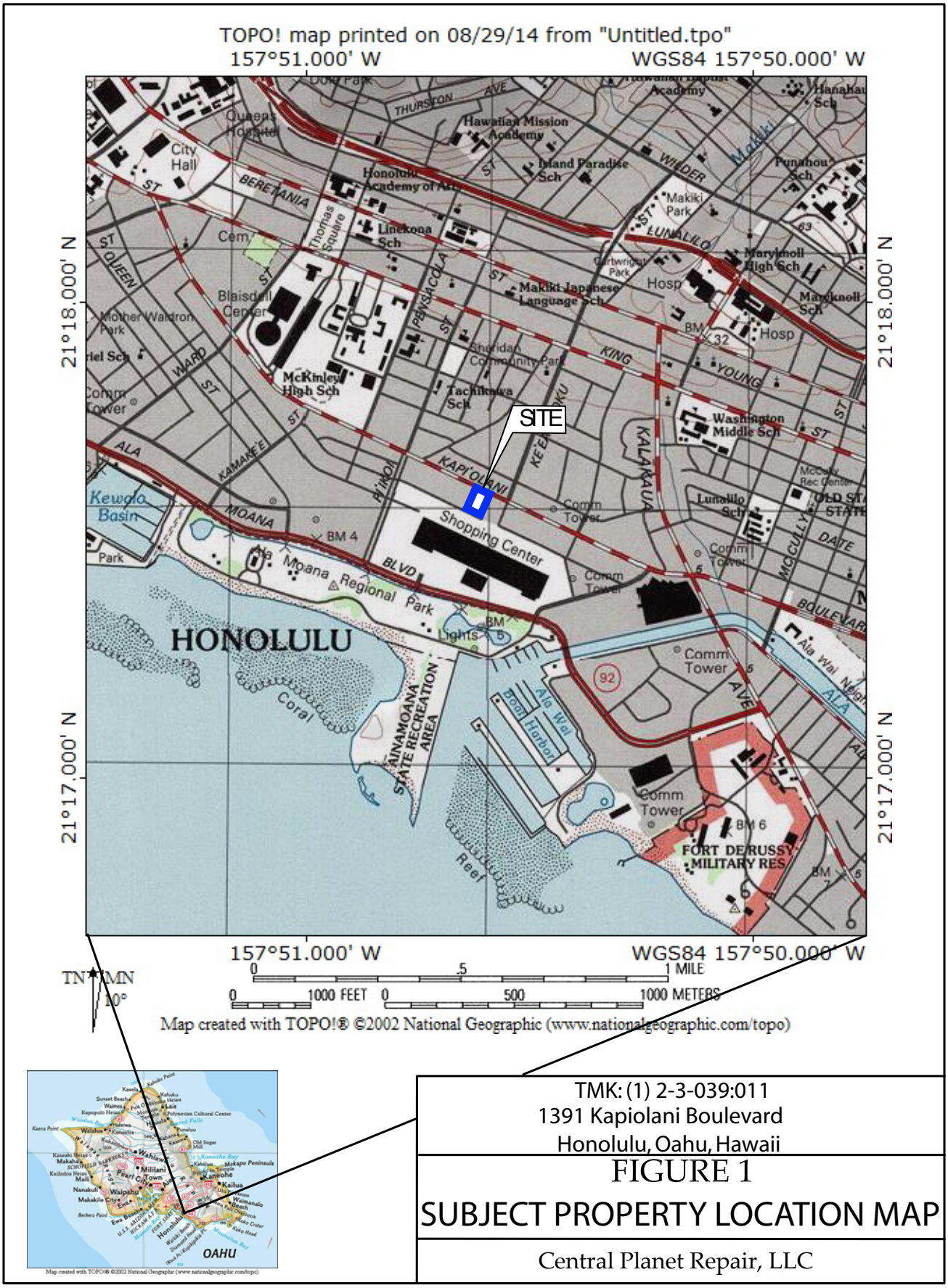
Department of Environmental Services, 1999. *Best Management Practices Manual for Construction Sites in Honolulu.* Department of Environmental Services, City and County of Honolulu in cooperation with the General Contractors Association of Hawaii, May 1999).

Geolabs, 2014. *Technical Memorandum. Samkoo Hawaii Condominium Preliminary Geotechnical Recommendations.* Geolabs, Inc. February 26, 2014.

Mink J.F. and L.S. Lau, 1990. *Aquifer Identification and Classification for Oahu: Groundwater Protection Strategy for Hawaii.* Water Resources Research Center, University of Hawaii at Manoa.

SSFM, 2013. *Sam Koo Hawaii Condominium Preliminary Engineering Report.* SSFM International, Inc. August 2013.

FIGURES

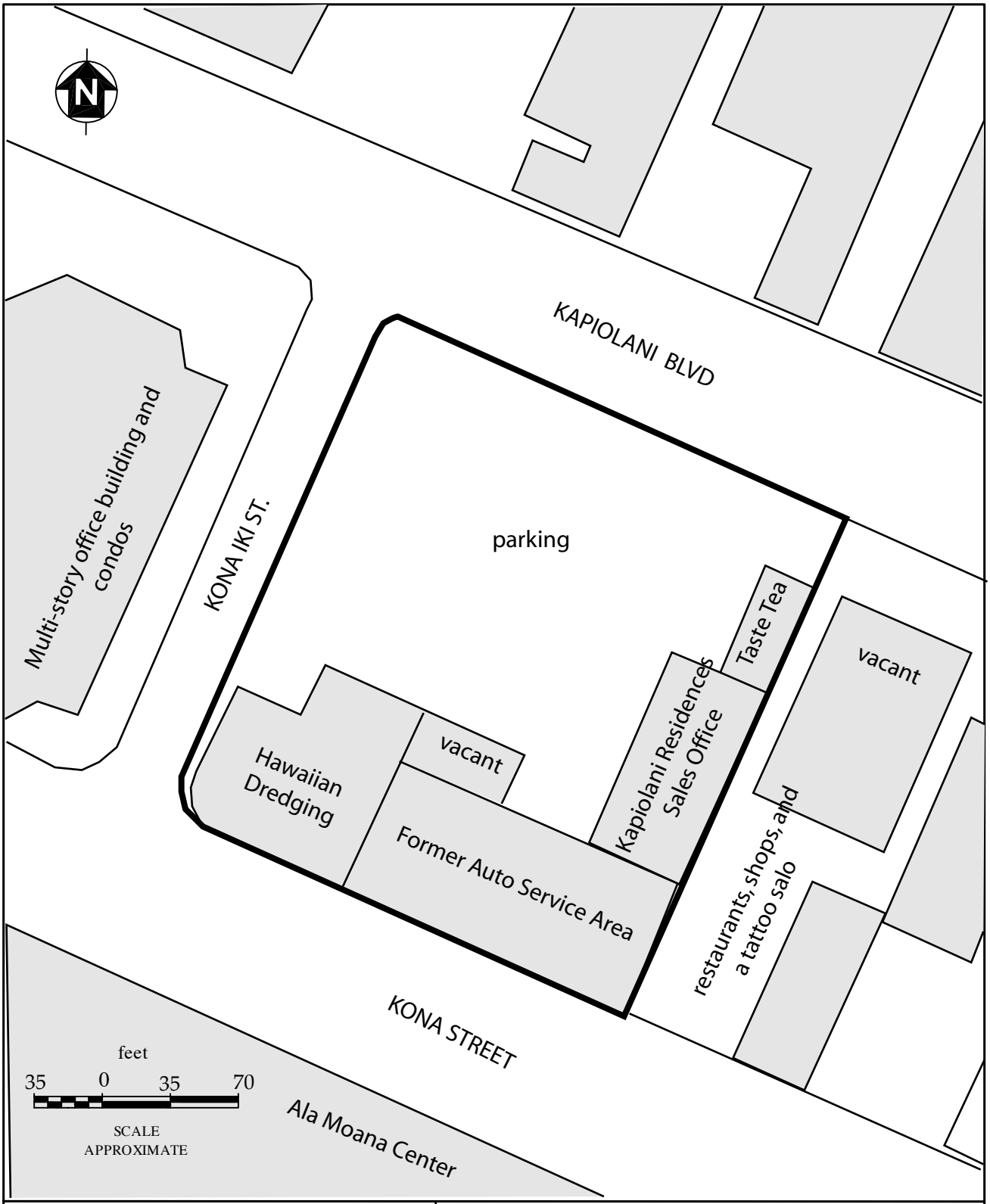


TMK: (1) 2-3-039:011
1391 Kapiolani Boulevard
Honolulu, Oahu, Hawaii

FIGURE 1

SUBJECT PROPERTY LOCATION MAP

Central Planet Repair, LLC



LEGEND:

Subject Property Boundaries

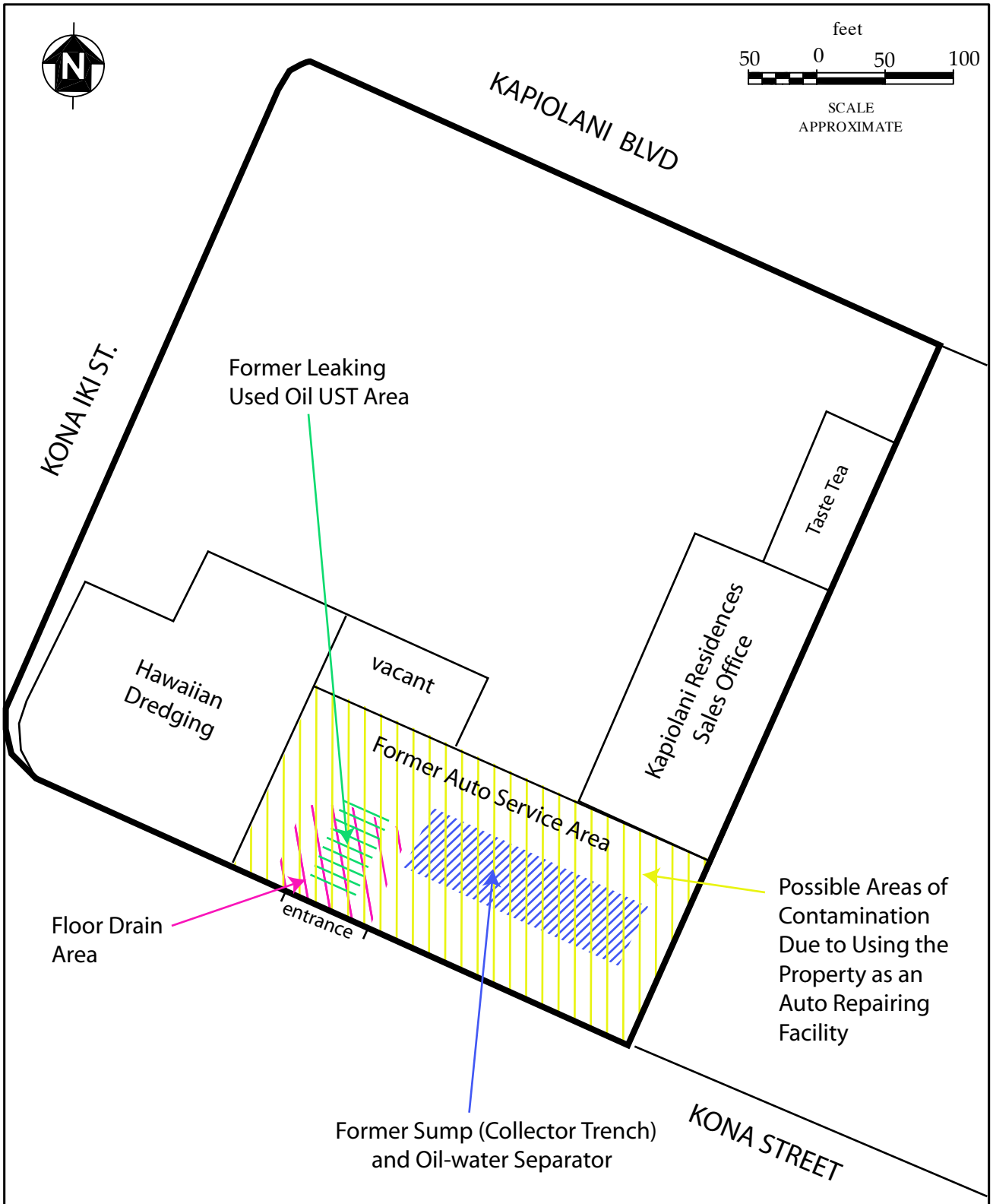
Buildings and Structures

TMK: (1) 2-3-039:011
1391 Kapiolani Boulevard
Honolulu, Oahu, Hawaii

FIGURE 2

SUBJECT PROPERTY PLAN

Central Planet Repair, LLC



LEGEND:

Subject Property Boundaries

TMK: (1) 2-3-039:011
1391 Kapiolani Boulevard
Honolulu, Oahu, Hawaii

FIGURE 3
AREAS OF CONCERN

Central Planet Repair, LLC

APPENDICES

Appendix A

Site Photographs

Photo 1. Sept 2014, Pool of Carwash Water in the Auto-repairing Section.

Photo 2. Sept 2014, Trench Drain and Oil-Water Separator in the Auto-repairing Section.

Photo 3. Sept 2014, Groundwater Monitoring Well in the Former UST area.

Photo 4. Nov 2017, Taste Tea Shop and Kapiolani Residences Office.

Photo 5. Nov 2017, Contractor Parking Area.

Photo 6. Nov 2017, Entrance to Former Auto Service Area.

Photo 7. Nov 2017, Trench Drain and Oil-Water Separator in the Former Service Area. Note Repair in Floor to Right of Drain.

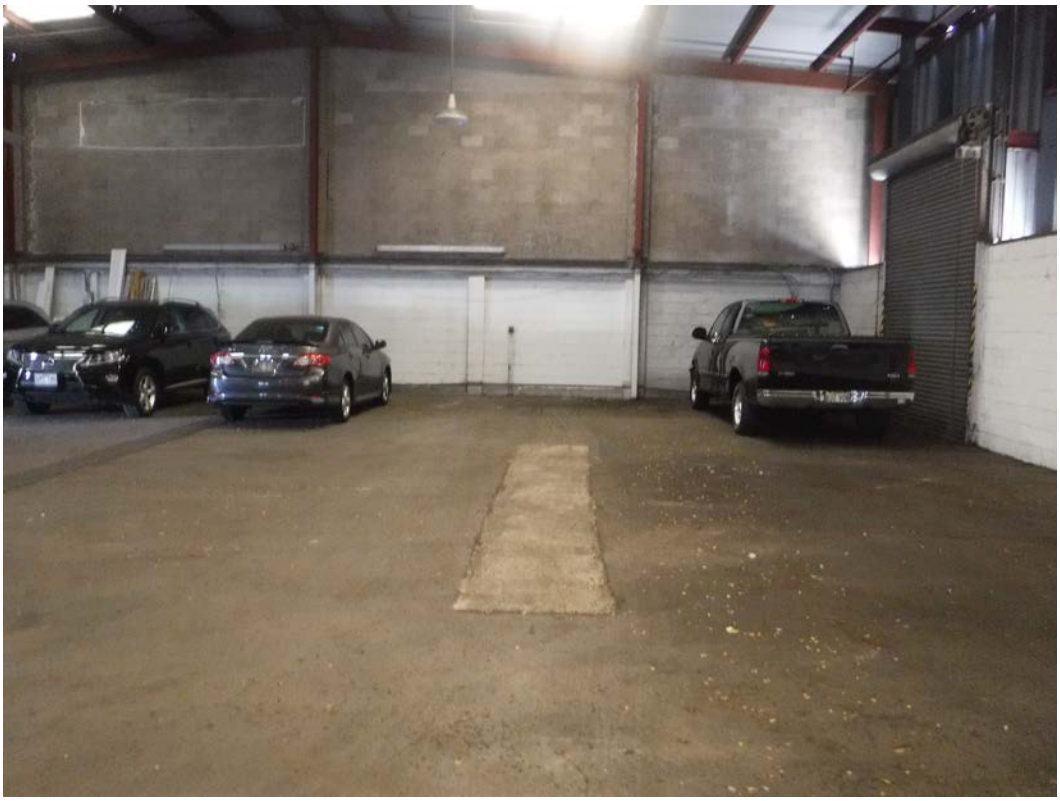


Photo 8. Nov 2017, Repair in Floor Indicating Former Subsurface Structure in the Former Auto Service Area.

Photo 9. Nov 2017, Looking West in the Former Auto Service Area. The Former UST and Monitoring Wells are Adjacent to the Roll-up Door on the Left.

G. ARCHAEOLOGICAL INVENTORY SURVEY

Final
Archaeological Inventory Survey Report for the 1391 Kapiʻolani Boulevard Parcel, Waikīkī Ahupuaʻa, Honolulu District, Island of Oʻahu TMK: [1] 2-3-039:011

Prepared for

Samkoo Pacific, LLC

Prepared by

Kelly L. Burke, M.Sc.

and

Hallett H. Hammatt, Ph.D.

Cultural Surveys Hawaiʻi, Inc.

Kailua, Hawaiʻi

(Job Code: KAKAAKO 53)

August 2014

Oʻahu Office
P.O. Box 1114
Kailua, Hawaiʻi 96734
Ph.: (808) 262-9972
Fax: (808) 262-4950

www.culturalsurveys.com

Maui Office
1860 Main St.
Wailuku, Hawaiʻi 96793
Ph.: (808) 242-9882
Fax: (808) 244-1994

Management Summary

Reference	Archaeological Inventory Survey Report for the 1391 Kapi‘olani Boulevard Parcel, Waikīkī Ahupua‘a, Honolulu District, Island of O‘ahu (TMK: [1] 2-3-039:011) (Burke and Hammatt 2012)
Date	August 2014
Project Number(s)	Cultural Surveys Hawai‘i, Inc. (CSH) Job Code: KAKAAKO 53
Investigation Permit Number	CSH completed the fieldwork component of the archaeological inventory survey (AIS) under Hawai‘i State Historic Preservation Division/Department of Land and Natural Resources (SHPD/DLNR) permit no. 11-17, issued per Hawai‘i Administrative Rules (HAR) Chapter 13-13-282.
Project Location	The project area is located at 1391 Kapi‘olani Boulevard and comprises the northwestern half of the block bounded by Kapi‘olani Boulevard to the north, Kona Iki Street to the west, Kona Street to the south, and Ke‘eaumoku Street to the east.
Land Jurisdiction	Private, Samkoo Pacific, LLC
Agencies	SHPD/DLNR
Project Description	The project area is proposed for development as a residential condominium. Ground disturbance associated with the project area’s development will include borings related to foundation pile installation as well as excavations, to include structural footings, utility installation, roadway and parking area installation, and landscaping.
Project Acreage	Approximately 1.43 acres
Area of Potential Effect (APE)	The APE for the current AIS investigation is defined as the entire approximately 1.43-acre project area.
Historic Preservation Regulatory Context	This document was prepared to support the proposed project's historic preservation review under Hawai‘i Revised Statutes (HRS) Chapter 6E-42 and HAR Chapters 13-13-275 and 13-13-284. In consultation with the SHPD/DLNR, the AIS investigation was designed to fulfill the state requirements for an AIS, per HAR Chapter 13-13-276. This study follows a literature review and field inspection (Hammatt 2006a), which was reviewed and approved by the SHPD.
Fieldwork Effort	Fieldwork was conducted between June 14 and 24, 2011 by CSH archaeologists David Shideler, M.A., Kelly Burke, M.Sc., Josie Paolello, M.S., Nifae Hunkin, B.A., and Nigel Kingsbury, B.A., and required approximately 24 person-days to complete. All fieldwork was performed under the general supervision of Hallett H. Hammatt, Ph.D. (principal investigator).
Number of Historic Properties Identified	One. A single historic property was identified within the project area, SIHP # 50-80-14-7193, which consists of a layer of historic trash. This layer was seen in nine trenches within the northern and eastern portions of the project area.

Historic Properties Recommended Eligible to the Hawai‘i Register of Historic Places (Hawai‘i Register)	None
Historic Properties Recommended Ineligible to the Hawai‘i Register	SIHP # 50-80-14-7193, a historic trash layer
Effect Recommendation	The proposed project will not affect a significant historic property. CSH's effect recommendation for the current project is "no historic properties affected" (in accordance with HAR 13-284-7).
Mitigation Recommendation	As there is no project effect, there is no need for any mitigation measures.

Table of Contents

Management Summary i

Section 1 Introduction 1

1.1 Project Background 1
1.2 Scope of Work 1
1.3 Environmental Setting 5
1.3.1 Natural Environment 5
1.3.2 Built Environment 6

Section 2 Methods 8

2.1 Field Methods 8
2.1.1 Pedestrian Inspection 8
2.1.2 Ground Penetrating Radar (GPR) Survey 8
2.1.3 Subsurface Testing 13
2.2 Laboratory Methods 13
2.3 Document Review 13

Section 3 Background Research 15

3.1 Legendary and Traditional Accounts 15
3.2 Historic Background 17
3.2.1 Pre-Contact and Early Historic Periods 17
3.2.2 Mid- to Late Nineteenth Century 28
3.2.3 Twentieth Century 38
3.3 Previous Archaeological Research 53
3.3.1 Smith 1989 53
3.3.2 Chiogioji and Hammatt 1992 63
3.3.3 Athens et al. 1994 63
3.3.4 Maly et al. 1994; Hammatt and Shideler 1995, 1996 63
3.3.5 Hammatt and McDermott 1999; Perzinski et al. 1999; Jones and Hammatt 2004 64
3.3.6 Sinoto 2000; Sinoto and Pantaleo 2002; McElroy 2010 64
3.3.7 Winieski and Hammatt 2000 64
3.3.8 Winieski and Hammatt 2001 64
3.3.9 Souza et al. 2002 65
3.3.10 O’Hare et al. 2003 65
3.3.11 Hammatt and Chiogioji 2004 65
3.3.12 LeSuer and Cleghorn 2004 65
3.3.13 Tulchin and Hammatt 2004 65
3.3.14 O’Hare et al. 2004; Tulchin and Hammatt 2005; Hammatt 2008 66
3.3.15 O’Leary and Hammatt 2004; Fong et al. 2009 66
3.3.16 Clark and Gosser 2005; Gosser et al. 2006 66
3.3.17 Freeman et al. 2005; Tulchin and Hammatt 2009 66
3.3.18 Monahan 2005 67
3.3.19 Bell et al. 2006 67
3.3.20 Bush and Hammatt 2006; Carney and Hammatt 2008 67
3.3.21 Esh and Hammatt 2006 67
3.3.22 Hammatt 2006a 67

3.3.23 Hammatt 2006b 68
3.3.24 Hammatt and Chiogioji 2006 68
3.3.25 O’Hare et al. 2006 68
3.3.26 O’Leary and Hammatt 2006; Pammer and Hammatt 2010 68
3.3.27 Barnes and Shideler 2007 68
3.3.28 Bell and McDermott 2006 69
3.3.29 Runyon and Hammatt 2007 69
3.3.30 Hazlett et al. 2008 69
3.3.31 Petrey et al. 2008 69
3.3.32 Thurman et al. 2009 69
3.3.33 Tulchin and Hammatt 2009 69
3.4 Background Summary 70
3.4.1 Human Burials 70
3.4.2 Pre-Contact and Early Post-Contact Agricultural and Habitation Deposits 70
3.4.3 Anticipated Subsurface Remains 70

Section 4 Results of Fieldwork 72

4.1 GPR 72
4.1.1 Summary and Interpretation 72
4.1.2 GPR Data Analysis 74
4.2 Stratigraphy 89
4.3 Test Trench Documentation 89
4.3.1 Trench 1 89
4.3.2 Trench 2 93
4.3.3 Trench 3 96
4.3.4 Trench 4 99
4.3.5 Trench 5 102
4.3.6 Trench 6 105
4.3.7 Trench 7 108
4.3.8 Trench 8 111
4.3.9 Trench 9 114
4.3.10 Trench 10 117
4.3.11 Trench 11 120
4.3.12 Trench 12 123
4.3.13 Trench 13 126
4.3.14 Trench 14 129
4.3.15 Trench 15 132
4.3.16 Trench 16 135
4.3.17 Trench 17 139
4.3.18 Trench 18 143
4.3.19 Trench 19 146
4.3.20 Trench 20 149
4.3.21 Trench 21 153
4.3.22 Trench 22 157
4.4 Historic Property Description—SIHP # 50-80-14-7193 161

Section 5 Results of Laboratory Analysis 163

5.1 Artifact Analysis 163
5.1.1 Glass Bottles/Containers 163

5.2 Disposition of Materials 175
Section 6 Summary and Interpretation 176
Section 7 Significance Assessments 177
7.1 SIHP # 50-80-14-7193 177
Section 8 Project Effect and Mitigation Recommendations 178
8.1 Project Effect 178
8.2 Mitigation Recommendations 178
Section 9 References 179

List of Figures

Figure 1. Portion of a 1998 U.S. Geological Survey 7.5-minute topographic map, Honolulu quadrangle, showing location of the project area....2
Figure 2. Tax map [1] 2-3-039 showing project area....3
Figure 3. 2008 GoogleEarth aerial photograph showing car dealership car lot and service and sales buildings within the project area....4
Figure 4. Overlay of Soil Survey of the State of Hawai‘i (Foote et al. 1972) showing sediment types within and surrounding the project area (base map: 1998 Honolulu U.S.G.S. 7.5-minute topographic quadrangle)....7
Figure 5. GPR suitability map (source: NRCS) showing the location of the project area....9
Figure 6. Illustration of GPR survey grid and method of data collection....12
Figure 7. 1817 map by Otto von Kotzebue of the Russian ship Rurick, showing taro lo‘i, fishponds, and salt pans in Honolulu and Waikīkī in relation to the project area (map reprinted in Fitzpatrick 1986:48-49)....19
Figure 8. Portion of 1834 sketch by anonymous illustrator entitled “Town of Honolulu: Island of Woahoo: Sandwich Islands (original sketch at Bernice P. Bishop Museum; reproduced in Grant et al. 2000:64-65)....21
Figure 9. 1850 Sketch by Paul Emmert (original sketch at the Hawaiian Historical Society; reproduced in Grant et al. 2000:5)....21
Figure 10. Photograph ca. 1887 of Honolulu and Waikīkī; Kawaiaha‘o Church in left foreground; project area is within the marshlands seen in the upper right background (original photograph at Hawai‘i State Archives, Henry L. Chase Collection; reproduced in Stone 1983:84-85)....22
Figure 11. Enlarged inset section of photograph ca. 1887 (Figure 10, above) showing marshlands and scattered huts along the coast....22
Figure 12. 1838 sketch of “Honolulu Salt Pans, near Kaka‘ako” drawn by a French visitor, Auguste Borget (original sketch at Peabody Essex Museum, Salem, Mass; reprinted in Grant et al. 2000:64-65)....25
Figure 13. 1845 sketch of “Native Church [Kawaiaha‘o Church], Oahu, from the Old Salt Pans,” drawn by John B. Dale, from the U.S. Exploring Expedition led by Lt. Charles Wilkes (J. Welles Henderson Collection, reprinted in Forbes 1992:126); the sketch is probably from the salt pans in the Ka‘ākaukukui area west of the project area....25
Figure 14. 1902 photograph of Kewalo Brine Basins to the west of the project area; caption of photograph in Scott (1968:579) states that the photograph was taken “beyond the shacks, in the vicinity of what is now Ward Street and Kapiolani Boulevard, rise the tree-studded slope of Punchbowl and the steep of Tantalus”....26
Figure 15. 1881 map of O‘ahu (portion) by R. Covington, showing the extensive salt pans to the west of the project area in Kewalo; also note the project area in the *‘ili* of Kukuluāe‘o (Hawai‘i Land Survey Division, Registered Map No. 1381)....27
Figure 16. Portion of 1855 map of the Honolulu District by Lt. Joseph de LaPasse, showing the project areas within taro *lo‘i* (map reprinted in Fitzpatrick 1986:82-83)....29
Figure 17. 1887 map of Honolulu by Walter E. Wall, showing project area within Kewalo ‘Ili; also note the Kaka‘ako Battery to the west of the project area....30

Figure 18. Portion of 1866 map of Kewalo ‘Ili by J. F. Makalena showing the project area just outside Kewalo ‘Ili in the *‘ili* of Kālia (Hawai‘i Land Survey Division, Registered Map No. 111)....31
Figure 19. Portion of 1897 map of Honolulu by M. D. Monsarrat, showing the project area just outside Kewalo ‘Ili in the *‘ili* of Kālia (Hawai‘i Land Survey Division, Registered Map No. 1910)....32
Figure 20. 1884 map of Honolulu, Kewalo Section, by S. E. Bishop showing LCA parcels and project area (Hawai‘i Land Survey Division, Registered Map No. 1090)....34
Figure 21. 1893 map of Honolulu (portion) by Walter E. Wall, showing project area and “Honolulu Rifle Assoc.” 200-yard rifle range; also note area *makai* of project area labeled “swamp” 39
Figure 22. Kewalo Basin (left foreground), ca. 1930 (Hawai‘i State Archives) 44
Figure 23. 1950s photograph of dredge boats between Ala Wai Yacht Club (right foreground) and Kewalo Basin (left background); also note coral fill area (white) on land where the future Ala Moana Shopping Center would be built (Hawai‘i State Archives) 44
Figure 24. 1919 U.S. War Department Fire Control Map of O‘ahu, Honolulu Quadrangle showing project area and street grids 45
Figure 25. 1927-28 U.S. Geological Survey map, Honolulu Quadrangle (portion), showing project area and street grids....47
Figure 26. 1931 aerial photograph showing dredged materials (white crushed coral) used in the construction of Kapi‘olani Boulevard and used for fill in marshy areas of Honolulu and Waikīkī; the large area of crushed coral is the future site of McKinley High School, west of the project area (Hawai‘i State Archives)....48
Figure 27. 1933 aerial photograph showing project area location....49
Figure 28. Ca. 1946 aerial photograph with location of project area indicated just north of the future site of Ala Moana Shopping Center....50
Figure 29. 1948 aerial photograph of the Kaka‘ako/Kewalo area showing large warehouses in the western portion and the future site of Ala Moana Shopping Center (the white block) on the right, south of the project area....51
Figure 30. 1952 aerial photograph with project area location indicated....52
Figure 31. 1943 U.S. War Department map, Honolulu Quadrangle (portion) showing continued extension of street grids, the undeveloped land around the current project area, and the new Kewalo Basin....54
Figure 32. 1953 Army Mapping Service map of O‘ahu, Honolulu Quadrangle (portion), showing continued development of and improved roads in the Kaka‘ako District....55
Figure 33. Portion of 1998 Honolulu U.S. Geological Survey 7.5-minute topographic quadrangle showing previous archaeological research in the vicinity of the present project area ...56
Figure 34. Locations of Trenches 1 through 22 within the project area....73
Figure 35. Amplitude slice maps collected at Trench 1....75
Figure 36. GPR profile collected at Trench 1 76
Figure 37. Amplitude slice maps collected at Trench 2....77
Figure 38. GPR profile collected at Trench 2 79
Figure 39. Amplitude slice maps collected at Trench 3....80
Figure 40. GPR profile collected at Trench 3 81
Figure 41. Amplitude slice maps collected at Trench 4....82

Figure 42. GPR profile collected at Trench 4 83
Figure 43. Amplitude slice maps collected at Trench 5....85
Figure 44. GPR profile collected at Trench 5 86
Figure 45. Amplitude slice maps collected at Trench 6....87
Figure 46. GPR profile collected at Trench 6 88
Figure 47. Photograph of Trench 1, south wall of excavation....90
Figure 48. Trench 1 profile, south wall of excavation....91
Figure 49. Photograph of Trench 2, south wall of excavation....93
Figure 50. Trench 2 profile, south wall of excavation....94
Figure 51. Photograph of Trench 3, north wall of excavation 96
Figure 52. Trench 3 profile, north wall of excavation 97
Figure 53. Photograph of Trench 4, north wall of excavation 99
Figure 54. Trench 4 profile, north wall of excavation 100
Figure 55. Photograph of Trench 5, south wall of excavation....102
Figure 56. Trench 5 profile, south wall of excavation....103
Figure 57. Photograph of Trench 6, west wall of excavation 105
Figure 58. Trench 6 profile, west wall of excavation 106
Figure 59. Photograph of Trench 7, east wall of excavation 108
Figure 60. Trench 7 profile, east wall of excavation 109
Figure 61. Photograph of Trench 8, south wall of excavation....111
Figure 62. Trench 8 profile, south wall of excavation....112
Figure 63. Photograph of Trench 9, south wall of excavation....114
Figure 64. Trench 9 profile, south wall of excavation....115
Figure 65. Photograph of Trench 10, north wall of excavation 117
Figure 66. Trench 10 profile, north wall of excavation 118
Figure 67. Photograph of Trench 11, east wall of excavation 120
Figure 68. Trench 11 profile, east wall of excavation 121
Figure 69. Photograph of Trench 12, north wall of excavation 123
Figure 70. Trench 12 profile, north wall of excavation 124
Figure 71. Photograph of Trench 13, west wall of excavation 126
Figure 72. Trench 13 profile, west wall of excavation 127
Figure 73. Photograph of Trench 14, east wall of excavation; note metal concentration, part of SIHP # -7193, in middle of photograph 129
Figure 74. Trench 14 profile, east wall of excavation 130
Figure 75. Photograph of Trench 15, west wall of excavation 132
Figure 76. Trench 15 profile, west wall of excavation 133
Figure 77. Photograph of Trench 16, west wall of excavation 135
Figure 78. Close-up photograph of *mauka* end of Trench 16 showing SIHP # -7193, historic trash layer 136
Figure 79. Trench 16 profile, west wall of excavation 137
Figure 80. Photograph of Trench 17, east wall of excavation 139
Figure 81. Photograph of Trench 17 showing the concentration of metal in the middle of the trench and SIHP # -7193, historic trench layer, at the base of the trench 140
Figure 82. Trench 17 profile, east wall of excavation 141
Figure 83. Photograph of Trench 18, east wall of excavation 143

Figure 84. Trench 18 profile, east wall of excavation 144
Figure 85. Photograph of Trench 19, west wall of excavation 146
Figure 86. Trench 19 profile, west wall of excavation 147
Figure 87. Photograph of Trench 20, west wall of excavation; note substantial historic trash layer at bottom of photograph, part of SIHP # -7193.....149
Figure 88. Close-up photograph of *mauka* end of Trench 20 showing SIHP # -7193, historic trash layer 150
Figure 89. Trench 20 profile, west wall of excavation 151
Figure 90. Photograph of Trench 21, north wall of excavation; note substantial historic trash layer at bottom of photograph, part of SIHP # -7193.....153
Figure 91. Photograph of portion of backdirt pile for Trench 21 showing bottles from SIHP # -7193, historic trash layer 154
Figure 92. Trench 21 profile, north wall of excavation 155
Figure 93. Photograph of Trench 22, west wall of excavation; note substantial historic trash layer at bottom of photograph, part of SIHP # -7193.....157
Figure 94. Close-up photograph of *mauka* end of Trench 22 showing SIHP # -7193, historic trash layer 158
Figure 95. Close-up photograph of *makai* end of Trench 22 showing SIHP # -7193, historic trash layer 158
Figure 96. Trench 22 profile, west wall of excavation 159
Figure 97. Inferred geographic extent of SIHP # 50-80-14-7193 (base map: 2008 GoogleEarth aerial photograph) 162
Figure 98. Sample of soda bottles (left to right): ca. 1958, clear, “Palolo” embossed, soda bottle; 1943, green, “7-Up” painted label, soda bottle (Canada Dry Bottling Co.); early to mid-1950s, aqua, “Coca-Cola” embossed, soda bottle 169
Figure 99. Sample of soda bottles (left to right): 1950s, clear, “Royal Crown” painted label, soda bottle; 1920-1940, clear, “Kist” embossed, soda bottle; 1946, clear, “Royal Soda” embossed, soda bottle; post ca. 1920, green, “Pacific Soda Works” embossed, soda bottle.....170
Figure 100. Sample of spirits (ale, beer, whiskey, etc.) bottles (left to right): post 1940, unlabeled, clear, spirits bottle; 1942, unlabeled, amber, long-neck beer bottle; 1936/1946, green, short-neck, beer bottle; post 1940, clear, short-neck, beer bottle with stippling; 1948, amber, short-neck, beer bottle 171
Figure 101. Sample of milk bottles (left to right); post 1933, “Dairymen’s Ice Cream” painted label, milk bottle fragment; post 1933, one-half pint, pyroglazed, “Dairymen’s Association,” milk bottle; post 1940, one quart, pyroglazed, “Dairymen’s Association,” milk bottle; 1944, one quart, pyroglazed, “Dairymen’s Association” milk bottle.....172
Figure 102. Sample of wide-mouth jars (left to right, top to bottom): 1925-1930, clear, rectangular bottle embossed “JAF” for J. A. Folgers spices and extracts; 1939, clear, round jar, embossed “Best Foods;” 1920-1964, milk glass, round jar, probably cold cream, embossed “Woodbury;” post 1906, clear, barrel-shaped, unlabeled jar.....173
Figure 103. Sample of “Red Cross Germ Proof Mouthpiece/Patented by E. & L. May 3, 1910” for use with candlestick telephones.....173
Figure 104. Exemplar of Red Cross germ proof telephone mouthpiece attached to a candlestick phone (from Wolff 1996) 174

List of Tables

Table 1. GPR Data Collection Parameters....10
Table 2. Summary of Previous Archaeological Studies in the Vicinity of the Current Project Area57
Table 3. Stratigraphy Observed at Trench 1 92
Table 4. Stratigraphy Observed at Trench 2 95
Table 5. Stratigraphy Observed at Trench 3 98
Table 6. Stratigraphy Observed at Trench 4 101
Table 7. Stratigraphy Observed at Trench 5 104
Table 8. Stratigraphy Observed at Trench 6 107
Table 9. Stratigraphy Observed at Trench 7 110
Table 10. Stratigraphy Observed at Trench 8 113
Table 11. Stratigraphy Observed at Trench 9 116
Table 12. Stratigraphy Observed at Trench 10 119
Table 13. Stratigraphy Observed at Trench 11 122
Table 14. Stratigraphy Observed at Trench 12 125
Table 15. Stratigraphy Observed at Trench 13 128
Table 16. Stratigraphy Observed at Trench 14 131
Table 17. Stratigraphy Observed at Trench 15 134
Table 18. Stratigraphy Observed at Trench 16 138
Table 19. Stratigraphy Observed at Trench 17 142
Table 20. Stratigraphy Observed at Trench 18 145
Table 21. Stratigraphy Observed at Trench 19 148
Table 22. Stratigraphy Observed at Trench 20 152
Table 23. Stratigraphy Observed at Trench 21 156
Table 24. Stratigraphy Observed at Trench 22 160
Table 25. SIHP # 50-80-14-7193 description....161
Table 26. Artifacts from Trench 1 164
Table 27. Artifacts from Trench 15 164
Table 28. Artifacts from Trench 16 165
Table 29. Artifacts from Trench 17 166
Table 30. Artifacts from Trench 20 166
Table 31. Artifacts from Trench 21 167
Table 32. Artifacts from Trench 22 168
Table 33. Table of Historic Properties....177

Section 1 Introduction

1.1 Project Background

At the request of Samkoo Pacific, LLC, Cultural Surveys Hawai‘i, Inc. (CSH) conducted an archaeological inventory survey (AIS) of a parcel located at 1391 Kapi‘olani Boulevard in Honolulu, Waikīkī Ahupua‘a, Honolulu District, Island of O‘ahu (TMK [1] 2-3-039:011). The project area comprises the northwestern half of the block bounded by Kapi‘olani Boulevard to the north, Kona Iki Street to the west, Kona Street to the south, and Ke‘eaumoku Street to the east. The location of the project area is depicted on a 1998 United States Geological Survey 7.5-minute topographic quadrangle map (Figure 1), Tax Map [1] 2-3-39 (Figure 2), and a 2004 aerial photograph (Figure 3).

The project area is currently developed as an automotive dealership that includes an asphalt-paved car lot and low-rise sales and service buildings (Figure 3). The project area is proposed for development of a residential condominium. Ground disturbance associated with the project area’s development will include borings related to foundation pile installation as well as excavations, to include structural footings, utility installation, roadway and parking area installation, and landscaping.

This AIS report was preceded by a field inspection and literature review report (Hammatt 2006a), which was reviewed and approved by the SHPD.

1.2 Scope of Work

The following archaeological inventory survey scope of work was designed to satisfy the Hawai‘i state requirements for archaeological inventory surveys (Hawai‘i Administrative Rules [HAR] Chapter 13-13-275, 13-13-276, and 13-13-284):

1. Historic and archaeological background research, including a search of historic maps, written records, Land Commission Award documents, and reports from prior archaeological investigations. This research will focus on the specific project area’s past land use, with general background on the pre-contact and historic settlement patterns of the *ahupua‘a* and district. This background information will be used to compile a predictive model for the types and locations of historic properties that could be expected within the project area.
2. A field inspection of the project area to identify any potential surface historic properties. Surface historic properties will be recorded with an evaluation of age, function, interrelationships, and significance. Documentation will include photographs, scale drawings, and, when warranted, limited, controlled excavation of select sites and/or features.
3. Based on the project area’s environment and the results of the background research, subsurface testing with a combination of hand and backhoe excavation to identify and document subsurface historic properties that would not be located by surface pedestrian

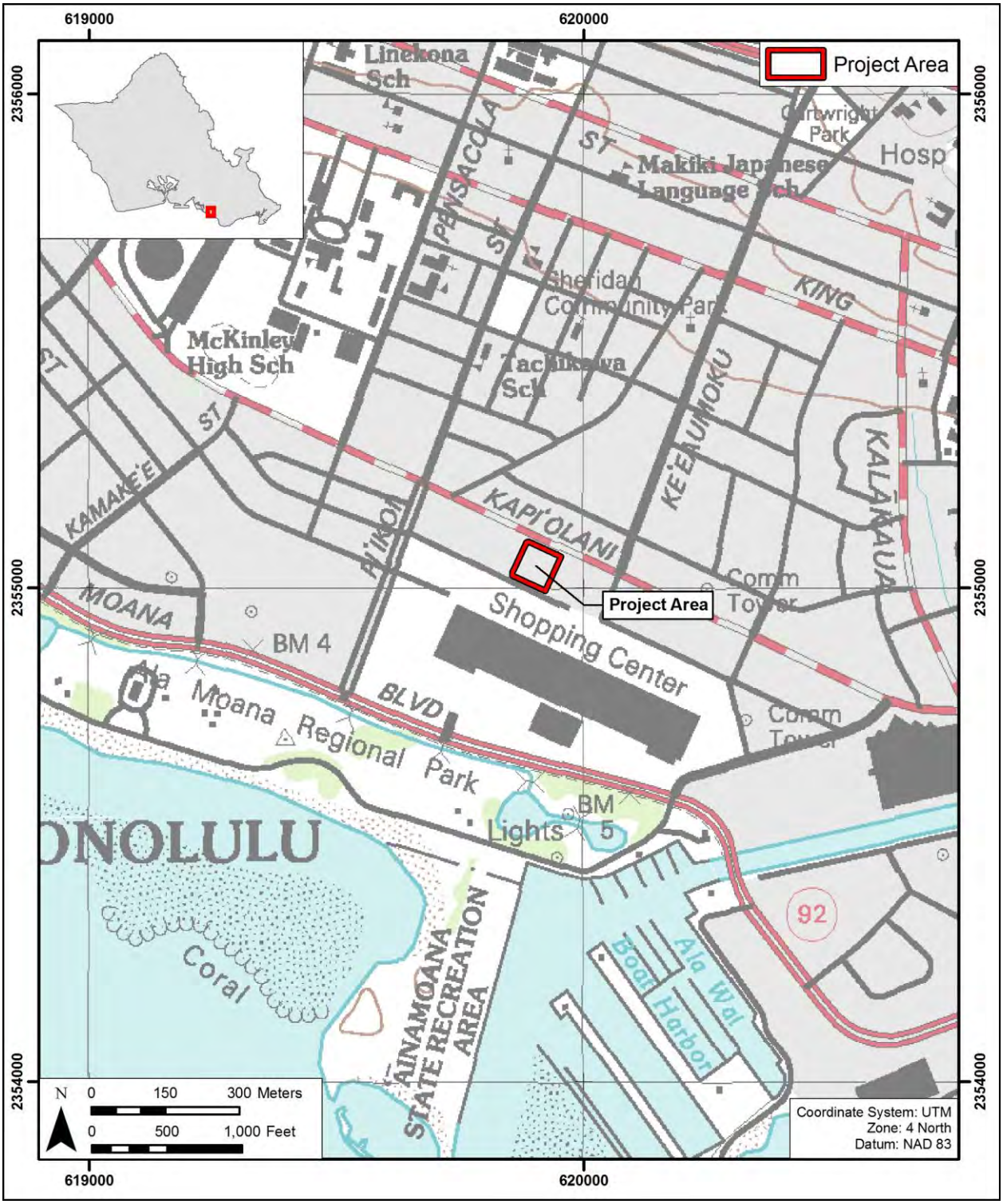


Figure 1. Portion of a 1998 U.S. Geological Survey 7.5-minute topographic map, Honolulu quadrangle, showing location of the project area

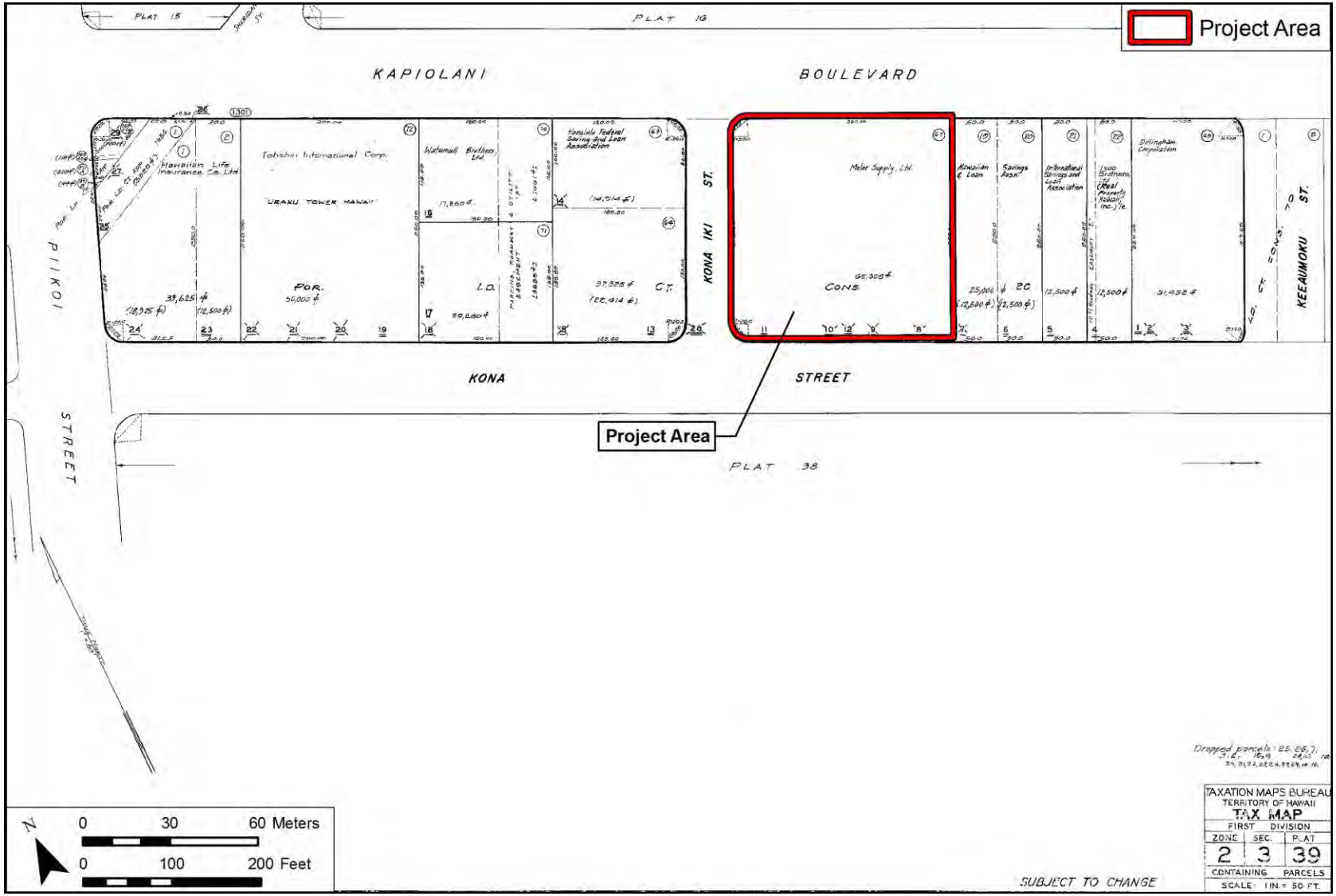


Figure 2. Tax map [1] 2-3-039 showing project area

Figure 3. 2008 GoogleEarth aerial photograph showing car dealership car lot and service and sales buildings within the project area

inspection, as deemed appropriate. Appropriate samples from these excavations will be analyzed for cultural and chronological information. All subsurface historic properties identified will be documented to the extent possible, including geographic extent, content, function/derivation, age, interrelationships, and significance.

4. As appropriate, consultation with knowledgeable individuals regarding the project area's history, past land use, and the function and age of the historic properties documented within the project area.
5. As appropriate, laboratory work to process and gather relevant environmental and/or archaeological information from collected samples.
6. Preparation of an inventory survey report, which includes the following:
   a) A project description
   b) A section of a U.S.G.S. topographic map showing the project area boundary and the location of all recorded historic properties
   c) Historical and archaeological background sections summarizing prehistoric and historic land use of the project area and its vicinity
   d) Descriptions of all historic properties, including select photographs and scale drawings and discussions of age, function, laboratory results, and significance. Each historic property will be assigned a Hawai‘i State Inventory of Historic Properties (SIHP) number
   e) If appropriate, a section concerning cultural consultations
   f) A summary of historic property categories, integrity, and significance based upon the Hawai‘i Register of Historic Places criteria
   g) A project effect recommendation
   h) Treatment recommendations to mitigate the project's adverse effect on any historic properties identified in the project area that are recommended eligible to the Hawai‘i Register of Historic Places

This scope of work includes full coordination with the SHPD/DLNR and the City relating to archaeological matters. This coordination takes place after consent of the owner or representatives.

1.3 Environmental Setting

1.3.1 Natural Environment

In this area of the Honolulu District, rainfall averages less than 30 inches per year (Armstrong 1973:62). Northeasterly trade winds prevail throughout the year, although their frequency varies from more than 90% during the summer months to 50% in January; the average annual wind velocity is approximately 10 miles per hour (Wilson Okamoto & Associates, Inc. 1998:1-2). Vegetation within the project area is limited to a few ornamental trees along Kapi‘olani Boulevard.

The USDA Soil Survey classifies the project area’s soils as “fill land, mixed” (FL) (Figure 4):

> This land type occurs mostly near Pearl Harbor and in Honolulu, adjacent to the ocean. It consists of areas filled with material dredged from the ocean or hauled from nearby areas, garbage, and general material from other sources [Foote et al. 1972:31].

1.3.2 Built Environment

The project area is located within central Honolulu and is surrounded by modern urban development including streets, sidewalks, and commercial and utility infrastructure. The majority of the project area consists of a paved parking lot, with buildings located along the eastern and southern edges of the project area (refer to Figure 3).

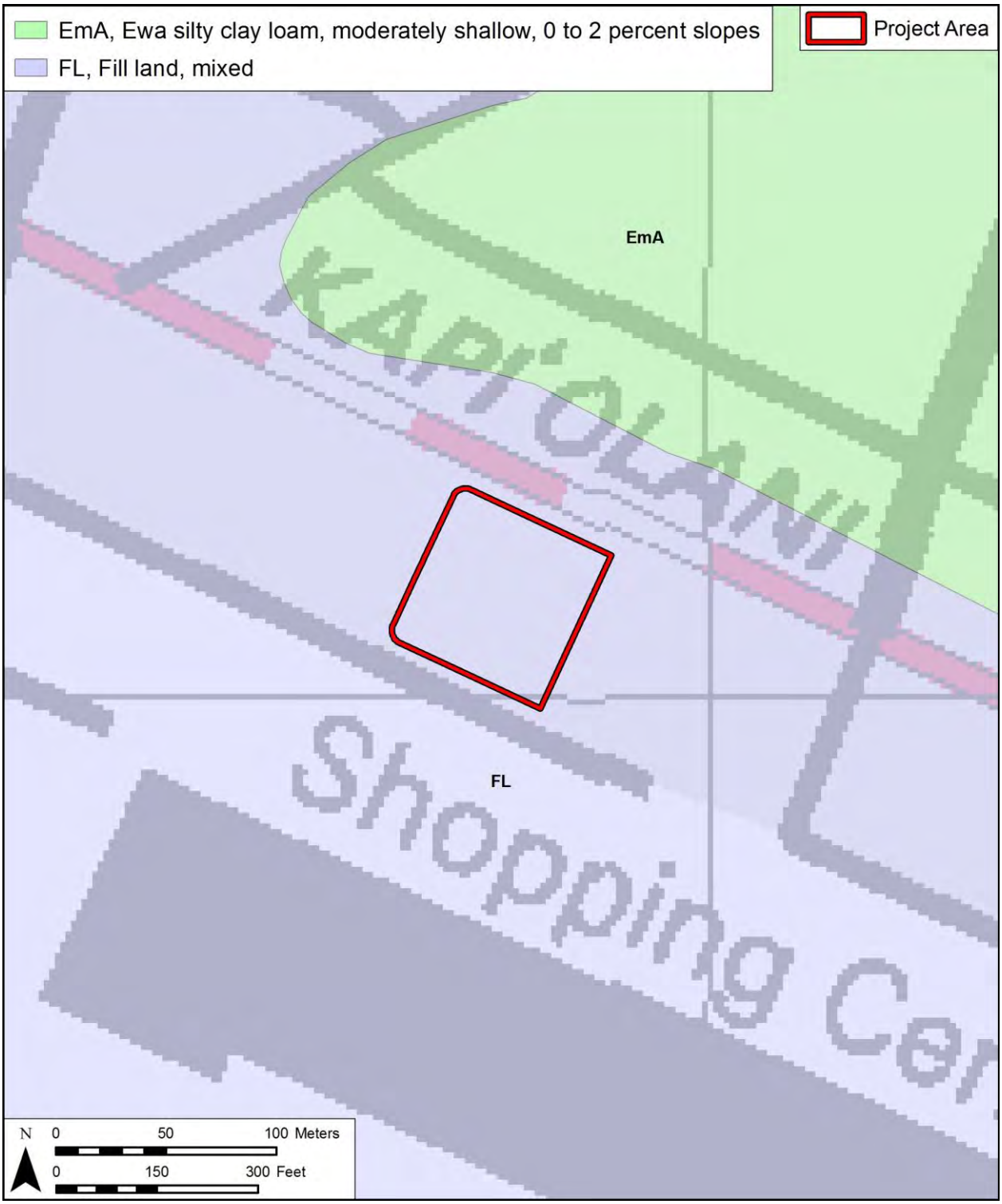


Figure 4. Overlay of Soil Survey of the State of Hawai‘i (Foote et al. 1972) showing sediment types within and surrounding the project area (base map: 1998 Honolulu U.S.G.S. 7.5-minute topographic quadrangle)

Section 2 Methods

2.1 Field Methods

CSH completed the fieldwork component of the AIS under SHPD/DLNR permit No. 11-17, issued per HAR Chapter 13-13-282. The fieldwork component was conducted between June 14 and 24, 2011 by CSH archaeologists David Shideler, M.A., Kelly Burke, M.Sc., Josie Paolello, M.S., Nifae Hunkin, B.A., and Nigel Kingsbury, B.A. This effort required approximately 24 person-days to complete. All fieldwork was carried out under the general supervision of Hallett H. Hammatt, Ph.D. (principal investigator).

2.1.1 Pedestrian Inspection

A 100% pedestrian inspection of the project area was undertaken for the purpose of historic property identification and documentation. The pedestrian survey was accomplished through systematic sweeps, spaced 5 m apart.

2.1.2 Ground Penetrating Radar (GPR) Survey

GPR data is acquired by transmitting pulses of electromagnetic energy, in the radar frequency range, into the ground via a sending antenna. Each time a radar pulse encounters material with a different density, electrical conductivity, or chemical composition, a portion of the radar energy will reflect back to the surface and be recorded via a receiving antenna. The remaining radar energy will continue to pass into the ground to be further reflected, until it finally dissipates with depth. Reflection features may include discrete objects, stratigraphic layering, or other subsurface anomalies such as subsurface disturbances associated with utility installation or human interment.

The effectiveness of GPR is highly dependent on local soil conditions. The penetration depth of GPR is determined by antenna frequency and the electrical conductivity of the earthen materials being profiled (Daniels 2004). Soils having high electrical conductivity rapidly attenuate radar energy, restrict penetration depths, and severely limit the effectiveness of GPR (USDA National Resource Conservation Service [NRCS] GPR Methodology n.d.). The electrical conductivity of soils increases with increasing water, clay, and soluble salt contents.

GPR suitability maps created by the NRCS were reviewed in an attempt to anticipate the predominant soil matrix within the project area and to assess the relative suitability of GPR application. Figure 5 shows the project area on the NRCS GPR Suitability Map for Hawai‘i. The project area is shown to include lands in the moderate and very low GPR suitability categories. The NRCS provides the following discussion when defining their GPR suitability categories:

> Areas dominated by mineral soil materials with less than 10 percent clay or very deep organic soils with pH values < 4.5 in all layers have very high potential for GPR applications. Areas with very high potential afford the greatest possibility for deep, high resolution profiling with GPR. However, depending on the ionic concentration of the soil solution and the amounts and types of clay minerals in the soil matrix, signal attenuation and penetration depths will vary. With a 200

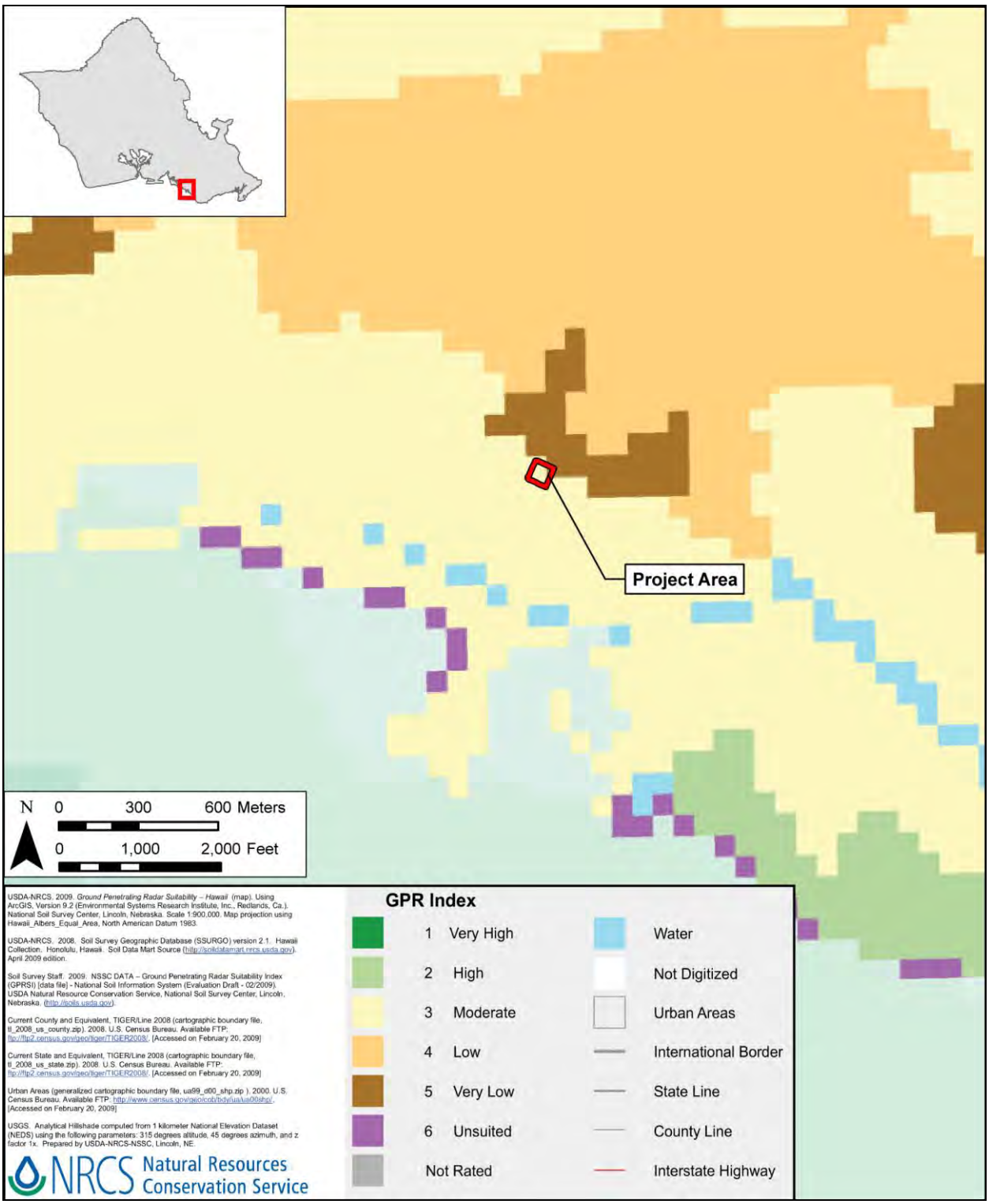


Figure 5. GPR suitability map (source: NRCS) showing the location of the project area

> MHz antenna, in soils with very high potential for GPR, the effective penetration depth has averaged about 16.5 feet. However, because of variations in textural layering, mineralogy, soil water content, and the ionic concentration of the soil water, the depth of penetration can range from 3.3 to greater than 50 feet.
>
> Areas dominated by mineral soils with 18 to 35 percent clay or with 35 to 60 percent clay that are mostly low-activity clay minerals have moderate potential for GPR. Low activity clays are principally associated with older, more intensely weathered soils. In soils with moderate potential for GPR, the effective penetration depth with a 200 MHz antenna has averaged about 7 feet with a range of about 1.6 to 16 feet. Though penetration depths are restricted, soil polygons with moderate potential are suited to many GPR applications Mineral soils with 35 to 60 percent clay, or calcareous and/or gypsiferous soils with 18 to 35 percent clay have low potential for GPR. Areas with low potential are very depth restrictive to GPR. In soils with low potential for GPR, the depth of penetration with a 200 MHz antenna has averaged about 1.6 feet with a range of about 0.8 to 6.5 feet.
>
> Areas that are unsuited to GPR consist of saline and sodic soils. These soil map units are principally restricted to arid and semiarid regions and coastal areas of the United States [USDA NRCS GPR Methodology n.d.].

Note that the estimated depth penetration by the NRCS is based on the use of a 200MHz antenna. The current survey will utilize a 400MHz antenna, which balances radar penetration depth with image resolution, so all projected depth estimates by the NRCS must be cut in half. Thus, average depth penetration would be 3.5 feet (1 m) in moderate suitability areas and 0.8 feet (0.2 m) in low suitability areas.

2.1.2.1 Survey Methodology

The GPR survey was conducted using a Geophysical Survey Systems, Inc. SIR-3000 system equipped with a 400 MHz radar antenna proceeding along transects within a survey grid. Due to computer interpolation software (*Surfer 9*) it was only necessary to run data collection transects along one axis of each survey grid (X or Y). In order to standardize the data collection process, all transects were run in the Y direction, originating from an arbitrary southwest corner (Figure 6). Transect spacing was 50 cm.

2.1.2.2 Data Collection Parameters

GPR data collection parameters were held constant throughout the survey (Table 1).

Table 1. GPR Data Collection Parameters

Parameter	Settings
Antenna	400 MHz
Transmission rate	100KHz
Samples	512
Format	16-bit

Parameter	Settings
Range	40 nanoseconds
Dielectric	14.00
Rate	100
Scans per unit	45 per meter
Low Pass Filter	750MHz
High Pass Filter	200MHz

2.1.2.3 Post-Processing

All collected GPR data were post-processed using the following software: *RADAN 6.6*, *GPR Process*, and *Surfer 9*.

RADAN 6.6 was utilized to generate two-dimensional depth profiles from the collected GPR data. These profiles illustrate the geometry of the reflections recorded during data collection. An analysis of these profiles can determine whether the radar energy is reflecting from a flat stratigraphic layer (seen as a distinct horizontal band on a profile), a discrete buried object (seen as a hyperbola in profile), or from stratigraphic irregularities such as subsurface disturbances associated with utility installation or human interment (also seen as hyperbolas, but usually are more ephemeral and consist of clustered reflections).

Position correction was utilized to remove unwanted surface “noise” from GPR profiles. High and low pass filters were applied to remove any excess background noise generated from nearby power lines, radio frequencies, etc. during data collection. Gain (signal amplification) was also applied to accent poorly defined or ephemeral reflections that are typically associated with subsurface cultural deposits.

A combination of *GPR Process* and *Surfer 9* was used to generate amplitude slice maps from the collected GPR data. Amplitude slice-maps are a three-dimensional tool for viewing differences in radar reflection amplitudes across a given surface at various depths. Amplitude slice-maps can be thought of as plan view maps or excavation level records that display GPR at user-defined depth intervals. Reflected radar amplitudes are of interest because they measure the degree of physical and chemical differences in buried materials, which in turn can indicate the presence of stratigraphic interfaces, discrete buried objects (i.e., basalt boulders, utility lines, burial caskets, etc.), or stratigraphic irregularities (i.e., subsurface anomalies associated with burial pits, fire pits, buried irrigation ditches, etc.). The amplitude slice maps are also important because they allow the visualization of radar reflections throughout the entire data set collected at a survey area at a given depth. This gives size and shape to collected radar reflections, which can aid in the interpretation of identified subsurface anomalies.

Amplitude slice-maps are generated through the comparison of radar reflection amplitudes recorded in vertical depth profiles, which correspond to individual transects collected within a survey grid along the X-axis (note that while transects are collected in the Y-direction, they are actually located within the X-axis.). In this method, amplitude variations are analyzed at each location where a radar reflection was recorded. Reflection amplitude data from the X-axis is then used to interpolate reflection data on to the Y-axis.

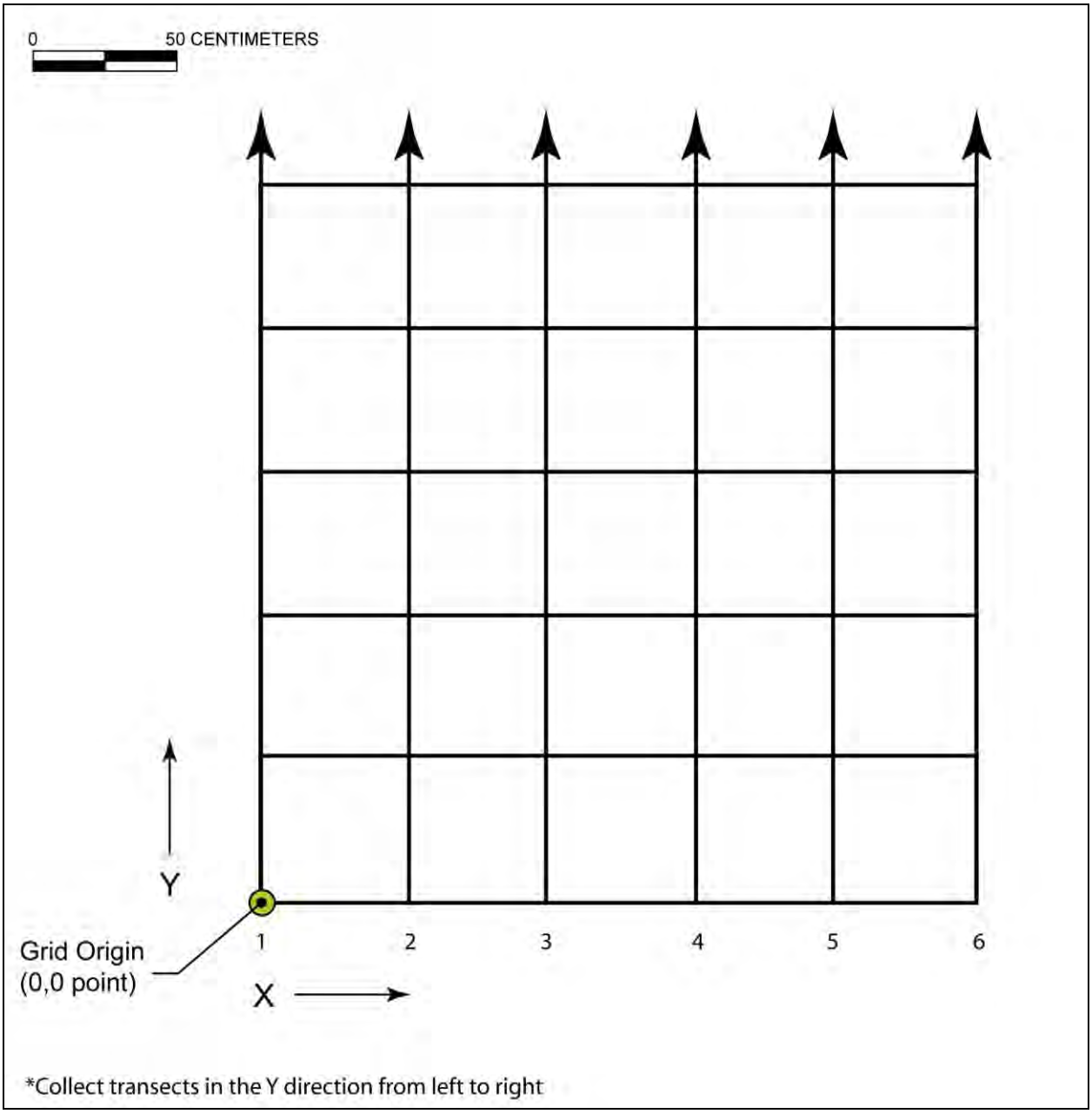


Figure 6. Illustration of GPR survey grid and method of data collection

2.1.3 Subsurface Testing

The subsurface testing program included the excavation of 22 test trenches. Twenty of the test trenches originally measured 6.0 m long and 0.8 m wide, while two of the test trenches measured 3.1 m long and 0.915 m wide. One of the original 6.0-x-0.8 m trenches (Trench 15) was extended to a length of 7.5 m due to a large amount of debris within the trench. Depths ranged from 1.64 m to 2.6 m below surface.

The stratigraphic profile of each test excavation was drawn and photographed. The observed sediments were described using standard USDA soil description observations/terminology. Sediment descriptions included: Munsell color; texture; consistency; structure; plasticity; cementation; origin of sediments; descriptions of any inclusions, such as cultural material and/or roots; lower boundary distinctiveness and topography; and other general observations. Where stratigraphic anomalies were exposed, these were carefully represented on the trench excavation profile.

Hundreds of kilograms of artifacts including hundreds of fragments of the same mid-twentieth century bottles were observed during subsurface testing. A number of diagnostic artifacts were collected and analyzed per the laboratory methods described below. The sample of artifacts collected was selected to represent the types and varieties of artifacts observed in the assemblage. Non-diagnostic (unidentifiable or un-datable) artifacts were not collected during fieldwork or analyzed. Their presence was noted and they were briefly described in the field notes. Multiple duplicates of the same artifact also were not collected. No wood was sampled or analyzed.

2.2 Laboratory Methods

Materials collected during AIS fieldwork were identified and cataloged at CSH’s laboratory facility in Waimānalo. Analysis of collected materials was undertaken using standard archaeological laboratory techniques. Artifacts were washed, sorted, described, photographed, and cataloged. In general, artifact analysis focuses on establishing, to the greatest extent possible, material type, function, cultural affiliation, and/or age of manufacture. Diagnostic (dateable) attributes of artifacts were researched. A catalog of all collected material was prepared and is presented in Section 5, below.

Upon completion of the project, all material collected during subsurface testing will remain at the CSH Waimānalo office until a permanent facility is determined, based on consultation with the landowner and the SHPD/DLNR.

2.3 Document Review

Background research included: a review of previous archaeological studies on file at the SHPD/DLNR library; review of historical documents at Hamilton Library at the University of Hawai‘i, the Hawai‘i State Archives, the Mission Houses Museum Library, the Hawai‘i Public Library, and the Archives of the Bishop Museum; study of historic photographs at the Hawai‘i State Archives and the Archives of the Bishop Museum; study of historic maps at the Hawai‘i State Land Survey Division; and study of historic maps and photographs at the CSH library. Information on Land Commission Awards (LCAs) was accessed through Waihona ‘Aina

Corporation’s Māhele Database (www.waihona.com), as well as a selection of CSH library references. This research provided the environmental, cultural, historic, and archaeological background for the project area. The sources consulted were used to formulate a predictive model regarding the expected types and locations of historic properties that may be located in the project area.

Section 3 Background Research

The present project area is located in a region identified as Kewalo on early historic maps. Land Commission Awards (LCAs) and other historic-era documents identify Kewalo as the area between Cooke and Sheridan Streets, *mauka* of Queen Street. The *‘ili* of Kewalo is located within Kaka‘ako Ahupua‘a.

3.1 Legendary and Traditional Accounts

The ethnographer Henry Kekahuna (1958:4) said that at one time the Kewalo area had a sand beach where various sports, such as surfing, were held. According to Pukui et al. (1974:109), “outcasts (*kauwā*) intended for sacrifice were drowned here” (see *mo‘olelo* below). Kewalo once had a freshwater spring in its central portion (current location unknown), as recorded in the proverb “*Ka wai huahua‘i o Kewalo*,” which translates as “The bubbling water of Kewalo.” Two springs are mentioned in a traditional story of the Waters of Ha‘o. This legend tells of two children of the chief Ha‘o who ran away from their cruel stepmother. They stayed for a time with the caretakers of Kewalo Spring, which may have been located close to the trail that connected Waikīkī and Honolulu. The children then left when they heard that the chiefess had sent men to look for them. The two children followed the moonlit trail across the plain toward Kou (Honolulu), but finally collapsed from weariness and thirst. In a dream, the boy’s mother told him to pull up a plant close to his feet. When he did, he found a spring under the plant, which was called the Water of Ha‘o, or Kawaiaha‘o. This spring is located at the western end of the trail, near Kawaiaha‘o Church (Pukui 1988:87-89).

The Kewalo area also once had a famous fishpond that was used to drown members of a pariah caste (*kauwā*) or *kapu* (taboo) breakers as the first step in a sacrificial ritual known as *Kānāwai Kaihehe‘e* (Kamakau 1991:6) or *Ke-kai-he‘ehe‘e*, which translates as “sea sliding along,” suggesting the victims were slid under the sea (Westervelt 1991:16). Kewalo is described as:

> A fishpond and surrounding land on the plains below King Street, and beyond Koula. It contains a spring rather famous in the times previous to the conversion to Christianity, as the place where victims designed for the Heiau of Kanelaau on Punchbowl slopes, were first drowned. The priest holding the victim’s head under water would say to her or him on any signs of struggling, “Moe malie i ke kai o ko haku.” “Lie still in the waters of your superiors.” From this it was called Kawailumalumai, “Drowning waters” [Sterling and Summers 1978:292].

Kewalo is mentioned in a legend as a marsh near the beach, where tall *pili* grass was growing. A man named Kapoi went to this area to get thatching for his house. While there, Kapoi found seven owl eggs and took them home to cook for his supper. An owl perched on the fence surrounding his house and cried out “O Kapoi, give me my eggs!” After several such pleas, Kapoi returned the eggs. In return, the owl became his ‘*aumakua* (family god) and instructed him to build a *heiau* (pre-Christian place of worship) named Mānoa. Kapoi built the *heiau,* placed some bananas on the altar as a sacrifice, and set the *kapu* days for its dedication. The king of O‘ahu, Kākuhihewa, who was building his own *heiau* in Waikīkī, had made a law that if any man among his people erected a *heiau* and set the *kapu* before him, that man should die. Kapoi

was seized and taken to the *heiau* of Kūpalaha, in Waikīkī. Kapoi's ‘*aumakua* owl asked for aid from the king of the owls at Owl's Hill (Pu‘u Pu‘eo) in Mānoa, who gathered all of the owls of the islands. They flew to Kūpalaha and battled the king's men, who finally surrendered. From this time, the owl was considered a powerful *akua* (god). The battle area was known as Kukaeunahio-ka-pueo, which means "the confused noise of owls rising in masses" (Thrum 1998:200-202; Westervelt 1991:135-137). Kekahuna (1958:4) also identifies Kewalo as the meeting place of the owls "who, reinforced by the owls from Hawai‘i to Kaua‘i, defeated the owls of Ka‘kuhihewa."

Kewalo was also the birthplace of the great chief Hua-nui-ka-la-la‘ila‘i, as mentioned in this *mele* (story) chanted by Kamakau (1991:24):

‘O Hua-a-Kamapau ke ‘li‘i	Hua-a-Kamapau the chief
O Honolulu o Waikīkī	O Honolulu, of Waikīkī
I hanau no la i kahua la i **Kewalo**,	Was born at **Kewalo**,
‘O Kālia la kahua	Kālia was the place [the site]
O Makiki la ke ēwe,	At Makiki the placenta,
I Kānelā‘au i Kahehuna ke piko,	At Kānelā‘au at Kahehuna the navel cord,
I Kalo i Pauoa ka ‘a‘a;	At Kalo at Pauoa the caul;
I uka i Kaho‘iwai i	Upland at Kaho‘iwai, at
Kanaloaho‘okau . . .	Kanaloaho‘okau. . .

The chief Hua was born in Kewalo. He was famous for his love of cultivation and his care of the people. His *heiau,* called Pu‘ukea, was in Kukuluāe‘o in Honolulu. It is mentioned in a traditional *wānana* (prophecy) recorded by Kamakau (1991:24-25).

[*Ka makaua ua kahi o ‘Ewa*]	[The increasing "first rain" of ‘Ewa]
Ua puni ka i‘a o Mokumoa,	Overcomes the fish of Mokumoa,
Ua kau i‘a ka nene,	Washes up fish to the nene plants,
Ua ha‘a kalo ha‘a nu,	Lays low the taro as it patters down,
*Ha‘a ka i‘a o **Kewalo**,*	Lays low the fish of **Kewalo**,
Ha‘a na ‘ualu o Pahua,	Lays low the sweet potatoes of Pahua,
Ha‘a ka mahiki i Pu‘ukea,	Lays low the mahiki grass at Pu‘ukea,
Ha‘a ka unuunu i Pele‘ula,	Lays low the growing things at Pele‘ula,
Ha‘a Makaaho i ke ala.	Lays low Makaaho [Makāho] in its path.
E Kū e, ma ke kaha ka ua, e Kū,	O Kū, the rain goes along the edge [of the island], O Kū,
[*I ‘ai ‘na ka i‘a o Maunalua*] . . .	[Eating" the fish of Maunalua] . . .

From these legendary accounts it can be seen that Kewalo was traditionally noted for its fishponds, its marsh lands where *pili* grass could be collected, for ceremonial sites such as Kewalo spring and the fishpond at which sacrifices were made, and for its trails that allowed transport between the more populated areas of Waikīkī and Honolulu. Important chiefs were born in the area and conducted religious rites, and commoners traveled to the area to procure food and other resources. Some commoners probably also lived in the area, possibly adjacent to the fishponds and the trails.

3.2 Historic Background

3.2.1 Pre-Contact and Early Historic Periods

The *‘ili* of Kewalo in Kaka‘ako Ahupua‘a is a section of the broad plain that, in traditional Hawaiian times, separated the more populated and cultivated centers of Kou (present-day Honolulu) and Waikīkī. In Waikīkī, a system of irrigated taro *lo‘i* (irrigated fields) fed by streams descending from Makiki, Mānoa, and Pālolo valleys blanketed the plain, and networks of fishponds dotted the shoreline. Similarly, Kou—the area of downtown Honolulu surrounding the harbor—possessed shoreward fishponds and irrigated fields watered by ample streams descending from Nu‘uanu and Pauoa Valleys. The pre-contact population and land use patterns of Kaka‘ako may have derived from its relationship to these two densely populated areas. Thus, an attempt to reconstruct the Kaka‘ako region (including Kewalo) as it existed for the Hawaiians during the centuries before western contact and the modern urbanization that has reconfigured the landscape must begin with accounts of Kou and Waikīkī.

Waikīkī is actually the name of a large *ahupua‘a* encompassing lands stretching from Honolulu to Maunalua Bay. Within this *ahupua‘a*, by the time of the arrival of Europeans during the late eighteenth century, the area today known as Waikīkī had long been a center of population and political power on O‘ahu. According to Martha Beckwith (1940:383), by the end of the fourteenth century Waikīkī had become “the ruling seat of the chiefs of O‘ahu.” The pre-eminence of Waikīkī continued into the eighteenth century and was confirmed by the decision of Kamehameha, in the midst of unifying control of the islands, to reside there after wresting control of O‘ahu by defeating the island’s chief, Kalanikūpule.

Chiefly residences were only one element of a complex of features sustaining a large population that characterized Waikīkī up through pre-contact times. Beginning at least by the fifteenth century, a vast system of irrigated taro fields was constructed, extending across the littoral plain from Waikīkī to lower Mānoa and Pālolo valleys. This field system, an impressive feat of engineering, the design of which is traditionally attributed to the chief Kalamakua, took advantage of streams descending from Makiki, Mānoa, and Pālolo Valleys, which also provided ample fresh water for the Hawaiians living in the *ahupua‘a*. Water was also available from springs in nearby Mō‘ili‘ili and Punahou. Closer to the Waikīkī shoreline, coconut groves and fishponds dotted the landscape. A continuous zone of population and cultivation (from the shoreline of present day Waikīkī Beach) extended north, well into Mānoa Valley. The western and eastern bounds of this zone are less clear, and there are no specific references to Waikīkī’s abundance reaching into the Kewalo region.

A basic description of Honolulu (Kou), up to western contact, is given by E. S. Craighill Handy and Elizabeth Handy:

> What is now Honolulu was originally that flatland area between the lower ends of Nu‘uanu and Pauoa Valleys and the harbor. [W. D.] Westervelt. . .wrote that “Honolulu was probably a name given to a very rich district of farm land near what is now . . . the junction of Liliha and School Streets, because its chief was Honolulu, one of the high chiefs at the time of Kakuhihewa.” . . . It is probable that the chief referred to by Westervelt took his name from the harbor and adjoining land. The original name of the land where the town grew when the

> harbor became a haven for foreign ships was Kou. . . . The number of *heiau* in this area indicates that it was a place of first importance before the era of foreign contact [Handy and Handy 1972:479].

Rev. Hiram Bingham, arriving in Honolulu in 1820, described a still predominantly native Hawaiian environment—still a “village”—on the brink of western-induced transformations:

> We can anchor in the roadstead abreast of Honolulu village, on the south side of the island, about 17 miles from the eastern extremity. . . . Passing through the irregular village of some thousands of inhabitants, whose grass thatched habitations were mostly small and mean, while some were more spacious, we walked about a mile northwardly to the opening of the valley of Pauoa, then turning southeasterly, ascending to the top of Punchbowl Hill, an extinguished crater, whose base bounds the northeast part of the village or town. . . . Below us, on the south and west, spread the plain of Honolulu, having its fishponds and salt making pools along the seashore, the village and fort between us and the harbor, and the valley stretching a few miles north into the interior, which presented its scattered habitations and numerous beds of *kalo* (*arum esculentum*) in its various stages of growth, with its large green leaves, beautifully embossed on the silvery water, in which it flourishes [Bingham 1847:92-93].

The Kaka‘ako region would have been in Bingham’s view as he stood atop “Punchbowl Hill” looking toward Waikīkī to the south; it would have comprised part of the area he describes as the “plain of Honolulu, having its fishponds and salt making pools along the seashore” (Bingham 1847:92-93).

Another visitor to Honolulu in the 1820s, Capt. Jacobus Boelen, hints at the possible pre-contact character of Honolulu and its environs, including the Kaka‘ako area:

> It would be difficult to say much about Honoruru [Honolulu]. On its southern side is the harbor or the basin of that name (which as a result of variations in pronunciation is also written as Honolulu, and on some maps, Honoonoono). The landlocked side in the northwest consists mostly of tarro [*sic*.] fields. More to the north there are some sugar plantations and a sugar mill, worked by a team of mules. From the north toward the east, where the beach forms the bight of Whytetee [Waikīkī], the soil around the village is less fertile, or at least not greatly cultivated [Boelen 1988:62].

Boelen’s description implies that the Kaka‘ako/Kewalo region, including the current study area, is within a “not greatly cultivated” region of Honolulu perhaps extending from Pūowaina (Punchbowl Crater) at the north to the Kālia portion of Waikīkī in the east.

An early, somewhat generalized depiction of the pre-contact native Hawaiian shaping of Waikīkī, Honolulu, and the Kaka‘ako region (including Kewalo) is given on an 1817 map (Figure 7) by Otto von Kotzebue, commander of the Russian ship *Rurick*, who had visited O‘ahu the previous year. Von Kotzebue’s map illustrates that the land between Pūowaina (Punchbowl Crater) and the shoreline—which includes Kewalo—formed a “break” between the heavily populated and cultivated centers of Honolulu and Waikīkī; the area is only characterized

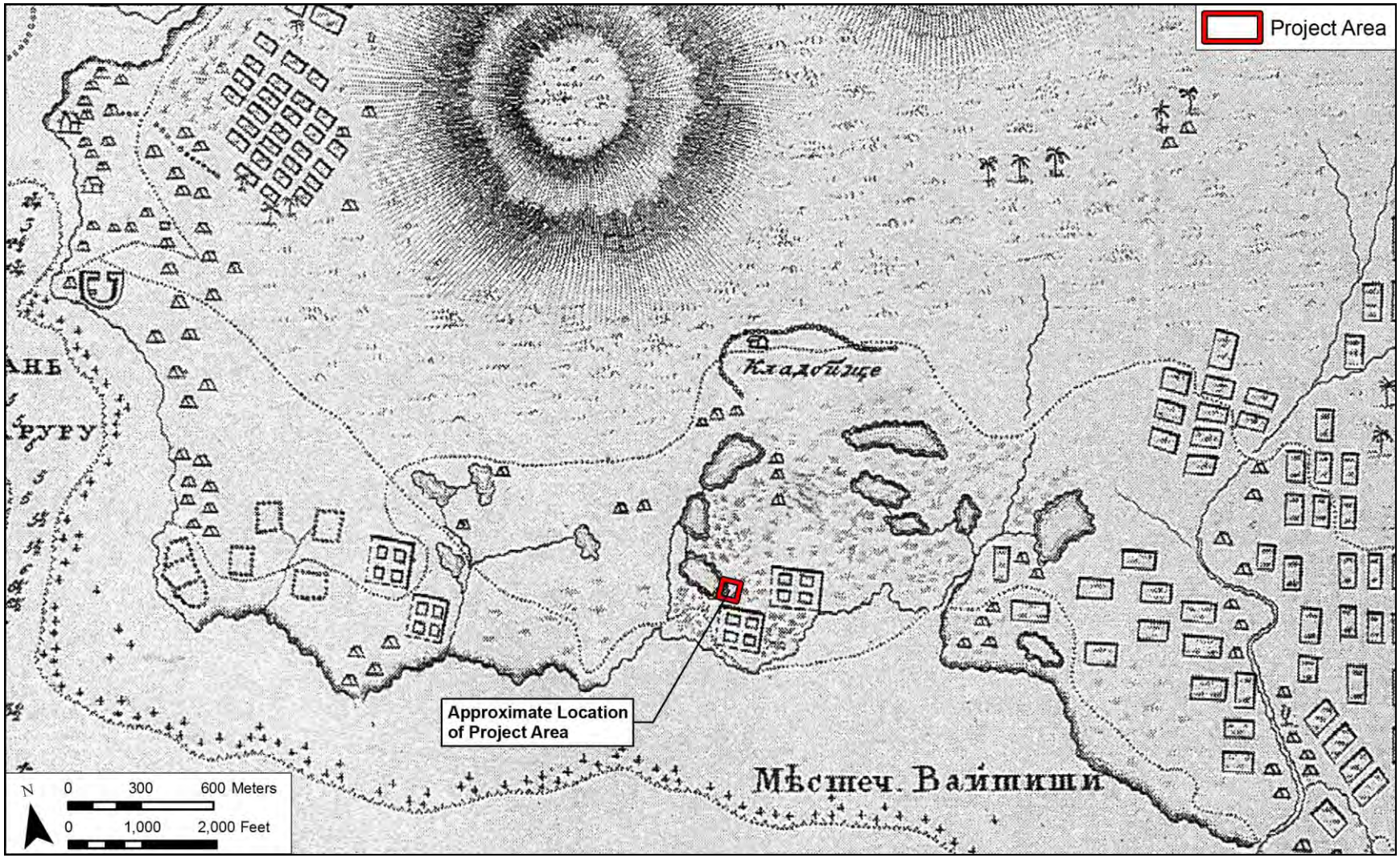


Figure 7. 1817 map by Otto von Kotzebue of the Russian ship Rurick, showing taro lo‘i, fishponds, and salt pans in Honolulu and Waikīkī in relation to the project area (map reprinted in Fitzpatrick 1986:48-49)

by fishponds, salt ponds, trails connecting Honolulu and Waikīkī, and occasional taro *lo‘i* and habitation sites.

A clearer picture of Kaka‘ako and the present project area in Kewalo develops with accounts of other visitors to and settlers of Honolulu during the first half of the nineteenth century. Gorman D. Gilman, who arrived in Honolulu in 1841, recalled in a memoir the limits of Honolulu during the early 1840s:

> The boundaries of the old town may be said to have been, on the *makai* side, the waters of the harbor; on the *mauka* side, Beretania street; on the Waikīkī side [i.e., the area just beyond Punchbowl Street], the barren and dusty plain, and on the Ewa side, the Nuuanu Stream [Gilman 1903:97].

Gilman further describes the “barren and dusty plain” beyond (east of) Punchbowl Street:

> The next and last street running parallel [he had been describing the streets running *mauka-makai*, or from the mountains to the shore] was that known as Punchbowl Street. There was on the entire length of this street, from the *makai* side to the slopes of Punchbowl, but one residence, the two-story house of Mr. Henry Diamond, *mauka* of King Street. Beyond the street was the old Kawaiahao church and burying ground. A more forsaken, desolate looking place than the latter can scarcely be imagined. One, to see it in its present attractiveness of fences, trees and shrubbery, can hardly believe its former desolation, when without enclosure, horses and cattle had free access to the whole place [Gilman 1903:89].

That the environs of the missionary enclave and Kawaiaha‘o Church were indeed “forsaken” and “desolate looking” in the 1820s when the missionaries first settled there is confirmed in the memoirs of the American missionary C. S. Stewart who, arriving on Maui after living at the mission, declared Lahaina to be “like the delights of an Eden” after “four weeks residence on the dreary plain of Honoruru” (Stewart 1970:177). It is likely that these descriptions of the Honolulu plain also include—at least for western sensibilities—the Kaka‘ako region. The barrenness of the Kaka‘ako area is illustrated in two sketches, one made in 1834 (Figure 8) when Kawaiaha‘o Church was still a long grass-thatched building and one made in 1850 (Figure 9) after the grass hut had been replaced by a large coral stone structure with a steeple. Between Kawaiaha‘o Church and the sea were only a few scattered huts along the shore and aligned along the inland trail (now covered by King Street). The current project area would be *makai* and left (east) of the church along the shore. An 1887 photograph (Figure 10 and Figure 11) also shows the marshy nature of the area, with only scattered houses near the ponds or near the shore *makai* of Kawaiaha‘o Church. The missionary families grazed their cows in the lands *makai* of the mission houses (*Paradise of the Pacific* 1950:21).

3.2.1.1 Salt

Much of the lands in the Kaka‘ako region were used to produce *pa‘akai* (salt). The Hawaiians used salt for a variety of purposes: to flavor food, to preserve fish, for medicines, and for ceremonial purposes. David Malo describes the traditional method:

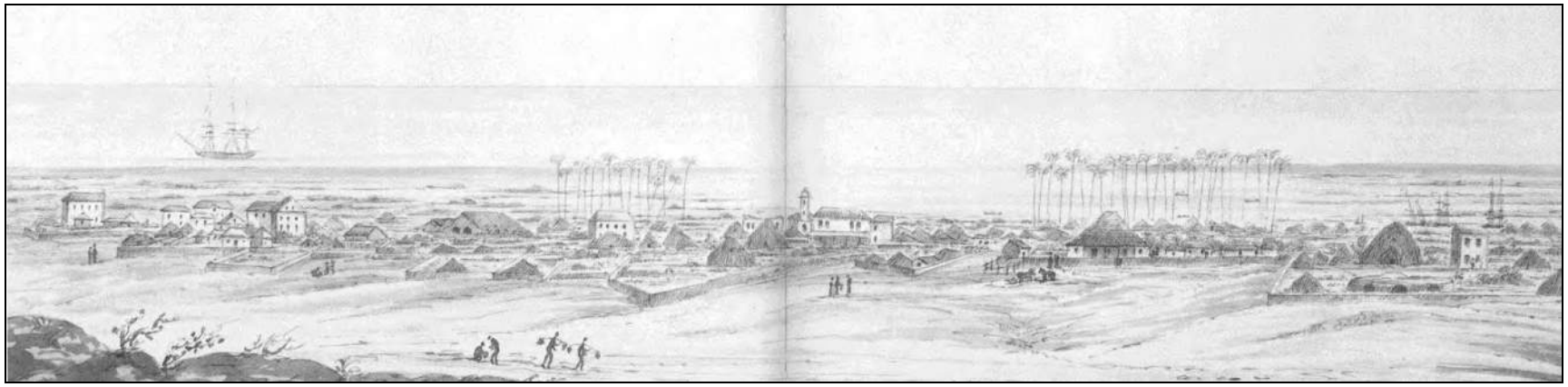


Figure 8. Portion of 1834 sketch by anonymous illustrator entitled “Town of Honolulu: Island of Woahoo: Sandwich Islands (original sketch at Bernice P. Bishop Museum; reproduced in Grant et al. 2000:64-65)

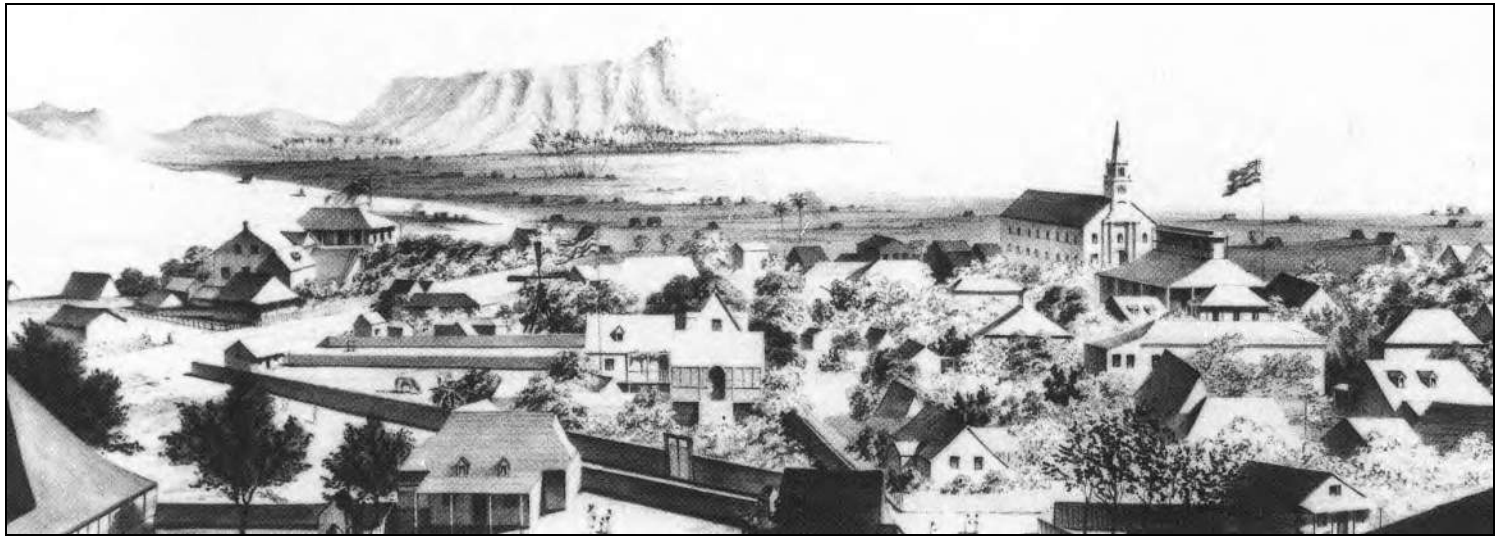


Figure 9. 1850 Sketch by Paul Emmert (original sketch at the Hawaiian Historical Society; reproduced in Grant et al. 2000:5)

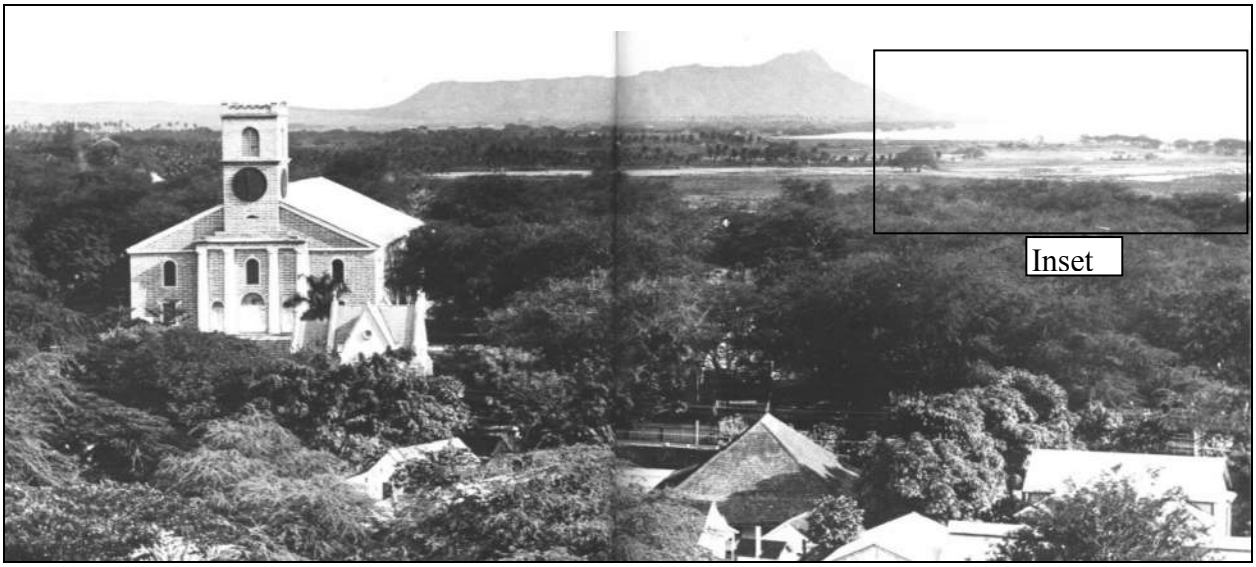


Figure 10. Photograph ca. 1887 of Honolulu and Waikīkī; Kawaiaha‘o Church in left foreground; project area is within the marshlands seen in the upper right background (original photograph at Hawai‘i State Archives, Henry L. Chase Collection; reproduced in Stone 1983:84-85)

Figure 11. Enlarged inset section of photograph ca. 1887 (Figure 10, above) showing marshlands and scattered huts along the coast

> *O ka paakai kekahi mea e pono ai, he mea e ono ai, ka ia, a me ke koekoe o ka paina ana, he mea hana ia ka paakai, ma kekahi aina, aole i hana a ma kekahi aina, o ke kai makai, e kii aku no ka wahine, a lawe mai ma ke poi, a ke kai hooholo ia mai kekahi ma kauwahi mai.*
>
> *E waiho kela kai ma kekahi poho paha, he ekaha paha, he kahe ka paha, a liu malaila, alaila lawe ana kauwahi e, a paakai iho la no ia, o ka papa laau ka mea kui poi* [Malo 2006:73].
>
> Translation
>
> Pa‘akai (salt) is another beneficial item. It is used to make fish delicious and tasteless foods edible. Pa‘akai is made at a particular place, [but] it [salt] is not actually made from this spot, rather it [salt water] came from the sea. A woman went to get some when the sea crashed [upon the rocks] and she ran back [with the salt water] to this particular spot.
>
> That salt water (kai) is placed in, perhaps, a depression (poho) or a “Bird’s nest” (ēkeha) or rock basin (kāheka) and allowed to evaporate (liu). Then it is taken to another spot and is formed into pa‘akai. Wooden boards (papa lā‘au) are used to pound poi (*mashed cooked* kalo *corms*) on [Malo 2006:95].

In 1903, Nathaniel Emerson translated David Malo’s articles on early Hawaiian life. In his publication, the translations are not literal, but include information that Emerson added to clarify the accounts. In Emerson’s translation:

> Salt was one of the necessities and was a condiment used with fish and meat, also as a relish with fresh food. Salt was manufactured in certain places. The women brought sea-water in calabashes, or conducted it in ditches to natural holes, hollows and shallow ponds (*kekaha*) on the sea-coast, where it soon became strong brine from evaporation. Thence it was transferred to another hollow or shallow vat, where crystallization into salt was completed [in Malo 1951:123].

Captain Cook was the first person to note the method of making salt in prepared “saltpans:”

> Amongst their arts, we must not forget that of making salt, with which we were amply supplied, during our stay at these islands, and which was perfectly good of its kind. Their saltpans are made of earth, lined with clay; being generally six or eight feet square, and about eight inches deep. They are raised upon a bank of stones near the high-water mark, from whence the salt water is conducted to the foot of them, in small trenches, out of which they are filled, and the sun quickly performs the necessary process of evaporation. . . . Besides the quantity we used in salting pork, we filled all our empty casks, amounting to sixteen puncheons, in the Resolution only [Cook 1784:151].

In the next years after the discovery of the islands by Captain Cook in 1778, most visitors to the islands were British and American fur-traders, who stopped at Hawai‘i on their way to China. One reason for their visit was to stock up on food and water, but another concern was to buy or trade for salt, which was used to cure the seal and mammal pelts collected from the Northwest

Coast. During Kotzebue's visit in 1816 and 1817, he noted that, "Salt and sandalwood were the chief items of export" (in Thrum 1904:50).

> The journals of none mention the object of call other than for refreshments, though one, 3 some years later, records the scarcity and high price of salt at the several points touched at, with which to serve them in the curing of furs obtained on the coast. In all probability salt was the first article of export trade of the islands and an object, if not the object, of these pioneer furtraders' call [Thrum 1904:45].

The missionary William Ellis, on a tour of the Hawaiian Islands in 1822 and 1823, also noted these salt pans and recorded the final step of crystallization:

> The natives of this district (Kawaihae) manufacture large quantities of salt, by evaporating the sea water. We saw a number of their pans, in the disposition of which they display great ingenuity. They have generally one large pond near the sea, into which the water flows by a channel cut through the rocks, or is carried thither by the natives in large calabashes. After remaining there for some time, it is conducted into a number of smaller pans about six or eight inches in depth, which are made with great care, and frequently lined with large evergreen leaves, in order to prevent absorption. Along the narrow banks or partitions between the different pans, we saw a number of large evergreen leaves placed. They were tied up at each end, so as to resemble a narrow dish, and filled with sea water, in which the crystals of salt were abundant [Ellis 1827:403-404].

In an article on Hawaiian salt works, Thomas Thrum discussed the large salt works at Alia Pa‘akai (Salt Lake in Moanalua) and at Pu‘uloa on the western loch of Pearl Harbor. Kamakau (1964:409) reported, "The king and Isaac of Pu‘uloa are getting rich by running the salt water into patches and trading salt with other islands." The salt was sent to Russian settlements in the Pacific Northwest, where it was used to pack salmon (*Hawaiian Gazette,* January 29, 1897). Thrum also mentions a salt works in Kaka‘ako.

> Honolulu had another salt-making section in early days, known as the Kakaako salt works, the property of Kamehameha IV, but leased to and conducted by E. O. Hall, and subsequently E. O. Hall & Son, until comparatively recent years. This enterprise was carried on very much after the ancient method of earth saltpans as described by Cook and Ellis [Thrum 1923b:116].

In the testimony for LCA 1903, Lolopi claimed two *ālia* (salt beds), 15 *ho‘oliu* (drains), two *poho kai* (depressions where salt is gathered) and one salt *kula* (dryland or wasteland). Four separate types of salt features are mentioned; the ponds near the shore that fill with salt water at high tide (*ālia*), the drains (*ho‘oliu*) where the salt water is transferred to smaller clay-lined or leaf-lined channels, the natural depressions (or modified depressions) in the rocks along the shore where salt formed naturally, and the salt *kula*, which was waste land, land that could probably not be used for agriculture as it was impregnated with salt. Lolopi did not live near his salt lands, but Pahiha, claimant of LCA 1504, did have a house near his fishpond and salt bed. The house was probably a simple grass hut, similar to those shown on an 1838 sketch entitled

“Honolulu Salt Pans, near Kaka‘ako” and the one shown on an 1845 sketch of the “Old Salt Pans” (Figure 12 and Figure 13).

Figure 12. 1838 sketch of “Honolulu Salt Pans, near Kaka‘ako” drawn by a French visitor, Auguste Borget (original sketch at Peabody Essex Museum, Salem, Mass; reprinted in Grant et al. 2000:64-65)

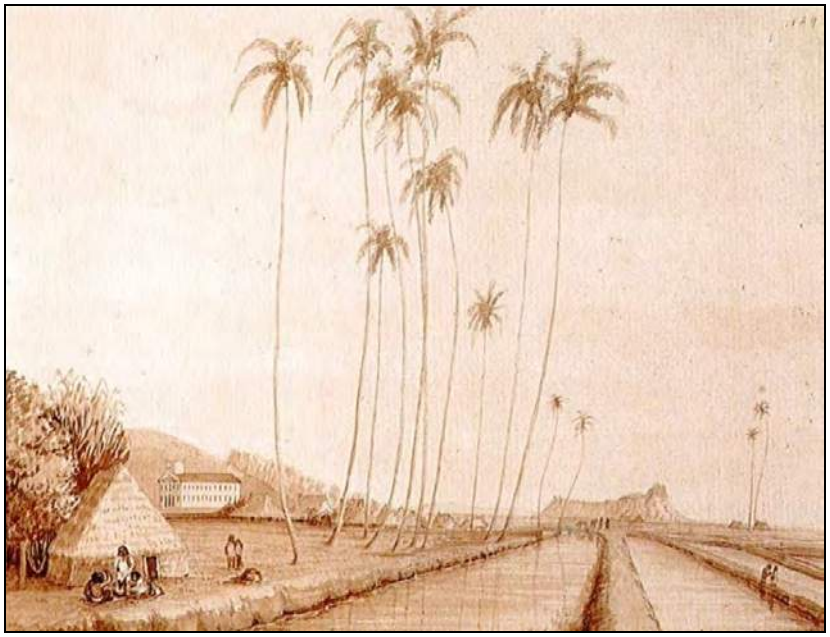


Figure 13. 1845 sketch of “Native Church [Kawaiaha‘o Church], Oahu, from the Old Salt Pans,” drawn by John B. Dale, from the U.S. Exploring Expedition led by Lt. Charles Wilkes (J. Welles Henderson Collection, reprinted in Forbes 1992:126); the sketch is probably from the salt pans in the Ka‘ākaukukui area west of the project area

The export of salt declined in the late nineteenth century. Thrum (1923b:116) states that the apex of the trade was in 1870, but by 1883, he noted that “pulu, salt and oil have disappeared entirely” from the list of yearly exports (Thrum 1883:68). By 1916, only one salt works, the Honolulu Salt Co., was still in operation. Salt continued to be manufactured for local use; the Kaka‘ako Salt Works appears on maps as late as 1891 and a page in Victoria Wards’ ledger for 1883 notes a yearly income of $651.50 received from her “Salt Lands” in Kukuluāe‘o (Hustace 2000:50). A 1902 photograph (Figure 14) shows the extensive salt beds of the Kewalo area, in an area probably west of the project area. An 1881 map (Figure 15) shows the extensive grid of salt beds to the west of the project area.

Figure 14. 1902 photograph of Kewalo Brine Basins to the west of the project area; caption of photograph in Scott (1968:579) states that the photograph was taken “beyond the shacks, in the vicinity of what is now Ward Street and Kapiolani Boulevard, rise the tree-studded slope of Punchbowl and the steep of Tantalus”

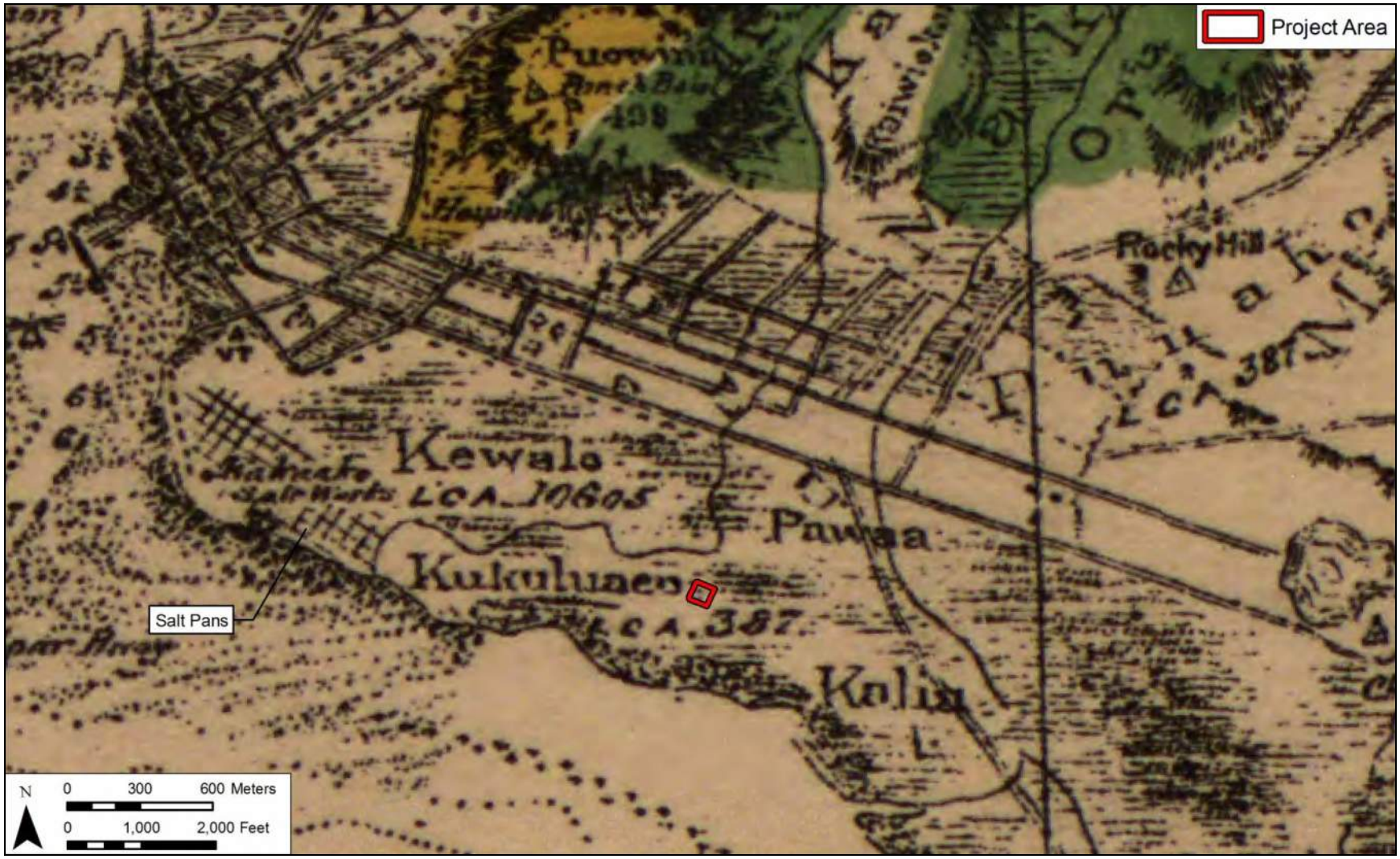


Figure 15. 1881 map of O‘ahu (portion) by R. Covington, showing the extensive salt pans to the west of the project area in Kewalo; also note the project area in the *‘ili* of Kukuluāe‘o (Hawai‘i Land Survey Division, Registered Map No. 1381)

The Chinese were involved in salt production, usually in concert with their management of fishponds. One son of a Chinese resident remembered the Chinese form of salt production (for ca. 1900) from salt pans bordering the sea, which were fed continually with seawater by the tides:

> Both the natural tides and the Chinese method of peddling a wooden wheel that transported water upward, helped to keep the salt beds damp with about three inches of water. After a few months, the senior Mau would drain off the remaining water and use a wooden rake with deep prongs to break up the salt. When the bed was dry a flat rake was used to flatten and smooth out the salt. Later it was raked into piles, packed in cloth bags and distributed [Chong 1998:108].

By 1901, most of the fishponds and salt pans *makai* of the Ward "Old Plantation" area were reported as abandoned. In that year, the Hawai‘i First Legislative Assembly (1901:185) proposed to build a ditch to drain away the "foul and filthy water that overflows that district at the present time."

> The district makai of King St. and the Catholic Cemetery, Ewa of Mrs. Ward's (the Old Plantation), mauka of Clayton St., and Waikiki of the land from King St., leading to the Hoomananaauao Church, consists of six large abandoned fish ponds and a large number of smaller ones, all in filthy condition, fed by springs and flowing into Peck's ditches. Just makai of these ponds, at the end of Clayton street, next to Mr. Ward's, is Peck's place. An artesian well flushing the wash houses flows into two foul ditches, thence to the big pond which is Waikiki of what used to be Cyclomere and next to Mrs. Ward's line [ditch] extending down to Waimanu St.
>
> The rear portion of Mrs. Ward's property down to Waimanu St. used to be fish ponds all connecting to the sea by a ditch which is fed by an artesian well. These ponds, with the exception of three, are abandoned [Hawai‘i First Legislative Assembly 1901:185].

3.2.2 Mid- to Late Nineteenth Century

A map of Honolulu drawn in 1855 by Joseph de LaPasse, a lieutenant aboard the French vessel, *L‘Eurydice* (Figure 16), shows fishponds and taro *lo‘i* (irrigated patches, shown as rectangles) surrounding the project area and massed around the streams descending from Nu‘uanu and Mānoa Valleys. Houses can be seen scattered along King Street. The depicted areas of population and habitation concentration probably reflect distortions caused by the post-contact shift of Hawaiians to the area around Honolulu Harbor—the only sheltered landing on O‘ahu and the center of increasing trade with visiting foreign vessels. Kamehameha himself had moved from Waikīkī to Honolulu in 1809.

Several early maps (Figure 17 through Figure 19) show very little development in the vicinity of the project area, mostly fishponds, taro *lo‘i*, and salt pans. An 1887 map by Walter E. Wall shows the project area within Kewalo ‘Ili (Figure 17). An 1866 map by J. F. Makalena (Figure 18) and an 1897 map by M. D. Monsarrat (Figure 19) show the project area just outside Kewalo

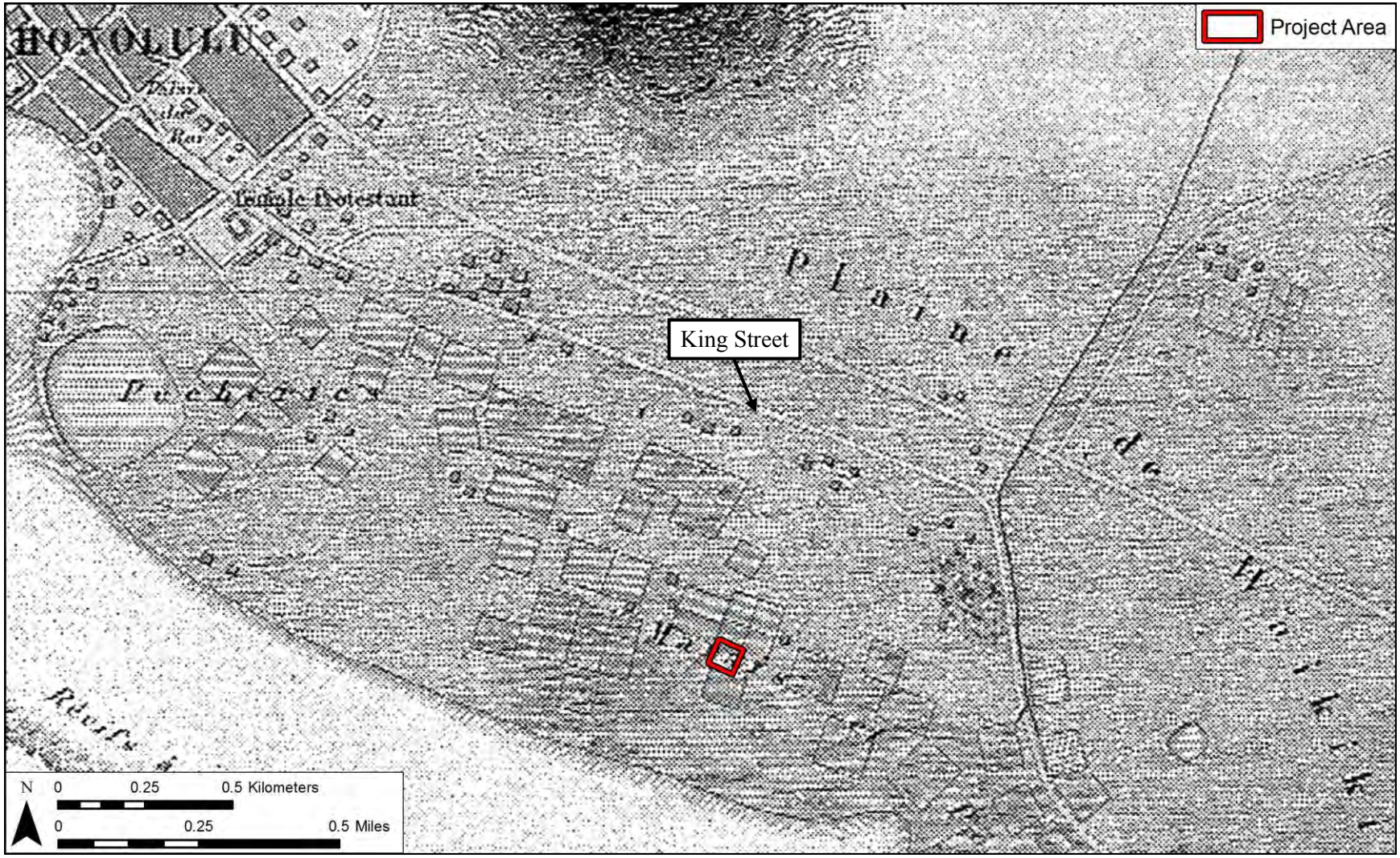


Figure 16. Portion of 1855 map of the Honolulu District by Lt. Joseph de LaPasse, showing the project areas within taro *lo‘i* (map reprinted in Fitzpatrick 1986:82-83)

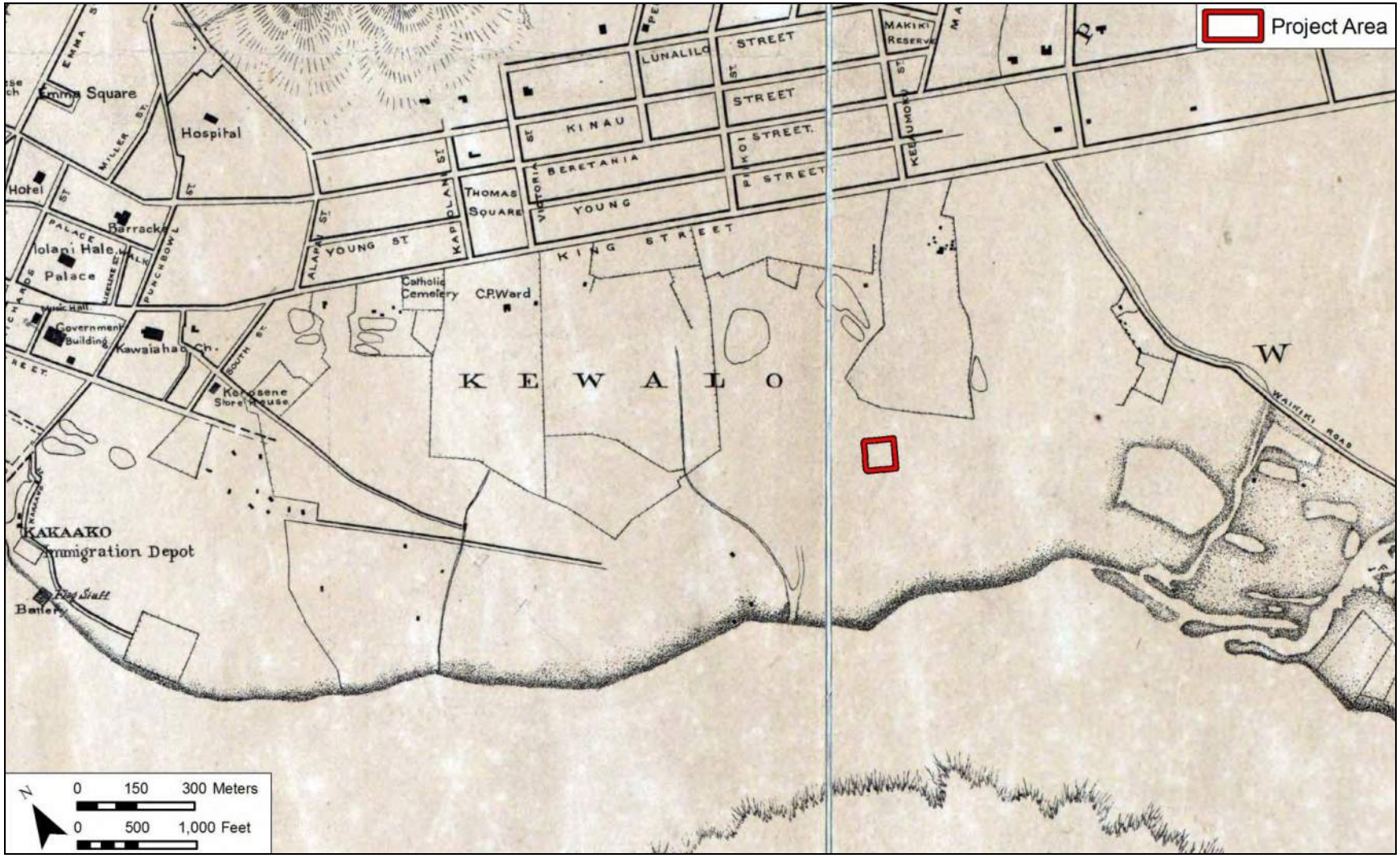


Figure 17. 1887 map of Honolulu by Walter E. Wall, showing project area within Kewalo ‘Ili; also note the Kaka‘ako Battery to the west of the project area

Figure 18. Portion of 1866 map of Kewalo ‘Ili by J. F. Makalena showing the project area just outside Kewalo ‘Ili in the *‘ili* of Kālia (Hawai‘i Land Survey Division, Registered Map No. 111)

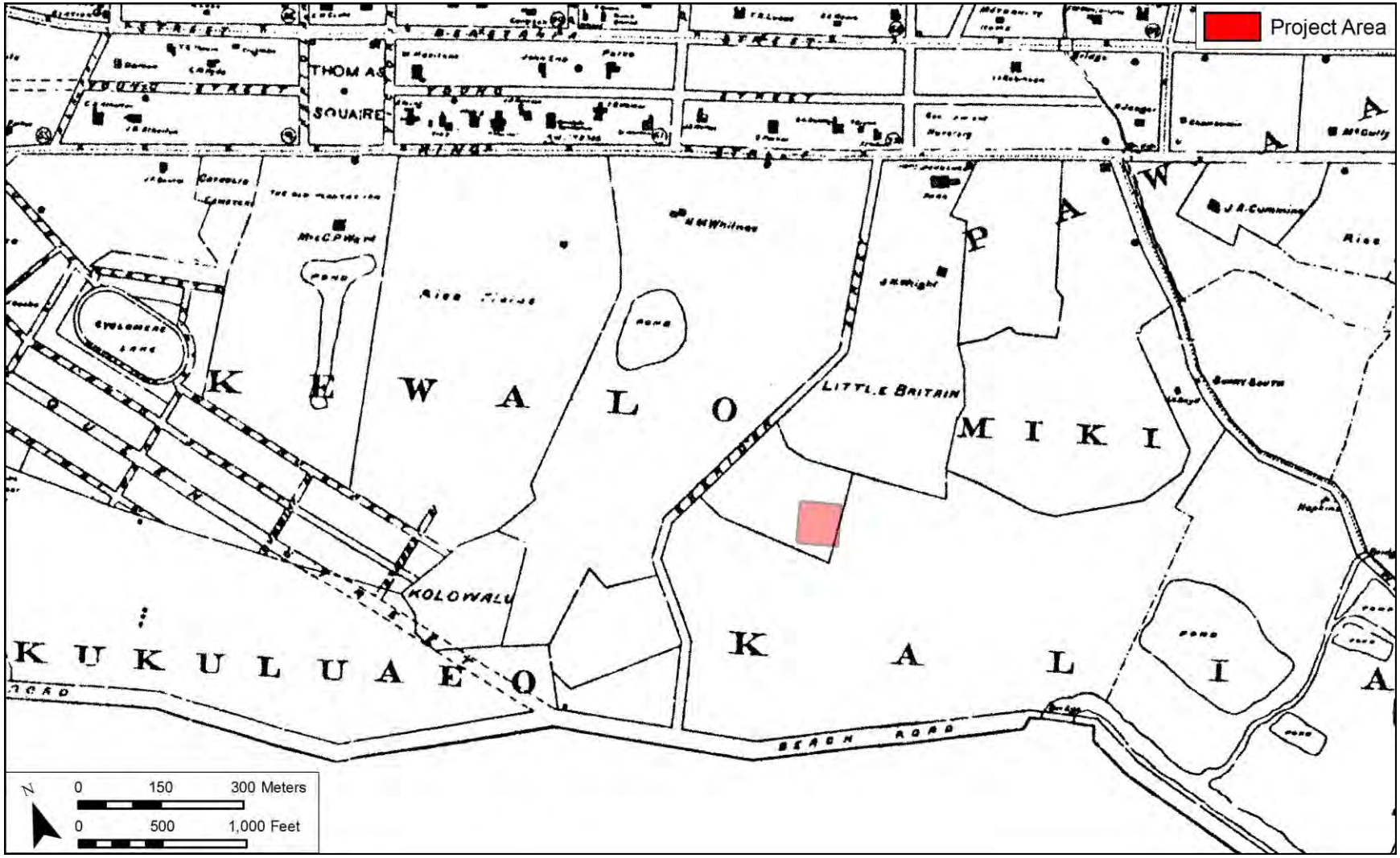


Figure 19. Portion of 1897 map of Honolulu by M. D. Monsarrat, showing the project area just outside Kewalo ‘Ili in the *‘ili* of Kālia (Hawai‘i Land Survey Division, Registered Map No. 1910)

‘Ili within the *‘ili* of Kālia. An 1881 map of O‘ahu by R. Convington places the project area within the *‘ili* of Kukuluāe‘o (see Figure 15).

3.2.2.1 The Māhele

The Organic Acts of 1845 and 1846 initiated the process of the *Māhele*—the division of Hawaiian lands—which introduced private property into Hawaiian society. In 1848, the crown, the Hawaiian government, and the *ali‘i* received their land titles. The common people (*maka‘āinana*) began to receive their *kuleana* awards (individual land parcels) in 1850. It is through records for Land Commission Awards (LCA) generated during the Māhele that the first specific documentation of life in the Kewalo area, as it had evolved up to the mid-nineteenth century, come to light.

Among the first descriptions of the Kaka‘ako area by the Hawaiians themselves are the testimonies recorded during the 1840s in documents associated with LCAs and awardees of the *Māhele*. The LCA records indicate that traditional Hawaiian usage of the region and its environs may have been confined to salt making and farming of fishponds, with some wetland agriculture in those areas *mauka* or toward Waikīkī at the very limits of the field system descending from Makiki and Mānoa valleys. The testimonies indicate that the area was lived on and was shaped by Hawaiians before the nineteenth century. The LCA records also reveal that, midway through the nineteenth century, taro cultivation, traditional salt making, and fishpond farming activities continued within the Kaka‘ako area. These activities and the land features that supported them were eliminated, or buried, during the remainder of the nineteenth century by the urbanization of Honolulu. The LCA records along with historic maps and archival photographs document more precisely traditional Hawaiian settlement and subsequent historic land usage within and around the present project area.

An 1884 map by S. E. Bishop shows the Honolulu plain amid the encroaching development of Honolulu Town (Figure 20). Surrounding the project area are marshlands that have not yet been filled and integrated into urban Honolulu. The map also shows the disposition of LCAs, land grants, and Royal Patents recorded near the current project area. The salt lands are mainly along the coast, the fishponds are usually located *mauka* of Queen Street, and the houselots are clustered around established roads, especially Queen Street and King Street. Only one awardee in the project area indicated that his houselot was also near his salt lands. Most of the claimants had a salt land *makai* of Queen Street, a houselot along Queen Street, and one or more agricultural lands farther *mauka* of Queen Street.

The *‘ili* of Kewalo was awarded to Kamake‘e Pi‘ikoi, a member of the *ali‘i* and wife of Jonah Pi‘ikoi, as part of LCA 10605, *‘āpana* (lot) 7. Documents related to LCA 10605 reveal little of the actual character of the land; however, records for other awards—including testimonies entered for smaller *kuleana* awards to individuals living in the area—give a more detailed picture of Kewalo.

On the 1884 map by S. E. Bishop, the project area is shown within LCA 100 F.L. LCA 100 F.L. to Kekaula is recorded as consisting of “2 fish ponds, 5 fish ponds, 1 patch, house site, and a pasture in one section of land” (Native Testimony, 1847, Vol. 10:304). Adjacent to Kekaula’s parcel, LCA 101 F.L. to Kaluaoku included “two ponds and three small kiopuaa ponds for young fish and one lo‘i” (*Native Register*, 1847, Vol. 3:764).

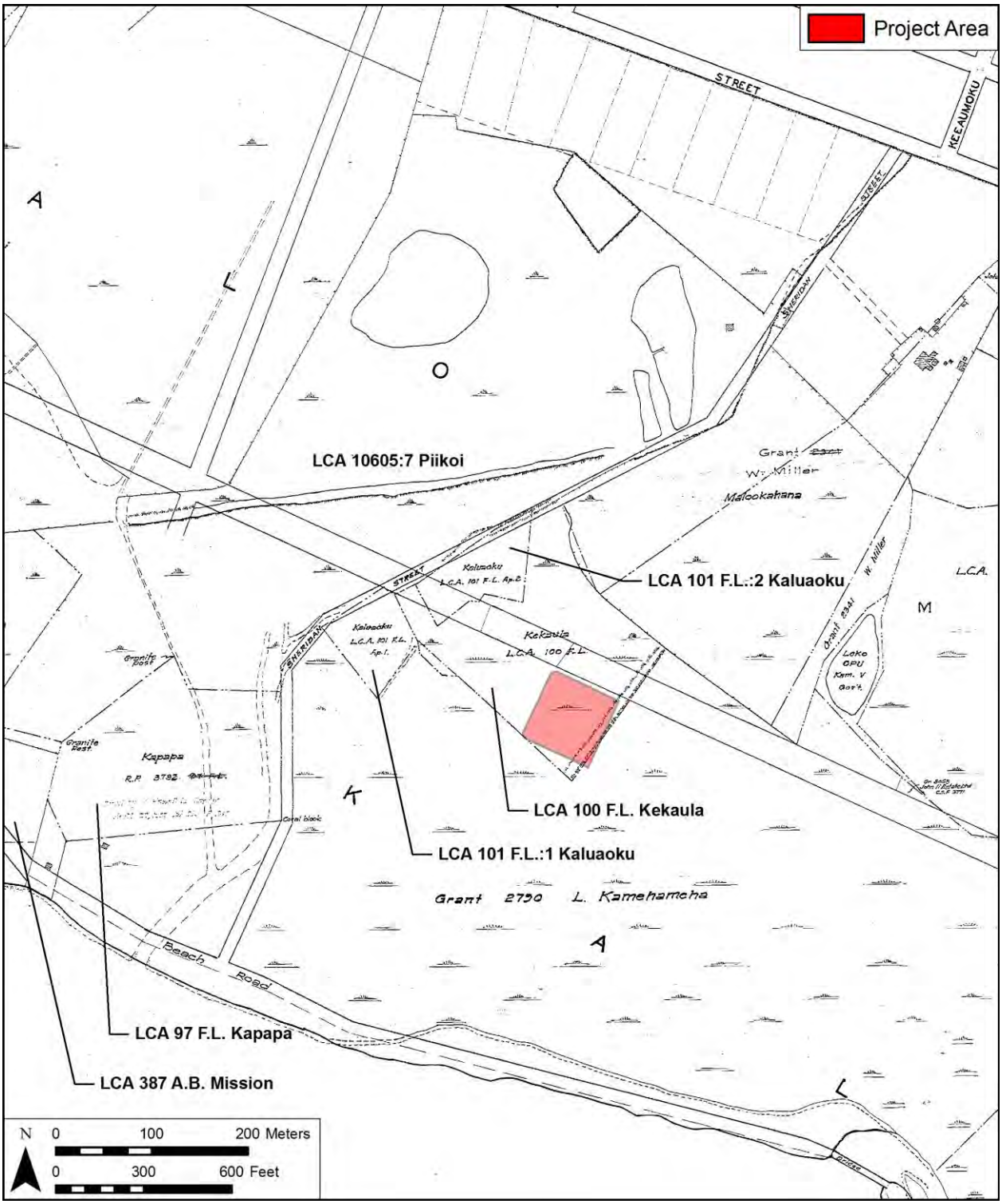


Figure 20. 1884 map of Honolulu, Kewalo Section, by S. E. Bishop showing LCA parcels and project area (Hawai‘i Land Survey Division, Registered Map No. 1090)

The land immediately *makai* of Kewalo (the *‘ili* of Kukuluāe‘o, LCA 387) was originally awarded to the king, but he returned it to the government. This land then was awarded to the American Board of Commissioners for Foreign Missions (ABCFM). Testimonies describe the land—identified as “Punahou”—and the background of the ABCFM’s claim to it:

> The boundaries of that part which lies on the sea shore we cannot define so definitely, but presume there will be no difficulty in determining them, as it is commonly known as pertaining to Punahou. This part embraces fishing grounds, coral flats & salt beds [Land Commission Award 387].
>
> The above land was given by Boki to Mr. Bingham, then a member of the above named Mission & Kaahumanu afterwards confirmed the grant [Foreign Register 1842:33].
>
> The Makai part of Punahou is bounded Mauka by “Kewalo” and “Koula,” Waititi side by “Kalia,” seaward it extends out to where the surf breaks. Honolulu side by “Honolulu.”
>
> This land was given to Mr. Bingham for the Sandwich Island Mission by Gov. Boki in 1829. . . . From that time to these the S. I. Mission have [*sic*] been the only Possessors and Konohikis of the Land...
>
> The name of the Makai part is Kukuluaeo. There are several tenants on the land of Punahou whose rights should be respected [Foreign Testimony 1848:115].

That the land just *mauka* of the coast was indeed exposed coral flats dotted with salt pans and fishponds into the nineteenth century is corroborated in the testimonies recorded for individual *kuleana* awards to some of those tenants on the land “whose rights should be respected.” LCA 1503 to Puaa is recorded as consisting of three fishponds and a houselot. LCA 1504 to Pahiha (Pahika on Bishop’s 1884 map) comprised a houselot, a pond, and a salt bed. Testimony for LCA 1903 to Lolohi (Lolopi on Bishop’s 1884 map) explicitly defines the general area:

> Peka W. [*wahine*] sw[orn]. I know this place. It is on the salt plains of Honolulu, used for making salt.
>
> Mauka is a stream of salt water. Waititi is several salt ponds—Napela Kuniae and others own them. Makai—Gov’t road. Honolulu—Peka Kaula, Lilea, Bolabola, Poe.
>
> Claimant received this land from his father who died last year and held it a long time back in Kinau’s time [Foreign Testimony 1848:220].

LCA 9549 to Kaholomoku comprised “three ponds, a salt *mo‘o*” (Native Register 1847:477). LCA 10463 to Napela is recorded as consisting of “2 ponds, a ditch, 2 deposits, a house site and a salt land section in two pieces” (Native Testimony 1847:445). LCA 3169 to Koalele is located within Kewalo itself:

> Mahoe, sworn, says he knows the land of Claimant in ‘Kewalo.’ It consists of some kalo patches mauka and some Lokos makai.
>
> The kalo patches are bounded mauka by Kealoha; bound Waikiki side by Kuaipaka’s, makai by the konohiki. Ewa side by J. Booth.

> The fish ponds are bounded mauka by the konohiki. Waikiki and makai side, the same. Honolulu side by J. Booth.
>
> Clt [claimant] received his land from Kapihi in the lifetime of Kinau and he has held the same without dispute til the present time [Foreign Testimony 1848:507].

The *mauka* portion of Koalele's claim, which includes the taro patches, is not shown on Bishop's 1884 map; it is likely somewhere immediately *mauka* of the present King Street. The *makai* portion—the "Lokos" or fishponds—is shown on the map.

3.2.2.2 Development

Maps of the 1880s and 1890s (refer to Figure 17 above) record an "arm" of streets projecting from downtown Honolulu into Kaka‘ako and Kewalo. A large portion of Kewalo, however, remained open and the maps reveal that much of the region had become rice fields, while other areas were designated marsh lands. However, two developments in the Kewalo area during the second half of the nineteenth century—Thomas Square and the "Old Plantation"—are paradigmatic of western-conceived and induced change imposed on the landscape. Archibald S. Cleghorn designed Thomas Square, named for Admiral Richard Thomas who, at that site in July 1843, restored the Hawaiian flag to Kamehameha III. In 1870, Curtis P. Ward bought the property across King Street from Thomas Square at auction for $2,450 from the estate of the late Joseph Booth. The property originally consisted of 17 acres with a fishpond but, by 1875, Ward's property comprised 30 acres. An article in the *Pacific Commercial Advertiser* (September 4, 1875) reported:

> In taking a drive out on the Kulaokahua continuation of King Street, attention is attracted to the premises just beyond the Catholic cemetery, the property of Mr. C. P. Ward. The lot consists of some thirty acres, and is thickly planted with algaroba and, in rows, there are some seven thousand thrifty young cocoanut trees. . . .The algarobas will certainly be valuable as firewood, and the cocoanuts alone will in a few years produce a handsome income. The property is well watered by means of pumps driven by windmills, there being an inexhaustible supply of water a few feet below the surface of the plains.

Five years later Ward built a homestead on the land. He had been dead more than twenty years when the property, by then known as the "Old Plantation" and lived on by his widow Victoria Ward and their children, was described in a 1901 *Paradise of the Pacific* article as "Now one vast cocoanut grove, containing upwards of 2,000 trees. . . . It is the largest collection of cocoanut palms in Hawaii and must yield nearly 100,000 nuts a year."

3.2.2.3 Disease

Hansen's Disease (leprosy) was first reported in 1840, and first definitively identified in 1853. During the next 25 years (1853-1878), there were 160 cases per year (about 4000 total), 80 cases per year for the next 50 years (1878-1928; about 4000 total), steadily decreasing to 60 cases a year in 1931, and 20 cases a year by 1951 (Arnold 1956:317). In 1865, a receiving hospital in Kalihi was set up, and the first patients were sent to the Kalaupapa colony on Moloka‘i. In 1881, a branch hospital or receiving station for cases of Hansen's Disease was opened in Kaka‘ako, in a block now bound by Ala Moana, Auahi, Coral, and Keawe Streets (west of the project area)

(Griffin et al. 1987:55). This land, at a spot called “Fisherman’s Point,” had been donated by Princess Ruth Keelikolani (*Hawaiian Gazette*, September 14, 1881). In 1888, the Hawaii Board of Health decided to close the branch, moving the receiving station to Kalihi, and determined that “The buildings at Kakakao should be entirely removed” (Hanley and Bushnell 1980:275). However, Thrum (1896:101) reports that victims of the cholera epidemic of 1895 were treated at the Kaka‘ako Hospital, so the buildings must have remained or been rebuilt.

In the Kaka‘ako area during the 1853 smallpox epidemic, patients were isolated at a temporary quarantine camp, a hospital was set up (Thrum 1896:98), and victims of the disease were buried at the Honouakaha Cemetery near the modern junction of Quinn Lane and South Street (Griffin et al. 1987:13).

In 1899, the first case of bubonic plague was identified in Hawai‘i and spread rapidly through the crowded tenements of Chinatown. The government decided that the best way to eradicate the disease was through “controlled burning” of the wooden buildings. Infected patients were moved to a quarantine camp at Kaka‘ako. Some people whose homes were burned (not necessarily patients) were housed at the barracks of the Kaka‘ako Rifle Range, and their belongings were stored in the cellars of Kaumakapili Church. On January 20, a fire was set in Block 15 between Kaumakapili Church and Nu‘uanu Avenue, which quickly got out of control. No one was killed in the fire, but much of Chinatown was destroyed. Many people were homeless and bereft of all belongings, which were lost when Kaumakapili Church burned to the ground (Iwamoto 1969:122-124, 130-131).

Before new immigrants could travel to their new homes at the sugar plantations, they first had to be examined by doctors to check for disease. An immigration station was established in 1893 on Allen Street near downtown Honolulu, but it was moved to the Kaka‘ako area in 1905. The station was built on mud flats resting on a pile foundation and was connected to the shoreline by two bridges. One room of the station was dedicated to the marriage between Japanese picture brides to their new husbands, who had arrived previously (University of Hawai‘i 1978:A-11).

3.2.2.4 Military Works at Kaka‘ako, Ka‘ākaukukui, and Kukuluāe‘o

In 1887, a secret organization called the Hawaiian League was formed to push for reform in the government of King Kalākaua. The men wanted to take away much of Kalākaua’s power and form a constitutional monarchy, with the Hawaiian king a mere figurehead. The main power would reside in a new cabinet, dominated by the members of the Hawaiian League, who were mainly *haole* (non-native Hawaiian) businessmen.

In 1884, a volunteer military company called the Honolulu Rifles was organized. In its first few years it operated mainly for drill exhibitions, often attended by Kalākaua himself, but it gradually became the military arm of the Hawaiian League. Pressured by the Hawaiian League, with the added threat of the Honolulu Rifles, Kalākaua dismissed his cabinet in 1887, signed a new constitution, and established the Reform Government. An insurrection to the new reform government, led by Robert Wilcox, was attempted in 1889. A supporter of Queen Liliu’okalani for the throne, he organized a volunteer militia, mainly Hawaiians or part-Hawaiians, called the Kamehameha Rifle Association. On July 30, they marched on ‘Iolani Palace, demanding that Kalākaua abrogate the 1887 constitution. The king was not at the palace, and Wilcox’s militia was soon boxed in on a structure in the palace yard. They came under fire when the Honolulu

Rifles arrived at the palace and eventually surrendered to government forces (Kuykendall 1967:347-352, 426-428).

Although the Honolulu Rifles had been officially disbanded in 1890, many of its former members became a part of the voluntary military force for the Committee of Public Safety, which was instrumental in the overthrow of the Hawaiian monarch, Queen Liliu‘okalani, in 1893 (Judd 1971:160). Many members of these early volunteer militias also joined the National Guard of Hawaii during the years of the Hawaiian Republic, which later became the U.S. National Guard after annexation.

An 1893 map of Kewalo by Walter E. Wall (Figure 21) shows a narrow section of land labeled as the "Honolulu Rifle Assoc." This land section was probably chosen for target practice based on the absence of any habitations in the area. The narrow portion is crossed by targets with the width of the strip noted as 200 yards. This rifle range was in the Kukuluāe‘o portion of the Victoria Ward Estate and is located to the west of the project area. The Honolulu Rifle Association was organized in 1885, with J. Brodie, C. H. Nicoll, and J. H. Fisher as the officers (Thrum 1886a:98). J. H. Fisher was also the commander of Company C of the Honolulu Rifles in 1887 (Adler and Barratt 1973:162). It is not clear if these are two separate organizations or if they are two organizations with overlapping members. This rifle range may have been used by the National Guard of Hawaii in 1893, as mentioned by Judd (1971:187):

> There was considerable emphasis on practice firing [in the National Guard of Hawaii]. . . . A 100 yard rifle range was constructed behind Iolani Palace Barracks which was not only convenient for use but the length of the range approximated the firing distance envisioned for the defense of the government buildings. Accuracy increased from 43% to 57% in the first two weeks of use. (The noise of rifle firing disturbed and alarmed the downtown citizenry, three months later all firing was conducted at a 200 yard range built at the Kaka‘ako Battery.)

During the monarchy, the point at Kaka‘ako was the location for a battery, with three cannons used to salute visiting naval vessels, which responded with their own cannon salutes. Other saluting batteries were at the top of Punchbowl Crater and at the Honolulu Fort (Dukas 2004:163). The *Hawaiian Annual and Almanac for 1887* (Thrum 1886b:37) reported that $4,500 had been spent to build the battery, which was used for gun salutes up to at least the end of the monarchy in 1893 (Judd 1975:57). The location of the battery is shown on an 1887 map of Honolulu by Walter E. Wall (Figure 17).

3.2.3 Twentieth Century

3.2.3.1 Early Twentieth Century Land Reclamation Projects

3.2.3.1.1 Kaka‘ako Reclamation

The first efforts to deepen Honolulu Harbor were made in the 1840s. The idea to use the dredged material (composed of sand and crushed coral) to fill in low-lying lands, was quickly adopted. Between 1857 and 1870, the "Esplanade" between Fort and Alakea Streets was created on 22 acres of filled-in former reef and tideland. By 1874, Sand (Quarantine) Island, site of the first immigration station, had been created over "reclaimed" land on reefs.

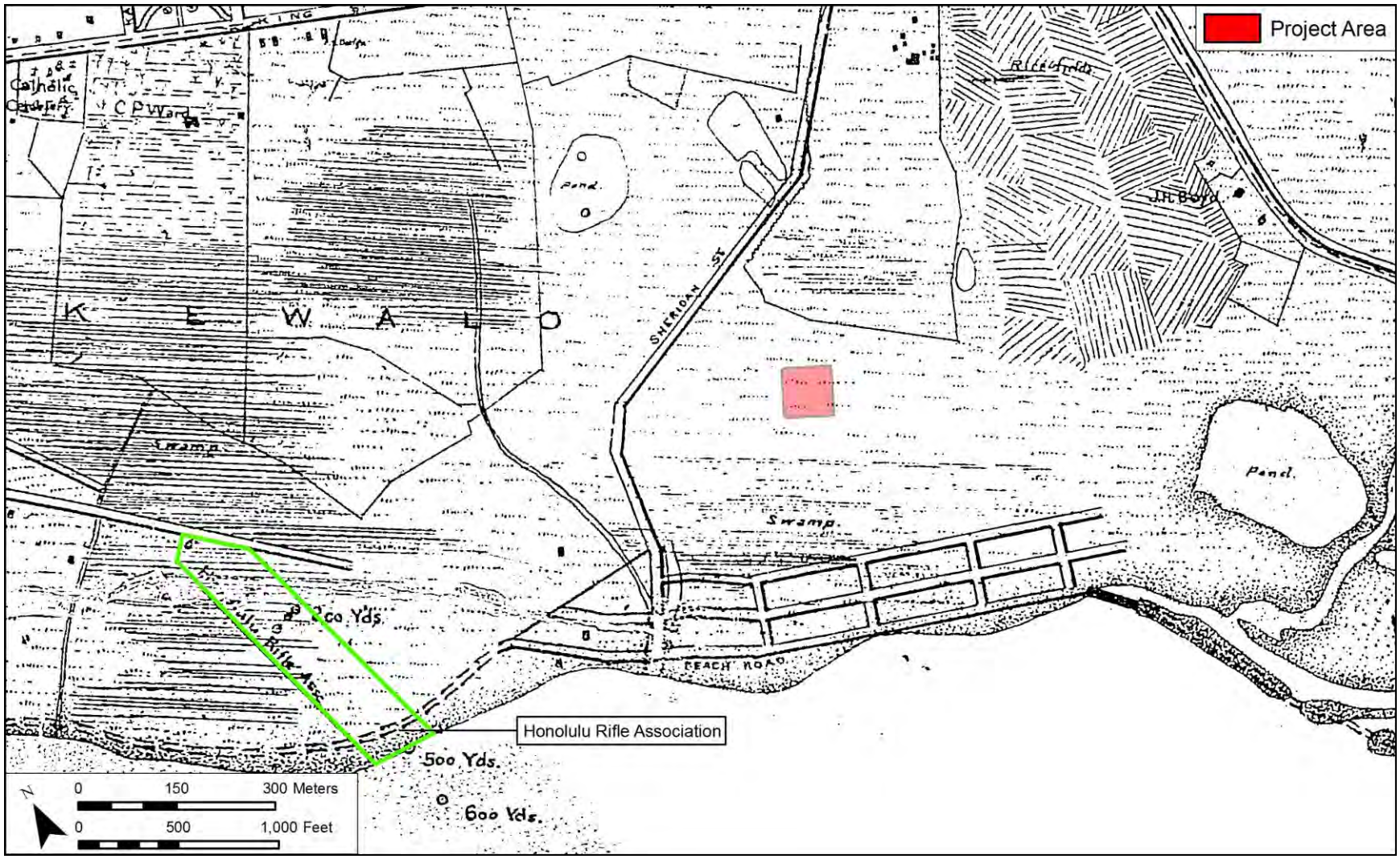


Figure 21. 1893 map of Honolulu (portion) by Walter E. Wall, showing project area and “Honolulu Rifle Assoc.” 200-yard rifle range; also note area *makai* of project area labeled “swamp”

By the 1880s, filling-in of the mud flats, marshes, and salt ponds in the Kaka‘ako and Kewalo areas had begun. This filling was pushed by three separate but overlapping improvement justifications. The first directive or justification was for the construction of new roads and the improvement of older roads by raising the grade so the improvements would not be washed away by flooding during heavy rains. A report by the Hawaii Board of Health (1908:80) noted:

> I beg to call attention to the built-up section of Kewalo, “Kaka‘ako,” where extensive street improvements, filling and grading have been done. This, no doubt, is greatly appreciated and desirable to the property owners of that locality, but from a sanitary point of view is dangerous, inasmuch as no provision has been made to drain the improved section, on which have been erected neat cottages occupied for the greater part by Hawaiian and Portuguese families, now being from one to three feet below the street surface, and which will be entirely flooded during the rainy season. Unless this is remedied this locality will be susceptible to an outbreak [of cholera] such as we experienced in the past.

As mentioned in the above section, the justification for filling in low lying areas most frequently cited was driven by public health and sanitation, the desire to clean up rivers and ponds that were reservoirs for diseases (such as cholera) and that acted as breeding places for rats and mosquitoes. The first areas to be filled in were those areas closest to Honolulu Town, then out towards Kaka‘ako (Griffin et al. 1987:13). The first fill material may have been set down for the Kaka‘ako Leper Branch Hospital (between Coral and Keawe Streets), which had been built on a salt marsh. Laborers were hired to “haul in wagonloads of rubble and earth to fill up that end of the marsh” (Hanley and Bushnell 1980:113). In 1903, five more lots in Kewalo, on Lanaiwai, Queen, and Cooke Streets, were condemned and ordered to be filled (Hawaii Board of Health 1903:6).

Although public health and safety were prominently cited, according to Nakamura (1979), the main justification for filling in Honolulu, Kewalo, and then Waikīkī lands was to provide more room for residential subdivisions, industrial areas, and finally tourist resorts. In the early part of the twentieth century, Kaka‘ako was becoming a prime spot for large industrial complexes, such as iron works, lumber yards, and draying companies, which needed large spaces for their stables, feed lots, and wagon sheds. In 1900, the Honolulu Iron Works (which produced most of the large equipment for the Hawaiian plantation sugar mills) moved from their old location at Queen and Merchant Streets near downtown Honolulu to the shore at Kaka’ako, on land that had been filled from dredged material during the deepening of Honolulu Harbor (Thrum 1900:172). Other businesses soon followed. Thrum (1901:168) noted:

> The Union Feed Co. is another concern whose business has outgrown the limits of its old location, corner of Queen and Edinburgh streets. Like the Iron Works Co. they have secured spacious premises at Kakaako, erecting buildings specially adapted to the needs of their extensive business at the corner of Ala Moana (Ocean Road) and South Street.

Private enterprises were not the only new occupants of Kaka‘ako. A sewer pumping station, an immigrant station, and a garbage incinerator were also built on “reclaimed land.” In 1900, a pond surrounded by a racing bicycle track (called the Cyclomere and built in 1897) in the Kewalo area was filled. This was located on the *makai* side of Kapi‘olani Avenue between

Cooke Street and Ward Avenue. In 1904, the area around South Street from King to Queen Streets was filled in. The Hawaii Department of Public Works (1904) reported “considerable filling [was] required” for the extension of Queen Street, from South Street to Ward Avenue, which would “greatly relieve the district of Kewalo in the wet season.”

3.2.3.1.2 Kewalo Reclamation Project

Although the Board of Health could condemn a property and the Department of Public Works could then fill in the land, the process was rather arbitrary and piecemeal. In 1910, after an epidemic of bubonic plague, the Board of Health condemned a large section of Kewalo, consisting of 140 land parcels (including areas once known as Kukuluāe‘o and Ka‘ākaukukui), which contained numerous ponds (Hawaii Department of Public Works 1914:196).

The superintendent then sent a letter to all of the property owners, informing them that they must fill in the lands to the grade of the street level within sixty days. Only a few of the land owners complied and filled their land with a variety of materials. Most of the land owners did not comply with this notice, and, in 1912, the bid to fill in the land was given to Lord-Young Engineering Co. to fill in the land with “sand, coral and material dredged from the harbor or reef and the depositing of the same upon the land by the hydraulic method” (Hawaii Reports 1915:331). The recalcitrant land owners sued to stop the work, and in the suit, the method of hydraulic filling is described:

> By this [hydraulic] method the material dredged is carried in suspension or by the influence of water which is forced through large pipes and laid upon the lands and intervening streets, and afterwards is distributed and leveled, the water having drained off through ditches provided for the purpose. The work is done in large sections around which bulkheads have been constructed. A section can be filled in about thirty days, the dredger working about fifteen hours per day. And in about two months after a section has been filled the ground will have dried out so as to be fit for use as before. . . . The character of the material varies from very fine sand to coarse bits of coral. . .
>
> It appears in evidence that though the method employed the finest of the material which is carried upon the land settles when the water which transports it becomes quiet and as the water runs off a sludge or mud remains which forms a strata more or less impervious to water. This strata, however, is covered by the coarser and more porous material. . . . It appears that by mixing in to a depth of a few inches ordinary soil small plants will grow without difficulty. . . . The character of the locality must be considered. It is not adapted to agriculture, but is suited more particularly to such business purposes as it now partly is used for, such as stables, laundries, warehouses, mills, etc., and for cottages with small yards for the accommodation of laborers engaged in connection therewith. Upon the whole, we are of the opinion that the material proposed to be used in the fill-in of the lands of the complainants is not of a character as should be held to be improper for any of the reasons urged [Hawaii Reports 1914:351].

The expense of the suit did manage to shut down operations planned for the area from Ward Street to Waikīkī (Thrum 1915:159-160). This land was mainly owned by the Bishop Estate,

who leased the land to small farmers growing taro and rice and raising ducks in the ponds. In 1916, the Bishop Estate announced that as soon as their present tenant leases expired, they planned to fill the lands and divide them into residence and business lots (Larrison 1916:148-149).

The first land to be filled in was a portion of the Ward Estate Kukuluāe‘o property west of Ward Avenue, completely filled in by June of 1913. In July, “25,000 cubic yards of sand and ground-up coral were deposited on the Bishop Estate in the vicinity of Ala Moana and Keawe street, the reason for shifting operations to this part of the district being that the Hawaiian Sugar Planter’s Association had erected a reinforced concrete building there and wished to have the lot brought to grade” (Hawaii Department of Public Works 1914:198). By August, the rest of the Ward Kukuluāe‘o lands west of Ward Avenue had been completely filled, and by February 1914, all of the land from South to Ward Streets, and from Ala Moana Boulevard to Queen Street had been filled. In 1914, the entire:

> . . . locality bounded by King street, Ward avenue, Ala Moana and South street, comprising a total area of about two hundred acres, had been found by the board of health of the Territory to be deleterious to the public health in consequence of being low and below ‘the established grades of the street nearest thereto’ and at times covered or partly covered by water and improperly drained and incapable by reasonable expenditure of effectual drainage, and that said lands were in an insanitary and dangerous condition [Hawaii Reports 1915:329].

3.2.3.1.3 Waikīkī Reclamation Project

It was during the 1920s that southeast O‘ahu would be transformed when the construction of the Ala Wai Drainage Canal—begun in 1921 and completed eight years later—resulted in the draining and filling in of the remaining ponds and irrigated fields of Honolulu and Waikīkī. The canal was one element of a plan to urbanize Waikīkī and the surrounding districts, first conceived in 1906. The final result was a “canal three miles long, with an average depth of twenty-five feet and a breadth of two hundred fifty feet” (*Honolulu Star Advertiser*, 17 October 1928:2, 16).

The first action was to dig a canal parallel to the coast along Waikīkī Beach. The dredged material was placed on adjacent properties from McCully Street to Kapi‘olani Park. This action affected several private landowners, including the Bishop Estate and the Booth Estate. The second action was to dredge a canal from the beach towards the reef. The material dredged was pumped to the new McKinley High School site, an area of former large ponds adjacent to the eastern boundary of the *mauka* portion of the Ward Estate (Hawaii Governor 1922:49-50). Additional dredged material was used to fill the area *makai* of the school grounds in 1930 (Hawaii Governor 1930:74).

The Hawaiian Dredging Company won the initial bid for dredging associated with the construction of the Ala Wai Canal (Thrum 1923a:66). This company was founded in 1902 by Walter Dillingham, also president of the Oahu Land and Railway Company. Several claims were made subsequently against the dredging company, including compensation for destroyed crops and livestock by farmers. For instance, a Chinese tenant farmer named Chang Fow, leasing lands in Waikīkī from the Bishop Trust Company, wrote a letter of complaint indicating that the salt

water that leached into his lands as a result of the dredging of the canal had devastated his fishponds and stocks of ducks and chickens (letter from Chang Fow to the Bishop Trust Company, 23 May 1922, cited in Nakamura 1979:100-101). His claims, along with those of other residents of the area, give an impression of the continuing agricultural subsistence base in Waikīkī that lasted into the 1920s and rapidly became a thing of the past.

In Nakamura's (1979:113) *The Story of Waikīkī and the Reclamation Project*, he writes that this land "reclamation" program changed the ecology of Waikīkī from a once viable and important agriculture and aquaculture center. . .destroyed by profit-seeking capitalist entrepreneurs. . .under the subterfuge of "drainage" and "sanitation." Many of the original property owners lost their land or had serious damage to their property as a result of the reclamation activities and/or the costly expense for the mandatory filling in of their properties.

3.2.3.2 Kewalo Basin Dredging

In 1919, the Hawaii Government appropriated $130,000 to improve the small harbor of Kewalo for the aim of "harbor extension in that it will be made to serve the fishing and other small craft, to the relief of Honolulu harbor proper" (Thrum 1919:147) (Figure 22 and Figure 23). As the area chosen for the harbor area was adjacent to several lumber yards, the basin was initially made to provide docking for lumber schooners, but by the time the wharf was completed in 1926, this import business had faded, so the harbor was used mainly by commercial fishermen. The dredged material from the basin was used to fill a portion of the Bishop Estate on the western edge of Waikīkī and some of the Ward Estate in the coastal area east of Ward Avenue (U.S. Department of the Interior 1920:52). In 1941, the basin was dredged and expanded to its current 55 acres. In 1955, dredged material was placed along the *makai* side to form an 8-acre land section protected by a revetment.

3.2.3.3 Urban Development

In the beginning of the twentieth century, the Kaka‘ako/Kewalo area was used as a place for sewage treatment and garbage burning, finally becoming an area for cheap housing and commercial industries (Griffin et al. 1987:13). During the first half of the twentieth century, both rice fields and marshlands would be eliminated as Kaka‘ako and Kewalo lands were filled to accommodate the expanding urbanization of Honolulu. The 1887 map by Walter E. Wall (see Figure 17) shows a corridor of streets extending diagonally from Honolulu Town, including Queen Street, which was planned to connect to the beach road to Waikīkī. The Queen Street alignment appears to follow the route of the traditional trail from Honolulu to Waikīkī described by John Papa ‘Ī‘ī. This trail likely ran on a sand berm raised above the surrounding marshlands and coral flats. The location of the northern Kaka‘ako boundary adjacent to the trail/Queen Street corridor suggests that at least the *makai* portion likely comprised a sandy dryland environment in the traditional Hawaiian landscape.

A 1919 U.S. War Department map (Figure 24) shows the grids of streets extending out from downtown Honolulu and encroaching upon the region that includes the project area, which is still undeveloped. Residences are shown mainly to the north and west. The current project area includes a house site and is surrounded by other house sites and a network of trails or roads. These features suggest that the project area and its environs may have comprised a dryland environment above the surrounding marshlands indicated on the 1884 map.

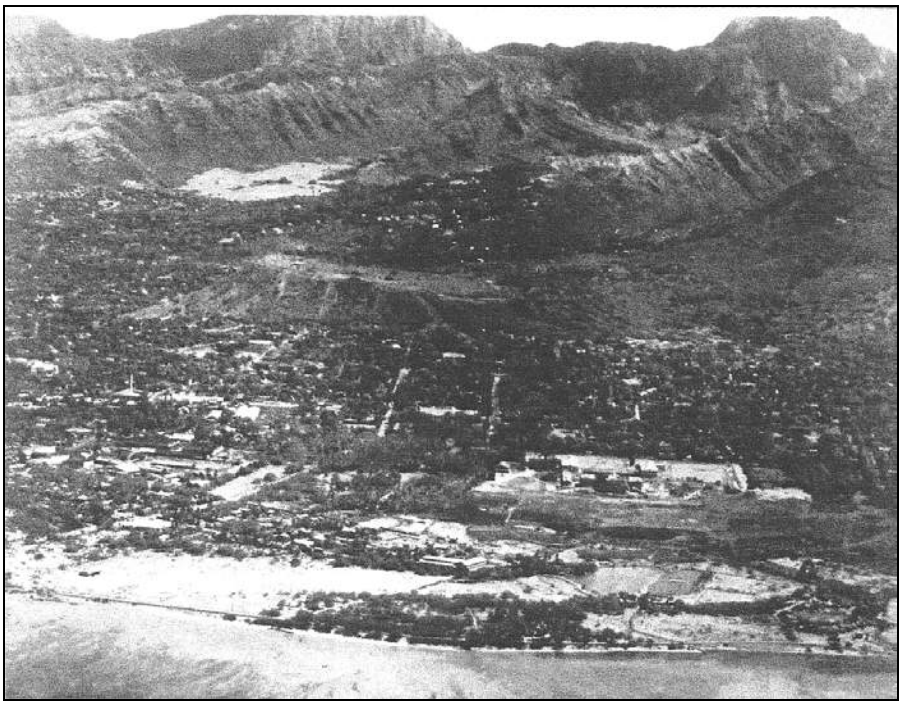


Figure 22. Kewalo Basin (left foreground), ca. 1930 (Hawai‘i State Archives)

Figure 23. 1950s photograph of dredge boats between Ala Wai Yacht Club (right foreground) and Kewalo Basin (left background); also note coral fill area (white) on land where the future Ala Moana Shopping Center would be built (Hawai‘i State Archives)

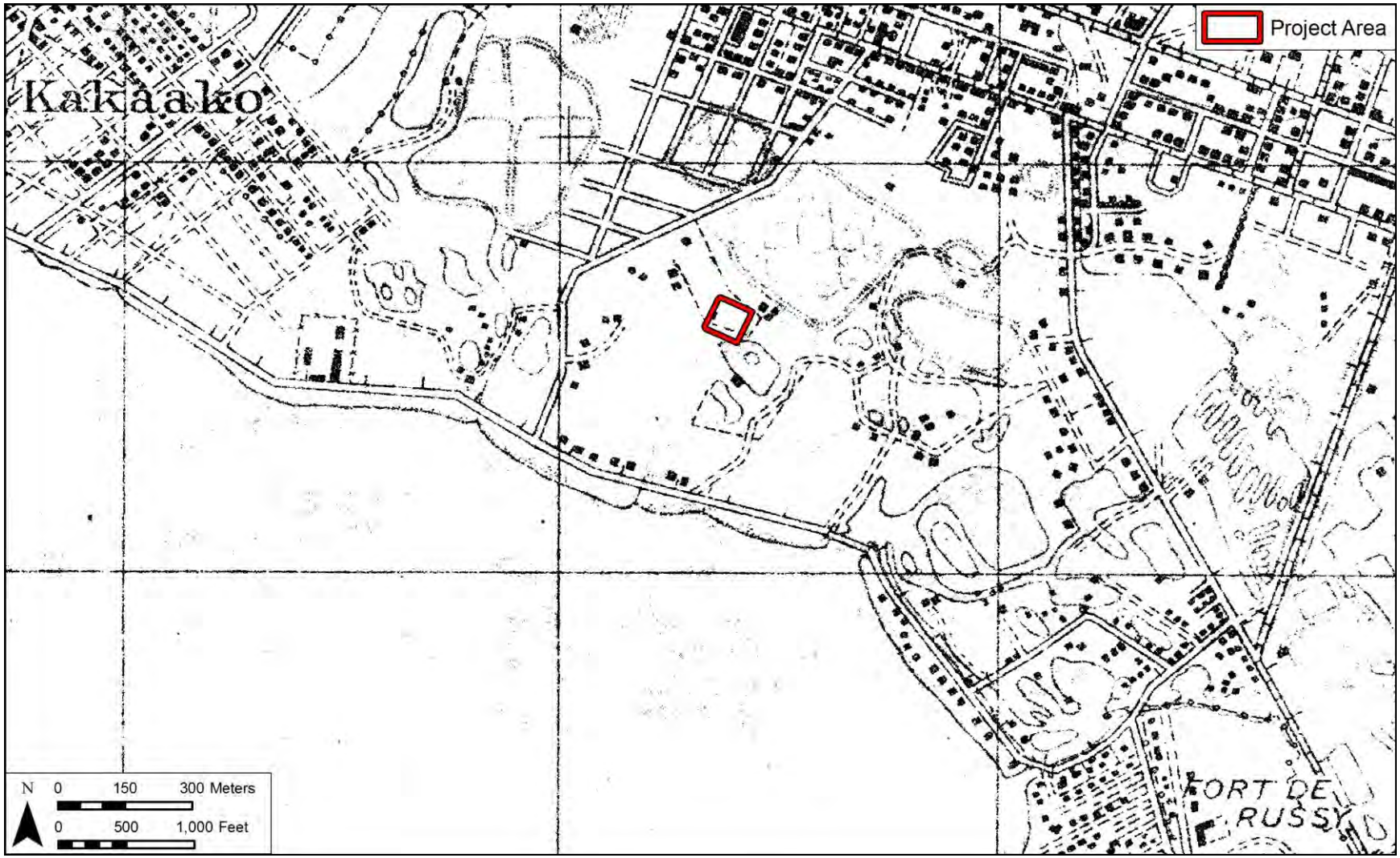


Figure 24. 1919 U.S. War Department Fire Control Map of O‘ahu, Honolulu Quadrangle showing project area and street grids

The 1919 map also shows that there are still many ponds in the eastern part of Kaka‘ako, especially at the future site of McKinley High School and the area along the coast, which will be developed into Ala Moana Shopping Center and Park. In the 1920s, on the east side of Kewalo Basin, poor people, mainly native Hawaiians, congregated at a camp called “Blue Pond,” named after a large and deep pond near the shore. On the west side of the basin, in the Ka‘ākaukukui area (shortened to ‘Ākaukukui), they lived in shacks and sturdy houses in an area called “Squattersville,” named because they lived there illegally—on government land without authorization. This camp was generally around Olomehani Street near the shore, protected from the waves by a long sea wall. There were around 700 Hawaiians and part-Hawaiians living in these two camps in the mid-1920s, but by 1926 they were all gone. The government evicted the families and razed the houses (Clark 1977:6).

A 1927-28 U.S. Geological Survey map (Figure 25) illustrates that the eastern portion of Kaka‘ako is still undeveloped, with dotted lines showing unimproved or proposed streets. However, the land was inhabited more than is evident from this map. Kaka‘ako was one of the first residential areas for working class families, housing people working at the laundries, the harbor, the Honolulu Iron Works, the Honolulu Brewery, and truck drivers, seamen, and fishermen. The Ward family leased lands for camps, schools, playground, temples, and shrines located on their lands to the Japanese. In 1940, Kaka‘ako had a population of over 5,000 residents. Hawaiians, Portuguese, Chinese, and Japanese settled in camps based on their ethnic origins, but they came together for social and community functions.

Aerial photographs of the early 1930s indicate that the open areas of Kaka‘ako/Kewalo are in the process of being filled with material dredged from the Ala Wai Canal, Ala Moana Beach Park, and Kewalo Basin, and with material from the city incinerator at the Kewalo coastline (Figure 26 and Figure 27). A 1931 aerial photograph (Figure 26) shows large white areas that were recently covered with dredged material and crushed coral. The largest white section to the east of the project area is the future site of McKinley High School. In 1928, work began on Kapi‘olani Boulevard, commencing at the intersection of South and King Streets. By 1931 the boulevard had reached Sheridan Street. As shown in a 1933 photograph (Figure 27), paving of Kapi‘olani by then extended well past Sheridan Street. Both the 1931 and 1933 photographs show vegetation patterns along Kapi‘olani Boulevard in the vicinity of the project area that suggest that this section of Kewalo indeed comprised an original dryland environment amid surrounding marshlands and irrigated fields before the landfill operations of the twentieth century.

Subsequent photographs of the late 1940s and early 1950s (Figure 28 through Figure 30) show the project area cleared of all vegetation shown in the photographs from the 1930s. As indicated in a ca. 1946 photograph (Figure 28), the project area is clearly defined by Kapi‘olani Boulevard and the nascent alignment of Kona Street. Especially evident is the bare coral fill comprising the future Ala Moana Shopping Center property. The photograph suggests that the land between Kona Street and Kapi‘olani Boulevard may have resulted from a separate, less intensive landfill project. The land between Kona Street and Kapi‘olani Boulevard remains generally undeveloped. A 1948 aerial photograph (Figure 29) shows the project area filled with large warehouses, as well as the newly filled area for the Ala Moana Shopping Center. By 1952, however, as indicated by a subsequent aerial photograph (Figure 30), the lands between Kapi‘olani Boulevard and Kona Street are being developed and are occupied by low-rise

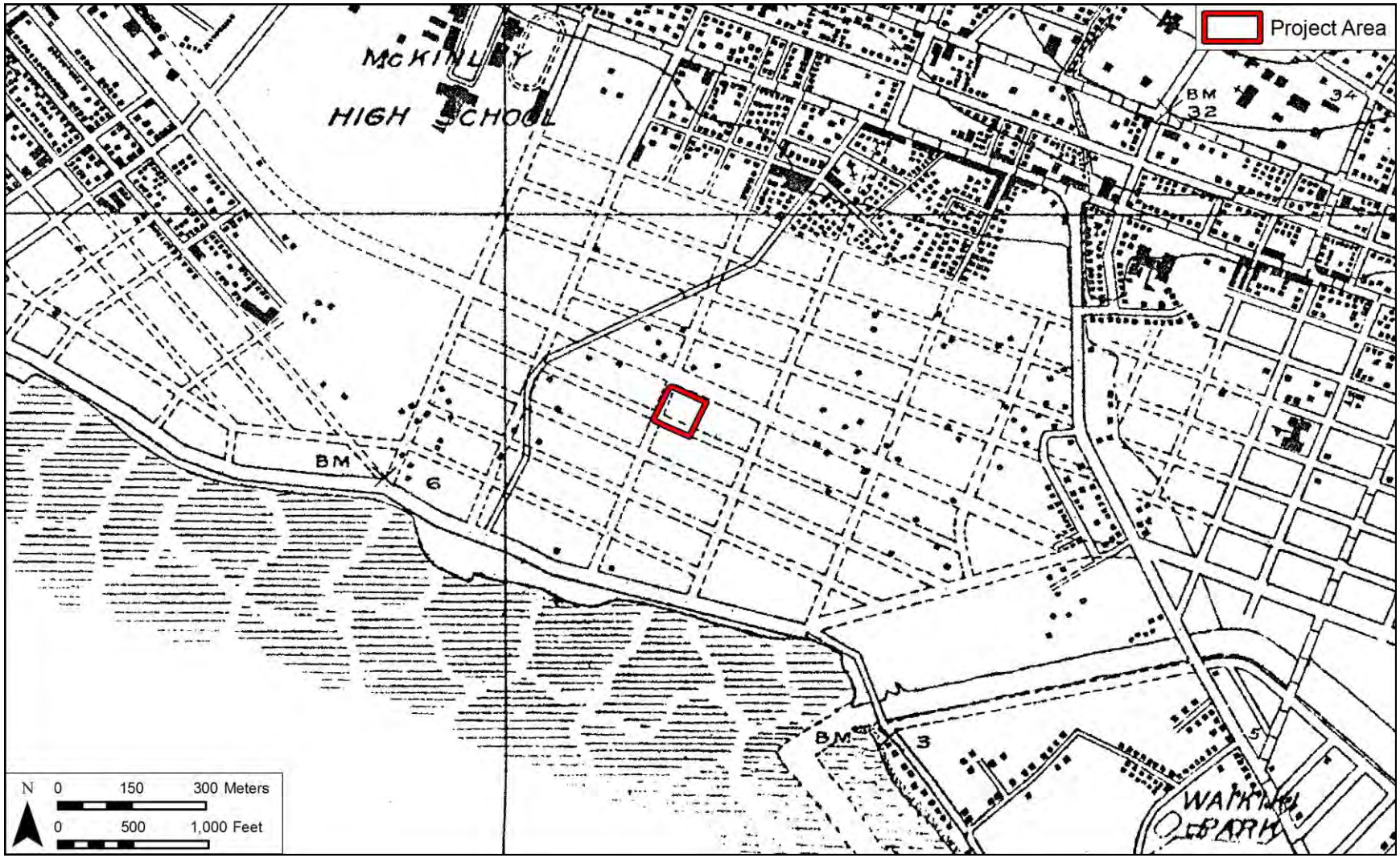


Figure 25. 1927-28 U.S. Geological Survey map, Honolulu Quadrangle (portion), showing project area and street grids

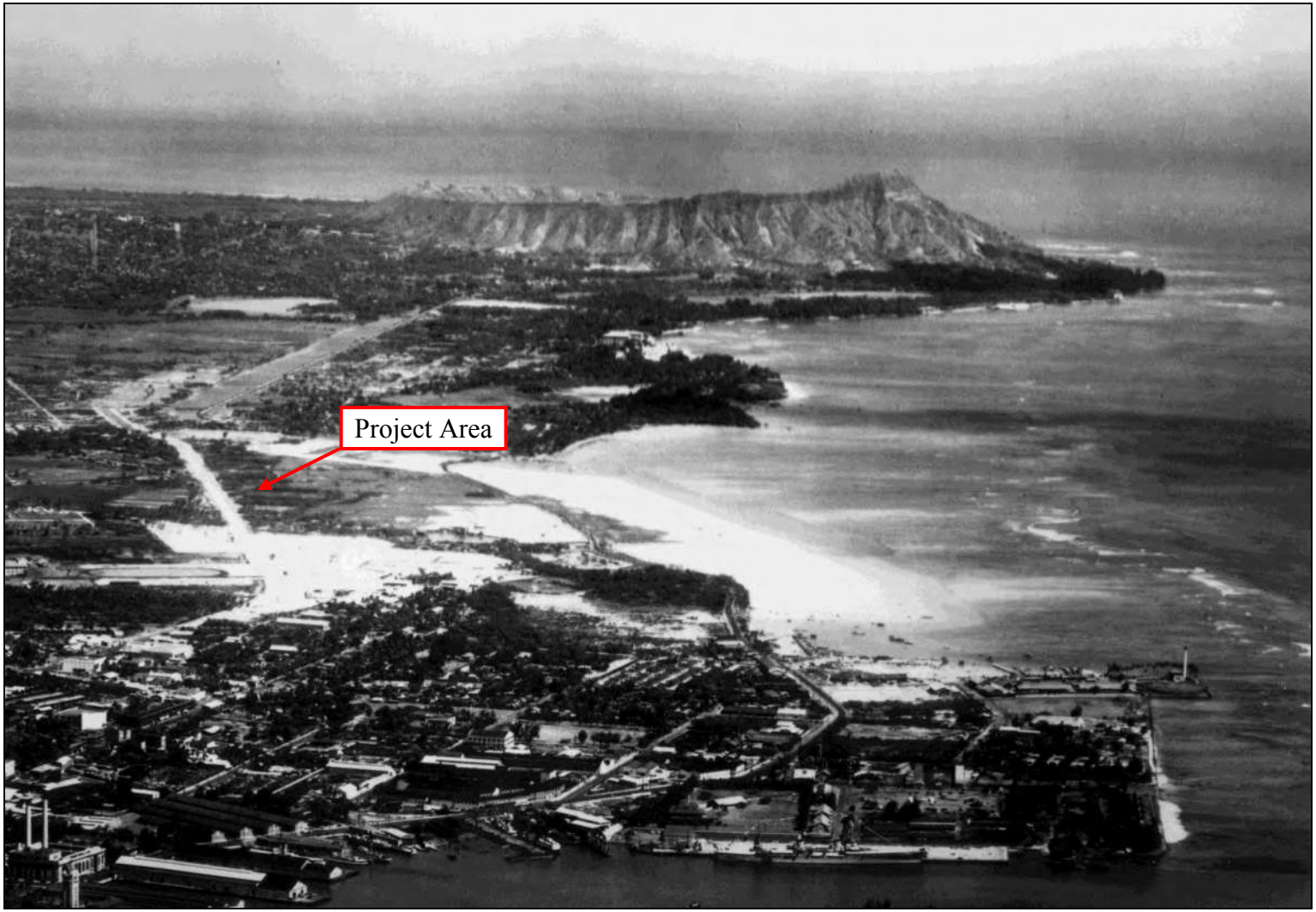


Figure 26. 1931 aerial photograph showing dredged materials (white crushed coral) used in the construction of Kapi‘olani Boulevard and used for fill in marshy areas of Honolulu and Waikīkī; the large area of crushed coral is the future site of McKinley High School, west of the project area (Hawai‘i State Archives)

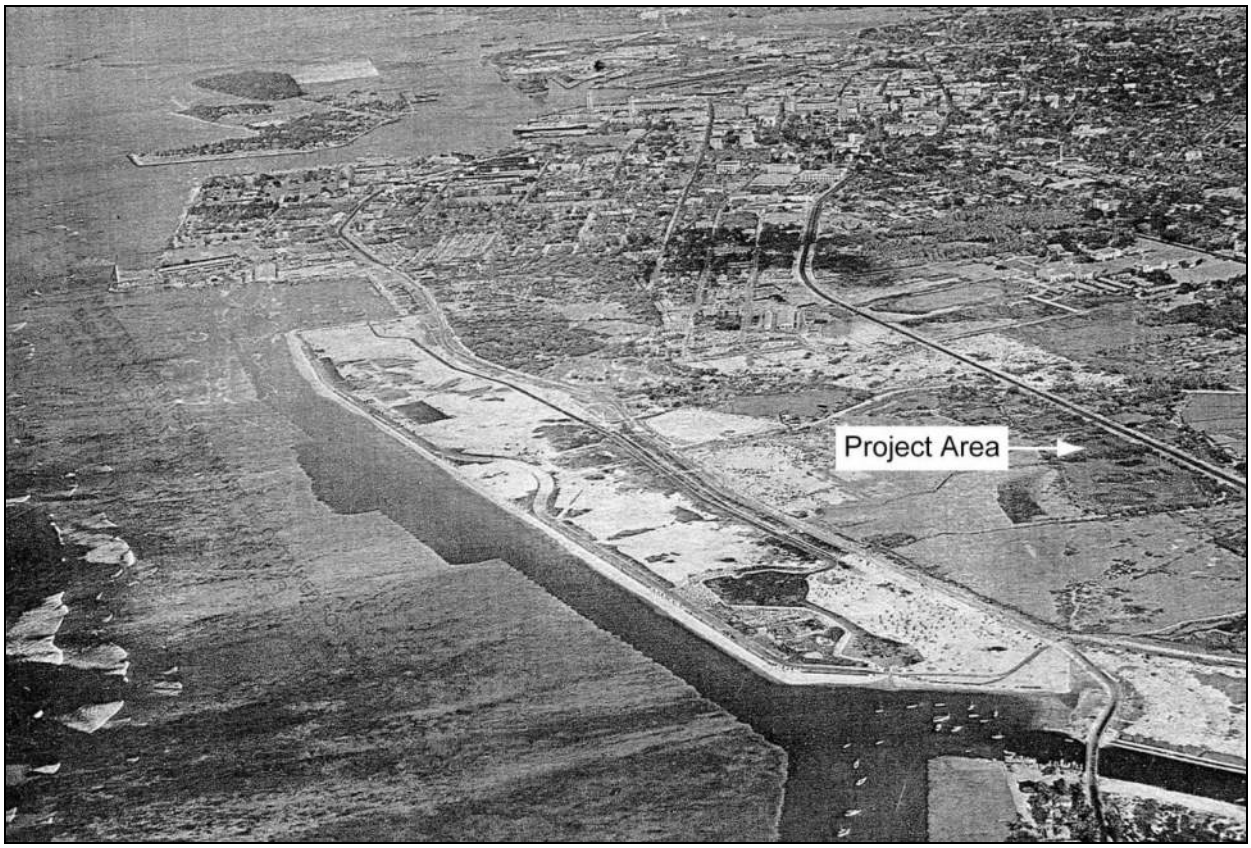


Figure 27. 1933 aerial photograph showing project area location

Figure 28. Ca. 1946 aerial photograph with location of project area indicated just north of the future site of Ala Moana Shopping Center

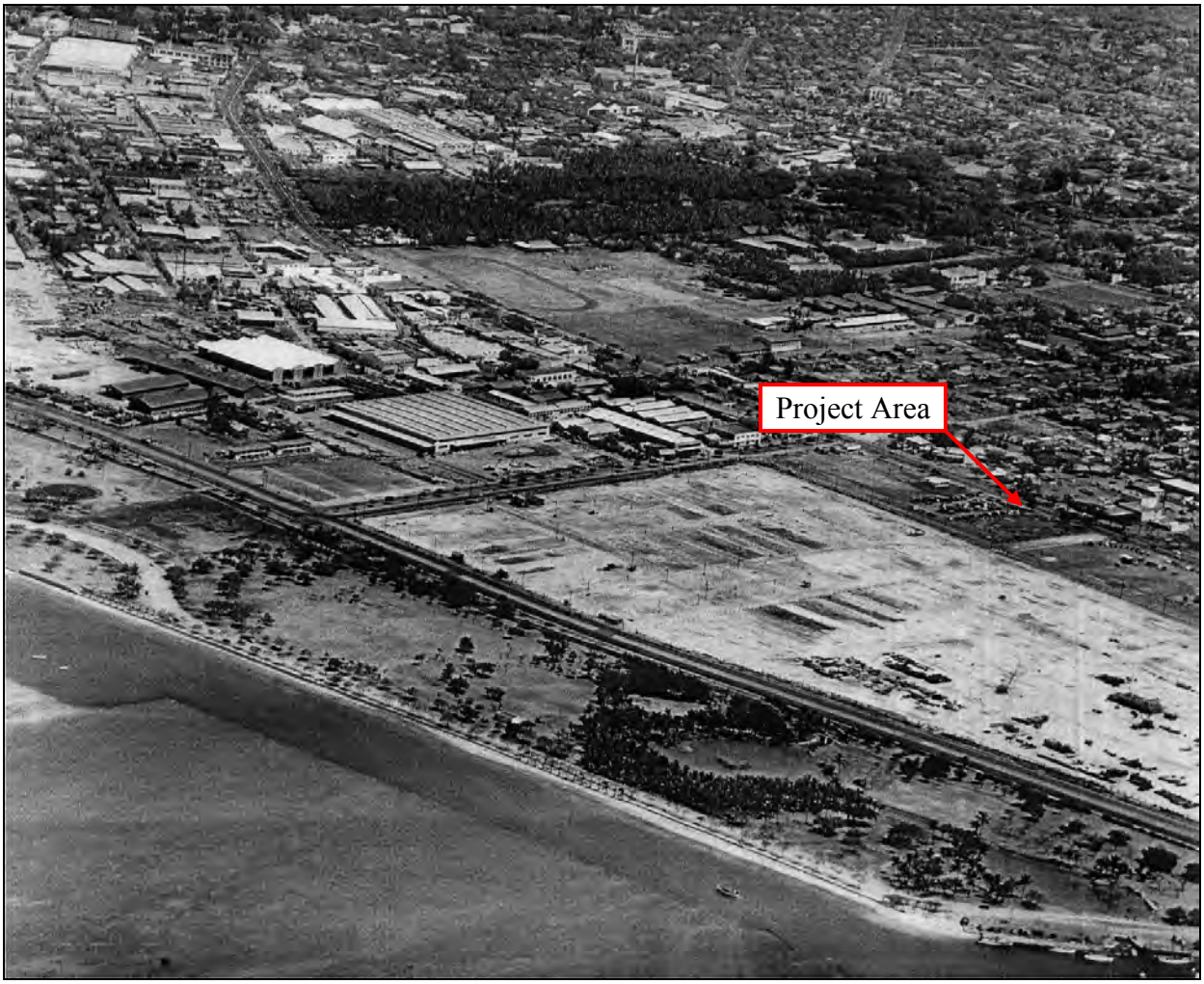


Figure 29. 1948 aerial photograph of the Kaka‘ako/Kewalo area showing large warehouses in the western portion and the future site of Ala Moana Shopping Center (the white block) on the right, south of the project area

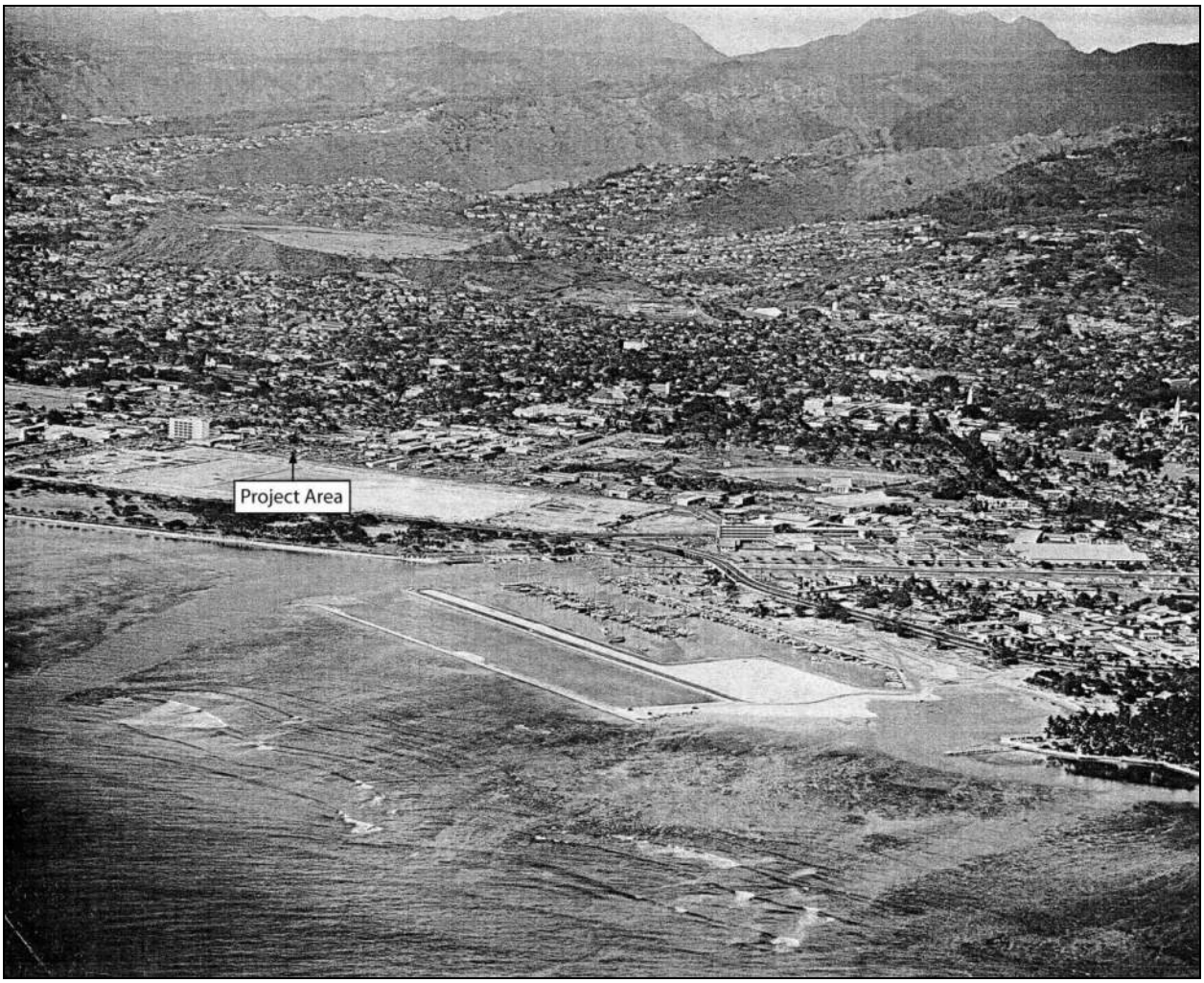


Figure 30. 1952 aerial photograph with project area location indicated

commercial buildings. However, it appears that no buildings had as yet been constructed within the project area itself by the mid-twentieth century.

After World War II, the Kaka‘ako/Kewalo area became increasingly industrialized, and residents moved out to the newer subdivisions away from Honolulu’s central area. A 1943 U.S. War Department map (Figure 31) shows the continued extension of streets grids extending out from downtown Honolulu and the less-developed nature of the area surrounding the project area. The map also shows the newly developed Kewalo Basin. The Kewalo Channel had been dredged in 1924 and the McFarlane Tuna Company (now Hawaiian Tuna Packers) built a shipyard there in 1929 for their fishermen’s “sampan fleet.” A new tuna cannery was built at the basin in 1933 and operated successfully; however, the entire cannery was taken over in 1941 by the military after the attack on Pearl Harbor. The cannery was converted to military use and used to make airplane gas tanks. Land in Kaka‘ako taken by the military was returned in 1946.

A 1953 Army Mapping Service map of O‘ahu (Figure 32) illustrates continued development within the Kaka‘ako area.

In summary, documentary evidence suggests that the project area, before being filled and graded toward the middle of the twentieth century to create the present land surface, comprised a portion of Kewalo that included habitation sites, taro *lo‘i*, and ponds situated amid the encompassing marshlands of the plain of Honolulu. The documentation suggests a more dryland environment than a ponded one. Based on the historic documentation, no named ponds were within the project area.

3.3 Previous Archaeological Research

The Kaka‘ako/Kewalo area contains historic properties of both pre-contact and post-contact origin. Most traditional Hawaiian surface structures had been demolished in the Kaka‘ako area in the vicinity of the project area by the time of the first scientific archaeological surveys (i.e., Smith 1989). McAllister (1933:80), in his report on the survey of O‘ahu sites conducted in the early 1930s, says of Honolulu, “Information regarding former sites within the present limits of Honolulu must come entirely from literary sources.” The Kaka‘ako/Kewalo area became a focus of archaeological work during the 1980s, impelled by the construction of local and federal government buildings and by state-planned redevelopment. Previous archaeological research in the vicinity of the project area is shown on Figure 33 and summarized in Table 2. The following is a summary of the archaeological studies.

3.3.1 Smith 1989

In 1989, four bone fragments were found by construction workers in a property (TMK 2-3-39:19) on the southeast corner of Kapi‘olani Boulevard and Pi‘ikoi Street. The find was reported to Marc Smith (1989) of the SHPD. Smith examined the bones and determined that only one was human; the remaining bones were pig bones. The human bone was a right tibia shaft fragment. The bone was temporarily taken to the Honolulu SHPD office and the site was given the designation of SIHP 50-80-14-4243.

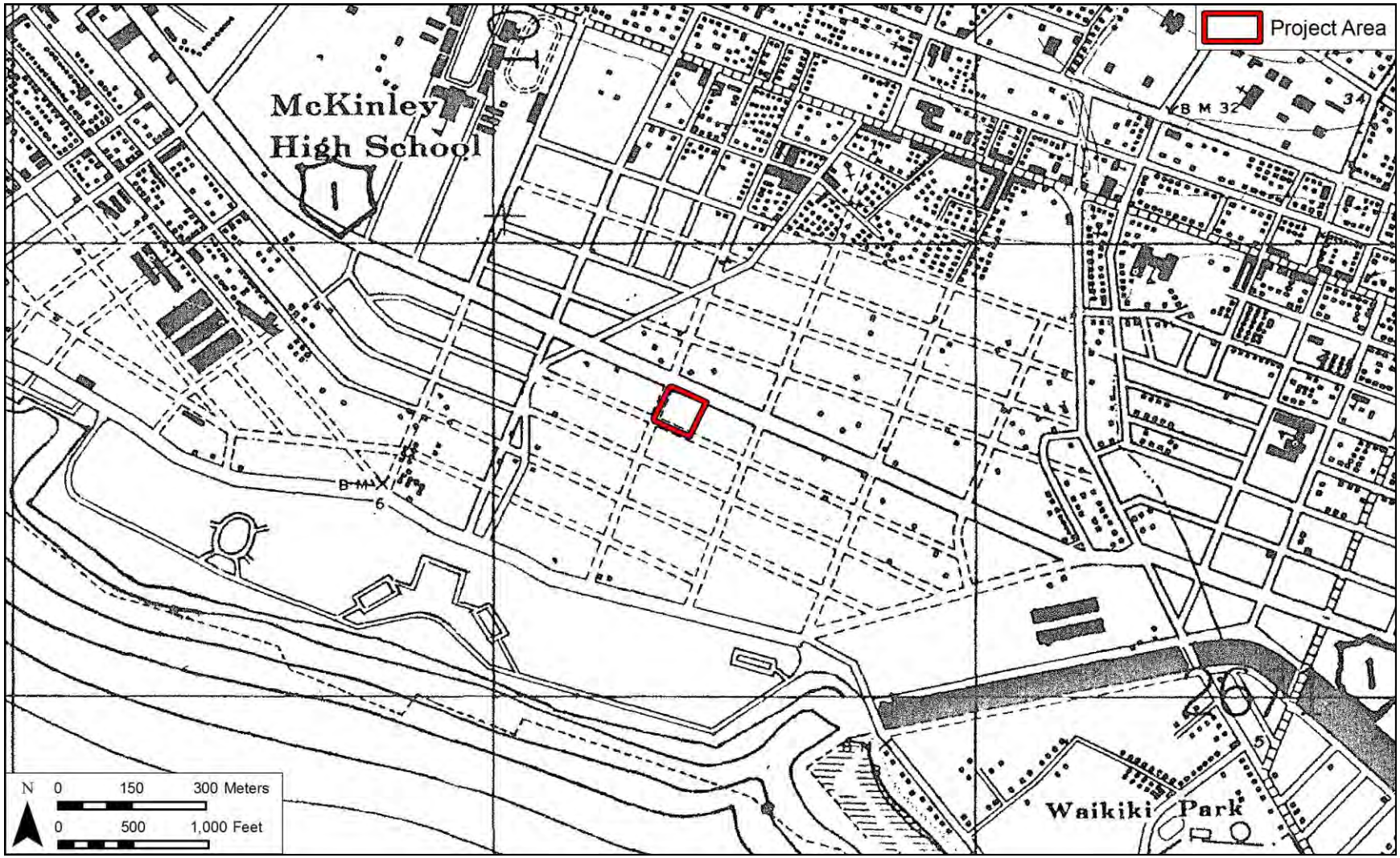


Figure 31. 1943 U.S. War Department map, Honolulu Quadrangle (portion) showing continued extension of street grids, the undeveloped land around the current project area, and the new Kewalo Basin

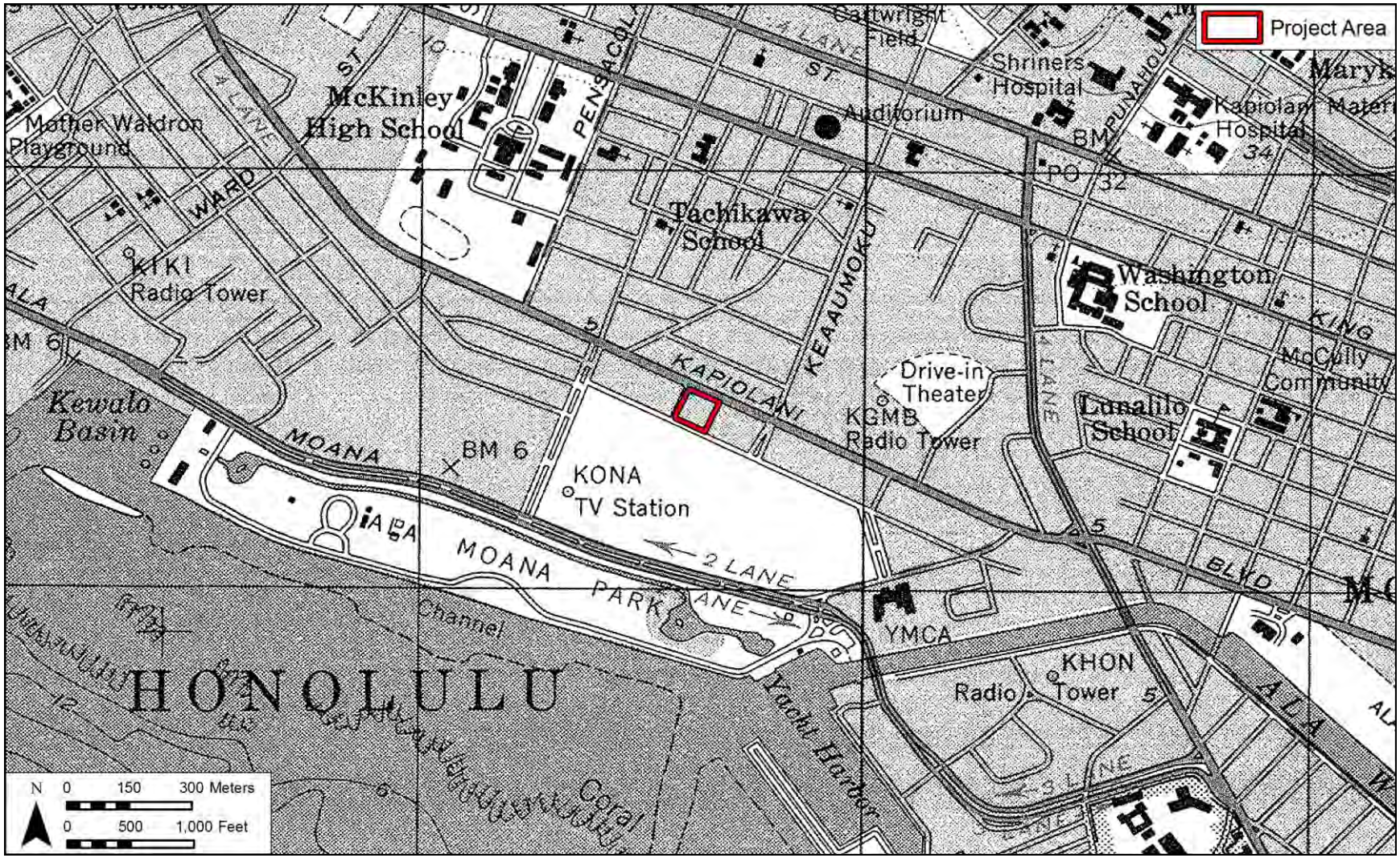


Figure 32. 1953 Army Mapping Service map of O‘ahu, Honolulu Quadrangle (portion), showing continued development of and improved roads in the Kaka‘ako District

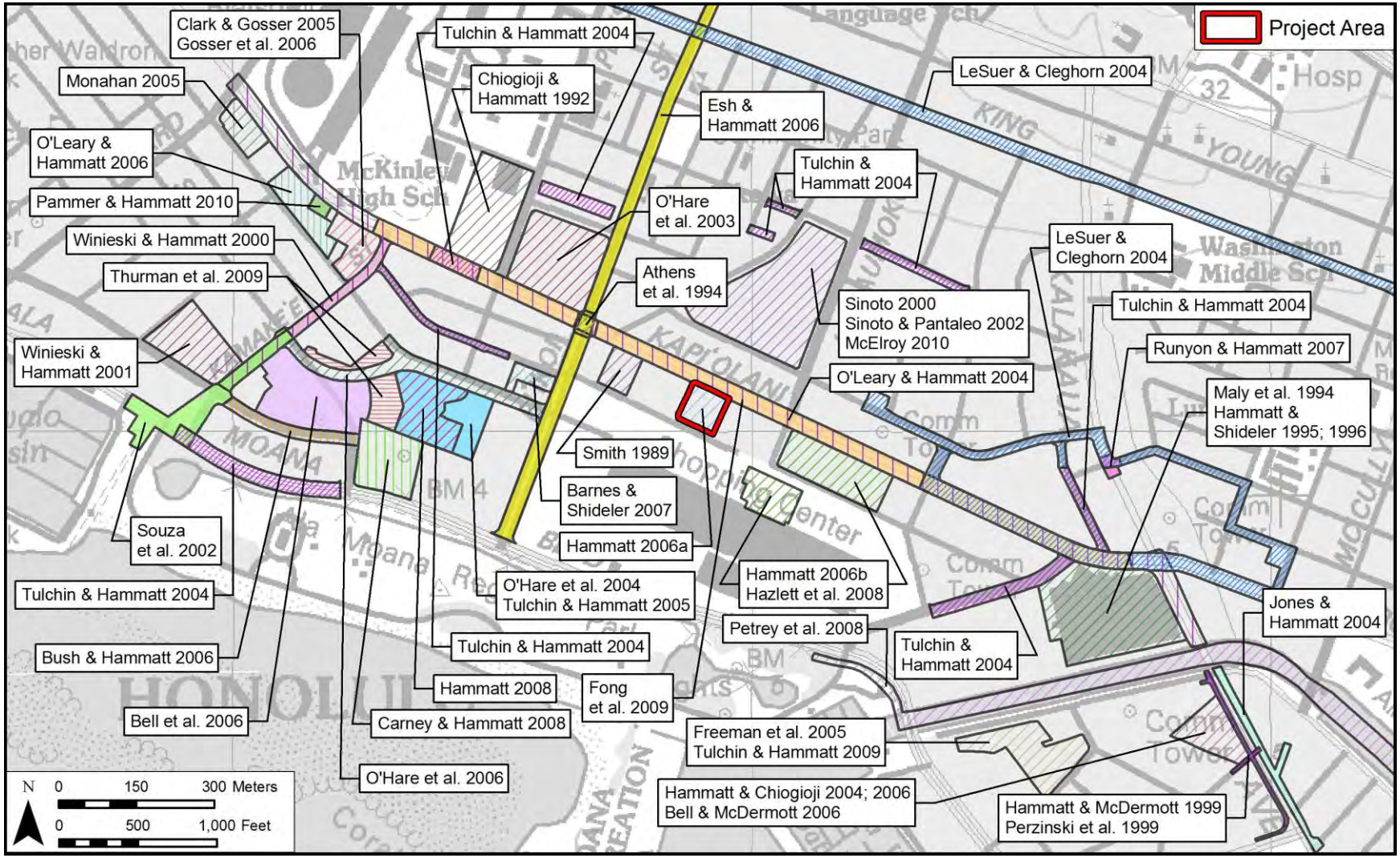


Figure 33. Portion of 1998 Honolulu U.S. Geological Survey 7.5-minute topographic quadrangle showing previous archaeological research in the vicinity of the present project area

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

Reference	Location	Nature of Study	Results (Sites 50-80-14-)
Smith 1989	1341 Kapi‘olani Ave.	State Parks response to inadvertent discovery of human remains	SIHP # -4243 (isolated long bone) found in a disturbed context.
Chiogioji & Hammatt 1992	NW corner of Pensacola St. and Kapi’olani Blvd, TMK: 2-3-09: por. 01	Archaeological assessment (field inspection & literature review)	Notes potential for paleo-environmental data; recommends subsurface testing.
Athens et al. 1994	Pi‘ikoi St. and Kapi‘olani Blvd. intersection	Archaeological investigation of inadvertently discovered human remains	Identifies SIHP # -4847, an inadvertently discovered, scattered human burial dating to ca. 1450s.
Maly, Franklin, & Rosendahl 1994	Convention Center, TMK: 2-3-35; 2-3-36:018, 024, 025	Archaeological and historical assessment study (field inspection & literature review)	Notes 1 LCA and fishpond and anticipates archaeological features; recommends subsurface testing.
Hammatt & Shideler 1995	Convention Center (TMK 2-3-35:001),	Archaeological inventory survey	10 backhoe test trenches and 5 cores. No clear evidence of pre-contact occupation observed.
Hammatt & Shideler 1996	Convention Center, TMK: 2-3-35:001	Archaeological data recovery	Determined that vast majority of in-situ sediments overlying the limestone hardpan dates back no further than AD 1520 to 1690. No clear evidence of Kūwili pond sediments found.
Hammatt & McDermott 1999	Kalākaua Ave.	Burial disinterment plan and report	Details the disinterment of 2 human burials (SIHP # -5744-1 and -2).
Perzinski et al. 1999	Ala Wai Blvd., Kalākaua Ave., Ala Moana Blvd., and ‘Ena Rd.	Archaeological monitoring report	Many pockets of undisturbed layers including beach sand noted; two human burials documented.

Reference	Location	Nature of Study	Results (Sites 50-80-14-)
Sinoto 2000	Wal-Mart/Sam's Club, TMK: 2-3-16:9, 12, 42	Archaeological assessment (field inspection & literature review)	Noted some remains may still be present; recommended archaeological monitoring program.
Winieski & Hammatt 2000	Kaka‘ako Improvement District 4, Kamake‘e St.	Archaeological monitoring report	SIHP # -5598 (two adjacent coffin burials); old A horizon noted in some trenches.
Winieski & Hammatt 2001	Victoria Ward Theater, TMK: 2-3-02:1	Archaeological monitoring report	No pre-contact materials, historic cultural materials, or human burials encountered.
Sinoto & Pantaleo 2002	Wal-Mart/Sam's Club, TMK: 2-3-16:9, 12, 42	Archaeological monitoring plan	Anticipates a low potential for subsurface remains.
Souza, Perzinski, and Hammatt 2002	Kaka‘ako Improvement District 7, Kamake‘e St.	Archaeological monitoring report	3 disturbed, pre-contact burials recorded (SIHP #s -6376, -6377, -6378); old A horizon found in 7 of 10 profiles.
O'Hare, Borthwick, & Hammatt 2003	Kapi‘olani Blvd. and Pi‘ikoi St., TMK: 1-2-3-10:28, 48, 50, 52-56	Archaeological inventory survey	Original wetland surface of Kewalo (SIHP # -6636) and a trash layer (SIHP # -6637) observed.
Hammatt & Chiogioji 2004	TMK: 2-6-13:1, 3, 4, 7, 8, 9, 11, 12	Archaeological literature review and field check	Anticipates archaeological inventory survey.
Jones & Hammatt 2004	Kalākaua Ave. from Ala Wai Blvd. to Pau St., TMK: 2-6-7, 13	Archaeological monitoring report	No significant cultural remains; remains of old McCully Rd. and pond/*lo‘i* noted.
LeSuer & Cleghorn 2004	HECO East O‘ahu Transmission Project	Archaeological assessment (field inspection & literature review)	Discusses Loko Opu fishpond near HECO Makaloa Substation.

Reference	Location	Nature of Study	Results (Sites 50-80-14-)
Tulchin & Hammatt 2004	Kapi‘olani Area, TMK: 2-3-04, 05, 07, 09, 10, 13, 14, 17, 18, 22, 35, 36, 38	Literature review and field check	Notes areas of sand, ponds, and multiple former burial finds in the vicinity; archaeological monitoring recommended.
O’Hare et al. 2004	Ko‘olani Condominium, TMK: 2-3-04:73, 2-3-05:27; 2-3-06:14; 2-3-07:2	Archaeological inventory survey	Original wetland surface of Kewalo (SIHP # -6636), 3 historic trash pits (SIHP # -6639), and a historic fill layer (SIHP # -6641) reported.
O‘Leary & Hammatt 2004	Kapi‘olani Blvd. from Kalākaua Ave. to Kamake‘e St., TMK: [1] 2-3-3	Archaeological monitoring report	No cultural material observed.
Clark and Gosser 2005	Corner of Kapi‘olani Blvd. and Kamake‘e St., TMK: 2-3-003:075, 085, 086	Archaeological inventory survey	Remnant of un-named pond, SIHP # -6636, observed.
Freeman et al. 2005	Ala Wai Gateway, TMK: [1] 2-6-011:001, 002, 004, 032, 037, 040	Archaeological inventory survey and cultural impact evaluation	SIHP # -6700, a disturbed burial; SIHP # -6701, a historic coffin burial; SIHP # -6702, a culturally enriched, buried A horizon in geographic association with LCA 99 F.L. to Uma; SIHP # -6703, a fishpond remnant.
Monahan 2005	Ward Ave. and Kapi‘olani Blvd., TMK: [1] 2-3-003:73, 96	Archaeological assessment report	9 trenches excavated; no significant cultural materials; all fill layers to BOE.
Bell & McDermott 2006	Allure Waikīkī, TMK: [1] 2-6-13:1,3,4,7,8,9, 11, 12	Archaeological inventory survey report	28 test trenches excavated, 3 historic properties identified: SIHP # -6873, isolated traditional Hawaiian burial; SIHP # -6874, subsurface cultural layer of pre- and post-contact origin; SIHP # -5875, isolated traditional Hawaiian burial.

Reference	Location	Nature of Study	Results (Sites 50-80-14-)
Tulchin & Hammatt 2005	Ko‘olani Condominium, TMK: 2-3-04:073, 2-3-05:027, 2-3-06:014, 2-3-07:002	Addendum to an archaeological inventory survey	8 backhoe test trenches excavated; SIHP # -6636, original wetland surface of Kewalo area; SIHP # -6641, historic garbage layer.
Bell, McDermott, & O’Leary 2006	Victoria Ward Village Shops, TMK: [1] 2-3-5:013-017, 022, 023	Archaeological inventory survey report	6 burials (SIHP # -6854) found during AIS and additional 50+ burials found during on-going monitoring; historic privy/activity area (SIHP # -6855); and fishpond sediments (Kolowalu Pond, SIHP # -6856) recorded.
Bush & Hammatt 2006	Hokua Tower, Ala Moana Blvd., TMK: [1] 2-03-04:073; 2-03-05:027; 2-03-06:014; 2-03-07:002	Archaeological monitoring report	No burials or cultural deposits observed; old A horizon found at eastern end of Auahi St.
Esh & Hammatt 2006	Pi‘ikoi St. from Ala Moana Blvd. to Matlock St., TMK: 2-3-06, 07, 10, 11, 12, 14, 15, 35, 38; 2-4-03, 04, 11, 12	Archaeological monitoring report	No cultural material observed.
Gosser, Nees, & Clark 2006	Corner of Kapi‘olani Blvd. and Kamake‘e St., TMK: 2-3-003:075, 085, 086	Archaeological monitoring report	No cultural material observed.
Hammatt 2006a	1391 Kapi‘olani Blvd.	Archaeological literature review and field inspection	Discusses 1391 Kapi‘olani Boulevard (the current project area)
Hammatt 2006b	Ala Moana Center, TMK: [1] 2-3-38:001, 2-3-40:005, 007, 009, 011, 014, 016, 018	Archaeological inventory survey	30 test trenches excavated; SIHP # -6847, a small, subsurface feature (wooden box with chopsticks, brushes, a bead, animal bones) dating to late 19th/early 20th century.

Reference	Location	Nature of Study	Results (Sites 50-80-14-)
Hammatt & Chiogioji 2006	Waikīkī, TMK: 2-6-13:1, 3, 4, 7, 8, 9, 11, 12	Archaeological literature review and field inspection	Noted possible presence of human burials; anticipates archaeological inventory survey.
O’Hare, Bush, & Hammatt 2006	Kaka‘ako Improvement District 10, TMK: [1] 2-3-04, 05, 06, 07	Archaeological monitoring report	Cluster of 28 historic burials (SIHP # -6658), 2 isolated disturbed burials (SIHP # -6659), and a historic trash dump (SIHP # -6660); weak A horizon; some fishpond sediments observed.
O’Leary & Hammatt 2006	Moana Vista, Kapi‘olani Blvd., TMK: [1] 2-3-003:072, 088, 102	Archaeological inventory survey	24 test trenches excavated. Extensive prior subsurface disturbance noted. No historic properties observed. Small area of sand layers noted.
Barnes & Shideler 2007	1235 Kona St./ 1226 Waimanu St. Housing, TMK: [1] 2-3-007:026, 049	Field check and literature review	Notes many burials in general vicinity but concludes lower likelihood of burial finds.
Runyon & Hammatt 2007	Intersection of Kalākaua Ave. and Fern St., TMK: [1] 2-3-022, 023, 032	Archaeological monitoring report	No cultural material observed.
Carney & Hammatt 2008	Hokua Tower Project, Ala Moana Blvd., TMK: [1] 2-03-005:001, 002, 003, por. 024, 026, 027	Archaeological monitoring report	Isolated human mandible fragment and a historic trash pit (SIHP -6765) observed.
Hammatt 2008	Ko‘olani Condominium, Waimanu St., TMK: 2-3-04:73, 2-3-05:27, 2-3-06:14, 2-3-07:2	Archaeological monitoring report	2 isolated burials (SIHP #s -6910, -6912) and a cluster of 16 coffin burials (SIHP # -6911) found.
Hazlett, Carney, & Hammatt 2008	Honolulu Design Center, TMK: [1] 2-3-010:048, 050, 052, 053, 054, 055, 056	Archaeological monitoring report	No cultural material observed.

Reference	Location	Nature of Study	Results (Sites 50-80-14-)
Petrey, Borthwick, & Hammatt 2008	Ala Wai to Magic Island, TMK: [1] 2-3-034, 036, 037; 2-6-017, 018; 2-7-036	Archaeological monitoring report	No cultural material observed.
Fong, Borthwick, & Hammatt 2009	Kapi‘olani Blvd. from Kalākaua to Ward Aves., Kamake‘e St. from Kapi‘olani Blvd. to Auahi St., and Atkinson Dr. from Kapi‘olani to Ala Moana Blvds., TMK: [1] 2-1-044, 049, [1] 2-3-001-005, 007, 008, 010, 015, 016, 021, 022, 032, 034-036, 038-041	Archaeological monitoring report	No cultural material observed.
Thurman et al. 2009	Queen Street Parks	Archaeological inventory survey report	Historic trash layer (liekly correlated to previously documented SIHP # -6641) and previously documented historic fishpond remnant (SIHP # -6856) observed.
Tulchin & Hammatt 2009	Ala Wai Watermark, TMK: [1] 2-6-011:001, 037	Archaeological monitoring report	SIHP # -6700, previously disturbed human burial; SIHP # -6701, undisturbed coffin burial; SIHP # -6702, subsurface cultural layer containing evidence of both pre- and post-contact land use; SIHP # -6703, subsurface fishpond sediment.
McElroy 2010	Makaloa-Sheridan Sam's Club/Wal-Mart, TMK: [1] 2-3-016:009 and 043	Archaeological monitoring report	Human remains (MNI = 64) found in 6 areas assigned SIHP #s -6516, -6661, & -6662. Both pre-contact and post-contact burials.

Reference	Location	Nature of Study	Results (Sites 50-80-14-)
Pammer & Hammatt 2010	0.26-acre Moana Vista Project, Kapi‘olani Blvd., TMK: [1] 2-3-003:084	Archaeological assessment	4 test trenches excavated; no cultural material observed.

3.3.2 Chiogioji and Hammatt 1992

In 1992, CSH conducted an archaeological assessment of a lot that once housed Kapi‘olani Community College (Chiogioji and Hammatt 1992). The project area was bounded by Pensacola Street on the east and Kapi‘olani Street on the south. The report covered the historical and archival research used to predict possible subsurface deposits that may be within the project area. Based on the background and previous archaeological research, it was concluded that the property could contain burials, the remains of Hawaiian agricultural features, and pre-and post-habitation deposits. Due to these concerns, archaeological monitoring was recommended during any future construction in the study area.

3.3.3 Athens et al. 1994

In 1994, during excavation of a trench for an underground telephone line near the northeast corner of Pi‘ikoi Street and Kapi‘olani Boulevard, the remains of a single individual were inadvertently discovered and later disinterred (Athens et al. 1994). Osteological analysis revealed that the remains were the fairly complete skeleton of a 12- to 15-year-old female. Radiocarbon analysis of a sample of bone collagen yielded a date of death of between AD 1295 and AD 1473, supporting the osteological determination of Hawaiian/Polynesian ancestry. The remains were interred within a wetlands environment at a shallow depth of 50-80 cm below surface. A lack of burial goods and the presence of the remains within an unusual wetlands context strongly suggested that the location of the remains did not reflect an intentional burial. Osteological analysis revealed a severe bone infection of the right pubis as the probable cause of death. The individual may have passed away at the very spot of interment and remained undiscovered.

3.3.4 Maly et al. 1994; Hammatt and Shideler 1995, 1996

Maly et al. (1994) noted one LCA and one fishpond during an archaeological and historical assessment study (field inspection and literature review) for a project at the convention center. They recommended subsurface testing be performed. CSH performed an AIS (Hammatt and Shideler 1995) for the convention center project involving the excavation of 10 test trenches and five cores. They determined that there was no clear evidence of pre-contact occupation. CSH later performed archaeological data recovery (Hammatt and Shideler 1996) for the project and determined that the vast majority of in-situ sediments overlying the limestone hardpan dates back no further than AD 1520 to 1690. Also, no clear evidence of Kūwili pond sediments was observed.

3.3.5 Hammatt and McDermott 1999; Perzinski et al. 1999; Jones and Hammatt 2004

In 1999, CSH performed archaeological monitoring for the Anti-Crime Street Lighting Improvements Project along Kalākaua Avenue, Ala Wai Boulevard, Ala Moana Boulevard, and ‘Ena Road (Perzinski et al. 1999). Two human burials (SIHP #s 50-80-14-5744-1 and -2) were observed near the intersection of Kalākaua Avenue and ‘Ena Road. Several pockets of undisturbed stratigraphy, including beach sand, also were noted. Later in 1999, CSH disinterred the two burials (Hammatt and McDermott 1999)

In 2004, CSH performed archaeological monitoring for the Anti-Crime Street Lighting Improvements Project along Kalākaua Avenue from Ala Wai Boulevard to Pau Street (Jones and Hammatt 2004). No significant cultural material were observed; however, the remains of the old McCully Road and a pond/*lo‘i* were noted.

3.3.6 Sinoto 2000; Sinoto and Pantaleo 2002; McElroy 2010

An archaeological assessment (Sinoto 2000) was conducted and an archaeological monitoring plan (Sinoto and Pantaleo 2002) was prepared for Makaloa-Sheridan Sam’s Club/Wal-Mart Project, the block bounded by Sheridan, Rycroft, Ke‘eaumoku, and Makaloa Streets. According to information provided in personal communications with SHPD personnel, multiple human burials were encountered during excavations for the Wal-Mart store within the block. The primary cluster of historic-era burials was located in the corner closest to Sheridan and Makaloa Streets. Other, apparently isolated, burial finds were encountered in other parts of the parcel, although relatively close to Sheridan Street.

In 2010, archaeological monitoring was conducted for the Makaloa-Sheridan Sam’s Club/Wal-Mart Project (McElroy 2010). Human remains (MNI = 64) (SIHP #s 50-80-14-6516, -6661, and -6662) were observed in six areas throughout the project. The burials appear to represent both pre-contact and post-contact burials.

3.3.7 Winieski and Hammatt 2000

In 2000, archaeological monitoring for the Kaka‘ako Improvement District (ID) 4 Project was conducted by CSH (Winieski and Hammatt 2000). The project documented two isolated historic coffin burials (SIHP # 50-80-14-5598) on Kamake‘e Street, between Kawaiaha‘o and Waimanu Streets. The two burials, adjacent to one another, were within an undisturbed beach sand deposit, directly underlying an A horizon, which itself was beneath approximately 50 cm of construction fill and pavement. Well-defined burial pits were present, as well as staining from the deteriorated coffin wood. No associated artifacts, other than the coffins, were discovered during disinterment. Additionally, during excavation for a manhole hookup approximately 2 m west of Kamake‘e Street on Waimanu Street, a horse or mule skeleton was discovered within the undisturbed sand layer, approximately one meter below the surface. No other materials were observed during the Kaka‘ako ID 4 project, except for randomly scattered bottles and bottle fragments of modern provenience discovered within fill materials. One “Star Soda Works” bottle was dated to c. 1900.

3.3.8 Winieski and Hammatt 2001

In 2000, CSH performed archaeological monitoring for Victoria Ward Ltd. at the site of the Ward Village Phase II (Ward Theaters) construction project in Kaka‘ako (Winieski and Hammatt

2001). No pre-contact materials, historic cultural materials, or human burials were encountered. Stratigraphic profiles within the project area revealed that fill materials were placed over a pre-existing marsh surface. In the northwest corner of the project area, an old A horizon, naturally deposited pond sediments, and calcareous sand were observed. In the southwest corner of the project area, an old A horizon and naturally deposited calcareous sand were observed.

3.3.9 Souza et al. 2002

In 2000, construction monitoring associated with the Kaka‘ako ID-7 construction project was undertaken by CSH. Three human burials were encountered, which were severely disturbed by excavation activities (Souza et al. 2002). The burials' age and ethnicity are unknown, though the lack of grave goods may indicate that they are pre-contact or early post-contact. Burial 1 (SIHP # 50-80-14-6376), a single cranium, was inadvertently discovered by construction personnel in the base yard backdirt pile. Burial 2 (SIHP # 50-80-14-6377), an adult individual, was encountered by a CSH archaeologist during backhoe excavations for a box drain. The burial was within an undisturbed beach sand deposit. Burial 3 (SIHP # 50-80-14-6378), a femur and several rib fragments, again was recovered in the base yard.

3.3.10 O'Hare et al. 2003

In July 2006, CSH (O'Hare et al. 2003) conducted an AIS for Evershine X in an approximately 6-acre project area bounded by Pensacola Street, Kamaile Street, Pi‘ikoi Street, and Kapi‘olani Boulevard (TMK: 2-3-10: 28, 48, 50, 52-56). The AIS identified a pre-contact to early twentieth century wetland surface with an associated sand berm (SIHP # 50-80-14-6636). Also found was a trash dump in the northeast corner of the project area that contained wood, brick, tires, ceramic dinnerware, insulators, rusted metal, and glass bottles (SIHP # 50-80-14-6637). Many of the glass bottles were dated to between the 1920s and 1940s. No human remains were found in the project area.

3.3.11 Hammatt and Chiogioji 2004

In 2004, CSH performed an archaeological literature review and field check for a property at TMK: 2-6-13:1, 3, 4, 7, 8, 9, 11, and 12 (Hammatt and Chiogioji 2004). The study concluded that an AIS would likely have to be performed prior to construction activities.

3.3.12 LeSuer and Cleghorn 2004

In 2004, an archaeological literature review and field inspection was conducted for the HECO East O‘ahu Transmission Project (LeSuer and Cleghorn 2004). Loko Opu fishpond near the HECO Makaloa substation is discussed.

3.3.13 Tulchin and Hammatt 2004

In 2004, CSH performed a literature review and field check for the Kapi‘olani Area Revised Sewer System Project (Tulchin and Hammatt 2004). Areas of sand, ponds, and multiple former burial finds were noted in the vicinity. Archaeological monitoring was recommended for any future work.

3.3.14 O’Hare et al. 2004; Tulchin and Hammatt 2005; Hammatt 2008

In 2003, CSH conducted the Phase I portion of the AIS for the Ko‘olani Condominium Project in the Kewalo area (O’Hare et al. 2004). A total of 13 trenches were excavated in the project area. Two previously unrecorded historic properties were found: SIHP #s 50-80-14-6639 and 50-80-14-6641, both historic trash pits dating from the early-twentieth century. In addition, one previously recorded historic property, the original wetland surface of Kewalo (SIHP # 50-80-14-6636) was documented.

In 2005, CSH conducted Phase II of the AIS for the Ko‘olani Condominium Project (Tulchin and Hammatt 2005). Two previously recorded (by O’Hare et al. 2004) historic properties were identified: SIHP #s 50-80-14-6636 and 50-80-14-6641.

In 2008, CSH completed archaeological monitoring for the Ko‘olani Condominium Project (Hammatt 2008). Three new historic properties were identified: SIHP # 50-80-14-6910, a single pre-contact burial; SIHP # 50-80-14-6911, a cluster of 16 historic coffin burials believed to comprise a discrete cemetery; and SIHP # 50-80-14-6912, a single burial. Additionally, various historic trash deposits were observed throughout the project area but were not considered eligible for the Hawai‘i Register of Historic Places.

3.3.15 O’Leary and Hammatt 2004; Fong et al. 2009

CSH conducted archaeological monitoring for emergency sewer line repairs that occurred along Kapi‘olani Boulevard between August and October 2004 (O’Leary and Hammatt 2004). A total of five 0.6 m deep trenches were excavated. These excavations took place in fill materials associated with the original placement of the sewer pipes; no cultural material was encountered.

In 2009, CSH completed archaeological monitoring of construction associated with the upgrading of existing drainage, water, and sewer systems within Kapi‘olani Boulevard from Kalākaua Avenue to Ward Avenue, within Kamake‘e Street from Kapi‘olani Boulevard to Auahi Street and within Atkinson Drive from Kapi‘olani Boulevard to Ala Moana Boulevard. No historic properties were observed. Observed stratigraphy consisted primarily of imported fill material associated utility and road construction. In some instances pockets of naturally deposited sediment (jaucas sand and wetland clays) were observed beneath fill deposits.

3.3.16 Clark and Gosser 2005; Gosser et al. 2006

In 2005, an AIS was performed for a 1.84-acre parcel at the west corner of Kapi‘olani Boulevard and Kamake‘e Street (Clark and Gosser 2005). A remnant of an unnamed fishpond was identified (SIHP # 50-80-14-6636).

In 2006, archaeological monitoring was performed for this parcel (Gosser et al. 2006). No cultural materials were observed.

3.3.17 Freeman et al. 2005; Tulchin and Hammatt 2009

In 2005, an AIS and a cultural impact evaluation were performed for the Ala Wai Gateway Project (Freeman et al. 2005). Four historic properties were identified: SIHP # 50-80-14-6700, a disturbed burial; SIHP # 50-80-14-6701, a historic coffin burial; SIHP # 50-80-14-6702, a

culturally enriched, buried A horizon in geographic association with LCA 99 F.L. to Uma; and SIHP # 50-80-14-6703, a fishpond remnant.

In 2009, CSH conducted archaeological monitoring for the Ala Wai Watermark Project (Gateway) Project (Tulchin and Hammatt 2009). The four previously documented historic properties from the 2005 AIS were observed again. No new cultural properties were documented.

3.3.18 Monahan 2005

In 2005, an archaeological assessment was conducted for three parcels in Kaka‘ako measuring approximately 1.35 acres (Monahan 2005). Nine trenches were excavated. No significant historic properties were observed. Additionally, no in-situ, undisturbed stratigraphic layers were observed (i.e., all fill layers to BOE).

3.3.19 Bell et al. 2006

In 2006, CSH completed an AIS for the Victoria Ward Village Shops Project (Bell et al. 2006). A total of 86 trenches were excavated in the project area. Three historic properties were identified: 1.) SIHP # 50-80-14-6854, a subsurface cultural layer/activity area remnant, which contains an immature pig skeleton, remnants of a historic privy, remnants of a culturally-enriched A horizon (containing both historic and prehistoric cultural material), five previously identified human burials; 2.) SIHP # 50-80-14-6855, an activity area remnant comprised of a pronounced subsurface traditional Hawaiian cultural layer that includes numerous pit features, six previously identified human burials; and 3.) SIHP # 50-80-14-6856, a historic fishpond remnant, part of Land Commission Grant 3194, “Kolowalu,” awarded to Kalae and Kaaua.

3.3.20 Bush and Hammatt 2006; Carney and Hammatt 2008

Between 2003 and 2005, CSH conducted archaeological monitoring along Auahi Street for the Hokua Tower Project (Bush and Hammatt 2006). No cultural materials were observed.

In 2008, CSH performed archaeological monitoring for the Hokua Tower Project on Ala Moana Boulevard (Carney and Hammatt 2008). An isolated human mandible fragment and a historic trash pit (SIHP # 50-80-14-6765) were observed.

3.3.21 Esh and Hammatt 2006

In August 2004, CSH conducted archaeological monitoring for the Rehabilitation of Streets, Unit 5B on Pi‘ikoi Street between Ala Moana Boulevard and Matlock Street (Esh and Hammatt 2006a). No cultural materials were observed.

3.3.22 Hammatt 2006a

In 2006, CSH performed an archaeological literature review and field inspection for a parcel at 1391 Kapi‘olani Boulevard (the same parcel as the current project area) (Hammatt 2006a). The study found no surface historic properties, but noted that intact subsurface cultural deposits could be lying undisturbed beneath relatively shallow modern fill layers.

3.3.23 Hammatt 2006b

In late 2005 and early 2006, CSH conducted an AIS of the Ala Moana Expansion Project (Hammatt 2006b). The investigation's 30 backhoe trenches revealed no jaucas sand deposits within the project area. The natural land surface, prior to historic/modern fill episodes, was either a sandy clay or a highly organically enriched peaty layer. The natural pre-fill land surface had been completely removed by prior construction-related disturbances within large portions of the project area. One historic property (SIHP # 50-80-14-6847) was found, consisting only of a wooden box placed in a pit cut down into the sandy-clay former land surface. The box contained a mix of historic artifacts including, among other things, printed material, wooden chopsticks, pig bone, and a horse brush. It was tentatively dated to the late nineteenth or early twentieth century.

3.3.24 Hammatt and Chiogioji 2006

In 2006, CSH performed an archaeological literature review and field inspection for a 2.3-acre parcel in Waikīkī (Hammatt and Chiogioji 2006). The fieldwork and report noted the possible presence of human burials in the vicinity.

3.3.25 O'Hare et al. 2006

In 2006, CSH completed archaeological monitoring for the Queen Street Extension Project (O'Hare et al. 2006). During monitoring of the construction, 30 human burials were found and disinterred. The analysis of the distribution of the burials and the associated grave goods indicates that 28 of the burials (SIHP 50-80-14-6658) constitute a cemetery, possibly used between the 1840s and the 1880s, located on the lip of Kolowalu Pond. Two burials (SIHP 50-80-14-6659) were isolated finds and were not related to the main cemetery cluster. Historic trash pits (SIHP 50-80-14-6660) were also discovered during monitoring intruding into the eastern edge of the cemetery. The human remains and associated grave goods were reburied on-site in a specially constructed vault complex.

3.3.26 O'Leary and Hammatt 2006; Pammer and Hammatt 2010

An AIS conducted by CSH in October 2005 for a 4-acre parcel for the Moana Vista Project on Kapi‘olani Boulevard identified no historic properties (O'Leary and Hammatt 2006). It did note, however, that the southernmost portion of the project area was composed of beach sand deposits, and in the future, it may yield historic properties, including human burials.

In 2010, CSH conducted an archaeological assessment for a 0.26-acre parcel for the Moana Vista Project (Pammer and Hammatt 2010). Four trenches were excavated, but no cultural materials were observed.

3.3.27 Barnes and Shideler 2007

In 2007, CSH performed an archaeological literature review and field check for the proposed 1235 Kona Street/Waimanu Street Reserved Housing Project (Barnes and Shideler 2007). The fieldwork and report noted many burials in the general vicinity, but concluded that the likelihood of finding burials within the project area was lower.

3.3.28 Bell and McDermott 2006

In 2007, CSH performed an AIS for the Allure Waikīkī (Bell and McDermott 2007). During the project, 28 test trenches were excavated. Three historic properties were identified: SIHP # 50-80-14-6873, an isolated traditional Hawaiian burial; SIHP # 50-80-14-6874, a subsurface cultural layer of pre- and post-contact origin; and SIHP # 50-80-14-5875, an isolated traditional Hawaiian burial.

3.3.29 Runyon and Hammatt 2007

During 2007, CSH performed archaeological monitoring for traffic control signal work at the intersection of Kalākaua Avenue and Fern Street (Runyon and Hammatt 2007). No cultural materials were observed.

3.3.30 Hazlett et al. 2008

In 2008, CSH performed archaeological monitoring for the Honolulu Design Center Phase III Project (Hazlett et al. 2008). No cultural materials were observed.

3.3.31 Petrey et al. 2008

In 2008, CSH performed archaeological monitoring for the City and County of Honolulu’s Emergency Sewer Bypass Project, from Ala Wai to Magic Island (Petrey et al. 2008). No cultural materials were observed.

3.3.32 Thurman et al. 2009

In 2009, CSH completed an AIS for the Queen Street Parks project. Fieldwork involved the excavation of 29 backhoe trenches. One previously identified historic property was recorded: SIHP # 50-80-14-6856, a historic fishpond remnant, originally identified by Bell et al. (2006).

Documented stratigraphy consisted of varying layers of fill overlying various naturally deposited sediments atop the coral shelf. The fill consisted of imported terrigenous sediment, incinerator material containing burnt and unburnt historic refuse, crushed coral, and hydraulic pump dredge. The historic trash layer has not been assigned its own SIHP number; however, this layer appears to correlate to SIHP # -6641. Natural sediments consisted primarily of backshore marsh or pond sediments associated with SIHP -6856 (Kolowalu fish pond). Naturally deposited Jaucas sand deposits were also observed.

3.3.33 Tulchin and Hammatt 2009

In 2009, CSH conducted archaeological monitoring for the Ala Wai Watermark Project (Tulchin and Hammatt 2009). Four historic properties were documented: SIHP # 50-80-14-6700, a previously disturbed human burial; SIHP # 50-80-14-6701, an undisturbed coffin burial; SIHP # 50-80-14-6702, a subsurface cultural layer containing evidence of both pre- and post-contact land use; and SIHP # 50-80-14-6703, subsurface fishpond sediment.

3.4 Background Summary

Documentary evidence suggests that the present study area is located in a region that was less extensively populated by the Hawaiians inhabiting the southern coast of O‘ahu than the nearby centers of Waikīkī and Honolulu before the nineteenth century. However, maps and documents produced during the nineteenth century indicate that the Kewalo region had been utilized for fishpond farming, salt making, wetland agriculture, and human burials by the Hawaiians. It is likely that evidence left behind by those involved in exploiting the area's resources remain intact beneath the late-nineteenth and early-twentieth century fill layers covering Kewalo today.

Archaeological studies have recorded the presence within Kewalo and Kaka‘ako of subsurface historic properties—including cultural deposits and human burials—of both pre-contact Hawaiian and post-western contact provenience. These deposits had remained intact despite the years of construction activity that have altered the entire Kewalo area.

3.4.1 Human Burials

Previous and on-going archaeological investigations have documented human burials—both pre-contact Hawaiian and historic—throughout the greater Kaka‘ako area, which includes Kewalo. Isolated burials and burial clusters have been found primarily in sandy deposits, just above the water table and below historic-era fill materials. More than 64 sets of human burials were discovered immediately north of the project area at the Makaloa-Sheridan Sam’s Club/Wal-Mart Project (McElroy 2010; Sinoto 2000, 2002).

3.4.2 Pre-Contact and Early Post-Contact Agricultural and Habitation Deposits

The project area is located in what was the wetland plain of Kewalo. This area provided ancient Hawaiians with the environment needed for the cultivation of fishponds and subsistence crops such as taro and banana. The features expected from these cultural activities include berms, *lo‘i*, pond banks, and *‘auwai* levee remnants. Following the initial years of European contact, Westerners engaged in new massive agricultural ventures. Immigrant workers from Asia were brought to Hawai‘i to labor in these new agricultural ventures, and as a result rice also became a major crop in many areas. The wetlands of Kewalo were an ideal environment for the cultivation of rice, and the area yielded much of its traditional taro cultivation land to rice production. The same area in the early twentieth century was altered more intensely for land-reclamation plans; the resulting dredge and fill projects obliterated what remained of traditional Hawaiian cultivation processes in the wetlands of Kewalo. Late nineteenth century maps show ponds and irrigated fields bounded by wide stretches of naturally elevated ground.

3.4.3 Anticipated Subsurface Remains

As exemplified above, construction activities in the project area have the potential to inadvertently uncover: (1) pre-contact and post-contact (1800s) burials, (2) pre-contact and post-contact habitation deposits, and (3) pre-contact and post-contact agricultural and aquacultural features.

Pre-contact burials will likely be located within pits and may possibly be associated with pre-contact habitation deposits. Post-contact burials will typically be located within extended pits with possible evidence of coffin material and/or grave goods associated with the post-contact

period (metal jewelry or other Asian or European objects). Habitation deposits will frequently be evident in the stratigraphy as dark-colored sand with features such as post-holes, fire pits, artifacts, and food remains (marine shell, bone, and *kukui* endocarps, etc.). Post-contact deposits will likely contain ceramic, metal, and glass. Agricultural features such as irrigation ditches, fishponds, and irrigated fields, and sand berms that were often built along the edges of ponds and fields may be found in trench profiles. *‘Auwai* and sand berms will frequently be evident within the stratigraphy as a dip within a stratigraphic layer which could possibly be stone-lined (McDermott et al. 1996:27). *Lo‘i* will frequently be evident by a silty clay layer within the stratigraphy.

Section 4 Results of Fieldwork

Subsurface testing was conducted between June 14 and 24, 2011. A total of 22 test trenches (Trenches 1 through 22) were excavated within the project area (Figure 34). Sixteen of the trenches were within the paved parking lot and 6 of them were within the warehouse along the southern edge of the property. Fieldwork and documentation was performed by a crew of three to four alternating CSH archaeologists, David Shideler, M.A., Kelly Burke, M.Sc., Josie Paolello, M.S., Nifae Hunkin, B.A., and Nigel Kingsbury, B.A., under the general supervision of Hallett H. Hammatt, Ph.D. (principal investigator). Fieldwork required approximately 24 person-days to complete.

A single historic property (a buried historic trash layer) was identified within nine trenches and was designated SIHP # 50-80-14-7193. A detailed description of this historic property is presented in Section 4.4 below.

4.1 GPR

A GPR survey was conducted within the project area prior to project construction in an attempt to define the local stratigraphy and to prospect for buried cultural deposits. GPR survey was conducted at Trenches 1-6 (see Figure 34).

Depth profiles and amplitude slice maps were generated from collected GPR data in order to analyze radar reflection features that could include discrete objects, stratigraphic layering, or other subsurface anomalies such as subsurface disturbances associated with utility installation or human interment. The depth profiles consist of a subsurface profile of the GPR data, illustrating the entire range of subsurface radar penetration that was possible during the survey. Amplitude slices are similar to plan view maps generated at selected defined depth intervals, and are useful for displaying the general shape and spatial distribution of recorded radar reflections associated with subsurface anomalies.

4.1.1 Summary and Interpretation

The GPR survey was not successful in terms of prospecting for buried cultural deposits as maximum depth (visibility; i.e., radar wave penetration) was limited to 50 to 90 cm below the surface. The limited depth penetration is likely due to the presence of wet (saline saturated) clay-rich sediments present within the project area (Conyers 2004:52). These results are consistent with the NRCS, which indicated that the project area is situated within a moderate to very low GPR suitability area (see Section 1.2.1 above and Figure 5). Additionally, the GPR survey was conducted in an area that was covered by thick reinforced concrete slabs. The rebar within these slabs produced numerous prominent hyperbolic reflections that would have obscured any ephemeral reflections that may have been present. These potential ephemeral reflections are important, as they are more likely to be associated with subsurface cultural deposits, which tend to be more subtle than utility lines or backfilled machine excavations.

Identified subsurface anomalies within the study area were of varying size, distribution, and prominence. These anomalies likely correspond to subsurface features associated with urbanization, such as backfilled machine excavations, abandoned or in-use utility lines, varying

Figure 34. Locations of Trenches 1 through 22 within the project area

fill deposits, and miscellaneous construction debris. This interpretation is based on the project area's location within urban Honolulu, the limited GPR depth penetration (50-90 cmbs), and the presence of thick imported fill deposits within the project area (Foote et al. 1972:31). The interpretation of subsurface anomalies prior to ground truthing via excavation is not an exact science, but rather an educated guess based on an analysis of the size, distribution, and prominence of observed anomalies and incorporating this data with background research of the study area's prior land use history. Subsurface testing is recommended to ground truth the initial GPR analysis and to provide additional data for more accurate interpretation of subsurface anomalies. A detailed analysis of the observed anomalies per survey area is presented below.

Concerning study area stratigraphy, GPR depth profiles indicated that the soils within the survey area consist of a complex variation of fill layers with varying densities and chemical compositions. This was indicated through the presence of horizontal banding, commonly associated with stratigraphic layering, observed at various depth intervals throughout areas surveyed with GPR.

4.1.2 GPR Data Analysis

4.1.2.1 Trench 1

Trench 1 is located in the *makai* (southwestern) portion of the project area, situated within an existing warehouse with thick concrete floors (see Figure 34). The GPR survey area measured approximately 6 m by 3 m and involved the collection of seven 6 m-long transects spaced 50 cm apart.

A review of amplitude slice maps indicates the presence of prominent subsurface anomalies at the east and west ends of the survey area (Figure 35). The anomalies are long and linear in shape and could correspond to utility lines or associated subsurface disturbance (i.e., utility trenches). Other less prominent anomalies were also observed scattered throughout the survey area; these anomalies have no apparent organization or defined shape and likely correspond to varying fill deposits and miscellaneous debris such as construction refuse and basalt or coral boulders.

GPR depth profiles collected at Trench 1 identified numerous small reflections clustered at the surface (Figure 36). These reflections correspond to the concrete present at the surface of the survey area. Also of note was the presence of an anomaly reminiscent of subsurface disturbance in the form of a utility trench at the east end of the survey area.

4.1.2.2 Trench 2

Trench 2 is located in the *makai* (southwestern) portion of the project area, situated within an existing warehouse with thick concrete floors (see Figure 34). The GPR survey area measured approximately 6 m by 2 m and involved the collection of five 6 m-long transects spaced 50 cm apart.

A review of amplitude slice maps indicates the presence of subsurface anomalies throughout the survey area (Figure 37). The anomalies have no apparent organization or defined shape and likely correspond to varying fill deposits and miscellaneous debris such as construction refuse and basalt or coral boulders.

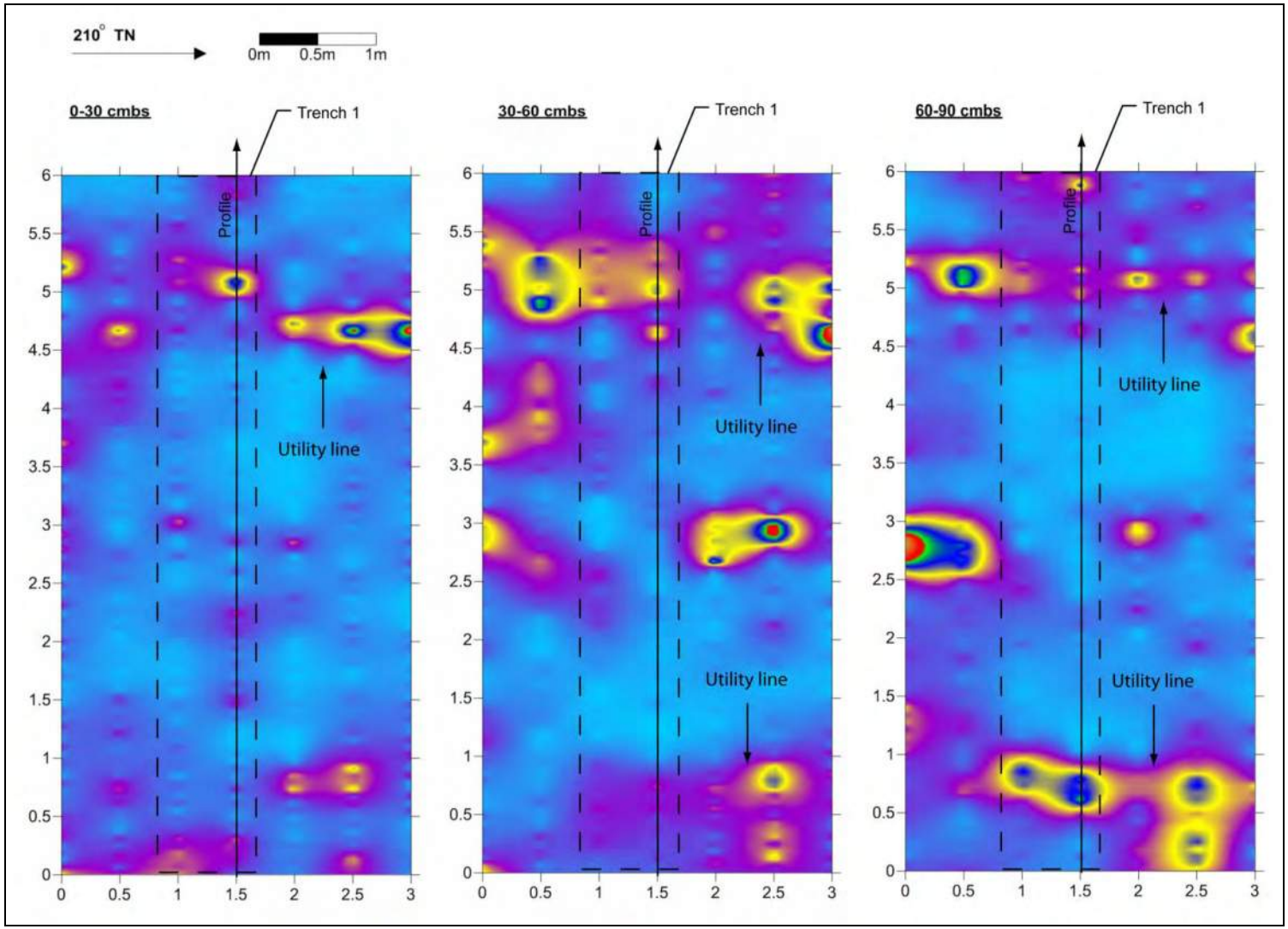


Figure 35. Amplitude slice maps collected at Trench 1

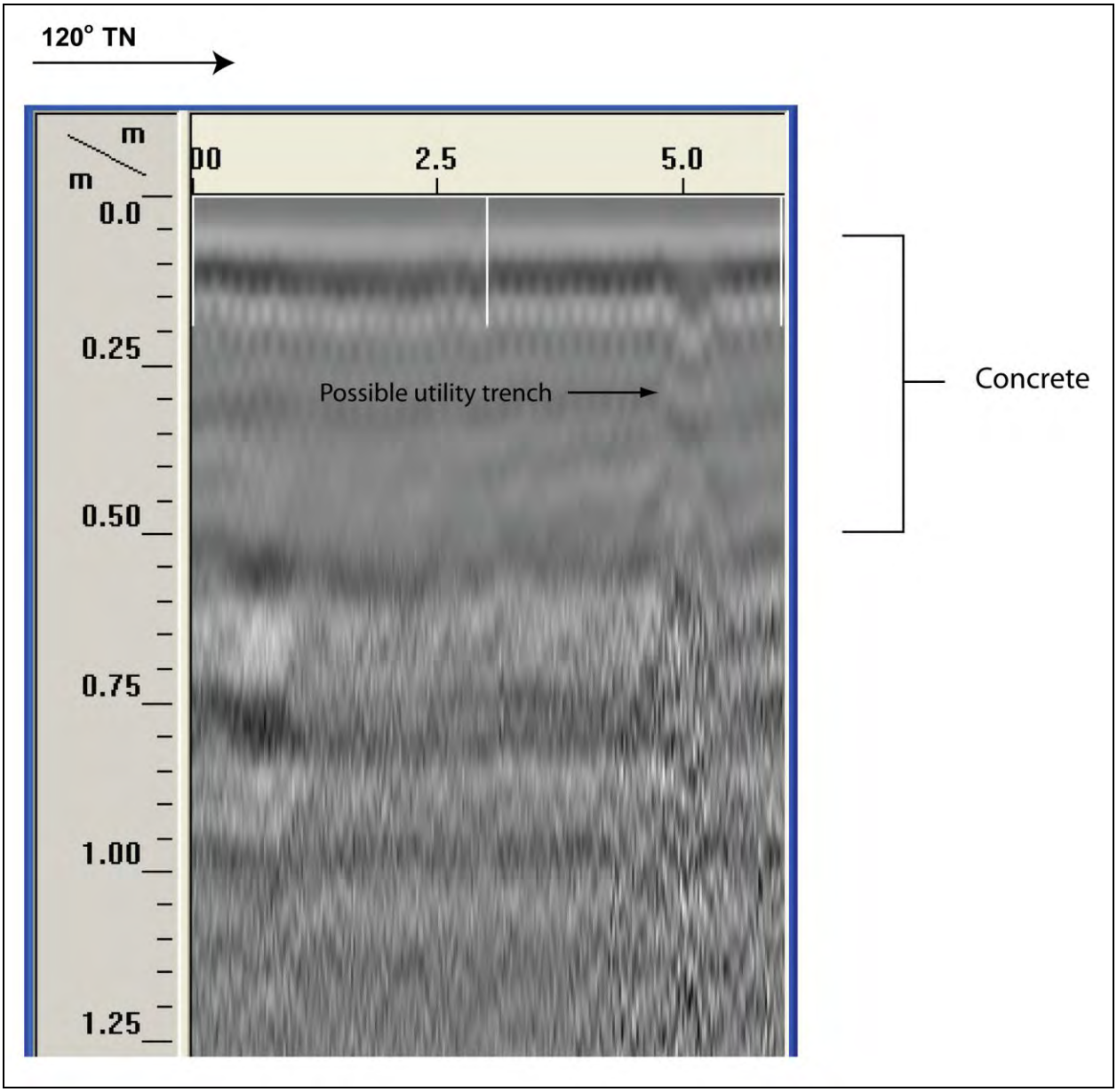


Figure 36. GPR profile collected at Trench 1

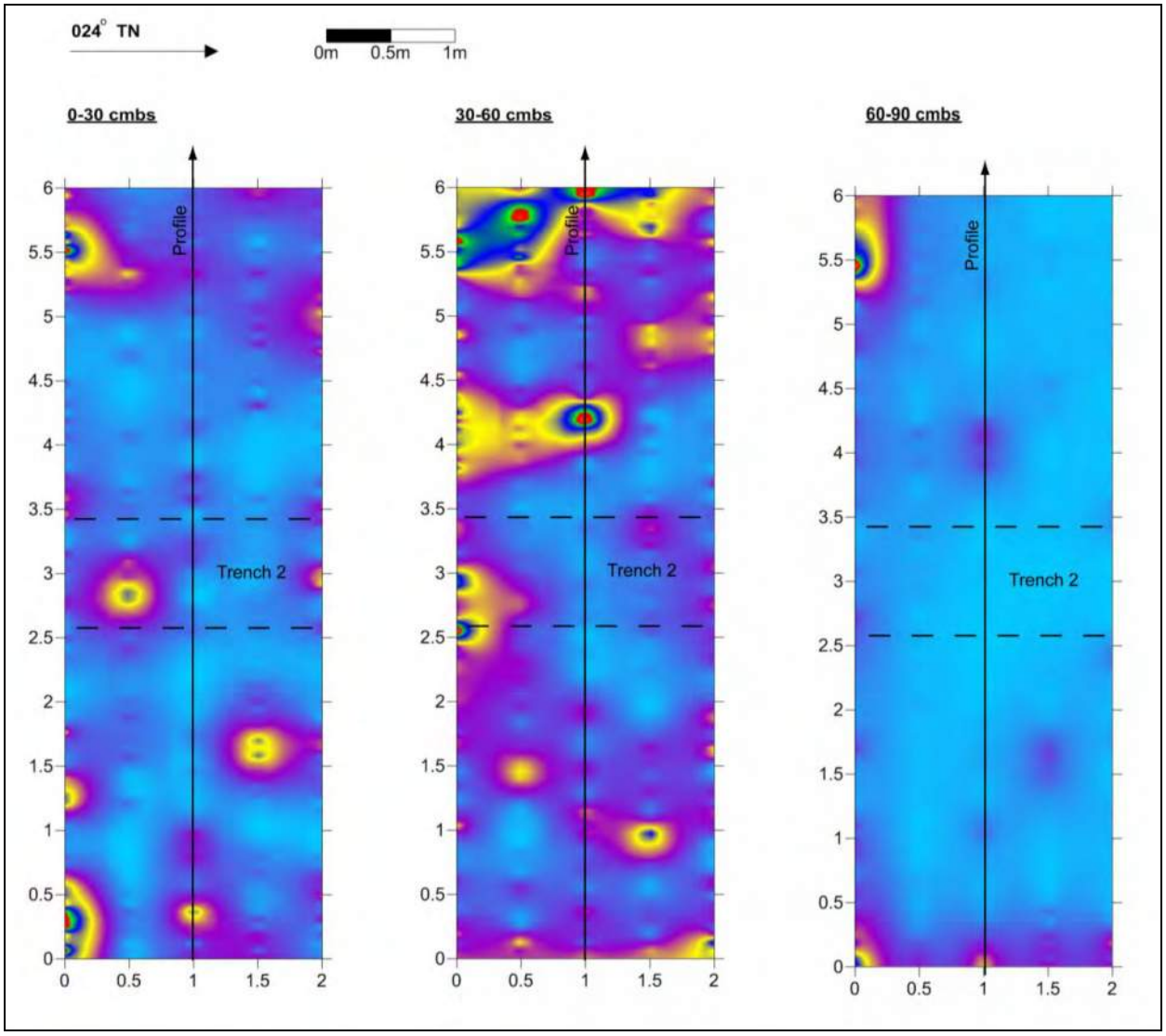


Figure 37. Amplitude slice maps collected at Trench 2

GPR depth profiles collected at Trench 2 identified numerous small reflections clustered at the surface (Figure 38). These reflections correspond to the concrete present at the surface of the survey area.

4.1.2.3 Trench 3

Trench 3 is located in the *makai* (southwestern) portion of the project area, situated within an existing warehouse with thick concrete floors (see Figure 34). The GPR survey area measured approximately 6 m by 3 m and involved of the collection of seven 6 m-long transects spaced 50 cm apart.

A review of amplitude slice maps indicates the presence of subsurface anomalies scattered throughout the survey area (Figure 39). The anomalies have no apparent organization or defined shape and likely correspond to varying fill deposits and miscellaneous debris such as construction refuse and basalt or coral boulders.

GPR depth profiles collected at Trench 3 identified numerous small reflections clustered at the surface (Figure 40). These reflections correspond to the concrete present at the surface of the survey area. Also of note was the presence of an anomaly reminiscent of subsurface disturbance in the form of a utility trench at the east end of the survey area.

4.1.2.4 Trench 4

Trench 4 is located in the *makai* (southwestern) portion of the project area, situated within an existing warehouse with thick concrete floors (see Figure 34). The GPR survey area measured approximately 6 m by 3 m and involved of the collection of seven 6 m-long transects spaced 50 cm apart.

A review of amplitude slice maps indicates prominent subsurface anomalies at the east and west ends of the survey area. The size and prominence of these anomalies suggest the presence of subsurface disturbances (i.e., backfilled machine excavations) and/or a subsurface utility box or storage tank (Figure 41). Other less prominent anomalies were also observed scattered throughout the survey area; these anomalies have no apparent organization or defined shape and likely correspond to varying fill deposits and miscellaneous debris such as construction refuse and basalt or coral boulders.

GPR depth profiles collected at Trench 4 identified numerous small reflections clustered at the surface (Figure 42). These reflections correspond to the concrete present at the surface of the survey area. Also of note was the presence of very pronounced horizontal banding from 55 to 100 cmbs. This banding is typically associated with stratigraphic layering and suggests a complex stratigraphic sequence in this location. Of particular interest are two breaks in this banding sequence that correspond to the anomalies seen in the slice maps. This suggests that these anomalies are the remnants of previously excavated trenches.

4.1.2.5 Trench 5

Trench 5 is located in the *makai* (southwestern) portion of the project area, situated within an existing warehouse with thick concrete floors (see Figure 34). The GPR survey area measured

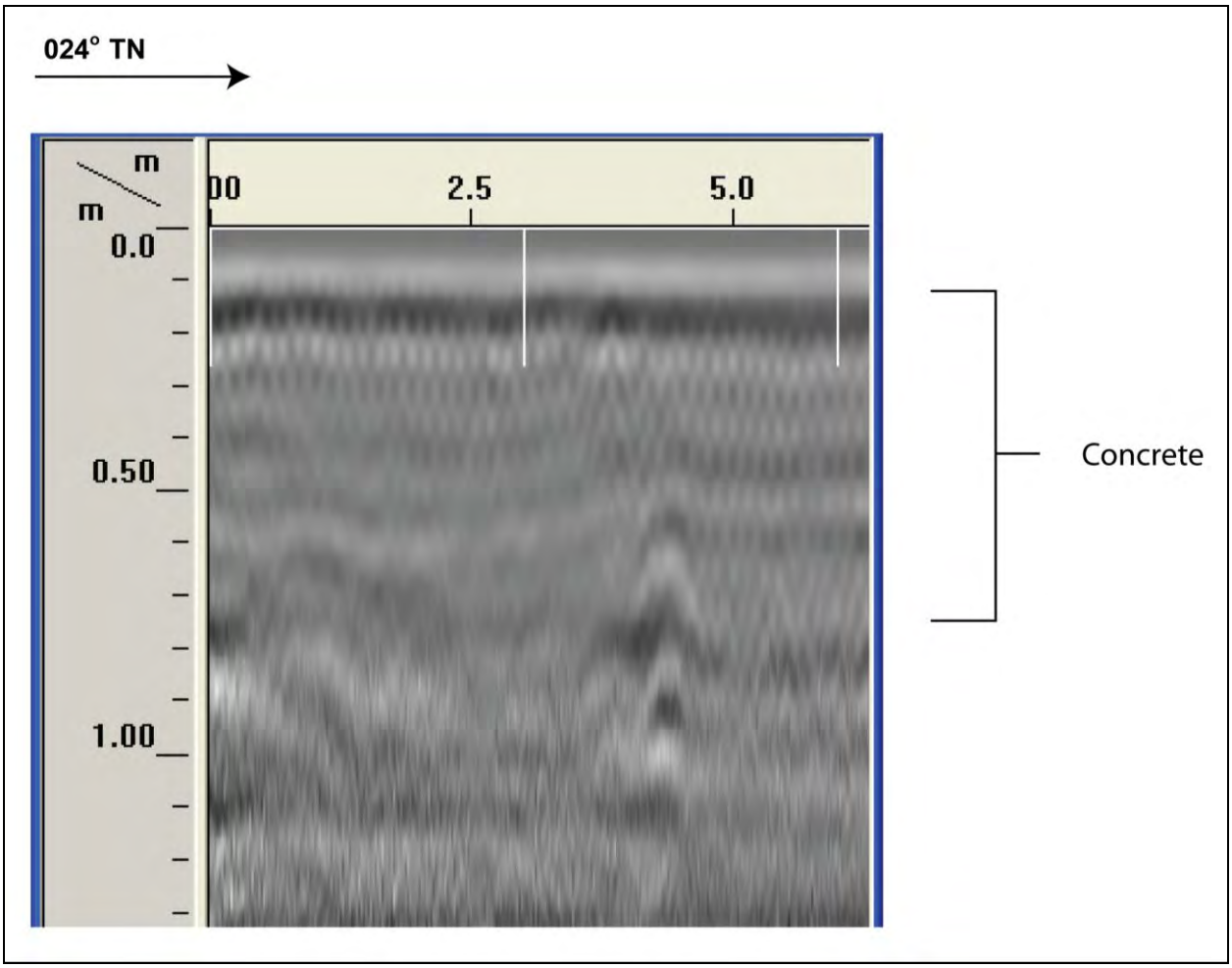


Figure 38. GPR profile collected at Trench 2

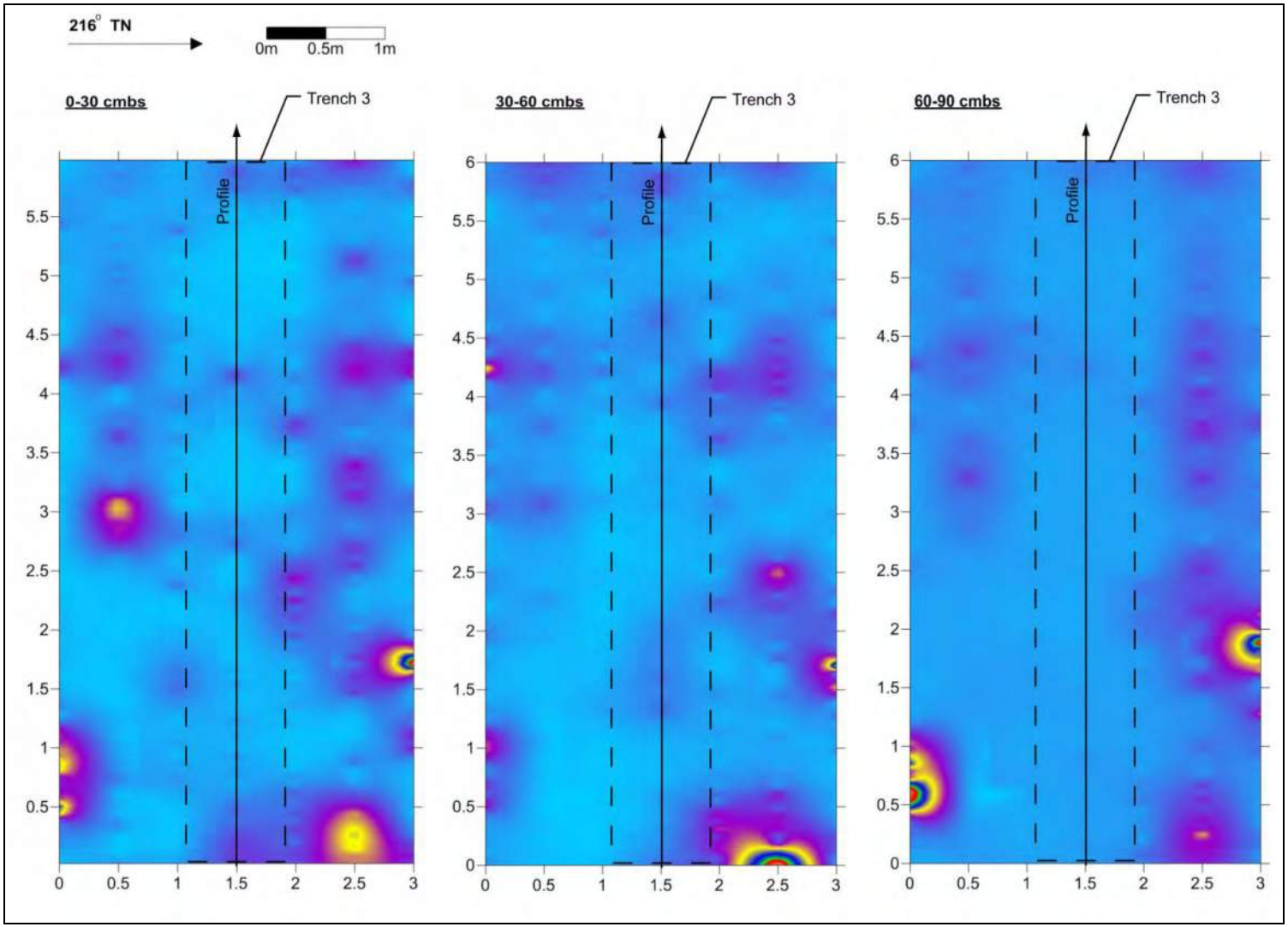


Figure 39. Amplitude slice maps collected at Trench 3

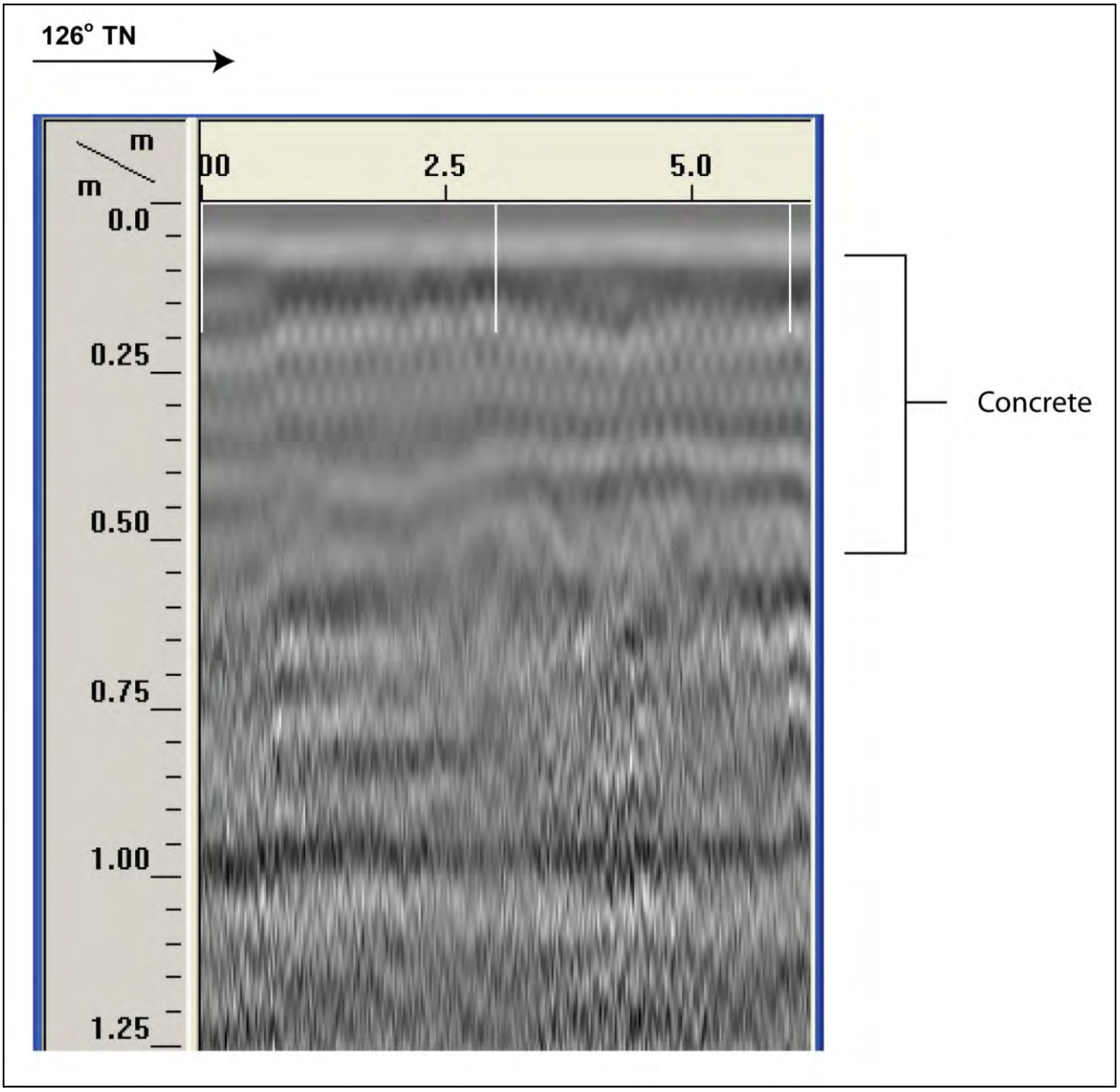


Figure 40. GPR profile collected at Trench 3

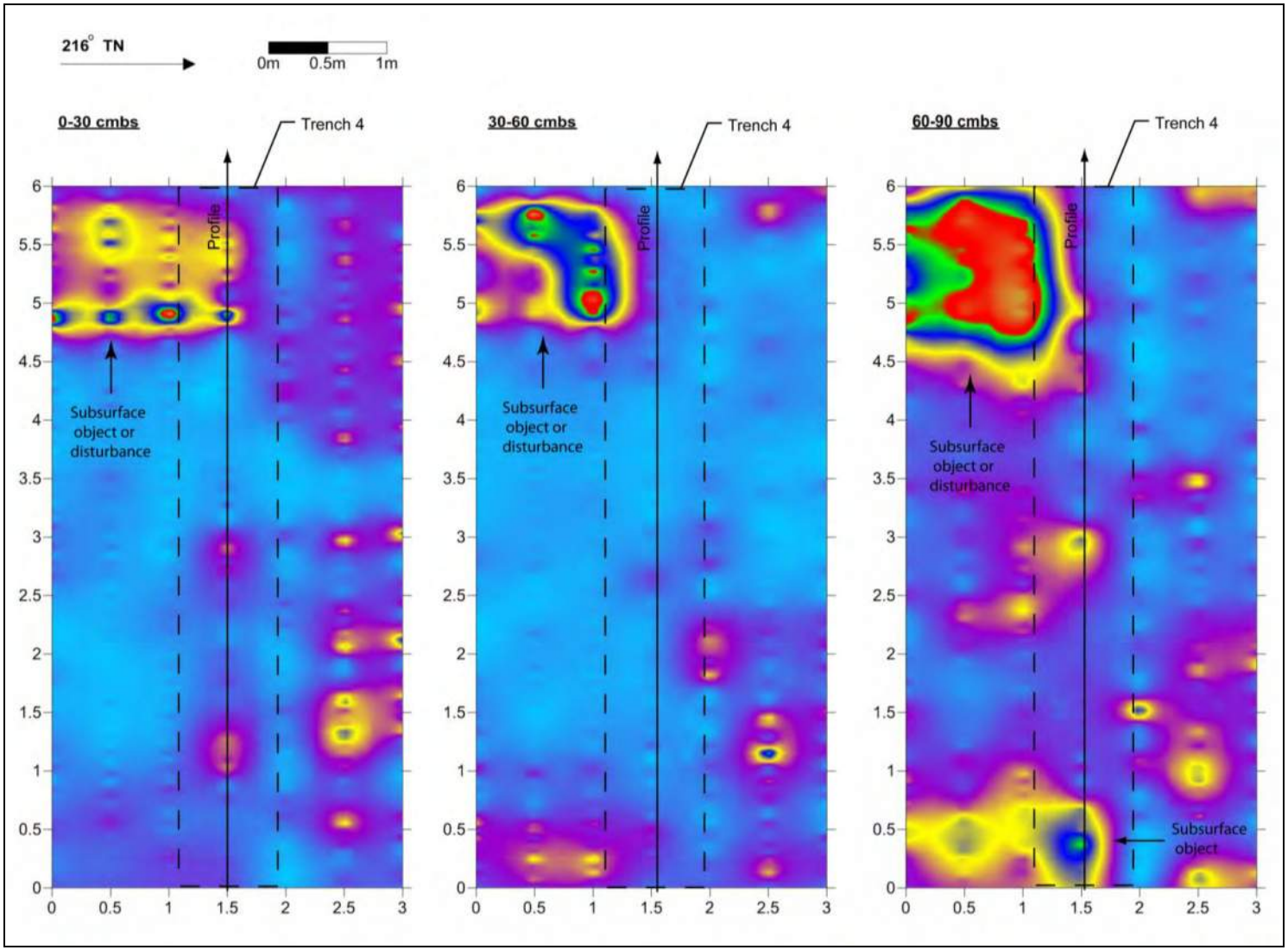


Figure 41. Amplitude slice maps collected at Trench 4

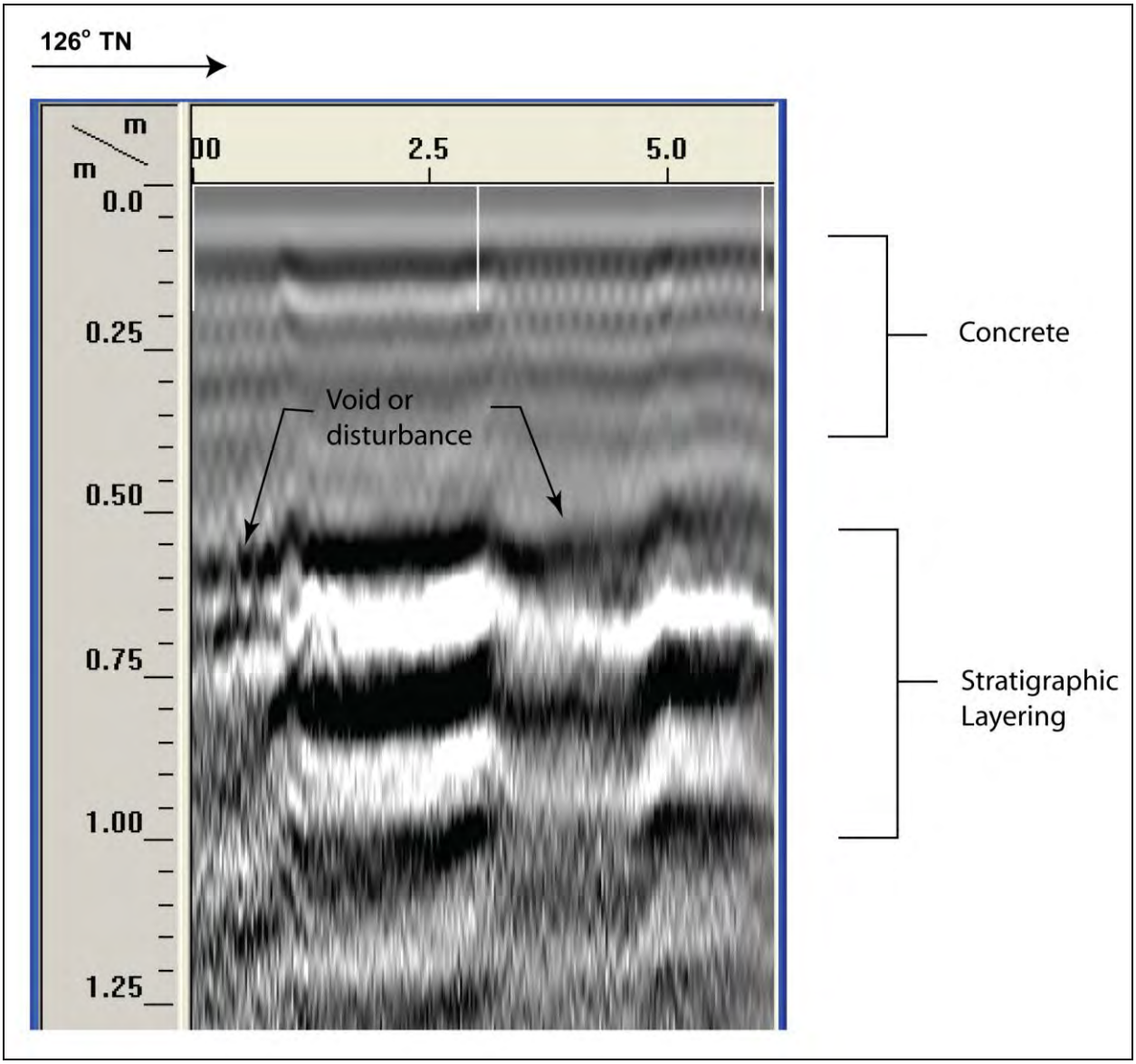


Figure 42. GPR profile collected at Trench 4

approximately 6 m by 3 m and involved of the collection of seven 6 m-long transects spaced 50 cm apart.

A review of amplitude slice maps indicates the presence of prominent subsurface anomalies at the east and west ends of the survey area (Figure 43). The anomalies at the east end are long and linear in shape and could correspond to a utility line or associated subsurface disturbance (i.e., utility trench). The anomalies at the west end have no apparent organization or defined shape and likely correspond to varying fill deposits or subsurface disturbances (i.e., previously excavated trenches).

GPR depth profiles collected at Trench 5 identified numerous small reflections clustered at the surface (Figure 44). These reflections correspond to the concrete present at the surface of the survey area. Also of note was the presence of an anomaly reminiscent of subsurface disturbance in the form of a utility trench at the east end of the survey area. Also of note was the presence of very pronounced horizontal banding from 55 to 100 cmbs. This banding is typically associated with stratigraphic layering and suggests a complex stratigraphic sequence in this location.

4.1.2.6 Trench 6

Trench 6 is located in the *makai* (southwestern) portion of the project area, situated within an existing warehouse with thick concrete floors (see Figure 34). The GPR survey area measured approximately 6 m by 3 m and involved of the collection of seven 6 m-long transects spaced 50 cm apart.

A review of amplitude slice maps indicates the presence of subsurface anomalies throughout the survey area (Figure 45). The anomalies have no apparent organization or defined shape and likely correspond to varying fill deposits and miscellaneous debris such as construction refuse and basalt or coral boulders.

GPR depth profiles collected at Trench 6 identified numerous small reflections clustered at the surface (Figure 46). These reflections correspond to the concrete present at the surface of the survey area. Of note was the presence of an anomaly reminiscent of subsurface disturbance in the form of a utility trench at the east end of the survey area. Also of note was the presence of very pronounced horizontal banding from 55 to 85 cmbs. This banding is typically associated with stratigraphic layering and suggests a complex stratigraphic sequence in this location.

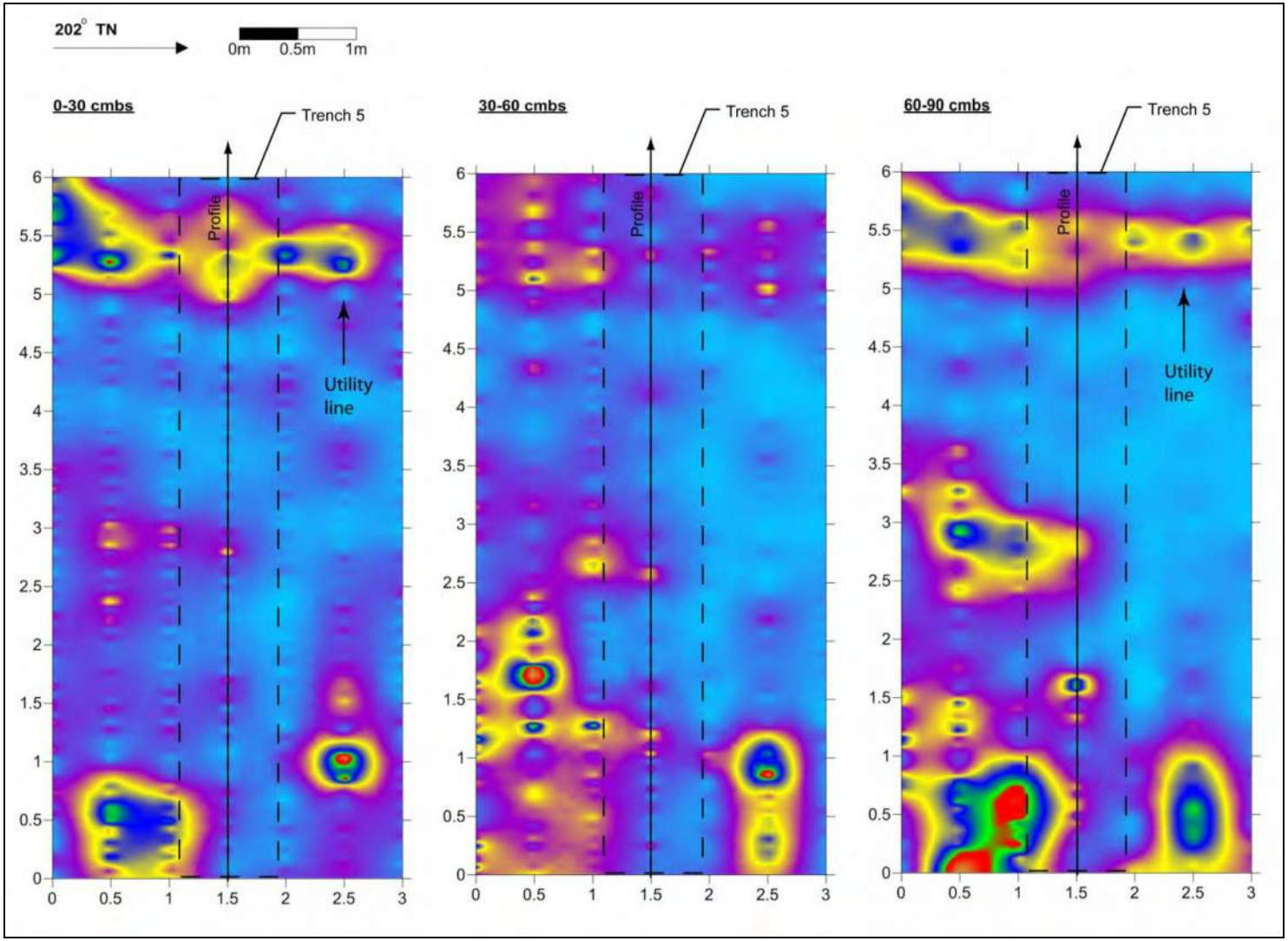


Figure 43. Amplitude slice maps collected at Trench 5

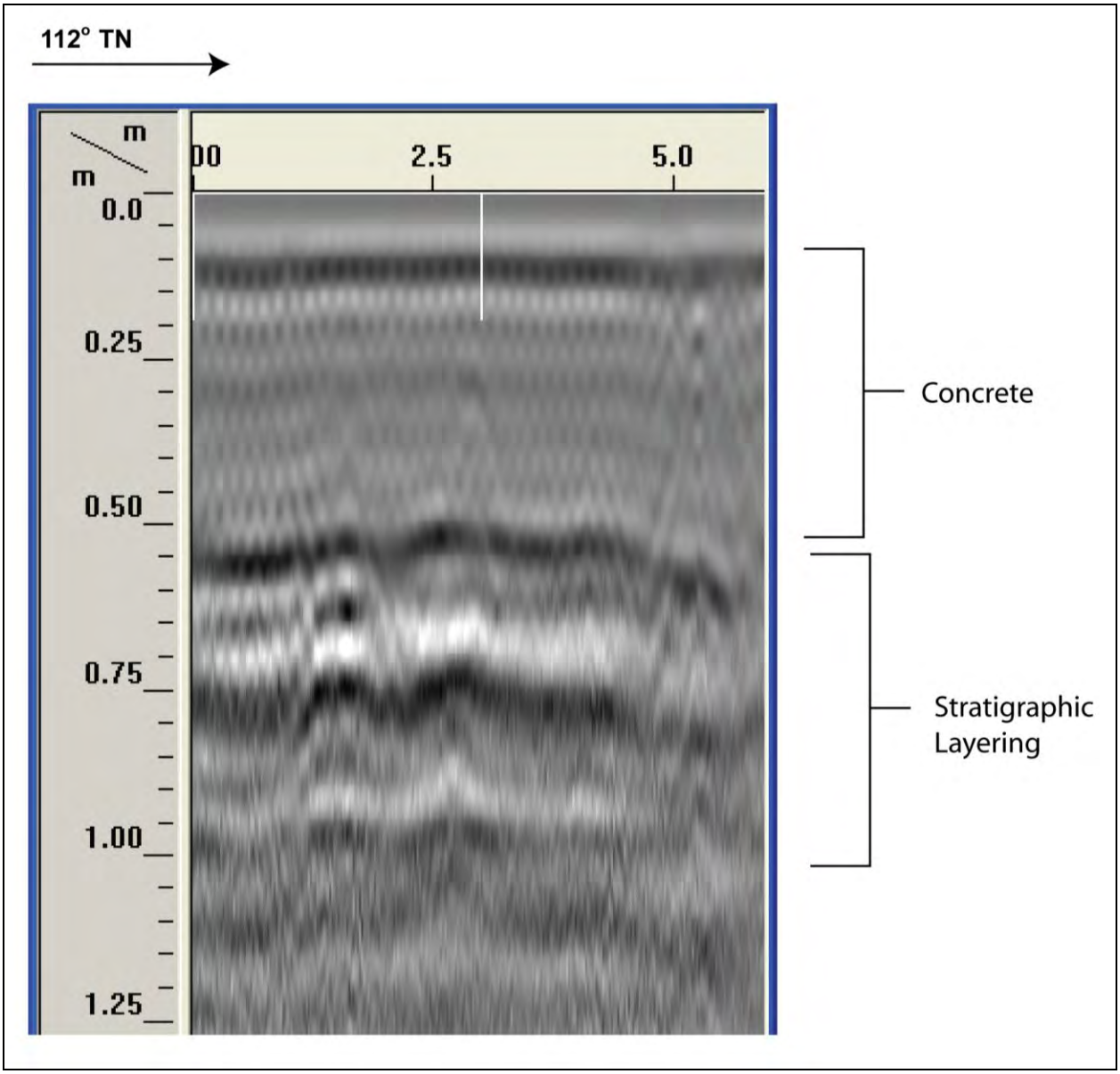


Figure 44. GPR profile collected at Trench 5

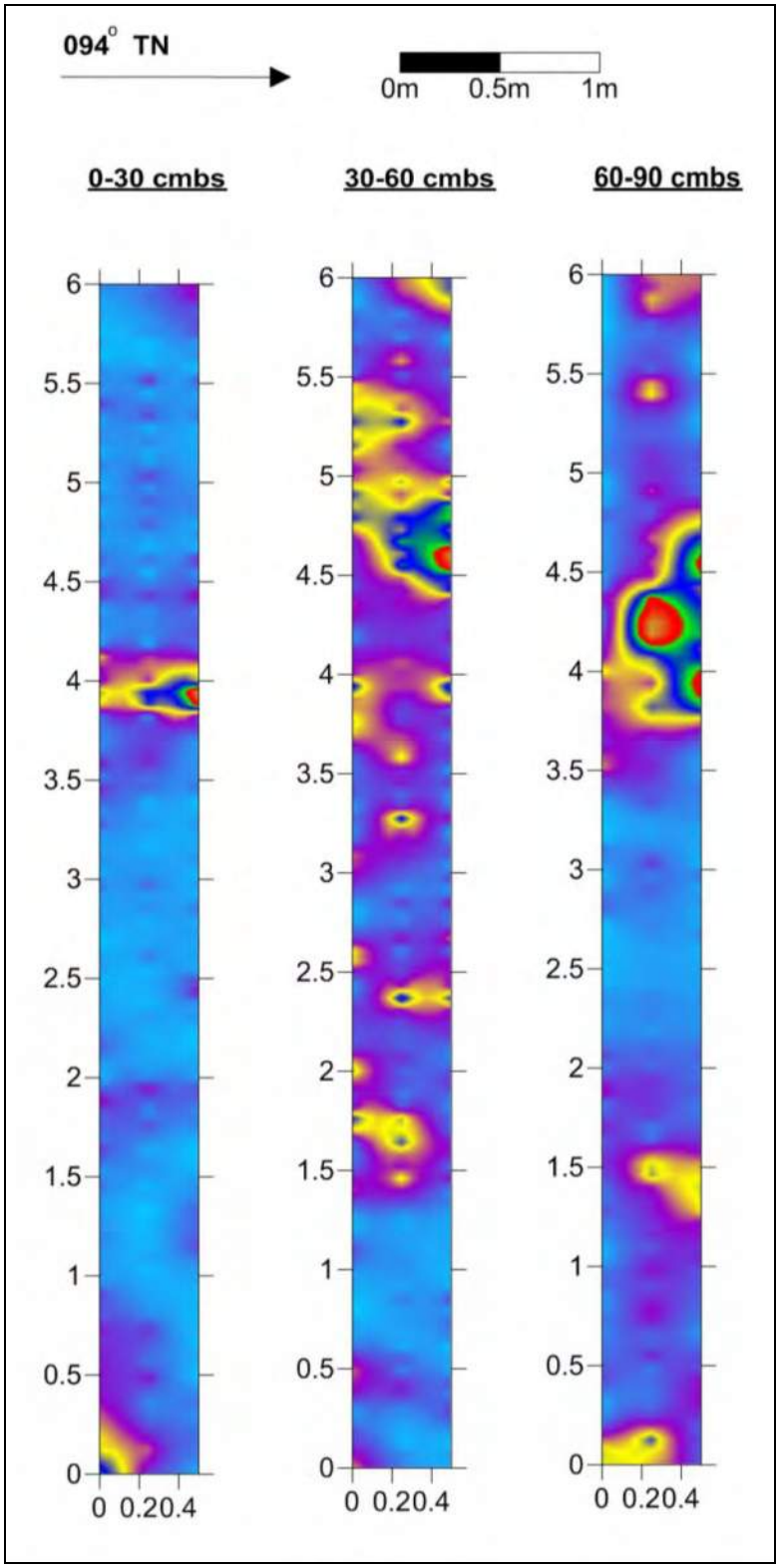


Figure 45. Amplitude slice maps collected at Trench 6

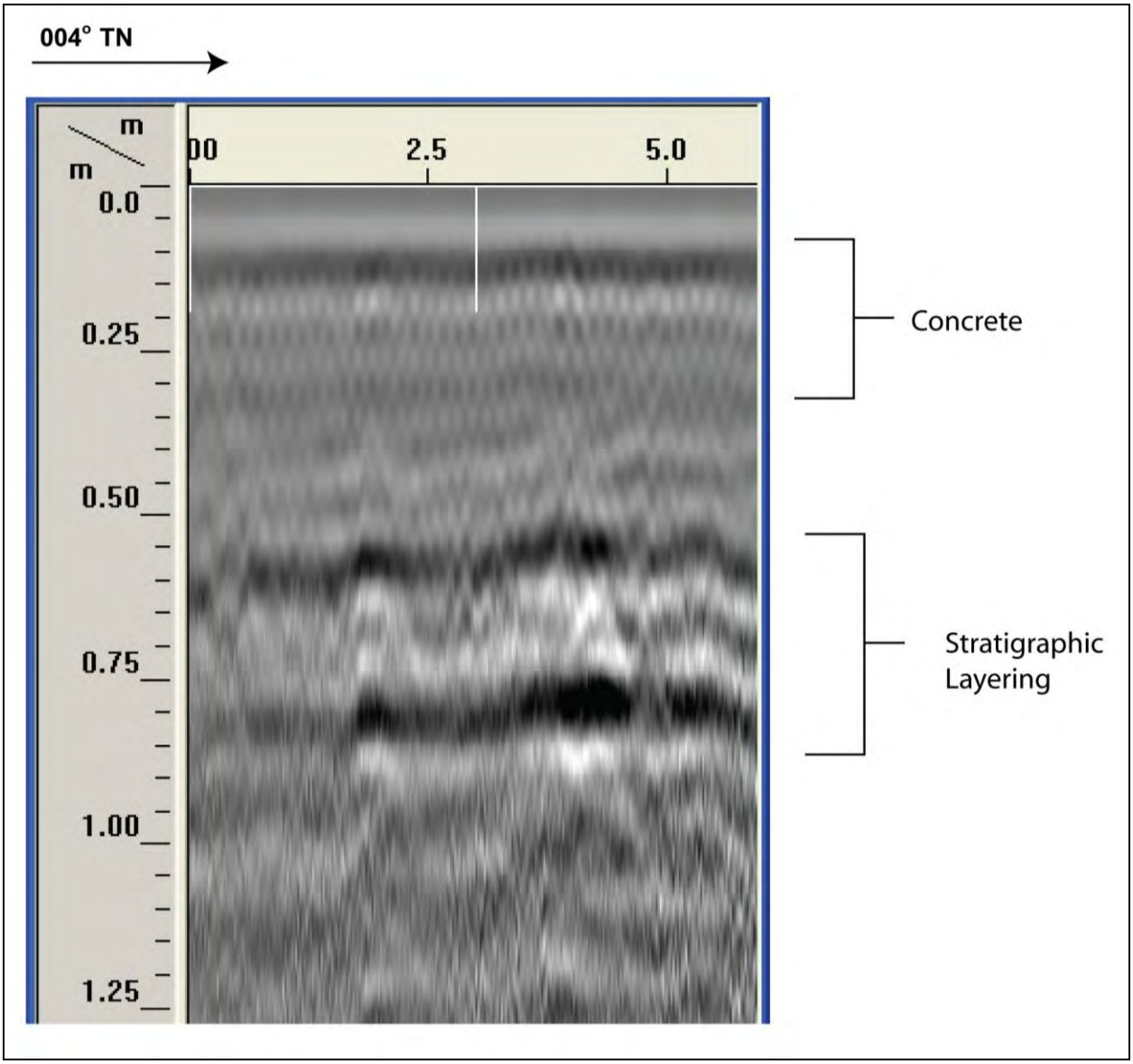


Figure 46. GPR profile collected at Trench 6

4.2 Stratigraphy

The following paragraphs provide an overview of the stratigraphy observed within the 22 test trenches excavated within the project area. For detailed information regarding each of the excavated trenches, refer to the trench profiles, sediment descriptions, and photographs, below.

Strata were designated I through III and sub-designated a through i. The observed stratigraphic sequences throughout the project area were largely similar. In general, Stratum I consisted of ground surfaces (asphalt and concrete) and construction grading and fill layers; Stratum II consisted of either historic trash layers (SIHP # -7193) or, if no trash layers were present, an old A horizon and natural gley and sandy clay layers; Stratum III consisted of an old A horizon and natural gley and sandy clay layers, when Stratum II (historic trash layer) was present. The coral shelf was observed at the base of excavation (BOE) of all excavated trenches except for one (Trench 2).

The historic trash layer consists of a substantial amount of whole and fragmented glass bottles and jars, unidentifiable metal fragments, wires, ceramic fragments, red brick and ceramic tiles, red bricks, cinder blocks, lumber, nails, metal barrel remnants, and tire remnants and has been designated SIHP # 50-80-14-7193.

The old, buried A horizon consists of a narrow layer of black silt loam containing decaying organic matter (peat) and abundant land snail shells. No cultural material was observed within this layer; therefore, it was not sampled or recommended as a historic property.

4.3 Test Trench Documentation

4.3.1 Trench 1

Trench 1 is located in the southeast corner of the warehouse at the southern edge of the project area (Figure 47, Figure 48, and Table 3). The stratigraphy of Trench 1 consists of concrete (Stratum Ia) and silt loam grading fill (Stratum Ib) overlying a layer of asphalt (Stratum Ic) and crushed coral grading fill (Stratum Id) overlying a gravelly silt loam fill layer (Stratum Ie) overlying a thick gravelly sand and historic trash layer (Stratum IIa; part of SIHP # -7193), which overlies a gravelly silt loam fill layer (Stratum IIb) and four layers of natural sand and gley (Strata IIIa-d), which overlie the natural coral shelf. Stratum IIb overlies an old peat A horizon (Stratum IIIe), which overlies the natural coral shelf.

Figure 47. Photograph of Trench 1, south wall of excavation

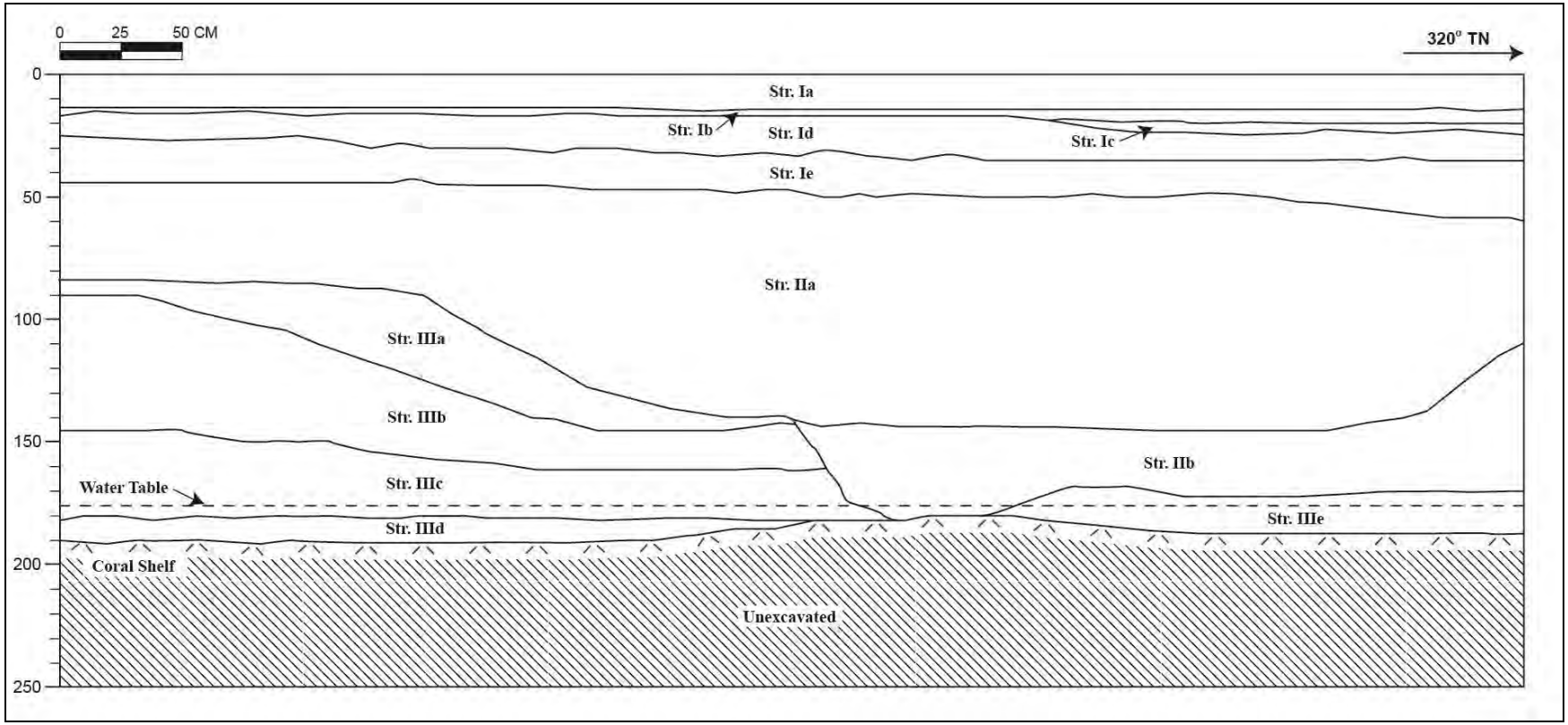


Figure 48. Trench 1 profile, south wall of excavation

Table 3. Stratigraphy Observed at Trench 1

Stratum	Depth (cmbs)	Description of Sediments
Ia	0-14	Concrete
Ib	25-59	Fill; 7.5YR 3/3, dark brown; silt loam; weak, fine, crumb structure; moist, friable consistency; non-plastic; terrestrial origin; very abrupt, wavy lower boundary; crushed coral inclusions; grading fill.
Ic	19-24	Asphalt
Id	15-35	Crushed coral grading fill; 10YR 8/2, very pale brown.
Ie	14-19	Fill; 5YR 3/3, dark reddish brown; gravelly silt loam; weak, very fine, crumb structure; moist, very friable consistency; slightly plastic; terrestrial origin; abrupt, wavy lower boundary; imported fill.
IIa	42-144	Fill; 5YR 4/2, dark reddish gray; gravelly sand; fine to coarse; single-grain; moist, loose consistency; non-plastic; marine origin; clear, wavy lower boundary; contains red brick tiles, metal fragments, ceramic tiles, glass jars, red bricks, cinder blocks, and wires; part of SIHP # -7193, historic trash layer.
IIb	109-180	Fill; 5YR 3/3, dark reddish brown; gravelly silt loam; moderate, fine, crumb structure; moist, friable consistency; slightly plastic; terrestrial origin; diffuse, wavy lower boundary; imported fill.
IIIa	83-145	Natural; 10YR 6/3, pale brown; sand; fine; single-grain; moist, loose consistency; non-plastic; marine origin; diffuse, wavy lower boundary; partially disturbed.
IIIb	89-161	Natural; 10YR 5/2, grayish brown; clay; moderate, medium, platy structure; moist, friable consistency; very plastic; mixed origin; diffuse, wavy lower boundary.
IIIc	144-180	Natural; Gley 2 6/10G, greenish gray; clay; weak, medium, platy structure; moist, very friable consistency; plastic; mixed origin; diffuse, smooth lower boundary; gley.
IIId	180-190 (base of excavation [BOE])	Natural; Gley 1 7/5GY, light greenish gray; sandy clay; fine; weak, medium, platy structure; moist, friable consistency; slightly plastic; mixed origin; lower boundary not visible; gley; overlies coral shelf.
IIIe	168-186 (BOE)	Natural; 10YR 2/1, black; silt loam; weak, fine, platy structure; wet, slightly sticky consistency; non-plastic; terrestrial origin; abrupt, wavy lower boundary; many fine to medium roots; consists of decaying organic material; peat; old A horizon; overlies coral shelf.

4.3.2 Trench 2

Trench 2 is located in the southeast corner of the warehouse at the southern edge of the project area (Figure 49, Figure 50, and Table 4). The stratigraphy of Trench 2 consists of concrete (Stratum Ia) overlying a silt loam grading fill (Stratum Ib) overlying a layer of asphalt (Stratum Ic) and crushed coral grading fill (Stratum Id) overlying two thick silt loam fill layers (Strata Ie-f) overlying a basalt cobble and boulder layer (Stratum II) on top of the natural coral shelf.

Figure 49. Photograph of Trench 2, south wall of excavation

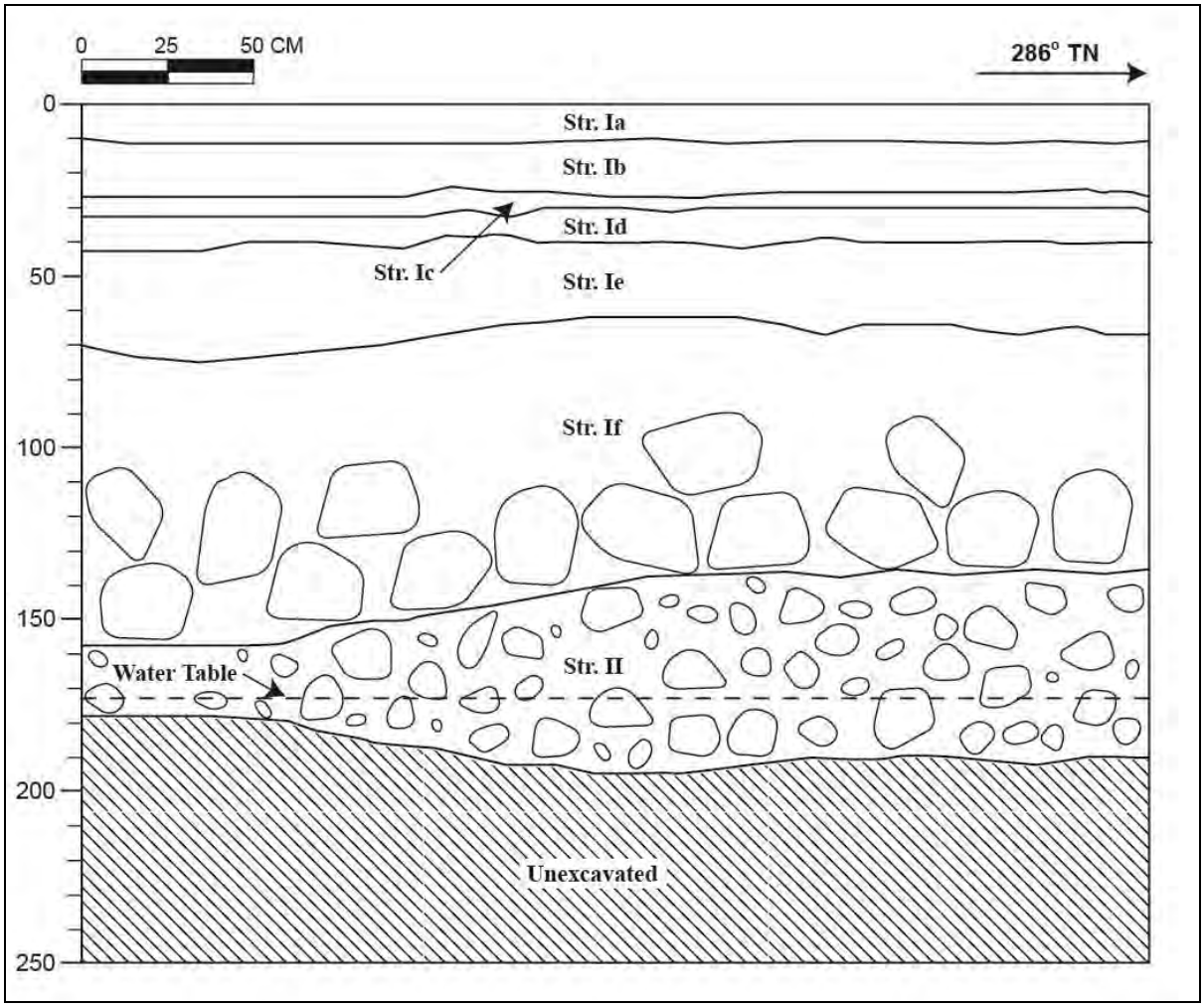


Figure 50. Trench 2 profile, south wall of excavation

Table 4. Stratigraphy Observed at Trench 2

Stratum	Depth (cmbs)	Description of Sediments
Ia	0-12	Concrete
Ib	11-27	Fill; 7.5 YR 3/3, dark brown; silt loam; weak, fine, crumb structure; moist, friable consistency; non-plastic; terrestrial origin; very abrupt, smooth lower boundary.
Ic	27-32	Asphalt
Id	30-42	Crushed coral grading fill; 10YR 8/2, very pale brown.
Ie	39-74	Fill; 5YR 3/3, dark reddish brown; silt loam; weak, fine, crumb structure; moist, very friable consistency; slightly plastic; terrestrial origin; abrupt, wavy lower boundary; imported fill.
If	62-107	Fill; 7.5YR 3/3, dark brown; silt loam; weak, fine, crumb structure; moist, very friable consistency; non-plastic; terrestrial origin; clear, wavy lower boundary; large, sub-angular, basalt boulder inclusions.
II	131-195 (BOE)	Fill; small cobbles to large, sub-angular, basalt boulders.

4.3.3 Trench 3

Trench 3 is located in the middle of the warehouse at the southern edge of the project area (Figure 51, Figure 52, and Table 5). The stratigraphy of Trench 3 consists of concrete (Stratum Ia) and silt loam grading fill (Stratum Ib) overlying asphalt (Stratum Ic) and crushed coral grading fill (Stratum Id) overlying two thick silt loam fill layers (Strata Ie-f) overlying an old peat A horizon (Stratum IIa) overlying natural gley (Stratum IIb) on top of the natural coral shelf.

Figure 51. Photograph of Trench 3, north wall of excavation

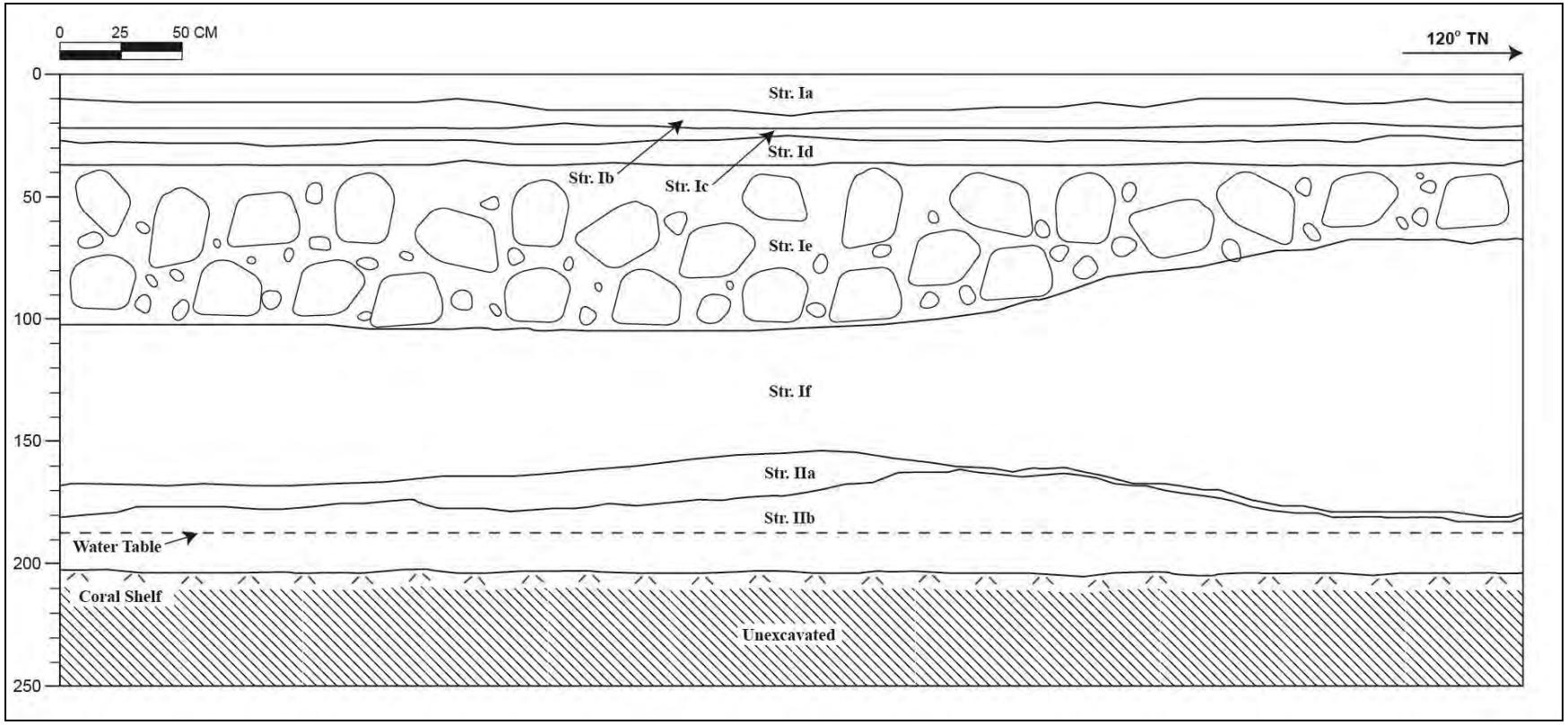


Figure 52. Trench 3 profile, north wall of excavation

Table 5. Stratigraphy Observed at Trench 3

Stratum	Depth (cmbs)	Description of Sediments
Ia	0-15	Concrete
Ib	11-23	Fill; 7.5 YR 3/3, dark brown; silt loam; weak, fine, crumb structure; moist, friable consistency; non-plastic; terrestrial origin; very abrupt, smooth lower boundary.
Ic	20-29	Asphalt
Id	27-37	Crushed coral grading fill; 10YR 8/2, very pale brown.
Ie	37-54	Fill; 5YR 3/3, dark reddish brown; silt loam; weak, fine, crumb structure; moist, very friable consistency; slightly plastic; terrestrial origin; diffuse, wavy lower boundary; large, sub-angular, basalt boulder inclusions; some metal fragment inclusions.
If	67-180	Fill; 2.5YR 3/4, dark reddish brown; gravelly silt loam; weak, fine crumb structure; moist, very friable consistency; slightly plastic; terrestrial origin; abrupt, wavy lower boundary.
IIa	154-182	Natural; 10YR 2/1, black; silt loam; weak, fine, platy structure; moist, very friable consistency; non-plastic; terrestrial origin; diffuse, wavy lower boundary; many fine to medium roots; consists of decaying organic material; peat; old A horizon.
IIb	163-204 (BOE)	Natural; Gley 2 6/10G, greenish gray; clay; weak, medium, platy structure; wet, slightly sticky consistency; plastic; mixed origin; lower boundary not visible; common, fine roots; gley; overlies coral shelf.

4.3.4 Trench 4

Trench 4 is located in the middle of the warehouse at the southern edge of the project area (Figure 53, Figure 54, and Table 6). The stratigraphy of Trench 4 consists of concrete (Stratum Ia) over a layer of asphalt (Stratum Ib) overlying crushed coral grading fill (Stratum Ic) overlying a thick silt loam fill layer (Stratum Id) overlying a clay loam fill layer (Stratum Ie) overlying an old peat A horizon (Stratum IIa) overlying two layers of natural gley (Strata IIb-c) on top of the natural coral shelf.

Figure 53. Photograph of Trench 4, north wall of excavation

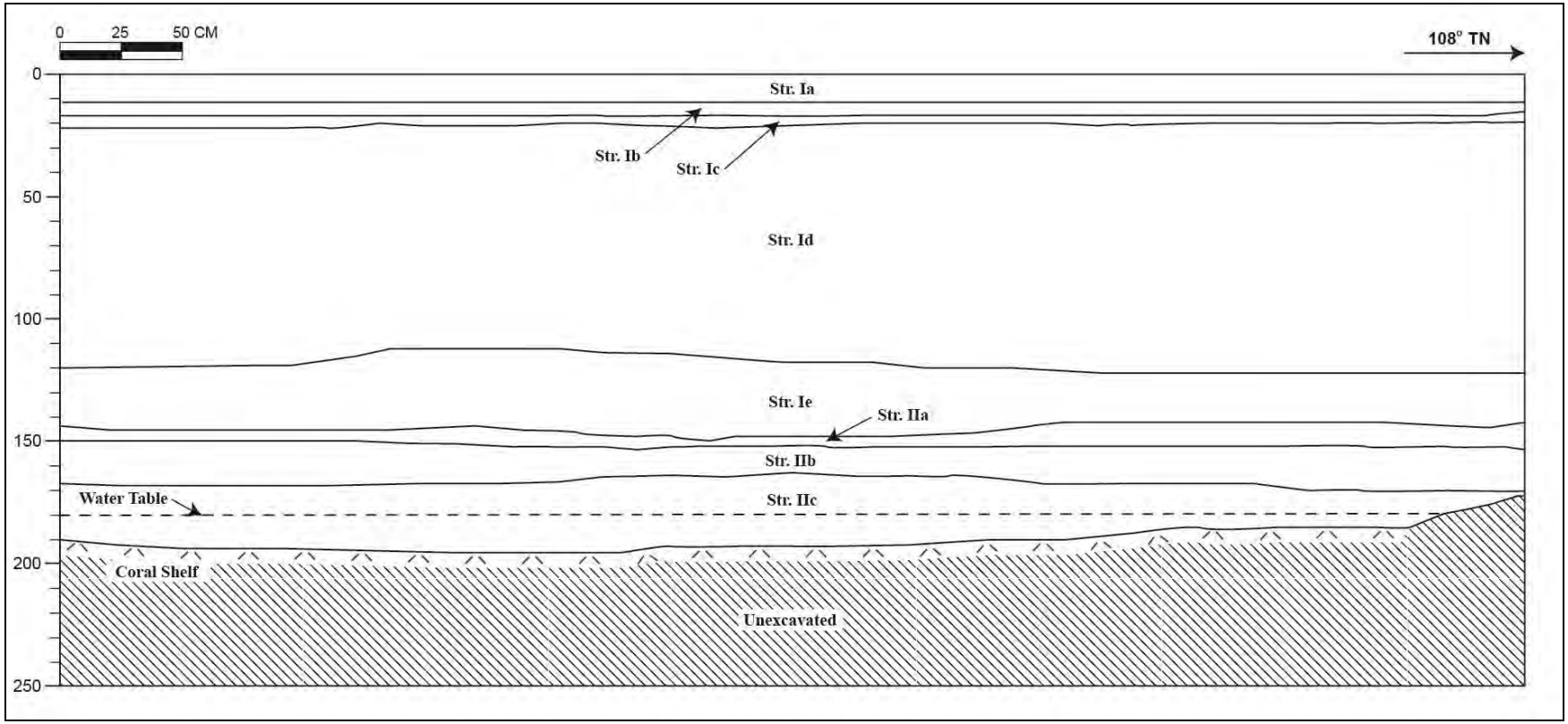


Figure 54. Trench 4 profile, north wall of excavation

Table 6. Stratigraphy Observed at Trench 4

Stratum	Depth (cmbs)	Description of Sediments
Ia	0-12	Concrete
Ib	12-18	Asphalt
Ic	18-22	Crushed coral grading fill; 10YR 8/2, very pale brown.
Id	20-120	Fill; 2.5 YR 3/4, dark reddish brown; silt loam; weak, fine, crumb structure; moist, friable consistency; non-plastic; terrestrial origin; diffuse, wavy lower boundary; imported fill.
Ie	113-145	Fill; 10YR 3/2, very dark brown; clay loam; weak, fine, crumb structure; moist, friable consistency; slightly plastic; terrestrial origin; diffuse, smooth lower boundary.
IIa	141-152	Natural; 10YR 2/1, black; silt loam; weak, fine, platy structure; moist, very friable consistency; non-plastic; terrestrial origin; diffuse, wavy lower boundary; many fine to medium roots; consists of decaying organic material; peat; old A horizon.
IIb	149-170	Natural; Gley 1 4/10Y, dark greenish gray; clay; moderate, medium, platy structure; moist, friable consistency; plastic; mixed origin; diffuse, smooth lower boundary; gley.
IIc	164-196 (BOE)	Natural; Gley 1 5/N, greenish gray; clayey sand; weak, medium, crumb structure; moist, very friable consistency; slightly plastic; mixed origin; lower boundary not visible; gley; overlies coral shelf.

4.3.5 Trench 5

Trench 5 is located in the southwest corner of the warehouse at the southern edge of the project area (Figure 55, Figure 56, and Table 7). The stratigraphy of Trench 5 consists of concrete (Stratum Ia) and a layer of gravelly silt grading fill (Stratum Ib) over asphalt (Stratum Ic) and crushed coral grading fill (Stratum Id) overlying a thick silt loam fill layer (Stratum Ie) overlying a natural silt loam layer (Stratum IIa) overlying a layer of natural clayey sand (gley) (Stratum IIb) on top of the soft natural coral shelf.

Figure 55. Photograph of Trench 5, south wall of excavation

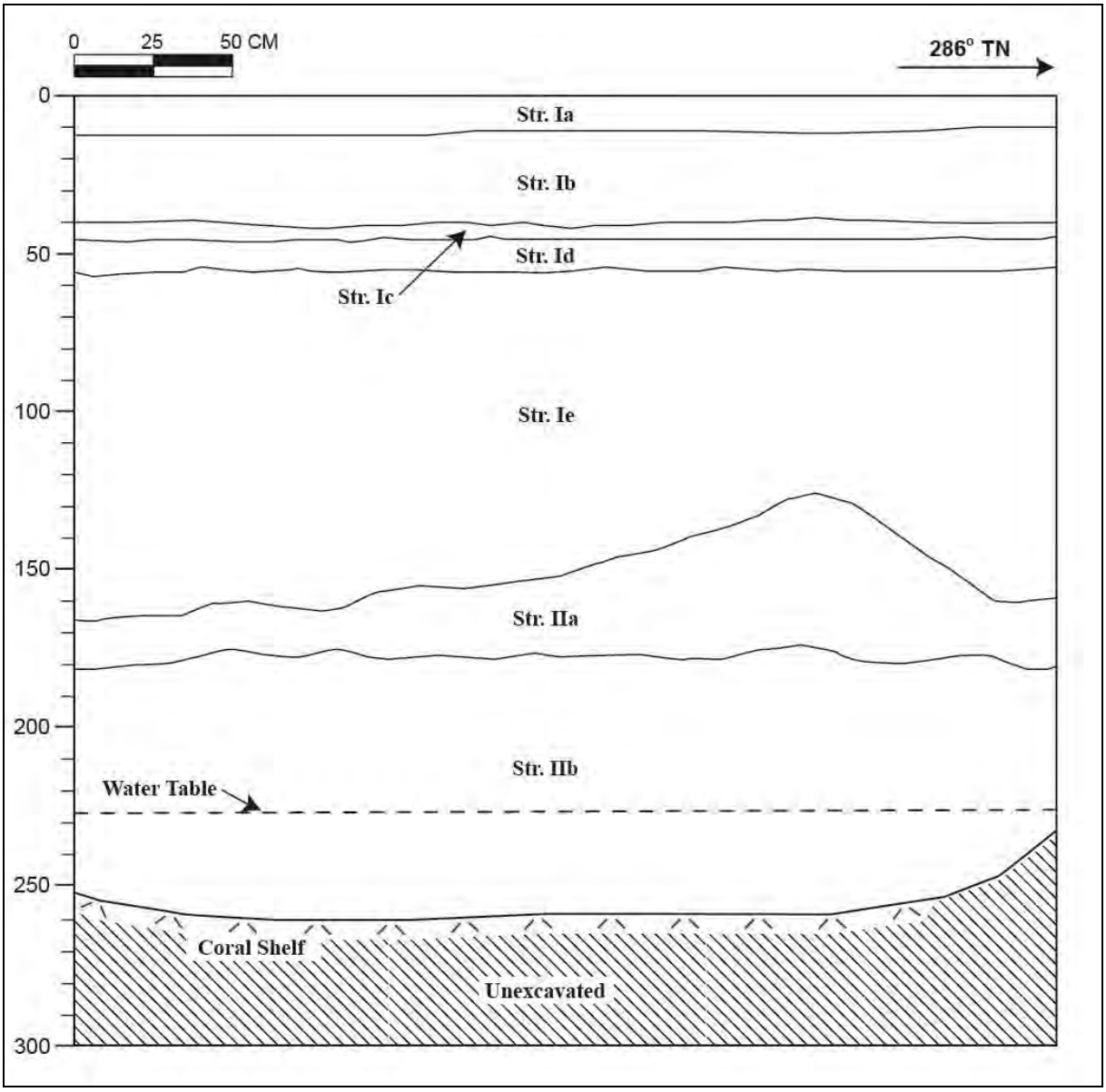


Figure 56. Trench 5 profile, south wall of excavation

Table 7. Stratigraphy Observed at Trench 5

Stratum	Depth (cmbs)	Description of Sediments
Ia	0-12	Concrete
Ib	12-40	Fill; 10YR 5/3, brown; gravelly silt; weak, very fine structure; dry, weakly coherent consistency; non-plastic; terrestrial origin; very abrupt, smooth lower boundary; gravel and small cobble inclusions.
Ic	40-45	Asphalt
Id	45-55	Crushed coral grading fill; 10YR 8/2, very pale brown.
Ie	55-164	Fill; 5YR 3/4, dark reddish brown; silt loam; weak, medium, crumb structure; moist, friable consistency; slightly plastic; terrestrial origin; becomes more clayey with depth; gravel inclusions.
IIa	125-180	Natural; 10YR 2/2, very dark brown, silt loam; weak, medium, crumb structure; moist, friable consistency; slightly plastic; terrestrial origin; diffuse, wavy lower boundary; gravel inclusions.
IIb	176-260 (BOE)	Natural; Gley 2 6/10G, greenish gray; clayey sand; weak, medium, granular structure; wet, sticky consistency; slightly plastic; mixed origin; gley; becomes more sandy with depth; overlies soft coral shelf.

4.3.6 Trench 6

Trench 6 is located along the west wall of the warehouse at the southern edge of the project area (Figure 57, Figure 58, and Table 8). The stratigraphy of Trench 6 consists of concrete (Stratum Ia) over a gravelly silt grading fill layer (Stratum Ib) overlying asphalt (Stratum Ic) overlying crushed coral grading fill (Stratum Id) overlying a thick silt loam fill layer (Stratum Ie) overlying a natural clay layer (Stratum IIa) overlying a natural gley layer (Stratum IIb) overlying a sandy gley (Strata IIc) on top of the natural coral shelf.

Figure 57. Photograph of Trench 6, west wall of excavation

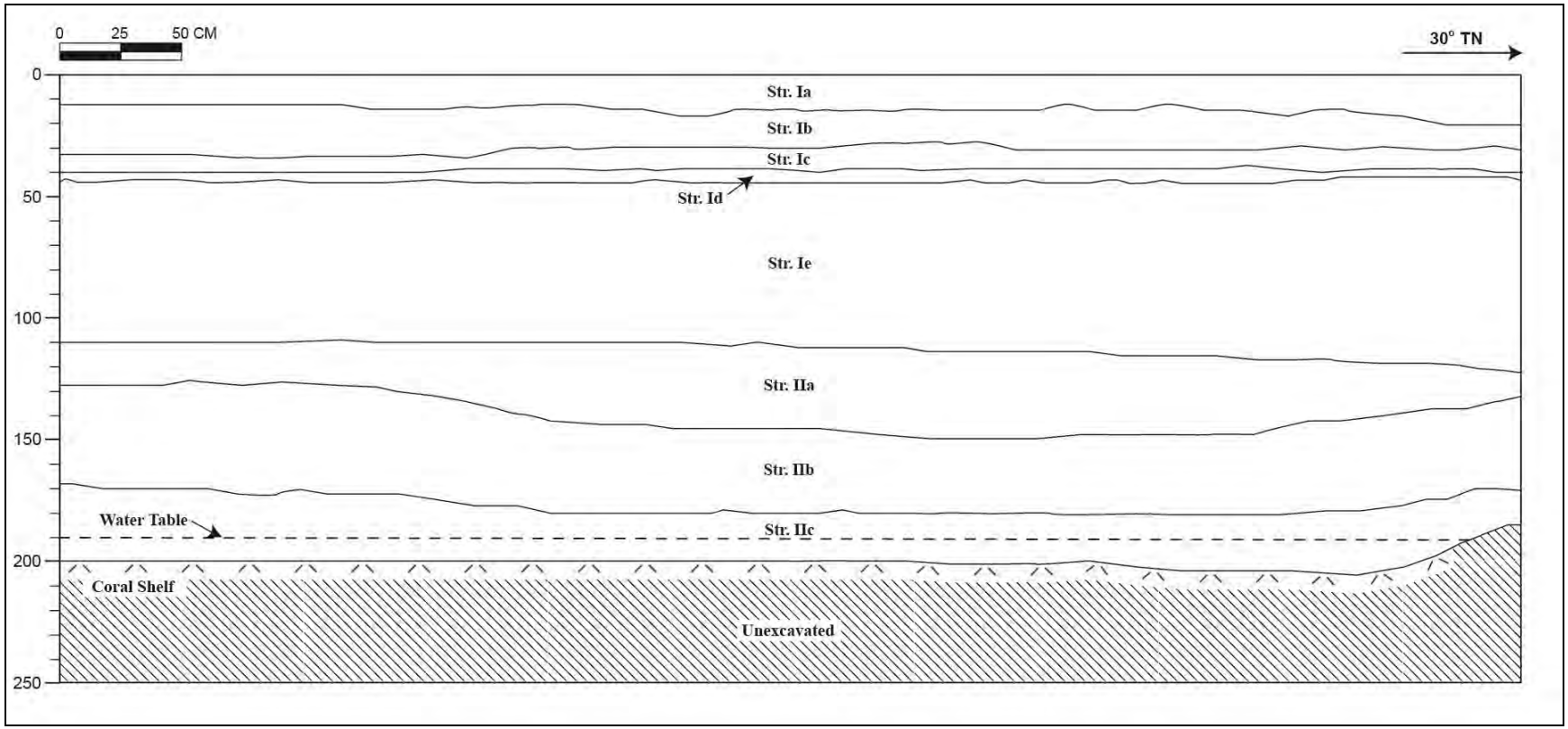


Figure 58. Trench 6 profile, west wall of excavation

Table 8. Stratigraphy Observed at Trench 6

Stratum	Depth (cmbs)	Description of Sediments
Ia	0-20	Concrete
Ib	12-33	Fill; 7.5YR 4/3, brown; gravelly silt; weak, very fine, granular structure; dry, loose consistency; non-plastic; terrestrial origin; very abrupt, smooth lower boundary.
Ic	28-40	Asphalt
Id	37-44	Crushed coral grading fill; 10YR 8/2, very pale brown.
Ie	42-121	Fill; 5YR 3/4, dark reddish brown; silt loam; moderate, medium, crumb structure; moist, friable consistency; slightly plastic; terrestrial origin; clear, smooth lower boundary; imported fill.
IIa	110-150	Natural; 2.5Y 5/2, grayish brown; sandy clay; moderate, medium, crumb structure; moist, friable consistency; plastic; mixed origin; diffuse, wavy lower boundary; many medium, decaying roots.
IIb	127-180	Natural; Gley 1 3/10Y, very dark greenish gray; clay; moderate, medium, platy structure; moist, friable consistency; very plastic; diffuse, wavy lower boundary; many fine, decaying roots; gley.
IIc	170-204 (BOE)	Natural; Gley 1 5/10GY, greenish gray; sandy clay, moderate, medium, blocky structure; moist, friable consistency; plastic; mixed origin; lower boundary not visible; gley; overlies coral shelf.

4.3.7 Trench 7

Trench 7 is located in the southwest corner of the project area, just north of the warehouse (Figure 59, Figure 60, and Table 9). The stratigraphy of Trench 7 consists of asphalt (Stratum Ia) over crushed coral grading fill (Stratum Ib) overlying a thick silt loam fill layer (Stratum Ic) overlying an old peat A horizon (Stratum IIa) overlying natural clayey sand (gley) (Stratum IIb) on top of the natural coral shelf.

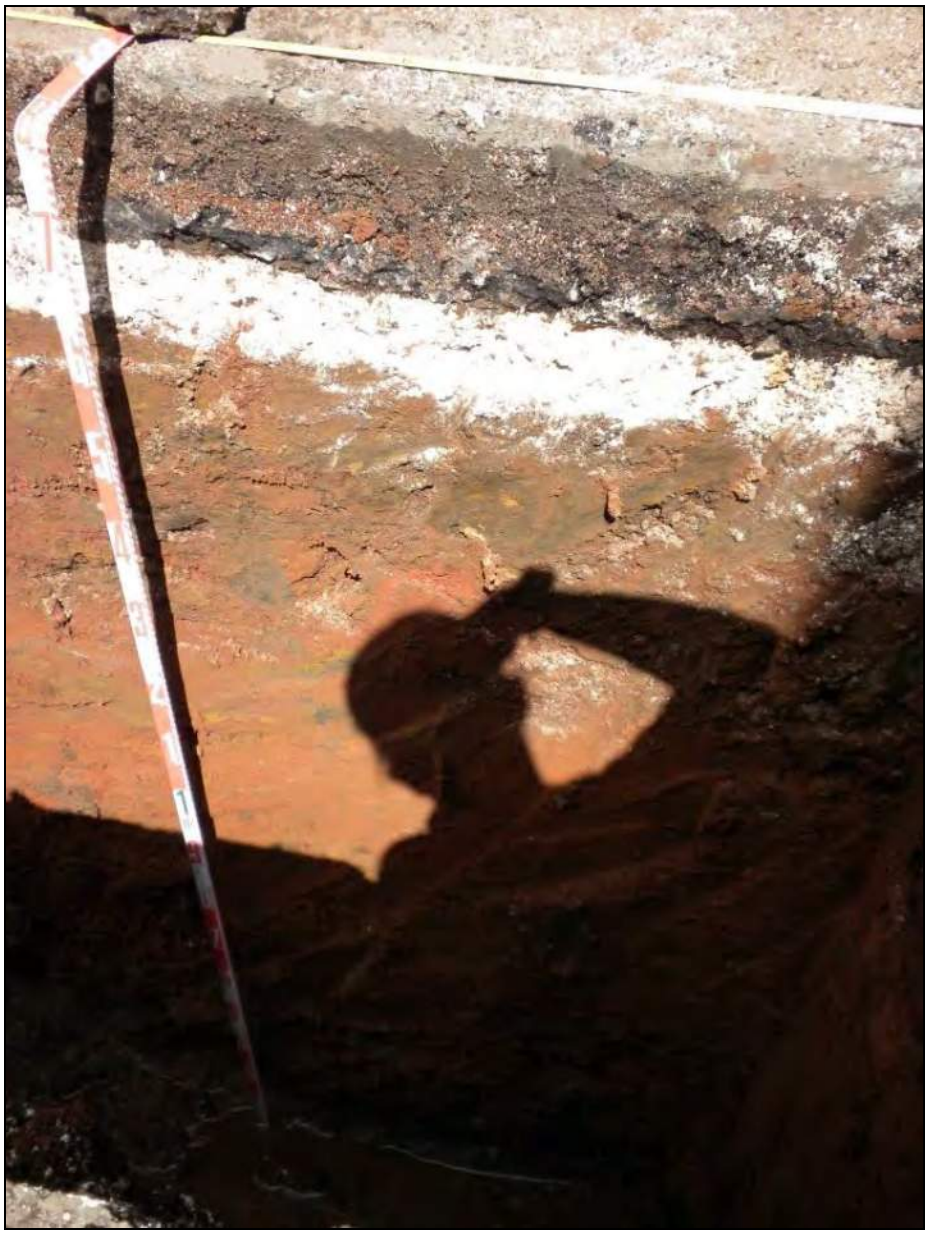


Figure 59. Photograph of Trench 7, east wall of excavation

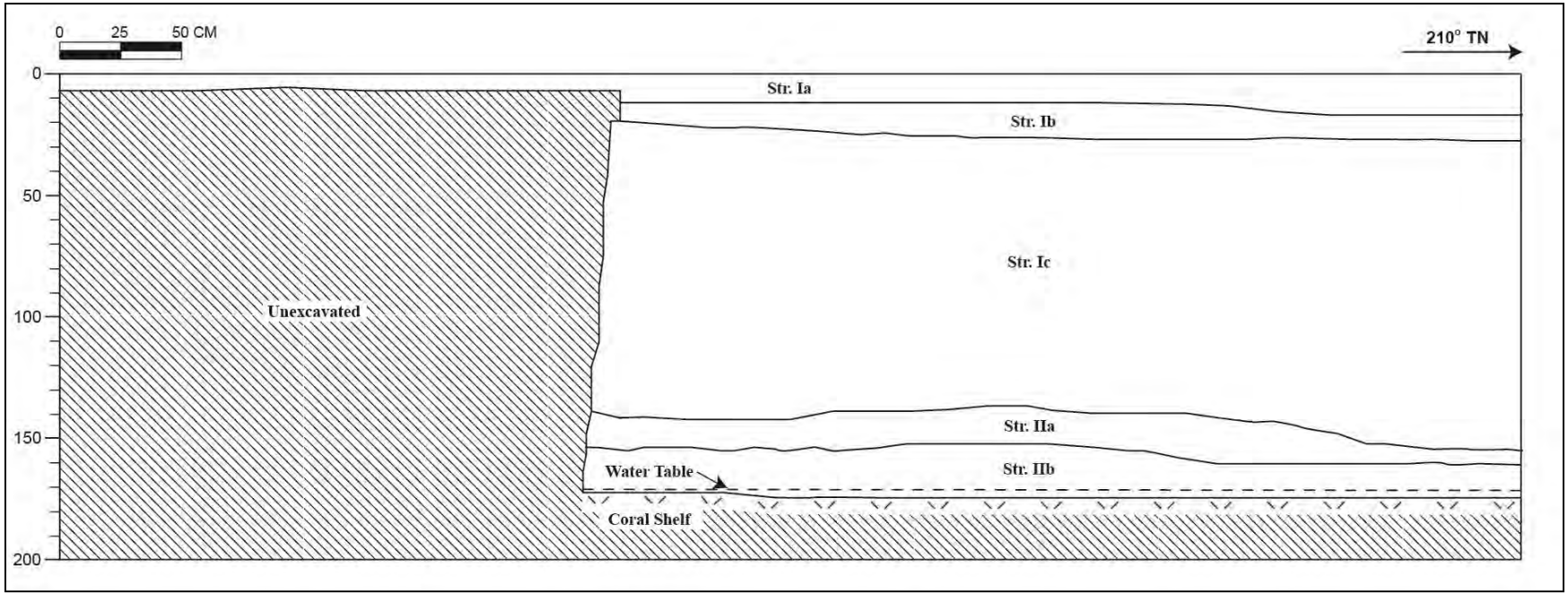


Figure 60. Trench 7 profile, east wall of excavation

Table 9. Stratigraphy Observed at Trench 7

Stratum	Depth (cmbs)	Description of Sediments
Ia	0-15	Asphalt
Ib	12-26	Crushed coral grading fill; 10YR 8/2, very pale brown.
Ic	26-154	Fill; 2.5 YR 3/4, dark reddish brown; silt loam; weak, fine crumb structure; moist, friable consistency; non-plastic; terrestrial origin; clear, wavy lower boundary; imported fill.
IIa	136-160	Natural; 10 YR 2/1, black; silt loam; weak, fine, crumb structure; wet, slightly sticky consistency; slightly plastic; terrestrial origin; diffuse, wavy lower boundary; many fine to medium roots; consists of decaying organic material; peat; many land snail shell inclusions; old A horizon.
IIb	150-173 (BOE)	Natural; Gley 1 5/5G, greenish gray; clayey sand; moderate, fine, granular structure; slightly sticky consistency; slightly plastic; mixed origin; lower boundary not visible; gley; becomes more sandy with depth; overlies coral shelf.

4.3.8 Trench 8

Trench 8 is located along the middle of the western edge of the project area (Figure 61, Figure 62, and Table 10). The stratigraphy of Trench 8 consists of asphalt (Stratum Ia) over crushed coral grading fill (Stratum Ib) and gravel grading fill (Stratum Ic). Underneath Stratum Ib lay two thick silt loam fill layers (Strata Id-e) overlying an old peat A horizon (Stratum IIa) overlying natural gley (Stratum IIb) overlying natural clayey sand (gley) (stratum IIc) on top of the natural coral shelf.

Figure 61. Photograph of Trench 8, south wall of excavation

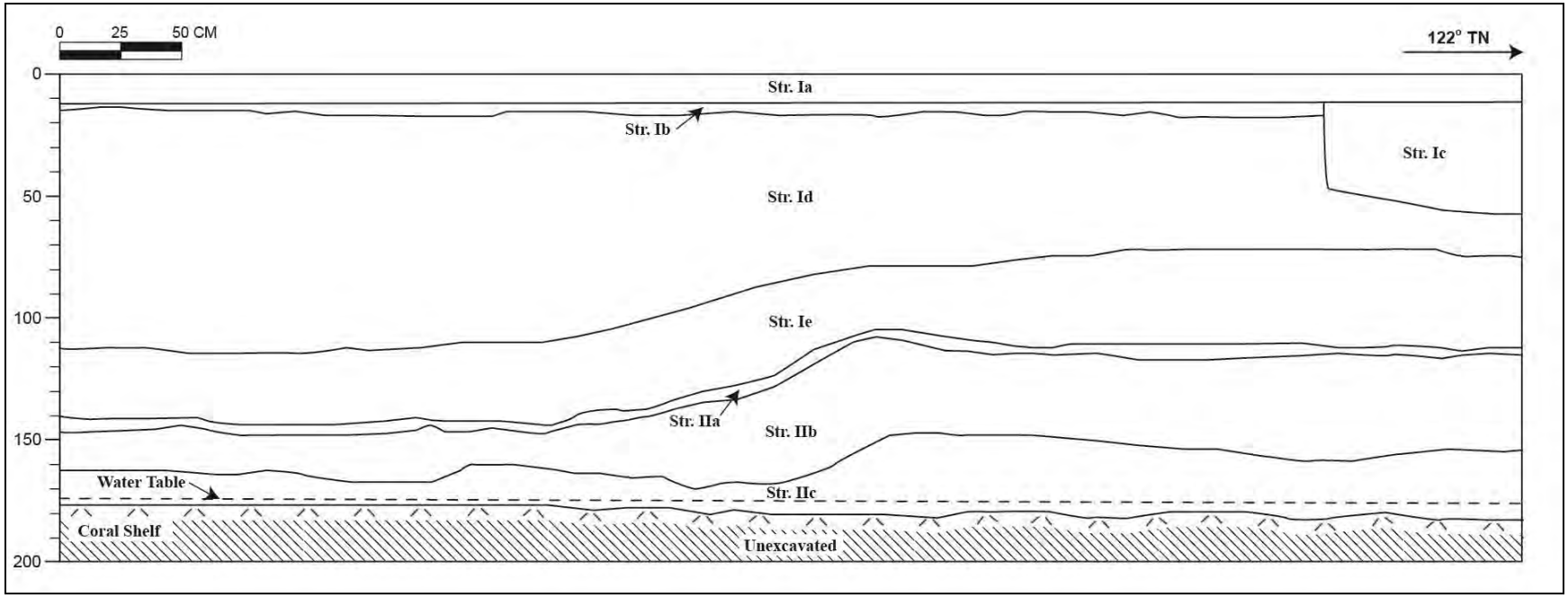


Figure 62. Trench 8 profile, south wall of excavation

Table 10. Stratigraphy Observed at Trench 8

Stratum	Depth (cmbs)	Description of Sediments
Ia	0-12	Asphalt
Ib	12-17	Crushed coral grading fill; 10YR 8/2, very pale brown.
Ic	12-57	Gravel grading fill
Id	15-115	Fill; 2.5YR 3/4, dark reddish brown; silt loam; weak, fine, crumb structure; moist, friable consistency; non-plastic; terrestrial origin; clear, wavy lower boundary; imported fill.
Ie	71-145	Fill; 7.5YR 3/3, dark brown; silt loam; weak, fine, crumb structure; moist, friable consistency; non-plastic; terrestrial origin; clear, wavy lower boundary; imported fill.
IIa	105-148	Natural; 10 YR 2/1, black; silt loam; weak, fine, crumb structure; wet, slightly sticky consistency; slightly plastic; terrestrial origin; diffuse, wavy lower boundary; many medium roots; consists of decaying organic material; peat; many land snail shell inclusions; old A horizon.
IIb	108-167	Natural; Gley 1 5/5G, greenish gray; clay; moderate, fine, platy structure; moist, friable consistency; slightly plastic; mixed origin; diffuse, wavy lower boundary; common, medium roots; gley.
IIc	147-183 (BOE)	Natural; Gley 1 5/10GY, greenish gray; clayey sand; single-grain; moist, very friable consistency; non-plastic; marine origin; lower boundary not visible; overlies coral shelf.

4.3.9 Trench 9

Trench 9 is located in the middle of the western edge of the project area (Figure 63, Figure 64, and Table 11). The stratigraphy of Trench 9 consists of asphalt (Stratum Ia) over crushed coral grading fill (Stratum Ib) overlying two thick silt loam fill layers (Strata Ic-d) overlying an old peat A horizon (Stratum IIa) overlying natural clay (Stratum IIb) and natural gley (Stratum IIc), which overlies natural clayey sand (gley) (stratum IId) on top of the natural coral shelf.

Figure 63. Photograph of Trench 9, south wall of excavation

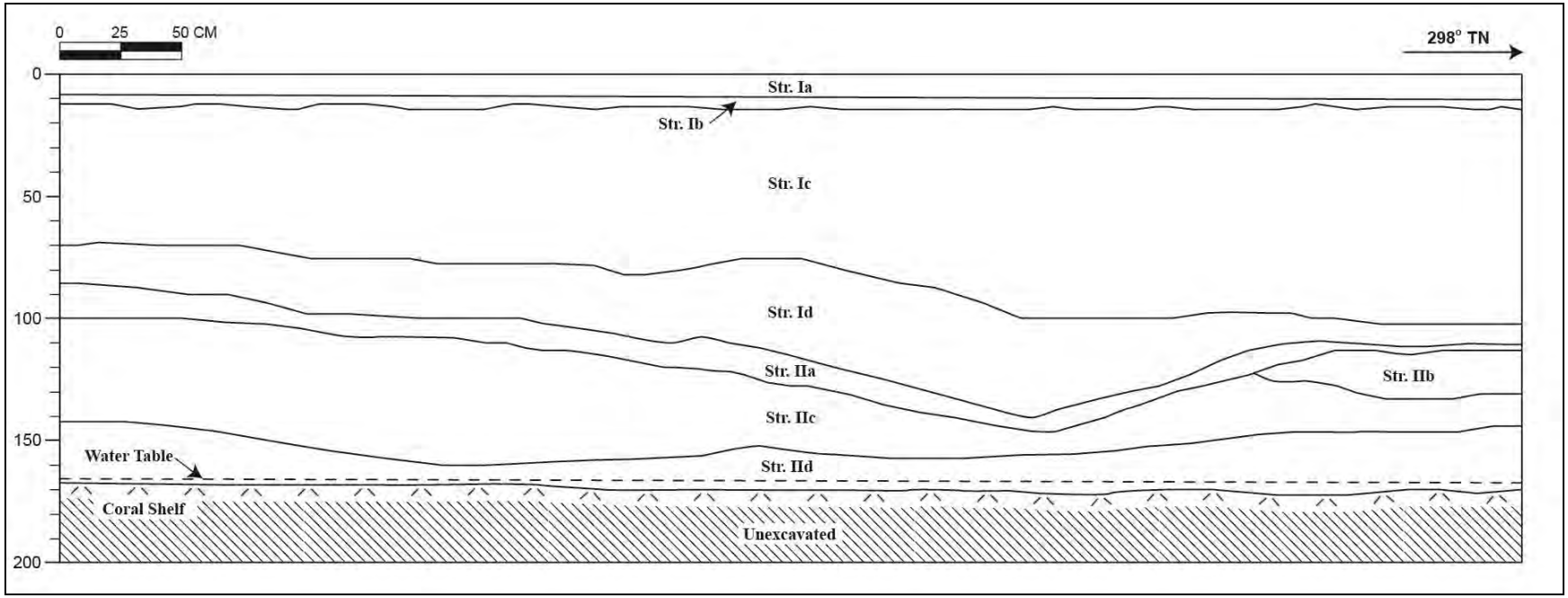


Figure 64. Trench 9 profile, south wall of excavation

Table 11. Stratigraphy Observed at Trench 9

Stratum	Depth (cmbs)	Description of Sediments
Ia	0-10	Asphalt
Ib	10-15	Crushed coral grading fill; 10YR 8/2, very pale brown.
Ic	13-102	Fill; 2.5YR 3/4, dark reddish brown; silt loam; weak, fine, crumb structure; moist, friable consistency; non-plastic; terrestrial origin; diffuse, wavy lower boundary; few, medium roots; imported fill.
Id	70-140	Fill; 7.5YR 3/3, dark brown; silt loam; weak, fine, crumb structure; moist, friable consistency; non-plastic; terrestrial origin; clear, wavy lower boundary.
IIa	86-145	Natural; 10 YR 2/1, black; silt loam; weak, fine, crumb structure; moist, friable consistency; slightly plastic; terrestrial origin; clear, wavy lower boundary; many medium roots; consists of decaying organic material; peat; many land snail shell inclusions; old A horizon.
IIb	113-132	Natural; 10 YR 5/3, brown; clay; moderate, medium, platy structure; moist, friable consistency; plastic; terrestrial origin; clear, wavy lower boundary; common, medium roots.
IIc	100-160	Natural; Gley 1 6/10Y, greenish gray; clay; moderate, medium, platy structure; moist, friable consistency; plastic; mixed origin; diffuse, wavy lower boundary; common, medium roots; gley.
IId	143-170 (BOE)	Natural; Gley 1 5/10GY, greenish gray; clayey sand; single-grain; wet, slightly sticky consistency; non-plastic; marine origin; lower boundary not visible; many, medium roots; overlies coral shelf.

4.3.10 Trench 10

Trench 10 is located in the northwest corner of the project area (Figure 65, Figure 66, and Table 12). The stratigraphy of Trench 10 consists of asphalt (Stratum Ia) over crushed coral grading fill (Stratum Ib) overlying a thick silt loam fill layer (Stratum Ic) overlying natural clay (Stratum IIa) overlying natural gley (Stratum IIb) on top of the natural coral shelf.

Figure 65. Photograph of Trench 10, north wall of excavation

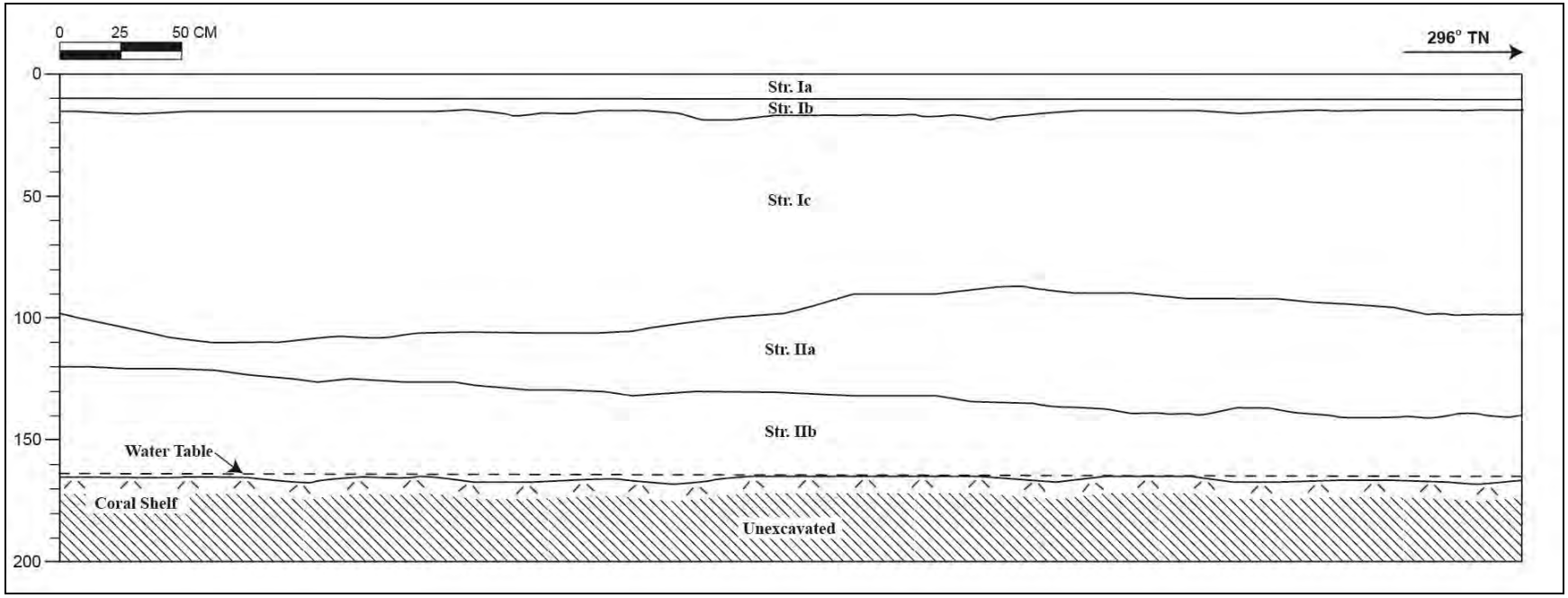


Figure 66. Trench 10 profile, north wall of excavation

Table 12. Stratigraphy Observed at Trench 10

Stratum	Depth (cmbs)	Description of Sediments
Ia	0-10	Asphalt
Ib	10-18	Crushed coral grading fill; 10YR 8/2, very pale brown.
Ic	14-110	Fill; 2.5 YR 3/4, dark reddish brown; silt loam; weak, fine crumb structure; moist, friable consistency; non-plastic; terrestrial origin; abrupt, wavy lower boundary; few, fine roots and one large tree root; imported fill.
IIa	87-138	Natural; 10 YR 5/3, brown; clay; moderate, medium, platy structure; wet, sticky consistency; plastic; mixed origin; diffuse, smooth lower boundary.
IIb	120-165	Natural; Gley 1 6/10Y, greenish gray; clay; moderate, medium, platy structure; moist, friable consistency; very plastic; mixed origin; lower boundary not visible; gley; overlies coral shelf.

4.3.11 Trench 11

Trench 11 is located in the middle of the project area (Figure 67, Figure 68, and Table 13). The stratigraphy of Trench 11 consists of asphalt (Stratum Ia) over crushed coral grading fill (Stratum Ib) over a layer of asphalt (Stratum Ic) overlying a thick silt loam fill layer (Stratum Id) overlying an old peat A horizon (Stratum IIa) overlying natural silty clay (Stratum IIb) overlying clayey sand (gley) (Stratum IIc) on top of the natural coral shelf.

Figure 67. Photograph of Trench 11, east wall of excavation

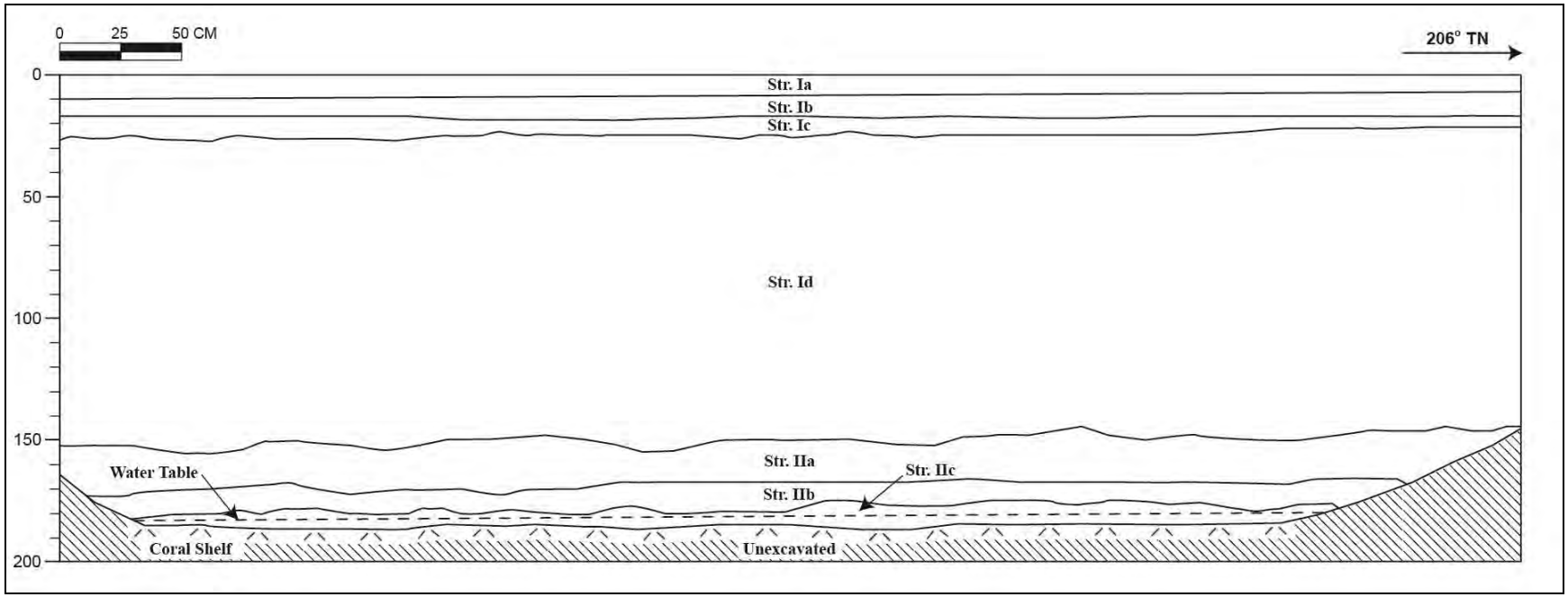


Figure 68. Trench 11 profile, east wall of excavation

Table 13. Stratigraphy Observed at Trench 11

Stratum	Depth (cmbs)	Description of Sediments
Ia	0-10	Asphalt
Ib	10-18	Crushed coral grading fill; 10YR 8/2, very pale brown.
Ic	18-26	Asphalt
Id	23-155	Fill; 2.5YR 3/4, dark reddish brown; silt loam; weak, fine crumb structure; moist, friable consistency; non-plastic; terrestrial origin; clear, wavy lower boundary; imported fill.
IIa	145-172	Natural; 10 YR 2/1, black; silt loam; weak, fine, crumb structure; moist, very friable consistency; non-plastic; terrestrial origin; clear, wavy lower boundary; contains decaying organic material; peat; many land snail shell inclusions; old A horizon.
IIb	166-181	Natural; 10 YR 4/1, dark gray; silty clay; moderate, fine, platy structure; wet, sticky consistency; plastic; mixed origin; diffuse, smooth lower boundary.
IIc	175-185 (BOE)	Natural; Gley 1 5/10Y, greenish gray; clayey sand; moderate, fine, platy structure; wet, slightly sticky consistency; slightly plastic; marine origin; lower boundary not visible; gley; overlies coral shelf.

4.3.12 Trench 12

Trench 12 is located in the middle of the project area (Figure 69, Figure 70, and Table 14). The stratigraphy of Trench 12 consists of asphalt (Stratum Ia) over crushed coral grading fill (Stratum Ib) over asphalt (Stratum Ic) overlying two thick silt loam fill layers (Stratum Id-e) overlying an old peat A horizon (Stratum IIa) overlying clayey sand (gley) (Stratum IIb) on top of the natural coral shelf.

Figure 69. Photograph of Trench 12, north wall of excavation

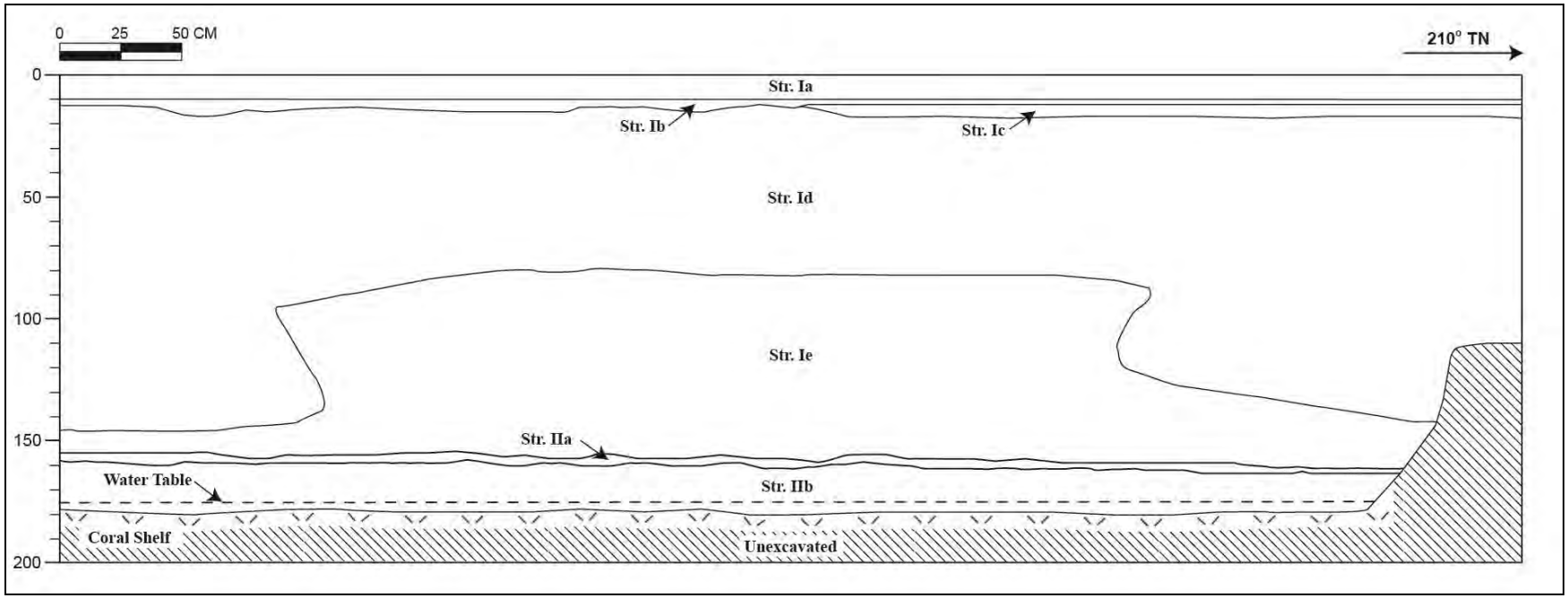


Figure 70. Trench 12 profile, north wall of excavation

Table 14. Stratigraphy Observed at Trench 12

Stratum	Depth (cmbs)	Description of Sediments
Ia	0-10	Asphalt
Ib	10-15	Crushed coral grading fill; 10YR 8/2, very pale brown.
Ic	13-16	Asphalt
Id	12-145	Fill; 5YR 3/4, dark reddish brown; silt loam; weak, fine crumb structure; moist, friable consistency; non-plastic; terrestrial origin; clear, irregular lower boundary; imported fill.
Ie	80-160	Fill; 5YR 3/1, very dark gray; silt loam; weak, fine, crumb structure; moist friable consistency; non-plastic; terrestrial origin; diffuse, smooth lower boundary.
IIa	153-162	Natural; 10YR 2/1, black; silt loam; weak, fine, platy structure; moist, very friable consistency; slightly plastic; terrestrial origin; diffuse, smooth lower boundary; few, fine roots; consists of decaying organic material; peat; many land snail shell inclusions; old A horizon.
IIb	157-178 (BOE)	Natural; Gley 1 5/5G, greenish gray; clayey sand; moderate, fine, granular structure; wet, slightly sticky consistency; slightly plastic; mixed origin; lower boundary not visible; gley; becomes more sandy with depth; overlies coral shelf.

4.3.13 Trench 13

Trench 13 is located in the northwest section of the project area (Figure 71, Figure 72, and Table 15). The stratigraphy of Trench 13 consists of asphalt (Stratum Ia) over crushed coral grading fill (Stratum Ib) overlying a thick silt loam fill layer (Stratum Ic) overlying an old A horizon (Stratum IIa) overlying silty clay (Stratum IIb) overlying sandy gley (Stratum IIc) on top of the natural coral shelf.

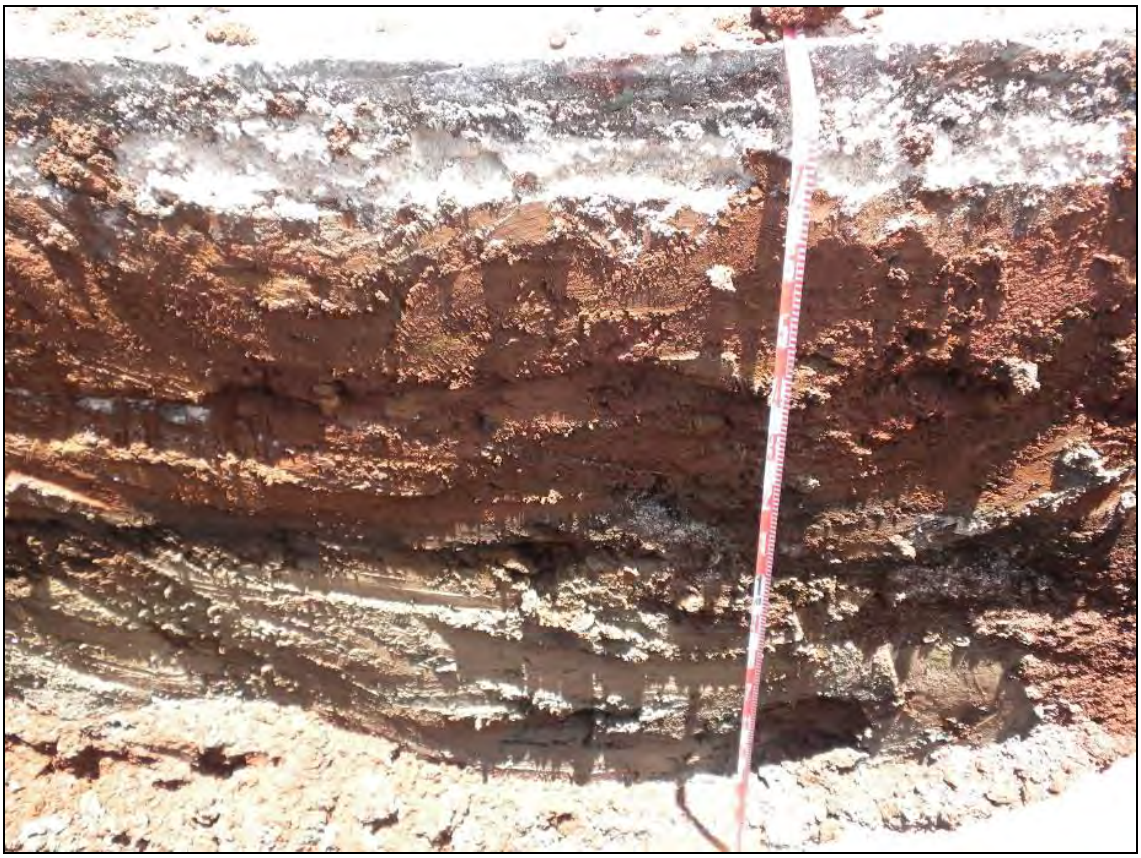


Figure 71. Photograph of Trench 13, west wall of excavation

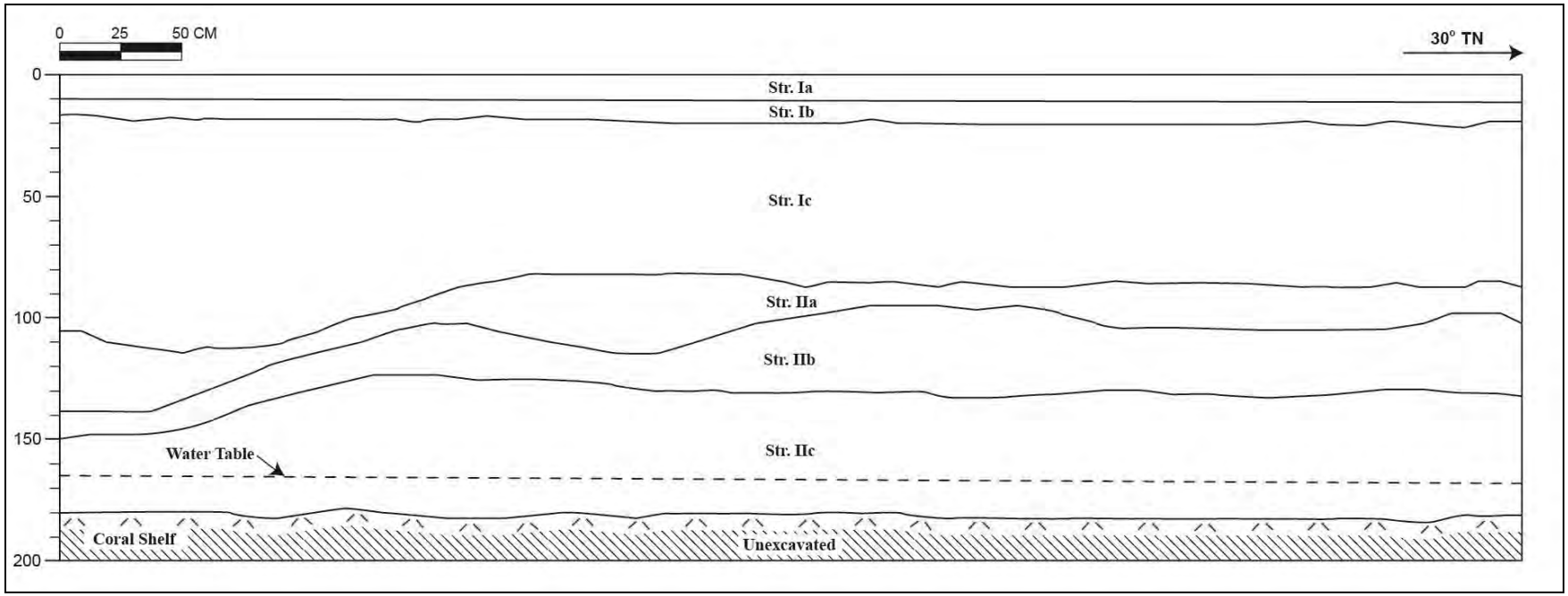


Figure 72. Trench 13 profile, west wall of excavation

Table 15. Stratigraphy Observed at Trench 13

Stratum	Depth (cmbs)	Description of Sediments
Ia	0-10	Asphalt
Ib	10-20	Crushed coral grading fill; 10YR 8/2, very pale brown.
Ic	18-115	Fill; 2.5YR 3/4, dark reddish brown; silt loam; weak, fine crumb structure; moist, very friable consistency; non-plastic; terrestrial origin; clear, wavy lower boundary; few pieces of wood planks observed; imported fill.
IIa	82-140	Natural; 10YR 2/1, black; silt loam; weak, fine crumb structure; moist, very friable consistency; non-plastic; terrestrial origin; clear, wavy lower boundary; few burnt wood fragments; old A horizon.
IIb	95-150	Natural; 10YR 5/2, grayish brown; silty clay; moderate, fine platy structure; moist, friable consistency; slightly plastic; mixed origin; diffuse, wavy lower boundary; few large coral boulder inclusions.
IIc	129-180 (BOE)	Natural; Gley 1 5/5GY, greenish gray; sandy clay; weak, fine, platy structure; moist, friable consistency; slightly plastic; marine origin; lower boundary not visible; few large coral boulder inclusions; gley; overlies coral shelf.

4.3.14 Trench 14

Trench 14 is located in the northwest corner of the project area (Figure 73, Figure 74, and Table 16). The stratigraphy of Trench 14 consists of asphalt (Stratum Ia) over crushed coral grading fill (Stratum Ib) overlying two silt loam fill layers (Stratum Ic-d) overlying silty clay (Stratum IIa) overlying sandy gley (Stratum IIb) on top of the natural coral shelf. A large concentration of unidentified metal fragments and wire is located at the base of Stratum Ic in the southern portion of the trench; this is considered part of the historic trash layer, SIHP # -7193 on the basis of stratigraphy and because it is regarded as the same early to mid-twentieth century trash fill layer that was deposited in the greater Kaka‘ako area. The metal concentration measures approximately 0.4 m high and minimally 2.15 m long and extends beyond the limits of the excavated trench.

Figure 73. Photograph of Trench 14, east wall of excavation; note metal concentration, part of SIHP # -7193, in middle of photograph

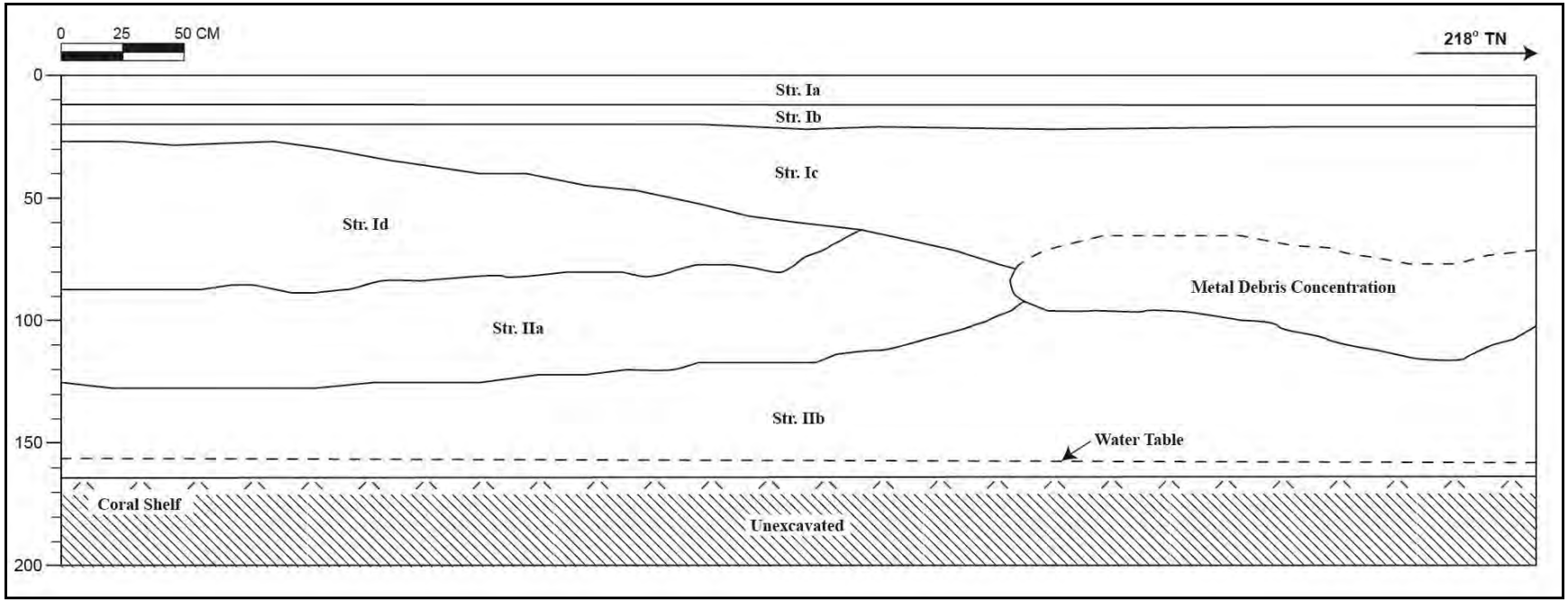


Figure 74. Trench 14 profile, east wall of excavation

Table 16. Stratigraphy Observed at Trench 14

Stratum	Depth (cmbs)	Description of Sediments
Ia	0-12	Asphalt
Ib	10-20	Crushed coral grading fill; 10YR 8/2, very pale brown.
Ic	20-77	Fill; 2.5YR 3/4, dark reddish brown; silt loam; weak, fine, crumb structure; moist, friable consistency; non-plastic; terrestrial origin; abrupt, wavy lower boundary; contains a large concentration of unidentifiable metal fragments and wire, part of SIHP # -7193, historic trash layer; imported fill.
Id	27-88	Fill; 10YR 3/3, dark brown; silt loam; weak, fine, crumb structure; moist, friable consistency; non-plastic; terrestrial origin; abrupt, irregular lower boundary.
IIa	63-129	Natural; 10YR 5/3, brown; sandy clay; weak, fine, platy structure; wet, sticky consistency; plastic; mixed origin; diffuse, smooth lower boundary; contains decaying organic material.
IIb	93-214	Natural; Gley 1, 5/10Y, greenish gray; sandy clay; weak, fine, platy structure; wet, sticky consistency; plastic; mixed origin; lower boundary not visible; few large coral boulder inclusions; gley; overlies coral shelf.

4.3.15 Trench 15

Trench 15 is located in the middle of the project area, just north of the warehouse (Figure 75, Figure 76, and Table 17). The stratigraphy of Trench 15 consists of asphalt (Stratum Ia) over crushed coral grading fill (Stratum Ib) overlying a silt loam fill layer (Stratum Ic) overlying a stony clay loam fill layer (Stratum Id) overlying a silt loam and historic trash layer (Stratum II; part of SIHP # -7193) overlying an old peat A horizon (Stratum IIIa) overlying sandy gley (Stratum IIIb) on top of the natural coral shelf. SIHP # -7193 contains a substantial amount of historic debris: glass bottles and jars, ceramic fragments, and metal fragments.

Figure 75. Photograph of Trench 15, west wall of excavation

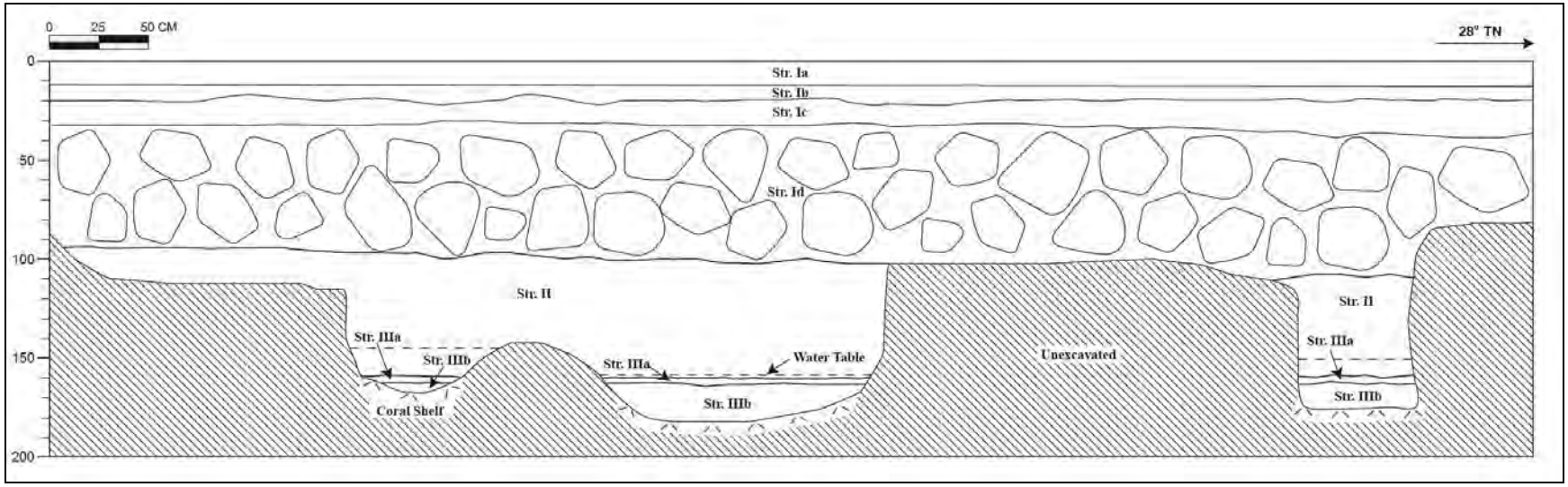


Figure 76. Trench 15 profile, west wall of excavation

Table 17. Stratigraphy Observed at Trench 15

Stratum	Depth (cmbs)	Description of Sediments
Ia	0-12	Asphalt
Ib	12-20	Crushed coral grading fill; 10YR 8/2, very pale brown.
Ic	18-36	Fill; 10YR 3/3, dark brown; silt loam; weak, fine crumb structure; moist, friable consistency; slightly plastic; terrestrial origin; very abrupt, smooth lower boundary.
Id	32-108	Fill; 5YR 3/2, dark reddish brown; stony clay loam; weak, fine crumb structure; moist, friable consistency; slightly plastic; terrestrial origin; very abrupt, smooth lower boundary; many large, sub-angular, basalt cobbles and boulders.
II	95-159	Fill; 7.5YR 4/6, strong brown; silt loam; weak, fine, crumb structure; moist, very friable consistency; slightly plastic; terrestrial origin; abrupt, smooth lower boundary; contains substantial amount of historic debris: glass bottles and jars, ceramic fragments, and metal fragments; part of SIHP # -7193, historic trash layer.
IIIa	159-161	Natural; 10YR 2/1, black; silt loam; weak, fine, crumb structure; wet, slightly sticky consistency; slightly plastic; terrestrial origin; diffuse, smooth lower boundary; many, medium roots; consists of decaying organic material; peat; many land snail shell inclusions; old A horizon.
IIIb	161-180	Natural; Gley 1 5/5G, greenish gray; sandy clay; moderate, fine, granular structure; wet, slightly sticky consistency; slightly plastic; mixed origin; lower boundary not visible; common, medium roots; gley; becomes more sandy with depth; overlies coral shelf.

4.3.16 Trench 16

Trench 16 is located in the middle of the project area (Figure 77 through Figure 79 and Table 18). The stratigraphy of Trench 16 consists of asphalt (Stratum Ia) over crushed coral grading fill (Stratum Ib) over asphalt (Stratum Ic) overlying three gravelly silt loam fill layers (Strata Id-f) overlying a clay and historic trash layer (Stratum II; part of SIHP # -7193) overlying an old peat A horizon (Stratum IIIa) overlying natural gley (Stratum IIIb) on top of the natural coral shelf. SIHP # -7193 contains a substantial amount of historic debris: glass bottles and jars, ceramic fragments, red brick tiles, metal fragments, metal barrel remnants, and lumber.

Figure 77. Photograph of Trench 16, west wall of excavation

Figure 78. Close-up photograph of *mauka* end of Trench 16 showing SIHP # -7193, historic trash layer

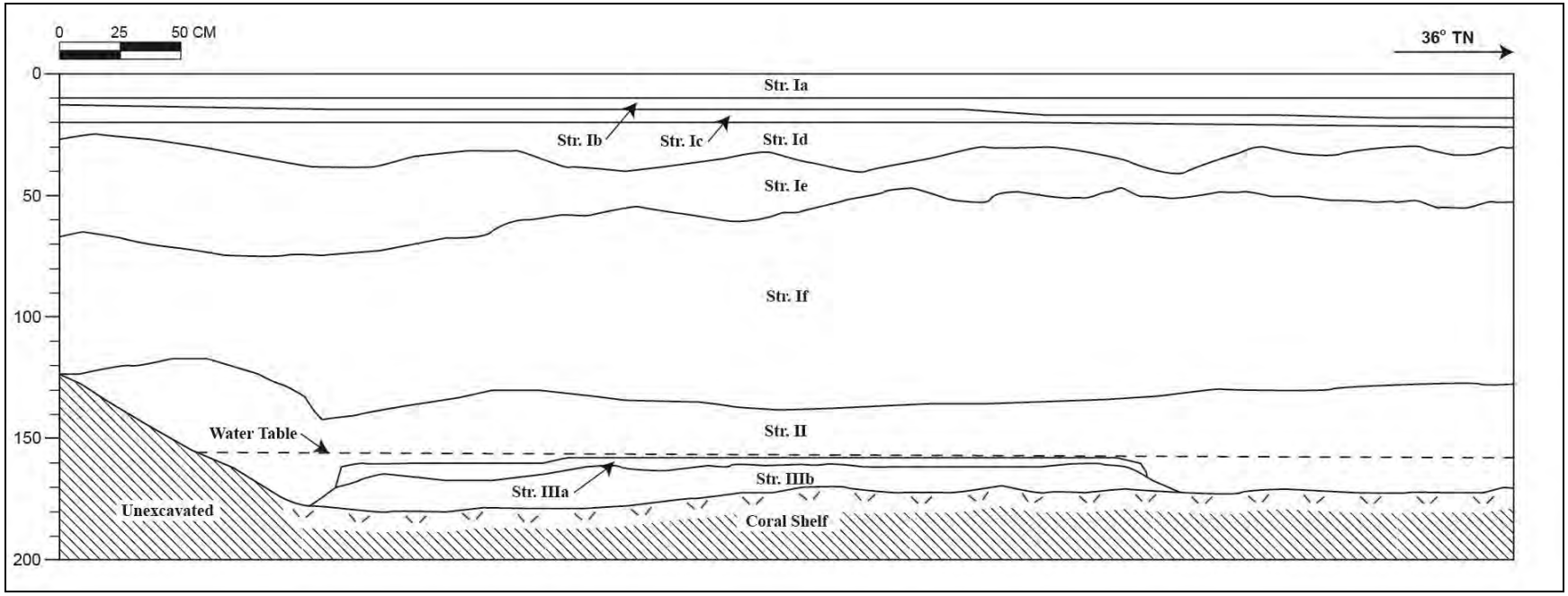


Figure 79. Trench 16 profile, west wall of excavation

Table 18. Stratigraphy Observed at Trench 16

Stratum	Depth (cmbs)	Description of Sediments
Ia	0-10	Asphalt
Ib	10-18	Crushed coral grading fill; 10YR 8/2, very pale brown.
Ic	15-20	Asphalt
Id	20-40	Fill; 2.5YR 3/4, dark reddish brown; gravelly silt loam; weak, fine, crumb structure; moist, friable consistency; non-plastic; terrestrial origin; clear, wavy lower boundary; imported fill.
Ie	27-75	Fill; 10YR 3/2, very dark grayish brown; gravelly silt loam; weak, fine, crumb structure; moist, friable consistency; slightly plastic; terrestrial origin; clear, wavy lower boundary; common gravel and coral inclusions.
If	47-142	Fill; 2.5YR 3/4, dark reddish brown; gravelly silt loam; weak, fine, crumb structure; moist, friable consistency; non-plastic; terrestrial origin; diffuse, wavy lower boundary; imported fill.
II	130-161	Fill; 10 YR 2/1, very dark gray; clay; moderate, fine, platy structure; moist, friable consistency; plastic; terrestrial origin; clear, smooth lower boundary; contains substantial amount of historic debris: glass bottles and jars, ceramic fragments, red brick tiles, metal fragments, metal barrel remnants, and lumber; part of SIHP # -7193, historic trash layer.
IIIa	157-165	Natural; 10YR 2/1, black; loamy silt; weak, fine, blocky structure; wet, non-sticky consistency; non-plastic; terrestrial origin; diffuse, wavy lower boundary; consists of decaying organic material; peat; many land snail shell inclusions; old A horizon.
IIIb	158-180 (BOE)	Natural; Gley 1 5/10Y, greenish gray; clay; weak, medium, platy structure; wet, slightly sticky consistency; plastic; mixed origin; lower boundary not visible; gley; overlies coral shelf.

4.3.17 Trench 17

Trench 17 is located in the northeast portion of the project area (Figure 80 through Figure 82 and Table 19). The stratigraphy of Trench 17 consists of asphalt (Stratum Ia) over crushed coral grading fill (Stratum Ib) over a silt loam fill layer (Stratum Ic) overlying a gravelly silt loam fill layer (Stratum Id) overlying a thick loamy sand and historic trash layer (Stratum II; part of SIHP # -7193) overlying natural gley (Stratum III) on top of the natural coral shelf. SIHP # 7193 contains a substantial amount of historic debris: metal fragments, glass bottles and jars, ceramic fragments, and bricks, and it also contained a large metal debris concentration located in the middle of the trench. The metal debris was unidentifiable and so solid that the excavator could not scoop it out. The concentration of metal was approximately 1.5 m long and 35 cm high and spanned the width of the trench.

Figure 80. Photograph of Trench 17, east wall of excavation

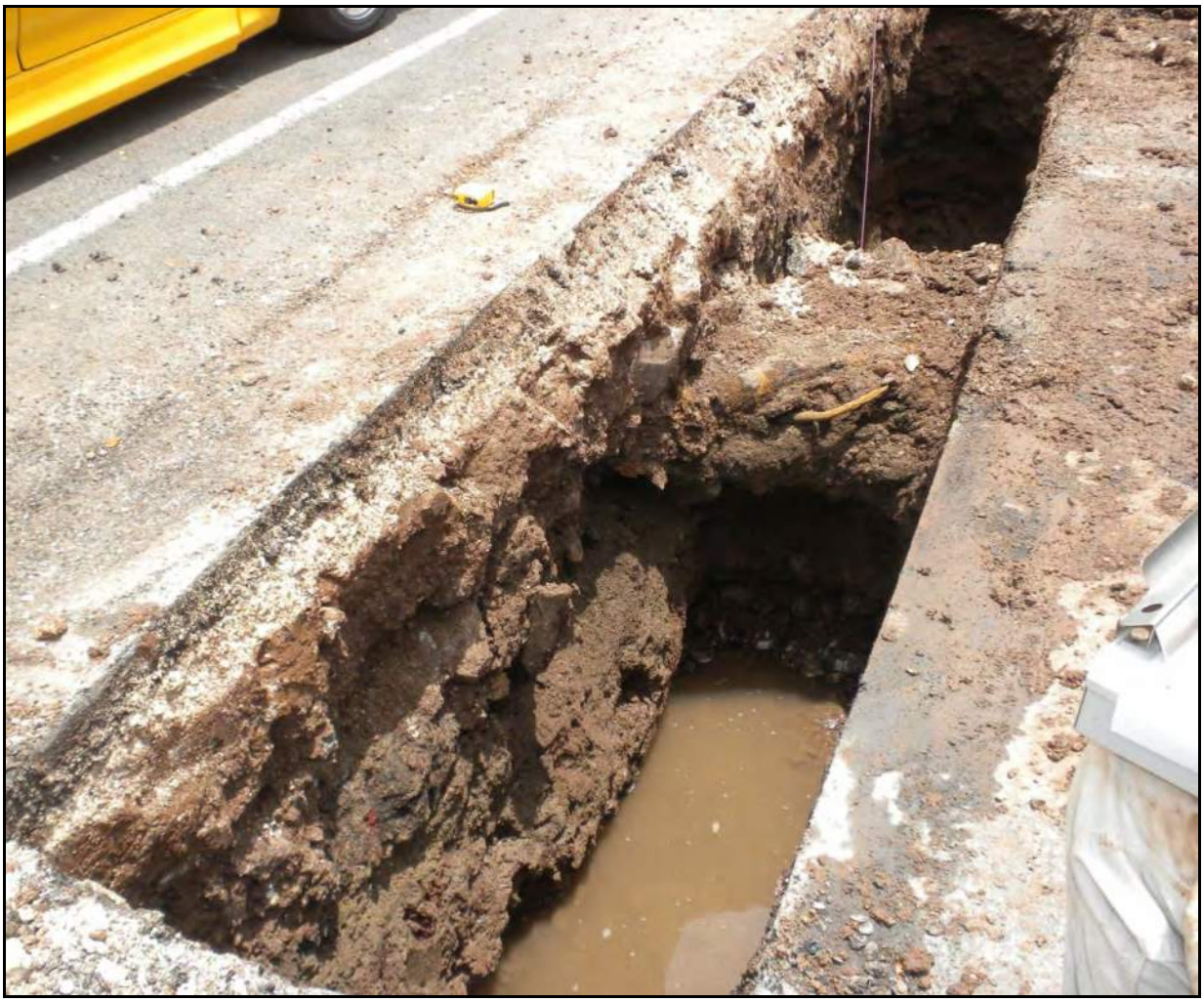


Figure 81. Photograph of Trench 17 showing the concentration of metal in the middle of the trench and SIHP # -7193, historic trench layer, at the base of the trench

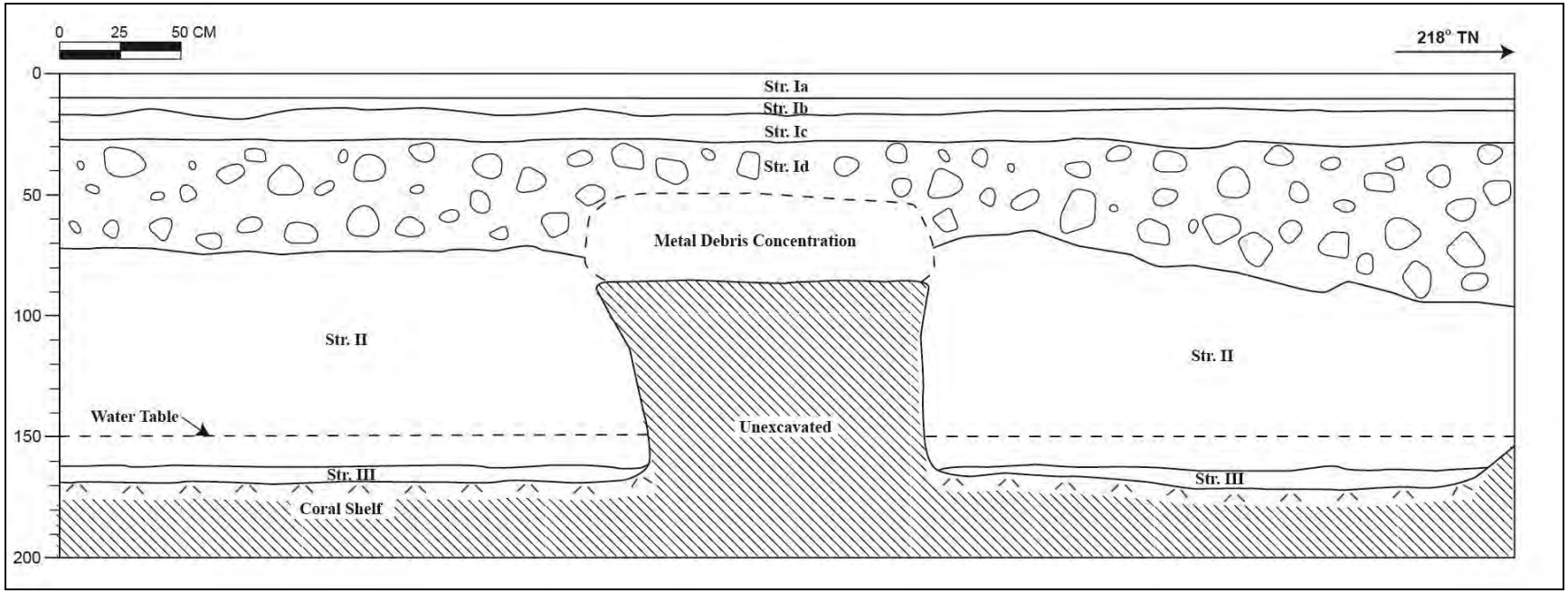


Figure 82. Trench 17 profile, east wall of excavation

Table 19. Stratigraphy Observed at Trench 17

Stratum	Depth (cmbs)	Description of Sediments
Ia	0-10	Asphalt
Ib	10-18	Crushed coral grading fill; 10YR 8/2, very pale brown.
Ic	15-30	Fill; 10YR 4/4, dark yellowish brown; silt loam; moderate, medium, crumb structure; dry, slightly hard consistency; slightly plastic; terrestrial origin; clear, smooth lower boundary.
Id	27-96	Fill; 7.5YR 3/4, dark brown; gravelly silt loam; moderate, medium, crumb structure; moist, very friable consistency; slightly plastic; terrestrial origin; clear, wavy lower boundary; contains gravel and basalt cobble and boulder inclusions.
II	64-112	Fill; 10YR 4/1, dark gray; loamy sand; weak, fine, crumb structure; moist, loose consistency; non-plastic; mixed origin; abrupt, wavy lower boundary; contains substantial amount of historic debris: metal fragments, glass bottles and jars, ceramic fragments, and bricks; part of SIHP # -7193, historic trash layer.
III	161-169 (BOE)	Natural; Gley 1 5/5G, greenish gray; clay; moderate, medium, platy structure; wet, slightly sticky consistency; plastic; mixed origin; lower boundary not visible; gley; overlies coral shelf.

4.3.18 Trench 18

Trench 18 is located in the north portion of the project area (Figure 83, Figure 84, and Table 20). The stratigraphy of Trench 18 consists of asphalt (Stratum Ia) over crushed coral grading fill (Stratum Ib) over a thick silt loam fill layer (Stratum Ic) overlying an old peat A horizon (Stratum IIa) overlying natural gley (Stratum IIb) on top of the natural coral shelf.

Figure 83. Photograph of Trench 18, east wall of excavation

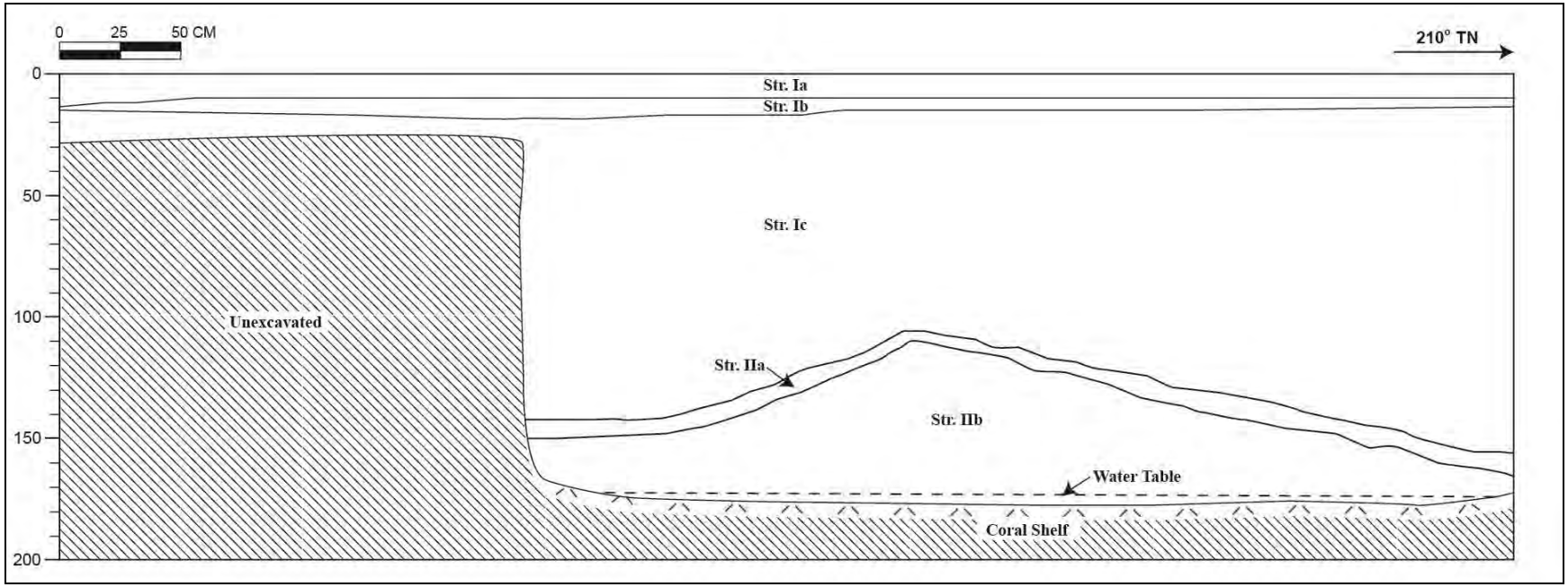


Figure 84. Trench 18 profile, east wall of excavation

Table 20. Stratigraphy Observed at Trench 18

Stratum	Depth (cmbs)	Description of Sediments
Ia	0-15	Asphalt
Ib	10-17	Crushed coral grading fill; 10YR 8/2, very pale brown.
Ic	15-155	Fill; 2.5 YR 3/4, dark reddish brown; silt loam; weak, fine, crumb structure; moist, friable consistency; non-plastic; terrestrial origin; clear, wavy lower boundary; metal pipe present at top of layer; imported fill.
IIa	105-114	Natural; 10YR 2/1, black; silt loam; weak, fine, crumb structure; moist, friable consistency; slightly plastic; terrestrial origin; clear, wavy lower boundary; common, medium roots; consists of decaying organic material; peat; many land snail shell inclusions; old A horizon.
IIb	109-176 (BOE)	Natural; Gley 1 5/5G, greenish gray; clay; moderate, medium platy structure; moist, friable consistency; plastic; mixed origin; lower boundary not visible; many, fine roots; gley; becomes more sandy with depth; overlies coral shelf.

4.3.19 Trench 19

Trench 19 is located in the southeast corner of the parking lot, *mauka* of the warehouse (Figure 85, Figure 86, and Table 21). The stratigraphy of Trench 19 consists of asphalt (Stratum Ia) over crushed coral grading fill (Stratum Ib) overlying three layers of clay loam fill (Strata Ic-e) overlying an old peat A horizon (Stratum IIa) overlying natural gley (Stratum IIb) overlying natural sandy clay (gley) (Stratum IIc) on top of the natural coral shelf. Stratum Ie contained areas of burnt wood and historic trash at its base. The trash consisted of red brick tiles, ceramic tiles, red bricks, cinder blocks, metal fragments, tire remnants, and lumber. The trash concentrations are approximately 1.3-1.5 m long and 5-15 cm high. These trash concentrations are considered part of SIHP # -7193 on the basis of stratigraphy and because they are regarded as the same early to mid-twentieth century trash fill layer that was deposited in the greater Kaka‘ako area.

Figure 85. Photograph of Trench 19, west wall of excavation

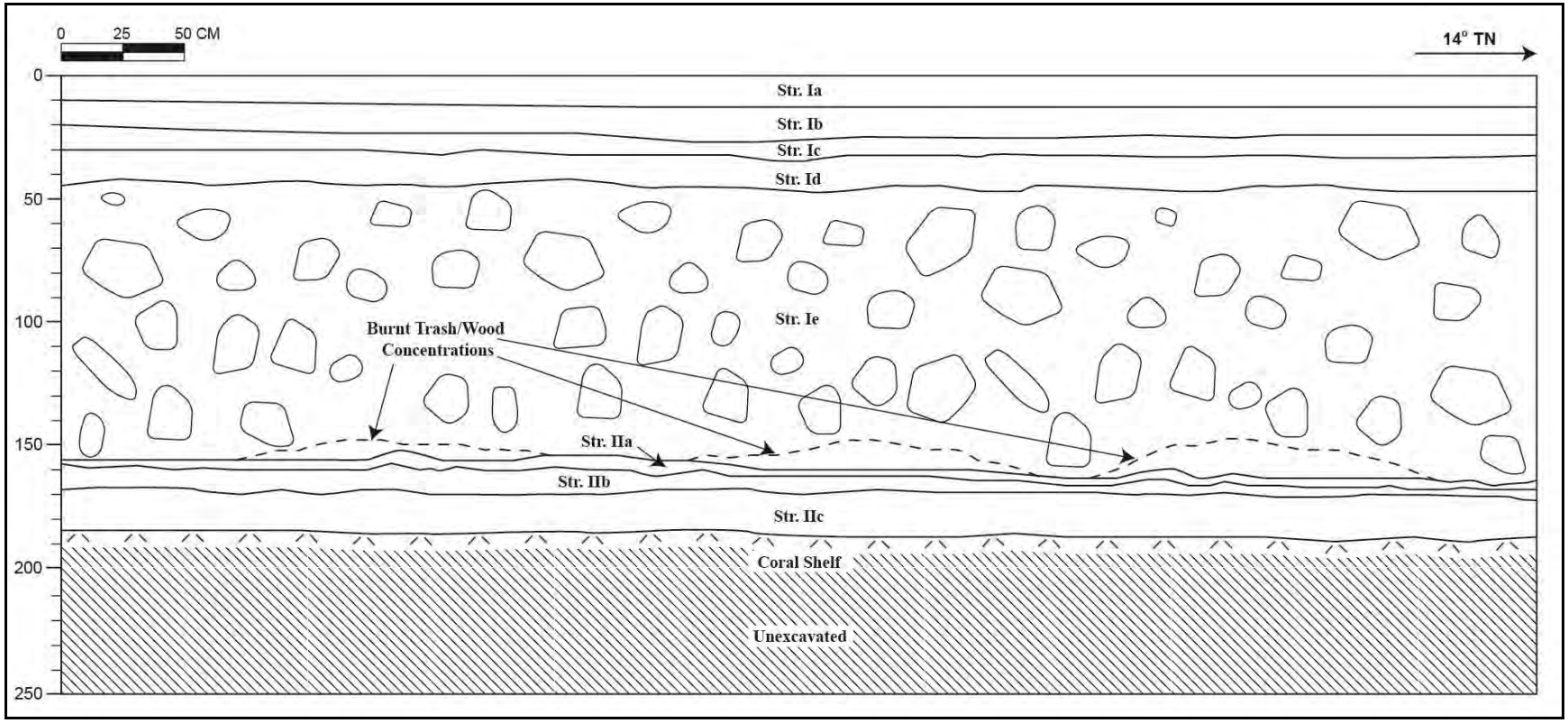


Figure 86. Trench 19 profile, west wall of excavation

Table 21. Stratigraphy Observed at Trench 19

Stratum	Depth (cmbs)	Description of Sediments
Ia	0-12	Asphalt
Ib	12-22	Crushed coral grading fill; 10YR 8/2, very pale brown.
Ic	22-31	Fill; 5YR 3/4, dark reddish brown; clay loam; weak, fine, crumb structure; moist, friable consistency; slightly plastic; terrestrial origin; clear, smooth lower boundary.
Id	30-46	Fill; 10YR 3/3, dark brown; clay loam; weak, fine, crumb structure; moist, friable consistency; slightly plastic; terrestrial origin; clear, smooth lower boundary.
Ie	44-164	Fill; 5YR 3/2, dark reddish brown; stony clay loam; weak, fine crumb structure; moist, friable consistency; slightly plastic; terrestrial origin; abrupt, smooth lower boundary; contains cobble and boulder inclusions; contained substantial amount of burnt wood and trash: red brick tiles, ceramic tiles, red bricks, cinder blocks, metal fragments, tire remnants, and lumber; part of SIHP # -7193, historic trash layer.
IIa	153-165	Natural; 10YR 2/1, black; silt loam; weak, fine, blocky structure; wet, non-sticky consistency; non-plastic; terrestrial origin; diffuse, smooth lower boundary; consists of decaying organic material; peat; many land snail shell inclusions; old A horizon.
IIb	160-170	Natural; Gley 1 4/10Y, dark greenish gray; clay; weak, medium, platy structure; wet, sticky consistency; plastic; mixed origin; diffuse, smooth lower boundary; gley.
IIc	167-185 (BOE)	Natural; Gley 1 4/10Y, dark greenish gray; sandy clay; weak, fine, crumb structure, wet, slightly sticky consistency; plastic; lower boundary not visible; gley; overlies coral shelf.

4.3.20 Trench 20

Trench 20 is located near the northeast corner of the project area (Figure 87 through Figure 89 and Table 22). The stratigraphy of Trench 20 consists of asphalt (Stratum Ia) over crushed coral grading fill (Stratum Ib) overlying two layers of loamy clay fill (Strata Ic-d), the bottom of which contained few nails and unidentifiable metal fragments, overlying a silt loam layer containing few nails and unidentifiable metal fragments (Stratum IIa) overlying a thick silt loam and historic trash layer (Stratum IIb; part of SIHP # -7193) overlying an old peat A horizon (Stratum IIIa) overlying natural gley (Stratum IIIb) overlying natural loamy sand (gley) (Stratum IIIc) on top of the soft natural coral shelf. SIHP # -7193 contained a substantial amount of historic debris: glass bottles and jars, ceramic fragments, metal fragments, nails, red bricks, tiles, and lumber fragments.

Figure 87. Photograph of Trench 20, west wall of excavation; note substantial historic trash layer at bottom of photograph, part of SIHP # -7193

Figure 88. Close-up photograph of *mauka* end of Trench 20 showing SIHP # -7193, historic trash layer

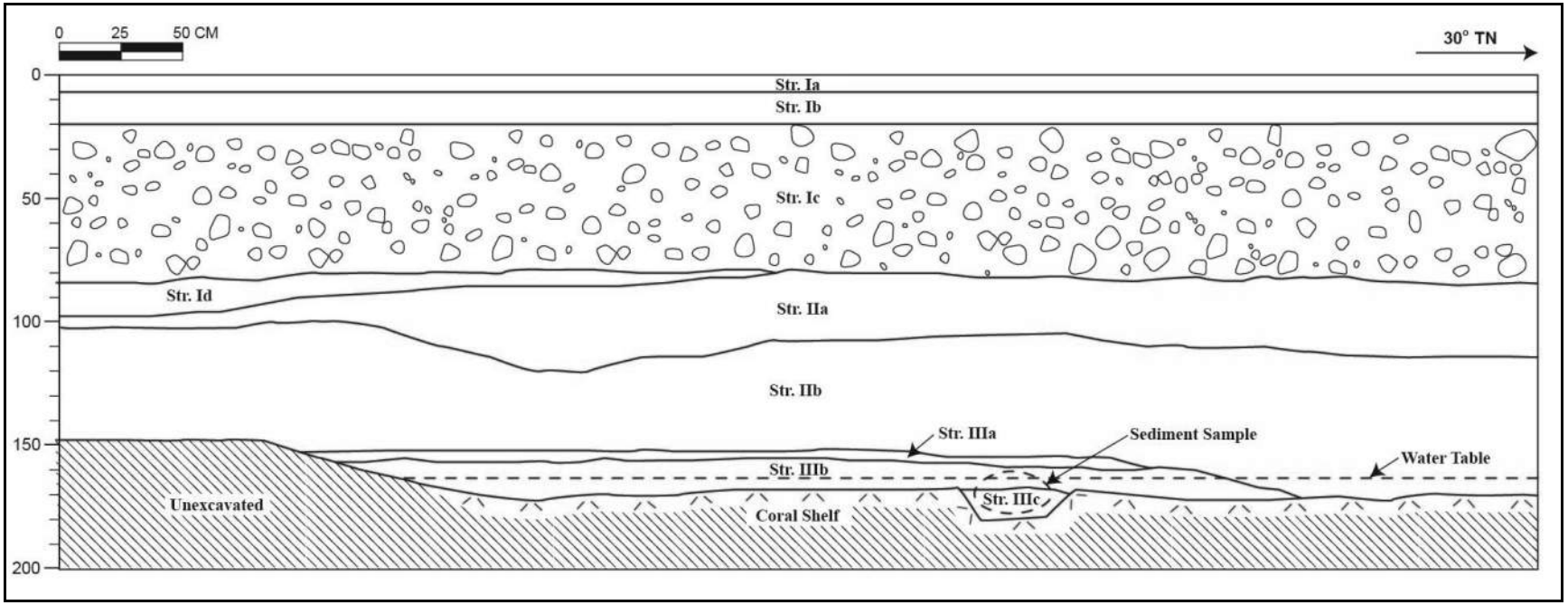


Figure 89. Trench 20 profile, west wall of excavation

Table 22. Stratigraphy Observed at Trench 20

Stratum	Depth (cmbs)	Description of Sediments
Ia	0-8	Asphalt
Ib	8-20	Crushed coral grading fill; 10YR 8/2, very pale brown.
Ic	20-86	Fill; 10YR 3/1, very dark gray; loamy clay; weak, fine, crumb structure; moist, very friable consistency; slightly plastic; terrestrial origin; clear, wavy lower boundary; many sub-angular, basalt boulder inclusions.
Id	80-98	Fill; 2.5YR 3/4, dark reddish brown; loamy clay; weak, fine, crumb structure; moist, very friable consistency; slightly plastic; terrestrial origin; clear, wavy lower boundary; contained few nails and unidentifiable metal fragments.
IIa	80-120	Fill; 10YR 3/2, very dark grayish brown; silt loam; weak, very fine, crumb structure; moist, very friable consistency; slightly plastic; terrestrial origin; diffuse, wavy lower boundary; contained few nails and unidentifiable metal fragments.
IIb	100-171	Fill; 7.5YR 4/6, strong brown; silt loam; weal, very fine, crumb structure; moist, very friable consistency; slightly plastic; terrestrial origin; very abrupt, smooth lower boundary; contained substantial amount of historic debris: glass bottles and jars, ceramic fragments, metal fragments, nails, red bricks, tiles, and lumber fragments; part of SIHP # -7193, historic trash layer.
IIIa	152-160	Natural; 7.5YR 2.5/1, black; loamy silt; weak, very fine, crumb structure; moist, very friable consistency; slightly plastic; terrestrial origin; diffuse, smooth lower boundary; consists of decaying organic material; peat; many land snail shell inclusions; old A horizon.
IIIb	155-171	Natural; Gley 1 6/5GY, greenish gray; silty clay; weak, fine, platy structure; moist, friable consistency; plastic; mixed origin; diffuse, smooth lower boundary; gley.
IIIb	167-180 (BOE)	Natural; Gley 1 5/10Y, greenish gray; loamy sand; weak, fine, crumb structure; moist, friable consistency; slightly plastic; mixed origin; lower boundary not visible; overlies soft coral shelf.

4.3.21 Trench 21

Trench 21 is located in the northeast corner of the project area (Figure 90 through Figure 92 and Table 23). The stratigraphy of Trench 21 consists of asphalt (Stratum Ia) over crushed coral grading fill (Stratum Ib) and concrete (Stratum Ib) over black sand grading fill (Stratum Id). Strata Ic and Id overlie four layers of clay loam and sandy loam (Strata Ie-h), which overlies a thick silt loam and historic trash layer (Stratum II; part of SIHP # -7193) overlying an old peat A horizon (Stratum IIIa) overlying natural gley (Stratum IIIb) on top of the natural coral shelf. SIHP # -7193 contained a substantial amount of historic debris: glass bottles and jars and ceramic fragments.

Figure 90. Photograph of Trench 21, north wall of excavation; note substantial historic trash layer at bottom of photograph, part of SIHP # -7193

Figure 91. Photograph of portion of backdirt pile for Trench 21 showing bottles from SIHP # -7193, historic trash layer

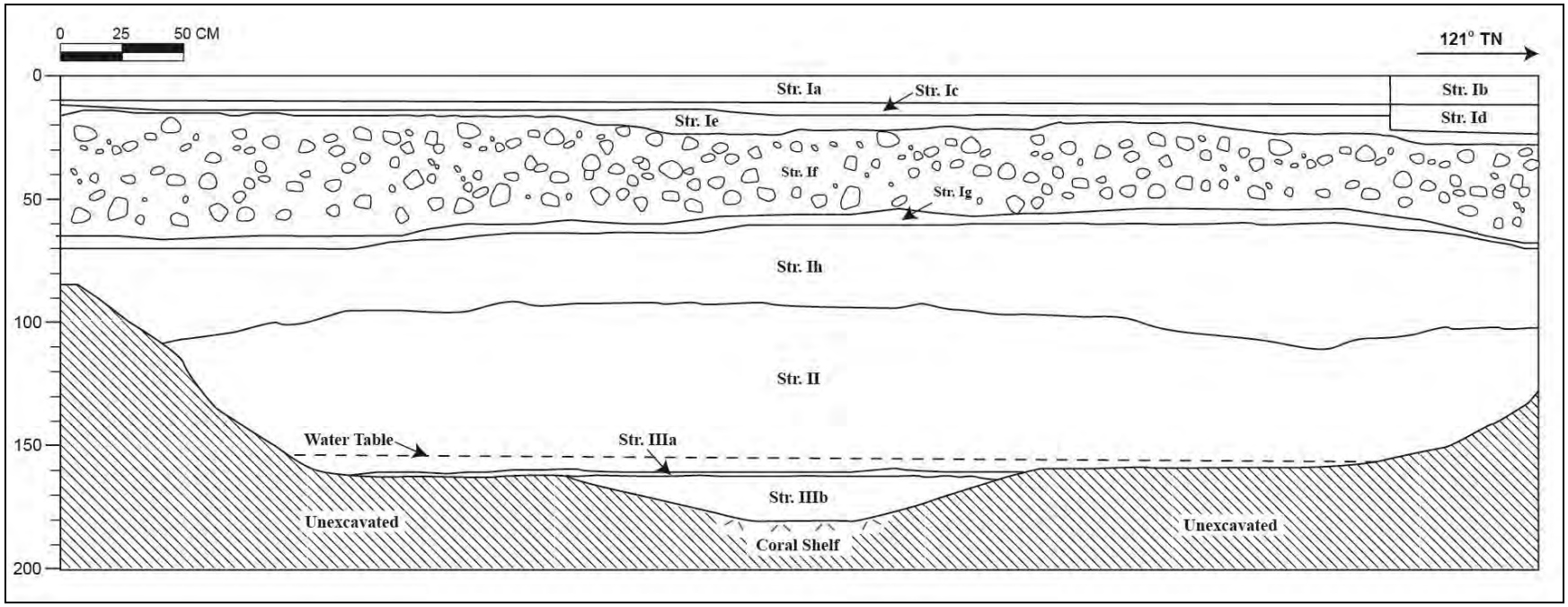


Figure 92. Trench 21 profile, north wall of excavation

Table 23. Stratigraphy Observed at Trench 21

Stratum	Depth (cmbs)	Description of Sediments
Ia	0-10	Asphalt
Ib	0-10	Concrete
Ic	10-14	Crushed coral grading fill; 10YR 8/2, very pale brown.
Id	10-20	Black sand grading fill; 10YR 2/1, black.
Ie	14-25	7.5YR 3/4, dark brown; clay loam; weak, fine, crumb structure; moist, friable consistency; slightly plastic; terrestrial origin; abrupt, smooth lower boundary.
If	16-66	Fill; 7.5YR 2.5/3, very dark brown; stony clay loam; weak, coarse, crumb structure; moist, friable consistency; slightly plastic; terrestrial origin; abrupt, smooth lower boundary; common sub-angular, basalt boulder inclusions.
Ig	52-71	Fill; 10YR 3/4, dark yellowish brown; sandy loam; weak, fine, crumb structure; moist, loose consistency; non-plastic; terrestrial origin; abrupt, smooth lower boundary.
Ih	56-108	Fill; 7.5YR 2.5/3, very dark brown; clay loam; weak, medium, crumb structure; moist, friable consistency; plastic; terrestrial origin; very abrupt, wavy lower boundary.
II	90-160	Fill; 7.5YR 2.5/3, very dark brown; silt loam; weak, fine, crumb structure; moist, friable consistency; non-plastic; terrestrial origin; abrupt, smooth lower boundary; contained substantial amount of historic debris: glass bottles and jars and ceramic fragments; part of SIHP # -7193, historic trash layer.
IIIa	158-161	Natural; 10YR 2/1, black; loamy silt; weak, very fine, blocky structure; moist, very friable consistency; slightly plastic; terrestrial origin; diffuse, wavy lower boundary; consists of decaying organic material; peat; many land snail shell inclusions; old A horizon.
IIIb	161-180 (BOE)	Natural; Gley 1 6/5GY, greenish gray; clay; weak, medium, platy structure; wet, sticky consistency; very plastic; mixed origin; lower boundary not visible; gley; overlies coral shelf.

4.3.22 Trench 22

Trench 22 is located in the northeast corner of the project area (Figure 93 through Figure 96 and Table 24). The stratigraphy of Trench 22 consists of asphalt (Stratum Ia) over crushed coral grading fill (Stratum Ib) overlying two layers of silt loam fill (Strata Ic-d) overlying crushed coral grading fill (Stratum Ie) overlying a loamy clay fill layer (Stratum If) overlying a silty loam fill layer (Stratum Ig) overlying a thick silt loam and historic trash layer (Stratum II; part of SIHP # -7193) overlying two silty clay fill layers (Stratum Ih-i) overlying an old peat A horizon (Stratum IIIa) overlying natural silty gley (Stratum IIIb) on top of the natural coral shelf. SIHP # -7193 consists of a substantial amount of historic debris: glass bottles and jars (mostly dairy bottles), red bricks, ceramic tiles, and metal fragments.

Figure 93. Photograph of Trench 22, west wall of excavation; note substantial historic trash layer at bottom of photograph, part of SIHP # -7193

Figure 94. Close-up photograph of *mauka* end of Trench 22 showing SIHP # -7193, historic trash layer

Figure 95. Close-up photograph of *makai* end of Trench 22 showing SIHP # -7193, historic trash layer

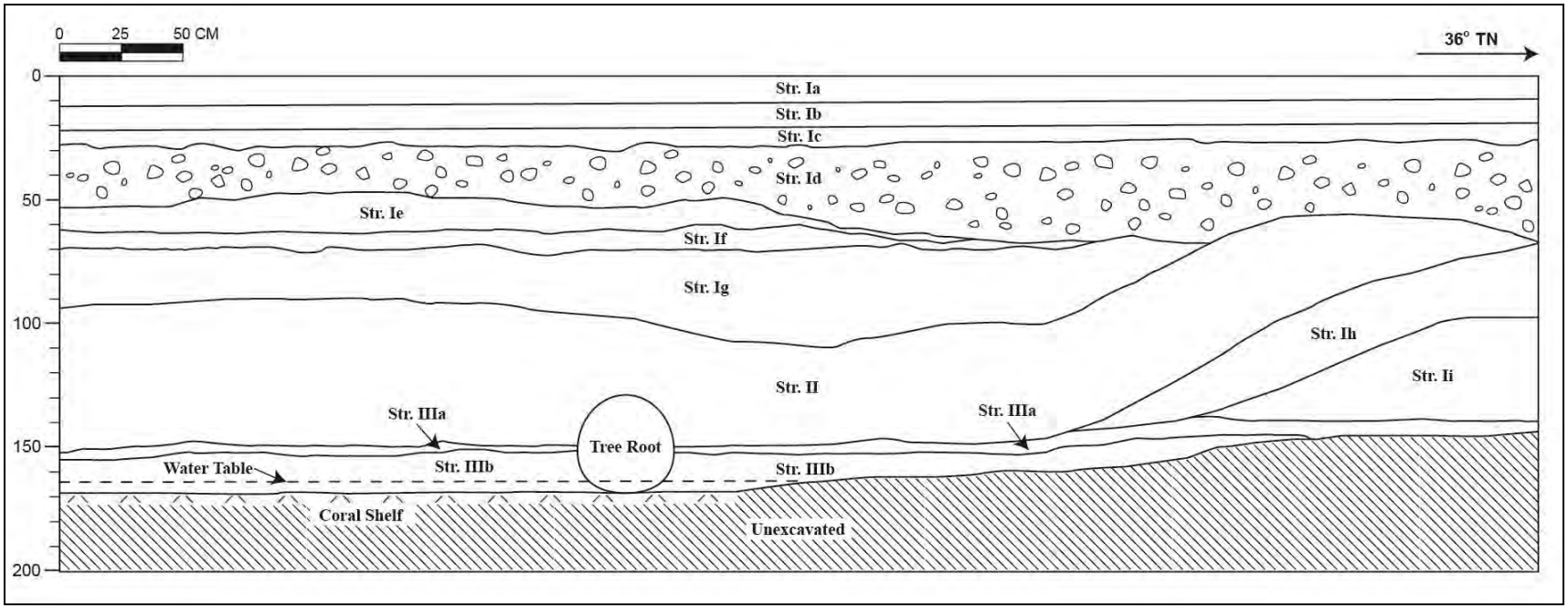


Figure 96. Trench 22 profile, west wall of excavation

Table 24. Stratigraphy Observed at Trench 22

Stratum	Depth (cmbs)	Description of Sediments
Ia	0-12	Asphalt
Ib	12-21	Crushed coral grading fill; 10YR 8/2, very pale brown.
Ic	21-30	Fill; 10YR 4/4, dark yellowish brown; silt loam; moderate, medium, crumb structure; dry, slightly hard consistency; slightly plastic; terrestrial origin; abrupt, smooth lower boundary; few medium roots.
Id	28-68	Fill; 5YR 4/2, dark reddish gray; gravelly silt loam; moderate, medium, crumb structure; dry, weakly coherent consistency; slightly plastic; terrestrial origin; clear, wavy lower boundary; few coarse roots.
Ie	47-64	Crushed coral grading fill; 10YR 6/2, light brownish gray.
If	60-72	Fill; 2.5YR 3/4, dark reddish brown; loamy clay; weak, fine, crumb structure; moist, very friable consistency; slightly plastic; terrestrial origin; abrupt, wavy lower boundary; few, very fine roots.
Ig	66-109	Fill; 10YR 3/2, very dark grayish brown; silt loam; weak, fine, crumb structure; moist, very friable consistency; slightly plastic; terrestrial origin; clear, wavy lower boundary; few, medium roots.
Ih	70-145	Fill; 10YR 4/4, dark yellowish brown; silty clay; weak, medium, crumb structure; moist, friable consistency; slightly plastic; terrestrial origin; clear, wavy lower boundary; few, fine roots.
Ii	100-140	Fill; 10YR 5/3, brown; silty clay; weak, fine crumb structure; moist, very friable consistency; slightly plastic; mixed origin; abrupt, smooth lower boundary; few coral and shell inclusions.
II	57-152	Fill; consists of a substantial amount of historic debris: glass bottles and jars (mostly dairy bottles), red bricks, ceramic tiles, and metal fragments; part of SIHP # -7193, historic trash layer.
IIIa	138-153	Natural; 10YR 2/1, black; loamy silt; weak, very fine, crumb structure; moist, very friable consistency; slightly plastic; terrestrial origin; very abrupt, smooth lower boundary; consists of decaying organic material; peat; many land snail shell inclusions; old A horizon.

Stratum	Depth (cmbs)	Description of Sediments
IIIb	145-168 (BOE)	Natural; Gley 1 6/5GY, greenish gray; silty clay; weak, fine, platy structure; moist, friable consistency; plastic; mixed origin; lower boundary not visible; overlies coral shelf.

4.4 Historic Property Description—SIHP # 50-80-14-7193

SIHP # 50-80-14-7193 is a buried, historic trash layer that was identified within nine of the test trenches (Trenches 1, 14-17, and 19-22) in the project area (Table 25 and Figure 97). The trenches lie within the eastern half and northern extent of the project area. The lateral limits of the subsurface cultural layer beyond the project area remain unknown, but available data from other projects indicate that SIHP # -7391 is part of trash disposal and/or land reclamation activities that were broad in aerial extent, and similar deposits, probably related to SIHP # 7391, have been identified elsewhere (e.g., see O’Hare, Borthwick, and Hammatt 2003; O’Hare, Bush, Borthwick, and Hammatt 2004; O’Hare, Bush, and Hammatt 2006; Thurman et al. 2009; Tulchin and Hammatt 2006).

A total of 115 accessioned artifacts were collected from within the SIHP # 50-80-14-7193 trash layer during subsurface excavations. All 115 accessioned artifacts collected are considered historic period artifacts and consist of various glass, ceramic, and metal items and fragments. A detailed summary and analysis of artifacts collected from SIHP # 50-80-14-7193 is presented below. The artifacts collected from SIHP # -7193 provide temporally diagnostic information indicating that SIHP # -7193 was utilized as a trash disposal area and/or as fill material during land reclamation activities during the early to mid-twentieth century.

Table 25. SIHP # 50-80-14-7193 description

Formal Type	Trash layer
Functional Interpretation	Trash disposal and/or fill for land reclamation
No. of Features	1
Age:	Historic, 1930s-1950s
Current Dimensions	Identified within nine subsurface test excavations within the 1.43-acre project area (lateral limits not established)
Location	Trenches 1, 14-17, and 19-22 on the northern and eastern sides of the project area
Tax Map Key	[1]-2-3-039:011
Land Jurisdiction	Private, Samkoo Pacific, LLC

Figure 97. Inferred geographic extent of SIHP # 50-80-14-7193 (base map: 2008 GoogleEarth aerial photograph)

Section 5 Results of Laboratory Analysis

5.1 Artifact Analysis

A total of 115 artifacts were recovered from SIHP # 50-80-14-7193, a subsurface historic trash layer, observed within nine trenches in the project area (Trenches 1, 14-17, and 19-22). This trash layer produced a substantial quantity of material, mostly glass bottles and bottle fragments. Due to the considerable amount of material unearthed and the lack of diversity with considerable duplication of artifacts, only a sample of artifacts was collected from each trench. Therefore, the majority of the collected items are complete bottles or diagnostic fragments. A substantial amount of additional non-diagnostic historic artifacts, such as miscellaneous unidentifiable metal pieces, lumber, cinder blocks, red bricks, red brick tiles, ceramic tiles, and unmarked bottle glass fragments were observed and briefly described during subsurface excavations, but were not collected.

Artifacts recovered from SIHP # -7193 were cataloged according to provenience and type (Table 26 through Table 32). All 115 accessions were determined to be historic period artifacts and consist of various diagnostic or representative glass, ceramic, and metal items (Figure 98 through Figure 104). The artifacts consist of 93 glass bottles/containers, one champagne glass stem, one glass jar lid, two glass telephone mouthpieces, one metal spike, one metal washer, one metal table spoon, one ceramic bowl fragment, and 14 ceramic tiles.

5.1.1 Glass Bottles/Containers

All terminology used to describe bottle traits and all bottle dating information was taken from the Bureau of Land Management (U.S. Department of the Interior) “Historic Glass Bottle Identification and Information Website” (http://www.sha.org/bottle/index.htm). Research on glass bottles focused on function and manufacturing dates of the items using reference texts (e.g., Elliott 1971, Elliott and Gould 1988; Fike 1987; Lebo 1997; Millar 1988; Munsey 1970; Toulouse 1971; Zumwalt 1980).

From antiquity to ca. 1800, all bottles were free-blown from the base to the lip. In 1800, glass blowers began to blow part of the bottle in a mold; by ca. 1865, most glass makers were using molds, while the lip of the bottle was still finished by hand. In 1906, Michael Owens invented the automatic bottle machine (ABM), which could blow a bottle completely by machine, making a human glass blower obsolete in major glass manufacturing. These bottles have two side seams running vertically along the bottle body, extending up and over the lip. At first, only wide-mouthed jars were made by the ABM, but by ca. 1910, most narrow-mouthed bottles (e.g., sodas and beers) were also made by this method. All the bottles from the current project area were manufactured using an ABM; thus, all the wide-mouthed jars post-date 1906, and all the narrow-neck bottles likely post-date 1910.

Additional manufacturing techniques can be used to date bottles. Two techniques were invented in 1940 to strengthen the glass for those bottles that were returned and refilled several times, such as soda and beer bottles. One technique was called “stippling,” which is characterized by small embossed dots on the surface of the glass. Another strengthening process,

used by the Owens-Illinois Glass Co., was called “Duraglas.” Eight bottles from the current project area had a Duraglas embossed mark, six bottles had stippling, and three bottles had both.

Table 26. Artifacts from Trench 1

Artifact Type	Material	Color	Date	Comments
Cosmetic jar	Glass	Milk glass	1920-1964	H.A. embossed mark (Hazel-Atlas Glass Co.), “Woodberry” mark
Sauce jar	Glass	Clear	1938	O-I mark (Owens-Illinois Glass Co.)
Jar	Glass	Clear	1951	O-I mark
Tile	Ceramic/mortar	9 blue, 2 yellow, 1 green	Unknown	12 tiles; 4.7-x-4.7-x-1.3 cm
Tile	Ceramic	Floral	Unknown	10-x-10-x-1 cm
Tile	Ceramic	Geometric	Unknown	10-x-10-x-1 cm

Table 27. Artifacts from Trench 15

Artifact Type	Material	Color	Date	Comments
Jar	Glass	Clear	1920-1964	H.A. mark
Jar	Glass	Clear	Post 1906	
Soda bottle	Glass	Clear	Post-1910	“Pacific” embossed mark (Pacific Soda Works); narrow mouth ABM
Soda bottle	Glass	Clear	1946	“Royal Soda”
Soda bottle	Glass	Clear	Post-1910	Narrow mouth ABM
Soda bottle	Glass	Clear	1920-1940	“Kist” embossed mark
Quart spirits bottle	Glass	Clear	Post-1920	Narrow mouth ABM
Sauce bottle	Glass	Clear	1920-1964	H.A. markings
Soda bottle	Glass	Clear	1940s-1950s	Pyroglazed label (ACL)
Drinking glass	Glass	Clear	N/A	N.A. mark; long-stemmed champaign glass form
Spirits pint flask	Glass	Clear	Post 1940	O-I mark; stippling

Artifact Type	Material	Color	Date	Comments
Spirits bottle	Glass	Clear	1943	O-I and Duraglas marks; stippling
Spirits bottle	Glass	Light green	1943	O-I mark, push up base; made in Cuba
Sauce bottle	Glass	Clear	Post-1910	Narrow mouth ABM, external thread; has heat deformation
Jar lid	Glass	Clear	Unknown	5.3 cm diameter
Medicine or toiletry bottle	Glass	Clear	1935 or 1945	O-I mark
Extract bottle	Glass	Clear	1925-1930	“I.P.G.” (Illinois Pacific Glass Corp.) and “J.A.F.” (J. A. Folger) embossed marks
Telephone mouthpiece	Glass	Clear	Post-1910	Red Cross Germ Proof Glass Mouthpiece Co.; 2 mouthpieces
Beer bottle	Glass	Emerald green	1944	Duraglas and O-I marks
Beer bottle	Glass	Emerald green	Post-1910	Narrow mouth ABM
4/5 quart spirits bottle	Glass	Clear	1920-1964	H.A. mark
Jar	Glass	Clear	1939	O-I and “Best Foods” marks
Jar	Glass	Clear	Unknown	“Best Foods” embossed mark; design patent: 80918
Soda bottle	Glass	Clear	1946	“Royal Soda”
Soda/beer bottle	Glass	Clear	1932 or 1942	O-I mark
Soda/beer bottle	Glass	Clear	1933 or 1943	O-I mark
Soda/beer bottle	Glass	Clear	Post-1910	Narrow mouth ABM
Jar	Glass	Amber	1944	Duraglas and O-I marks

Table 28. Artifacts from Trench 16

Artifact Type	Material	Color	Date	Comments
Ice cream jar	Glass	Clear	Post 1933	Pyroglazed
4/5 quart spirits bottle	Glass	Clear	Post 1940	O-I mark; stippling
4/5 quart spirits bottle	Glass	Clear	1938-1977	A.H. embossed mark (Anchor Hocking Glass Co.)

Table 29. Artifacts from Trench 17

Artifact Type	Material	Color	Date	Comments
Half pint milk bottle	Glass	Clear	Post 1933	Pyroglazed; 2 bottles
Quart milk bottle	Glass	Clear	1944	“Dairymen’s Association” label; Duraglas and O-I marks
Quart milk bottle	Glass	Clear	Post 1940	Pyroglazed; Duraglas mark
Beer bottle	Glass	Clear	1937	O-I mark
Beer bottle	Glass	Clear	Post-1910	Narrow mouth ABM
Beer bottle	Glass	Clear	Post 1940	“Ball” embossed mark (Ball Glass Mfg. Co.); stippling
Soda bottle	Glass	Light green	1950s	“Royal Crown” embossed mark; O-I mark
Soda bottle	Glass	Light green	1950s	“Coca-Cola” embossed mark
Sauce jar	Glass	Clear	1920-1964	H.A. mark
Small jar	Glass	Clear	Post-1906	
Household bottle	Glass	Clear	1934-1968	Overlapping GC mark (Glass Containers Corp.)
Spike	Metal	N/A	Unknown	Possibly railroad related; 7 1/2 in long
Washer	Metal	N/A	Unknown	2.1 cm diameter
Spoon	Metal	N/A	Unknown	Dinner-sized, 14.2 cm long
Bowl fragment	Ceramic	White	Unknown	Marking is unclear

Table 30. Artifacts from Trench 20

Artifact Type	Material	Color	Date	Comments
Household bottle	Glass	Clear	1942	O-I mark
Beer bottle	Glass	Amber	1934 or 1944	O-I mark
Beer bottle	Glass	Clear	1942	O-I mark
Beer bottle	Glass	Dark green	1936 or 1946	O-I mark
Beer bottle	Glass	Amber	1934 or 1944	O-I mark
Beer bottle	Glass	Amber	1944	O-I mark

Artifact Type	Material	Color	Date	Comments
Beer bottle	Glass	Amber	1944	O-I mark
Beer bottle	Glass	Clear	1942	O-I mark
Beer bottle	Glass	Amber	1933 or 1943	O-I mark
Beer bottle	Glass	Amber	1937	O-I mark
Soda bottle	Glass	Clear	1934 or 1944	O-I mark
Beer bottle	Glass	Clear	1938-1969	Armstrong Cork Co. (Glass Division) embossed mark
Beer bottle	Glass	Clear	1940-1969	Armstrong Cork Co. (Glass Division) embossed mark; stippling
Beer bottle	Glass	Clear	1940-1969	“Ball” embossed mark; stippling
Soda bottle	Glass	Clear	1950-1955	“Coca-Cola” embossed mark
Jar	Glass	Clear	Post 1906	Golden Mustard
Beer bottle	Glass	Clear	1934-1968	Overlapping GC mark (Glass Containers Corp.)
Soda bottle	Glass	Green	1939	O-I mark

Table 31. Artifacts from Trench 21

Artifact Type	Material	Color	Date	Comments
Soda bottle	Glass	Emerald green	1943	“7-Up” ACL; bottled in Honolulu; O-I mark
Soda bottle	Glass	Aqua	Early to mid-1950s	“Coca-Cola” embossed mark; 3 bottles
Soda bottle	Glass	Clear	1932 or 1942	O-I mark
Beer bottle	Glass	Clear	1915-1980	Obear Nestor mark; 2 bottles
Beer bottle	Glass	Clear	1941	“Regal Amber Brewing Co.” embossed mark; O-I mark; stippling
Beer bottle	Glass	Clear	Post-1910	“Primo Brewing Corp” mark; narrow mouth ABM
Jar	Glass	Clear	1920-1964	H.A. mark
Jug	Glass	Clear	Post-1906	Wide mouth
Quart bottle	Glass	Amber	Circa 1958	“Palolo” embossed mark; M.G. mark (Maywood Glass Co.)

Artifact Type	Material	Color	Date	Comments
Beer bottle	Glass	Amber	1938	O-I mark
Beer bottle	Glass	Amber	Circa 1970	N.W. mark (Northwestern Glass Co.)
Beer bottle	Glass	Clear	Post-1910	Narrow mouth ABM; double diamond mark
Beer bottle	Glass	Green	1936 or 1946	O-I mark
Beer bottle	Glass	Clear	1942	O-I and Duraglas marks; stippling
Beer bottle	Glass	Amber	1942	O-I and Duraglas marks; stippling
Ice cream jar	Glass	Clear	1933	Pyroglazed “Dairymen’s Association”

Table 32. Artifacts from Trench 22

Artifact Type	Material	Color	Date	Comments
1/2 pint milk bottle	Glass	Clear	1942	O-I mark
1/2 pint milk bottle	Glass	Clear	Post 1933	Pyroglazed “Dairymen’s Association”
1/2 pint milk bottle	Glass	Clear	Post 1940	Duraglas mark
1/2 pint milk bottle	Glass	Clear	Post 1933	Pyroglazed
Quart milk bottle	Glass	Clear	Post 1933	Pyroglazed
Beer bottle	Glass	Amber	1944	O-I mark
Beer bottle	Glass	Clear	1942	O-I mark
Beer bottle	Glass	Clear	1933-1954	O-I mark
Beer bottle	Glass	Clear	1942	O-I and Duraglas mark
Beer bottle	Glass	Clear	1942	O-I and Duraglas mark
Quart milk bottle	Glass	Clear	1931 or 1941	O-I and Duraglas mark; pyroglazed “Dairymen’s Association”
Beer bottle	Glass	Clear	1933-1954	O-I and Duraglas mark
Beer bottle	Glass	Clear	1920-1964	H.A. mark

Figure 98. Sample of soda bottles (left to right): ca. 1958, clear, “Palolo” embossed, soda bottle; 1943, green, “7-Up” painted label, soda bottle (Canada Dry Bottling Co.); early to mid-1950s, aqua, “Coca-Cola” embossed, soda bottle

Figure 99. Sample of soda bottles (left to right): 1950s, clear, “Royal Crown” painted label, soda bottle; 1920-1940, clear, “Kist” embossed, soda bottle; 1946, clear, “Royal Soda” embossed, soda bottle; post ca. 1920, green, “Pacific Soda Works” embossed, soda bottle

Figure 100. Sample of spirits (ale, beer, whiskey, etc.) bottles (left to right): post 1940, unlabeled, clear, spirits bottle; 1942, unlabeled, amber, long-neck beer bottle; 1936/1946, green, short-neck, beer bottle; post 1940, clear, short-neck, beer bottle with stippling; 1948, amber, short-neck, beer bottle

Figure 101. Sample of milk bottles (left to right); post 1933, “Dairymen’s Ice Cream” painted label, milk bottle fragment; post 1933, one-half pint, pyroglazed, “Dairymen’s Association,” milk bottle; post 1940, one quart, pyroglazed, “Dairymen’s Association,” milk bottle; 1944, one quart, pyroglazed, “Dairymen’s Association” milk bottle

Figure 102. Sample of wide-mouth jars (left to right, top to bottom): 1925-1930, clear, rectangular bottle embossed “JAF” for J. A. Folgers spices and extracts; 1939, clear, round jar, embossed “Best Foods;” 1920-1964, milk glass, round jar, probably cold cream, embossed “Woodbury;” post 1906, clear, barrel-shaped, unlabeled jar

Figure 103. Sample of “Red Cross Germ Proof Mouthpiece/Patented by E. & L. May 3, 1910” for use with candlestick telephones

Figure 104. Exemplar of Red Cross germ proof telephone mouthpiece attached to a candlestick phone (from Wolff 1996)

Bottles can also be dated by the company histories of their glass manufacturers, the company history of the brands, and the labeling style. When bottles began to be blown in molds, it was possible to put information on the bottle using emboss lettering or marks.

In 1933, a new method was developed for product information, called pyroglazing, which used applied color labels (ACLs) or painted labels. ACLs and painted labels were made using a pigment and mineral mixture that was baked onto the bottle. Bottles with embossed or ACL company names include five “Coca-Cola” soda bottles, one “Kist” soda bottle, two “Royal Soda” bottles, one “Royal Crown” soda bottle, one “Pacific” soda bottle, one “7-Up” soda bottle, one “Primo Brewing Corp” beer bottle, one “Regal Amber Brewing Co.” beer bottle, one “Woodbury” cold cream jar, one “J.A.F.” (J. A. Folger) spice/extract bottle, two “Best Foods” jars, and four “Dairymen’s Association” milk bottles. The labeling and the embossing style for brands changed often and can sometimes be used to narrow the date ranges for the bottles. Based on the brand label style, the “Kist” soda bottle dates to 1920-1940, the three “Royal Soda” bottles to 1946, the “Royal Crown” soda bottle to the 1950s, and the four “Coca-Colas” soda bottles to the early to mid-1950s.

Sixty bottles had an embossed mark identifying a glass manufacturing company: 41 for the Owens-Illinois Glass Co. (1930-1954), six for the Hazel Atlas Glass Co. (1920-1964), two for the Ball Glass Mfg. Co. (1919-1969), two for the Obear-Nestor Glass Co. (1915-1980), two for Glass Containers Corp. (1934-1968), two for the Armstrong Cork Co. (Glass Division) (~1938-1969), one for the Anchor Hocking Glass Co. (1938-1977), one for the Illinois-Pacific Glass Co. (1925-1930), one for the Northwestern Glass Co. (1931-?), one for the Maywood Glass Co. (1930-1959), and one for an unknown manufacturer (N.A.). The Owens-Illinois Glass Co. embossed dates on their bottles using single digits from 1930-1946 and double digits from 1947-1954. Bottles with the single digits 0 to 6 indicate 1930s or 1940s dates; single digits 7-9 always indicate 1930s bottles. Bottles with single digits 0-6 that also have stippling or a Duraglas mark date to the 1940s. For the 41 Owens-Illinois bottles, 21 date to the 1940s, five date to the late 1930s, two date to the early 1930s or early 1940s, two date to the 1950s, and two date to 1933-1954.

The earliest-dated glass bottles/containers from the trash layer are two clear glass jars and one clear glass jug dated to post-1906. It is likely, however, that these artifacts date to later than 1906, based on the dates of the other artifacts collected. The next earliest dated artifact has a date range of 1925-1930. This artifact is a clear glass extract bottle manufactured by the Illinois Pacific Glass Corporation (see Figure 102). The latest dated artifact is a clear glass 4/5 quart spirits bottle manufactured by Anchor Hocking from 1938 until 1977. The next latest dated artifact is an amber glass beer bottle manufactured by the Northwestern Glass Co. circa 1970. None of the non-glass artifacts could be dated to a specific time. The majority of artifacts from SIHP # -7193, however, date from the 1930s and 1940s.

Interestingly, bottle types seemed to be clustered geographically; several of the trenches contained an overwhelming percentage of a certain type of bottle. Trench 22 contained mostly milk bottles, with beer and soda bottles underrepresented. Trench 20 contained mostly beer bottles, with soda and milk bottles underrepresented. Trench 15 contained a large amount of Red Cross germ proof telephone mouthpieces (see Figure 103 and Figure 104). The glass is embossed with the words “Red Cross Germ Proof Mouthpiece/Patented by E. & L. May 3, 1910.” The mouthpieces were typically used with “candlestick” type phones, which were popular from the 1890s into the 1930s, when they were gradually replaced by the tabletop “cradle” type of phone, still in use today. These mouthpieces were removable and contained a small piece of rope or thread inside that was soaked in an antiseptic. The mouthpieces were thought to prevent the spread of tuberculosis, influenza, and the plague (Wolff 1996). Trench 15 was the only trench to contain these mouthpieces, and milk and beer bottles were underrepresented in this trench.

5.2 Disposition of Materials

Materials collected during the current AIS will remain temporarily curated at the CSH storage facility in Waimānalo, O‘ahu. CSH will make arrangements with the landowner regarding the disposition of this material. Should the landowner request different archiving of material, an archive location will be determined in consultation with the SHPD/DLNR.

Section 6 Summary and Interpretation

In compliance with and to fulfill applicable Hawai‘i State historic preservation legislation, CSH conducted an archaeological inventory survey for a parcel located at 1391 Kapi‘olani Boulevard in Kaka‘ako Ahupua‘a. Fieldwork for the AIS was conducted between June 14 and 24, 2011. Twenty-two test trenches were excavated throughout the project area. Twenty of the test trenches originally measured 6.0 m long and 0.8 m wide, while two of the test trenches measured 3.1 m long and 0.915 m wide. One of the original 6.0-x-0.8 m trenches (Trench 15) was extended to a length of 7.5 m due to a large amount of debris within the trench. Depths ranged from 1.64 m to 2.6 m below surface.

The project area’s subsurface deposits have been heavily disturbed by past land use. A large volume of imported fill material has been deposited within the project area, largely replacing the natural land surface, which correlates to land reclamation activities. In general, the observed and documented stratigraphy consisted of the following sequence: 1) various ground surfaces (asphalt and concrete) and construction grading and fill layers (Stratum I); 2) either historic trash layers or, if no trash layers were present, an old A horizon and natural gley and sandy clay layers (Stratum II); and 3) an old A horizon and natural gley and sandy clay layers (when Stratum II [historic trash layer] was present). The coral shelf was observed at the base of excavation (BOE) of all excavated trenches except for one.

The old, buried A horizon was found in 16 of the 22 test trenches. It consisted of a thin layer of black silt loam containing decaying organic matter (peat) and abundant land snail shells. No cultural material was observed within this layer; therefore, it was not sampled or recommended as a historic property.

A single historic property (SIHP # 50-80-14-7193) was identified within the project area during the current AIS investigation (see Table 25 and Figure 97). SIHP # 50-80-14-7193 is a subsurface trash layer, consisting of whole and fragmented glass bottles and jars, unidentified metal fragments, wires, ceramic fragments, red brick and ceramic tiles, red bricks, cinder blocks, lumber, nails, metal barrel remnants, and tire remnants. This site is dated to ca. the 1930s to 1950s. The large volume of trash and fill material imported into the project area corresponds with trash disposal and/or historic land reclamation activities. These activities were broad in aerial extent and similar deposits, probably related to SIHP # 7393, have been identified throughout Kaka‘ako. SIHP # 50-80-14-7193 is not determined eligible to the Hawai‘i Register of Historic Places.

Section 7 Significance Assessments

A single historic property was identified within the current project area (Table 33). To be considered eligible for listing on the Hawai‘i Register of Historic Places, a historic property must possess one or more of the following: integrity of location, design, setting, materials, workmanship, feeling, and/or association, and meet one or more of the following broad cultural/historic significance criteria:

A Historic property reflects major trends or events in the history of the state or nation.

B Historic property is associated with the lives of persons significant in our past.

C Historic property is an excellent example of a site type.

D Historic property has yielded or may be likely to yield information important in prehistory or history.

E Historic property has cultural significance to an ethnic group, including, but not limited to, religious structures, burials, and traditional cultural properties.

Table 33. Table of Historic Properties

SIHP #	Significance Assessment	Recommendation
50-80-14-7193	Not significant	No further cultural resource management work needed

7.1 SIHP # 50-80-14-7193

SIHP # 50-80-14-7193 is a subsurface historic trash layer dating from ca. the 1930s to 1950s. This site is considered part of trash disposal and/or land reclamation activities that were widely performed in the area. Similar trash deposits, probably related to this site, have been identified elsewhere. SIHP # -7193 is not considered significant and is therefore not recommended eligible to the Hawai‘i Register.

Section 8 Project Effect and Mitigation Recommendations

8.1 Project Effect

The proposed project will not affect a significant historic property; therefore, CSH's effect recommendation for the current project is "no historic properties affected" (in accordance with HAR 13-284-7).

8.2 Mitigation Recommendations

As there is no project effect, there is no need for any mitigation measures. No further cultural resource management work is recommended.

Section 9 References

Adler, Jacob and Gwynn Barrett

1973 *The Diaries of Walter Murray Gibson 1886, 1887*. The University Press of Hawai‘i, Honolulu.

Armstrong, Warwick (ed.)

1973 *Atlas of Hawai‘i*, University of Hawaii Press, Honolulu.

Army Mapping Service

1956 Map of O‘ahu, Honolulu Quadrangle.

Arnold, Harry L.

1956 Hawaii Medical Association, 1856-1956. *Hawaii Medical Journal*. 15(4):313-324.

Athens, J. Stephen, Conrad Erkelens, Jerome V. Ward, Robert H. Cowie, and Michael Pietrusewsky

1994 *The Archaeological Investigation of Inadvertently Discovered Human Remains at the Piikoi and Kapiolani Intersections, Kewalo, Waikiki, O‘ahu, Hawai‘i*. IARII, Honolulu.

Barnes, Shawn and David W. Shideler

2007 *Field Check and Literature Review for the Proposed 1235 Kona Street/1226 Waimanu Street Reserved Housing Project Kaka‘ako, Kona District, O‘ahu Island TMK: [1] 2-3-007:026 & 049.* Cultural Surveys Hawai‘i, Inc., Kailua, HI.

Beckwith, Martha

1940 *Hawaiian Mythology.* Yale University Press, New Haven, CT.

Bell, Matthew J. and Matt McDermott

2006 *Archaeological Inventory Survey Report for the Allure Waikīkī Development, Waikīkī Ahupua‘a, Honolulu (Kona) District, O‘ahu, TMK [1] 2-6-13:1, 3, 4, 7, 8, 9, 11 and 12*. Cultural Surveys Hawai‘i, Inc., Kailua, HI.

Bell, Matthew J., Matt McDermott, and Owen O. O’Leary

2006 *Archaeological Inventory Survey Report for the Victoria Ward Village Shops Project, Waikīkī Ahupua‘a, Kona District, O‘ahu Island TMK: [1] 2-3-5:013–017, 022, & 023*. Cultural Surveys Hawai‘i, Inc., Kailua, HI.

Bingham, Hiram

1847 *A Residence of Twenty-One Years in the Sandwich Islands*. Praeger Publisher, Hartford, CT.

Bishop, S. E.

1884 Portion of map of Honolulu, Kewalo Section. Hawai‘i Land Survey Division, Registered Map No. 1090

Boelen, Jacobus

1988 *A Merchant's Perspective: Captain Jacobus Boelen's Narrative of his Visit to Hawai‘i in 1828*. Hawaiian Historical Society: Honolulu.

Borget, Auguste

1838 Sketch of “Honolulu Salt Pans, near Kaka‘ako.”

Bush, Tony and Hallett H. Hammatt

2006 *Archaeological Monitoring Report for Hawaiian Electric Company (HECO) Trenching for the Hokua Tower Project on Ala Moana Boulevard Kaka‘ako/Kewalo District, Waikīkī Ahupua‘a, Island of O‘ahu, TMK (1) 2-03-004:073; 2-03-005:027; 2-03-006:014; 2-3-007:002*. Cultural Surveys Hawai‘i, Inc., Kailua, HI.

Carney, Mary and Hallett H. Hammatt

2008 *FINAL An Archaeological Monitoring Report for the Hokua Tower Project Parcel on Ala Moana Boulevard, Kaka‘ako/Kewalo District, Waikiki Ahupua‘a, Island of O‘ahu TMK: [1] 2-03-005: 001, 002, 003, por. 024, 026, and 027*. Cultural Surveys Hawai‘i, Inc., Kailua, HI.

Chiogioji, Rodney, and Hallett H. Hammatt

1992 *An Archaeological Assessment of a 5.33 Acre Parcel in the Kapi‘olani Business District, Honolulu, Island Of O‘ahu (TMK 2-3-09:Portion 01)*. Cultural Surveys Hawai‘i, Inc., Kailua, HI.

Chong, Douglas Dai Lunn

1998 *Ancestral Reflections: Hawaii’s Early Chinese of Waipahu: An Ethnic Community Experience, 1885-1935*. Waipahu Tsoong Nyee Society, Waipahu, HI.

Clark, John R. K.

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

Clark, Stephen D. and Dennis Gosser

2005 *Final Report: A Subsurface Archaeological Inventory Survey of TMK 2-3-003:075, 085, and 086. Waikīkī Ahupua‘a, Kona District, O‘ahu, Hawai‘i*. Pacific Consulting Services, Inc., Honolulu.

Conyers, Lawrence B.

2004 *Ground-Penetrating Radar for Archaeology*. AltaMira Press, Walnut Creek, California.

Cook, James P.

1784 *A Voyage to the Pacific Ocean...the Northern Hemishpere...Performed Under the Direction of Captains Cook, Clerke, and Gore, in...the Resolution and Discovery...in the years 1776, 1777, 1779, and 1780. Vol. 2 and 3.* G. Nichol & T. Cadell, London.

Covington, R.

1881 Map of O‘ahu (portion). Hawai‘i Land Survey Division, Registered Map No. 1381.

Dale, John B.

1845 Sketch of “Native Church, Oahu, from the Old Salt Pans.”

Daniels, D. J.

2004 *Ground Penetrating Radar*, 2nd Edition. The Institute of Electrical Engineers, London.

de LaPasse, Lt. Joseph

1855 Map of Honolulu District.

Dukas, Neil Bernard

2004 A *Military History of Sovereign Hawai‘i.* Mutual Publishing, Honolulu.

Elliott, Rex R.

1971 *Hawaiian Bottles of Long Ago*. Hawaiian Service In., Honolulu.

Elliott, Rex R. and Stephen C. Gould

1988 *Hawaiian Bottles of Long Ago: A Little of Hawaii’s Past*. Hawaiian Service, Honolulu.

Ellis, William

1827 *Narrative of a Tour through Hawaii, or Owhyhee: With Observations on the Natural History of the Sandwich Islands, and Remarks on the Manners, Customs, Traditions, History, and Language of their Inhabitants.* Printed for B. J. Holdsworth, London.

1964 *Polynesian Researches, Hawaii*: *Journal of William Ellis*. Charles E. Tuttle Company, Rutland, VT.

Emmert, Paul

1850 Sketch. Hawaiian Historical Society, Honolulu.

Esh, Kelley S. and Hallett H. Hammatt

2006 *Archaeological Monitoring Report for the Rehabilitation of Streets Unit 5B Project Pi‘ikoi Street from Ala Moana Blvd. to Matlock Street Kewalo ‘Ili, Waikīkī Ahupua‘a, Kona District, O‘ahu Island (TMK: 2-3-06, 07, 10, 11, 12, 14, 15, 35, & 38 and 2-4-03, 04, 11 & 12)*. Cultural Surveys Hawaii, Inc., Kailua, HI.

Fike, R.E.

1987 *The Bottle Book: A Comprehensive Guide to Historic, Embossed Medicine Bottles*. Peregrine Smith Books, Salt Land City, ID.

Fitzpatrick, Gary

1986 *The Early Mapping of Hawai‘i.* Editions Limited, Honolulu, HI.

Fong, Jeffrey W. K., Douglas F. Borthwick, and Hallett H. Hammatt

2009 *Final Archaeological Monitoring Report for Rehabilitation of Streets: Unit 9, Phase 1 Kapi‘olani Boulevard from Kalākaua Avenue to Ward Avenue, Kamake‘e Street from Kapi‘olani Boulevard to Auahi Street and Atkinson Drive from Kapi‘olani Boulevard to Ala Moana Boulevard TMK: [1] 2-1-044, 049, [1] 2-3-001-005, 007, 008, 010, 015, 016, 021, 022, 032, 034-036, 038-041*. Cultural Surveys Hawaii, Inc., Kailua, HI.

Foote, Donald E., Elmer L. Hill, Sakuichi Nakamura, and Floyd Stephens

1972 *Survey of the Islands of Kauai, O‘ahu, Maui, Molokai and Lanai. State of Hawai‘i.* U.S. Department of Agriculture, U.S. Government Printing Office, Washington, D.C.

Forbes, David

1992 *Encounters with Paradise: Views of Hawaii and its People 1778-1941*. Honolulu Academy of Arts, Honolulu.

Foreign Register

1842 *Foreign Register of Kuleana Claims to Quiet Land Titles in the Hawaii Islands (1842-43),* vol. 2. State of Hawai‘i Archives, Honolulu.

Foreign Testimony

1848 *Foreign Testimony of Kuleana Claims to Quiet Land Titles in the Hawaii Islands (1848-50),* vol. 3. State of Hawai‘i Archives, Honolulu.

Freeman, Sallee, Matt McDermott, Constance R. O’Hare, and Hallett H. Hammatt

2005 *Archaeological Inventory Survey and Cultural Impact Evaluation for the Ala Wai Gateway Project Site, Kālia, Waikīkī, O‘ahu. TMK: [1] 2-6-011:001, 002, 004, 032, 037 and 040*. Cultural Surveys Hawai‘i, Inc., Kailua, HI.

Gilman, Gorman D.

1903 Streets of Honolulu in the Early Forties. In *Hawaiian Almanac and Annual for 1904*, Thomas G. Thrum (ed.). Honolulu, HI.

GoogleEarth

2008 Aerial photograph.

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

2006 Final Report: Archaeological Monitoring Report of TMK 2-3-003:075, 085, and 086 Waikīkī Ahupua‘a, Kona District, O‘ahu, Hawai‘i. Pacific Consulting Services, Inc., Honolulu.

Grant, Glen, Bennett Hymer, and the Bishop Museum Archives

2000 *Hawai‘i Looking Back: An Illustrated History of the Islands.* Mutual Publishing, Honolulu.

Griffin, P. Bion, D. T. P. Keene, and Joseph Kennedy

1987 *Kaka‘ako: Prediction of Sub-Surface Archaeological Resources, Kaka‘ako Community Development District-Archaeological Reconnaissance Survey*. University of Hawai‘i at Mānoa, Honolulu, HI.

Hammatt, Hallett H.

2006a *Archaeological Literature Review and Field Inspection of the 1391 Kapi‘olani Boulevard Parcel, Waikīkī Ahupua‘a, Kona District, O‘ahu, TMK: [1] 2-3-39:11*. Cultural Surveys Hawai‘i, Inc., Kailua, HI.

2006b *Archaeological Inventory Survey for the Ala Moana Center Expansion Project, Waikīkī Ahupua‘a, Kona District, O‘ahu Island (TMK: [1] 2-3-38: 001 and 2-3-40: 005, 007, 009, 011, 014, 016, & 018)*. Cultural Surveys Hawai‘i, Inc., Kailua, HI.

2008 *Final Archaeological Monitoring Report for the Ko‘olani Project on Waimanu Street, Kaka‘ako/Kewalo, Waikīkī Ahupua‘a, Kona District, Island Of O‘ahu TMK [1] 2-3-004, 005, 006, & 007.* Cultural Surveys Hawai‘i, Inc., Kailua, HI.

Hammatt, Hallett H. and Rodney Chiogioji

2004 *Archaeological Literature Review and Field Inspection for a 2.3-Acre Project Area, Waikīkī Ahupua‘a, Kona District, O‘ahu (TMK 2-6-13: 1, 3, 4, 7, 8, 9, 11 and 12).* Cultural Surveys Hawai‘i, Inc., Kailua, HI.

2006 *Archaeological Literature Review and Field Inspection for a 2.3-Acre Project Area, Waikīkī Ahupua‘a, Kona District, O‘ahu (TMK 2-6-13: 1, 3, 4, 7, 8, 9, 11 and 12).* Cultural Surveys Hawai‘i, Inc., Kailua, HI.

Hammatt, Hallett H. and Matt McDermott

1999 *Appendix Burial Disinterment Plan and Report, State Site Numbers 50-80-14-5744-1 and -2, found during Anti-Crime Street Lighting Improvements beneath Kalākaua Avenue, Waikīkī, Island of O‘ahu.* Cultural Surveys Hawai‘i, Inc., Kailua, HI.

Hammatt, Hallett H. and David W. Shideler

1995 *Archaeological Sub-surface Inventory Survey at the Hawai‘i Convention Center Site, Waikīkī, Kona District, O‘ahu (TMK 2-3-35:001).* Cultural Surveys Hawai‘i, Inc., Kailua, HI.

1996 *Archaeological Data Recovery at the Hawai‘i Convention Center Site, Waikīkī, Kona District, O‘ahu (TMK 2-3-35:001).* Cultural Surveys Hawai‘i, Inc., Kailua, HI.

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

1972 *Native Planters in Old Hawaii: Their Life, Lore, and Environment*. Bishop Museum Bulletin 23, Honolulu, HI.

Hanley, Sister M. L. and O. A. Bushnell

1980 *A Song of Pilgrimage and Exile: The Life and Spirit of Mother Marianne of Molokai.* Franciscan Herald Press, Chicago.

Hawaii First Legislative Assembly

1901 *First Legislative Assembly of the Territory of Hawaii, 1901, in Extra Session.* The Grieve Publishing Co., Honolulu.

Hawaii Board of Health

1903 *Annual Report of the Board of Health of the Territory of Hawaii*. Bulletin Publishing Co., Honolulu.

1908 *Annual Report of the Board of Health of the Territory of Hawaii*. Bulletin Publishing Co., Honolulu.

Hawaii Department of Public Works

1904 *Annual report of the Superintendent of Public Works to the Governor of the territory of Hawaii*. Bulletin Publishing Co., Honolulu.

1914 *Annual report of the Superintendent of Public Works to the Governor of the territory of Hawaii*. Bulletin Publishing Co., Honolulu.

Hawaii Governor

1922 *Report of the Governor of the Territory of Hawaii to the Secretary of the Interior.* Government Printing Office, Washington, D. C.

1930 *Annual Report of the Governor of the Territory of Hawaii to the Secretary of the Interior.* Government Printing Office, Washington, D. C.

Hawaii Reports

1914 *Cases Decided in the Supreme Court of the Territory of Hawaii*. Honolulu Star-Bulletin, Honolulu.

1915 *Cases Decided in the Supreme Court of the Territory of Hawaii*. Honolulu Star-Bulletin, Honolulu.

Hawai‘i State Archives

ca. 1930 Aerial photograph of Kewalo Basin.

1931 Aerial photograph of Honolulu and Waikīkī.

1950s Aerial photograph of Kewalo Basin and Kaka‘ako.

Hawai‘i Tax Map Key Service

2009 Tax Map Key [1] 2-3-039. On file at Hawai‘i TMK Service, 222 Vineyard Street, Suite 401, Honolulu, HI.

Hawaiian Gazette

1881 September 14 article.

1897 January 29 article.

Hawaiian Humane Society

1997 *Poi Dogs & Pōpoki.* Hawaiian Humane Society, Hong Kong.

Hazlett, Alex, Mary Carney, and Hallett H. Hammatt

2008 *Final Archaeological Monitoring Report for the Honolulu Design Center Phase III Project, Waikiki Ahupua‘a, ‘Ili of Kewalo, Honolulu (Kona) District, O‘ahu Island TMK: [1] 2-3-010:048, 050, 052, 053, 054, 055, 056*. Cultural Surveys Hawai‘i, Inc., Kailua, HI.

Honolulu Star Advertiser

1928 October 17 article.

Hustace, Frank Ward, III

2000 *Victoria Ward and Her Family: Memories of Old Plantation*. Victoria Ward, Ltd., Honolulu.

Iwamoto, Lana

1969 The Plague and Fire of 1899-1900 in Honolulu. In *Hawaii Historical Review Selected Readings*, pp. 122-141. Hawaiian Historical Society, Honolulu.

Jones, C. Kulani and Hallett H. Hammatt

2004 *Archaeological Monitoring Report for the Anti-Crime Street Lighting Improvements beneath Kalākaua Avenue, Waikīkī, Island of O‘ahu.* Cultural Surveys Hawai‘i, Inc., Kailua, HI.

Judd, Walter F.

1971 *Hawaii's Military Heritage. Polynesian to Annexation.* Typescript manuscript available at Cultural Surveys Hawai‘i, Inc. Library, Waimanalo, Hawai‘i.

1975 *Palaces and Forts of the Hawaiian Kingdom. From Thatch to American Florentine.* Pacific Books, Palo Alto, California.

Kamakau, Samuel Mānaiakalani

1964 *Ka Po‘e Kahiko: The People of Old*. The Bishop Museum, Sp. Publication 51. Bishop Museum Press, Honolulu.

1991 *Tales and Traditions of the People of Old: Nā Mo‘olelo a ka Po‘e Kahiko*. Bishop Museum Press, Honolulu.

Kekahuna, Henry E. P.

1958 *Hawaiian Place Names of O-‘ahu.* Box M-445, Item # 81, Hawai‘i State Archives, Honolulu.

Kotzebue, Otto von

1821 *A Voyage of Discovery, into the South Sea and Beering Straits, for the Purpose of Exploring a North-east Passage Undertaken in the Years 1815-1818*. Longman, Hurst, Rees, Orme, and Brown, London.

Kuykendall, Ralph S.

1967 *The Hawaiian Kingdom: l874-l893, Volume 3.* University Press of Hawai‘i, Honolulu.

Larrison, G.

1916 Honolulu’s Future Water Supply. In *Hawaiian Almanac and Annual for 1917*, pp. 148-149. Thomas G. Thrum, Honolulu.

Lebo, Susan A. (editor)

1997 *Native Hawaiian and Euro-American Culture Change in Early Honolulu*. Anthropology Department, Bernice P. Bishop Museum, Honolulu.

LeSuer, Celeste C. and Paul L. Cleghorn

2004 *Archaeological Assessment for the Hawaiian Electric Company, Inc.: East O‘ahu Transmission Project-46kV Phased Project*. Cultural Surveys Hawai‘i, Inc., Kailua, HI.

McAllister, J. Gilbert

1933 *Archaeology of Oahu.* Bernice P. Bishop Museum Bulletin 104. Bishop Museum Press, Honolulu.

McDermott, Matt, Rodney Chiogioji, and Hallett H. Hammatt

1996 *An Archaeological Inventory Survey of Two Lots (TMK 2-6-24:65-68 & 80-83 and TMK 2-6-24:34-40 & 42-45) in Waikīkī Ahupua‘a, O‘ahu, Hawai‘i*. Cultural Surveys Hawai‘i, Inc., Kailua, HI.

McElroy, Windy K.

2010 *FINAL Archaeological Monitoring for the Makaloa-Sheridan Sam’s Club/Wal-Mart Development Area, Makiki Ahupua‘a, Kona district, Island of O‘ahu, Hawai‘i. TMKs: (1)2-3-016:009 and 043*. Windy K. McElroy, Honolulu.

Makalena J. F.

1866 Portion of map of Kewalo ‘Ili. Hawai‘i Land Survey Division, Registered Map No. 111.

Malo, David

1951 *Hawaiian Antiquities (Moolelo Hawaii).* Translated from the Hawaiian by Dr. Nathaniel B. Emerson 1898. Bernice P. Bishop Museum Special Publication. Second Edition. Bishop P. Bishop Museum, Honolulu.

2006 *Ka Mo‘olelo Hawai‘i. Hawaiian Traditions.* Translated by Malcolm Nāea Chun. First People’s Productions, Honolulu.

Maly, Kepa, Leta J. Franklin, and Paul H. Rosendahl

1994 *Archaeological and Historical Assessment Study Convention Center Project Area Land of Waikiki Kona District, Island of O'ahu (TMK: 2-3-35 and 2-3-36:018, 024, 025*. Paul H. Rosendahl, Inc., Hilo, HI.

Millar, Jim

1988 *The Handbook of Hawaiian Machine Made Soda Bottles*. Soda Mart, Goodletsville, Tennessee.

Monahan, Christopher M.

2005 *An Archaeological Assessment Report of Three Parcels Measuring Approximately 1.35 Acres in Waikīkī Ahupua‘a, ‘Ili of Kewalo, Kona (Honolulu) District, Island of O‘ahu, Hawai‘i*. Scientific Consultant Services, Inc., Honolulu.

Monsarrat, M. D.

1897 Map of Honolulu. Hawai‘i Land Survey Division, Registered Map No. 1910.

Munsey, Cecil

1970 The Illustrated Guide to Collecting Bottles. Hawthorne Books, Inc. Publishers, New York.

Nakamura, Barry

1979 *The Story of Waikiki and the Reclamation Project*. M.A. thesis, University of Hawai‘i, Honolulu.

Native Register

1847 *Native Register of Kuleana Claims to Quiet Land Titles in the Hawaii Islands (1847-53)*. State of Hawai‘i Archives, Honolulu.

Native Testimony

1847 *Native Testimony of Kuleana Claims to Quiet Land Titles in the Hawaii Islands (1847-53)*, vol. 10. State of Hawai‘i Archives, Honolulu.

O’Hare, Constance R., Douglas Borthwick, and Hallett H. Hammatt

2003 *An Archaeological Inventory Survey of a Property in Waikīkī Ahupua‘a, ‘Ili of Kewalo, Kona District, O‘ahu (TMK 1-2-3-10:28, 48, 50, 52-56)*. Cultural Surveys Hawai‘i, Inc., Kailua, HI.

O’Hare, Constance R., Anthony Bush, Douglas Borthwick, and Hallett H Hammatt

2004 *Archaeological Inventory Survey for the Ko‘olani Condominium Project, Honolulu Ahupua‘a, Kona district, Island of O‘ahu, (TMK 2-3-04:73:, 2-3-05:27; 2-3-06:14; 2-3-07:2).* Cultural Surveys Hawai‘i, Inc. Kailua, HI.

O’Hare, Constance R., Anthony R. Bush, and Hallett H. Hammatt

2006 *Archaeological Monitoring Report Kaka‘ako Community Improvement District 10, Honolulu Ahupua‘a, Kona District, O‘ahu. (TMK [1] 2-3-04, 05, 06, & 07).* Cultural Surveys Hawai‘i, Inc., Kailua, HI.

O’Leary, Owen L. and Hallett H. Hammatt

2004 *Archaeological Monitoring Report for the Emergency Phase Rehabilitation of Streets Unit 9 Phase I Kapi‘olani Boulevard from Kalākaua Avenue to Kamake‘e Street, Honolulu Ahupua‘a, Kona District, O‘ahu (TMK: 2-3-3, 4, 7, 9, 10, 15, 16, 21, 22, 35, 39, 40, & 41)*. Cultural Surveys Hawai‘i, Inc., Kailua, HI.

2006 *Archaeological Inventory Survey for the approximately 4-acre Moana Vista Project Area on Kapi‘olani Boulevard, Honolulu Ahupua‘a, Kona District, O‘ahu Island ([1] 2-3-003:072, 088, 102).* Cultural Surveys Hawai‘i, Inc., Kailua, HI.

Pacific Commercial Advertiser

1875 September 4 article.

Pammer, Michele and Hallett H. Hammatt

2010 *Final Archaeological Assessment for an Approximately 0.26-Acre Moana Vista Project Area on Kapi‘olani Boulevard, Kaka‘ako Ahupua‘a, Kona District, O‘ahu Island, TMK (1) 2-3-003:084*. Cultural Surveys Hawai‘i, Inc., Kailua, HI.

Paradise of the Pacific

1901 Article on the “Old Plantation.”

1950 Kakaako, A Growing Business District. In *Paradise of the Pacific*, November 1950, p. 21.

Perzinski, David, Matt McDermott, Rodney Chiogioji, and Hallett H. Hammatt

1999 *Archaeological Monitoring Report for Anti-Crime Street Lighting Improvements Along Portions of Ala Wai Boulevard, Kalākaua Avenue, Ala Moana Boulevard and ‘Ena Road, Waikīkī, O‘ahu*. Cultural Surveys Hawai‘i, Inc., Kailua, HI.

Petrey, Whitney, Douglas F. Borthwick, and Hallett H. Hammatt

2008 *Final Archaeological Monitoring Report for the City and County of Honolulu’s Emergency Sewer Bypass Project, Ala Wai to Magic Island, Waikīkī Ahupua‘a, Kona District, Island of O‘ahu, TMK: [1] 2-3-034, -036, 037; 2-6-017, -018; 2-7-036.* Cultural Surveys Hawai‘i, Inc., Kailua, HI.

Pukui, Mary Kawena

1988 *Tales of the Menehune.* Collected or suggested by Mary Kawena Pūku‘i. Retold by Caroline Curtis. The Kamehameha Schools Press, Honolulu.

Pukui, Mary Kawena, Samuel H. Elbert, and Esther T. Mookini

1974 *Place Names of Hawaii*. University of Hawai‘i Press, Honolulu.

Runyon, Rosanna and Hallett H. Hammatt

2007 *Final Archaeological Monitoring Report for Traffic Control Signal Work at the Intersection of Kalākaua Avenue and Fern Street, Waikīkī Ahupua‘a, Honolulu District, Island of O‘ahu, Tax Map Key (TMK): (1) 2-3-022, 023 & 032*. Cultural Surveys Hawai‘i, Inc., Kailua, HI.

Scott, Edward B.

1968 *The Saga of the Sandwich Islands, Volume 1*. Sierra-Tahoe Publishing Co., Crystal Bay, Lake Tahoe, Nevada.

Sinoto, Aki

2000 *Archaeological Assessment of the Proposed Wal-Mart/Sam's Club Development Area, Kalia, Makiki, Kona, O‘ahu (TMK 2-3-16:9, 12, and 42)*. Aki Sinoto Consulting, Honolulu.

Sinoto, Aki and Jeffrey Pantaleo

2002 *Archaeological Monitoring Plan for the Proposed Wal-Mart/Sam's Club Development Area, Kalia, Makiki, Kona, O‘ahu (TMK 2-3-16:9, 12, and 42)*. Aki Sinoto Consulting, Honolulu.

Smith, Marc

1989 *Human Bone at 1341 Kapiolani Ave., Honolulu, Oahu (TMK 2-3-39:19)*. State Parks Archaeologist, HI.

Souza, Kehaulani, Mary Perzinski, and Hallett H. Hammatt

2002 *An Archaeological Monitoring Report for the Kaka‘ako Improvement District 7 Project (TMK 2-1-58, 2-3-01 thru 05)*. Cultural Surveys Hawai‘i, Inc., Kailua, HI.

Sterling, Elspeth and Catherine C. Summers

1978 *Sites of Oahu*. Departments of Anthropology and Education, Bishop Museum, Honolulu.

Stewart, Charles S.

1970 *Private Journal of a Voyage to the Pacific Ocean, and Residence at the Sandwich Islands in the Years 1822, 1823, 1824, and 1825*. University of Hawai‘i Press, Honolulu. Reproduction of 1830 edition (missionary).

Stone, Scott C. S.

1983 *Honolulu, Heart of Hawai‘i.* Continental Heritage Press, Inc., Tulsa, Oklahoma.

Thrum, Thomas

1883 Retrospect of the Year 1883. In *Hawaiian Almanac and Annual for 1884*, pp. 64-69. Thomas G. Thrum, Honolulu.

1886a Hawaiian Register and Directory for 1887. In *Hawaiian Almanac and Annual for 1887*, pp. 91-98. Thomas G. Thrum, Honolulu.

1886b Appropriation Bill for the Biennial Period Ending March 13, 1988. In *Hawaiian Almanac and Annual* for 1887, pp. 33-44. Thomas G. Thrum, Honolulu.

1896 Hawaiian Epidemics. In *Hawaiian Almanac and Annual for 1897*, pp. 95-101. Thomas G. Thrum, Honolulu.

1900 Retrospect for 1900. In *Hawaiian Almanac and Annual for 1901*, pp. 166-177. Thomas G. Thrum, Honolulu.

1901 Retrospect for 1901. In *Hawaiian Almanac and Annual for 1902*, pp. 158-170. Thomas G. Thrum, Honolulu.

1904 The Sandal-wood Trade of Early Hawaii as Told by the Pioneer Traders, Voyagers and Others. In *Hawaiian Almanac and Annual for 1905*, pp. 43-74. Compiled by Thos. G. Thrum. Thomas G. Thrum, Honolulu.

1915 Retrospect for 1915. In *Hawaiian Almanac and Annual for 1916*, pp. 156-174. Thomas G. Thrum, Honolulu.

1919 Retrospect for 1919. In *Hawaiian Almanac and Annual for 1920*, pp. 139-157. Thomas G. Thrum, Honolulu.

1923a *More Hawaiian Folk Tales*. Unknown publisher.

1923b Hawaiian Salt Making. In *Hawaiian Almanac and Annual for 1924*, pp. 112-117. Thomas G. Thrum, Honolulu.

1998 *Hawaiian Folk Tales: A Collection of Native Legends*. Compiled by Thomas G. Thrum. Mutual Publishing, Honolulu.

Thurman, Douglas, Kendy Altizer, Constance R. O’Hare, David W. Shideler, and Hallett H. Hammatt

2009 *Final Archaeological Inventory Survey Report for the Queen Street Parks, Kaka‘ako, Honolulu District, O‘ahu Island, TMK: [1] 2-3-004:075, 076*. Cultural Surveys Hawai‘i, Inc., Kailua, HI.

Toulouse, Julian Harrison

1971 *Bottle Makers and Their Marks*. Thomas Nelson Inc., Camden, New York.

Tulchin, Jon and Hallett H. Hammatt

2004 *Literature Review and Field Check for the Kapi‘olani Area Revised Sewer System, Honolulu Ahupua‘a, Kona District, Island of O‘ahu, (TMK: 2-3-04, 05, 07, 09, 10, 13, 14, 17, 18, 22, 35, 36, & 38)*. Cultural Surveys Hawai‘i, Inc., Kailua, HI.

2009 *Final Archaeological Monitoring Report for the Ala Wai Watermark Project, Waikīkī Ahupua‘a, Honolulu District, O‘ahu, TMK: [1] 2-6-011: 001 & 037*. Cultural Surveys Hawai‘i, Inc., Kailua, HI.

Tulchin, Todd and Hallett H. Hammatt

2005 *Addendum to an Archaeological Inventory Survey for the Ko‘olani Condominium Project, Honolulu Ahupua‘a, Kona District, Island of O‘ahu (Portions of TMKs 2-3-04:73, 2-3-05:27, 2-3-06:14, 2-3-07:2)*. Cultural Surveys Hawai‘i, Inc., Kailua, HI.

University of Hawai‘i

1978 *Remembering Kakaako: 1910-1950.* Ethnic Studies Oral History Project, Ethnic Studies Program, University of Hawai‘i at Mānoa, Honolulu.

U.S. Department of Agriculture Natural Resources Conservation Service

n.d. *Ground Penetration Radar Methodology*. http://soils.usda.gov/survey/geography/maps/gpr/methodology.html. Electronic document, accessed July 6, 2011.

U.S. Department of the Interior

1920 *Reports of the Department of the Interior for the Fiscal Year Ended June 30 1920.* Government Printing Office, Washington D. C.

U.S. Geological Survey

1927-28 U.S. Geological Survey 7.5 minute topographic map, Honolulu Quadrangle. Available at U.S.G.S. Information Services, Maps/U.S. Department of War Maps, Box 25286, Denver, Colorado.

1998 U.S. Geological Survey 7.5 minute topographic map, Honolulu Quadrangle. Available at U.S.G.S. Information Services, /U.S. Department of War Maps, Box 25286, Denver, Colorado.

U.S. War Department

1919 Fire Control Map of O‘ahu Island. Copies available from Cultural Surveys Hawai‘i, Inc. library, Waimānalo, HI.

1943 U.S. War Department 7.5 minute topographic map, Honolulu Quadrangle. Available at U.S.G.S. Maps/U.S. Department of War Maps/Information Services, Box 25286, Denver, Colorado.

Waihona ‘Aina

2000 *The Māhele Database*. Electronic document, http://www.waihona.com, accessed August 1, 2010.

Wall, Walter E.

1887 Map of Kewalo.

1893 Map of Honolulu.

Westervelt, W. D.

1991 *Hawaiian Legends of Old Honolulu*. Collected and translated from the Hawaiian by W. D. Westervelt. Charles E. Tuttle Co., Rutland, VT.

Wilson Okamoto & Associates, Inc.

1998 *Final Environmental Impact Statement for the Block J Redevelopment Project Honolulu, O‘ahu, Hawai‘i*. Prepared for the City and County of Honolulu Department of Community Services, Honolulu.

Winieski, John P. and Hallett Hammatt

2000 *An Archaeological Monitoring Report for Kaka‘ako Improvement District 4 Honolulu, Hawai‘i (TMK 2-3-02 thru 05)*. Cultural Surveys Hawai‘i, Inc., Kailua, HI.

2001 *Archaeological Monitoring Report for Ward Village Phase II, (Ward Theaters), Kaka‘ako, Honolulu, O‘ahu, Hawai‘i (TMK 2-3-02:1)*. Cultural Surveys Hawai‘i, Inc., Kailua, HI.

Wolff, Lawrence A., D.D.S.

1996 Mouthpieces. In *Desk Telephones of the Bell System: The Years 1875 to 1955,* 2nd Ed. The Art Director, Burbank, CA.

Zumwalt, Betty

1980 *Ketchup, Pickles and Sauces: 19th Century Food in Glass*. Mark West Publishers, Fulton, CA.

H. TRAFFIC IMPACT ANALYSIS

DRAFT

THE CENTRAL ALA MOANA

1391 Kapiolani Boulevard

Honolulu, Hawaii

Traffic Impact Analysis Report

December 27, 2017

Prepared for

SamKoo Hawaii, LLC

Prepared by

SSFM INTERNATIONAL

Table of Contents

I. INTRODUCTION 1
II. EXISTING PLANS AND PROCESSES 4
A. Transit Oriented Development Plan 4
B. Zone Change Application 4
III. EXISTING (2017) CONDITIONS 6
A. Transportation Network 6
1. Vehicular Facilities 6
2. Pedestrian Facilities 6
3. Bicycle Facilities 10
B. Geometric Configuration 10
1. Intersection Configuration 10
2. Roadway Configuration 13
C. Volumes 15
1. Peak Hour Volumes 15
2. 24-Hour Volumes 15
3. Multi-Modal Volumes 16
D. Travel Time Runs 18
E. Level of Service 19
1. Methodology 19
2. Intersection Conditions 21
3. Pedestrian Facility Conditions 23
4. Bicycle Facility Conditions 24
F. Mitigation 24
1. Intersection Conditions 24
IV. FUTURE (2024) CONDITIONS 26
A. Surrounding Area Conditions 26
A. Transportation Network 26
1. Vehicular Facilities 26
2. Pedestrian Facilities 26
3. Bicycle Facilities 27

B. Geometric Configuration 27
C. Traffic Volumes 27
1. Background Growth 27
2. Project Related Volumes 30
3. Future Peak Hour Volumes 33
4. Future 24-Hour Volumes 33
5. Multi-Modal Volumes 37
D. Level of Service 38
1. Intersection Conditions 38
2. Pedestrian Facility Conditions 42
3. Bicycle Facility Conditions 43
E. Mitigation 43
1. Intersection Conditions 43
2. Pedestrian Facility Conditions 44
3. Bicycle Facility Conditions 44
V. FUTURE (2030) CONDITIONS 45
A. Transportation Network 45
1. Vehicular Facilities 45
2. Pedestrian Facilities 45
3. Bicycle Facilities 45
B. Geometric Configuration 45
1. Honolulu Rail Transit 45
C. Traffic Volumes 46
1. Background Growth 46
2. Project Related Volumes 46
3. Future Peak Hour Volumes 46
D. Level of Service 47
E. Mitigation 47
VI. SUMMARY 48
VII. REFERENCES 50

List of Figures

Figure 1: Project Location Map 2
Figure 2: The Central Ala Moana at 1391 Kapiolani Boulevard Site Plan 3
Figure 3: Zoning Height Limitations 5
Figure 4: Street Network 7
Figure 5: TheBus Stops and Routes 8
Figure 6: Sidewalk Width 9
Figure 7: Bikeway Details 11
Figure 8: Existing (2017) Lane Configurations 12
Figure 9: Existing (2017) Contraflow 14
Figure 10: Existing (2017) Peak Hour Vehicle Volumes 16
Figure 11: Existing (2017) Peak Hour Pedestrian and Bicycle Volumes 18
Figure 12: Future (2024) Without Project Peak Hour Vehicular Volumes 28
Figure 13: Future (2024) Without Project Peak Hour Pedestrian and Bicycle Volumes 29
Figure 14: Future Trip Distribution 32
Figure 15: Project Related Peak Hour Vehicular Volumes 34
Figure 16: Project Related Peak Hour Pedestrian and Bicycle Volumes 35
Figure 17: Future (2024) With Project Peak Hour Vehicular Volumes 36
Figure 18: Future (2024) With Project Peak Hour Pedestrian and Bicycle Volumes 37

List of Tables

Table 1: Intersection Peak Hours 15
Table 2: Roadway ADT 15
Table 3: TheBus Daily Totals 17
Table 4: Travel Time Runs 19
Table 5: LOS Criteria for Unsignalized Intersections 19
Table 6: LOS Criteria for Signalized Intersections 20
Table 7: LOS Criteria for Non-Automobile Modes 21
Table 8: Existing (2017) Unsignalized Intersection Level of Service 22
Table 9: Existing (2017) Signalized Intersection Level of Service 23
Table 10: Existing (2017) Signalized Intersection Pedestrian Level of Service 24
Table 11: Development Trip Generation Rates 30
Table 12: Development Trip Generation Volumes 30
Table 13: Project Related Trip Definitions 31
Table 14: Project Related Transportation Mode 33
Table 15: Future (2024) Roadway ADT 33
Table 16: Future (2024) Without Project Unsignalized Intersection Level of Service 38
Table 17: Future (2024) Without Project Signalized Intersection Level of Service 39
Table 18: Future (2024) With Project Unsignalized Intersection Level of Service 40
Table 19: Future (2024) With Project Signalized Intersection Level of Service 41

Table 20: Future (2024) Without Project Signalized Intersection Pedestrian Level of Service 42
Table 21: Future (2024) With Project Signalized Intersection Pedestrian Level of Service**Error! Bookmark not defined.**
Table 22: Ala Moana Rail Station Rider Modal Use 46
Table 23: Ala Moana Rail Station Peak Hour Vehicle Trip Generation..... 47
Table 24: Future (2030) With Project Intersection Level of Service 47

List of Appendices

Appendix A – Intersection Peak Period Traffic Counts
Appendix B – Travel Time Study
Appendix C – Analysis Reports Existing (2017) Conditions
Appendix D – Analysis Reports Future (2024) Without Project Conditions
Appendix E – Analysis Reports Future (2024) With Project Conditions

I. INTRODUCTION

SamKoo Hawaii, LLC is proposing to develop The Central Ala Moana, a 513-unit, 43 floor condominium building at 1391 Kapiolani Boulevard in Honolulu. The project site is located at the corner of Kapiolani Boulevard and Kona Iki Street near Ala Moana Center (see Figure 1). The project will have a mix of studio apartments, one, two and three bedroom units, and approximately 10,000 square feet of retail space on the ground level. 60% of these units (310) will be priced to be affordable to persons or households earning 100-140% of the Average Median Income (AMI) as defined by the U.S. Departments of Housing and Urban Development (HUD). 40% of the units (202) will be priced at market rates and one unit will be dedicated to the resident manager. Primary access to the site is being proposed off of Kapiolani Boulevard while secondary access, retail parking and delivery access will be permitted off of Kona Street. The proposed Central Ala Moana project has an anticipated full build-out and occupancy year of 2024.

The Central Ala Moana at 1391 Kapiolani Boulevard is the second of two independent, predominantly affordable residential towers being developed by SamKoo Hawaii LLC.

The proposed Honolulu Rail Transit project includes a route between East Kapolei and Ala Moana Center with a rail transit station planned at the Watamull Building property one block away from this project. The rail project full build-out and operation is expected for approximately 2025. In association with the Honolulu Rail Transit project, transit-oriented development (TOD) plans are being prepared for the neighborhoods surrounding each rail transit station site that integrate land use and transportation planning. Higher densities are an important characteristic of TOD, focusing on pedestrians and including a mix of land uses that include residential and commercial activities.

Samkoo Hawaii, LLC is planning to develop the Central Ala Moana in accordance with the 201H Affordable Housing Program administered by HHFDC. The existing zoning (BMX-3: Community Business Mixed Use under the Land Use Ordinance of the City - LUO) provides baseline regulations from which Ordinance 14-10 may allow exceptions. SamKoo Hawaii, LLC is requesting exemptions for building height, height setback, street setbacks, density, parking, loading, park dedication requirements and project fees.

This traffic impact analysis report (TIAR) is being prepared to determine expected traffic impacts due to development of the project. Existing (2017) conditions are being established and Future (2024) Without Project and Future (2024) With Project conditions are being evaluated for determination of project impact. In addition, Future (2030) With Project conditions are being documented to establish the impact on the study area as a result of the proposed development and completion of the Honolulu Rail Transit project.

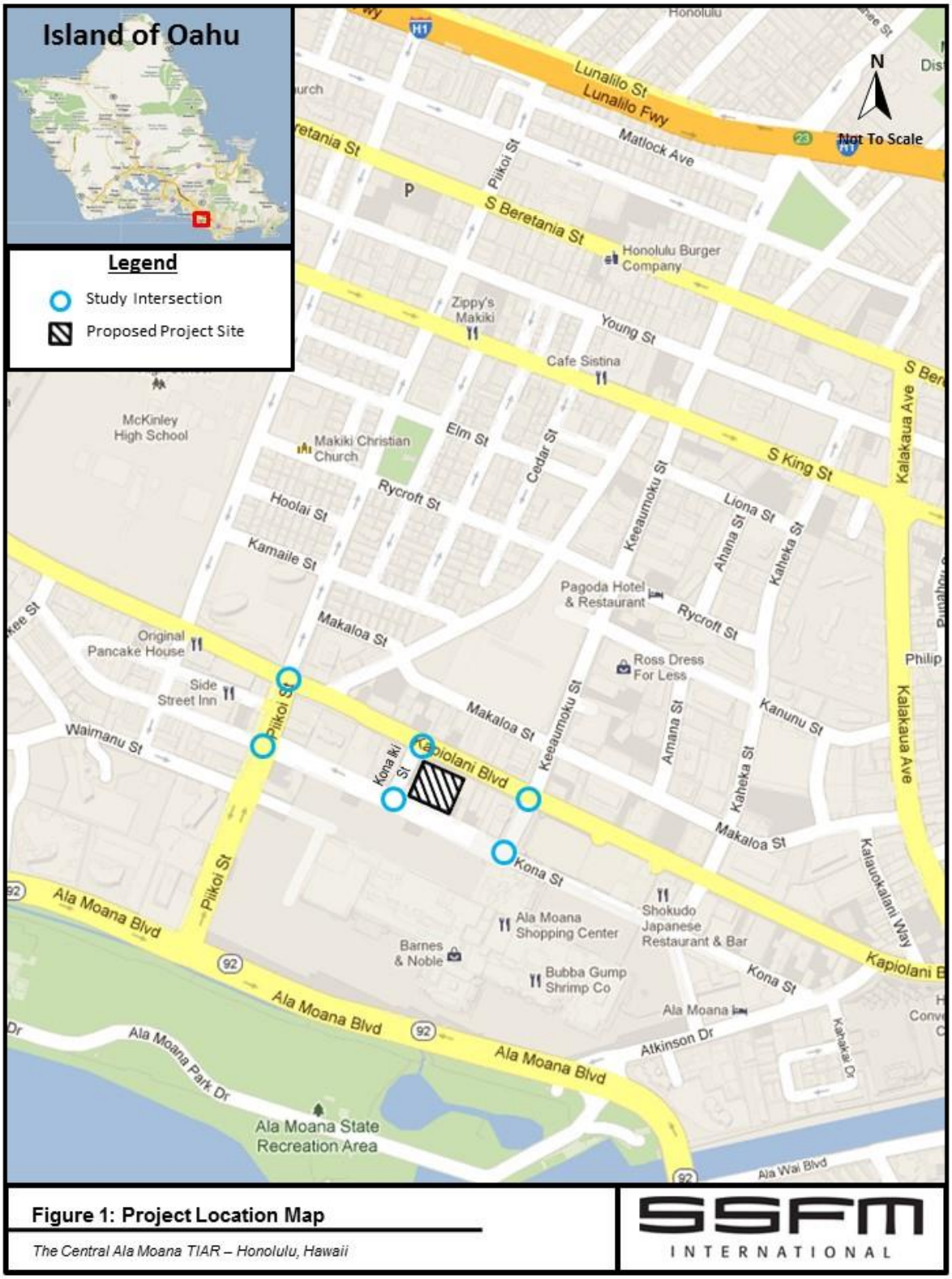


Figure 1: Project Location Map

Figure 2: The Central Ala Moana at 1391 Kapiolani Boulevard Site Plan

II. EXISTING PLANS AND PROCESSES

A. Transit Oriented Development Plan

The Land Use Ordinance (LUO) provisions for TOD special districts was adopted by the Honolulu City Council in 2009. They authorize preparation of a neighborhood TOD plan to serve as the basis for creation of a TOD Zone and the accompanying development regulations. The TOD plan references and is compliant with past plans and policies including the October 2002 *Oahu General Plan* and the June 2004 *Primary Urban Center Development Plan*.

TOD refers to development within a comfortable (five to ten minute) walking distance of a transit stop which translates into a ¼- to ½-mile radius from the station. The *Ala Moana Neighborhood Transit-Oriented Development Plan, Existing Conditions Report* (RTKL, August 2012) states that higher densities are an important characteristic of TOD development and are often achieved through development of vacant land or redevelopment of low density sites. Although The Central Ala Moana project is being developed as an Affordable Housing project, it fits the criteria and is identified in the TOD plan as a key parcel for transit-oriented development.

B. Zone Change Application

Currently, The Central Ala Moana project site is under the zoning designation of "Community Business Mixed Use District" which includes a regulation of BMX-3, FAR 3.5, with a maximum building height of 250-feet. The developer is pursuing the zoning change to BMX-4, FAR 7.5 and max building height of 420-feet. Figure 3 shows the existing zoning height limitations overlaid on the ¼- to ½-mile walking radius as referenced in the *Ala Moana Neighborhood Transit-Oriented Development Plan, Existing Conditions Report* (RTKL, August 2012).

As a part of the pre-application process, the Samkoo House Condominium project (predecessor to The Central Ala Moana) team met with the City and County of Honolulu Traffic Review Branch. In this meeting the City stated that the intent of the traffic portion of the zone change application was to prove that the proposed development change would provide the highest and best use of the project site.

The zone change application includes a requirement from the *Land Use Ordinance* (last amended in 1990) that a TIAR be completed. The TIAR is to include general street patterns and intended connections of the proposed development to the regional roadway network, including transit routes and pedestrian and bicycle routes. Also required is a discussion of the impact of the proposed zone change on surrounding streets including traffic and transportation concerns as well as necessary transportation network improvements.

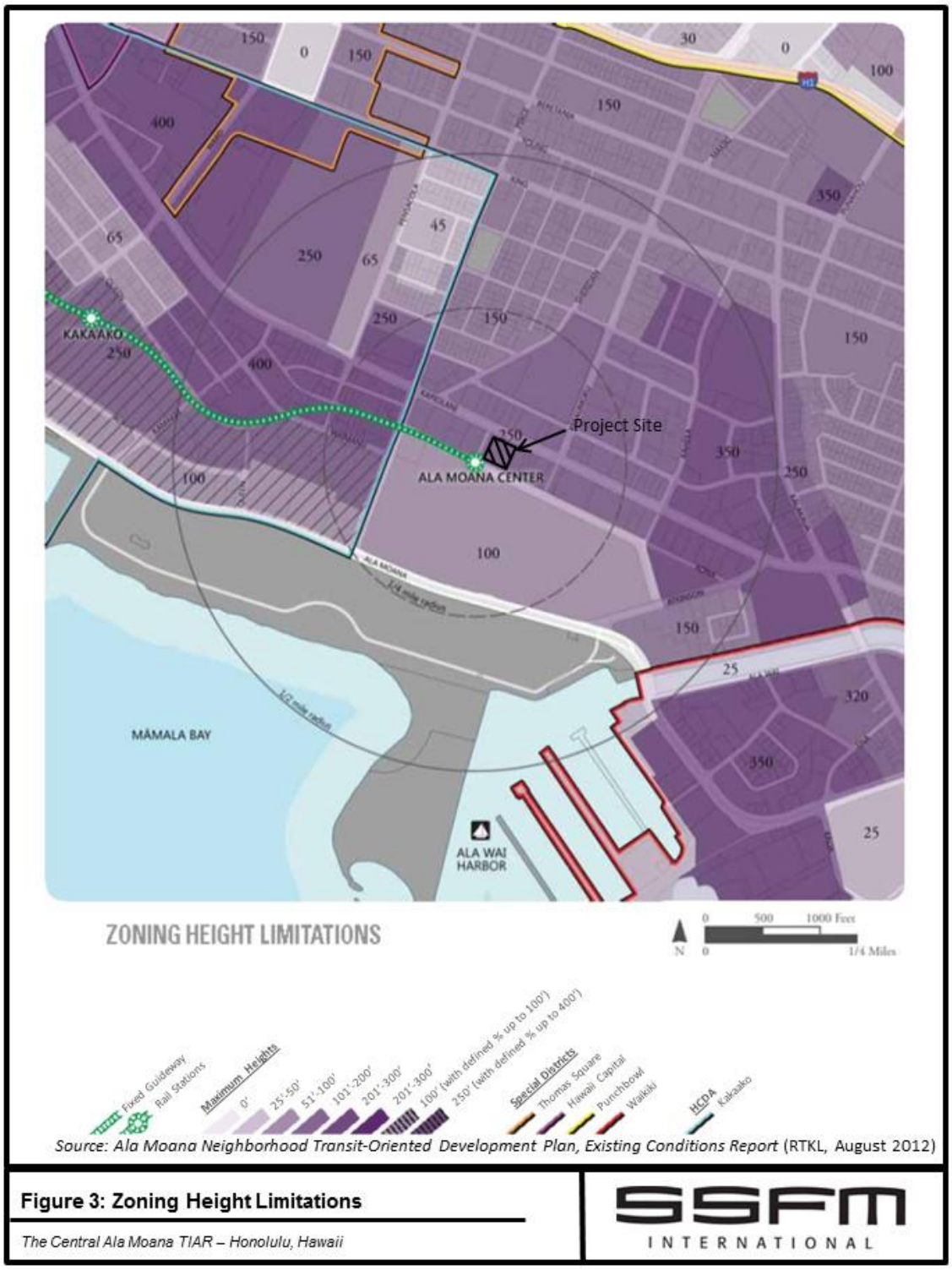


Figure 3: Zoning Height Limitations

III. EXISTING (2017) CONDITIONS

The surrounding Ala Moana neighborhood is an urban district that has a mix of commercial and residential uses. The neighborhood is a high employment zone due to the existence of Ala Moana Center and other surrounding commercial and retail establishments. Several high-rise condominiums have been constructed over the past ten years which adds to the neighborhood being a major residential area. Recently along Kapiolani Boulevard, small retail, dining, and entertainment establishments have been replaced by newer, higher value and higher capacity buildings.

The existing 1.43 acre site at 1391 Kapiolani Boulevard is comprised of a surface parking lot and two buildings: a commercial building along the site's east edge that houses Taste Tea and offices for SamKoo and the Hawaiian Dredging Construction company, and a building along the makai edge of the site which is used for storage and a garage. Minimal trips are generated by the existing site uses which are proposed for relocation when the project is developed.

A. Transportation Network

1. Vehicular Facilities

a) Passenger Vehicles

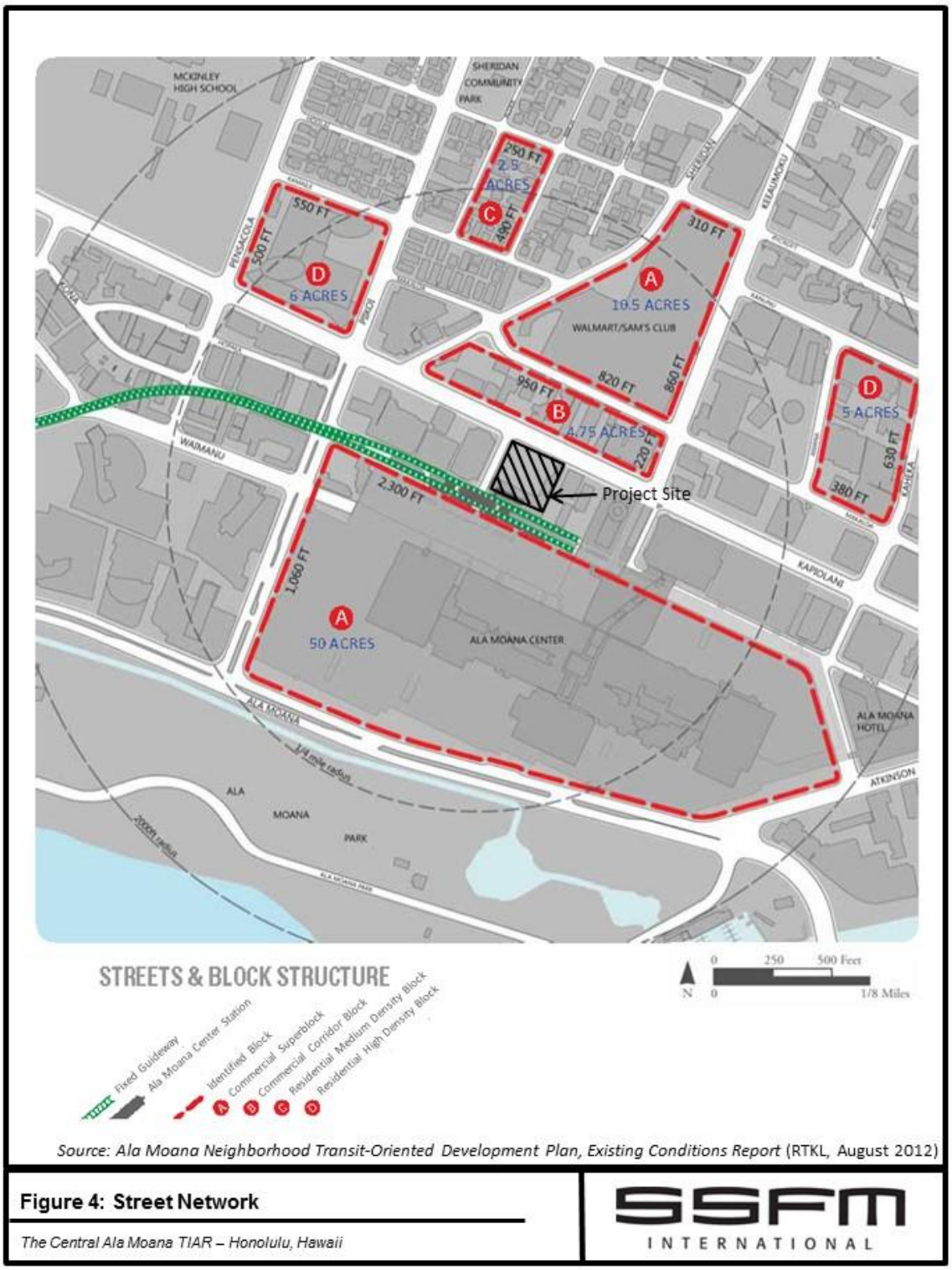
The surrounding transportation network is comprised of a gridded network of streets (see Figure 4). The *Ala Moana Neighborhood Transit-Oriented Development Plan, Existing Conditions Report* (RTKL, August 2012) states that the transportation network is disrupted by the existence of "superblocks" (large blocks that interrupt the street grid). These superblocks concentrate vehicular volumes at primary intersections resulting in long signal timing cycle lengths and strained capacity. They also make it difficult to maintain connectivity and mobility for all transportation modes.

b) Buses and Heavy Vehicles

Ala Moana shopping center is the primary transfer point for TheBus system with a transit center located along Kona Street, adjacent to Ala Moana Center. Buses that service this area include Routes: C, 6, 8, 23, 40, 52, 53, 55, 56, 57, 57A, 62, 65 and 88A. Additional buses that stop along Kapiolani Boulevard in the project area include Routes: A, 3, 9, 13, 17, and 18. See Figure 5 for locations of TheBus system stops and available routes surrounding Ala Moana Center. Included in the figure are the approximate bus stop "geoid" (identified as HEA Stop #), the physical id of the stop according to TheBus internal management system and used for tracking of buses using the TheBus smartphone application. Private bus and trolley services also have stops within the Ala Moana Center parking garages.

2. Pedestrian Facilities

Sidewalks line both sides of Kapiolani Boulevard with landscaped planter strips separating vehicular travel ways from pedestrians in most locations. Along Kona Iki Street, sidewalks exist along both sides of the street. Fronting the project site, the sidewalk is narrow with a landscaped barrier between the sidewalks and vehicular travel way. Sidewalk widths in the surrounding project area are shown in Figure 6. The City and County of Honolulu is systematically implementing Complete Streets improvements as part of an initiative to make Oahu more bike and pedestrian friendly. Sidewalks will have a 5 foot minimum requirement and wider in busy, pedestrian-heavy areas like Kapiolani Boulevard. Along Kona Street, adjacent to the project area, there are frequent driveway locations that interrupt the sidewalks along both sides of the street.



Source: Ala Moana Neighborhood Transit-Oriented Development Plan, Existing Conditions Report (RTKL, August 2012)

Figure 4: Street Network

The Central Ala Moana TIAR – Honolulu, Hawaii

SSFM INTERNATIONAL

Figure 4: Street Network

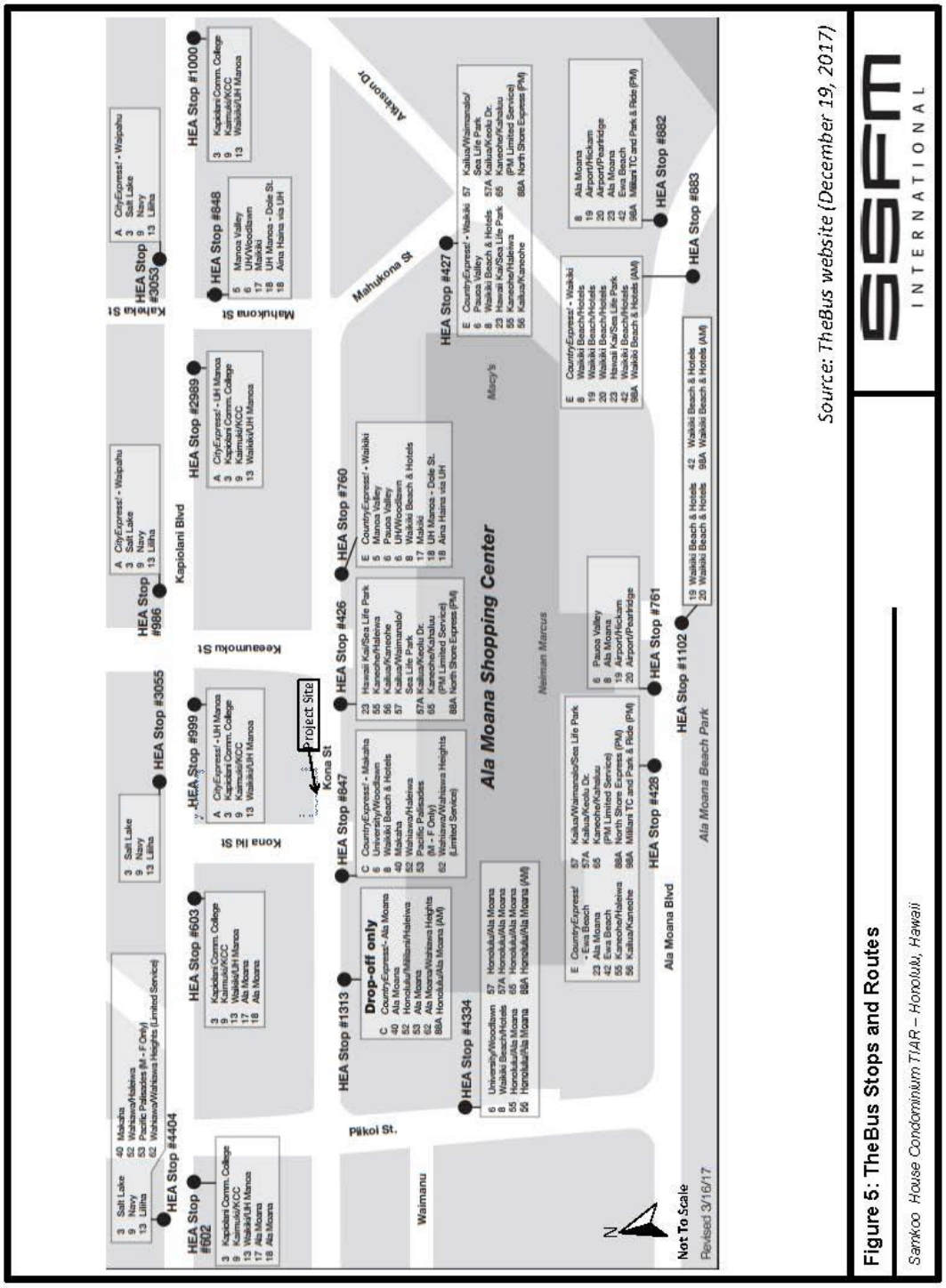


Figure 5: TheBus Stops and Routes

SamKoo House Condominium TIAR – Honolulu, Hawaii

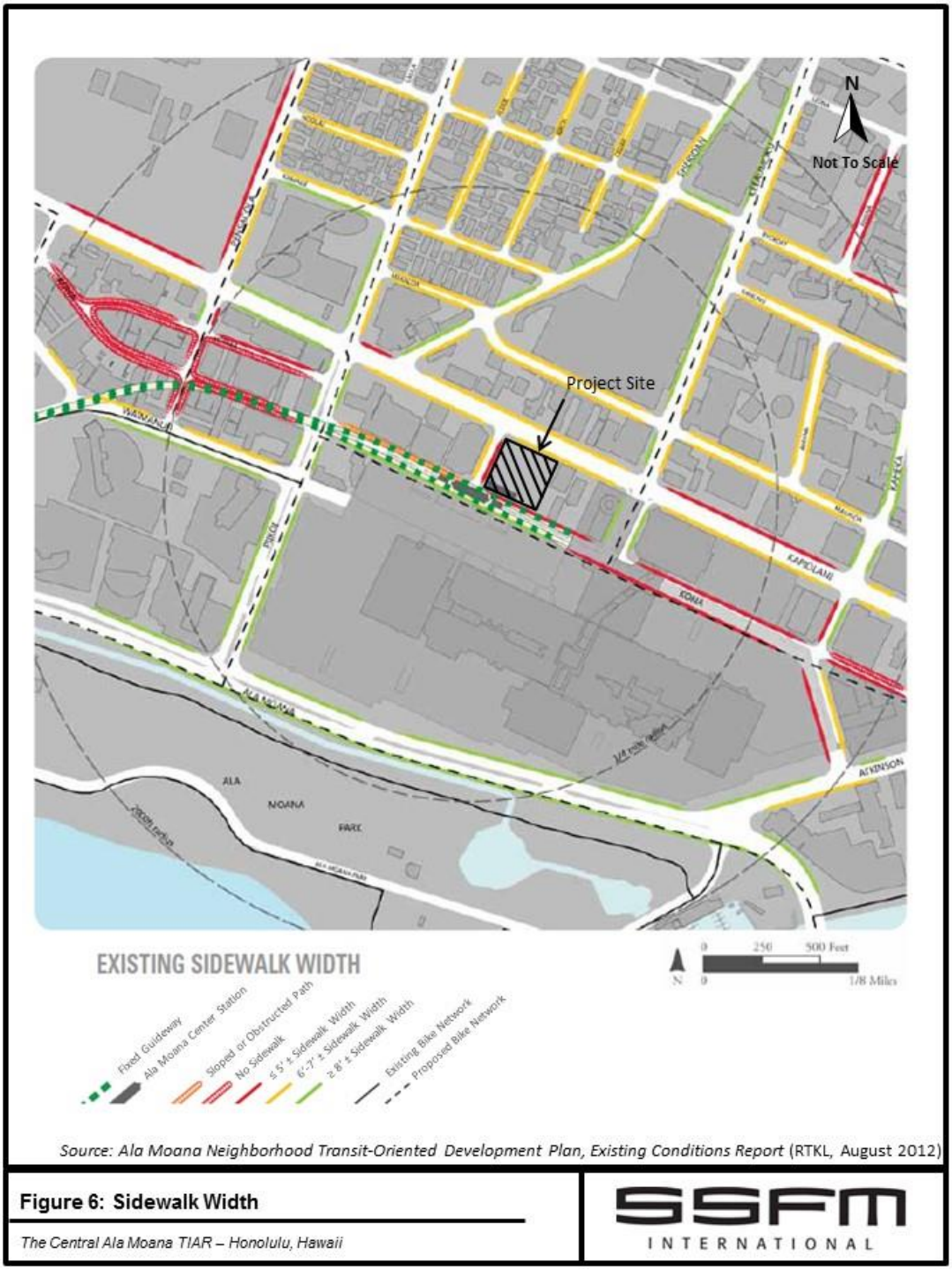


Figure 6: Sidewalk Width

Marked crosswalks exist at most major intersections with pedestrian signal heads and push-buttons for signalized intersections. At all studied signalized intersections, pedestrian walk intervals are seven seconds which is the minimum recommended length per the *Manual on Uniform Traffic Control Devices* (FHWA, 2009) to allow pedestrians adequate opportunity to leave the curb before the pedestrian clearance time begins. Pedestrian clearance (don't walk) times reflect a range of walking speeds. *MUTCD* (FHWA, 2009) recommends pedestrian clearance times be sufficient for a walking speed of 3.5 feet per second. Signalized intersections reflect vehicle and pedestrian actuated traffic control, although pretimed operations were used in the traffic model to reflect a worst-case scenario during vehicle and pedestrian peak hours.

At two locations along Kona Street, adjacent to TheBus transit center on either side of the intersection with Keeaumoku Street, fences exist along the raised divided median to prohibit pedestrians from crossing at unmarked locations.

3. Bicycle Facilities

Oahu Bike Plan, A Bicycle Master Plan (HHF, August 2012) has no designated bike paths, lanes or routes on Kapiolani. However, the Urban Core Complete Streets project has future bicycle accommodations planned for Kapiolani Boulevard. Hawaii Revised Statutes states that bicyclists traveling along the roadway slower than the normal speed of traffic should ride as close as practicable to the right-hand curb or edge of the road where bike lanes are not available. In areas other than business or prohibited districts, bicycles may be ridden on sidewalks provided the speed is 10 mph or less. On sidewalks, the bicycle operator must yield the right-of-way to pedestrians.

Ease of biking in the surrounding project area is not optimal because of the lack of designated bikeways, the presence of heavy vehicle traffic, and narrow sidewalk widths. For Diamond Head-Ewa (east-west) travel, King Street has a two way protected bike lane, a bike route exists along Young Street and a bike path is adjacent to Ala Moana Boulevard. The latter two are ¼ mile from the site in opposite directions. Mauka-makai bike ways are gradually being added in Honolulu as part of the Complete Streets initiative. Future mauka-makai bikeways on Piikoi Street and Keeaumoku Street are shown in the *Oahu Bike Plan, A Bicycle Master Plan* (HHF, August 2012) (see Figure 7).

B. Geometric Configuration

1. Intersection Configuration

Considering existing traffic movements in the project area and the anticipated impact of the proposed development, the following intersections were selected for study:

1. Kapiolani Boulevard and Piikoi Street
2. Kapiolani Boulevard and Kona Iki Street
3. Kapiolani Boulevard and Keeaumoku Street
4. Kona Street and Piikoi Street
5. Kona Street and Kona Iki Street
6. Kona Street and Keeaumoku Street

Existing (2017) lane configurations, pedestrian crosswalks, and traffic control at the study intersections are shown in Figure 8.

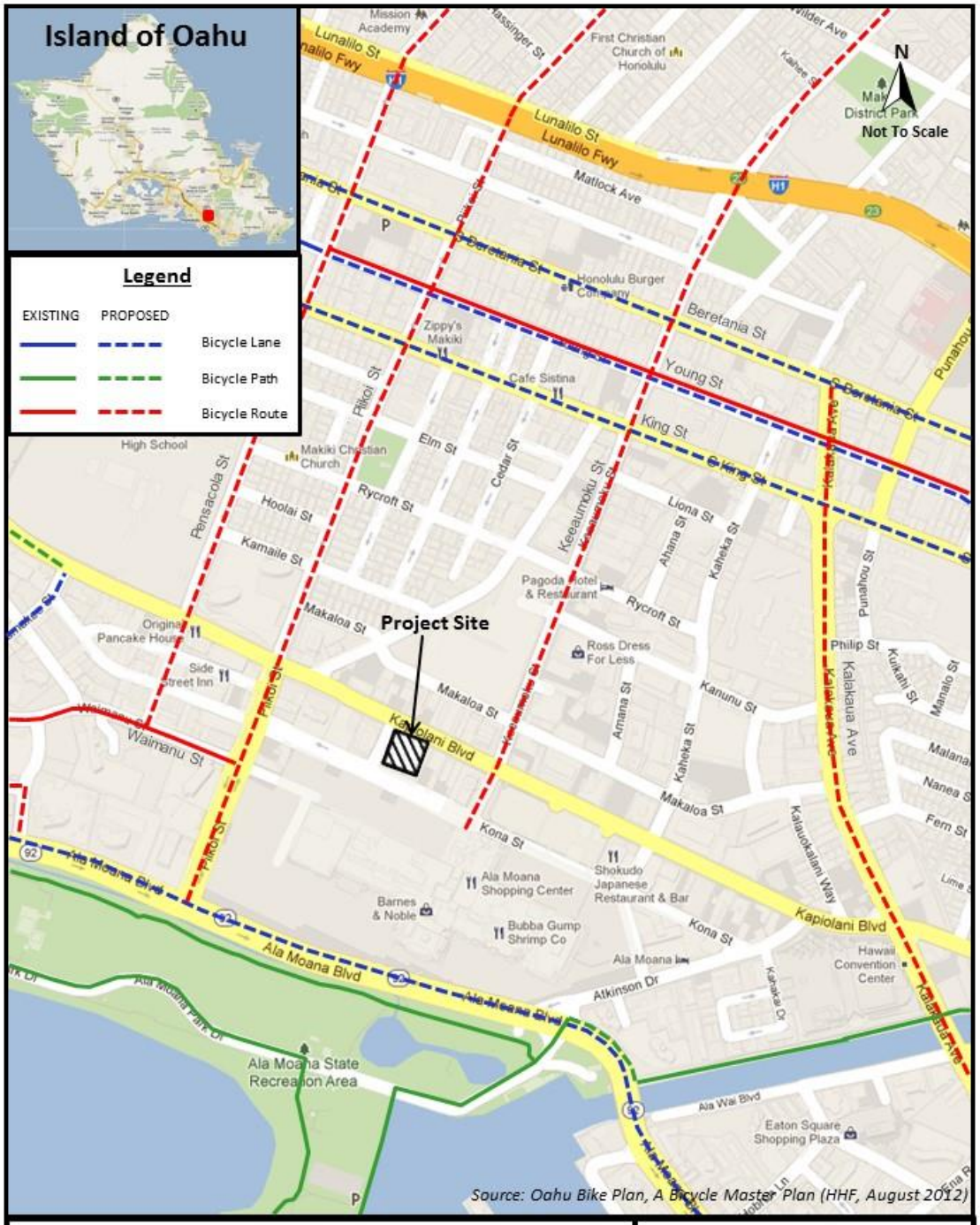


Figure 7: Bikeway Details

The Central Ala Moana TIAR – Honolulu, Hawaii

SSFM INTERNATIONAL

Figure 7: Bikeway Details

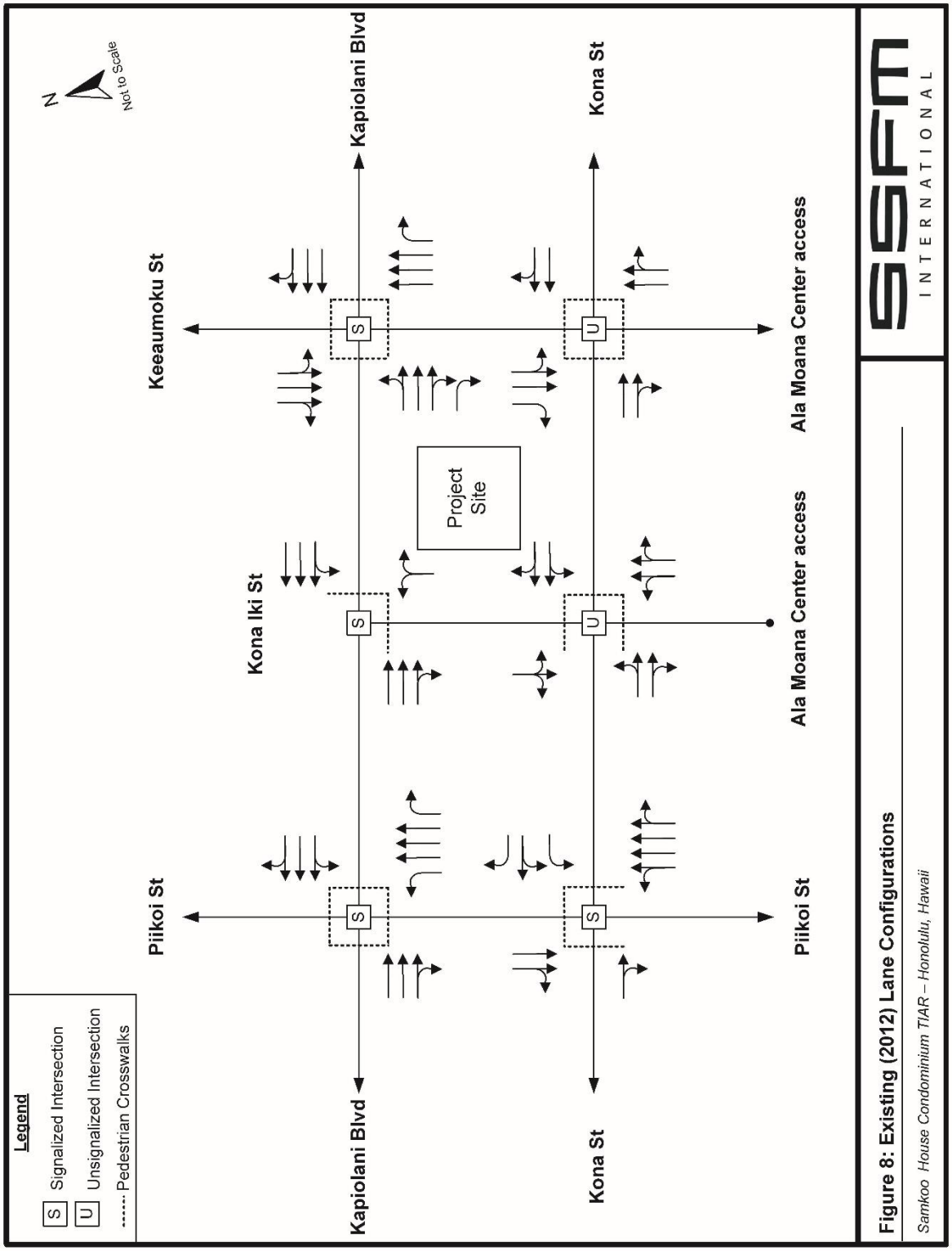


Figure 8: Existing (2017) Lane Configurations

2. Roadway Configuration

Kapiolani Boulevard is a County owned urban principal arterial that runs in the Diamond Head-Ewa direction. In the project area, Kapiolani Boulevard is a six-lane, undivided, signalized arterial with a 35 mph posted speed limit. On-street parking is prohibited from 6:00 AM to 6:30 PM. During the AM peak period the corridor is contraflowed, providing an additional lane in the westbound direction between the H-1 Freeway near South King Street to west of Ward Avenue (see Figure 9). Left turns are prohibited for the eastbound direction during the AM contraflow. During the PM peak period, an additional lane is provided in the eastbound direction between Pensacola Street to McCully Street. Left turns are prohibited for the westbound direction during the PM contraflow. In the project area, driveway accesses to existing properties, including the subject project site, line Kapiolani Boulevard with no mid-block dedicated turn lanes. Kapiolani Boulevard serves as a major bus route although bus pullouts do not exist. Fronting the property, sidewalks exist along both sides of the street, with various widths and an 11-foot landscaped area providing a buffer from vehicular travel lanes.

Keeaumoku Street runs mauka-makai between Kona Street and Nehoa Street. Between Kapiolani Boulevard and Nehoa Street Keeaumoku Street is a County owned urban minor arterial. In the project area Keeaumoku Street is a six-lane, undivided, signalized arterial with a 30 mph posted speed limit. At the makai end of the corridor at the intersection with Kapiolani Boulevard, two makai-bound receiving lanes continue up a ramp to the Ala Moana Center parking garage. The remaining access continues under the parking garage to the study intersection with Kona Street. Keeaumoku Street provides access to the westbound H-1 Freeway via Lunalilo Street. Parking is permitted in sections along both sides of the road except for some restrictions during the PM peak periods. Wide sidewalks line both sides of the street.

Piikoi Street is a County owned urban minor arterial that runs in the mauka-makai direction. Between Ala Moana Boulevard and Kapiolani Boulevard, Piikoi Street operates in two directions, with two to three lanes in the makai direction and three to four lanes in the mauka direction separated by a landscaped median. Left turn pockets are provided at most intersections on this stretch of Piikoi Street and on-street parking is prohibited during the weekday AM and PM peak periods. North of Kapiolani Boulevard, Piikoi Street turns into a one-way, five-lane mauka-bound roadway operating in a couplet with Pensacola Street one block to the west. The corridor has a 25 mph posted speed limit. Limited on-street parking is provided during the AM and PM peak periods on both sides of the street. Sidewalks exist on both sides of the street.

Kona Street, between Piikoi Street and Keeaumoku Street, is a four-lane roadway that runs in the Diamond Head-Ewa direction with a 15 mph posted speed limit. Kona Street is privately owned by General Growth Properties, the owners of Ala Moana Center, and serves as the primary access to Ala Moana Center parking garages. The Ala Moana bus transit center is also located along Kona Street which contributes to a high volume of bus and pedestrian traffic. It was observed that buses queue at the bus stop location in the eastbound direction along Kona Street between Kona Iki Street and Keeaumoku Street, so for much of the time only one lane is available in the eastbound direction at this location. Stop signs, pedestrian crosswalks, and speed bumps are located at places along this stretch of road providing traffic calming. Sidewalks exist along both sides of the street although frequent driveway curb cuts provide many potential conflict locations. Sidewalk widths range from four feet near the store fronts and business entrances up to 25-feet at bus stop locations.

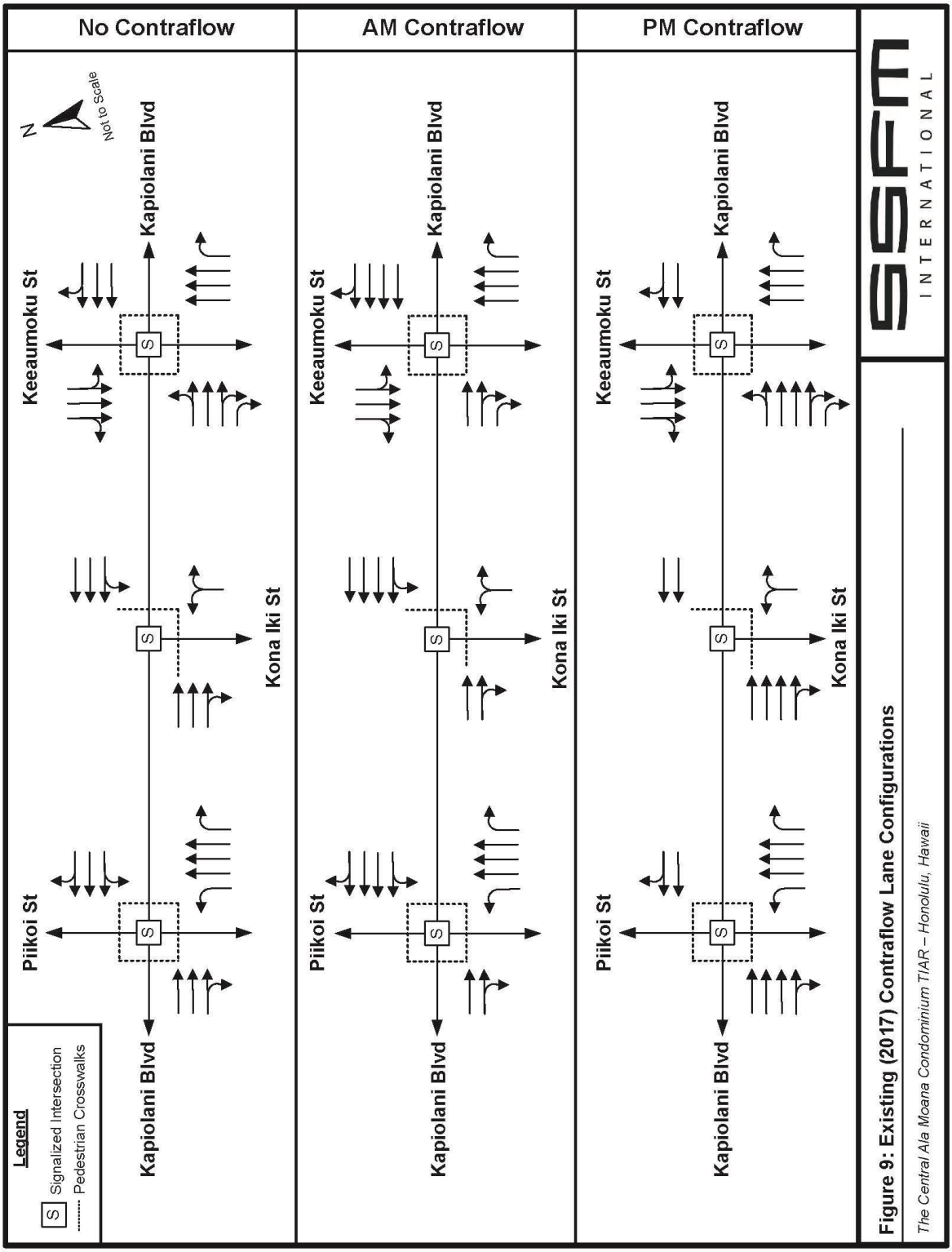


Figure 9: Existing (2017) Contraflow

Kona Iki Street is a two-lane roadway, owned by General Growth Properties, which provides a connection between Kapiolani Boulevard and Kona Street. Parking is prohibited along either side of the road. The road primarily serves as an access road for Ala Moana Center parking garages and adjacent properties, including the subject project site. Sidewalks exist along both sides of the street.

C. Volumes

The proposed project location is situated in an urban area with high vehicle volume and multi-modal movements. The Ala Moana project area is considered to have a high concentration of transit-dependent households, as noted in the *HHCTC, Transportation Technical Report, Addendum 2* (PB, October 2009).

1. Peak Hour Volumes

Intersection turning movement traffic counts were taken on Thursday, November 9, 2017. These counts also included classification of heavy vehicles as well as counting pedestrian movements at all intersections. Bicycle counts were also taken at the six study intersections. A 48 hour tube count taken Wednesday and Thursday November 1 and 2 indicated the peak traffic volumes occurred 7:45-9:45 AM and 4:45-6:45 PM. Intersection turning movement counts were taken during these hours. Appendix A includes the detailed traffic count data. Peak hours varied per intersection and are provided in Table 1. Peak hour vehicle volumes are shown in Figure 10. Vehicles were observed making prohibited turning movements at study intersections and thus were included in traffic volumes figures, but will not be analyzed for intersection operations as the intent of the intersections is to not permit these movements.

Table 1: Intersection Peak Hours

Intersection	AM Peak Hour	PM Peak Hour
Kapiolani Boulevard and Piikoi Street	7:45 – 8:45 AM	4:45 – 5:45 PM
Kapiolani Boulevard and Kona Iki Street	7:45 – 8:45 AM	4:45 – 5:45 PM
Kapiolani Boulevard and Keeaumoku Street	7:45 – 8:45 AM	4:45 – 5:45 PM
Kona Street and Piikoi Street	8:30 – 9:30 AM	4:45 – 5:45 PM
Kona Street and Kona Iki Street	8:45 – 9:45 AM	5:00 – 6:00 PM
Kona Street and Keeaumoku Street	8:15 – 9:15 AM	4:45 – 5:45 PM

2. 24-Hour Volumes

Average daily traffic (ADT) along Kapiolani Boulevard based on Hawaii Department of Transportation (HDOT) *Historical Traffic Station Maps* is shown in Table 2.

Table 2: Roadway ADT

Roadway	Station	Location	Year	ADT
Kapiolani Boulevard	B727 503 00077	Between Sheridan Street and Keeaumoku Street	2010	46,000
	B727 503 00153	Between Atkinson Drive and Kalauokalani Way	2010	65,300
	Avg Nov 1 & 2, 2017 (raw counts)	Kapiolani Blvd between Keeaumoku and Kona Iki	2017	41,300

Source: *Historical Traffic Station Maps (HDOT) and tube counts Nov 1&2, 2017*

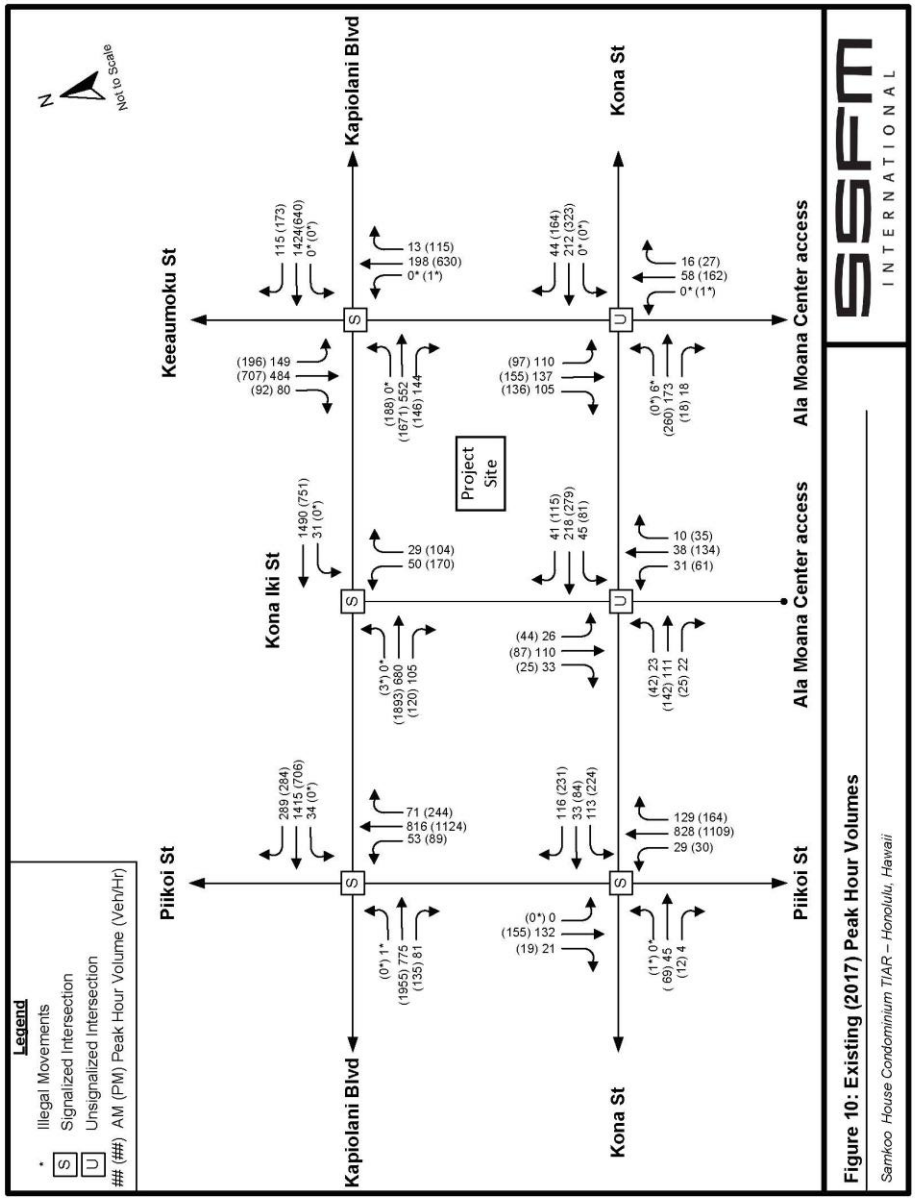


Figure 10: Existing (2017) Peak Hour Vehicle Volumes

3. Multi-Modal Volumes

a) Buses and Heavy Vehicles

Heavy vehicle movements primarily come from TheBus transit service, tourist bus/trolleys, and delivery trucks. Daily total ridership per stop for TheBus in the study area (see Table 3) was provided by the City and County of Honolulu, Department of Transportation Services, Public Transit Division.

Table 3: TheBus Daily Totals

Geoid	TheBus Stop	Daily Totals	
		On	Off
847	Kona Street, Opposite Kona Iki Street	3,053	1,174
1313	Kona Street, Opposite Kona Iki Street	19	1,544
425	Kona Street, Opposite Kona Iki Street	61	1,677
760	Kona Street, Opposite Keeaumoku Street	356	246
427	Mahukona Street Atkinson Drive	12	17
602	Kapiolani Boulevard – Eastbound, Piikoi Street	157	360
603	Kapiolani Boulevard – Eastbound, Kona Iki Street	479	691
999	Kapiolani Boulevard – Eastbound, Keeaumoku Street	1,251	2,308
2989	Kapiolani Boulevard – Eastbound, Keeaumoku Street	274	422
1000	Kapiolani Boulevard – Eastbound, Atkinson Drive	260	427
985+	Kapiolani Boulevard – Westbound, Atkinson Drive	327	340
3053	Kapiolani Boulevard – Westbound, Kaheka Street	357	349
986**	Kapiolani Boulevard – Westbound, Keeaumoku Street	1,738	1,762
3055	Kapiolani Boulevard – Westbound, Kona Iki Street	148	108
4404	Kapiolani Boulevard – Westbound, Piikoi Street	208	150
Daily Totals		8,700	11,573

+-Not shown in Figure 5.
**-As of September 29, 2014, bus stop closed at Kapiʻolani/Keeaumoku in the westbound direction.
Source: *City and County of Honolulu, DTS, Public Transit Division* (2013)
4334, 848, 1102, 761, 5, 428

b) Pedestrians and Bicycles

Peak hour pedestrian and bicycle counts are shown in Figure 11. Large pedestrian volumes were counted at the study intersections during the AM and PM peak hours. This is a result of the neighborhood being an urban district with high employment and residential accessibility. Additionally, a large number of pedestrians are generated by the TheBus transit center at Ala Moana Center. The lack of designated bikeways in the study area resulted in bikes often utilizing sidewalks.

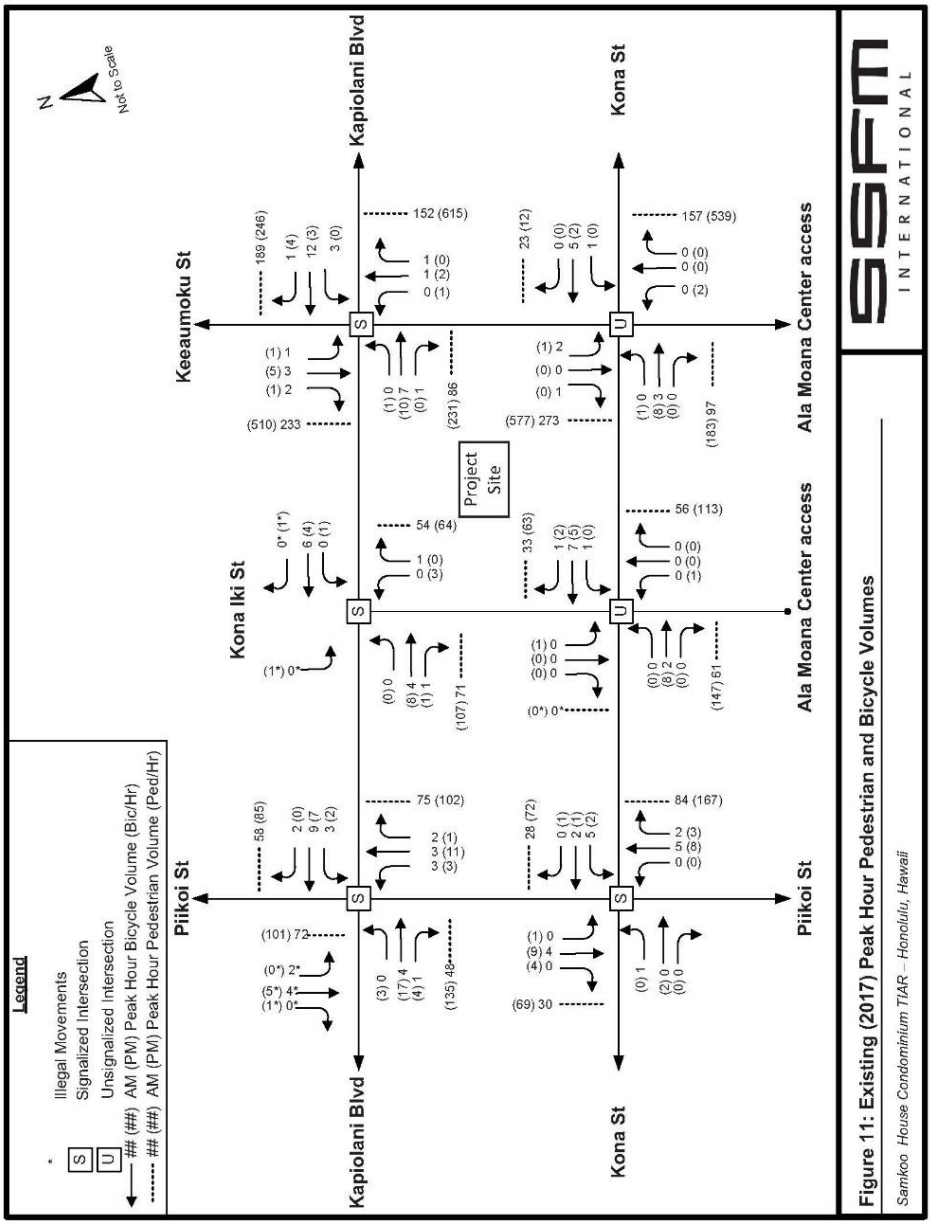


Figure 11: Existing (2017) Peak Hour Pedestrian and Bicycle Volumes

D. Travel Time Runs

Travel time runs were collected along Kapiolani Boulevard during the AM and PM peak periods. The complete results of these can be seen in Appendix B. With the heavy volumes, average vehicle speed during these peak periods was considerably lower than the 35 mph posted speed limit along the corridor (see Table 4). Slow travel speeds were noted in both directions during the AM and PM peak periods with the slowest vehicular speed existing adjacent to the project site between Mahukona Street and Keeaumoku Street. This is likely a result of the closely spaced intersections and delay resulting from the large timing split and cycle lengths.

Table 4: Travel Time Runs

Kapiolani Boulevard Roadway Segment	AM Average Speed (mph)		PM Average Speed (mph)	
	WB	EB	WB	EB
Mahukona Street to Keeaumoku Street	26	14	11	12
Keeaumoku Street to Piikoi Street	22	24	13	18
Piikoi Street to Pensacola Street	26	23	23	15
Total	**23**	**17**	**12**	**13**

E. Level of Service

1. Methodology

Level of service (LOS) is an operational analysis rating system used in traffic engineering to measure the effectiveness of roadway operating conditions. There are six LOS ranging from A to F. LOS A is defined as being the least interrupted flow conditions with little or no delays, whereas LOS F is defined as conditions where extreme delays exist. Guidelines from *A Policy on Geometric Design of Highways and Streets* (AASHTO, 2011) states that appropriate LOS for an urban road is LOS D or better. *Synchro Version 10.0* utilizes the methodology of the *Highway Capacity Manual 6th Ed.* (*HCM*) (TRB, 2016) to calculate delay and LOS. With the updates of the 2010 *HCM*, pedestrian and bicycle operations at signalized intersections can also be analyzed where data is available.

a) All-Way Stop Controlled Intersection

All-way stop-controlled (AWSC) intersections require every vehicle to stop at the intersection before proceeding. Because each driver must stop, the decision to proceed into the intersection is a function of traffic conditions on the other approaches. Intersection LOS criteria for AWSC is determined by the measured control delay (see Table 5).

Table 5: LOS Criteria for Unsignalized Intersections

Average Control Delay (s/veh)	LOS by v/c Ratio	
	<=1.0	>1.0
≤ 10.0	A	F
>10 and ≤15	B	F
>15 and ≤25	C	F
>25 and ≤35	D	F
>35 and ≤50	E	F
>50	F	F

Source: *HCM* (TRB, 2016)

b) Signalized Intersection

The LOS analysis for signalized intersections is based on average total vehicle delay based on the methodologies of the *HCM* (TRB, 2016) shown in Table 6. High numbers of vehicles passing the

intersection, long cycle lengths, inappropriate signal phasing, or a poor signal progression can result in long delays, and consequently poor LOS.

Table 6: LOS Criteria for Signalized Intersections

Average Control Delay (s/veh)	LOS by v/c Ratio	
	<=1.0	>1.0
≤ 10.0	A	F
>10 and ≤20	B	F
>20 and ≤35	C	F
>35 and ≤55	D	F
>55 and ≤80	E	F
>80	F	F

Source: *HCM* (TRB, 2016)

Another measure of intersection operation is the volume to capacity (v/c) ratio. This is the ratio of the volume of traffic utilizing the intersection compared to the maximum volume of vehicles that can be accommodated by the intersection during a specific period of time. A v/c ratio under 0.85 means the intersection is operating under capacity and excessive delays are not experienced. An intersection is operating near its capacity when v/c ratios range from 0.85 to 0.95. Unstable flows are expected when the v/c ratio is between 0.95 and 1.0. Any v/c ratio greater than or equal to 1.0 indicates that the intersection is operating at or above capacity which results in a LOS F per the *HCM* (TRB, 2016). A traffic movement can have a poor LOS but low v/c which suggests that the traffic volumes along that movement are low but have to wait a long time to make the movement. This is common for low volume protected turn movements or side streets that have to wait through a long cycle length for their split to come up.

c) Pedestrian Facility

The evaluation of pedestrian facilities considers pedestrian speed and perceived comfort, as represented by available pedestrian space, to assess delay and LOS. At signalized intersections, performance is evaluated separately for each crosswalk and intersection corner to consider a pedestrian's travel through an intersection. Performance measures include corner circulation area, crosswalk circulation area, pedestrian delay, and pedestrian LOS score. Table 7 lists the range of scores associated with each LOS for the pedestrian facility. The association between LOS Score value and LOS is based on traveler perception

research with the letter "A" representing the best quality of service and "F" representing the worst quality of service.

Table 7: LOS Criteria for Non-Automobile Modes

LOS Score	LOS
≤ 2.00	A
>2.00-2.75	B
>2.75-3.50	C
>3.50-4.25	D
>4.25-5.00	E
>5.00	F

Source: *HCM* (TRB, 2016)

d) Bicycle Facility

Evaluating the performance of a signalized intersection in terms of its service to bicyclists assesses each roadway approach separately, using the assumption that the bicycle is traveling in the street in the same direction as motorized vehicles. Bicycle delay can be calculated only for intersection approaches that have an on-street bicycle lane or a shoulder that can be used by bicyclists as a bicycle lane. Bicyclists who share a lane with automobile traffic will experience the same delay as the automobiles. For approaches with a separate bike facility provided, LOS is represented by the list in Table 7, similar to a pedestrian facility.

2. Intersection Conditions

Existing (2017) intersection LOS and delay was determined for the AM and PM peak hours (see Table 8 and 9) using *Synchro 10* traffic analysis modeling software, which calculates multi-modal delay using methodology from the *HCM* (TRB, 2016). Traffic signal timing was input from signal timing sheets provided by the City and County of Honolulu, DTS. Bus blockage numbers were included in the intersection analysis to reflect the number of buses per hour that stop and actually block traffic. Along Kona Street and Kapiolani Boulevard, this number is significant, often resulting in the roadways and intersections operating with reduced capacity. Pedestrian conflict volumes were included to reflect delay resulting from the conflict of turning vehicles and crossing pedestrians progressing in the same signal timing phase. Additionally, maximum pedestrian calls per hour were included to represent worst-case capacity conditions. For roadways and intersections near capacity, the actual LOS experienced may be worse than reported because intersection delay analysis is calculated based on traffic volumes that are able to pass through intersections rather than on the actual demand volumes. Detailed analysis reports for these intersections for Existing (2017) conditions are provided in Appendix C. All intersection conditions have appropriate LOS although the eastbound right turn approach at Kapiolani Boulevard and Keeaumoku Street has LOS E in the AM peak.

Table 8: Existing (2017) Unsignalized Intersection Level of Service

Unsignalized Intersection	Approach	Mvmt	AM			PM		
			Delay	v/c	LOS	Delay	v/c	LOS
Kona Street and Kona Iki Street	Northbound	LT	10.0	0.11	A	13.3	0.30	B
		TR	9.0	0.06	A	11.6	0.22	B
	Eastbound	LT	10.0	0.14	A	12.8	0.27	B
		TR	9.5	0.13	A	11.7	0.22	B
	Westbound	LT	10.7	0.27	B	15.0	0.45	B
		TR	10.1	0.25	B	14.7	0.48	B
	Southbound	LTR	11.8	0.33	B	14.5	0.37	B
Kona Street and Keeaumoku Street	Northbound	T	10.8	0.09	B	14.8	0.23	B
		TR	10.3	0.08	B	15.7	0.29	C
	Eastbound	T	11.7	0.21	B	19.8	0.48	C
		TR	11.7	0.23	B	15.1	0.29	C
	Westbound	T	12.3	0.29	B	20.7	0.55	C
		TR	11.1	0.23	B	24.4	0.65	C
	Southbound	LT	13.2	0.34	B	18.2	0.42	C
		T	10.8	0.19	B	14.8	0.29	B
		R	10.0	0.19	A	14.7	0.34	B

Table 9: Existing (2017) Signalized Intersection Level of Service

Signalized Intersection		AM			PM		
Approach	**Movement**	**Delay**	**v/c**	**LOS**	**Delay**	**v/c**	**LOS**
Piikoi Street and Kapiolani Boulevard		21.7	-	C	14.5	-	B
Eastbound	T	15.8	0.49	B	21.4	0.66	C
	TR	15.9	0.49	B	24.1	0.66	C
Westbound	LT	17.5	0.59	B	Left movement prohibited		
	T	17.3	0.61	B	2.8	0.59	A
	TR	19.1	0.61	B	3.1	0.60	A
Northbound	L	28.8	0.11	C	9.2	0.13	A
	T	35.4	0.59	D	11.3	0.59	B
	R	29.9	0.18	C	12.2	0.46	B
Kona Iki Street and Kapiolani Boulevard*		26.6	0.48	C	9.8	0.60	A
Eastbound	T	13.0	0.45	B	7.6	0.67	A
Westbound	T	32.6	0.55	C	7.5	0.45	A
Northbound	LR	39.1	0.28	D	30.4	0.50	C
Keeaumoku Street and Kapiolani Boulevard*		29.7	0.62	C	24.8	0.89	C
Eastbound	T	44.2	0.40	D	17.3	0.96	B
	R	60.7	0.19	E	3.9	0.21	A
Westbound	T	23.2	0.64	C	21.1	0.53	C
Northbound	T	28.4	0.16	C	35.5	0.48	D
	R	26.9	0.01	C	33.7	0.24	C
Southbound	LT	27.6	0.53	C	37.4	0.80	D
Piikoi Street and Kona Street*		21.2	0.31	C	23.1	0.45	C
Eastbound	TR	21.3	0.08	C	20.2	0.13	C
Westbound	L	22.9	0.18	C	22.9	0.30	C
	LT	22.5	0.16	C	22.4	0.28	C
	R	22.7	0.18	C	24.3	0.38	C
Northbound	LTR	19.4	0.41	B	22.7	0.52	C
Southbound	TR	29.8	0.10	C	27.0	0.12	C

** - Synchro Version 10.0 is unable to calculate LOS for shared through and turning movement lanes using HCM 6th or HCM 2010 methodology, so HCM 2000 results are given.*

3. Pedestrian Facility Conditions

Pedestrian crosswalk LOS at signalized intersections are shown in Table 10 below. Problems for pedestrians at two major roads are primarily related to long crossing distances, turning conflicts, high speeds, sufficient crossing signal time, roadway width, and the number of travel lanes.

Table 10: Existing (2017) Signalized Intersection Pedestrian Level of Service

Signalized Intersection	Approach Crosswalk	LOS	
		AM	PM
Piikoi Street and Kapiolani Boulevard	Eastbound	C	C
	Westbound	C	C
	Northbound	C	C
	Southbound	C	C
Kona Iki Street and Kapiolani Boulevard	Eastbound	C	C
	Westbound	C	C
	Northbound	B	B
Keeaumoku Street and Kapiolani Boulevard	Eastbound	C	C
	Westbound	C	C
	Northbound	C	C
	Southbound	C	C
Piikoi Street and Kona Street	Eastbound	B	B
	Westbound	B	B
	Northbound	C	C
	Southbound	C	C

4. Bicycle Facility Conditions

Without any existing bike facilities or shoulders along the study roads, LOS conditions cannot be calculated specifically for bicycles. With heavy vehicular volumes along Kapiolani Boulevard during the peak periods, conditions for bikes are not optimal. Kona Street provides a potential alternative for Diamond Head-Ewa travel, although high bus volumes require bicycles to weave as they navigate through regular bus stops. Bicycles traveling on the sidewalk have some of the same concerns as pedestrians, with the added conflict between bicycles and pedestrians.

F. Mitigation

Although the Synchro analysis indicated adequate capacity and acceptable LOS at the study intersections, existing conditions for the project area had some areas of concern, as noted through field observations. These noted instances are cause for considering mitigation as it relates to existing operations, especially for relatively easily implemented mitigation measures such as signal optimization and coordination.

1. Intersection Conditions

It was observed at the intersection of Kona Street and Keeaumoku Street that due to the long distance vehicles have to cross along Kona Street, and high pedestrian volumes, some vehicles proceeding through the intersection were forced to stop half-way through the intersection to give way to the crossing pedestrians. This was noted more for the vehicles approaching in the Ewa-bound direction along Kona Street. This often created some confusion as to who had right-of-way between these vehicles and those approaching in the makai-bound direction from Keeaumoku Street, forcing vehicles to consider other vehicles and crossing pedestrians at two locations in a single intersection. Existing structural pillars around the intersection also created a visual barrier for some pedestrians and vehicles, which further complicated

conditions between drivers and pedestrians. Signalization of the intersection is not likely warranted as a result of the vehicular or pedestrian volumes, as exhibited through the resulting appropriate intersection LOS, although additional signage, flashing beacons, or in-ground lights could be used to notify vehicles of the crossing pedestrians.

The intersection of Kapiolani Boulevard and Keeaumoku Street is a major intersection with a high volume of vehicles and pedestrians. It was reported in a *Honolulu Star Advertiser article*, Oahu's Risky Roads, Maps Reveal Hazardous Traffic Spots (Kagawa, January 26, 2013), that this intersection had the second highest number of pedestrian/vehicle accidents (eight accidents) between 2007-2011. It was observed that right turning vehicles conflicted with the high pedestrian volumes. With a large number of travel lanes and no mid-street median refuge, pedestrians are forced to cross long distances. Potential mitigation, as noted in the *MUTCD* (FHWA, 2009), suggests that "at intersections with high pedestrian volumes and high conflicting turning vehicle volumes, a brief leading pedestrian interval, during which an advanced WALKING PERSON indication is displayed for the crossing while red indications continue to be displayed to parallel through and/or turning traffic, may be used to reduce conflicts between pedestrians and turning vehicles." Additionally, "at intersections with pedestrian volumes that are so high that drivers have difficulty finding an opportunity to turn across the crosswalk, the duration of the green interval for a parallel concurrent vehicular movement is sometimes intentionally set to extend beyond the pedestrian clearance time to provide turning drivers additional green time to make their turns while the pedestrian signal head is displaying a steady UPRAISED HAND signal indication after pedestrians have had time to complete their crossings."

The intersection of Kona Street and Kona Iki Street had a number of pedestrians counted crossing the west leg of Kona Street at a location that does not have a marked crosswalk. With significant pedestrians approaching Ala Moana Center and the transit center from both directions, it is suggested to consider providing a marked crosswalk at this location with ADA appropriate curb ramps for safe and accessible pedestrian crossing.

IV. FUTURE (2024) CONDITIONS

Full build-out and occupancy of The Central Ala Moana is planned for approximately 2024, and therefore future without project (no-action) and future with project (full-build) conditions will be evaluated for that year. Roadway changes and additional traffic as a result of surrounding area development will be considered for Future (2024) Without Project analysis. Project related volumes as a result of The Central Ala Moana development are included in Future (2024) With Project conditions.

A. Surrounding Area Conditions

Research at the State of Hawaii Office of Environmental Quality Control Viewer shows no projects are included for construction by 2024. The Statewide Transportation Improvements Program (STIP) does not include any projects in the area that would affect roadway geometry or configuration. City Planning and Traffic personnel report there are some development projects in the early planning stages for sites in the surrounding area with a potential construction planned for by 2024. The planned developments do not have finalized plans or traffic impact analysis reports, and therefore individual project-related volumes could not be applied. Therefore, a general background growth was used to estimate anticipated growth in the area. The current plans for final build of the railway and rail station estimate full-build out and operation by 2025 and therefore are not included in Future (2024) analysis.

A. Transportation Network

1. Vehicular Facilities

a) Passenger Vehicles

Primary vehicular access to The Central Ala Moana is being proposed as a 'right-in/right-out' driveway on Kapiolani Boulevard. This condition is consistent with similar condominium developments in the area. Secondary full access is being proposed off of Kona Street and will require a break in the median.

b) Bus and Heavy Vehicles

Changes are expected to access Ala Moana transit center, and these should be completed in advance of the Honolulu Rail Transit system opening. Such changes may include alterations of available routes, the location of the bus stops, and queuing.

2. Pedestrian Facilities

The ground level site plan for The Central Ala Moana (Figure 2) shows sidewalks eight-feet wide or greater being provided adjacent to the project site along Kona Street, Kona Iki Street, and Kapiolani Boulevard, with a tree-lined landscaped buffer along Kapiolani Boulevard. A pedestrian plaza is also shown along Kapiolani Boulevard, adjacent to commercial storefronts.

To analyze signalized intersections, pedestrian walk times were maintained at seven seconds and clearance times were updated to reflect walking speeds of 3.5 feet per second per MUTCD (FHWA, 2009) recommendations. Although the signalized intersection controller will likely retain vehicle and pedestrian actuated traffic control, pretimed operations were used for traffic model analysis to reflect a worst-case scenario during vehicle and pedestrian peak hours.

3. Bicycle Facilities

Future bikeways included in the *Oahu Bike Plan, A Bicycle Master Plan* (HH&F, August 2012) are shown on Figure 7. Priority 1 projects in the project area anticipated in the next five years include a bike route along Piikoi Street. A two-way protected bike lane has been added along South King Street.

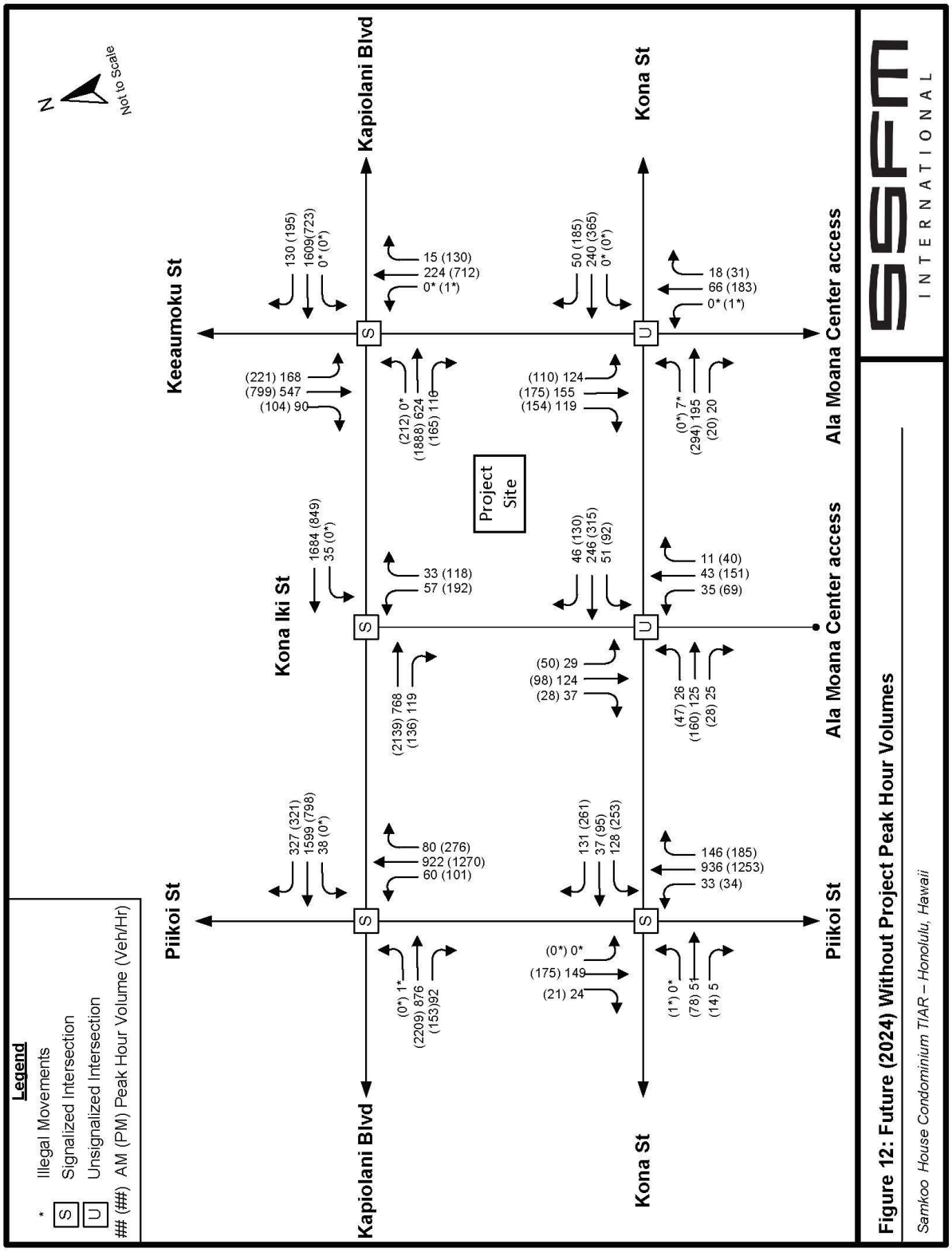
B. Geometric Configuration

With limited right-of-way in this urban transportation network, no changes in roadway configuration are expected. Future (2024) conditions were evaluated with the existing lane configuration, as shown in Figure 8.

C. Traffic Volumes

1. Background Growth

Changes in traffic volume along roadways in the surrounding area over the past ten years have been mixed. Despite large scale development and increased density from high-rise condominiums, vehicular traffic volumes have not grown at a steady rate. A decrease in ADT is noted for some roadways but large increases for others. This may be due to a change in motorist travel habits as a result of certain roadways operating at capacity or due to construction projects on Kapiolani Boulevard and on Ala Moana Boulevard. The *Ala Moana Neighborhood Transit-Development Plan, Existing Conditions Report, Supplement – Market Opportunities Study* (KMA, October 2012) projects a 1.75% cumulative growth in population for the area between the years 2013 and 2018. Although population growth is not directly related to traffic growth, a conservative 2.0% was assumed for all traffic (vehicles, pedestrians, and bicycles) growth which is in line with prior studies in the area. With this increase in volume, Future (2024) Without Project Volumes are shown in Figure 12 and 13.



49

Figure 12: Future (2024) Without Project Peak Hour Vehicular Volumes

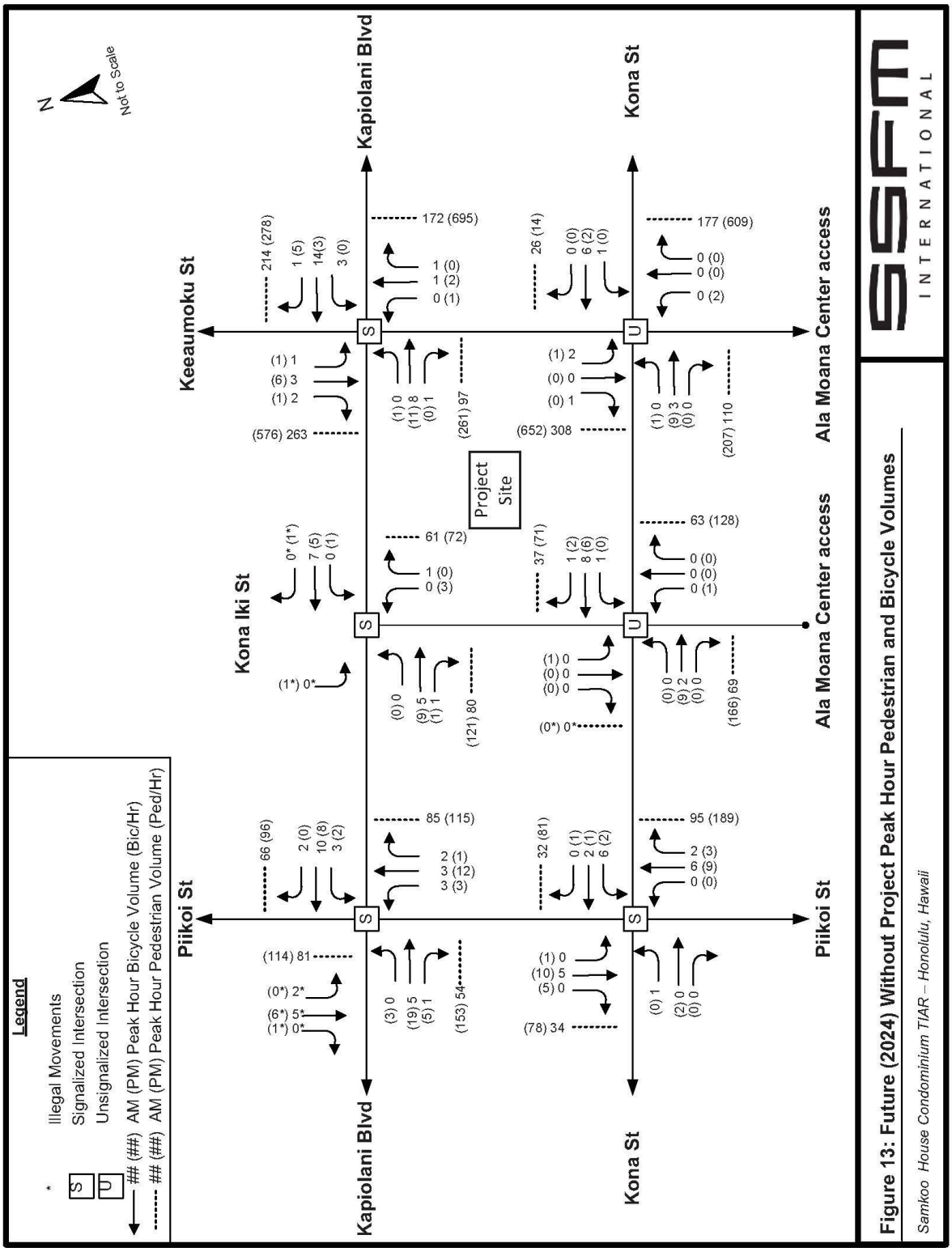


Figure 13: Future (2024) Without Project Peak Hour Pedestrian and Bicycle Volumes

2. Project Related Volumes

The trips resulting from The Central Ala Moana development were estimated using a standard four step trip generation methodology: trip generation, trip distribution, modal choice, route assignment.

a) Trip Generation

The proposed Central Ala Moana development will include 513 units in addition to 10,000 square feet of retail space. Expected trip generation rates for the proposed development, using *Trip Generation, 8th Edition* (ITE, 2008), are shown in Table 11. Resulting trip generation volumes for the AM and PM peak hours are shown in Table 12.

Table 11: Development Trip Generation Rates

Land Use [ITE Code]	Quantity	Units	Trip Generation Average Rate	
			AM	PM
High Rise Residential Condominiums [232]	513	Dwelling Units	0.34	0.38
Land Use [ITE Code]	**Quantity**	**Units**	**Fitted Curve Equation - PM**	
Specialty Retail Center [814]	10	Area (1,000 Sq Ft)	T=2.40*(Area)+21.4	

Retail space does not significantly contribute trips to AM Peak Hour

Table 12: Development Trip Generation Volumes

Land Use [ITE Code]	Project Related Trips					
	AM			PM		
	In	Out	Total	In	Out	Total
High Rise Residential Condominiums [232]	**33**	**141**	**174**	**121**	**74**	**195**
Specialty Retail Centre [814]	**-**	**-**	**-**	**20**	**25**	**45**

Methodologies described in *Trip Generation Handbook, 2nd Edition* (ITE, June 2004) state that although total project trips are calculated for a specified development, the total trips will not necessarily be new vehicles added to the adjacent roadways. The three types of project related trips considered are pass-by trips, diverted trips and primary trips. The definition of each type of trip is shown in Table 13. For a conservative estimate of traffic, all trips to and from the residential units will be considered primary trips.

Table 13: Project Related Trip Definitions

Type	Definition
Pass-by	Traffic currently passing the site on an adjacent street or roadway that offers direct access to the generator.
Diverted	Trips that are attracted from the traffic volume on roadways within the vicinity of the generator but require a diversion from that roadway to another roadway to gain access to the site.
Primary	Trips made for the specific purpose of visiting the generator. The stop at the generator is the primary reason for the trip.

Source: *Trip Generation Handbook, 2nd Edition* (ITE, June 2004)

b) Trip Distribution

To distribute the expected trips, the analysis was consistent with other transportation reports in the area of Ala Moana shopping center. The *Kakaako Mauka Area Plan Transportation Analysis* (AECOM, April 2009) identified the future trip distribution trends (see Figure 14). This analysis used the *O'ahu MPO Travel Demand Forecast Model* which is considered applicable for the proposed Central Ala Moana development because the study area is directly adjacent to the project site:

- Ewa bound (via surface streets): 25%
- Diamond Head bound (via surface streets): 22%
- Ewa bound (via H-1): 19%
- Diamond Head bound (via H-1): 24%
- Mauka bound: 3%; and,
- Within the project area: 7%.

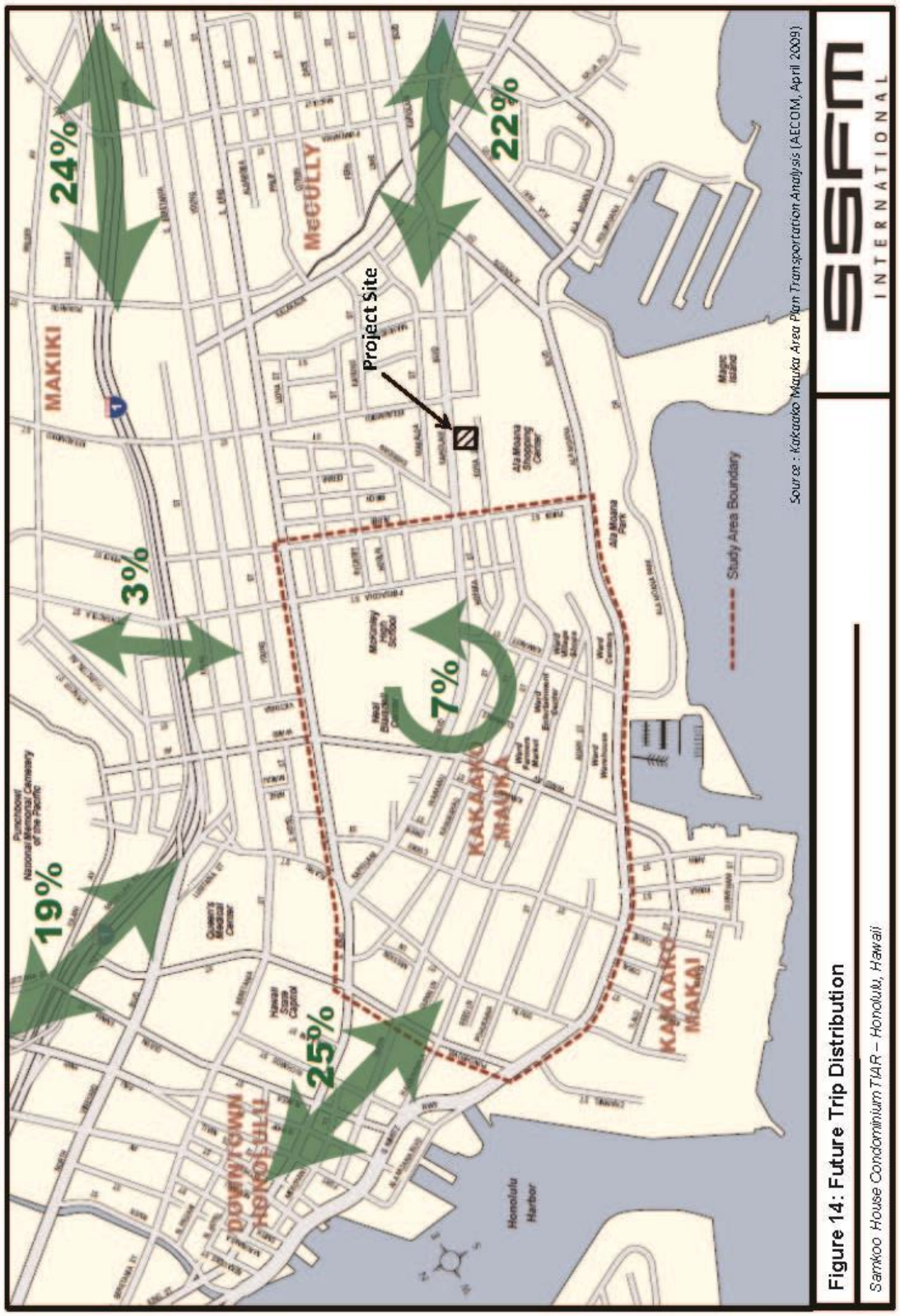


Figure 14: Future Trip Distribution

c) Modal Choice

Because The Central Ala Moana project is an urban setting with proximity to existing transit and rail options, a high degree of alternative travel modes exist. The *Kakaako Mauka Area Plan Transportation Analysis* (AECOM, April 2009) states that because of the difficulty in estimating ongoing redevelopment and TOD effects on travel behavior, existing modal split is still deemed appropriate for use in the near term. This modal split percentage was used to calculate project related trips (see Table 14).

Table 14: Project Related Transportation Mode

Transportation Mode	Percentage	Residential and Retail	
		AM Peak Hour	PM Peak Hour
Private Vehicle	76.9%	134	184
Transit	12.8%	22	31
Bike	2.3%	4	6
Walk	8.0%	14	19

Source: *Kakaako Mauka Area Plan Transportation Analysis* (AECOM, April 2009)

d) Route Assignment

Project related trips associated with the proposed development during the AM and PM peak hours were distributed along the adjacent roadways using existing intersection distribution and future travel patterns. Project related vehicular volumes (see Figure 15) as well as pedestrian and bicycle volumes (see Figure 16) were distributed through the study intersections. Project related transit use will increase the demand for and volume from transit riders.

3. Future Peak Hour Volumes

Project related vehicular volumes were added to the Future (2024) Without Project traffic volumes for the resulting Future (2024) With Project traffic volumes shown in Figure 17. This is reflective of future traffic conditions after the build out of The Central Ala Moana project.

4. Future 24-Hour Volumes

Considering the anticipated growth in the area, projected Future (2024) ADT in the project area is shown in Table 15. The difference between Future (2024) Without Project and Future (2024) With Project roadway ADT is anticipated to be negligible.

Table 15: Future (2024) Roadway ADT

Roadway	Location	ADT
Kapiolani Boulevard	Between Sheridan Street and Keeaumoku Street	60,700
	Between Atkinson Drive and Kalauokalani Way	86,200
	Between Keeaumoku St and Kona Iki St	46,500

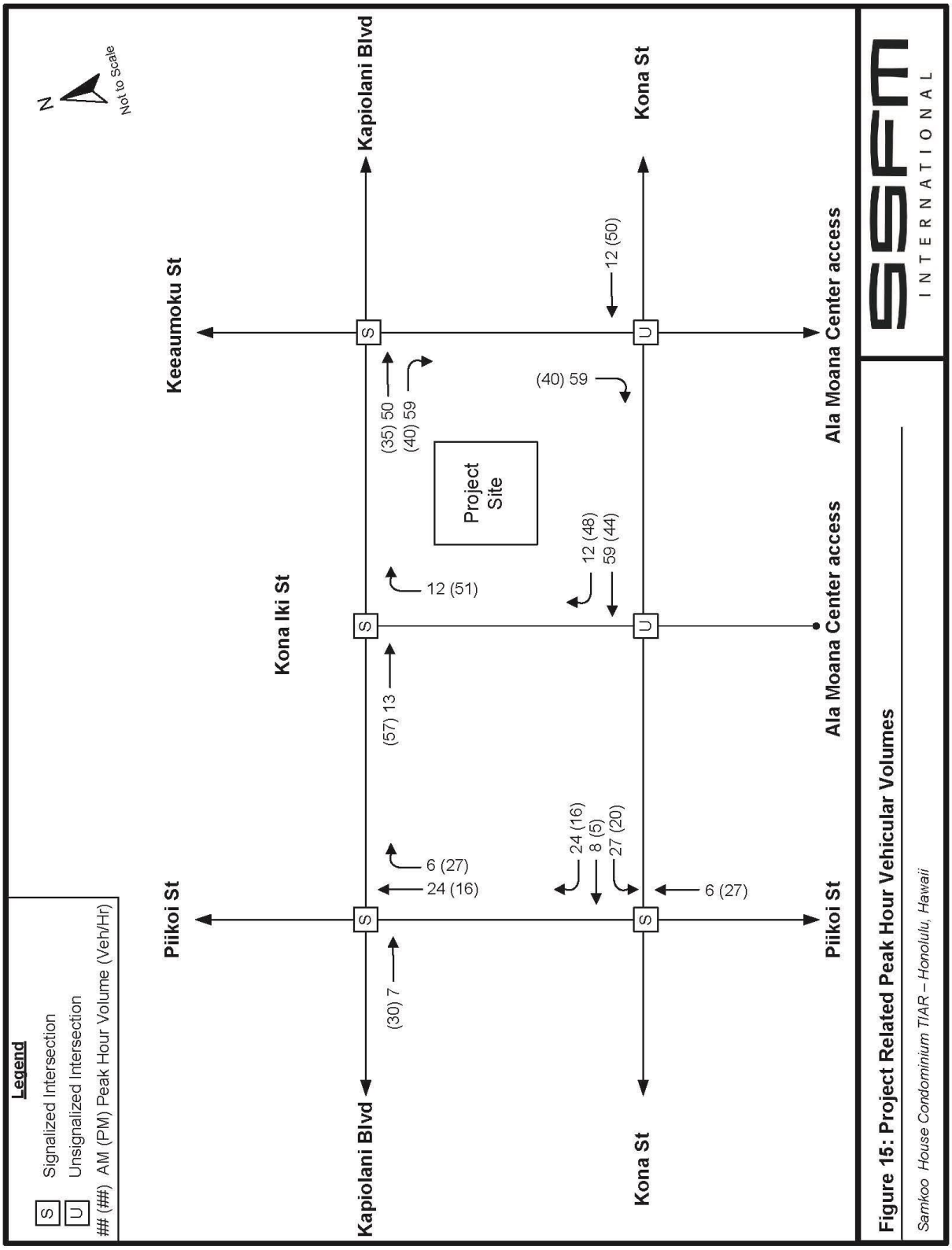


Figure 15: Project Related Peak Hour Vehicular Volumes

Samkoo House Condominium TIAR – Honolulu, Hawaii

Figure 15: Project Related Peak Hour Vehicular Volumes

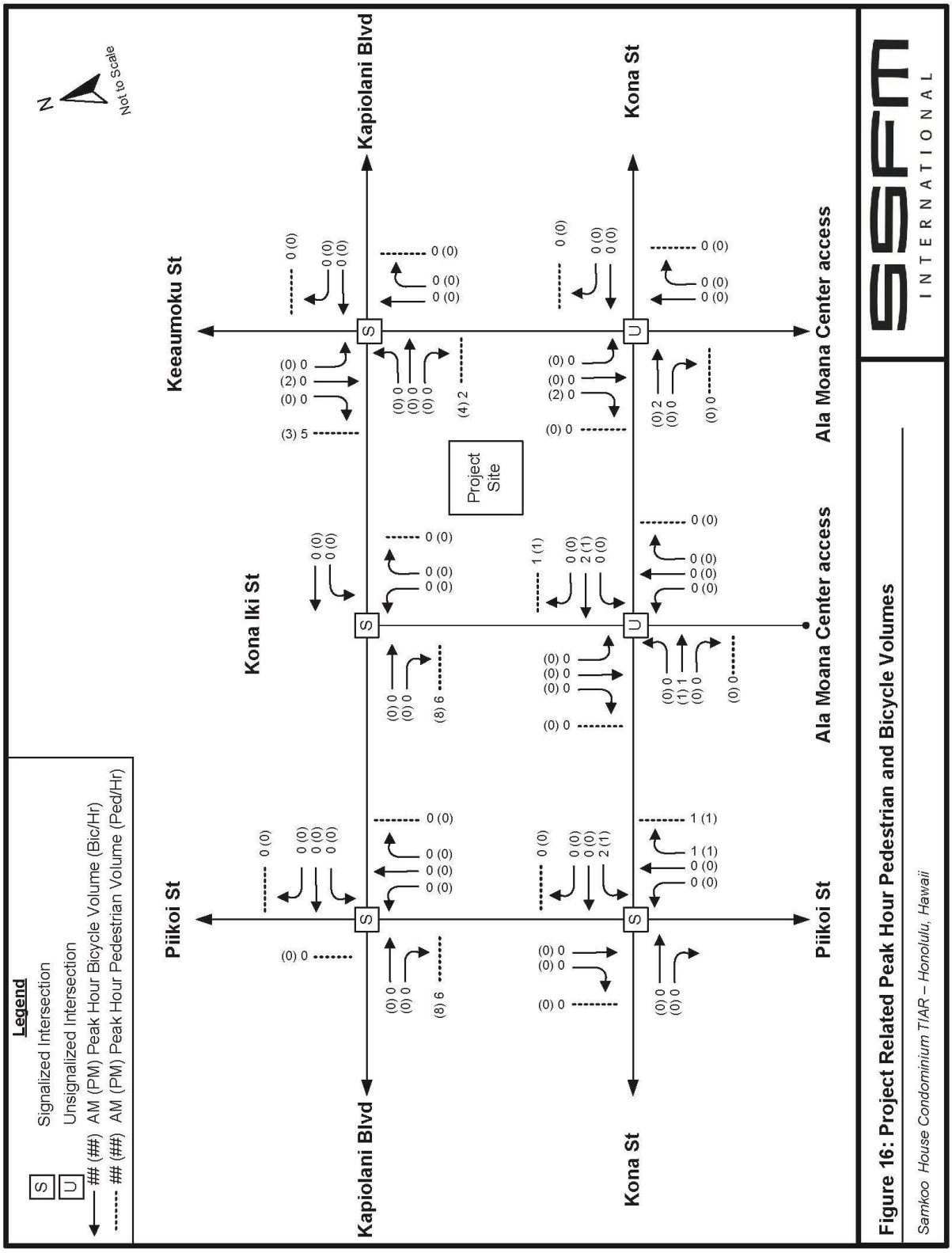
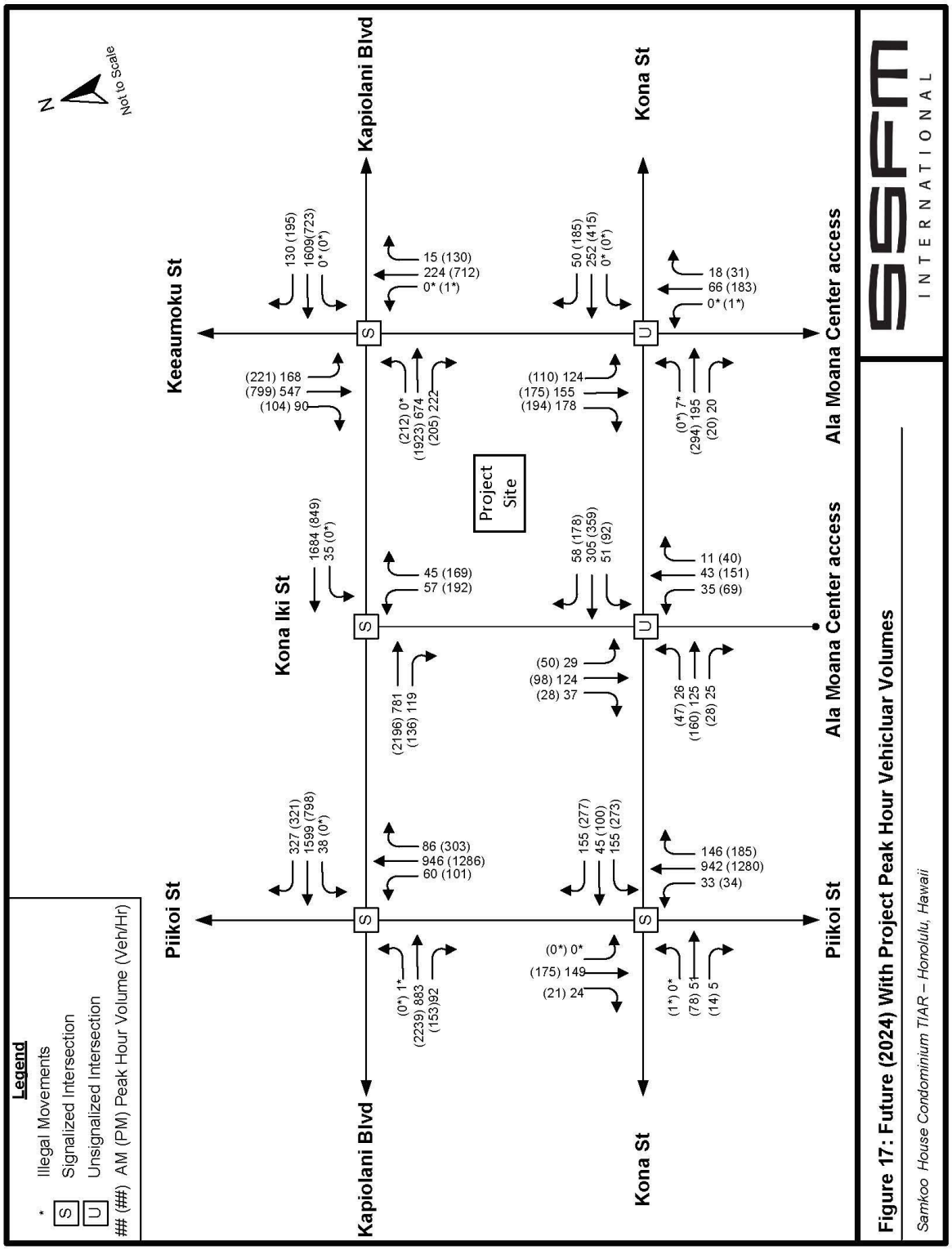


Figure 16: Project Related Peak Hour Pedestrian and Bicycle Volumes



49

Figure 17: Future (2024) With Project Peak Hour Vehicular Volumes

5. Multi-Modal Volumes

a) Buses and Heavy Vehicles

It is anticipated that for Future (2024) conditions, Ala Moana will remain the primary transfer point for TheBus system. It is expected that transit service will adjust to Future (2024) conditions and accommodate the changes in transit demand.

b) Pedestrians and Bicycles

Projected Future (2024) With Project Peak Hour Pedestrian and Vehicular volumes are shown in Figure 18.

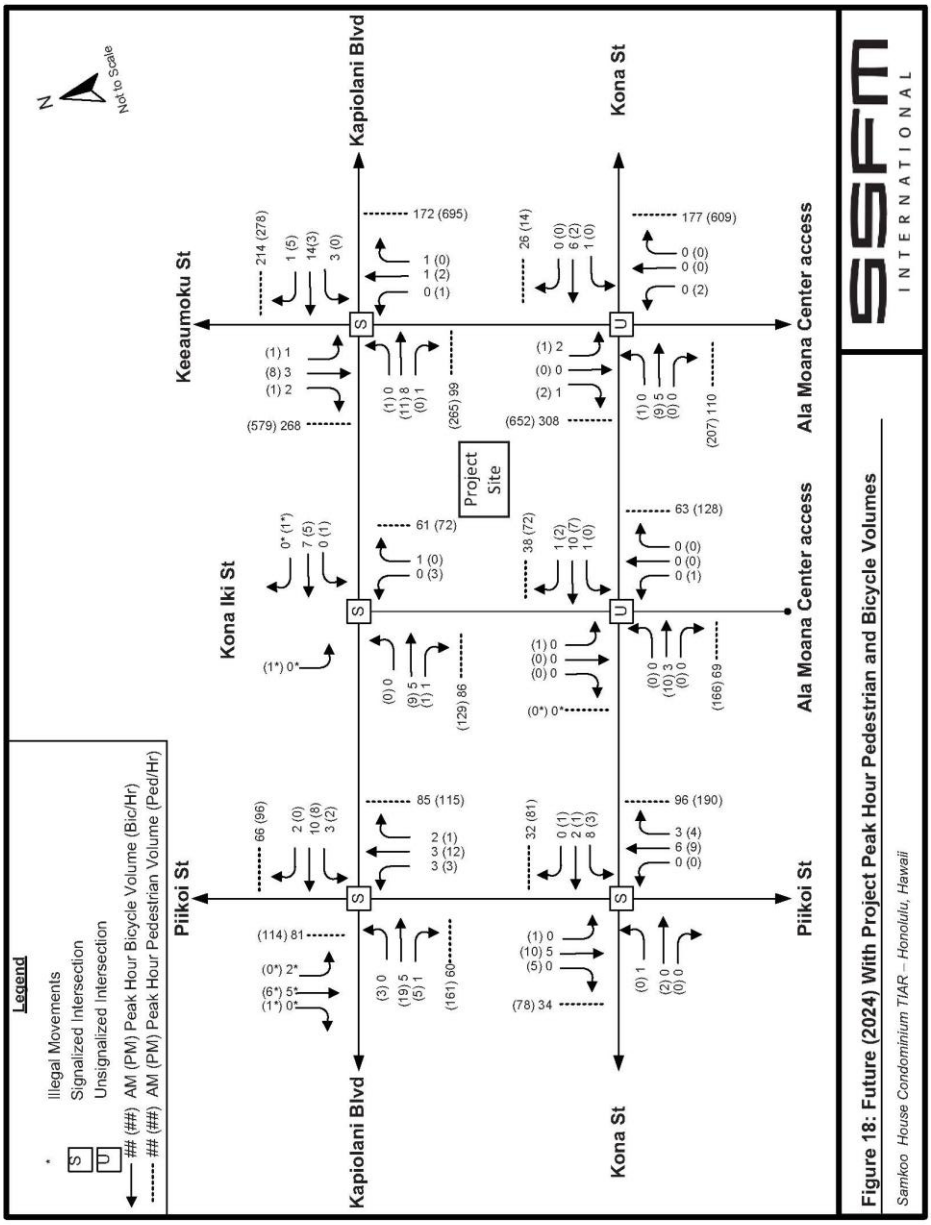


Figure 18: Future (2024) With Project Peak Hour Pedestrian and Bicycle Volumes

Samkoo House Condominium TIAR – Honolulu, Hawaii

Figure 18: Future (2024) With Project Peak Hour Pedestrian and Bicycle Volumes

D. Level of Service

1. Intersection Conditions

a) Future (2024) Without Project

For Future (2024) Without Project conditions, pedestrian crossing times were updated using the latest *MUTCD* (FHWA, 2009) standards. Where longer pedestrian crossing times exist, they were maintained. Future (2024) Without Project traffic volumes and updated signal timing were optimized using the *Synchro* model. The Future (2024) Without Project conditions reflects the anticipated growth in the surrounding area (see Table 16 and 17). Appendix D provides detailed analysis reports for the Future (2024) Without Project conditions.

With updated and optimized traffic signal timing, intersections are anticipated to operate at appropriate levels. At the intersection of Kona Street and Keeaumoku Street (all way stop controlled), the westbound through/right movement experiences on average 39 seconds of delay (LOS E) in the PM peak hour, but has sufficient capacity. The other approaches have less delay and sufficient capacity for future growth.

Table 16: Future (2024) Without Project Unsignalized Intersection Level of Service

Unsignalized Intersection	Approach	Mvmt	AM			PM		
			Delay	v/c	LOS	Delay	v/c	LOS
Kona Street and Kona Iki Street	Northbound	LT	10.5	0.13	B	14.9	0.36	B
		TR	9.4	0.07	A	12.7	0.27	B
	Eastbound	LT	10.5	0.17	B	14.3	0.32	B
		TR	10	0.16	A	12.8	0.26	B
	Westbound	LT	11.5	0.31	B	18.0	0.54	C
		TR	10.8	0.29	B	18.1	0.57	C
	Southbound	LTR	12.8	0.38	B	16.7	0.44	C
Kona Street and Keeaumoku Street	Northbound	T	11.6	0.11	B	17.1	0.28	C
		TR	11.1	0.10	B	18.6	0.37	C
	Eastbound	T	12.7	0.25	B	26.2	0.60	D
		TR	12.9	0.27	B	17.8	0.35	C
	Westbound	T	13.7	0.35	B	28.9	0.68	D
		TR	12.2	0.27	B	39.4	0.81	E
	Southbound	LT	14.9	0.40	B	22.7	0.52	C
		T	11.7	0.22	B	17.1	0.35	C
		R	10.9	0.23	B	17.8	0.43	C

Table 17: Future (2024) Without Project Signalized Intersection Level of Service

Signalized Intersection		AM			PM		
Approach	**Movement**	**Delay**	**v/c**	**LOS**	**Delay**	**v/c**	**LOS**
Piikoi Street and Kapiolani Boulevard		15.2	-	B	16.1	-	B
Eastbound	T	16.4	0.55	B	22.7	0.73	C
	TR	16.6	0.55	B	26.6	0.74	C
Westbound	LT	4.0	0.67	A	Left movement prohibited		
	T	2.4	0.69	A	3.6	0.66	A
	TR	4.9	0.69	A	4.2	0.67	A
Northbound	L	29.7	0.13	C	10.1	0.15	B
	T	38.2	0.68	D	13.3	0.68	B
	R	31.1	0.21	C	14.5	0.54	B
Kona Iki Street and Kapiolani Boulevard*		6.0	0.55	A	9.7	0.68	A
Eastbound	TR	7.9	0.54	A	7.2	0.74	A
Westbound	LT	3.4	0.66	A	7.0	0.49	A
Northbound	LR	36.0	0.28	D	34.4	0.59	C
Keeaumoku Street and Kapiolani Boulevard*		25.9	0.72	C	33.3	1.02	C
Eastbound	LT	20.6	0.45	C	29.8	1.28	C
	R	22.5	0.23	C	5.1	0.25	A
Westbound	TR	25.2	0.73	C	21.8	0.59	C
Northbound	T	30.8	0.20	C	37.6	0.56	D
	R	28.9	0.02	C	36.1	0.31	D
Southbound	LTR	31.1	0.63	C	50.5	1.01	D
Piikoi Street and Kona Street*		21.5	0.36	C	24.1	0.52	C
Eastbound	TR	22.1	0.09	C	20.4	0.15	C
Westbound	L	24.0	0.21	C	23.8	0.34	C
	LT	23.5	0.19	C	23.1	0.32	C
	R	24.2	0.23	C	25.5	0.44	C
Northbound	LTR	19.6	0.46	B	23.9	0.59	C
Southbound	TR	29.1	0.11	C	26.7	0.14	C

** - Synchro Version 10.0 is unable to calculate LOS for shared through and turning movement lanes using HCM 6th or HCM 2010 methodology, so HCM 2000 results are given.*

c) Future (2024) With Project

Future (2024) With Project LOS and v/c ratios for the study intersections are shown in Tables 18 and 19. Detailed analysis reports for Future (2024) With Project conditions are provided in Appendix E. For Future (2024) With Project conditions, intersections maintain appropriate LOS. The westbound through-right movement at Keeaumoku Street and Kona Street will experience over 50 seconds of delay on average in the PM peak hour, and is nearing capacity with a v/c ratio of 0.88.

Table 18: Future (2024) With Project Unsignalized Intersection Level of Service

Unsignalized Intersection	Approach	Mvmt	AM			PM		
			Delay	v/c	LOS	Delay	v/c	LOS
Kona Street and Kona Iki Street	Northbound	LT	10.8	0.13	B	15.5	0.37	C
		TR	9.6	0.07	A	13.2	0.28	B
	Eastbound	LT	10.7	0.17	B	14.8	0.33	B
		TR	10.2	0.16	B	13.2	0.27	B
	Westbound	LT	12.3	0.37	B	19.9	0.59	C
		TR	11.7	0.36	B	24.9	0.72	C
	Southbound	LTR	13.3	0.39	B	17.4	0.45	C
Kona Street and Keeaumoku Street	Northbound	T	11.9	0.12	B	18.0	0.29	C
		TR	11.4	0.10	B	19.9	0.38	C
	Eastbound	T	13.2	0.26	B	29.1	0.62	D
		TR	13.3	0.28	B	19.0	0.37	C
	Westbound	T	14.5	0.38	B	40.0	0.79	E
		TR	12.7	0.29	B	51.4	0.88	F
	Southbound	LT	15.2	0.41	C	24.0	0.54	C
		T	11.9	0.23	B	17.9	0.36	C
		R	12.6	0.35	B	22.4	0.56	C

Table 19: Future (2024) With Project Signalized Intersection Level of Service

Signalized Intersection		AM			PM		
Approach	**Movement**	**Delay**	**v/c**	**LOS**	**Delay**	**v/c**	**LOS**
Piikoi Street and Kapiolani Boulevard		15.5	-	B	16.9	-	B
Eastbound	T	17.2	0.56	B	25.8	0.78	C
	TR	17.4	0.56	B	31.0	0.78	C
Westbound	LT	4.6	0.68	A	Movement prohibited		
	T	2.5	0.70	A	4.3	0.69	A
	TR	5.3	0.71	A	5.0	0.70	A
Northbound	L	28.9	0.12	C	7.8	0.14	A
	T	37.5	0.68	D	10.0	0.64	B
	R	30.6	0.22	C	11.9	0.55	B
Kona Iki Street and Kapiolani Boulevard*		6.2	0.56	A	11.7	0.74	B
Eastbound	TR	7.9	0.55	A	9.4	0.81	A
Westbound	LT	3.4	0.66	A	8.1	0.52	A
Northbound	LR	36.7	0.31	D	33.5	0.65	C
Keeaumoku Street and Kapiolani Boulevard*		25.9	0.72	C	35.0	1.03	C
Eastbound	LT	21.8	0.48	C	31.8	1.24	C
	R	23.3	0.33	C	9.2	0.33	A
Westbound	TR	24.3	0.71	C	21.0	0.58	C
Northbound	T	31.6	0.20	C	38.6	0.57	D
	R	29.6	0.02	C	37.1	0.32	D
Southbound	LTR	32.0	0.64	C	54.9	1.03	D
Piikoi Street and Kona Street*		22.3	0.39	C	24.9	0.54	C
Eastbound	T	21.4	0.09	C	19.2	0.14	B
Westbound	L	24.1	0.25	C	22.8	0.35	C
	LT	23.6	0.23	C	22.2	0.33	C
	R	24.5	0.29	C	24.5	0.45	C
Northbound	LTR	20.3	0.47	C	25.8	0.62	C
Southbound	TR	31.1	0.11	C	26.4	0.14	C

** - Synchro Version 10.0 is unable to calculate LOS for shared through and turning movement lanes using HCM 6th or HCM 2010 methodology, so HCM 2000 results are given.*

2. Pedestrian Facility Conditions

a) Future (2024) Without Project

Pedestrian crosswalk LOS at signalized intersections are shown in Table 20 below.

Table 20: Future (2024) Without Project Signalized Intersection Pedestrian Level of Service

Signalized Intersection	Approach Crosswalk	LOS	
		AM	PM
Piikoi Street and Kapiolani Boulevard	Eastbound	C	C
	Westbound	C	C
	Northbound	C	C
	Southbound	C	C
Kona Iki Street and Kapiolani Boulevard	Eastbound	C	C
	Westbound	C	C
	Northbound	B	B
Keeaumoku Street and Kapiolani Boulevard	Eastbound	C	C
	Westbound	C	C
	Northbound	C	C
	Southbound	C	C
Piikoi Street and Kona Street	Eastbound	B	B
	Westbound	B	B
	Northbound	C	C
	Southbound	C	C

b) Future (2024) With Project

Pedestrian crosswalk LOS at signalized intersections are shown in Table 21 below.

Table 21: Future (2024) With Project Signalized Intersection Pedestrian Level of Service

Signalized Intersection	Approach Crosswalk	LOS	
		AM	PM
Piikoi Street and Kapiolani Boulevard	Eastbound	C	C
	Westbound	C	C
	Northbound	C	C
	Southbound	C	C
Kona Iki Street and Kapiolani Boulevard	Eastbound	C	C
	Westbound	C	C
	Northbound	B	B
Keeaumoku Street and Kapiolani Boulevard	Eastbound	C	C
	Westbound	C	C
	Northbound	C	C
	Southbound	C	C
Piikoi Street and Kona Street	Eastbound	B	B
	Westbound	B	B
	Northbound	C	C
	Southbound	C	C

3. Bicycle Facility Conditions

Without any existing bike facilities or shoulders along the study roads, LOS conditions cannot be calculated specifically for bicycles. With heavy vehicular volumes along roads during the peak periods, it can be concluded that conditions for bikes are not optimal at the study intersections and along the study roads.

E. Mitigation

The proposed Central Ala Moana project proposes to develop a plot of land that previously generated minimal trips. This project is expected to add vehicular and multi-modal traffic to the surrounding area. The City and County of Honolulu, DTS, has requested to limit driveway access to the project site along Kapiolani Boulevard to a single right-in/right-out driveway. A secondary, full-access, driveway off of Kona Street is proposed to provide primarily retail and delivery vehicle access.

1. Intersection Conditions

Predicted operations of the study intersections for Future (2024) Without Project conditions results in slightly worsening peak hour operations as compared to Existing (2017) conditions. Since right-of-way (ROW) constraints prevent widening of roads, improvements considered primarily consisted of modifications to the intersection operations.

Optimizing traffic signal timing is one method to reduce delay, and coordinating traffic signals can enhance progression along the primary corridor. Due to heavy bus volumes and high ridership numbers along Kapiolani Boulevard, it is a potential candidate for optimizing signal timing to favor bus travel. Implementation of transit signal priority (TSP) could also provide improved travel times for buses, which carry a significant volume of passengers.

Limited ROW, multiple approach lanes, and the large number of heavy vehicles make the study intersections inappropriate locations for the addition of roundabouts.

2. Pedestrian Facility Conditions

Existing pedestrian volumes and proposed neighborhood TOD plans suggest that pedestrian accessibility is important surrounding the project site. The project proposes the inclusion of wide sidewalks of eight feet or greater adjacent to the project site along Kona Street, Kona Iki Street, and Kapiolani Boulevard with a tree-lined landscaped buffer along Kapiolani Boulevard. A pedestrian plaza is also shown along Kapiolani Boulevard, adjacent to commercial storefronts. These pedestrian accessible areas are required to be ADA compliant. Landscaped buffers can give pedestrians a sense of safety while also providing a shaded canopy. Landscaping will be planted so that it will not interfere with line-of-sight for vehicles exiting the driveway, with the same objectives for any traffic control signals or signage along the corridor.

3. Bicycle Facility Conditions

The City's implementation of Complete Streets improvements will add bicycle facilities in the project area and improve the bicycling experience with dedicated bike lanes. It will also assist in making bicyclists more visible to vehicles. During peak hours, vehicles will travel at slower speeds, and roads become more navigable by bikes traveling at similar speeds. The Central Ala Moana development can create a bicycle friendly facility by providing bike racks and easy access, potentially through allowing use of freight elevators.

V. FUTURE (2030) CONDITIONS

The Honolulu Rail Transit system has a projected full build-out and operation year of 2025. Utilizing forecasts and results from the *Honolulu High-Capacity Transit Corridor Project, Final Environmental Impact Statement* (PB, June 2010), *Honolulu High-Capacity Transit Corridor Project, Transportation Technical Report* (PB, August 2008), and subsequent addenda, Future (2030) conditions in the study area were reviewed as they relate to the proposed development of The Central Ala Moana and surrounding area.

A. Transportation Network

1. Vehicular Facilities

a) Passenger Vehicles

As the Ala Moana area progresses with TOD development, changes will be implemented that favor multi-modal travel.

b) Bus and Heavy Vehicles

The *HHCTC, Transportation Technical Report* (PB, August 2008) states that even though bus operations at Ala Moana Center would transition from being the primary transfer point for TheBus system to one of many throughout Oahu, it would continue to be a dominant transfer location on the island for buses and rail activity.

The *HHCTC, Transportation Technical Report, Addendum 2* (PB, October 2009) states that with the railway system in place, the Ala Moana transit center would need a substantial increase in volume of buses. The study predicts the station will be served by the following routes: 5, 6, 7, 8, 9, 17, 18, 23, 40, 40A, 52, and 88A with Routes A and 3 continuing to operate on Kapiolani Boulevard.

2. Pedestrian Facilities

The *HHCTC, Transportation Technical Report* (PB, August 2008) states that escalators and elevators will be available at each station for pedestrian access. Complete Streets improvements will become more common, including the widening of sidewalks and improved safety at crossings.

3. Bicycle Facilities

The *HHCTC, Transportation Technical Report* (PB, August 2008) states that bicyclists will be encouraged and accommodated at each rail station. Each station will have facilities for parking bikes, and each rail car will be designed to accommodate bikes during the off peak hours.

Future bikeways included in the *Oahu Bike Plan, A Bicycle Master Plan* (HH&F, August 2012) are shown on Figure 7. All future projects noted on the plan are expected to be completed by Future (2030) conditions.

B. Geometric Configuration

1. Honolulu Rail Transit

The Honolulu Rail Transit is proposing to build a rail station at the Watamull Building site one block from The Central Ala Moana site. This will allow easy rail access for the residents of The Central Ala Moana building.

The *HHCTC, Transportation Technical Report, Addendum 2* (PB, October 2009) notes that along Kona Street, through lanes will be reduced to a minimum of 11 feet and turn lanes to a minimum of 10 feet to accommodate proposed guideway columns. Shown on the HHCTC plans, to accommodate the columns, the makai-side Kona Street sidewalk is widened and the median is narrowed. The additional sidewalk width will provide additional space for pedestrians, while the narrowed median will potentially remove a pedestrian refuge, although in doing so it will provide a shorter overall crossing distance.

C. Traffic Volumes

1. Background Growth

The Watamull Building's proposed future use as the location of the Ala Moana Rail Station will serve as the primary traffic generator for the area. The *HHCTC, Transportation Technical Report, Addendum 2* (PB, October 2009) forecasts that a total of 22,610 riders will board and 22,610 riders will depart the train daily at the Ala Moana Rail Station in 2030 conditions.

The existence of the rail station provides a more comprehensive transit network and additional transit alternative. The *HHCTC, Transportation Technical Report, Addendum 2* (PB, October 2009) predicts that the build-out of the rail will attract substantial ridership from local bus access and from people walking to stations. The forecasted daily volumes of riders per each travel mode accessing the Ala Moana Rail Station are shown in Table 22.

Table 22: Ala Moana Rail Station Rider Forecasted Modal Use

Transportation Mode	Percentage	Daily Riders
Vehicle (Parking)	1%	250
Vehicle (Kiss & Ride)	4%	890
Transit (Bus)	79%	17,790
Bike/Walk	16%	3,860
Total		22,610

Source: *HHCTC, Transportation Technical Report, Addendum 2* (PB, October 2009)

2. Project Related Volumes

The addition of the Honolulu Rail Transit system is not likely to significantly change the trip distribution of The Central Ala Moana project related volumes during the peak hours as those who are likely to use rail transit as their primary transportation in the AM and PM peaks in future conditions, will use bus transit, accessed through the Ala Moana transit center, in the interim. Therefore the project related volume distribution is still applicable for Future (2030) conditions.

3. Future Peak Hour Volumes

The *HHCTC, Transportation Technical Report, Addendum 2* (PB, October 2009) forecasts that during the AM two-hour peak period, 1,830 riders will board and 7,700 riders will depart the train at the Ala Moana Rail Station for 2030 conditions. The *HHCTC, Transportation Technical Report, Addendum 2* (PB, October 2009) provides the total peak hour vehicle trips generated at the Ala Moana Rail Station for 2030 conditions as a result of the rail system (see Table 23).

Table 23: Ala Moana Rail Station Peak Hour Vehicle Trip Generation

Mode	AM Peak		PM Peak	
	In	Out	In	Out
Bus Transit Vehicle Trips	74	74	74	74
Spillover Parking	87	0	0	87
Kiss-and-Ride	354	354	354	354
Total	515	428	428	515

Source: *HHCTC, Transportation Technical Report, Addendum 2* (PB, October 2009)

D. Level of Service

The *HHCTC, Transportation Technical Report, Addendum 2* (PB, October 2009) states that four intersections in the vicinity of the Ala Moana Rail Station are expected to experience large increases in bus activity, spillover parking, and kiss and ride activities. Three of these intersections are study intersections for The Central Ala Moana project. Resulting Future (2030) LOS conditions are shown in Table 24.

Table 24: Future (2030) With Project Intersection Level of Service

Intersection	Traffic Control	AM		PM	
		Delay	LOS	Delay	LOS
Kona Street at Keeaumoku Street	AWSC	317	F	487	F
Kona Street at Piikoi Street	Signalized	43	D	50	D
Kapiolani Boulevard at Keeaumoku Street	Signalized	25	C	142	F

Source: *HHCTC, Transportation Technical Report, Addendum 2* (PB, October 2009)

E. Mitigation

The *HHCTC, Transportation Technical Report* (PB, August 2009) estimates that for the Ala Moana Center Station area, traffic conditions would experience added delay and would require consideration of mitigation measures. The *HHCTC, Transportation Technical Report, Addendum 2* (PB, October 2009) states that the signalization of Kona Street at Keeaumoku Street will reduce delay but not alleviate the poor LOS at the intersection in the AM peak hour. Because of the proximity of this intersection to the signalized intersection at Kapiolani Boulevard, the signals will need to be coordinated to enhance traffic flows and prevent additional effects at other locations.

VI. SUMMARY

Existing (2017) conditions resulted in appropriate LOS conditions for all intersections. Existing pedestrian vehicle and pedestrian conflicts suggest the following mitigation could improve the situation:

- Kona Street and Keeaumoku Street – Additional signage, pavement marking, or other pedestrian notification solutions to dictate right of way as well as warn vehicles of crossing pedestrians.
- Kapiolani Boulevard and Keeaumoku Street – Leading pedestrian interval and extended vehicular interval to minimize conflicts between turning vehicles and crossing pedestrians.
- Kona Street and Kona Iki Street – Add marked crosswalk for the pedestrian crossing of the west leg of Kona Street.

Future (2024) Without Project conditions resulted in appropriate LOS conditions for all intersections, with the through-right movement at Keeaumoku Street and Kona Street having LOS E. The above mitigation measures would improve pedestrian safety, but not necessarily LOS. Plans for increased bicycle facilities in the project area will improve access with the intent to add additional facilities in subsequent phases. Additional mitigation for consideration includes:

- At signalized intersections, update pedestrian crossing times to reflect crossing speeds and pedestrian volumes to minimize conflicts between pedestrians and vehicles.

The Central Ala Moana development proposes primary vehicular access to the project site through a right-in/right-out driveway on Kapiolani Boulevard and secondary-access driveway off of Kona Street. Future (2024) With Project conditions maintained appropriate LOS conditions for all intersections. The eastbound and southbound approaches are over capacity for some movements at Kapiolani Boulevard and Keeaumoku Street. However, most movements will be under capacity. With limited ROW and capacity, suggested mitigation includes optimization of traffic signal timing, while maintaining progression along the primary corridors. The development is proposing the following mitigation to address projected impact:

- Include sidewalks eight-feet wide or greater adjacent to the project site along Kona Street, Kona Iki Street, and Kapiolani Boulevard with a tree-lined landscaped buffer along Kapiolani Boulevard.
- A pedestrian plaza is also planned along Kapiolani Boulevard, adjacent to commercial storefronts.

It is also recommended that bicycle access and storage be considered within the development.

Future (2030) With Project conditions consider the effect of the build-out and operation of the Honolulu Rail Transit and Ala Moana Rail Station. As a result of the increased activity around the project area from the rail system, the intersections of Kona Street at Keeaumoku Street, Kona Street at Piikoi Street, and Kapiolani Boulevard at Keeaumoku Street are expected to experience added delay. Suggested mitigation, as noted in the *HHCTC, Transportation Technical Report, Addendum 2* (PB, October 2009) includes:

- Kona Street at Keeaumoku Street – Signalization of the intersection will reduce the delay but not alleviate the poor LOS.

Samkoo Hawaii, LLC is planning to provide 310 affordable housing units with The Central Ala Moana and will be developing the project as a 201H project. The ground floor of the building is planned for commercial use and parking space. A conservative traffic analysis indicated the difference in LOS with and

without the project on the 6 study intersections is not significant. As multi-modal transportation options increase in the project area, residents of The Central Ala Moana will be able to bike, walk, take the bus or rail to and from their destinations.

VII. REFERENCES

AECOM, *Kakaako Mauka Area Plan Supplemental Environmental Impact Statement Transportation Analysis*, April 14, 2009.

American Association of State Highway and Transportation Officials, *A Policy on Geometric Design of Highways and Streets*, 2011.

City and County of Honolulu Department of Transportation Services Public Transit Division, personal communication, January 2013.

City and County of Honolulu Department of Transportation Services, *Traffic Standards Manual*, Rev. April 1979.

City and County of Honolulu TheBus, <http://thebus.org>, Accessed October 2012.

Design Partners Incorporated, *Samkoo House Condominium Site Plan,* May 1, 2012.

Federal Highway Administration, *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 Edition.

Helber Hastert & Fee, Planners, *Oahu Bike Plan, A Bicycle Master Plan*, August 2012.

Institute of Transportation Engineers, *Trip Generation, 8th Edition: An ITE Informational Report*, December 2008.

Institute of Transportation Engineers, *Trip Generation Handbook, 2nd Edition: An ITE Recommended Practice*, June 2004.

Kagawa, M. "Oahu's Risky Roads, Maps Reveal Hazardous Traffic Spots." *Honolulu Star Advertiser*, p.A1, January 26, 2013.

Keyser Marston Associates, *Ala Moana Neighborhood Transit-Development Plan, Existing Conditions Report, Supplement – Market Opportunities Study*, October 2012.

Parsons Brinkerhoff, *Ala Moana Center Station Ground Level*, March 9, 2012. From Grabauskas, Daniel A. Letter to Councilmember Kobayashi, April 19, 2012.

Parsons Brinkerhoff, *Honolulu High-capacity Transit Corridor Project, Addendum 01 to the Transportation Technical Report*, July 1, 2009.

Parsons Brinkerhoff, *Honolulu High-capacity Transit Corridor Project, Addendum 02 to the Transportation Technical Report*, October 1, 2009.

Parsons Brinkerhoff, *Honolulu High-capacity Transit Corridor Project, Addendum 03 to the Transportation Technical Report*, June 11, 2010.

Parsons Brinkerhoff, *Honolulu High-capacity Transit Corridor Project, Final Environmental Impact Statement*, June 2010.

Parsons Brinkerhoff, *Honolulu High-capacity Transit Corridor Project, Transportation Technical Report*, August 15, 2008.

RKTL Associates, Inc., *Ala Moana Neighborhood Transit-Development Plan, Existing Conditions Report*, August 2012.

RKTL Associates, Inc., *Ala Moana Neighborhood Transit-Development Plan, Public Review Draft*, July 2014.

SamKoo Hawaii, LLC, *The Central Ala Moana at 1391 Kapiolani Boulevard Project Profile*, October 30, 2017

State of Hawaii, Department of Transportation, *Historical Traffic Station Maps,* CD-ROM.

State of Hawaii, Office of Environmental Quality Control, *Map-Based Library of EA's and EIS's.*

State of Hawaii, Department of Transportation, *Hawaii Statewide Uniform Design Manual For Streets and Highways*, October 1980.

State of Hawaii, Department of Transportation, Statewide Transportation Improvements Program, <http://hawaii.gov/dot/highways/STIP>, Accessed November 2012.

Transportation Research Board, National Research Council, *Highway Capacity Manual,* Washington, D.C., 2010 Edition.

United States Census Bureau, *Census: Honolulu, Hawaii,* 2010.

APPENDIX A

48 hour Tube Count and Intersection Peak Period Traffic Counts

Prepared by NDS/ATD

VOLUME

Kapiolani Blvd Bet. Kona Iki St & Keeaumoku St

Day: Wednesday
Date: 11/1/2017

City: Honolulu
Project #: HI17_8103_001

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	21,920	19,440	41,360

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			95		130		225		12:00			319		242		561	
00:15			103		112		215		12:15			321		263		584	
00:30			95		92		187		12:30			301		259		560	
00:45			53	346	78	412	131	758	12:45			277	1218	255	1019	532	2237
01:00			69		97		166		13:00			331		258		589	
01:15			57		47		104		13:15			293		239		532	
01:30			67		63		130		13:30			302		263		565	
01:45			67	260	50	257	117	517	13:45			293	1219	328	1088	621	2307
02:00			62		38		100		14:00			285		279		564	
02:15			62		47		109		14:15			338		263		601	
02:30			66		52		118		14:30			290		274		564	
02:45			53	243	68	205	121	448	14:45			345	1258	304	1120	649	2378
03:00			61		62		123		15:00			345		244		589	
03:15			56		68		124		15:15			308		258		566	
03:30			53		56		109		15:30			324		280		604	
03:45			47	217	43	229	90	446	15:45			389	1366	249	1031	638	2397
04:00			42		40		82		16:00			395		245		640	
04:15			40		41		81		16:15			478		221		699	
04:30			43		39		82		16:30			476		212		688	
04:45			55	180	71	191	126	371	16:45			488	1837	257	935	745	2772
05:00			69		64		133		17:00			467		224		691	
05:15			34		46		80		17:15			576		245		821	
05:30			50		55		105		17:30			522		260		782	
05:45			41	194	44	209	85	403	17:45			612	2177	252	981	864	3158
06:00			65		59		124		18:00			593		231		824	
06:15			48		81		129		18:15			586		248		834	
06:30			57		87		144		18:30			442		210		652	
06:45			70	240	132	359	202	599	18:45			447	2068	236	925	683	2993
07:00			65		160		225		19:00			381		236		617	
07:15			86		211		297		19:15			381		224		605	
07:30			141		320		461		19:30			318		202		520	
07:45			172	464	431	1122	603	1586	19:45			294	1374	191	853	485	2227
08:00			182		448		630		20:00			260		240		500	
08:15			217		547		764		20:15			312		208		520	
08:30			220		522		742		20:30			293		175		468	
08:45			234	853	593	2110	827	2963	20:45			309	1174	188	811	497	1985
09:00			282		537		819		21:00			290		144		434	
09:15			223		506		729		21:15			217		176		393	
09:30			250		332		582		21:30			204		177		381	
09:45			221	976	338	1713	559	2689	21:45			191	902	161	658	352	1560
10:00			239		306		545		22:00			209		150		359	
10:15			247		251		498		22:15			194		151		345	
10:30			237		257		494		22:30			161		141		302	
10:45			296	1019	250	1064	546	2083	22:45			189	753	111	553	300	1306
11:00			283		290		573		23:00			140		123		263	
11:15			268		268		536		23:15			124		139		263	
11:30			287		296		583		23:30			110		117		227	
11:45			263	1101	274	1128	537	2229	23:45			107	481	88	467	195	948
TOTALS				6093		8999		15092	TOTALS				15827		10441		26268
SPLIT %				40.4%		59.6%		36.5%	SPLIT %				60.3%		39.7%		63.5%

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	21,920	19,440	41,360

AM Peak Hour			11:45	08:15	08:15	PM Peak Hour			17:30	13:45	17:30
AM Pk Volume			1204	2199	3152	PM Pk Volume			2313	1144	3304
Pk Hr Factor			0.938	0.927	0.953	Pk Hr Factor			0.945	0.872	0.956
7 - 9 Volume	0	0	1317	3232	4549	4 - 6 Volume	0	0	4014	1916	5930
7 - 9 Peak Hour			08:00	08:00	08:00	4 - 6 Peak Hour			17:00	16:45	17:00
7 - 9 Pk Volume	0	0	853	2110	2963	4 - 6 Pk Volume	0	0	2177	986	3158
Pk Hr Factor	0.000	0.000	0.911	0.890	0.896	Pk Hr Factor	0.000	0.000	0.889	0.948	0.914

Prepared by NDS/ATD

VOLUME

Kapiolani Blvd Bet. Kona Iki St & Keeaumoku St

Day: Thursday
Date: 11/2/2017

City: Honolulu
Project #: HI17_8103_001

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	21,526	19,702	41,228

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			84		113		197		12:00			306		260		566	
00:15			97		126		223		12:15			323		277		600	
00:30			68		93		161		12:30			348		252		600	
00:45			61	310	78	410	139	720	12:45			300	1277	272	1061	572	2338
01:00			85		62		147		13:00			306		260		566	
01:15			52		51		103		13:15			316		244		560	
01:30			44		50		94		13:30			359		284		643	
01:45			65	246	51	214	116	460	13:45			367	1348	275	1063	642	2411
02:00			39		45		84		14:00			312		272		584	
02:15			31		58		89		14:15			344		307		651	
02:30			35		57		92		14:30			346		265		611	
02:45			21	126	55	215	76	341	14:45			337	1339	285	1129	622	2468
03:00			32		48		80		15:00			326		287		613	
03:15			37		32		69		15:15			328		281		609	
03:30			19		33		52		15:30			361		252		613	
03:45			32	120	32	145	64	265	15:45			352	1367	223	1043	575	2410
04:00			21		28		49		16:00			399		217		616	
04:15			17		16		33		16:15			459		211		670	
04:30			30		19		49		16:30			467		241		708	
04:45			36	104	25	88	61	192	16:45			533	1858	216	885	749	2743
05:00			33		23		56		17:00			460		254		714	
05:15			28		30		58		17:15			578		267		845	
05:30			21		39		60		17:30			563		218		781	
05:45			34	116	44	136	78	252	17:45			598	2199	265	1004	863	3203
06:00			50		52		102		18:00			590		248		838	
06:15			44		70		114		18:15			573		263		836	
06:30			52		85		137		18:30			410		231		641	
06:45			65	211	124	331	189	542	18:45			422	1995	246	988	668	2983
07:00			86		149		235		19:00			432		222		654	
07:15			96		224		320		19:15			366		256		622	
07:30			124		374		498		19:30			340		239		579	
07:45			167	473	420	1167	587	1640	19:45			341	1479	235	952	576	2431
08:00			204		434		638		20:00			247		266		513	
08:15			206		553		759		20:15			241		226		467	
08:30			245		571		816		20:30			228		220		448	
08:45			224	879	603	2161	827	3040	20:45			224	940	203	915	427	1855
09:00			247		561		808		21:00			233		196		429	
09:15			234		481		715		21:15			216		152		368	
09:30			239		356		595		21:30			217		188		405	
09:45			226	946	352	1750	578	2696	21:45			187	853	153	689	340	1542
10:00			204		308		512		22:00			217		175		392	
10:15			217		233		450		22:15			191		152		343	
10:30			222		269		491		22:30			199		143		342	
10:45			240	883	259	1069	499	1952	22:45			207	814	174	644	381	1458
11:00			293		252		545		23:00			171		149		320	
11:15			241		277		518		23:15			158		141		299	
11:30			273		251		524		23:30			129		143		272	
11:45			283	1090	298	1078	581	2168	23:45			95	553	132	565	227	1118
TOTALS				5504		8764		14268	TOTALS				16022		10938		26960
SPLIT %				38.6%		61.4%		34.6%	SPLIT %				59.4%		40.6%		65.4%

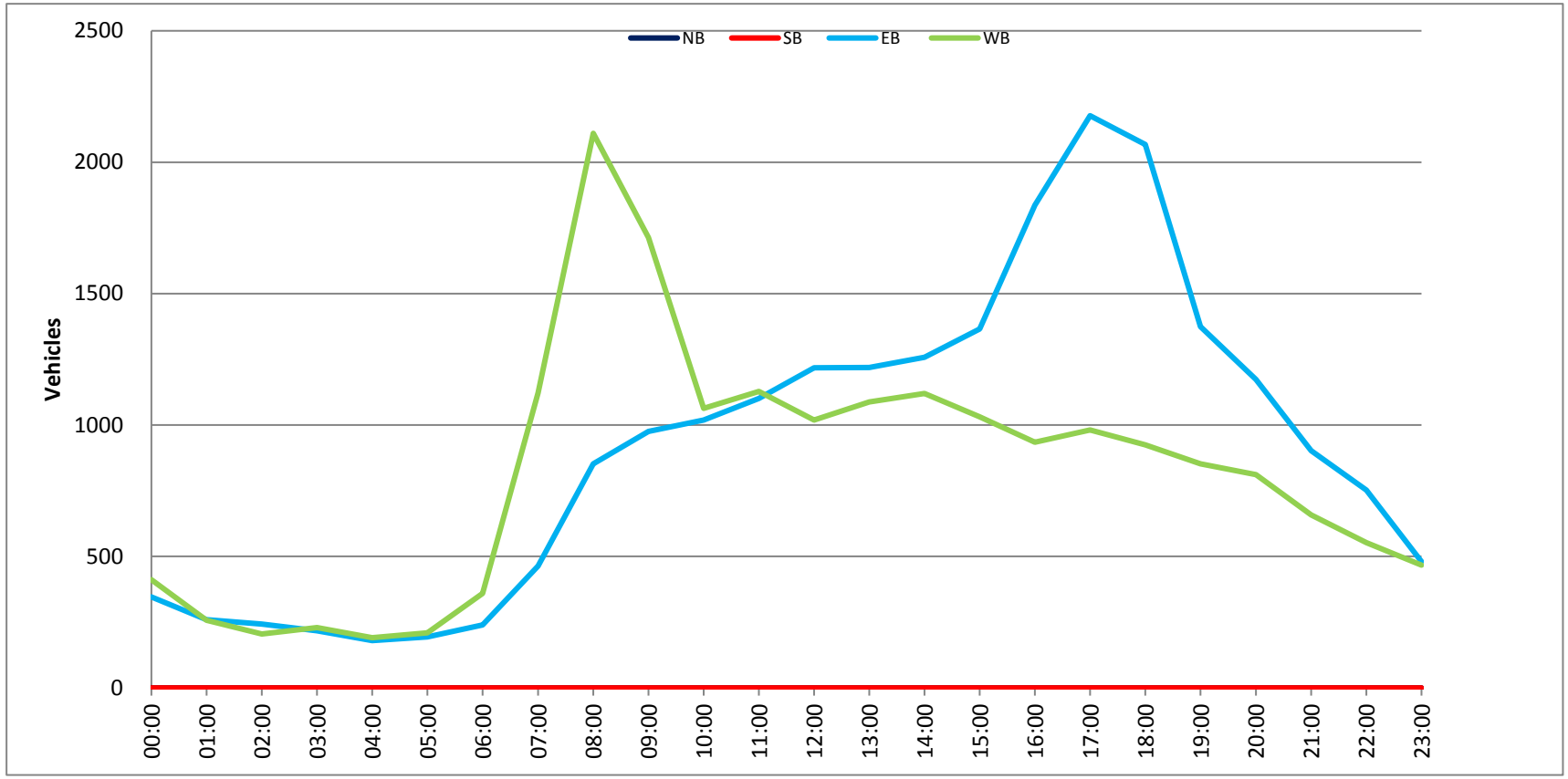
DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	21,526	19,702	41,228

AM Peak Hour			11:45	08:15	08:15	PM Peak Hour			17:15	14:15	17:15
AM Pk Volume			1260	2288	3210	PM Pk Volume			2329	1144	3327
Pk Hr Factor			0.905	0.949	0.970	Pk Hr Factor			0.974	0.932	0.964
7 - 9 Volume	0	0	1352	3328	4680	4 - 6 Volume	0	0	4057	1889	5946
7 - 9 Peak Hour			08:00	08:00	08:00	4 - 6 Peak Hour			17:00	17:00	17:00
7 - 9 Pk Volume	0	0	879	2161	3040	4 - 6 Pk Volume	0	0	2199	1004	3203
Pk Hr Factor	0.000	0.000	0.897	0.896	0.919	Pk Hr Factor	0.000	0.000	0.919	0.940	0.928

Prepared by NDS/ATD

Project #: HI17_8103_001 **City:** Honolulu

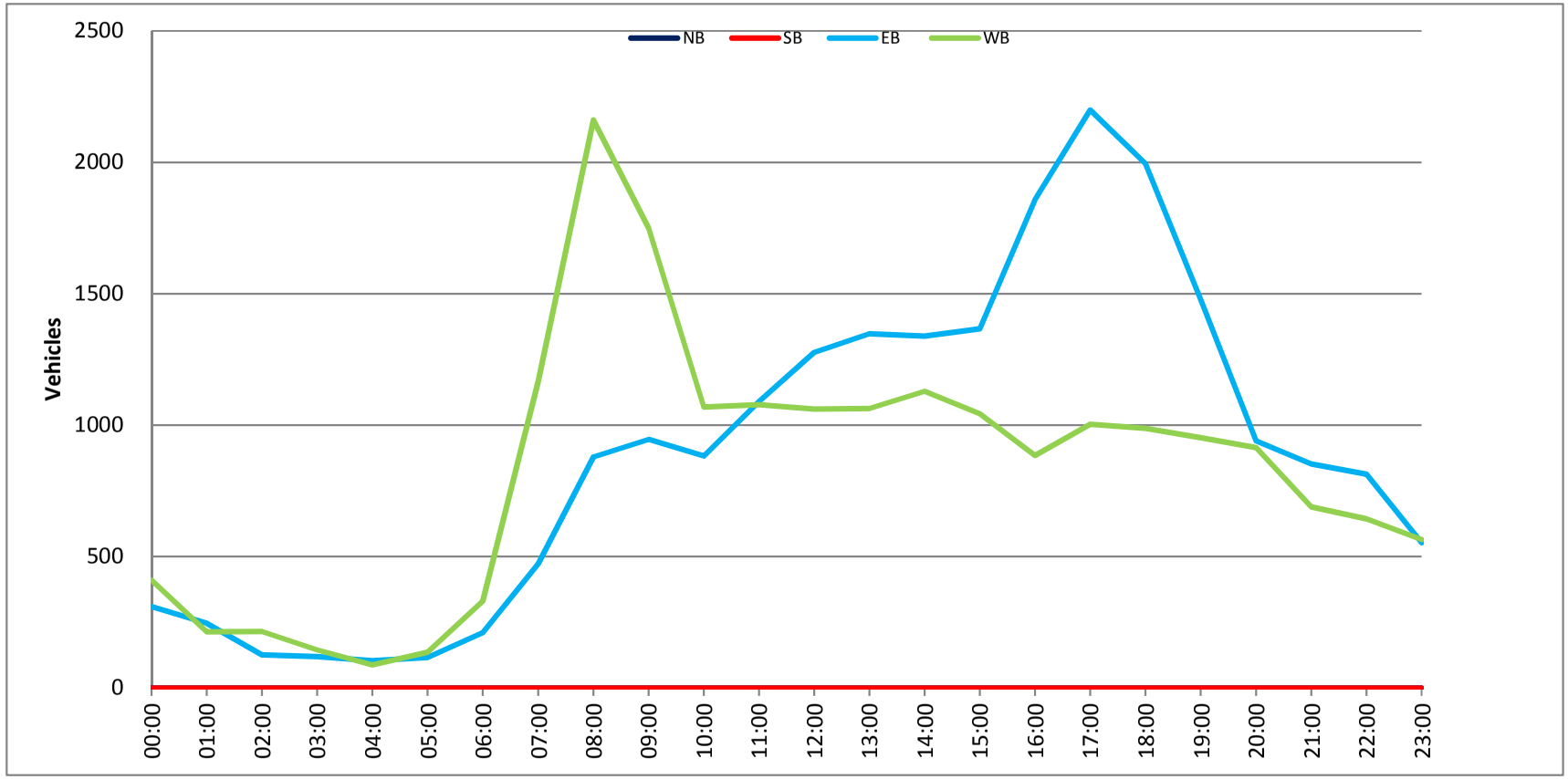
Location: Kapiolani Blvd Bet. Kona Iki St & Keeaumoku **Date:** 11/1/2017



Prepared by NDS/ATD

Project #: HI17_8103_001 **City:** Honolulu

Location: Kapiolani Blvd Bet. Kona Iki St & Keeaumoku **Date:** 11/2/2017



Prepared by National Data & Surveying Services

Piikoi St & Kapiolani Blvd

Peak Hour Turning Movement Count

ID: 17-8102-001
City: Honolulu

Day: Thursday
Date: 11/09/2017

PEAK HOURS	
AM	07:45 AM - 08:45 AM
NOON	01:30 PM - 02:30 PM
PM	04:45 PM - 05:45 PM

COUNT PERIODS	
AM	07:45 AM - 09:45 AM
NOON	01:00 PM - 03:00 PM
PM	04:45 PM - 06:45 PM

Piikoi St — SOUTHBOUND

AM	0	0	0	0	1106	AM
NOON	0	0	0	0	1470	NOON
PM	0	0	0	0	1414	PM

Kapiolani Blvd — EASTBOUND

AM	NOON	PM	
1468	909	795	⇦
0	0	0	↶ 0
1	11	6	↱ 0
775	1059	1955	→ 3
81	144	135	↳ 0

Kapiolani Blvd — WESTBOUND

	PM	NOON	AM
0 ↰	284	242	289
3 ←	706	768	1415
0 ↰	20	48	34
0 ↶	0	0	0
⇨	2199	1232	846

Piikoi St — NORTHBOUND

PM	155	0	89	1124	244	PM
NOON	192	0	141	1217	173	NOON
AM	115	0	53	816	71	AM

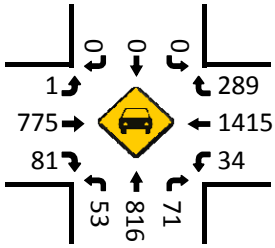
Turning movements (left, through, right): 0 0 0 0 — 0 1 3 1

CONTROL

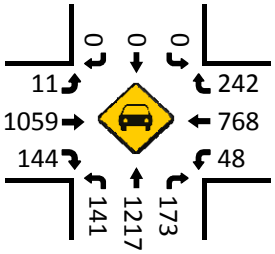
Signalized

	AM	NOON	PM
TEV	3535	3803	4563
PHF	0.91	0.97	0.98

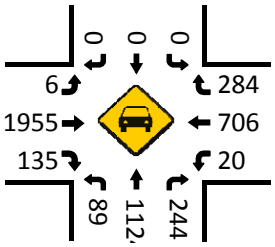
Total Vehicles (AM)



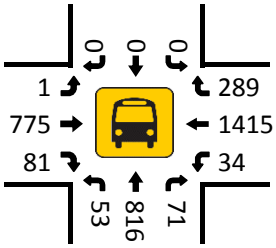
Total Vehicles (NOON)



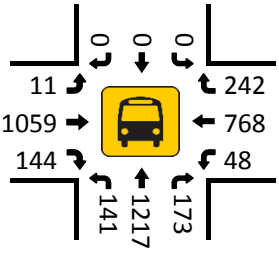
Total Vehicles (PM)



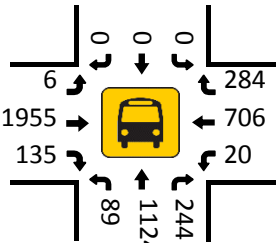
Total Vehicles (AM)



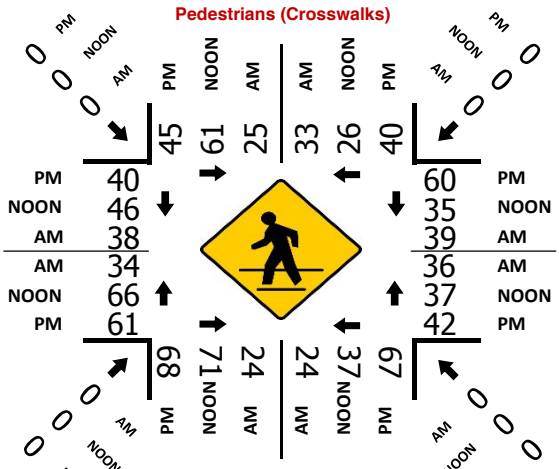
Total Vehicles (NOON)



Total Vehicles (PM)



Pedestrians (Crosswalks)



Prepared by National Data & Surveying Services

Kona Iki St & Kapiolani Blvd

Peak Hour Turning Movement Count

ID: 17-8102-002
City: Honolulu

Day: Thursday
Date: 11/09/2017

PEAK HOURS	
AM	07:45 AM - 08:45 AM
NOON	01:30 PM - 02:30 PM
PM	04:45 PM - 05:45 PM

COUNT PERIODS	
AM	07:45 AM - 09:45 AM
NOON	01:00 PM - 03:00 PM
PM	04:45 PM - 06:45 PM

SOUTHBOUND (Kona Iki St)

AM	0	0	0	0	0	AM
NOON	9	0	1	0	10	NOON
PM	2	0	0	0	4	PM

EASTBOUND (Kapiolani Blvd)

AM	NOON	PM	
1540	988	926	⇦
0	0	3	↶ 0
0	6	3	↱ 0
680	1090	1893	→ 3
105	103	120	↳ 0
AM	NOON	PM	

WESTBOUND (Kapiolani Blvd)

PM	NOON	AM	
1	4	0	↰ 0
751	834	1490	← 3
12	56	31	↲ 0
0	1	0	↺ 0
1997	1171	709	⇨
PM	NOON	AM	

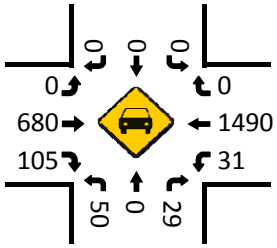
NORTHBOUND (Kona Iki St)

PM	132	0	170	0	104	PM
NOON	159	0	145	0	79	NOON
AM	136	0	50	0	29	AM

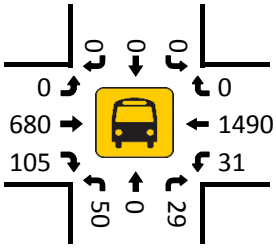
Turning movements (0 1 0 0 / 0 0 1 0)

CONTROL			
Signalized			
TEV	2385 AM	2328 NOON	3059 PM
PHF	0.87	0.96	0.95

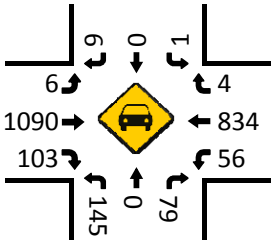
Total Vehicles (AM)



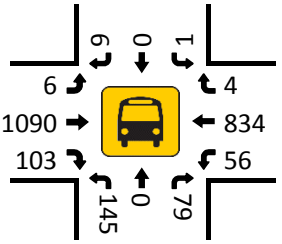
Total Vehicles (AM)



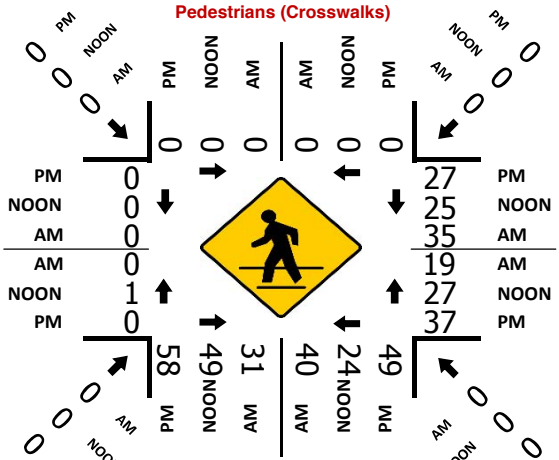
Total Vehicles (NOON)



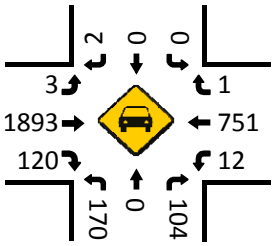
Total Vehicles (NOON)



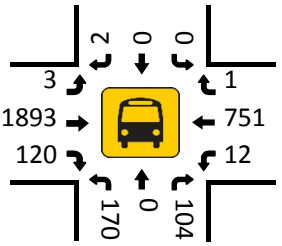
Pedestrians (Crosswalks)



Total Vehicles (PM)



Total Vehicles (PM)



Prepared by National Data & Surveying Services

Keeaumoku St & Kapiolani Blvd

Peak Hour Turning Movement Count

ID: 17-8102-003
City: Honolulu

Day: Thursday
Date: 11/09/2017

PEAK HOURS	
AM	07:45 AM - 08:45 AM
NOON	02:00 PM - 03:00 PM
PM	04:45 PM - 05:45 PM

COUNT PERIODS	
AM	07:45 AM - 09:45 AM
NOON	01:00 PM - 03:00 PM
PM	04:45 PM - 06:45 PM

Keeaumoku St — SOUTHBOUND

AM	80	484	149	0	341	AM
NOON	105	546	159	0	893	NOON
PM	92	707	196	0	991	PM
	0.5	2	0.5	0		

Kapiolani Blvd — EASTBOUND

AM	NOON	PM		
1505	812	733		
0	0	0	0	
28	144	188	0	
552	897	1671	2.5	
144	158	146	0.5	
AM	NOON	PM		

Kapiolani Blvd — WESTBOUND

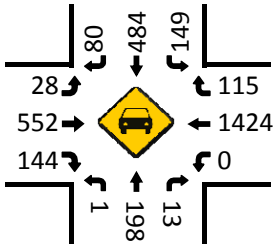
PM	NOON	AM	
173	150	115	0
640	705	1424	3
0	0	0	0
0	0	0	0
1982	1125	714	
PM	NOON	AM	

Keeaumoku St — NORTHBOUND

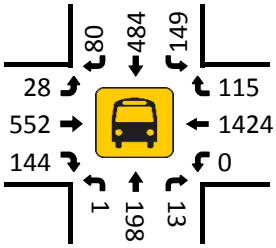
PM	853	0	1	630	115	PM
NOON	705	1	2	599	69	NOON
AM	628	0	1	198	13	AM
		0	0	2	0	

CONTROL			
Signalized			
TEV	3188	3535	4559
	AM	NOON	PM
PHF	0.92	0.94	0.92

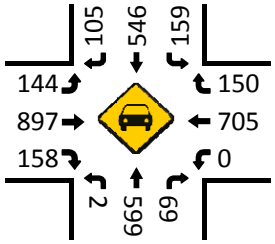
Total Vehicles (AM)



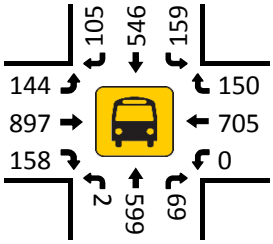
Total Vehicles (AM)



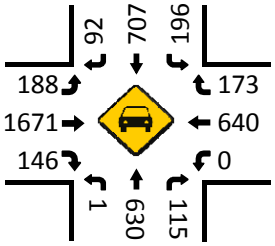
Total Vehicles (NOON)



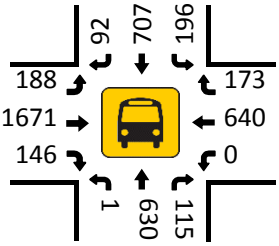
Total Vehicles (NOON)



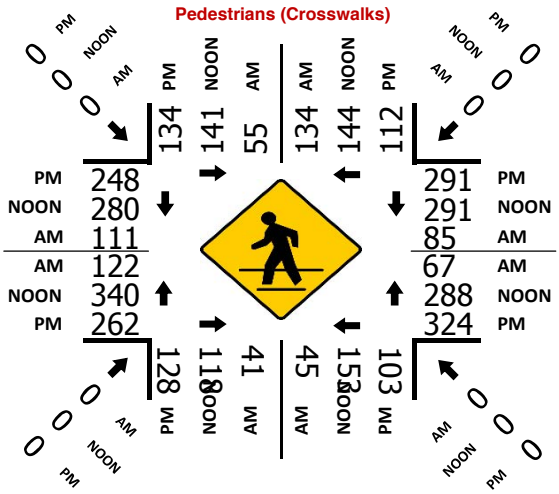
Total Vehicles (PM)



Total Vehicles (PM)



Pedestrians (Crosswalks)



Prepared by National Data & Surveying Services

Piikoi St & Kona St

Peak Hour Turning Movement Count

ID: 17-8102-004
City: Honolulu

Day: Thursday
Date: 11/09/2017

PEAK HOURS

AM	08:30 AM - 09:30 AM
NOON	01:15 PM - 02:15 PM
PM	04:45 PM - 05:45 PM

COUNT PERIODS

AM	07:45 AM - 09:45 AM
NOON	01:00 PM - 03:00 PM
PM	04:45 PM - 06:45 PM

SOUTHBOUND (Piikoi St)

AM	21	132	0	0	947	AM
NOON	10	157	0	0	1550	NOON
PM	19	155	0	0	1341	PM
	0.5	1.5	0	0		

EASTBOUND (Kona St)

AM	NOON	PM	
83	119	133	
0	0	0	0
3	21	1	0
45	43	69	0
4	11	12	0

WESTBOUND (Kona St)

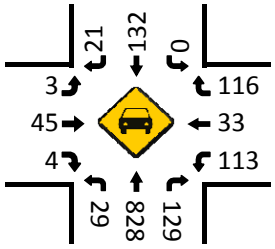
	PM	NOON	AM
1	231	199	116
0.5	84	58	33
1.5	224	160	113
0	0	0	0
	233	177	174

NORTHBOUND (Piikoi St)

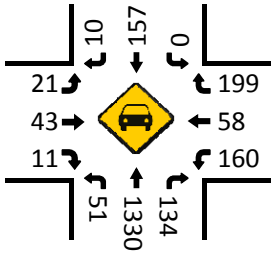
PM	392	1	30	1109	164	PM
NOON	328	0	51	1330	134	NOON
AM	249	0	29	828	129	AM
		0	0.5	3	0.5	

CONTROL			
Signalized			
TEV	1453 AM	2174 NOON	2099 PM
PHF	0.95	0.97	0.96

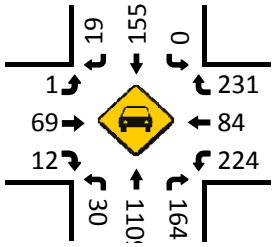
Total Vehicles (AM)



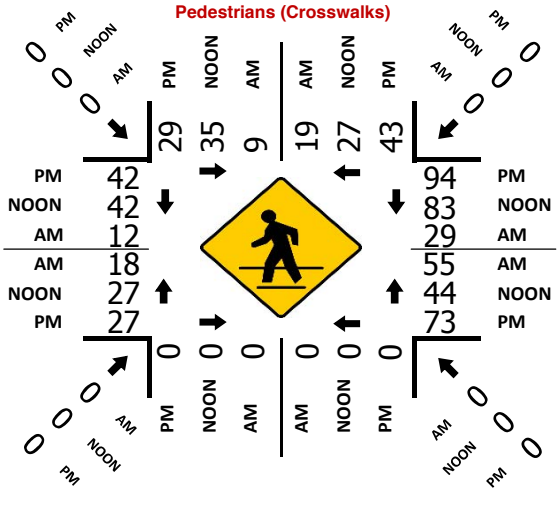
Total Vehicles (NOON)



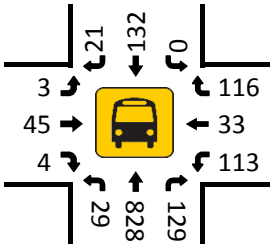
Total Vehicles (PM)



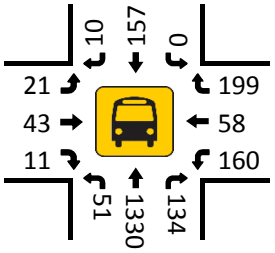
Pedestrians (Crosswalks)



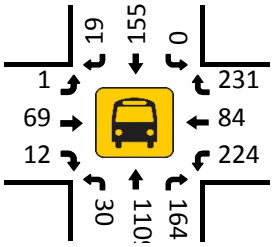
Total Vehicles (AM)



Total Vehicles (NOON)



Total Vehicles (PM)



Prepared by National Data & Surveying Services

Kona Iki St & Kona St

Peak Hour Turning Movement Count

ID: 17-8102-005
City: Honolulu

Day: Thursday
Date: 11/09/2017

PEAK HOURS	COUNT PERIODS
08:45 AM - 09:45 AM	07:45 AM - 09:45 AM
01:30 PM - 02:30 PM	01:00 PM - 03:00 PM
05:00 PM - 06:00 PM	04:45 PM - 06:45 PM

SOUTHBOUND (Kona Iki St)

AM	33	110	26	0	102	AM
NOON	31	77	39	0	196	NOON
PM	25	87	44	0	291	PM
	0	1	0	0		

EASTBOUND (Kona St)

AM	NOON	PM		
282	366	365		
0	0	0	0	
23	28	42	0	
111	134	142	2	
22	23	25	0	
AM	NOON	PM		

WESTBOUND (Kona St)

			PM	NOON	AM
0.5			115	73	41
1			279	260	218
0.5			81	51	45
0			1	0	0
			222	199	147

NORTHBOUND (Kona Iki St)

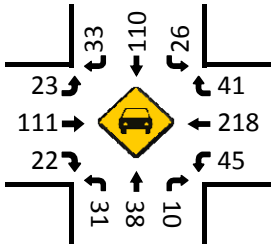
PM	194	1	61	134	35	PM
NOON	151	0	75	95	26	NOON
AM	177	0	31	38	10	AM
		0	0	2	0	

CONTROL

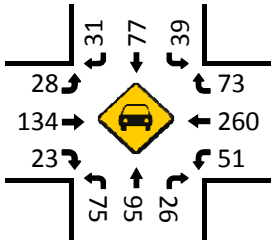
4-Way Stop

	AM	NOON	PM
TEV	708	912	1072
PHF	0.98	0.97	0.93

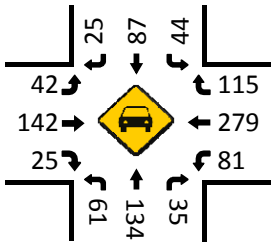
Total Vehicles (AM)



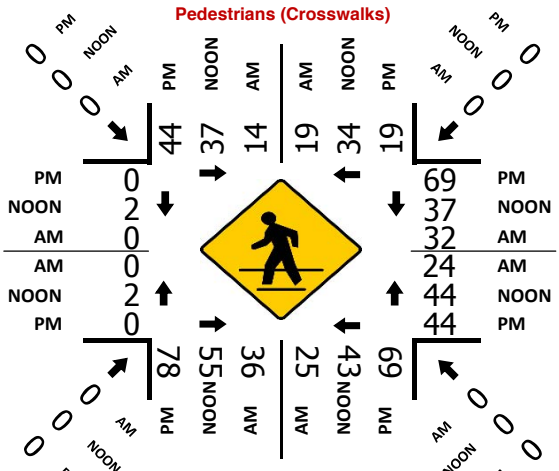
Total Vehicles (NOON)



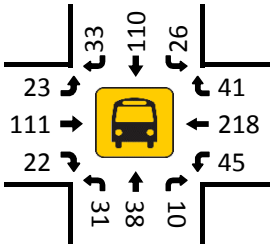
Total Vehicles (PM)



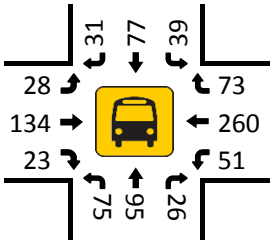
Pedestrians (Crosswalks)



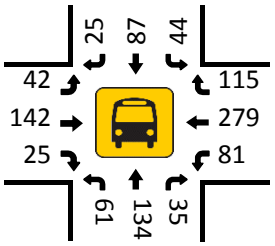
Total Vehicles (AM)



Total Vehicles (NOON)



Total Vehicles (PM)



Prepared by National Data & Surveying Services

Keeaumoku St & Kona St

Peak Hour Turning Movement Count

ID: 17-8102-006
City: Honolulu

Day: Thursday
Date: 11/09/2017

PEAK HOURS	COUNT PERIODS
08:15 AM - 09:15 AM	07:45 AM - 09:45 AM
02:00 PM - 03:00 PM	01:00 PM - 03:00 PM
04:45 PM - 05:45 PM	04:45 PM - 06:45 PM

SOUTHBOUND (Keeaumoku St)

	U-Turn	Left	Thru	Right		
AM	105	137	110	2	110	AM
NOON	113	127	93	0	236	NOON
PM	136	155	97	1	350	PM
	1	1.5	0.5	0		

EASTBOUND (Kona St)

AM	NOON	PM		
323	390	460		
1	0	0	U-Turn	0
6	10	23	Left	0
173	186	260	Thru	2
18	21	18	Right	0

WESTBOUND (Kona St)

		PM	NOON	AM
0.5	Right	164	77	44
1.5	Thru	323	271	212
0	Left	4	4	6
0	U-Turn	0	1	3
		384	308	302

NORTHBOUND (Keeaumoku St)

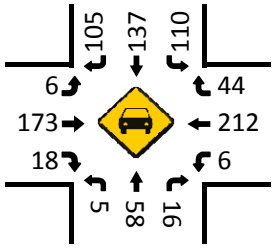
	U-Turn	Left	Thru	Right	
PM	177	0	1	162	27	PM
NOON	152	0	6	149	28	NOON
AM	161	0	5	58	16	AM
	0	0	1.5	0.5		

CONTROL

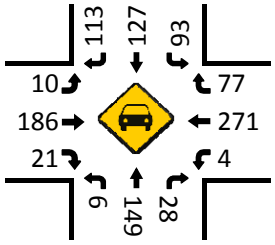
3-Way Stop (SB/EB/WB)

	AM	NOON	PM
TEV	896	1086	1371
PHF	0.92	0.92	0.94

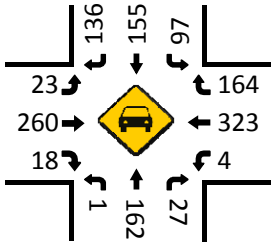
Total Vehicles (AM)



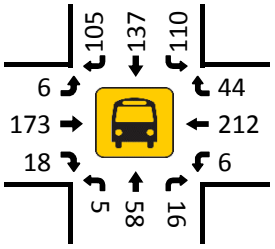
Total Vehicles (NOON)



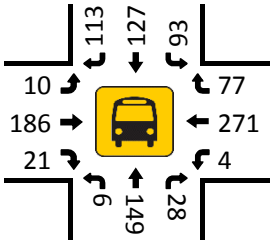
Total Vehicles (PM)



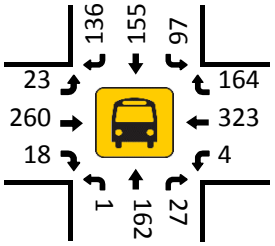
Total Vehicles (AM)



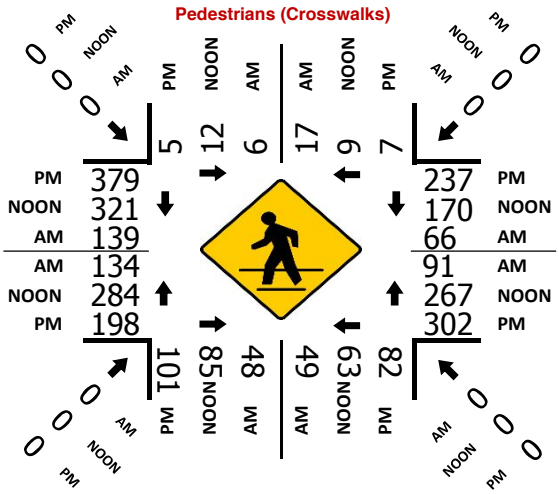
Total Vehicles (NOON)



Total Vehicles (PM)



Pedestrians (Crosswalks)



APPENDIX B
Travel Time Study

Time: 6:30 - 8:30 AM **Recorder: RG**

Kapiolani Blvd -Ewa Bound	Distance (miles)	Run 1 (s)	Speed (mph)	Run 2 (s)	Speed (mph)	Run 3 (s)	Speed (mph)	Run 4 (s)	Speed (mph)	Run 5 (s)	Speed (mph)	Run 6 (s)	Speed (mph)	Average Speed (mph)
lahukona/Kaheka Stre	0													
Keeaumoku Street	0.19	29	24	26	26	27	25	26	26	25	27	27	25	**26**
Piikoi Street	0.27	32	30	48	20	49	20	34	29	55	18	63	15	**22**
Pensacola Street	0.11	14	28	14	28	13	30	28	14	16	25	12	33	**26**
Total	**0.57**	**75**	27	**88**	23	**89**	23	**88**	23	**96**	21	**102**	20	**23**

Kapiolani Blvd - Diamond Head Bound	Distance (miles)	Run 1 (s)	Speed (mph)	Run 2 (s)	Speed (mph)	Run 3 (s)	Speed (mph)	Run 4 (s)	Speed (mph)	Run 5 (s)	Speed (mph)	Run 6 (s)	Speed (mph)	Average Speed (mph)
Pensacola Street	0													
Piikoi Street	0.11	19	21	20	20	19	21	14	28	15	26	17	23	**23**
Keeaumoku Street	0.27	39	25	35	28	37	26	69	14	37	26	38	26	**24**
Iaukona/Kaheka Stree	0.19	67	10	77	9	66	10	22	31	59	12	67	10	**14**
Total	**0.57**	**125**	16	**132**	16	**122**	17	**105**	20	**111**	18	**122**	17	**17**

Time: 4:00 - 6:00 PM **Recorder: RG**

Kapiolani Blvd -Ewa Bound	Distance (miles)	Run 1 (s)	Speed (mph)	Run 2 (s)	Speed (mph)	Run 3 (s)	Speed (mph)	Run 4 (s)	Speed (mph)	Run 5 (s)	Speed (mph)	Run 6 (s)	Speed (mph)	Average Speed (mph)
Kaheka Street	0													
Keeaumoku Street	0.19	121	6	97	7	30	23	95	7	65	11	77	9	**11**
Piikoi Street	0.27	64	15	76	13	103	9	64	15	73	13	75	13	**13**
Pensacola Street	0.11	17	23	14	28	61	6	14	28	14	28	16	25	**23**
Total	**0.57**	**202**	10	**187**	11	**194**	11	**173**	12	**152**	14	**168**	12	**12**

Kapiolani Blvd -Diamond Head Bound	Distance (miles)	Run 1 (s)	Speed (mph)	Run 2 (s)	Speed (mph)	Run 3 (s)	Speed (mph)	Run 4 (s)	Speed (mph)	Run 5 (s)	Speed (mph)	Run 6 (s)	Speed (mph)	Average Speed (mph)
Pensacola Street	0													
Piikoi Street	0.11	17	23	35	11	26	15	27	15	32	12	30	13	**15**
Keeaumoku Street	0.27	52	19	50	19	44	22	40	24	47	21	185	5	**18**
Kaheka Street	0.19	98	7	85	8	126	5	96	7	21	33	79	9	**12**
Total	**0.57**	**167**	12	**170**	12	**196**	10	**163**	13	**100**	21	**294**	7	**13**

APPENDIX C

Analysis Reports

Existing (2017) Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	775	81	34	1415	289	53	816	71	0	0	0
Future Volume (veh/h)	0	775	81	34	1415	289	53	816	71	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		0.95	1.00		0.92			
Parking Bus, Adj	1.00	1.00	0.94	1.00	1.00	0.97	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1758	1758	1772	1772	1772	1758	1758	1758			
Adj Flow Rate, veh/h	0	852	89	40	1685	344	60	917	80			
Peak Hour Factor	0.91	0.91	0.91	0.84	0.84	0.84	0.89	0.89	0.89			
Percent Heavy Veh, %	0	3	3	2	2	2	3	3	3			
Cap, veh/h	0	1737	181	75	2783	564	544	1560	444			
Arrive On Green	0.00	0.59	0.59	0.59	0.59	0.59	0.32	0.32	0.32			
Sat Flow, veh/h	0	3024	307	73	4704	953	1674	4799	1365			
Grp Volume(v), veh/h	0	485	456	584	1001	484	60	917	80			
Grp Sat Flow(s),veh/h/ln	0	1670	1572	1615	1387	1341	1674	1600	1365			
Q Serve(g_s), s	0.0	20.0	20.0	2.6	27.7	27.7	3.0	19.1	5.0			
Cycle Q Clear(g_c), s	0.0	20.0	20.0	24.6	27.7	27.7	3.0	19.1	5.0			
Prop In Lane	0.00		0.20	0.07		0.71	1.00		1.00			
Lane Grp Cap(c), veh/h	0	988	930	987	1641	794	544	1560	444			
V/C Ratio(X)	0.00	0.49	0.49	0.59	0.61	0.61	0.11	0.59	0.18			
Avail Cap(c_a), veh/h	0	988	930	987	1641	794	544	1560	444			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	0.0	14.1	14.1	14.9	15.7	15.7	28.4	33.8	29.0			
Incr Delay (d2), s/veh	0.0	1.7	1.8	2.6	1.7	3.5	0.4	1.6	0.9			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	7.6	7.2	9.8	8.6	8.7	1.3	7.7	1.8			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	15.8	15.9	17.5	17.3	19.1	28.8	35.4	29.9			
LnGrp LOS	A	B	B	B	B	B	C	D	C			
Approach Vol, veh/h		941			2069			1057				
Approach Delay, s/veh		15.9			17.8			34.6				
Approach LOS		B			B			C				

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		76.0		44.0		76.0
Change Period (Y+Rc), s		5.0		5.0		5.0
Max Green Setting (Gmax), s		71.0		39.0		71.0
Max Q Clear Time (g_c+I1), s		29.7		21.1		22.0
Green Ext Time (p_c), s		34.6		4.8		7.2

Intersection Summary	
HCM 6th Ctrl Delay	21.7
HCM 6th LOS	C

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	70.4	68.8	86.4	60.7
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	6	6	7	5
Number of Right-Turn Islands	0	0	0	0
Type of Control	Pretimed	Pretimed	Pretimed	Pretimed
Corresponding Signal Phase	4	4	6	2
Effective Walk Time (s)	11.0	11.0	11.0	11.0
Right Corner Size A (ft)	8.0	8.0	10.0	30.0
Right Corner Size B (ft)	12.0	8.0	10.0	20.0
Right Corner Curb Radius (ft)	30.0	30.0	30.0	30.0
Right Corner Total Area (sq.ft)	655.35	655.35	655.35	406.50
Ped. Left-Right Flow Rate (p/h)	5	52	28	43
Ped. Right-Left Flow Rate (p/h)	44	6	9	14
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	35	35	25	25
Right Corner Area per Ped (sq.ft)	6806.5	5102.5	6168.8	3440.3
Right Corner Quality of Service	A	A	A	A
Ped. Circulation Area (sq.ft)	270.0	226.7	370.5	226.5
Crosswalk Circulation Code	A	A	A	A
Pedestrian Delay (s/p)	49.5	49.5	49.5	49.5
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	2.98	3.04	2.75	2.52
Pedestrian Crosswalk LOS	C	C	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	941	2069	1057	0
Effct. Green for Bike (s)	71.0	71.0	39.0	0.0
Cross Street Width (ft)	86.4	60.7	68.8	70.4
Through Lanes Number	2	4	3	0
Through Lane Width (ft)	11.0	11.0	11.0	11.0
Bicycle Lane Width (ft)	0.0	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	Yes	Yes	Yes	Yes
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	1183	1183	650	0
Bicycle Delay (s/bike)	10.0	10.0	27.3	0.0
Bicycle Compliance	Fair	Fair	Fair	
Bicycle LOS Score	3.87	3.56	3.41	0.00
Bicycle LOS	D	D	C	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	680	105	31	1490	50	29
Future Volume (vph)	680	105	31	1490	50	29
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11
Total Lost time (s)	5.0			5.0	5.0	
Lane Util. Factor	0.95			0.86	1.00	
Frpb, ped/bikes	0.97			1.00	0.96	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.98			1.00	0.95	
Flt Protected	1.00			1.00	0.97	
Satd. Flow (prot)	3055			5816	1356	
Flt Permitted	1.00			0.88	0.97	
Satd. Flow (perm)	3055			5146	1356	
Peak-hour factor, PHF	0.83	0.83	0.80	0.80	0.73	0.73
Adj. Flow (vph)	819	127	39	1862	68	40
RTOR Reduction (vph)	10	0	0	0	17	0
Lane Group Flow (vph)	936	0	0	1902	91	0
Confl. Peds. (#/hr)		71	71			54
Confl. Bikes (#/hr)		8				
Heavy Vehicles (%)	3%	3%	2%	2%	13%	13%
Bus Blockages (#/hr)	0	15	0	7	0	0
Turn Type	NA		Perm	NA	Prot	
Protected Phases	6			2	4	
Permitted Phases			2			
Actuated Green, G (s)	81.0			81.0	29.0	
Effective Green, g (s)	81.0			81.0	29.0	
Actuated g/C Ratio	0.68			0.68	0.24	
Clearance Time (s)	5.0			5.0	5.0	
Lane Grp Cap (vph)	2062			3473	327	
v/s Ratio Prot	0.31				c0.07	
v/s Ratio Perm				c0.37		
v/c Ratio	0.45			0.55	0.28	
Uniform Delay, d1	9.1			10.1	37.0	
Progression Factor	1.35			3.19	1.00	
Incremental Delay, d2	0.6			0.5	2.1	
Delay (s)	13.0			32.6	39.1	
Level of Service	B			C	D	
Approach Delay (s)	13.0			32.6	39.1	
Approach LOS	B			C	D	

Intersection Summary			
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Approach	EB	WB	NB
Crosswalk Length (ft)	66.0	65.9	22.2
Crosswalk Width (ft)	12.0	12.0	12.0
Total Number of Lanes Crossed	6	6	2
Number of Right-Turn Islands	0	0	0
Type of Control	None	Pretimed	Pretimed
Corresponding Signal Phase	2	4	6
Effective Walk Time (s)	0.0	11.0	11.0
Right Corner Size A (ft)	9.0	20.0	7.0
Right Corner Size B (ft)	15.0	8.0	15.0
Right Corner Curb Radius (ft)	30.0	0.0	20.0
Right Corner Total Area (sq.ft)	655.35	160.00	19.00
Ped. Left-Right Flow Rate (p/h)	0	15	14
Ped. Right-Left Flow Rate (p/h)	0	36	42
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0
85th percentile speed (mph)	35	35	25
Right Corner Area per Ped (sq.ft)	10516.9	2779.8	126.8
Right Corner Quality of Service	A	A	A
Ped. Circulation Area (sq.ft)	0.0	257.4	174.7
Crosswalk Circulation Code	-	A	A
Pedestrian Delay (s/p)	60.0	49.5	49.5
Pedestrian Compliance Code	Poor	Poor	Poor
Pedestrian Crosswalk Score	3.02	2.99	1.84
Pedestrian Crosswalk LOS	C	C	B

Approach	EB	WB	NB
Bicycle Flow Rate (bike/h)	0	1	0
Total Flow Rate (veh/h)	946	1901	108
Effct. Green for Bike (s)	81.0	81.0	29.0
Cross Street Width (ft)	22.2	66.0	65.9
Through Lanes Number	2	4	1
Through Lane Width (ft)	11.0	11.0	11.0
Bicycle Lane Width (ft)	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0
Curb Is Present?	No	No	No
On Street Parking?	No	No	No
Bicycle Lane Capacity (bike/h)	1350	1350	483
Bicycle Delay (s/bike)	6.3	6.3	34.5
Bicycle Compliance	Good	Good	Poor
Bicycle LOS Score	2.89	3.57	2.96
Bicycle LOS	C	D	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	552	144	0	1424	115	0	198	13	149	484	80
Future Volume (vph)	0	552	144	0	1424	115	0	198	13	149	484	80
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)		6.0	6.0		6.0			6.0	6.0		6.0	
Lane Util. Factor		0.95	1.00		0.86			0.91	1.00		0.91	
Frpb, ped/bikes		1.00	0.89		0.98			1.00	0.80		0.97	
Flpb, ped/bikes		1.00	1.00		1.00			1.00	1.00		0.98	
Frt		1.00	0.85		0.99			1.00	0.85		0.98	
Flt Protected		1.00	1.00		1.00			1.00	1.00		0.99	
Satd. Flow (prot)		3101	1272		5692			4657	1154		4275	
Flt Permitted		1.00	1.00		1.00			1.00	1.00		0.80	
Satd. Flow (perm)		3101	1272		5692			4657	1154		3459	
Peak-hour factor, PHF	0.89	0.89	0.89	0.84	0.84	0.84	0.80	0.80	0.80	0.91	0.91	0.91
Adj. Flow (vph)	0	620	162	0	1695	137	0	248	16	164	532	88
RTOR Reduction (vph)	0	0	41	0	11	0	0	0	11	0	2	0
Lane Group Flow (vph)	0	620	121	0	1822	0	0	248	5	0	782	0
Confl. Peds. (#/hr)	189		86	86		189	233		152	152		233
Confl. Bikes (#/hr)			12			19			1			5
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	17	0	0	0	11	0	0	0	0	0	0
Turn Type		NA	Perm		NA			NA	Perm	pm+pt	NA	
Protected Phases		6			2			8		7	4	
Permitted Phases			6						8	4		
Actuated Green, G (s)		60.0	60.0		60.0			40.0	40.0		50.0	
Effective Green, g (s)		60.0	60.0		60.0			40.0	40.0		50.0	
Actuated g/C Ratio		0.50	0.50		0.50			0.33	0.33		0.42	
Clearance Time (s)		6.0	6.0		6.0			6.0	6.0		6.0	
Lane Grp Cap (vph)		1550	636		2846			1552	384		1468	
v/s Ratio Prot		0.20			c0.32			0.05			c0.02	
v/s Ratio Perm			0.10						0.00		c0.20	
v/c Ratio		0.40	0.19		0.64			0.16	0.01		0.53	
Uniform Delay, d1		18.8	16.6		22.1			28.2	26.8		26.2	
Progression Factor		2.32	3.63		1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.7	0.6		1.1			0.2	0.1		1.4	
Delay (s)		44.2	60.7		23.2			28.4	26.9		27.6	
Level of Service		D	E		C			C	C		C	
Approach Delay (s)		47.6			23.2			28.3			27.6	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	87.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	66.4	68.4	82.3	69.1
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	6	6	6	6
Number of Right-Turn Islands	1	1	2	0
Type of Control	Pretimed	Pretimed	Pretimed	Pretimed
Corresponding Signal Phase	4	8	6	2
Effective Walk Time (s)	11.0	11.0	11.0	11.0
Right Corner Size A (ft)	10.0	10.0	15.0	15.0
Right Corner Size B (ft)	10.0	10.0	15.0	15.0
Right Corner Curb Radius (ft)	40.0	30.0	40.0	30.0
Right Corner Total Area (sq.ft)	655.35	655.35	655.35	31.50
Ped. Left-Right Flow Rate (p/h)	209	55	20	131
Ped. Right-Left Flow Rate (p/h)	70	165	61	44
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	35	35	30	30
Right Corner Area per Ped (sq.ft)	1622.9	1446.8	1935.7	28.0
Right Corner Quality of Service	A	A	A	C
Ped. Circulation Area (sq.ft)	44.9	58.0	166.8	73.7
Crosswalk Circulation Code	B	B	A	A
Pedestrian Delay (s/p)	49.5	49.5	49.5	49.5
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	2.86	2.86	2.80	2.66
Pedestrian Crosswalk LOS	C	C	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	782	1832	264	784
Effct. Green for Bike (s)	60.0	60.0	40.0	48.0
Cross Street Width (ft)	82.3	69.1	68.4	66.4
Through Lanes Number	2	4	3	3
Through Lane Width (ft)	11.0	11.0	11.0	11.0
Bicycle Lane Width (ft)	0.0	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	No	No	No	No
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	1000	1000	667	800
Bicycle Delay (s/bike)	15.0	15.0	26.7	21.6
Bicycle Compliance	Fair	Fair	Fair	Fair
Bicycle LOS Score	3.68	3.59	2.97	3.22
Bicycle LOS	D	D	C	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	45	4	113	33	116	29	828	129	0	132	21
Future Volume (vph)	0	45	4	113	33	116	29	828	129	0	132	21
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)		5.0		5.0	5.0	5.0		5.0			5.0	
Lane Util. Factor		1.00		0.95	0.95	1.00		0.86			0.95	
Frpb, ped/bikes		1.00		1.00	1.00	0.96		0.99			0.99	
Flpb, ped/bikes		1.00		1.00	1.00	1.00		1.00			1.00	
Frt		0.99		1.00	1.00	0.85		0.98			0.98	
Flt Protected		1.00		0.95	0.97	1.00		1.00			1.00	
Satd. Flow (prot)		1684		1496	1531	1345		5386			3039	
Flt Permitted		1.00		0.72	0.84	1.00		0.92			1.00	
Satd. Flow (perm)		1684		1133	1317	1345		4955			3039	
Peak-hour factor, PHF	0.87	0.87	0.87	0.84	0.84	0.84	0.94	0.94	0.94	0.95	0.95	0.95
Adj. Flow (vph)	0	52	5	135	39	138	31	881	137	0	139	22
RTOR Reduction (vph)	0	3	0	0	0	39	0	23	0	0	11	0
Lane Group Flow (vph)	0	54	0	85	89	100	0	1027	0	0	151	0
Confl. Peds. (#/hr)	28					28	30		84	84		30
Confl. Bikes (#/hr)			1			4			10			11
Heavy Vehicles (%)	2%	2%	2%	5%	5%	5%	7%	7%	7%	5%	5%	5%
Turn Type		NA		Perm	NA	Perm	Perm	NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)		50.0		50.0	50.0	50.0		60.0			60.0	
Effective Green, g (s)		50.0		50.0	50.0	50.0		60.0			60.0	
Actuated g/C Ratio		0.42		0.42	0.42	0.42		0.50			0.50	
Clearance Time (s)		5.0		5.0	5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)		701		472	548	560		2477			1519	
v/s Ratio Prot		0.03									0.05	
v/s Ratio Perm				c0.08	0.07	0.07		c0.21				
v/c Ratio		0.08		0.18	0.16	0.18		0.41			0.10	
Uniform Delay, d1		21.1		22.1	21.9	22.0		18.9			15.8	
Progression Factor		1.00		1.00	1.00	1.00		1.00			1.88	
Incremental Delay, d2		0.2		0.8	0.6	0.7		0.5			0.1	
Delay (s)		21.3		22.9	22.5	22.7		19.4			29.8	
Level of Service		C		C	C	C		B			C	
Approach Delay (s)		21.3			22.7			19.4			29.8	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	21.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	23.0	61.6	82.8	87.5
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	2	5	6	6
Number of Right-Turn Islands	0	0	0	0
Type of Control	None	None	None	None
Corresponding Signal Phase	6	2	4	8
Effective Walk Time (s)	0.0	0.0	0.0	0.0
Right Corner Size A (ft)	8.0	8.0	8.0	8.0
Right Corner Size B (ft)	8.0	8.0	8.0	8.0
Right Corner Curb Radius (ft)	20.0	30.0	0.0	20.0
Right Corner Total Area (sq.ft)	655.35	655.35	64.00	655.35
Ped. Left-Right Flow Rate (p/h)	1	59	0	15
Ped. Right-Left Flow Rate (p/h)	10	7	0	12
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	15	15	25	25
Right Corner Area per Ped (sq.ft)	53551.4	6324.4	805.7	15495.8
Right Corner Quality of Service	A	A	A	A
Ped. Circulation Area (sq.ft)	0.0	0.0	0.0	0.0
Crosswalk Circulation Code	F	F	-	F
Pedestrian Delay (s/p)	60.0	60.0	60.0	60.0
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	1.77	2.37	2.65	2.63
Pedestrian Crosswalk LOS	B	B	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	57	312	1049	161
Effct. Green for Bike (s)	50.0	50.0	60.0	60.0
Cross Street Width (ft)	82.8	87.5	61.6	23.0
Through Lanes Number	1	1	4	2
Through Lane Width (ft)	11.0	11.0	11.0	11.0
Bicycle Lane Width (ft)	0.0	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	No	No	No	No
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	833	833	1000	1000
Bicycle Delay (s/bike)	20.4	20.4	15.0	15.0
Bicycle Compliance	Fair	Fair	Fair	Fair
Bicycle LOS Score	3.13	3.63	3.15	2.26
Bicycle LOS	C	D	C	B

Intersection	
Intersection Delay, s/veh	10.5
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	23	111	22	45	218	41	31	38	10	26	110	33
Future Vol, veh/h	23	111	22	45	218	41	31	38	10	26	110	33
Peak Hour Factor	0.95	0.95	0.95	0.94	0.94	0.94	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	15	15	15	6	6	6	3	3	3	3	3	3
Mvmt Flow	24	117	23	48	232	44	36	44	12	30	128	38
Number of Lanes	0	2	0	0	2	0	0	2	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	9.8	10.4	9.6	11.8
HCM LOS	A	B	A	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	62%	0%	29%	0%	29%	0%	15%
Vol Thru, %	38%	66%	71%	72%	71%	73%	65%
Vol Right, %	0%	34%	0%	28%	0%	27%	20%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	50	29	79	78	154	150	169
LT Vol	31	0	23	0	45	0	26
Through Vol	19	19	56	56	109	109	110
RT Vol	0	10	0	22	0	41	33
Lane Flow Rate	58	34	83	82	164	160	197
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.105	0.056	0.143	0.133	0.268	0.246	0.323
Departure Headway (Hd)	6.51	5.952	6.237	5.888	5.88	5.539	5.923
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	551	602	576	610	613	649	607
Service Time	4.241	3.683	3.965	3.615	3.602	3.261	3.948
HCM Lane V/C Ratio	0.105	0.056	0.144	0.134	0.268	0.247	0.325
HCM Control Delay	10	9	10	9.5	10.7	10.1	11.8
HCM Lane LOS	A	A	A	A	B	B	B
HCM 95th-tile Q	0.3	0.2	0.5	0.5	1.1	1	1.4

Intersection	
Intersection Delay, s/veh	10.5
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	23	111	22	45	218	41	31	38	10	26	110	33
Future Vol, veh/h	23	111	22	45	218	41	31	38	10	26	110	33
Peak Hour Factor	0.95	0.95	0.95	0.94	0.94	0.94	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	15	15	15	6	6	6	3	3	3	3	3	3
Mvmt Flow	24	117	23	48	232	44	36	44	12	30	128	38
Number of Lanes	0	2	0	0	2	0	0	2	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	9.8	10.4	9.6	11.8
HCM LOS	A	B	A	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	62%	0%	29%	0%	29%	0%	15%
Vol Thru, %	38%	66%	71%	72%	71%	73%	65%
Vol Right, %	0%	34%	0%	28%	0%	27%	20%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	50	29	79	78	154	150	169
LT Vol	31	0	23	0	45	0	26
Through Vol	19	19	56	56	109	109	110
RT Vol	0	10	0	22	0	41	33
Lane Flow Rate	58	34	83	82	164	160	197
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.105	0.056	0.143	0.133	0.268	0.246	0.323
Departure Headway (Hd)	6.51	5.952	6.237	5.888	5.88	5.539	5.923
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	551	602	576	610	613	649	607
Service Time	4.241	3.683	3.965	3.615	3.602	3.261	3.948
HCM Lane V/C Ratio	0.105	0.056	0.144	0.134	0.268	0.247	0.325
HCM Control Delay	10	9	10	9.5	10.7	10.1	11.8
HCM Lane LOS	A	A	A	A	B	B	B
HCM 95th-tile Q	0.3	0.2	0.5	0.5	1.1	1	1.4

Intersection	
Intersection Delay, s/veh	11.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	173	18	0	212	44	0	58	16	110	137	105
Future Vol, veh/h	6	173	18	0	212	44	0	58	16	110	137	105
Peak Hour Factor	0.88	0.88	0.88	0.92	0.92	0.92	0.86	0.86	0.86	0.89	0.89	0.89
Heavy Vehicles, %	15	15	15	6	6	6	3	3	3	5	5	5
Mvmt Flow	7	197	20	0	230	48	0	67	19	124	154	118
Number of Lanes	0	2	0	0	2	0	0	2	0	0	2	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	2	2
HCM Control Delay	11.7	11.8	10.6	11.6
HCM LOS	B	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	0%	0%	6%	0%	0%	0%	71%	0%	0%
Vol Thru, %	100%	55%	94%	83%	100%	62%	29%	100%	0%
Vol Right, %	0%	45%	0%	17%	0%	38%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	39	35	93	105	141	115	156	91	105
LT Vol	0	0	6	0	0	0	110	0	0
Through Vol	39	19	87	87	141	71	46	91	0
RT Vol	0	16	0	18	0	44	0	0	105
Lane Flow Rate	45	41	105	119	154	125	175	103	118
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.091	0.079	0.206	0.227	0.288	0.224	0.336	0.187	0.191
Departure Headway (Hd)	7.261	6.938	7.046	6.891	6.749	6.478	6.909	6.551	5.842
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	490	513	507	519	530	551	519	546	611
Service Time	5.053	4.729	4.822	4.667	4.522	4.251	4.676	4.318	3.609
HCM Lane V/C Ratio	0.092	0.08	0.207	0.229	0.291	0.227	0.337	0.189	0.193
HCM Control Delay	10.8	10.3	11.7	11.7	12.3	11.1	13.2	10.8	10
HCM Lane LOS	B	B	B	B	B	B	B	B	A
HCM 95th-tile Q	0.3	0.3	0.8	0.9	1.2	0.9	1.5	0.7	0.7

Intersection	
Intersection Delay, s/veh	11.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	173	18	0	212	44	0	58	16	110	137	105
Future Vol, veh/h	6	173	18	0	212	44	0	58	16	110	137	105
Peak Hour Factor	0.88	0.88	0.88	0.92	0.92	0.92	0.86	0.86	0.86	0.89	0.89	0.89
Heavy Vehicles, %	15	15	15	6	6	6	3	3	3	5	5	5
Mvmt Flow	7	197	20	0	230	48	0	67	19	124	154	118
Number of Lanes	0	2	0	0	2	0	0	2	0	0	2	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	2	2
HCM Control Delay	11.7	11.8	10.6	11.6
HCM LOS	B	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	0%	0%	6%	0%	0%	0%	71%	0%	0%
Vol Thru, %	100%	55%	94%	83%	100%	62%	29%	100%	0%
Vol Right, %	0%	45%	0%	17%	0%	38%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	39	35	93	105	141	115	156	91	105
LT Vol	0	0	6	0	0	0	110	0	0
Through Vol	39	19	87	87	141	71	46	91	0
RT Vol	0	16	0	18	0	44	0	0	105
Lane Flow Rate	45	41	105	119	154	125	175	103	118
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.091	0.079	0.206	0.227	0.288	0.224	0.336	0.187	0.191
Departure Headway (Hd)	7.261	6.938	7.046	6.891	6.749	6.478	6.909	6.551	5.842
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	490	513	507	519	530	551	519	546	611
Service Time	5.053	4.729	4.822	4.667	4.522	4.251	4.676	4.318	3.609
HCM Lane V/C Ratio	0.092	0.08	0.207	0.229	0.291	0.227	0.337	0.189	0.193
HCM Control Delay	10.8	10.3	11.7	11.7	12.3	11.1	13.2	10.8	10
HCM Lane LOS	B	B	B	B	B	B	B	B	A
HCM 95th-tile Q	0.3	0.3	0.8	0.9	1.2	0.9	1.5	0.7	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1955	135	0	706	284	89	1124	244	0	0	0
Future Volume (veh/h)	0	1955	135	0	706	284	89	1124	244	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		0.84	1.00		0.94	1.00		0.90			
Parking Bus, Adj	1.00	1.00	0.94	1.00	1.00	0.97	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1870	1870	0	1856	1856	1870	1870	1870			
Adj Flow Rate, veh/h	0	2102	145	0	751	302	91	1147	249			
Peak Hour Factor	0.93	0.93	0.93	0.94	0.94	0.94	0.98	0.98	0.98			
Percent Heavy Veh, %	0	2	2	0	3	3	2	2	2			
Cap, veh/h	0	3202	221	0	1263	507	683	1957	546			
Arrive On Green	0.00	0.53	0.53	0.00	1.00	1.00	0.77	0.77	0.77			
Sat Flow, veh/h	0	6267	413	0	2460	951	1781	5106	1425			
Grp Volume(v), veh/h	0	1688	559	0	559	494	91	1147	249			
Grp Sat Flow(s),veh/h/ln	0	1609	1593	0	1763	1556	1781	1702	1425			
Q Serve(g_s), s	0.0	30.1	30.2	0.0	0.0	0.0	1.6	11.4	7.5			
Cycle Q Clear(g_c), s	0.0	30.1	30.2	0.0	0.0	0.0	1.6	11.4	7.5			
Prop In Lane	0.00		0.26	0.00		0.61	1.00		1.00			
Lane Grp Cap(c), veh/h	0	2574	849	0	940	830	683	1957	546			
V/C Ratio(X)	0.00	0.66	0.66	0.00	0.59	0.60	0.13	0.59	0.46			
Avail Cap(c_a), veh/h	0	2574	849	0	940	830	683	1957	546			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00			
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	0.0	20.1	20.1	0.0	0.0	0.0	8.8	10.0	9.5			
Incr Delay (d2), s/veh	0.0	1.3	4.0	0.0	2.8	3.1	0.4	1.3	2.7			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	11.1	11.6	0.0	0.7	0.7	0.7	3.1	2.2			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	21.4	24.1	0.0	2.8	3.1	9.2	11.3	12.2			
LnGrp LOS	A	C	C	A	A	A	A	B	B			
Approach Vol, veh/h		2247			1053			1487				
Approach Delay, s/veh		22.1			2.9			11.3				
Approach LOS		C			A			B				

Timer - Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		69.0		51.0		69.0						
Change Period (Y+Rc), s		5.0		5.0		5.0						
Max Green Setting (Gmax), s		64.0		46.0		64.0						
Max Q Clear Time (g_c+I1), s		2.0		13.4		32.2						
Green Ext Time (p_c), s		20.6		8.0		21.5						

Intersection Summary												
HCM 6th Ctrl Delay			14.5									
HCM 6th LOS			B									

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	72.7	75.3	92.4	60.2
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	6	6	7	5
Number of Right-Turn Islands	0	0	0	0
Type of Control	Pretimed	Pretimed	Pretimed	Pretimed
Corresponding Signal Phase	4	4	6	2
Effective Walk Time (s)	11.0	11.0	11.0	11.0
Right Corner Size A (ft)	8.0	8.0	10.0	30.0
Right Corner Size B (ft)	12.0	8.0	10.0	20.0
Right Corner Curb Radius (ft)	30.0	30.0	30.0	30.0
Right Corner Total Area (sq.ft)	655.35	655.35	655.35	406.50
Ped. Left-Right Flow Rate (p/h)	8	67	62	29
Ped. Right-Left Flow Rate (p/h)	76	8	27	68
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	35	35	25	25
Right Corner Area per Ped (sq.ft)	3360.0	3415.8	3561.0	1995.3
Right Corner Quality of Service	A	A	A	A
Ped. Circulation Area (sq.ft)	156.9	177.2	154.3	131.9
Crosswalk Circulation Code	A	A	A	A
Pedestrian Delay (s/p)	49.5	49.5	49.5	49.5
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	3.05	3.11	2.80	2.55
Pedestrian Crosswalk LOS	C	C	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	2247	1053	1487	0
Effct. Green for Bike (s)	64.0	64.0	46.0	0.0
Cross Street Width (ft)	92.4	60.2	75.3	72.7
Through Lanes Number	4	2	3	0
Through Lane Width (ft)	12.0	12.0	12.0	12.0
Bicycle Lane Width (ft)	0.0	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	Yes	Yes	Yes	Yes
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	1067	1067	767	0
Bicycle Delay (s/bike)	13.1	13.1	22.8	0.0
Bicycle Compliance	Fair	Fair	Fair	
Bicycle LOS Score	3.90	3.35	3.53	0.00
Bicycle LOS	D	C	D	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1893	120	0	751	170	104
Future Volume (vph)	1893	120	0	751	170	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	
Lane Util. Factor	0.86			0.95	1.00	
Frpb, ped/bikes	0.98			1.00	0.96	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.99			1.00	0.95	
Flt Protected	1.00			1.00	0.97	
Satd. Flow (prot)	6232			3490	1622	
Flt Permitted	1.00			1.00	0.97	
Satd. Flow (perm)	6232			3490	1622	
Peak-hour factor, PHF	0.91	0.91	0.92	0.92	0.86	0.86
Adj. Flow (vph)	2080	132	0	816	198	121
RTOR Reduction (vph)	8	0	0	0	1	0
Lane Group Flow (vph)	2204	0	0	816	318	0
Confl. Peds. (#/hr)		107	107			64
Confl. Bikes (#/hr)		16				1
Heavy Vehicles (%)	2%	2%	2%	2%	4%	4%
Bus Blockages (#/hr)	0	15	0	7	0	0
Turn Type	NA			NA	Prot	
Protected Phases	6			2	4	
Permitted Phases						
Actuated Green, G (s)	63.0			63.0	47.0	
Effective Green, g (s)	63.0			63.0	47.0	
Actuated g/C Ratio	0.52			0.52	0.39	
Clearance Time (s)	5.0			5.0	5.0	
Lane Grp Cap (vph)	3271			1832	635	
v/s Ratio Prot	c0.35			0.23	c0.20	
v/s Ratio Perm						
v/c Ratio	0.67			0.45	0.50	
Uniform Delay, d1	20.9			17.7	27.6	
Progression Factor	0.32			0.39	1.00	
Incremental Delay, d2	0.9			0.7	2.8	
Delay (s)	7.6			7.5	30.4	
Level of Service	A			A	C	
Approach Delay (s)	7.6			7.5	30.4	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Approach	EB	WB	NB
Crosswalk Length (ft)	72.1	72.0	24.2
Crosswalk Width (ft)	12.0	12.0	12.0
Total Number of Lanes Crossed	6	6	2
Number of Right-Turn Islands	0	0	0
Type of Control	None	Pretimed	Pretimed
Corresponding Signal Phase	2	4	6
Effective Walk Time (s)	0.0	11.0	11.0
Right Corner Size A (ft)	9.0	20.0	7.0
Right Corner Size B (ft)	15.0	8.0	15.0
Right Corner Curb Radius (ft)	30.0	0.0	20.0
Right Corner Total Area (sq.ft)	655.35	160.00	19.00
Ped. Left-Right Flow Rate (p/h)	0	54	106
Ped. Right-Left Flow Rate (p/h)	0	23	45
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0
85th percentile speed (mph)	35	35	25
Right Corner Area per Ped (sq.ft)	3862.6	1851.6	48.1
Right Corner Quality of Service	A	A	B
Ped. Circulation Area (sq.ft)	0.0	172.2	64.4
Crosswalk Circulation Code	-	A	A
Pedestrian Delay (s/p)	60.0	49.5	49.5
Pedestrian Compliance Code	Poor	Poor	Poor
Pedestrian Crosswalk Score	3.09	3.04	1.91
Pedestrian Crosswalk LOS	C	C	B

Approach	EB	WB	NB
Bicycle Flow Rate (bike/h)	0	1	0
Total Flow Rate (veh/h)	2212	816	319
Effct. Green for Bike (s)	63.0	63.0	47.0
Cross Street Width (ft)	24.2	72.1	72.0
Through Lanes Number	4	2	1
Through Lane Width (ft)	12.0	12.0	12.0
Bicycle Lane Width (ft)	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0
Curb Is Present?	No	No	No
On Street Parking?	No	No	No
Bicycle Lane Capacity (bike/h)	1050	1050	783
Bicycle Delay (s/bike)	13.5	13.5	22.2
Bicycle Compliance	Fair	Fair	Fair
Bicycle LOS Score	2.84	3.34	3.19
Bicycle LOS	C	C	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	188	1671	146	0	640	173	1	630	115	196	707	92
Future Volume (vph)	188	1671	146	0	640	173	1	630	115	196	707	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0			6.0	6.0		6.0	
Lane Util. Factor		0.86	1.00		0.95			0.91	1.00		0.91	
Frpb, ped/bikes		1.00	0.72		0.93			1.00	0.60		0.97	
Flpb, ped/bikes		0.99	1.00		1.00			1.00	1.00		0.98	
Frt		1.00	0.85		0.97			1.00	0.85		0.99	
Flt Protected		0.99	1.00		1.00			1.00	1.00		0.99	
Satd. Flow (prot)		6251	1141		3200			5084	944		4709	
Flt Permitted		0.73	1.00		1.00			0.94	1.00		0.69	
Satd. Flow (perm)		4596	1141		3200			4773	944		3265	
Peak-hour factor, PHF	0.90	0.90	0.90	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	209	1857	162	0	696	188	1	685	125	213	768	100
RTOR Reduction (vph)	0	0	40	0	20	0	0	0	57	0	10	0
Lane Group Flow (vph)	0	2066	122	0	864	0	0	686	68	0	1071	0
Confl. Peds. (#/hr)	246		233	233		246	510		615	615		510
Confl. Bikes (#/hr)			10			5			6			7
Bus Blockages (#/hr)	0	13	0	0	0	11	0	0	0	0	0	0
Turn Type	Perm	NA	Perm		NA		Perm	NA	Perm	pm+pt	NA	
Protected Phases		6			2			8		7	4	
Permitted Phases	6		6				8		8	4		
Actuated Green, G (s)		61.0	61.0		61.0			36.0	36.0		47.0	
Effective Green, g (s)		61.0	61.0		61.0			36.0	36.0		47.0	
Actuated g/C Ratio		0.51	0.51		0.51			0.30	0.30		0.39	
Clearance Time (s)		6.0	6.0		6.0			6.0	6.0		6.0	
Lane Grp Cap (vph)		2336	580		1626			1431	283		1338	
v/s Ratio Prot					0.27						c0.03	
v/s Ratio Perm		c0.45	0.11					0.14	0.07		c0.28	
v/c Ratio		0.96dl	0.21		0.53			0.48	0.24		0.80	
Uniform Delay, d1		26.4	16.2		19.9			34.3	31.7		32.3	
Progression Factor		0.50	0.20		1.00			1.00	1.00		1.00	
Incremental Delay, d2		4.1	0.6		1.2			1.2	2.0		5.1	
Delay (s)		17.3	3.9		21.1			35.5	33.7		37.4	
Level of Service		B	A		C			D	C		D	
Approach Delay (s)		16.3			21.1			35.2			37.4	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	24.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	118.7%	ICU Level of Service	H
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	72.1	72.4	83.9	72.1
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	6	6	6	6
Number of Right-Turn Islands	1	1	2	0
Type of Control	Pretimed	Pretimed	Pretimed	Pretimed
Corresponding Signal Phase	4	8	6	2
Effective Walk Time (s)	11.0	11.0	11.0	11.0
Right Corner Size A (ft)	10.0	10.0	15.0	15.0
Right Corner Size B (ft)	10.0	10.0	15.0	15.0
Right Corner Curb Radius (ft)	40.0	30.0	40.0	30.0
Right Corner Total Area (sq.ft)	655.35	655.35	655.35	31.50
Ped. Left-Right Flow Rate (p/h)	337	345	192	77
Ped. Right-Left Flow Rate (p/h)	337	346	82	181
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	35	35	30	30
Right Corner Area per Ped (sq.ft)	587.6	593.9	583.8	-4.0
Right Corner Quality of Service	A	A	A	F
Ped. Circulation Area (sq.ft)	18.0	17.5	48.0	49.7
Crosswalk Circulation Code	D	D	B	B
Pedestrian Delay (s/p)	49.5	49.5	49.5	49.5
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	2.89	2.90	2.75	2.82
Pedestrian Crosswalk LOS	C	C	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	2228	884	811	1081
Effct. Green for Bike (s)	61.0	61.0	36.0	47.0
Cross Street Width (ft)	83.9	72.1	72.4	72.1
Through Lanes Number	4	2	3	3
Through Lane Width (ft)	12.0	12.0	12.0	12.0
Bicycle Lane Width (ft)	0.0	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	No	No	No	No
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	1017	1017	600	783
Bicycle Delay (s/bike)	14.5	14.5	29.4	22.2
Bicycle Compliance	Fair	Fair	Fair	Fair
Bicycle LOS Score	3.76	3.39	3.11	3.26
Bicycle LOS	D	C	C	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	69	12	224	84	231	30	1109	164	0	155	19
Future Volume (vph)	1	69	12	224	84	231	30	1109	164	0	155	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0	5.0		5.0			5.0	
Lane Util. Factor		1.00		0.95	0.95	1.00		0.86			0.95	
Frpb, ped/bikes		1.00		1.00	1.00	0.91		0.97			0.98	
Flpb, ped/bikes		1.00		1.00	1.00	1.00		1.00			1.00	
Frt		0.98		1.00	1.00	0.85		0.98			0.98	
Flt Protected		1.00		0.95	0.98	1.00		1.00			1.00	
Satd. Flow (prot)		1820		1665	1712	1423		5978			3403	
Flt Permitted		1.00		0.70	0.82	1.00		0.92			1.00	
Satd. Flow (perm)		1818		1224	1429	1423		5503			3403	
Peak-hour factor, PHF	0.76	0.76	0.76	0.92	0.92	0.92	0.95	0.95	0.95	0.85	0.85	0.85
Adj. Flow (vph)	1	91	16	243	91	251	32	1167	173	0	182	22
RTOR Reduction (vph)	0	5	0	0	0	10	0	22	0	0	8	0
Lane Group Flow (vph)	0	103	0	160	174	241	0	1350	0	0	196	0
Confl. Peds. (#/hr)	72					72	69		167	167		69
Confl. Bikes (#/hr)			5			3			17			9
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	4%	4%	4%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		53.0		53.0	53.0	53.0		57.0			57.0	
Effective Green, g (s)		53.0		53.0	53.0	53.0		57.0			57.0	
Actuated g/C Ratio		0.44		0.44	0.44	0.44		0.48			0.48	
Clearance Time (s)		5.0		5.0	5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)		802		540	631	628		2613			1616	
v/s Ratio Prot											0.06	
v/s Ratio Perm		0.06		0.13	0.12	c0.17		c0.25				
v/c Ratio		0.13		0.30	0.28	0.38		0.52			0.12	
Uniform Delay, d1		19.8		21.5	21.3	22.5		21.9			17.5	
Progression Factor		1.00		1.00	1.00	1.00		1.00			1.53	
Incremental Delay, d2		0.3		1.4	1.1	1.8		0.7			0.1	
Delay (s)		20.2		22.9	22.4	24.3		22.7			27.0	
Level of Service		C		C	C	C		C			C	
Approach Delay (s)		20.2			23.3			22.7			27.0	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	23.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	24.2	65.5	87.2	93.7
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	2	5	6	6
Number of Right-Turn Islands	0	0	0	0
Type of Control	None	None	None	None
Corresponding Signal Phase	6	2	4	8
Effective Walk Time (s)	0.0	0.0	0.0	0.0
Right Corner Size A (ft)	8.0	8.0	8.0	8.0
Right Corner Size B (ft)	8.0	8.0	8.0	8.0
Right Corner Curb Radius (ft)	20.0	30.0	0.0	20.0
Right Corner Total Area (sq.ft)	655.35	655.35	64.00	655.35
Ped. Left-Right Flow Rate (p/h)	1	59	0	15
Ped. Right-Left Flow Rate (p/h)	10	7	0	12
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	15	15	25	25
Right Corner Area per Ped (sq.ft)	53551.4	6324.4	805.7	15495.8
Right Corner Quality of Service	A	A	A	A
Ped. Circulation Area (sq.ft)	0.0	0.0	0.0	0.0
Crosswalk Circulation Code	F	F	-	F
Pedestrian Delay (s/p)	60.0	60.0	60.0	60.0
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	1.80	2.40	2.72	2.69
Pedestrian Crosswalk LOS	B	B	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	108	585	1372	204
Effct. Green for Bike (s)	53.0	53.0	57.0	57.0
Cross Street Width (ft)	87.2	93.7	65.5	24.2
Through Lanes Number	1	1	4	2
Through Lane Width (ft)	12.0	12.0	12.0	12.0
Bicycle Lane Width (ft)	0.0	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	No	No	No	No
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	883	883	950	950
Bicycle Delay (s/bike)	18.7	18.7	16.5	16.5
Bicycle Compliance	Fair	Fair	Fair	Fair
Bicycle LOS Score	3.07	3.96	3.13	2.10
Bicycle LOS	C	D	C	B

Intersection	
Intersection Delay, s/veh	13.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	42	142	25	81	279	115	61	134	35	44	87	25
Future Vol, veh/h	42	142	25	81	279	115	61	134	35	44	87	25
Peak Hour Factor	0.87	0.87	0.87	0.92	0.92	0.92	0.88	0.88	0.88	0.85	0.85	0.85
Heavy Vehicles, %	15	15	15	3	3	3	2	2	2	3	3	3
Mvmt Flow	48	163	29	88	303	125	69	152	40	52	102	29
Number of Lanes	0	2	0	0	2	0	0	2	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	12.3	14.8	12.5	14.5
HCM LOS	B	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	48%	0%	37%	0%	37%	0%	28%
Vol Thru, %	52%	66%	63%	74%	63%	55%	56%
Vol Right, %	0%	34%	0%	26%	0%	45%	16%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	128	102	113	96	221	255	156
LT Vol	61	0	42	0	81	0	44
Through Vol	67	67	71	71	140	140	87
RT Vol	0	35	0	25	0	115	25
Lane Flow Rate	145	116	130	110	240	277	184
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.299	0.223	0.267	0.215	0.452	0.482	0.369
Departure Headway (Hd)	7.409	6.92	7.404	7.027	6.789	6.279	7.235
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	487	520	486	511	532	575	497
Service Time	5.126	4.637	5.141	4.764	4.502	3.992	5.27
HCM Lane V/C Ratio	0.298	0.223	0.267	0.215	0.451	0.482	0.37
HCM Control Delay	13.3	11.6	12.8	11.7	15	14.7	14.5
HCM Lane LOS	B	B	B	B	B	B	B
HCM 95th-tile Q	1.2	0.8	1.1	0.8	2.3	2.6	1.7

Intersection	
Intersection Delay, s/veh	18.8
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	260	18	0	323	164	1	162	27	97	155	136
Future Vol, veh/h	0	260	18	0	323	164	1	162	27	97	155	136
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.94	0.94	0.87	0.87	0.87
Heavy Vehicles, %	11	11	11	2	2	2	2	2	2	3	3	3
Mvmt Flow	0	289	20	0	359	182	1	172	29	111	178	156
Number of Lanes	0	2	0	0	2	0	0	2	0	0	2	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	2	2
HCM Control Delay	18	22.8	15.3	16.1
HCM LOS	C	C	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	1%	0%	0%	0%	0%	0%	65%	0%	0%
Vol Thru, %	99%	75%	100%	83%	100%	40%	35%	100%	0%
Vol Right, %	0%	25%	0%	17%	0%	60%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	82	108	173	105	215	272	149	103	136
LT Vol	1	0	0	0	0	0	97	0	0
Through Vol	81	81	173	87	215	108	52	103	0
RT Vol	0	27	0	18	0	164	0	0	136
Lane Flow Rate	87	115	193	116	239	302	171	119	156
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.226	0.292	0.48	0.286	0.549	0.657	0.425	0.284	0.342
Departure Headway (Hd)	9.337	9.148	8.977	8.854	8.262	7.83	8.945	8.609	7.887
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	385	393	403	406	438	462	403	418	456
Service Time	7.092	6.904	6.728	6.605	6.006	5.574	6.691	6.355	5.633
HCM Lane V/C Ratio	0.226	0.293	0.479	0.286	0.546	0.654	0.424	0.285	0.342
HCM Control Delay	14.8	15.7	19.8	15.1	20.7	24.4	18.2	14.8	14.7
HCM Lane LOS	B	C	C	C	C	C	C	B	B
HCM 95th-tile Q	0.9	1.2	2.5	1.2	3.2	4.6	2.1	1.2	1.5

APPENDIX D

Analysis Reports

Future (2024) Without Project Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	876	92	38	1599	327	60	922	80	0	0	0
Future Volume (veh/h)	0	876	92	38	1599	327	60	922	80	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		0.93	1.00		0.95	1.00		0.90			
Parking Bus, Adj	1.00	1.00	0.94	1.00	1.00	0.97	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1758	1758	1772	1772	1772	1758	1758	1758			
Adj Flow Rate, veh/h	0	963	101	45	1904	389	67	1036	90			
Peak Hour Factor	0.91	0.91	0.91	0.84	0.84	0.84	0.89	0.89	0.89			
Percent Heavy Veh, %	0	3	3	2	2	2	3	3	3			
Cap, veh/h	0	1760	185	76	2775	561	530	1520	427			
Arrive On Green	0.00	0.60	0.60	1.00	1.00	1.00	0.32	0.32	0.32			
Sat Flow, veh/h	0	3021	308	73	4625	935	1674	4799	1348			
Grp Volume(v), veh/h	0	548	516	632	1148	558	67	1036	90			
Grp Sat Flow(s),veh/h/ln	0	1670	1570	1519	1387	1341	1674	1600	1348			
Q Serve(g_s), s	0.0	23.5	23.5	7.6	0.0	0.0	3.4	22.6	5.9			
Cycle Q Clear(g_c), s	0.0	23.5	23.5	31.1	0.0	0.0	3.4	22.6	5.9			
Prop In Lane	0.00		0.20	0.07		0.70	1.00		1.00			
Lane Grp Cap(c), veh/h	0	1002	942	943	1664	804	530	1520	427			
V/C Ratio(X)	0.00	0.55	0.55	0.67	0.69	0.69	0.13	0.68	0.21			
Avail Cap(c_a), veh/h	0	1002	942	943	1664	804	530	1520	427			
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	0.0	14.3	14.3	0.3	0.0	0.0	29.2	35.7	30.0			
Incr Delay (d2), s/veh	0.0	2.1	2.3	3.8	2.4	4.9	0.5	2.5	1.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	8.9	8.4	1.0	0.5	1.1	1.5	9.2	2.1			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	16.4	16.6	4.0	2.4	4.9	29.7	38.2	31.1			
LnGrp LOS	A	B	B	A	A	A	C	D	C			
Approach Vol, veh/h		1064			2338			1193				
Approach Delay, s/veh		16.5			3.4			37.2				
Approach LOS		B			A			D				

Timer - Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		77.0		43.0		77.0						
Change Period (Y+Rc), s		5.0		5.0		5.0						
Max Green Setting (Gmax), s		72.0		38.0		72.0						
Max Q Clear Time (g_c+I1), s		33.1		24.6		25.5						
Green Ext Time (p_c), s		35.2		4.9		8.7						

Intersection Summary												
HCM 6th Ctrl Delay			15.2									
HCM 6th LOS			B									

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	66.5	70.3	86.4	55.3
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	6	6	7	5
Number of Right-Turn Islands	0	0	0	0
Type of Control	Pretimed	Pretimed	Pretimed	Pretimed
Corresponding Signal Phase	4	4	6	2
Effective Walk Time (s)	11.0	11.0	11.0	11.0
Right Corner Size A (ft)	8.0	8.0	10.0	30.0
Right Corner Size B (ft)	12.0	8.0	10.0	20.0
Right Corner Curb Radius (ft)	30.0	30.0	30.0	30.0
Right Corner Total Area (sq.ft)	655.35	655.35	655.35	406.50
Ped. Left-Right Flow Rate (p/h)	5	52	28	43
Ped. Right-Left Flow Rate (p/h)	44	6	9	14
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	35	35	25	25
Right Corner Area per Ped (sq.ft)	6806.5	5102.5	6168.8	3440.3
Right Corner Quality of Service	A	A	A	A
Ped. Circulation Area (sq.ft)	267.4	227.5	370.5	222.5
Crosswalk Circulation Code	A	A	A	A
Pedestrian Delay (s/p)	49.5	49.5	49.5	49.5
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	3.04	3.11	2.76	2.55
Pedestrian Crosswalk LOS	C	C	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	1064	2338	1193	0
Effct. Green for Bike (s)	72.0	72.0	38.0	0.0
Cross Street Width (ft)	86.4	55.3	70.3	66.5
Through Lanes Number	2	4	3	0
Through Lane Width (ft)	11.0	11.0	11.0	11.0
Bicycle Lane Width (ft)	0.0	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	Yes	Yes	Yes	Yes
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	1200	1200	633	0
Bicycle Delay (s/bike)	9.6	9.6	28.0	0.0
Bicycle Compliance	Good	Good	Fair	
Bicycle LOS Score	3.97	3.58	3.51	0.00
Bicycle LOS	D	D	D	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	768	119	35	1684	57	33
Future Volume (vph)	768	119	35	1684	57	33
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0			5.0	5.0	
Lane Util. Factor	0.95			0.86	1.00	
Frpb, ped/bikes	0.97			1.00	0.97	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.98			1.00	0.95	
Flt Protected	1.00			1.00	0.97	
Satd. Flow (prot)	3045			5817	1373	
Flt Permitted	1.00			0.87	0.97	
Satd. Flow (perm)	3045			5079	1373	
Peak-hour factor, PHF	0.83	0.83	0.80	0.80	0.73	0.73
Adj. Flow (vph)	925	143	44	2105	78	45
RTOR Reduction (vph)	10	0	0	0	17	0
Lane Group Flow (vph)	1058	0	0	2149	106	0
Confl. Peds. (#/hr)		80	80			61
Confl. Bikes (#/hr)		9				
Heavy Vehicles (%)	3%	3%	2%	2%	13%	13%
Bus Blockages (#/hr)	0	15	0	7	0	0
Turn Type	NA		Perm	NA	Prot	
Protected Phases	6			2	4	
Permitted Phases			2			
Actuated Green, G (s)	77.0			77.0	33.0	
Effective Green, g (s)	77.0			77.0	33.0	
Actuated g/C Ratio	0.64			0.64	0.28	
Clearance Time (s)	5.0			5.0	5.0	
Lane Grp Cap (vph)	1953			3259	377	
v/s Ratio Prot	0.35				c0.08	
v/s Ratio Perm				c0.42		
v/c Ratio	0.54			0.66	0.28	
Uniform Delay, d1	11.8			13.4	34.2	
Progression Factor	0.59			0.20	1.00	
Incremental Delay, d2	0.9			0.8	1.8	
Delay (s)	7.9			3.4	36.0	
Level of Service	A			A	D	
Approach Delay (s)	7.9			3.4	36.0	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	6.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	83.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Approach	EB	WB	NB
Crosswalk Length (ft)	66.0	65.9	22.2
Crosswalk Width (ft)	12.0	12.0	12.0
Total Number of Lanes Crossed	6	6	2
Number of Right-Turn Islands	0	0	0
Type of Control	None	Pretimed	Pretimed
Corresponding Signal Phase	2	4	6
Effective Walk Time (s)	0.0	11.0	11.0
Right Corner Size A (ft)	9.0	20.0	7.0
Right Corner Size B (ft)	15.0	8.0	15.0
Right Corner Curb Radius (ft)	30.0	0.0	20.0
Right Corner Total Area (sq.ft)	655.35	160.00	19.00
Ped. Left-Right Flow Rate (p/h)	0	15	14
Ped. Right-Left Flow Rate (p/h)	0	36	42
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0
85th percentile speed (mph)	35	35	25
Right Corner Area per Ped (sq.ft)	10516.9	2779.8	126.8
Right Corner Quality of Service	A	A	A
Ped. Circulation Area (sq.ft)	0.0	257.4	174.7
Crosswalk Circulation Code	-	A	A
Pedestrian Delay (s/p)	60.0	49.5	49.5
Pedestrian Compliance Code	Poor	Poor	Poor
Pedestrian Crosswalk Score	3.09	3.06	1.85
Pedestrian Crosswalk LOS	C	C	B

Approach	EB	WB	NB
Bicycle Flow Rate (bike/h)	0	1	0
Total Flow Rate (veh/h)	1068	2149	123
Effct. Green for Bike (s)	77.0	77.0	33.0
Cross Street Width (ft)	22.2	66.0	65.9
Through Lanes Number	2	4	1
Through Lane Width (ft)	11.0	11.0	11.0
Bicycle Lane Width (ft)	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0
Curb Is Present?	No	No	No
On Street Parking?	No	No	No
Bicycle Lane Capacity (bike/h)	1283	1283	550
Bicycle Delay (s/bike)	7.7	7.7	31.5
Bicycle Compliance	Good	Good	Poor
Bicycle LOS Score	2.99	3.67	2.99
Bicycle LOS	C	D	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	624	163	0	1609	130	0	224	15	168	547	90
Future Volume (vph)	0	624	163	0	1609	130	0	224	15	168	547	90
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0	6.0		6.0			6.0	6.0		6.0	
Lane Util. Factor		0.95	1.00		0.86			0.91	1.00		0.91	
Frpb, ped/bikes		1.00	0.87		0.98			1.00	0.77		0.96	
Flpb, ped/bikes		1.00	1.00		1.00			1.00	1.00		0.98	
Frt		1.00	0.85		0.99			1.00	0.85		0.98	
Flt Protected		1.00	1.00		1.00			1.00	1.00		0.99	
Satd. Flow (prot)		3101	1253		5678			4657	1118		4265	
Flt Permitted		1.00	1.00		1.00			1.00	1.00		0.79	
Satd. Flow (perm)		3101	1253		5678			4657	1118		3418	
Peak-hour factor, PHF	0.89	0.89	0.89	0.84	0.84	0.84	0.80	0.80	0.80	0.91	0.91	0.91
Adj. Flow (vph)	0	701	183	0	1915	155	0	280	19	185	601	99
RTOR Reduction (vph)	0	0	41	0	11	0	0	0	13	0	1	0
Lane Group Flow (vph)	0	701	142	0	2060	0	0	280	6	0	884	0
Confl. Peds. (#/hr)	214		97	97		214	263		172	172		263
Confl. Bikes (#/hr)			14			21			1			6
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	17	0	0	0	11	0	0	0	0	0	0
Turn Type		NA	Perm		NA			NA	Perm	pm+pt	NA	
Protected Phases		6			2			8		7	4	
Permitted Phases			6						8	4		
Actuated Green, G (s)		60.0	60.0		60.0			37.0	37.0		48.0	
Effective Green, g (s)		60.0	60.0		60.0			37.0	37.0		48.0	
Actuated g/C Ratio		0.50	0.50		0.50			0.31	0.31		0.40	
Clearance Time (s)		6.0	6.0		6.0			6.0	6.0		6.0	
Lane Grp Cap (vph)		1550	626		2839			1435	344		1402	
v/s Ratio Prot		0.23			c0.36			0.06			c0.03	
v/s Ratio Perm			0.11						0.01		c0.23	
v/c Ratio		0.45	0.23		0.73			0.20	0.02		0.63	
Uniform Delay, d1		19.4	16.9		23.5			30.5	28.9		28.9	
Progression Factor		1.02	1.29		1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.8	0.7		1.7			0.3	0.1		2.2	
Delay (s)		20.6	22.5		25.2			30.8	28.9		31.1	
Level of Service		C	C		C			C	C		C	
Approach Delay (s)		21.0			25.2			30.7			31.1	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	89.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	66.1	66.6	78.3	66.1
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	6	6	6	6
Number of Right-Turn Islands	1	1	2	0
Type of Control	Pretimed	Pretimed	Pretimed	Pretimed
Corresponding Signal Phase	4	8	6	2
Effective Walk Time (s)	11.0	11.0	11.0	11.0
Right Corner Size A (ft)	10.0	10.0	15.0	15.0
Right Corner Size B (ft)	10.0	10.0	15.0	15.0
Right Corner Curb Radius (ft)	40.0	30.0	40.0	30.0
Right Corner Total Area (sq.ft)	655.35	655.35	655.35	31.50
Ped. Left-Right Flow Rate (p/h)	209	55	20	131
Ped. Right-Left Flow Rate (p/h)	70	165	61	44
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	35	35	30	30
Right Corner Area per Ped (sq.ft)	1622.9	1446.8	1935.7	28.0
Right Corner Quality of Service	A	A	A	C
Ped. Circulation Area (sq.ft)	44.9	57.7	165.6	73.1
Crosswalk Circulation Code	B	B	A	A
Pedestrian Delay (s/p)	49.5	49.5	49.5	49.5
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	2.88	2.89	2.79	2.68
Pedestrian Crosswalk LOS	C	C	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	884	2070	299	885
Effct. Green for Bike (s)	60.0	60.0	37.0	48.0
Cross Street Width (ft)	78.3	66.1	66.6	66.1
Through Lanes Number	2	4	3	3
Through Lane Width (ft)	11.0	11.0	11.0	11.0
Bicycle Lane Width (ft)	0.0	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	No	No	No	No
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	1000	1000	617	800
Bicycle Delay (s/bike)	15.0	15.0	28.7	21.6
Bicycle Compliance	Fair	Fair	Fair	Fair
Bicycle LOS Score	3.70	3.64	2.96	3.27
Bicycle LOS	D	D	C	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	51	5	128	37	131	33	936	146	0	149	24
Future Volume (vph)	0	51	5	128	37	131	33	936	146	0	149	24
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0		5.0	5.0	5.0		5.0			5.0	
Lane Util. Factor		1.00		0.95	0.95	1.00		0.86			0.95	
Frpb, ped/bikes		1.00		1.00	1.00	0.95		0.98			0.98	
Flpb, ped/bikes		1.00		1.00	1.00	1.00		1.00			1.00	
Frt		0.99		1.00	1.00	0.85		0.98			0.98	
Flt Protected		1.00		0.95	0.97	1.00		1.00			1.00	
Satd. Flow (prot)		1683		1496	1531	1338		5376			3033	
Flt Permitted		1.00		0.71	0.83	1.00		0.92			1.00	
Satd. Flow (perm)		1683		1125	1303	1338		4936			3033	
Peak-hour factor, PHF	0.87	0.87	0.87	0.84	0.84	0.84	0.94	0.94	0.94	0.95	0.95	0.95
Adj. Flow (vph)	0	59	6	152	44	156	35	996	155	0	157	25
RTOR Reduction (vph)	0	3	0	0	0	28	0	23	0	0	10	0
Lane Group Flow (vph)	0	62	0	96	100	128	0	1163	0	0	172	0
Confl. Peds. (#/hr)	32					32	34		95	95		34
Confl. Bikes (#/hr)			1			5			11			12
Heavy Vehicles (%)	2%	2%	2%	5%	5%	5%	7%	7%	7%	5%	5%	5%
Turn Type		NA		Perm	NA	Perm	Perm	NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)		49.0		49.0	49.0	49.0		61.0			61.0	
Effective Green, g (s)		49.0		49.0	49.0	49.0		61.0			61.0	
Actuated g/C Ratio		0.41		0.41	0.41	0.41		0.51			0.51	
Clearance Time (s)		5.0		5.0	5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)		687		459	532	546		2509			1541	
v/s Ratio Prot		0.04									0.06	
v/s Ratio Perm				0.09	0.08	c0.10		c0.24				
v/c Ratio		0.09		0.21	0.19	0.23		0.46			0.11	
Uniform Delay, d1		21.8		23.0	22.8	23.2		19.0			15.4	
Progression Factor		1.00		1.00	1.00	1.00		1.00			1.88	
Incremental Delay, d2		0.3		1.0	0.8	1.0		0.6			0.1	
Delay (s)		22.1		24.0	23.5	24.2		19.6			29.1	
Level of Service		C		C	C	C		B			C	
Approach Delay (s)		22.1			24.0			19.6			29.1	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	21.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	22.1	61.6	81.0	87.7
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	2	5	6	6
Number of Right-Turn Islands	0	0	0	0
Type of Control	None	None	None	None
Corresponding Signal Phase	6	2	4	8
Effective Walk Time (s)	0.0	0.0	0.0	0.0
Right Corner Size A (ft)	8.0	8.0	8.0	8.0
Right Corner Size B (ft)	8.0	8.0	8.0	8.0
Right Corner Curb Radius (ft)	20.0	30.0	0.0	20.0
Right Corner Total Area (sq.ft)	655.35	655.35	64.00	655.35
Ped. Left-Right Flow Rate (p/h)	1	59	0	15
Ped. Right-Left Flow Rate (p/h)	10	7	0	12
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	15	15	25	25
Right Corner Area per Ped (sq.ft)	53551.4	6324.4	805.7	15495.8
Right Corner Quality of Service	A	A	A	A
Ped. Circulation Area (sq.ft)	0.0	0.0	0.0	0.0
Crosswalk Circulation Code	F	F	-	F
Pedestrian Delay (s/p)	60.0	60.0	60.0	60.0
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	1.78	2.38	2.68	2.66
Pedestrian Crosswalk LOS	B	B	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	65	352	1186	182
Effct. Green for Bike (s)	49.0	49.0	61.0	61.0
Cross Street Width (ft)	81.0	87.7	61.6	22.1
Through Lanes Number	1	1	4	2
Through Lane Width (ft)	11.0	11.0	11.0	11.0
Bicycle Lane Width (ft)	0.0	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	No	No	No	No
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	817	817	1017	1017
Bicycle Delay (s/bike)	21.0	21.0	14.5	14.5
Bicycle Compliance	Fair	Fair	Fair	Fair
Bicycle LOS Score	3.12	3.70	3.21	2.26
Bicycle LOS	C	D	C	B

Intersection	
Intersection Delay, s/veh	11.3
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	26	125	25	51	246	46	35	43	11	29	124	37
Future Vol, veh/h	26	125	25	51	246	46	35	43	11	29	124	37
Peak Hour Factor	0.95	0.95	0.95	0.94	0.94	0.94	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	15	15	15	6	6	6	3	3	3	3	3	3
Mvmt Flow	27	132	26	54	262	49	41	50	13	34	144	43
Number of Lanes	0	2	0	0	2	0	0	2	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	10.3	11.2	10.1	12.8
HCM LOS	B	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	62%	0%	29%	0%	29%	0%	15%
Vol Thru, %	38%	66%	71%	71%	71%	73%	65%
Vol Right, %	0%	34%	0%	29%	0%	27%	19%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	57	33	89	88	174	169	190
LT Vol	35	0	26	0	51	0	29
Through Vol	22	22	63	63	123	123	124
RT Vol	0	11	0	25	0	46	37
Lane Flow Rate	66	38	93	92	185	180	221
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.124	0.065	0.167	0.156	0.312	0.286	0.376
Departure Headway (Hd)	6.768	6.213	6.467	6.115	6.07	5.728	6.129
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	530	576	554	586	592	627	588
Service Time	4.512	3.957	4.208	3.856	3.804	3.463	4.167
HCM Lane V/C Ratio	0.125	0.066	0.168	0.157	0.313	0.287	0.376
HCM Control Delay	10.5	9.4	10.5	10	11.5	10.8	12.8
HCM Lane LOS	B	A	B	A	B	B	B
HCM 95th-tile Q	0.4	0.2	0.6	0.5	1.3	1.2	1.7

Intersection	
Intersection Delay, s/veh	12.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	195	20	0	240	50	0	66	18	124	155	119
Future Vol, veh/h	7	195	20	0	240	50	0	66	18	124	155	119
Peak Hour Factor	0.88	0.88	0.88	0.92	0.92	0.92	0.86	0.86	0.86	0.89	0.89	0.89
Heavy Vehicles, %	15	15	15	6	6	6	3	3	3	5	5	5
Mvmt Flow	8	222	23	0	261	54	0	77	21	139	174	134
Number of Lanes	0	2	0	0	2	0	0	2	0	0	2	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	2	2
HCM Control Delay	12.8	13	11.4	12.9
HCM LOS	B	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	0%	0%	7%	0%	0%	0%	71%	0%	0%
Vol Thru, %	100%	55%	93%	83%	100%	62%	29%	100%	0%
Vol Right, %	0%	45%	0%	17%	0%	38%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	44	40	105	118	160	130	176	103	119
LT Vol	0	0	7	0	0	0	124	0	0
Through Vol	44	22	98	98	160	80	52	103	0
RT Vol	0	18	0	20	0	50	0	0	119
Lane Flow Rate	51	47	119	134	174	141	197	116	134
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.111	0.097	0.248	0.273	0.347	0.271	0.403	0.225	0.233
Departure Headway (Hd)	7.827	7.504	7.514	7.359	7.189	6.916	7.35	6.991	6.279
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	458	478	479	489	501	520	493	517	575
Service Time	5.573	5.249	5.254	5.099	4.928	4.656	5.05	4.691	3.979
HCM Lane V/C Ratio	0.111	0.098	0.248	0.274	0.347	0.271	0.4	0.224	0.233
HCM Control Delay	11.6	11.1	12.7	12.9	13.7	12.2	14.9	11.7	10.9
HCM Lane LOS	B	B	B	B	B	B	B	B	B
HCM 95th-tile Q	0.4	0.3	1	1.1	1.5	1.1	1.9	0.9	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	2209	153	0	798	321	101	1270	276	0	0	0
Future Volume (veh/h)	0	2209	153	0	798	321	101	1270	276	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		0.83	1.00		0.93	1.00		0.89			
Parking Bus, Adj	1.00	1.00	0.94	1.00	1.00	0.97	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1870	1870	0	1856	1856	1870	1870	1870			
Adj Flow Rate, veh/h	0	2375	165	0	849	341	103	1296	282			
Peak Hour Factor	0.93	0.93	0.93	0.94	0.94	0.94	0.98	0.98	0.98			
Percent Heavy Veh, %	0	2	2	0	3	3	2	2	2			
Cap, veh/h	0	3247	224	0	1282	512	668	1915	526			
Arrive On Green	0.00	0.54	0.54	0.00	1.00	1.00	0.75	0.75	0.75			
Sat Flow, veh/h	0	6256	413	0	2460	946	1781	5106	1403			
Grp Volume(v), veh/h	0	1909	631	0	631	559	103	1296	282			
Grp Sat Flow(s),veh/h/ln	0	1609	1582	0	1763	1550	1781	1702	1403			
Q Serve(g_s), s	0.0	36.0	36.6	0.0	0.0	0.0	2.0	15.5	10.1			
Cycle Q Clear(g_c), s	0.0	36.0	36.6	0.0	0.0	0.0	2.0	15.5	10.1			
Prop In Lane	0.00		0.26	0.00		0.61	1.00		1.00			
Lane Grp Cap(c), veh/h	0	2614	857	0	955	840	668	1915	526			
V/C Ratio(X)	0.00	0.73	0.74	0.00	0.66	0.67	0.15	0.68	0.54			
Avail Cap(c_a), veh/h	0	2614	857	0	955	840	668	1915	526			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00			
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	0.0	20.9	21.0	0.0	0.0	0.0	9.6	11.3	10.6			
Incr Delay (d2), s/veh	0.0	1.8	5.6	0.0	3.6	4.2	0.5	1.9	3.9			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	13.2	14.1	0.0	1.0	1.0	0.9	3.8	2.8			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	22.7	26.6	0.0	3.6	4.2	10.1	13.3	14.5			
LnGrp LOS	A	C	C	A	A	A	B	B	B			
Approach Vol, veh/h		2540			1190			1681				
Approach Delay, s/veh		23.7			3.9			13.3				
Approach LOS		C			A			B				

Timer - Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		70.0		50.0		70.0						
Change Period (Y+Rc), s		5.0		5.0		5.0						
Max Green Setting (Gmax), s		65.0		45.0		65.0						
Max Q Clear Time (g_c+I1), s		2.0		17.5		38.6						
Green Ext Time (p_c), s		25.5		9.2		21.0						

Intersection Summary												
HCM 6th Ctrl Delay			16.1									
HCM 6th LOS			B									

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	72.7	75.3	92.4	60.2
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	6	6	7	5
Number of Right-Turn Islands	0	0	0	0
Type of Control	Pretimed	Pretimed	Pretimed	Pretimed
Corresponding Signal Phase	4	4	6	2
Effective Walk Time (s)	11.0	11.0	11.0	11.0
Right Corner Size A (ft)	8.0	8.0	10.0	30.0
Right Corner Size B (ft)	12.0	8.0	10.0	20.0
Right Corner Curb Radius (ft)	30.0	30.0	30.0	30.0
Right Corner Total Area (sq.ft)	655.35	655.35	655.35	406.50
Ped. Left-Right Flow Rate (p/h)	8	67	62	29
Ped. Right-Left Flow Rate (p/h)	76	8	27	68
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	35	35	25	25
Right Corner Area per Ped (sq.ft)	3360.0	3415.8	3561.0	1995.3
Right Corner Quality of Service	A	A	A	A
Ped. Circulation Area (sq.ft)	156.9	177.2	154.3	131.9
Crosswalk Circulation Code	A	A	A	A
Pedestrian Delay (s/p)	49.5	49.5	49.5	49.5
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	3.13	3.20	2.82	2.58
Pedestrian Crosswalk LOS	C	C	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	2540	1190	1681	0
Effct. Green for Bike (s)	65.0	65.0	45.0	0.0
Cross Street Width (ft)	92.4	60.2	75.3	72.7
Through Lanes Number	4	2	3	0
Through Lane Width (ft)	12.0	12.0	12.0	12.0
Bicycle Lane Width (ft)	0.0	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	Yes	Yes	Yes	Yes
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	1083	1083	750	0
Bicycle Delay (s/bike)	12.6	12.6	23.4	0.0
Bicycle Compliance	Fair	Fair	Fair	
Bicycle LOS Score	4.02	3.46	3.64	0.00
Bicycle LOS	D	C	D	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	2139	136	0	849	192	118
Future Volume (vph)	2139	136	0	849	192	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	
Lane Util. Factor	0.86			0.95	1.00	
Frpb, ped/bikes	0.98			1.00	0.96	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.99			1.00	0.95	
Flt Protected	1.00			1.00	0.97	
Satd. Flow (prot)	6217			3490	1615	
Flt Permitted	1.00			1.00	0.97	
Satd. Flow (perm)	6217			3490	1615	
Peak-hour factor, PHF	0.91	0.91	0.92	0.92	0.86	0.86
Adj. Flow (vph)	2351	149	0	923	223	137
RTOR Reduction (vph)	8	0	0	0	1	0
Lane Group Flow (vph)	2492	0	0	923	359	0
Confl. Peds. (#/hr)		121	121			72
Confl. Bikes (#/hr)		18				1
Heavy Vehicles (%)	2%	2%	2%	2%	4%	4%
Bus Blockages (#/hr)	0	15	0	7	0	0
Turn Type	NA			NA	Prot	
Protected Phases	6			2	4	
Permitted Phases						
Actuated Green, G (s)	65.0			65.0	45.0	
Effective Green, g (s)	65.0			65.0	45.0	
Actuated g/C Ratio	0.54			0.54	0.38	
Clearance Time (s)	5.0			5.0	5.0	
Lane Grp Cap (vph)	3367			1890	605	
v/s Ratio Prot	c0.40			0.26	c0.22	
v/s Ratio Perm						
v/c Ratio	0.74			0.49	0.59	
Uniform Delay, d1	21.0			17.1	30.2	
Progression Factor	0.29			0.37	1.00	
Incremental Delay, d2	1.0			0.7	4.3	
Delay (s)	7.2			7.0	34.4	
Level of Service	A			A	C	
Approach Delay (s)	7.2			7.0	34.4	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Approach	EB	WB	NB
Crosswalk Length (ft)	72.1	72.0	24.2
Crosswalk Width (ft)	12.0	12.0	12.0
Total Number of Lanes Crossed	6	6	2
Number of Right-Turn Islands	0	0	0
Type of Control	None	Pretimed	Pretimed
Corresponding Signal Phase	2	4	6
Effective Walk Time (s)	0.0	11.0	11.0
Right Corner Size A (ft)	9.0	20.0	7.0
Right Corner Size B (ft)	15.0	8.0	15.0
Right Corner Curb Radius (ft)	30.0	0.0	20.0
Right Corner Total Area (sq.ft)	655.35	160.00	19.00
Ped. Left-Right Flow Rate (p/h)	0	54	106
Ped. Right-Left Flow Rate (p/h)	0	23	45
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0
85th percentile speed (mph)	35	35	25
Right Corner Area per Ped (sq.ft)	3862.6	1851.6	48.1
Right Corner Quality of Service	A	A	B
Ped. Circulation Area (sq.ft)	0.0	172.2	64.4
Crosswalk Circulation Code	-	A	A
Pedestrian Delay (s/p)	60.0	49.5	49.5
Pedestrian Compliance Code	Poor	Poor	Poor
Pedestrian Crosswalk Score	3.17	3.11	1.94
Pedestrian Crosswalk LOS	C	C	B

Approach	EB	WB	NB
Bicycle Flow Rate (bike/h)	0	1	0
Total Flow Rate (veh/h)	2500	923	360
Effct. Green for Bike (s)	65.0	65.0	45.0
Cross Street Width (ft)	24.2	72.1	72.0
Through Lanes Number	4	2	1
Through Lane Width (ft)	12.0	12.0	12.0
Bicycle Lane Width (ft)	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0
Curb Is Present?	No	No	No
On Street Parking?	No	No	No
Bicycle Lane Capacity (bike/h)	1083	1083	750
Bicycle Delay (s/bike)	12.6	12.6	23.4
Bicycle Compliance	Fair	Fair	Fair
Bicycle LOS Score	2.96	3.42	3.26
Bicycle LOS	C	C	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	212	1888	165	0	723	195	1	712	130	221	799	104
Future Volume (vph)	212	1888	165	0	723	195	1	712	130	221	799	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0			6.0	6.0		6.0	
Lane Util. Factor		0.86	1.00		0.95			0.91	1.00		0.91	
Frpb, ped/bikes		1.00	0.69		0.93			1.00	0.58		0.96	
Flpb, ped/bikes		0.99	1.00		1.00			1.00	1.00		0.98	
Frt		1.00	0.85		0.97			1.00	0.85		0.99	
Flt Protected		0.99	1.00		1.00			1.00	1.00		0.99	
Satd. Flow (prot)		6259	1093		3195			5085	912		4713	
Flt Permitted		0.72	1.00		1.00			0.94	1.00		0.67	
Satd. Flow (perm)		4525	1093		3195			4773	912		3184	
Peak-hour factor, PHF	0.90	0.90	0.90	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	236	2098	183	0	786	212	1	774	141	240	868	113
RTOR Reduction (vph)	0	0	40	0	20	0	0	0	58	0	10	0
Lane Group Flow (vph)	0	2334	143	0	978	0	0	775	83	0	1211	0
Confl. Peds. (#/hr)	278		263	263		278	576		695	695		576
Confl. Bikes (#/hr)			11			6			7			8
Bus Blockages (#/hr)	0	13	0	0	0	11	0	0	0	0	0	0
Turn Type	Perm	NA	Perm		NA		Perm	NA	Perm	pm+pt	NA	
Protected Phases		6			2			8		7	4	
Permitted Phases	6		6				8		8	4		
Actuated Green, G (s)		62.0	62.0		62.0			35.0	35.0		46.0	
Effective Green, g (s)		62.0	62.0		62.0			35.0	35.0		46.0	
Actuated g/C Ratio		0.52	0.52		0.52			0.29	0.29		0.38	
Clearance Time (s)		6.0	6.0		6.0			6.0	6.0		6.0	
Lane Grp Cap (vph)		2337	564		1650			1392	266		1284	
v/s Ratio Prot					0.31						c0.04	
v/s Ratio Perm		c0.52	0.13					0.16	0.09		c0.32	
v/c Ratio		1.28dl	0.25		0.59			0.56	0.31		1.01dl	
Uniform Delay, d1		29.0	16.1		20.2			35.9	33.1		35.7	
Progression Factor		0.51	0.27		1.00			1.00	1.00		1.00	
Incremental Delay, d2		15.0	0.7		1.6			1.6	3.0		14.8	
Delay (s)		29.8	5.1		21.8			37.6	36.1		50.5	
Level of Service		C	A		C			D	D		D	
Approach Delay (s)		28.0			21.8			37.3			50.5	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	33.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	125.3%	ICU Level of Service	H
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	72.1	72.4	83.9	72.1
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	6	6	6	6
Number of Right-Turn Islands	1	1	2	0
Type of Control	Pretimed	Pretimed	Pretimed	Pretimed
Corresponding Signal Phase	4	8	6	2
Effective Walk Time (s)	11.0	11.0	11.0	11.0
Right Corner Size A (ft)	10.0	10.0	15.0	15.0
Right Corner Size B (ft)	10.0	10.0	15.0	15.0
Right Corner Curb Radius (ft)	40.0	30.0	40.0	30.0
Right Corner Total Area (sq.ft)	655.35	655.35	655.35	31.50
Ped. Left-Right Flow Rate (p/h)	337	345	192	77
Ped. Right-Left Flow Rate (p/h)	337	346	82	181
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	35	35	30	30
Right Corner Area per Ped (sq.ft)	587.6	593.9	583.8	-4.0
Right Corner Quality of Service	A	A	A	F
Ped. Circulation Area (sq.ft)	18.0	17.5	48.0	49.7
Crosswalk Circulation Code	D	D	B	B
Pedestrian Delay (s/p)	49.5	49.5	49.5	49.5
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	2.92	2.93	2.73	2.86
Pedestrian Crosswalk LOS	C	C	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	2517	998	916	1221
Effct. Green for Bike (s)	62.0	62.0	35.0	46.0
Cross Street Width (ft)	83.9	72.1	72.4	72.1
Through Lanes Number	4	2	3	3
Through Lane Width (ft)	12.0	12.0	12.0	12.0
Bicycle Lane Width (ft)	0.0	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	No	No	No	No
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	1033	1033	583	767
Bicycle Delay (s/bike)	14.0	14.0	30.1	22.8
Bicycle Compliance	Fair	Fair	Poor	Fair
Bicycle LOS Score	3.88	3.49	3.17	3.33
Bicycle LOS	D	C	C	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	78	14	253	95	261	34	1253	185	0	175	21
Future Volume (vph)	1	78	14	253	95	261	34	1253	185	0	175	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0	5.0		5.0			5.0	
Lane Util. Factor		1.00		0.95	0.95	1.00		0.86			0.95	
Frpb, ped/bikes		1.00		1.00	1.00	0.90		0.97			0.97	
Flpb, ped/bikes		1.00		1.00	1.00	1.00		1.00			1.00	
Frt		0.98		1.00	1.00	0.85		0.98			0.98	
Flt Protected		1.00		0.95	0.98	1.00		1.00			1.00	
Satd. Flow (prot)		1820		1665	1712	1407		5957			3393	
Flt Permitted		1.00		0.68	0.80	1.00		0.92			1.00	
Satd. Flow (perm)		1819		1194	1409	1407		5473			3393	
Peak-hour factor, PHF	0.76	0.76	0.76	0.92	0.92	0.92	0.95	0.95	0.95	0.85	0.85	0.85
Adj. Flow (vph)	1	103	18	275	103	284	36	1319	195	0	206	25
RTOR Reduction (vph)	0	5	0	0	0	10	0	22	0	0	8	0
Lane Group Flow (vph)	0	117	0	181	197	274	0	1528	0	0	223	0
Confl. Peds. (#/hr)	81					81	78		189	189		78
Confl. Bikes (#/hr)			6			3			19			10
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	4%	4%	4%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		53.0		53.0	53.0	53.0		57.0			57.0	
Effective Green, g (s)		53.0		53.0	53.0	53.0		57.0			57.0	
Actuated g/C Ratio		0.44		0.44	0.44	0.44		0.48			0.48	
Clearance Time (s)		5.0		5.0	5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)		803		527	622	621		2599			1611	
v/s Ratio Prot											0.07	
v/s Ratio Perm		0.06		0.15	0.14	c0.19		c0.28				
v/c Ratio		0.15		0.34	0.32	0.44		0.59			0.14	
Uniform Delay, d1		20.0		22.0	21.7	23.2		22.9			17.7	
Progression Factor		1.00		1.00	1.00	1.00		1.00			1.50	
Incremental Delay, d2		0.4		1.8	1.3	2.3		1.0			0.2	
Delay (s)		20.4		23.8	23.1	25.5		23.9			26.7	
Level of Service		C		C	C	C		C			C	
Approach Delay (s)		20.4			24.3			23.9			26.7	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	81.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	24.2	65.5	87.2	93.7
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	2	5	6	6
Number of Right-Turn Islands	0	0	0	0
Type of Control	None	None	None	None
Corresponding Signal Phase	6	2	4	8
Effective Walk Time (s)	0.0	0.0	0.0	0.0
Right Corner Size A (ft)	8.0	8.0	8.0	8.0
Right Corner Size B (ft)	8.0	8.0	8.0	8.0
Right Corner Curb Radius (ft)	20.0	30.0	0.0	20.0
Right Corner Total Area (sq.ft)	655.35	655.35	64.00	655.35
Ped. Left-Right Flow Rate (p/h)	1	59	0	15
Ped. Right-Left Flow Rate (p/h)	10	7	0	12
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	15	15	25	25
Right Corner Area per Ped (sq.ft)	53551.4	6324.4	805.7	15495.8
Right Corner Quality of Service	A	A	A	A
Ped. Circulation Area (sq.ft)	0.0	0.0	0.0	0.0
Crosswalk Circulation Code	F	F	-	F
Pedestrian Delay (s/p)	60.0	60.0	60.0	60.0
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	1.81	2.41	2.75	2.72
Pedestrian Crosswalk LOS	B	B	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	122	662	1550	231
Effct. Green for Bike (s)	53.0	53.0	57.0	57.0
Cross Street Width (ft)	87.2	93.7	65.5	24.2
Through Lanes Number	1	1	4	2
Through Lane Width (ft)	12.0	12.0	12.0	12.0
Bicycle Lane Width (ft)	0.0	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	No	No	No	No
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	883	883	950	950
Bicycle Delay (s/bike)	18.7	18.7	16.5	16.5
Bicycle Compliance	Fair	Fair	Fair	Fair
Bicycle LOS Score	3.10	4.09	3.20	2.12
Bicycle LOS	C	D	C	B

Intersection	
Intersection Delay, s/veh	16.1
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	47	160	28	92	315	130	69	151	40	50	98	28
Future Vol, veh/h	47	160	28	92	315	130	69	151	40	50	98	28
Peak Hour Factor	0.87	0.87	0.87	0.92	0.92	0.92	0.88	0.88	0.88	0.85	0.85	0.85
Heavy Vehicles, %	15	15	15	3	3	3	2	2	2	3	3	3
Mvmt Flow	54	184	32	100	342	141	78	172	45	59	115	33
Number of Lanes	0	2	0	0	2	0	0	2	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	13.6	18.1	13.9	16.7
HCM LOS	B	C	B	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	48%	0%	37%	0%	37%	0%	28%
Vol Thru, %	52%	65%	63%	74%	63%	55%	56%
Vol Right, %	0%	35%	0%	26%	0%	45%	16%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	145	116	127	108	250	288	176
LT Vol	69	0	47	0	92	0	50
Through Vol	76	76	80	80	158	158	98
RT Vol	0	40	0	28	0	130	28
Lane Flow Rate	164	131	146	124	271	312	207
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.357	0.267	0.319	0.258	0.539	0.577	0.442
Departure Headway (Hd)	7.821	7.328	7.868	7.491	7.16	6.647	7.677
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	460	490	457	479	504	544	470
Service Time	5.569	5.075	5.619	5.242	4.903	4.39	5.726
HCM Lane V/C Ratio	0.357	0.267	0.319	0.259	0.538	0.574	0.44
HCM Control Delay	14.9	12.7	14.3	12.8	18	18.1	16.7
HCM Lane LOS	B	B	B	B	C	C	C
HCM 95th-tile Q	1.6	1.1	1.4	1	3.2	3.6	2.2

Intersection	
Intersection Delay, s/veh	25.5
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	294	20	0	365	185	1	183	31	110	175	154
Future Vol, veh/h	0	294	20	0	365	185	1	183	31	110	175	154
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.94	0.94	0.87	0.87	0.87
Heavy Vehicles, %	11	11	11	2	2	2	2	2	2	3	3	3
Mvmt Flow	0	327	22	0	406	206	1	195	33	126	201	177
Number of Lanes	0	2	0	0	2	0	0	2	0	0	2	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	2	2
HCM Control Delay	23	34.8	18	19.5
HCM LOS	C	D	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	1%	0%	0%	0%	0%	0%	65%	0%	0%
Vol Thru, %	99%	75%	100%	83%	100%	40%	35%	100%	0%
Vol Right, %	0%	25%	0%	17%	0%	60%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	93	123	196	118	243	307	168	117	154
LT Vol	1	0	0	0	0	0	110	0	0
Through Vol	92	92	196	98	243	122	58	117	0
RT Vol	0	31	0	20	0	185	0	0	154
Lane Flow Rate	98	130	218	131	270	341	193	134	177
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.281	0.365	0.595	0.354	0.677	0.812	0.522	0.349	0.426
Departure Headway (Hd)	10.264	10.073	9.832	9.709	9.018	8.583	9.719	9.38	8.654
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	349	356	366	370	400	423	370	382	414
Service Time	8.054	7.862	7.616	7.493	6.793	6.359	7.496	7.157	6.43
HCM Lane V/C Ratio	0.281	0.365	0.596	0.354	0.675	0.806	0.522	0.351	0.428
HCM Control Delay	17.1	18.6	26.2	17.8	28.9	39.4	22.7	17.1	17.8
HCM Lane LOS	C	C	D	C	D	E	C	C	C
HCM 95th-tile Q	1.1	1.6	3.7	1.6	4.8	7.4	2.9	1.5	2.1

APPENDIX E

Analysis Report

Future (2024) With Project Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	883	92	38	1599	327	60	946	86	0	0	0
Future Volume (veh/h)	0	883	92	38	1599	327	60	946	86	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		0.93	1.00		0.95	1.00		0.91			
Parking Bus, Adj	1.00	1.00	0.94	1.00	1.00	0.97	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1758	1758	1772	1772	1772	1758	1758	1758			
Adj Flow Rate, veh/h	0	970	101	45	1904	389	67	1063	97			
Peak Hour Factor	0.91	0.91	0.91	0.84	0.84	0.84	0.89	0.89	0.89			
Percent Heavy Veh, %	0	3	3	2	2	2	3	3	3			
Cap, veh/h	0	1737	181	75	2724	550	544	1560	439			
Arrive On Green	0.00	0.59	0.59	1.00	1.00	1.00	0.32	0.32	0.32			
Sat Flow, veh/h	0	3023	306	72	4605	930	1674	4799	1351			
Grp Volume(v), veh/h	0	552	519	624	1153	561	67	1063	97			
Grp Sat Flow(s),veh/h/ln	0	1670	1570	1492	1387	1341	1674	1600	1351			
Q Serve(g_s), s	0.0	24.2	24.2	10.1	0.0	0.0	3.4	23.0	6.3			
Cycle Q Clear(g_c), s	0.0	24.2	24.2	34.3	0.0	0.0	3.4	23.0	6.3			
Prop In Lane	0.00		0.19	0.07		0.69	1.00		1.00			
Lane Grp Cap(c), veh/h	0	988	929	915	1641	793	544	1560	439			
V/C Ratio(X)	0.00	0.56	0.56	0.68	0.70	0.71	0.12	0.68	0.22			
Avail Cap(c_a), veh/h	0	988	929	915	1641	793	544	1560	439			
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	0.0	14.9	14.9	0.4	0.0	0.0	28.5	35.1	29.5			
Incr Delay (d2), s/veh	0.0	2.3	2.4	4.1	2.5	5.3	0.5	2.4	1.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	9.3	8.8	1.0	0.6	1.2	1.5	9.4	2.2			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	17.2	17.4	4.6	2.5	5.3	28.9	37.5	30.6			
LnGrp LOS	A	B	B	A	A	A	C	D	C			
Approach Vol, veh/h		1071			2338			1227				
Approach Delay, s/veh		17.3			3.7			36.5				
Approach LOS		B			A			D				

Timer - Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		76.0		44.0		76.0						
Change Period (Y+Rc), s		5.0		5.0		5.0						
Max Green Setting (Gmax), s		71.0		39.0		71.0						
Max Q Clear Time (g_c+I1), s		36.3		25.0		26.2						
Green Ext Time (p_c), s		31.7		5.2		8.7						

Intersection Summary												
HCM 6th Ctrl Delay			15.5									
HCM 6th LOS			B									

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	66.5	70.3	86.4	55.3
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	6	6	7	5
Number of Right-Turn Islands	0	0	0	0
Type of Control	Pretimed	Pretimed	Pretimed	Pretimed
Corresponding Signal Phase	4	4	6	2
Effective Walk Time (s)	11.0	11.0	11.0	11.0
Right Corner Size A (ft)	8.0	8.0	10.0	30.0
Right Corner Size B (ft)	12.0	8.0	10.0	20.0
Right Corner Curb Radius (ft)	30.0	30.0	30.0	30.0
Right Corner Total Area (sq.ft)	655.35	655.35	655.35	406.50
Ped. Left-Right Flow Rate (p/h)	5	52	28	43
Ped. Right-Left Flow Rate (p/h)	44	6	9	14
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	35	35	25	25
Right Corner Area per Ped (sq.ft)	6806.5	5102.5	6168.8	3440.3
Right Corner Quality of Service	A	A	A	A
Ped. Circulation Area (sq.ft)	267.4	227.5	370.5	222.5
Crosswalk Circulation Code	A	A	A	A
Pedestrian Delay (s/p)	49.5	49.5	49.5	49.5
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	3.04	3.11	2.77	2.55
Pedestrian Crosswalk LOS	C	C	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	1071	2338	1227	0
Effct. Green for Bike (s)	71.0	71.0	39.0	0.0
Cross Street Width (ft)	86.4	55.3	70.3	66.5
Through Lanes Number	2	4	3	0
Through Lane Width (ft)	11.0	11.0	11.0	11.0
Bicycle Lane Width (ft)	0.0	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	Yes	Yes	Yes	Yes
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	1183	1183	650	0
Bicycle Delay (s/bike)	10.0	10.0	27.3	0.0
Bicycle Compliance	Fair	Fair	Fair	
Bicycle LOS Score	3.98	3.58	3.52	0.00
Bicycle LOS	D	D	D	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	781	119	35	1684	57	45
Future Volume (vph)	781	119	35	1684	57	45
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.0			5.0	5.0	
Lane Util. Factor	0.95			0.86	1.00	
Frpb, ped/bikes	0.97			1.00	0.96	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.98			1.00	0.94	
Flt Protected	1.00			1.00	0.97	
Satd. Flow (prot)	3047			5817	1353	
Flt Permitted	1.00			0.87	0.97	
Satd. Flow (perm)	3047			5073	1353	
Peak-hour factor, PHF	0.83	0.83	0.80	0.80	0.73	0.73
Adj. Flow (vph)	941	143	44	2105	78	62
RTOR Reduction (vph)	10	0	0	0	24	0
Lane Group Flow (vph)	1074	0	0	2149	116	0
Confl. Peds. (#/hr)		80	80			61
Confl. Bikes (#/hr)		9				
Heavy Vehicles (%)	3%	3%	2%	2%	13%	13%
Bus Blockages (#/hr)	0	15	0	7	0	0
Turn Type	NA		Perm	NA	Prot	
Protected Phases	6			2	4	
Permitted Phases			2			
Actuated Green, G (s)	77.0			77.0	33.0	
Effective Green, g (s)	77.0			77.0	33.0	
Actuated g/C Ratio	0.64			0.64	0.28	
Clearance Time (s)	5.0			5.0	5.0	
Lane Grp Cap (vph)	1955			3255	372	
v/s Ratio Prot	0.35				c0.09	
v/s Ratio Perm				c0.42		
v/c Ratio	0.55			0.66	0.31	
Uniform Delay, d1	11.9			13.4	34.5	
Progression Factor	0.59			0.20	1.00	
Incremental Delay, d2	1.0			0.8	2.2	
Delay (s)	7.9			3.4	36.7	
Level of Service	A			A	D	
Approach Delay (s)	7.9			3.4	36.7	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	6.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	83.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Approach	EB	WB	NB
Crosswalk Length (ft)	66.0	65.9	22.2
Crosswalk Width (ft)	12.0	12.0	12.0
Total Number of Lanes Crossed	6	6	2
Number of Right-Turn Islands	0	0	0
Type of Control	None	Pretimed	Pretimed
Corresponding Signal Phase	2	4	6
Effective Walk Time (s)	0.0	11.0	11.0
Right Corner Size A (ft)	9.0	20.0	7.0
Right Corner Size B (ft)	15.0	8.0	15.0
Right Corner Curb Radius (ft)	30.0	0.0	20.0
Right Corner Total Area (sq.ft)	655.35	160.00	19.00
Ped. Left-Right Flow Rate (p/h)	0	15	14
Ped. Right-Left Flow Rate (p/h)	0	36	42
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0
85th percentile speed (mph)	35	35	25
Right Corner Area per Ped (sq.ft)	10516.9	2779.8	126.8
Right Corner Quality of Service	A	A	A
Ped. Circulation Area (sq.ft)	0.0	257.4	174.7
Crosswalk Circulation Code	-	A	A
Pedestrian Delay (s/p)	60.0	49.5	49.5
Pedestrian Compliance Code	Poor	Poor	Poor
Pedestrian Crosswalk Score	3.09	3.06	1.86
Pedestrian Crosswalk LOS	C	C	B

Approach	EB	WB	NB
Bicycle Flow Rate (bike/h)	0	1	0
Total Flow Rate (veh/h)	1084	2149	140
Effct. Green for Bike (s)	77.0	77.0	33.0
Cross Street Width (ft)	22.2	66.0	65.9
Through Lanes Number	2	4	1
Through Lane Width (ft)	11.0	11.0	11.0
Bicycle Lane Width (ft)	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0
Curb Is Present?	No	No	No
On Street Parking?	No	No	No
Bicycle Lane Capacity (bike/h)	1283	1283	550
Bicycle Delay (s/bike)	7.7	7.7	31.5
Bicycle Compliance	Good	Good	Poor
Bicycle LOS Score	3.01	3.67	3.01
Bicycle LOS	C	D	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	674	223	0	1609	130	0	224	15	168	547	90
Future Volume (vph)	0	674	223	0	1609	130	0	224	15	168	547	90
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0	6.0		6.0			6.0	6.0		6.0	
Lane Util. Factor		0.95	1.00		0.86			0.91	1.00		0.91	
Frpb, ped/bikes		1.00	0.87		0.98			1.00	0.77		0.96	
Flpb, ped/bikes		1.00	1.00		1.00			1.00	1.00		0.98	
Frt		1.00	0.85		0.99			1.00	0.85		0.98	
Flt Protected		1.00	1.00		1.00			1.00	1.00		0.99	
Satd. Flow (prot)		3101	1253		5678			4657	1118		4265	
Flt Permitted		1.00	1.00		1.00			1.00	1.00		0.79	
Satd. Flow (perm)		3101	1253		5678			4657	1118		3419	
Peak-hour factor, PHF	0.89	0.89	0.89	0.84	0.84	0.84	0.80	0.80	0.80	0.91	0.91	0.91
Adj. Flow (vph)	0	757	251	0	1915	155	0	280	19	185	601	99
RTOR Reduction (vph)	0	0	40	0	10	0	0	0	13	0	1	0
Lane Group Flow (vph)	0	757	211	0	2060	0	0	280	6	0	884	0
Confl. Peds. (#/hr)	214		97	97		214	263		172	172		263
Confl. Bikes (#/hr)			14			21			1			6
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	17	0	0	0	11	0	0	0	0	0	0
Turn Type		NA	Perm		NA			NA	Perm	pm+pt	NA	
Protected Phases		6			2			8		7	4	
Permitted Phases			6						8	4		
Actuated Green, G (s)		61.0	61.0		61.0			36.0	36.0		47.0	
Effective Green, g (s)		61.0	61.0		61.0			36.0	36.0		47.0	
Actuated g/C Ratio		0.51	0.51		0.51			0.30	0.30		0.39	
Clearance Time (s)		6.0	6.0		6.0			6.0	6.0		6.0	
Lane Grp Cap (vph)		1576	636		2886			1397	335		1374	
v/s Ratio Prot		0.24			c0.36			0.06			c0.03	
v/s Ratio Perm			0.17						0.01		c0.23	
v/c Ratio		0.48	0.33		0.71			0.20	0.02		0.64	
Uniform Delay, d1		19.2	17.4		22.8			31.3	29.6		29.7	
Progression Factor		1.09	1.27		1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.9	1.2		1.5			0.3	0.1		2.3	
Delay (s)		21.8	23.3		24.3			31.6	29.6		32.0	
Level of Service		C	C		C			C	C		C	
Approach Delay (s)		22.2			24.3			31.5			32.0	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	89.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	66.1	66.6	78.3	66.1
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	6	6	6	6
Number of Right-Turn Islands	1	1	2	0
Type of Control	Pretimed	Pretimed	Pretimed	Pretimed
Corresponding Signal Phase	4	8	6	2
Effective Walk Time (s)	11.0	11.0	11.0	11.0
Right Corner Size A (ft)	10.0	10.0	15.0	15.0
Right Corner Size B (ft)	10.0	10.0	15.0	15.0
Right Corner Curb Radius (ft)	40.0	30.0	40.0	30.0
Right Corner Total Area (sq.ft)	655.35	655.35	655.35	31.50
Ped. Left-Right Flow Rate (p/h)	209	55	20	131
Ped. Right-Left Flow Rate (p/h)	70	165	61	44
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	35	35	30	30
Right Corner Area per Ped (sq.ft)	1622.9	1446.8	1935.7	28.0
Right Corner Quality of Service	A	A	A	C
Ped. Circulation Area (sq.ft)	44.9	57.7	165.6	73.1
Crosswalk Circulation Code	B	B	A	A
Pedestrian Delay (s/p)	49.5	49.5	49.5	49.5
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	2.89	2.89	2.78	2.68
Pedestrian Crosswalk LOS	C	C	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	1008	2070	299	885
Effct. Green for Bike (s)	61.0	61.0	36.0	47.0
Cross Street Width (ft)	78.3	66.1	66.6	66.1
Through Lanes Number	2	4	3	3
Through Lane Width (ft)	11.0	11.0	11.0	11.0
Bicycle Lane Width (ft)	0.0	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	No	No	No	No
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	1017	1017	600	783
Bicycle Delay (s/bike)	14.5	14.5	29.4	22.2
Bicycle Compliance	Fair	Fair	Fair	Fair
Bicycle LOS Score	3.80	3.64	2.96	3.27
Bicycle LOS	D	D	C	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	51	5	156	45	155	33	942	146	0	149	24
Future Volume (vph)	0	51	5	156	45	155	33	942	146	0	149	24
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0		5.0	5.0	5.0		5.0			5.0	
Lane Util. Factor		1.00		0.95	0.95	1.00		0.86			0.95	
Frpb, ped/bikes		1.00		1.00	1.00	0.95		0.98			0.98	
Flpb, ped/bikes		1.00		1.00	1.00	1.00		1.00			1.00	
Frt		0.99		1.00	1.00	0.85		0.98			0.98	
Flt Protected		1.00		0.95	0.97	1.00		1.00			1.00	
Satd. Flow (prot)		1683		1496	1531	1338		5377			3033	
Flt Permitted		1.00		0.71	0.82	1.00		0.92			1.00	
Satd. Flow (perm)		1683		1125	1288	1338		4937			3033	
Peak-hour factor, PHF	0.87	0.87	0.87	0.84	0.84	0.84	0.94	0.94	0.94	0.95	0.95	0.95
Adj. Flow (vph)	0	59	6	186	54	185	35	1002	155	0	157	25
RTOR Reduction (vph)	0	3	0	0	0	26	0	23	0	0	11	0
Lane Group Flow (vph)	0	62	0	117	123	159	0	1170	0	0	172	0
Confl. Peds. (#/hr)	32					32	34		95	95		34
Confl. Bikes (#/hr)			1			5			11			12
Heavy Vehicles (%)	2%	2%	2%	5%	5%	5%	7%	7%	7%	5%	5%	5%
Turn Type		NA		Perm	NA	Perm	Perm	NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)		50.0		50.0	50.0	50.0		60.0			60.0	
Effective Green, g (s)		50.0		50.0	50.0	50.0		60.0			60.0	
Actuated g/C Ratio		0.42		0.42	0.42	0.42		0.50			0.50	
Clearance Time (s)		5.0		5.0	5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)		701		468	536	557		2468			1516	
v/s Ratio Prot		0.04									0.06	
v/s Ratio Perm				0.10	0.10	c0.12		c0.24				
v/c Ratio		0.09		0.25	0.23	0.29		0.47			0.11	
Uniform Delay, d1		21.2		22.8	22.6	23.2		19.7			15.9	
Progression Factor		1.00		1.00	1.00	1.00		1.00			1.95	
Incremental Delay, d2		0.2		1.3	1.0	1.3		0.7			0.1	
Delay (s)		21.4		24.1	23.6	24.5		20.3			31.1	
Level of Service		C		C	C	C		C			C	
Approach Delay (s)		21.4			24.1			20.3			31.1	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	22.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	22.1	61.6	81.0	87.7
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	2	5	6	6
Number of Right-Turn Islands	0	0	0	0
Type of Control	None	None	None	None
Corresponding Signal Phase	6	2	4	8
Effective Walk Time (s)	0.0	0.0	0.0	0.0
Right Corner Size A (ft)	8.0	8.0	8.0	8.0
Right Corner Size B (ft)	8.0	8.0	8.0	8.0
Right Corner Curb Radius (ft)	20.0	30.0	0.0	20.0
Right Corner Total Area (sq.ft)	655.35	655.35	64.00	655.35
Ped. Left-Right Flow Rate (p/h)	1	59	0	15
Ped. Right-Left Flow Rate (p/h)	10	7	0	12
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	15	15	25	25
Right Corner Area per Ped (sq.ft)	53551.4	6324.4	805.7	15495.8
Right Corner Quality of Service	A	A	A	A
Ped. Circulation Area (sq.ft)	0.0	0.0	0.0	0.0
Crosswalk Circulation Code	F	F	-	F
Pedestrian Delay (s/p)	60.0	60.0	60.0	60.0
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	1.78	2.38	2.68	2.66
Pedestrian Crosswalk LOS	B	B	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	65	425	1192	182
Effct. Green for Bike (s)	50.0	50.0	60.0	60.0
Cross Street Width (ft)	81.0	87.7	61.6	22.1
Through Lanes Number	1	1	4	2
Through Lane Width (ft)	11.0	11.0	11.0	11.0
Bicycle Lane Width (ft)	0.0	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	No	No	No	No
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	833	833	1000	1000
Bicycle Delay (s/bike)	20.4	20.4	15.0	15.0
Bicycle Compliance	Fair	Fair	Fair	Fair
Bicycle LOS Score	3.12	3.82	3.21	2.26
Bicycle LOS	C	D	C	B

Intersection	
Intersection Delay, s/veh	11.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	26	125	25	51	305	58	35	43	11	29	124	37
Future Vol, veh/h	26	125	25	51	305	58	35	43	11	29	124	37
Peak Hour Factor	0.95	0.95	0.95	0.94	0.94	0.94	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	15	15	15	6	6	6	3	3	3	3	3	3
Mvmt Flow	27	132	26	54	324	62	41	50	13	34	144	43
Number of Lanes	0	2	0	0	2	0	0	2	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	10.5	12	10.3	13.3
HCM LOS	B	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	62%	0%	29%	0%	25%	0%	15%
Vol Thru, %	38%	66%	71%	71%	75%	72%	65%
Vol Right, %	0%	34%	0%	29%	0%	28%	19%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	57	33	89	88	204	211	190
LT Vol	35	0	26	0	51	0	29
Through Vol	22	22	63	63	153	153	124
RT Vol	0	11	0	25	0	58	37
Lane Flow Rate	66	38	93	92	216	224	221
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.127	0.067	0.171	0.16	0.366	0.358	0.387
Departure Headway (Hd)	6.974	6.418	6.605	6.253	6.083	5.761	6.3
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	513	557	542	573	591	625	570
Service Time	4.729	4.172	4.353	4	3.822	3.499	4.343
HCM Lane V/C Ratio	0.129	0.068	0.172	0.161	0.365	0.358	0.388
HCM Control Delay	10.7	9.6	10.7	10.2	12.3	11.7	13.3
HCM Lane LOS	B	A	B	B	B	B	B
HCM 95th-tile Q	0.4	0.2	0.6	0.6	1.7	1.6	1.8

Intersection	
Intersection Delay, s/veh	13.3
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	195	20	0	252	50	0	66	18	124	155	178
Future Vol, veh/h	7	195	20	0	252	50	0	66	18	124	155	178
Peak Hour Factor	0.88	0.88	0.88	0.92	0.92	0.92	0.86	0.86	0.86	0.89	0.89	0.89
Heavy Vehicles, %	15	15	15	6	6	6	3	3	3	5	5	5
Mvmt Flow	8	222	23	0	274	54	0	77	21	139	174	200
Number of Lanes	0	2	0	0	2	0	0	2	0	0	2	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	2	2
HCM Control Delay	13.3	13.7	11.7	13.4
HCM LOS	B	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	0%	0%	7%	0%	0%	0%	71%	0%	0%
Vol Thru, %	100%	55%	93%	83%	100%	63%	29%	100%	0%
Vol Right, %	0%	45%	0%	17%	0%	37%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	44	40	105	118	168	134	176	103	178
LT Vol	0	0	7	0	0	0	124	0	0
Through Vol	44	22	98	98	168	84	52	103	0
RT Vol	0	18	0	20	0	50	0	0	178
Lane Flow Rate	51	47	119	134	183	146	197	116	200
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.115	0.1	0.256	0.282	0.375	0.288	0.407	0.228	0.353
Departure Headway (Hd)	8.078	7.754	7.756	7.601	7.392	7.127	7.422	7.063	6.351
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	444	462	463	473	488	504	486	509	566
Service Time	5.83	5.506	5.498	5.343	5.133	4.869	5.158	4.799	4.087
HCM Lane V/C Ratio	0.115	0.102	0.257	0.283	0.375	0.29	0.405	0.228	0.353
HCM Control Delay	11.9	11.4	13.2	13.3	14.5	12.7	15.2	11.9	12.5
HCM Lane LOS	B	B	B	B	B	B	C	B	B
HCM 95th-tile Q	0.4	0.3	1	1.1	1.7	1.2	2	0.9	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	2239	153	0	798	321	101	1286	303	0	0	0
Future Volume (veh/h)	0	2239	153	0	798	321	101	1286	303	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		0.82	1.00		0.93	1.00		0.89			
Parking Bus, Adj	1.00	1.00	0.94	1.00	1.00	0.97	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1870	1870	0	1856	1856	1870	1870	1870			
Adj Flow Rate, veh/h	0	2408	165	0	849	341	103	1312	309			
Peak Hour Factor	0.93	0.93	0.93	0.94	0.94	0.94	0.98	0.98	0.98			
Percent Heavy Veh, %	0	2	2	0	3	3	2	2	2			
Cap, veh/h	0	3099	211	0	1222	488	713	2042	565			
Arrive On Green	0.00	0.52	0.52	0.00	1.00	1.00	0.80	0.80	0.80			
Sat Flow, veh/h	0	6259	407	0	2458	945	1781	5106	1413			
Grp Volume(v), veh/h	0	1934	639	0	632	558	103	1312	309			
Grp Sat Flow(s),veh/h/ln	0	1609	1579	0	1763	1547	1781	1702	1413			
Q Serve(g_s), s	0.0	38.8	39.5	0.0	0.0	0.0	1.6	12.7	9.3			
Cycle Q Clear(g_c), s	0.0	38.8	39.5	0.0	0.0	0.0	1.6	12.7	9.3			
Prop In Lane	0.00		0.26	0.00		0.61	1.00		1.00			
Lane Grp Cap(c), veh/h	0	2493	816	0	911	799	713	2042	565			
V/C Ratio(X)	0.00	0.78	0.78	0.00	0.69	0.70	0.14	0.64	0.55			
Avail Cap(c_a), veh/h	0	2493	816	0	911	799	713	2042	565			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00			
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	0.0	23.4	23.6	0.0	0.0	0.0	7.4	8.5	8.1			
Incr Delay (d2), s/veh	0.0	2.4	7.4	0.0	4.3	5.0	0.4	1.6	3.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	14.5	15.6	0.0	1.1	1.1	0.7	3.1	2.5			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	25.8	31.0	0.0	4.3	5.0	7.8	10.0	11.9			
LnGrp LOS	A	C	C	A	A	A	A	B	B			
Approach Vol, veh/h		2573			1190			1724				
Approach Delay, s/veh		27.1			4.7			10.2				
Approach LOS		C			A			B				

Timer - Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		67.0		53.0		67.0						
Change Period (Y+Rc), s		5.0		5.0		5.0						
Max Green Setting (Gmax), s		62.0		48.0		62.0						
Max Q Clear Time (g_c+I1), s		2.0		14.7		41.5						
Green Ext Time (p_c), s		25.0		9.9		17.2						

Intersection Summary												
HCM 6th Ctrl Delay			16.9									
HCM 6th LOS			B									

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	72.7	75.3	92.4	60.2
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	6	6	7	5
Number of Right-Turn Islands	0	0	0	0
Type of Control	Pretimed	Pretimed	Pretimed	Pretimed
Corresponding Signal Phase	4	4	6	2
Effective Walk Time (s)	11.0	11.0	11.0	11.0
Right Corner Size A (ft)	8.0	8.0	10.0	30.0
Right Corner Size B (ft)	12.0	8.0	10.0	20.0
Right Corner Curb Radius (ft)	30.0	30.0	30.0	30.0
Right Corner Total Area (sq.ft)	655.35	655.35	655.35	406.50
Ped. Left-Right Flow Rate (p/h)	8	67	62	29
Ped. Right-Left Flow Rate (p/h)	76	8	27	68
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	35	35	25	25
Right Corner Area per Ped (sq.ft)	3360.0	3415.8	3561.0	1995.3
Right Corner Quality of Service	A	A	A	A
Ped. Circulation Area (sq.ft)	156.9	177.2	154.3	131.9
Crosswalk Circulation Code	A	A	A	A
Pedestrian Delay (s/p)	49.5	49.5	49.5	49.5
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	3.13	3.21	2.83	2.58
Pedestrian Crosswalk LOS	C	C	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	2573	1190	1724	0
Effct. Green for Bike (s)	62.0	62.0	48.0	0.0
Cross Street Width (ft)	92.4	60.2	75.3	72.7
Through Lanes Number	4	2	3	0
Through Lane Width (ft)	12.0	12.0	12.0	12.0
Bicycle Lane Width (ft)	0.0	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	Yes	Yes	Yes	Yes
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	1033	1033	800	0
Bicycle Delay (s/bike)	14.0	14.0	21.6	0.0
Bicycle Compliance	Fair	Fair	Fair	
Bicycle LOS Score	4.03	3.46	3.66	0.00
Bicycle LOS	D	C	D	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	2196	136	0	849	192	169
Future Volume (vph)	2196	136	0	849	192	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			5.0	5.0	
Lane Util. Factor	0.86			0.95	1.00	
Frpb, ped/bikes	0.98			1.00	0.95	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.99			1.00	0.94	
Flt Protected	1.00			1.00	0.97	
Satd. Flow (prot)	6222			3490	1586	
Flt Permitted	1.00			1.00	0.97	
Satd. Flow (perm)	6222			3490	1586	
Peak-hour factor, PHF	0.91	0.91	0.92	0.92	0.86	0.86
Adj. Flow (vph)	2413	149	0	923	223	197
RTOR Reduction (vph)	7	0	0	0	1	0
Lane Group Flow (vph)	2555	0	0	923	419	0
Confl. Peds. (#/hr)		121	121			72
Confl. Bikes (#/hr)		18				1
Heavy Vehicles (%)	2%	2%	2%	2%	4%	4%
Bus Blockages (#/hr)	0	15	0	7	0	0
Turn Type	NA			NA	Prot	
Protected Phases	6			2	4	
Permitted Phases						
Actuated Green, G (s)	61.0			61.0	49.0	
Effective Green, g (s)	61.0			61.0	49.0	
Actuated g/C Ratio	0.51			0.51	0.41	
Clearance Time (s)	5.0			5.0	5.0	
Lane Grp Cap (vph)	3162			1774	647	
v/s Ratio Prot	c0.41			0.26	c0.26	
v/s Ratio Perm						
v/c Ratio	0.81			0.52	0.65	
Uniform Delay, d1	24.6			19.7	28.6	
Progression Factor	0.32			0.37	1.00	
Incremental Delay, d2	1.5			0.9	5.0	
Delay (s)	9.4			8.1	33.5	
Level of Service	A			A	C	
Approach Delay (s)	9.4			8.1	33.5	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	11.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Approach	EB	WB	NB
Crosswalk Length (ft)	72.1	72.0	24.2
Crosswalk Width (ft)	12.0	12.0	12.0
Total Number of Lanes Crossed	6	6	2
Number of Right-Turn Islands	0	0	0
Type of Control	None	Pretimed	Pretimed
Corresponding Signal Phase	2	4	6
Effective Walk Time (s)	0.0	11.0	11.0
Right Corner Size A (ft)	9.0	20.0	7.0
Right Corner Size B (ft)	15.0	8.0	15.0
Right Corner Curb Radius (ft)	30.0	0.0	20.0
Right Corner Total Area (sq.ft)	655.35	160.00	19.00
Ped. Left-Right Flow Rate (p/h)	0	54	106
Ped. Right-Left Flow Rate (p/h)	0	23	45
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0
85th percentile speed (mph)	35	35	25
Right Corner Area per Ped (sq.ft)	3862.6	1851.6	48.1
Right Corner Quality of Service	A	A	B
Ped. Circulation Area (sq.ft)	0.0	172.2	64.4
Crosswalk Circulation Code	-	A	A
Pedestrian Delay (s/p)	60.0	49.5	49.5
Pedestrian Compliance Code	Poor	Poor	Poor
Pedestrian Crosswalk Score	3.18	3.14	1.96
Pedestrian Crosswalk LOS	C	C	B

Approach	EB	WB	NB
Bicycle Flow Rate (bike/h)	0	1	0
Total Flow Rate (veh/h)	2562	923	420
Effct. Green for Bike (s)	61.0	61.0	49.0
Cross Street Width (ft)	24.2	72.1	72.0
Through Lanes Number	4	2	1
Through Lane Width (ft)	12.0	12.0	12.0
Bicycle Lane Width (ft)	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0
Curb Is Present?	No	No	No
On Street Parking?	No	No	No
Bicycle Lane Capacity (bike/h)	1017	1017	817
Bicycle Delay (s/bike)	14.5	14.5	21.0
Bicycle Compliance	Fair	Fair	Fair
Bicycle LOS Score	2.99	3.42	3.35
Bicycle LOS	C	C	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	212	1923	205	0	723	195	1	712	130	221	799	104
Future Volume (vph)	212	1923	205	0	723	195	1	712	130	221	799	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0			6.0	6.0		6.0	
Lane Util. Factor		0.86	1.00		0.95			0.91	1.00		0.91	
Frpb, ped/bikes		1.00	0.69		0.93			1.00	0.58		0.96	
Flpb, ped/bikes		0.99	1.00		1.00			1.00	1.00		0.99	
Frt		1.00	0.85		0.97			1.00	0.85		0.99	
Flt Protected		1.00	1.00		1.00			1.00	1.00		0.99	
Satd. Flow (prot)		6260	1093		3195			5085	912		4713	
Flt Permitted		0.72	1.00		1.00			0.94	1.00		0.67	
Satd. Flow (perm)		4533	1093		3195			4773	912		3180	
Peak-hour factor, PHF	0.90	0.90	0.90	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	236	2137	228	0	786	212	1	774	141	240	868	113
RTOR Reduction (vph)	0	0	39	0	20	0	0	0	59	0	10	0
Lane Group Flow (vph)	0	2373	189	0	978	0	0	775	82	0	1211	0
Confl. Peds. (#/hr)	278		263	263		278	576		695	695		576
Confl. Bikes (#/hr)			11			6			7			8
Bus Blockages (#/hr)	0	13	0	0	0	11	0	0	0	0	0	0
Turn Type	Perm	NA	Perm		NA		Perm	NA	Perm	pm+pt	NA	
Protected Phases		6			2			8		7	4	
Permitted Phases	6		6				8		8	4		
Actuated Green, G (s)		63.0	63.0		63.0			34.0	34.0		45.0	
Effective Green, g (s)		63.0	63.0		63.0			34.0	34.0		45.0	
Actuated g/C Ratio		0.52	0.52		0.52			0.28	0.28		0.38	
Clearance Time (s)		6.0	6.0		6.0			6.0	6.0		6.0	
Lane Grp Cap (vph)		2379	573		1677			1352	258		1256	
v/s Ratio Prot					0.31						c0.04	
v/s Ratio Perm		c0.52	0.17					0.16	0.09		c0.32	
v/c Ratio		1.24dl	0.33		0.58			0.57	0.32		1.03dl	
Uniform Delay, d1		28.4	16.4		19.5			36.8	33.9		36.7	
Progression Factor		0.65	0.51		1.00			1.00	1.00		1.00	
Incremental Delay, d2		13.5	0.9		1.5			1.8	3.2		18.1	
Delay (s)		31.8	9.2		21.0			38.6	37.1		54.9	
Level of Service		C	A		C			D	D		D	
Approach Delay (s)		29.9			21.0			38.3			54.9	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	35.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	125.8%	ICU Level of Service	H
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	72.1	72.4	83.9	72.1
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	6	6	6	6
Number of Right-Turn Islands	1	1	2	0
Type of Control	Pretimed	Pretimed	Pretimed	Pretimed
Corresponding Signal Phase	4	8	6	2
Effective Walk Time (s)	11.0	11.0	11.0	11.0
Right Corner Size A (ft)	10.0	10.0	15.0	15.0
Right Corner Size B (ft)	10.0	10.0	15.0	15.0
Right Corner Curb Radius (ft)	40.0	30.0	40.0	30.0
Right Corner Total Area (sq.ft)	655.35	655.35	655.35	31.50
Ped. Left-Right Flow Rate (p/h)	337	345	192	77
Ped. Right-Left Flow Rate (p/h)	337	346	82	181
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	35	35	30	30
Right Corner Area per Ped (sq.ft)	587.6	593.9	583.8	-4.0
Right Corner Quality of Service	A	A	A	F
Ped. Circulation Area (sq.ft)	18.0	17.5	48.0	49.7
Crosswalk Circulation Code	D	D	B	B
Pedestrian Delay (s/p)	49.5	49.5	49.5	49.5
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	2.93	2.93	2.73	2.86
Pedestrian Crosswalk LOS	C	C	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	2601	998	916	1221
Effct. Green for Bike (s)	63.0	63.0	34.0	45.0
Cross Street Width (ft)	83.9	72.1	72.4	72.1
Through Lanes Number	4	2	3	3
Through Lane Width (ft)	12.0	12.0	12.0	12.0
Bicycle Lane Width (ft)	0.0	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	No	No	No	No
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	1050	1050	567	750
Bicycle Delay (s/bike)	13.5	13.5	30.8	23.4
Bicycle Compliance	Fair	Fair	Poor	Fair
Bicycle LOS Score	3.92	3.49	3.17	3.33
Bicycle LOS	D	C	C	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	78	14	273	100	277	34	1280	185	0	175	21
Future Volume (vph)	1	78	14	273	100	277	34	1280	185	0	175	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0	5.0		5.0			5.0	
Lane Util. Factor		1.00		0.95	0.95	1.00		0.86			0.95	
Frpb, ped/bikes		1.00		1.00	1.00	0.90		0.97			0.97	
Flpb, ped/bikes		1.00		1.00	1.00	1.00		1.00			1.00	
Frt		0.98		1.00	1.00	0.85		0.98			0.98	
Flt Protected		1.00		0.95	0.98	1.00		1.00			1.00	
Satd. Flow (prot)		1820		1665	1711	1407		5963			3393	
Flt Permitted		1.00		0.68	0.80	1.00		0.92			1.00	
Satd. Flow (perm)		1819		1199	1397	1407		5480			3393	
Peak-hour factor, PHF	0.76	0.76	0.76	0.92	0.92	0.92	0.95	0.95	0.95	0.85	0.85	0.85
Adj. Flow (vph)	1	103	18	297	109	301	36	1347	195	0	206	25
RTOR Reduction (vph)	0	5	0	0	0	10	0	21	0	0	8	0
Lane Group Flow (vph)	0	117	0	193	213	291	0	1557	0	0	223	0
Confl. Peds. (#/hr)	81					81	78		189	189		78
Confl. Bikes (#/hr)			6			3			19			10
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	4%	4%	4%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)		55.0		55.0	55.0	55.0		55.0			55.0	
Effective Green, g (s)		55.0		55.0	55.0	55.0		55.0			55.0	
Actuated g/C Ratio		0.46		0.46	0.46	0.46		0.46			0.46	
Clearance Time (s)		5.0		5.0	5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)		833		549	640	644		2511			1555	
v/s Ratio Prot											0.07	
v/s Ratio Perm		0.06		0.16	0.15	c0.21		c0.28				
v/c Ratio		0.14		0.35	0.33	0.45		0.62			0.14	
Uniform Delay, d1		18.8		21.0	20.8	22.2		24.6			18.8	
Progression Factor		1.00		1.00	1.00	1.00		1.00			1.39	
Incremental Delay, d2		0.4		1.8	1.4	2.3		1.2			0.2	
Delay (s)		19.2		22.8	22.2	24.5		25.8			26.4	
Level of Service		B		C	C	C		C			C	
Approach Delay (s)		19.2			23.3			25.8			26.4	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	24.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	82.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	24.2	65.5	87.2	93.7
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	2	5	6	6
Number of Right-Turn Islands	0	0	0	0
Type of Control	None	None	None	None
Corresponding Signal Phase	6	2	4	8
Effective Walk Time (s)	0.0	0.0	0.0	0.0
Right Corner Size A (ft)	8.0	8.0	8.0	8.0
Right Corner Size B (ft)	8.0	8.0	8.0	8.0
Right Corner Curb Radius (ft)	20.0	30.0	0.0	20.0
Right Corner Total Area (sq.ft)	655.35	655.35	64.00	655.35
Ped. Left-Right Flow Rate (p/h)	1	59	0	15
Ped. Right-Left Flow Rate (p/h)	10	7	0	12
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	0	0	0	0
Veh. Perm. R. Flow in Walk (v/h)	0	0	0	0
Veh. RTOR Flow in Walk (v/h)	0	0	0	0
85th percentile speed (mph)	15	15	25	25
Right Corner Area per Ped (sq.ft)	53551.4	6324.4	805.7	15495.8
Right Corner Quality of Service	A	A	A	A
Ped. Circulation Area (sq.ft)	0.0	0.0	0.0	0.0
Crosswalk Circulation Code	F	F	-	F
Pedestrian Delay (s/p)	60.0	60.0	60.0	60.0
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	1.81	2.42	2.76	2.73
Pedestrian Crosswalk LOS	B	B	C	C

Approach	EB	WB	NB	SB
Bicycle Flow Rate (bike/h)	0	0	0	0
Total Flow Rate (veh/h)	122	707	1578	231
Effct. Green for Bike (s)	55.0	55.0	55.0	55.0
Cross Street Width (ft)	87.2	93.7	65.5	24.2
Through Lanes Number	1	1	4	2
Through Lane Width (ft)	12.0	12.0	12.0	12.0
Bicycle Lane Width (ft)	0.0	0.0	0.0	0.0
Striped Parking Lane Width (ft)	0.0	0.0	0.0	0.0
Paved Shoulder Width (ft)	0.0	0.0	0.0	0.0
Curb Is Present?	No	No	No	No
On Street Parking?	No	No	No	No
Bicycle Lane Capacity (bike/h)	917	917	917	917
Bicycle Delay (s/bike)	17.6	17.6	17.6	17.6
Bicycle Compliance	Fair	Fair	Fair	Fair
Bicycle LOS Score	3.10	4.16	3.21	2.12
Bicycle LOS	C	D	C	B

Intersection	
Intersection Delay, s/veh	18.7
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	47	160	28	92	359	178	69	151	40	50	98	28
Future Vol, veh/h	47	160	28	92	359	178	69	151	40	50	98	28
Peak Hour Factor	0.87	0.87	0.87	0.92	0.92	0.92	0.88	0.88	0.88	0.85	0.85	0.85
Heavy Vehicles, %	15	15	15	3	3	3	2	2	2	3	3	3
Mvmt Flow	54	184	32	100	390	193	78	172	45	59	115	33
Number of Lanes	0	2	0	0	2	0	0	2	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	14.1	22.7	14.5	17.4
HCM LOS	B	C	B	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	48%	0%	37%	0%	34%	0%	28%
Vol Thru, %	52%	65%	63%	74%	66%	50%	56%
Vol Right, %	0%	35%	0%	26%	0%	50%	16%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	145	116	127	108	272	358	176
LT Vol	69	0	47	0	92	0	50
Through Vol	76	76	80	80	180	180	98
RT Vol	0	40	0	28	0	178	28
Lane Flow Rate	164	131	146	124	295	389	207
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.368	0.276	0.328	0.266	0.591	0.721	0.454
Departure Headway (Hd)	8.058	7.564	8.078	7.7	7.211	6.68	7.893
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	447	475	445	466	502	540	456
Service Time	5.81	5.316	5.835	5.457	4.96	4.429	5.948
HCM Lane V/C Ratio	0.367	0.276	0.328	0.266	0.588	0.72	0.454
HCM Control Delay	15.5	13.2	14.8	13.2	19.9	24.9	17.4
HCM Lane LOS	C	B	B	B	C	C	C
HCM 95th-tile Q	1.7	1.1	1.4	1.1	3.8	5.9	2.3

Intersection	
Intersection Delay, s/veh	31.2
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	294	20	0	415	185	1	183	31	110	175	194
Future Vol, veh/h	0	294	20	0	415	185	1	183	31	110	175	194
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.94	0.94	0.94	0.87	0.87	0.87
Heavy Vehicles, %	11	11	11	2	2	2	2	2	2	3	3	3
Mvmt Flow	0	327	22	0	461	206	1	195	33	126	201	223
Number of Lanes	0	2	0	0	2	0	0	2	0	0	2	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	2	2
HCM Control Delay	25.3	46.1	19.1	21.9
HCM LOS	D	E	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	1%	0%	0%	0%	0%	0%	65%	0%	0%
Vol Thru, %	99%	75%	100%	83%	100%	43%	35%	100%	0%
Vol Right, %	0%	25%	0%	17%	0%	57%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	93	123	196	118	277	323	168	117	194
LT Vol	1	0	0	0	0	0	110	0	0
Through Vol	92	92	196	98	277	138	58	117	0
RT Vol	0	31	0	20	0	185	0	0	194
Lane Flow Rate	98	130	218	131	307	359	193	134	223
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.296	0.385	0.628	0.374	0.794	0.887	0.538	0.36	0.554
Departure Headway (Hd)	10.834	10.641	10.389	10.266	9.414	9.001	10.12	9.78	9.052
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	334	340	351	353	387	406	358	370	401
Service Time	8.549	8.357	8.089	7.966	7.114	6.701	7.82	7.48	6.752
HCM Lane V/C Ratio	0.293	0.382	0.621	0.371	0.793	0.884	0.539	0.362	0.556
HCM Control Delay	18	19.9	29.1	19	40	51.4	24	17.9	22.4
HCM Lane LOS	C	C	D	C	E	F	C	C	C
HCM 95th-tile Q	1.2	1.8	4	1.7	6.8	9.1	3	1.6	3.3

I. PRELIMINARY ENGINEERING REPORT

PRELIMINARY ENGINEERING REPORT

for

THE CENTRAL ALA MOANA

HONOLULU, OAHU, HAWAII 96814

TMK: 2-3-039:011

Submitted By

SSFM INTERNATIONAL, INC.

Project Managers, Planners, & Engineers

501 Sumner Street, Suite 620
Honolulu, Hawaii 96817
Phone: (808) 531-1308
Fax: (808) 521-7348
Email: contact_us@ssfm.com

December 2017

SSFM INTERNATIONAL

SSFM INTERNATIONAL, INC.
501 Sumner Street, Suite 620
Honolulu, Hawaii 96817
Phone: (808) 531-1308
Fax: (808) 521-7348

Project Managers, Planners, & Engineers
American Council of Engineering Companies, Member

Statement of SSFM International, Inc.'s Quality Process

It is the policy of SSFM to have a consistent and systematic approach to the development and review of its reports and other project deliverables.

All projects and products of our service are subject to a quality process and in no case will the quality review be eliminated. The main purpose of this process is to assure:

- Clarity, completeness, coordination, and accuracy of documents.
- That the project, study or investigation meets the Client's objectives.
- That the requirements of our Agreement with the Client have been met, and the Client has received the value of the fee to be paid.

The Preparation of This Report Was The Responsibility Of and Completed By:

Signature _____ December 6, 2017
Date

The Quality Review of This Report Was The Responsibility Of and Completed By:

Signature _____ December 6, 2017
Date

TABLE OF CONTENTS

INTRODUCTION **2**
I. BACKGROUND **2**
LAND USE AND ZONING 2
FLOOD ZONE 3
EXISTING USES 3
CLIMATE 3
TOPOGRAPHIC FEATURES 3
SOILS 4
II. DRAINAGE **4**
EXISTING CONDITIONS 4
MODIFICATIONS AFTER DEVELOPMENT 4
IMPACTS AND MITIGATION 5
III. GRADING AND SOIL EROSION **5**
GRADING 5
SOIL EROSION 5
IV. ROADS **6**
EXISTING CONDITIONS 6
MODIFICATIONS AFTER DEVELOPMENT 6
V. WATER **6**
EXISTING CONDITIONS 6
PROJECTED WATER DEMAND 7
LANDSCAPING IRRIGATION 8
FIRE PROTECTION 8
IMPACTS AND MITIGATION 8
VI. WASTEWATER **8**
EXISTING CONDITIONS 8
PROJECTED WASTEWATER FLOWS 9
IMPACTS AND MITIGATION 9
SEWER CREDITS 9
VII. SOLID WASTE **10**
EXISTING CONDITIONS 10
PROJECTED SOLID WASTE GENERATION 10
IMPACTS AND MITIGATION 11
VIII. ADDITIONAL UTILITIES **11**
ELECTRICAL 11
TELECOMMUNICATION 12
GAS 12
IX. REFERENCES **13**
TABLE OF FIGURES **14**
FIGURE 1: PROJECT LOCATION MAP 14
FIGURE 2: FLOOD INSURANCE RATE MAP 16
FIGURE 3: SITE LEASE ESTABLISHMENTS 18
FIGURE 4: SOILS MAP 20

TABLE OF CONTENTS

APPENDIX.....22

BOARD OF WATER SUPPLY: WATER CAPACITY PRE-APPROVAL LETTER 22
DPP WASTE WATER BRANCH: SEWER CAPACITY PRE-APPROVAL LETTER 26
SAMKOO C&C SEWER CREDIT CONFIRMATION LETTERS.....28
SAMKOO MEMORANDUM OF UNDERSTANDING AND AGREEMENT 31
SAMKOO ALLOCATION OF SEWER CREDITS LETTER.....48

INTRODUCTION

SamKoo Hawaii, LLC is proposing a residential and commercial condominium development in Honolulu, Oahu. The development, known as The Central Ala Moana ("project"), will occupy approximately 1.4 acres (62,328 sq. ft.) on TMK: 2-3-039:011 (1391 Kapiolani Boulevard). The project site is bordered to the north by Kapiolani Boulevard to the west by Kona Iki Street, to the south by Kona Street and Ala Moana Shopping Center, and by the adjacent property TMK: 2-3-039:006 to the east (see Figure 1).

The Central Ala Moana will consist of a 43-floor high-rise tower with approximately 513 units, a parking garage, elevated recreation deck, and publically accessible outdoor dining and refreshment spaces located in a continuous street level public plaza on two sides of the building. Public bicycle storage racks will be located on the Kona Iki side of the building.

The Central Ala Moana, at 1391 Kapiolani Boulevard is the second of two independent towers being developed by SamKoo Hawaii, LLC. The first of these towers, Kapiolani Residence, is currently under construction at 1631 Kapiolani Boulevard near the Hawaii Convention Center.

The objective of this preliminary engineering investigation is to present information on infrastructure requirements for the proposed The Central Ala Moana development. Specifically, this report will address:

1. Background information on the proposed project;
2. Existing conditions;
3. Modifications after development; and
4. Potential impacts due to development and proposed mitigated measures

I. BACKGROUND

LAND USE AND ZONING

The proposed project site is currently designated as BMX-3 Community Business Mixed Use with Floor Area Ratio (FAR) 3.5 under the City and County of Honolulu's Land Use Ordinance (LUO) zoning code with a maximum building height of 250 ft.

SamKoo Hawaii, LLC plans to develop this project in accordance with the Hawaii Housing Finance and Development Corporation ("HHFDC") 201H Affordable Housing Program. The project is not intended as a Transit Oriented Development (TOD) project. However, the development of the Ala Moana neighborhood in accordance with TOD principles is the City's stated future intent for the area.

As per the City's TOD plan, the Ala Moana Transit Station for the Honolulu Rail project may be located near to the project site. The proposed rail alignment is planned to run approximately 40 to 50 feet above ground level with the Ala Moana Transit Station consisting of an elevated platform.

FLOOD ZONE

The project's site location has been designated to be within flood zones AE and X under the Federal Emergency Management Agency (FEMA). The FEMA Flood Insurance Rate Map (FIRM) for the site is shown in Figure 2, release date January 19, 2011, Map 15003C0362G. Development of the project site must meet floodplain regulations of the City and County of Honolulu as those regulations were approved by FEMA for the National Flood Insurance Program.

Zone AE corresponds to the flood hazard area subject to the 1% annual chance flood (100-year flood), also known as the base flood, which is defined as the flood that has a 1% chance of being equaled or exceeded in any given year. Mandatory flood insurance purchase requirements apply. A base flood elevation of 6 ft. (MSL) has been determined for the project site under Zone AE.

Zone X corresponds to the flood to areas outside the 1% annual chance floodplain, areas of 1% annual chance sheet flow flooding where average depths are less than 1 ft., areas of 1% annual chance stream flooding where the contributing drainage area is less than 1 square mile, or areas protected from the 1% annual chance flood by levees. No Base Flood Elevations or depths are shown within this zone.

EXISTING USES

The project site is mostly a paved parking lot and contains two separate buildings. The building along the east edge of the site houses "Taste Tea", a bubble tea refreshment establishment, and offices for Kapiolani Residence. A long building along the Kona Street side of the site is used as a garage for automobiles as well as the Hawaiian Dredging Construction Company construction offices for the construction of Kapiolani Residence. A map showing the establishments described above are shown in Figure 3.

CLIMATE

The project site is located in the Metro Oahu region. The climate is relatively warm and dry. Trade winds from the northeast occur much of the time, with occasional Kona winds. The normal temperature range for the region varies from the high 60's (degrees Fahrenheit) to the low 90's. Rainfall is light, with mean annual rainfall of about 28 inches in Honolulu.

TOPOGRAPHIC FEATURES

The project site ranges from about 6.1 to 5.3 feet mean sea level (MSL) elevation per the Hawaii state plane coordinate grid system, Zone III with the North American Datum of 83 high accuracy reference network. Overall the site is very flat with the average existing parking lot elevation at approximately 5.5 feet.

SOILS

The soil type within the project site is identified in the U.S. Department of Agriculture, Soil Conservation Service Survey as Fill Land, mixed (FL) and is depicted on Figure 4. This type of soil occurs mostly near Pearl Harbor and the Honolulu areas adjacent to the ocean. It consists of areas filled with material dredged from the ocean or hauled from nearby areas and general materials from several other sources. This type of land type is used for urban development including airports, housing areas, and industrial facilities.

II. DRAINAGE

EXISTING CONDITIONS

The project site occupies approximately 1.4 acres (62,328 sq. ft.). Under existing conditions, the majority of runoff sheet flows across the asphalt pavement towards Kapiolani Boulevard and is intercepted by an existing catch basin adjacent to the property. Preliminary as-built research indicates runoff from the site is conveyed via a network of existing concrete box drains along Kapiolani Avenue, to an existing 36-in drain line along Atkinson Drive, going to an underground line at Kahakai Drive to the final discharge point at Ala Wai Canal.

A portion of runoff from the building adjacent to Kona Street is collected in roof downspouts and piped under the existing sidewalk. Runoff flows to existing drainage infrastructure within Kona Street and is then conveyed west to a box culvert in Piikoi Street and south to the canal within Ala Moana Beach Park.

MODIFICATIONS AFTER DEVELOPMENT

There will be drainage improvements within the project site to accommodate the proposed development. Since the existing site is comprised of asphalt pavement or buildings, the quantity of storm water runoff is not expected to increase due to construction of project improvements. The project is anticipated to reduce the amount of impervious surface at the project site with the planned landscaped areas. Where possible, there will be mitigation measures considered using natural runoff control such as bio-infiltration areas along with the landscaping treatments. Storm water quality features will be finalized as necessary during the design phase to satisfy agency requirements.

It is anticipated that wherever possible, the project will try to maintain existing runoff conditions. Sheet flow to the surrounding roadways will be directed through vegetative buffers or other pretreatment methods where possible to provide water quality pretreatment. Drainage inlets will be placed within the property where runoff will not be able to sheet flow and outlet. The onsite drainage network will discharge to the existing City storm drainage system on Kapiolani Boulevard or Kona Street. An extension of the drainage system across Kona Street will be required to connect to the existing infrastructure within that road. A drainage connection application will

be submitted during the permitting phase of the project. Water quality treatment facilities are planned prior to discharge to City drainage facilities to satisfy the City and County of Honolulu storm water quality requirements.

There will not be any anticipated drainage infrastructure upsizing outside of the project site as the proposed improvements should not alter nor impact the downstream system flows. A drainage analysis based on City and County of Honolulu standards will be developed during the design phase of this project.

IMPACTS AND MITIGATION

Impacts related to construction will be short term (approximately 1-2 years) and may include traffic disturbances, and inconveniences to motorists along Kapiolani Boulevard, Kona Street and Kona Iki Street. These short term impacts can be mitigated by limiting construction to off-peak traffic hours, implementing an approved traffic control plan, and coordinating construction with any other construction or events in the area. Generation of erosion, dust and noise due to construction operations will be mitigated by required compliance with the applicable Administrative Rules of the State Department of Health and further identified during the design and construction phases.

III. GRADING AND SOIL EROSION

GRADING

It is anticipated that the grading within the project site should be limited to within the property boundary. The grading concept will be coordinated during the design phase of the project.

An effort to balance the earthwork quantities of cut and fill is expected to minimize the cost of purchasing offsite borrow material and disposing excess excavated material at an off-site location. Grading operations will be in conformance with the applicable ordinances of the City and County of Honolulu.

The project, located within flood zone AE, has a base flood elevation of 6ft. The building finish floor shall be raised above the base flood elevation to meet the City's National Flood Insurance Program (NFIP) requirements.

A detailed soil analysis will be performed as planning of the project proceeds. Mitigative measures, if required, will be recommended by the project's soils engineers as building design and final locations are further defined. Mitigative measures may include removal of unsuitable soils under foundations and/or special foundation design.

SOIL EROSION

Best management practices shall be implemented in conformance with the City and County of Honolulu Administrative Rules, Title 20, Chapter 3, Rules Relating to Water Quality. An

assessment of the minimum best management practices to be implemented will be determined during the design phase and it is anticipated that it should not have a significant impact to surrounding areas.

The temporary Best Management Practices (BMPs) are anticipated to include measures such as silt and dust fencing, stabilized construction entrance, catch basin inlet protection and area drain protection. The permanent BMP measures may include smaller elements such as bioswales or filters that can be integrated with the site landscaping, as well as flow-based filtration system, sized to meet the City's water quality criteria requirements.

IV. ROADS

EXISTING CONDITIONS

The project site is located at the corner of Kapiolani Boulevard, Kona Iki Street and Kona Street. Kapiolani Boulevard, which is under the City's jurisdiction, borders the north side of the project and has the highest traffic volume of all three aforementioned roadways. The privately owned Kona Street runs along the south side of the project and is adjacent to the Ala Moana shopping center. It is heavily traveled by City Buses between Piikoi Street on the east and Atkinson Drive on the west, it serves as the transfer location (beginning/end point) for many City Bus routes. The privately owned Kona Iki Street runs along the east side of the project and serves as a connection between Kapiolani Boulevard and Kona Street.

MODIFICATIONS AFTER DEVELOPMENT

Access to the project site is currently proposed from Kapiolani Boulevard and from Kona Street. The area along Kona Iki Street is intended to be exclusive to pedestrians and will no longer have any access driveway. It is anticipated that there will be no widening to any existing surrounding roadways. See Traffic Impact Analysis Report (TIAR) prepared by SSFM dated January 31, 2013 for further discussion on traffic related items. To ensure information and analysis are current, SSFM is currently undertaking additional traffic analysis to update bus route and ridership information, bike facilities, lane configuration, signal timing, contraflow and restricted movements, ADTs, as well as future condition analysis.

V. WATER

EXISTING CONDITIONS

The Board of Water Supply (BWS) system provides water service to the existing project site. Based on BWS system as-built plans, potable water service is currently provided by a 1-inch lateral (meter no. 09030660) connected to an existing 12-inch water main along Kapiolani Boulevard. The fire protection system for the existing building is provided via the same 12-inch water main on Kapiolani Boulevard.

PROJECTED WATER DEMAND

The proposed project development will create additional water demands on the BWS system. Potable water demands will include service to the proposed residential/commercial development, fire protection and landscaping irrigation. A preliminary review of the existing system to adequately accommodate the proposed development has been coordinated with BWS based on the following water demand and consumption estimates.

Water demand estimates for this project are based upon BWS Water System Standards 2002 guidelines. A domestic water connection for the proposed building, including landscape irrigation, will be provided. The projected potable water average daily demand for the project based on BWS Domestic Consumption Guidelines is summarized below:

Land Use	*Sq. ft*	*GDP/sq.ft.*	*Average Daily Demand (GDP)*
Commercial/Residential Mix	627,730	120/1000 (0.12)	75,327
		Assume:	**0.075 MGD**

A fire service connection will also be provided for the building fire sprinklers. The projected fire flow, duration and hydrant spacing for the project based on BWS Fire Flow Requirements are summarized below:

Land Use	*Flow (gpm)/Duration (hrs.)/Fire Hydrant Spacing (ft.)*
High Rise Apartments	2000/2/250

Based on the average daily demand of 0.075 MGD on the island of Oahu, using BWS demand factor of 1.5, a maximum daily demand of 0.112 MGD is expected. The corresponding peak hour demand using BWS demand factor of 3 will be 0.225 MGD. The factors for maximum daily demand and peak hour demand are from Table 100-20 of the BWS Standard, and are directly applied to the calculated average daily demand. Per BWS guidelines, the capacity of the system shall deliver the maximum daily demand simultaneously with the required fire flow.

BWS has provided preliminary confirmation that the existing water distribution system is adequate to provide peak hour pressures and off-site fire protection for the project. A copy of this letter is included in the Appendix.

Further coordination with BWS will be required during the design phase. The final decision on the availability of water for domestic, fire, and irrigation demand will be confirmed when the building permit application is submitted for approval.

LANDSCAPING IRRIGATION

There will be landscaping in areas throughout the development. Landscaped areas will be approximately 4,000 square feet and 8,000 square feet on the ground floor and recreation deck, respectively. Irrigation for the development will practice water conservation measures where feasible. Other possible measures that may be considered include drought tolerant plants, xeriscape landscaping, and high-efficiency irrigation systems. The landscaping provided on the project site will require a permanent irrigation system which will be confirmed and coordinated with the landscape architect.

FIRE PROTECTION

The on-site fire protection requirements will be coordinated with the Fire Prevention Bureau of the Honolulu Fire Department. Site servicing requirements, related to fire protection will include the construction of a new lateral to the proposed building and associated occupied structures and will include the installation of a building fire sprinkler system to meet National Fire Protection Association (NFPA) requirements. There are two existing fire hydrants at the frontage of the property along Kapiolani Boulevard and an existing fire hydrant on Kona Street in the median. It is anticipated that these three fire hydrants will be able to serve the proposed development and meet fire hydrant location and servicing requirements per NFPA. Additional analysis on hydrant spacing will be completed during the detailed design phase to confirm if additional hydrant coverage is required. Also, based on letter received from the Board of Water Supply dated October 9, 2014 it has been assessed that the existing system is adequate to accommodate the proposed development.

IMPACTS AND MITIGATION

The final decision on the availability of water will be confirmed when the building permit application is submitted for approval. When water is made available, the project development will be required to pay BWS water system facilities charges for resource development, transmission and daily storage. A BWS water capacity pre-approval letter has been obtained for the project and is included in the Appendix.

VI. WASTEWATER

EXISTING CONDITIONS

An existing 6-inch gravity system lateral currently services the project site from Kapiolani Boulevard. The gravity system then connects to the existing 36-inch trunk sewer running along Kapiolani Boulevard. The system sewer lines ultimately transfer wastewater to the Sand Island Wastewater Treatment Facility where it is processed and discharged.

PROJECTED WASTEWATER FLOWS

Wastewater will be generated from the various facilities within the proposed development. Design and construction of the system will be in accordance with the City and County of Honolulu Wastewater System Design Standards, dated July 2017. Preliminary sewer flows expected from the proposed the project are listed below.

Category	*Average Waste Water Flow Rate (GDP)*
Residential (513 units)	100,548
Commercial floor (10,000 sq. ft.)	3080
Total:	103,628
Base Sanitary Flow:	**0.104 MGD**
Design Flow:	**0.315 MGD**

These wastewater flow calculations are used in determining the required capacities for the development and to check if the existing system is adequate to accommodate the additional flows generated by the proposed project. Additional information regarding methodology and terminology of the sewer design information provided above can be found in the *Wastewater System Design Standards, City and County of Honolulu, July 2017 – Chapter 2.*

An application for sewer connection (No. 2017/SCA-1598) has been submitted to DPP-Wastewater Branch and has received preliminary approval. All applicable wastewater system facility charges shall be collected at the prevailing rate in accordance with Honolulu's revised ordinances (See Appendix for sewer connection pre-approval letter).

IMPACTS AND MITIGATION

The final determination of availability sewer capacity will be confirmed when the building permit application is submitted for approval.

SEWER CREDITS

SamKoo Pacific, LLC and SamKoo Hawaii, LLC (formerly Sam House Development, LLC) are part of a group of developers defined as "Kalakaua Relief Line, LLC" (also known as "HUI"), that had partnered together to build a 2000 foot long sewer line along Kalakaua Avenue to relieve the strain on the City's main on Kapiolani Blvd that was threatening to delay contemplated projects in the Ala Moana and Waikiki area. A Memorandum of Understanding and Agreement (MOUA) dated December 19, 2007, and amended September 22, 2011 was signed between Kalakaua Relief Line, LLC members and the City and County of Honolulu (C&CH) Department of Environmental Services (ENV) and Department of Permitting and Planning (DPP), Wastewater Branch. Under this agreement, Kalakaua Relief Line, LLC members' responsibility was to design and construct

the sewer line based on plans and specifications approved by the City. In return, the City has awarded the Kalakaua Relief Line, LLC members' sewer credits in the amount of the actual total construction costs of the sewer line under the MOUA, based upon the City's 2010-2011 Wastewater System Facility Charges. In October 2011, the City issued letters to each of the members confirming the number of sewer credits to be allocated and assigned to each member under MOUA. The following are the Wastewater System Facility Charge (WSFC) Credits allocations made to SamKoo members per the MOUA:

Member	*Total WSFC Credits or ESDU issued by C&CH (10/18/11)*
Sam House Development, LLC (TMK 2-3-039:011)	167.79
SamKoo Pacific, LLC (TMK 2-3-041:009)	128.13

Relevant information regarding the WSFC credits allocation has been provided in the appendix. It was indicated that a minimum of one (1) ESDU credit would need to remain with either parcel and not all of the credits can be applied to either developments.

SamKoo Hawaii, LLC, formerly known as Sam House Development, in a letter to the City dated February 28, 2017, allocated all of its 167.79 WSFC credits to SamKoo Pacific, LCC to be used for the Kapiolani Residences project. This letter has been included in the Appendix. Any remaining credits not transferred and used by the Kapiolani Residence project will be applied to The Central Ala Moana project.

VII. SOLID WASTE

EXISTING CONDITIONS

A refuse service currently serves the tenants leasing the current project site.

PROJECTED SOLID WASTE GENERATION

Solid waste will be generated by the project site during construction and post-construction.

<u>During Construction</u>

The construction wastes will primarily be made up of construction packing and materials, pavement, rocks, and debris resulting from clearing the site prior to construction.

Post-Construction

It is anticipated that refuse generated by the proposed residential and commercial development will be collected by private contract with a refuse collection service. Solid waste generation from the proposed development is estimated to be 3.14 tons/day based on an average per capita generation rate of 12 pounds/dwelling unit/day and 13 pounds/per 1000 square foot commercial/day from the residential and commercial areas within the site.

A 2012 EPA report states on average, Americans generate 4.38 pounds per person per day. Assuming 2.8 people per dwelling unit (as referenced in the City and County Wastewater Standards), each unit will generate approximately 12 pounds per unit per day. The lessees of the commercial spaces is unknown at this time. A rate of 13 pounds per 1000 square feet of commercial space was selected from rates listed on *Estimated Solid Waste Generation Rates* from the CA.gov website.

Residential	6,156 lb/day
Commercial	137 lb/day
Total	6,293 lb/day
	(3.14 ton/day)

The EPA estimates uncompacted waste densities for mixed residential, institutional and commercial spaces to be in the range of 250 to 300 pounds per cubic yard. Using a density of 250 pounds per cubic yard and the estimated generation rate of 6293 pounds per day, the volume of refuse is estimated to be 25 cubic yards per day.

IMPACTS AND MITIGATION

The proposed development will be an additional generator of solid waste. Generation of construction wastes due to clearing and construction activities of the site will be a short term impact and should not cause major impact to the existing landfills.

The City and County is currently operating a landfill site in Waimanalo Gulch and the H-POWER waste energy recovery facility on the leeward side of Oahu. It is understood that the City is currently exploring alternative means of handling solid waste as an ongoing city-wide concern.

VIII. ADDITIONAL UTILITIES

ELECTRICAL

The proposed Condominium development will receive electrical power from the Hawaiian Electric (HECO) utility. The new underground service will originate the existing HECO-owned 25kV circuit, located in the existing HECO manhole on Kona St. New underground ductline will terminate at HECO vault, new pad-mounted HECO switchgear and HECO transformer(s).

Building's power distribution will consist of pad-mounted switchboard, 480Y/277V, 3-phase, 4-wire, with separate commercial and residential service, metering, and distribution sections. Pad-mounted, step-down transformers will be provided for buildings 208Y/120V systems, including vertical power distribution/risers. Two (2) - 5,000A (copper) vertical bus duct risers will be provided to distribute electrical power to each residential floor's distribution panelboards (and each residential unit consecutively). Emergency power distribution system (with riser), will provide power to emergency and stand-by systems, elevators, etc. Safety switches will be NEMA 1 rated for interior areas and NEMA 3R or NEMA 4X for exterior areas. Residential units will have dedicated load centers.

New generator, with sub-base fuel tank, will be sized to accommodate emergency (including life safety), stand-by loads, elevators, and other Owner-required (common area) loads. Anticipated size of the generator is 600kW. Pad-mounted generator will be housed in a generator room, located on the parking structure's ground level.

Project's lighting fixtures will be LED. Emergency lighting will meet NFPA 101 Life Safety Code requirements. Emergency lighting fixtures will have emergency generator connections. Lighting will be provided with automatic lighting controls in parking and office areas.

Power will be provided to residential and common area's mechanical equipment, electric water heaters, air conditioning equipment, building management system, communication/ security systems, and fire alarm and fire protection systems.

TELECOMMUNICATION

The project will include telecommunication services for Telephone, CATV and Internet for both Residential and Common Areas. Service location for connection to Telecommunication service providers (Hawaiian Telcom and Spectrum) existing system will be determined by the service provider. Empty primary concrete encased ductlines will be provided from the service provider location to the Telecom room MDF by the contractor.

AOAO services will include internal telephone network and access to telephone service, internal data network, internet access, CATV service, security CCTV and access control, entry phone, and parking garage access.

1. Residential Services
    a. Telephone service (traditionally from Hawaiian Telcom)
    b. Cable TV access (CATV) (traditionally from Spectrum, Dish or DirectTV).
    c. Internet Access
    d. Wireless Access Point

2. AOAO Services
    a. Internal Telephone network and access to telephone service
    b. Internal Data network
    c. Internet Access
    d. CATV service
    e. Security:
        i. CCTV
        ii. Access Control
    f. Entry Phone
    g. Parking Garage Access

GAS

Gas service will be provided by the Hawaii Gas with anticipated connection to infrastructure in Kapiolani Boulevard. Service location for connection to the existing system will be determined by the service provider during the permit phase of the project.

IX. REFERENCES

1. Design Standards of the Department of Wastewater Management, Volume I, Department of Wastewater Management, City and County of Honolulu, Hawaii, July 1993

2. Water System Standards, Board of Water Supply, City and County of Honolulu, Hawaii 2002.

3. Storm Drainage Standards, Department of Planning and Permitting, City and County of Honolulu, Hi, August 2017

4. Rules Relating to Water Quality of the Administrative Rules, Title 20, Department of Planning and Permitting, Chapter 3, adopted August 16, 2016.

5. Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts Figures for 2012, Environmental Protection Agency, February 2014

6. Estimate Solid Waste Generation Rates, State of California, Draft Environmental Impact Report for South Gate Commercial Corridors Redevelopment Project (cites CIWMB Resource Manual, May 1989) https://www2.calrecycle.ca.gov/WasteCharacterization/General/Rates (Febuary 1, 2018)

6. Volume-to-Weight Conversion Factors, U.S. Environmental Protection Agency Office of Resource Conservation and Recovery, April 2016

TABLE OF FIGURES

FIGURE 1: Project Location Map

PROJECT LOCATION MAP

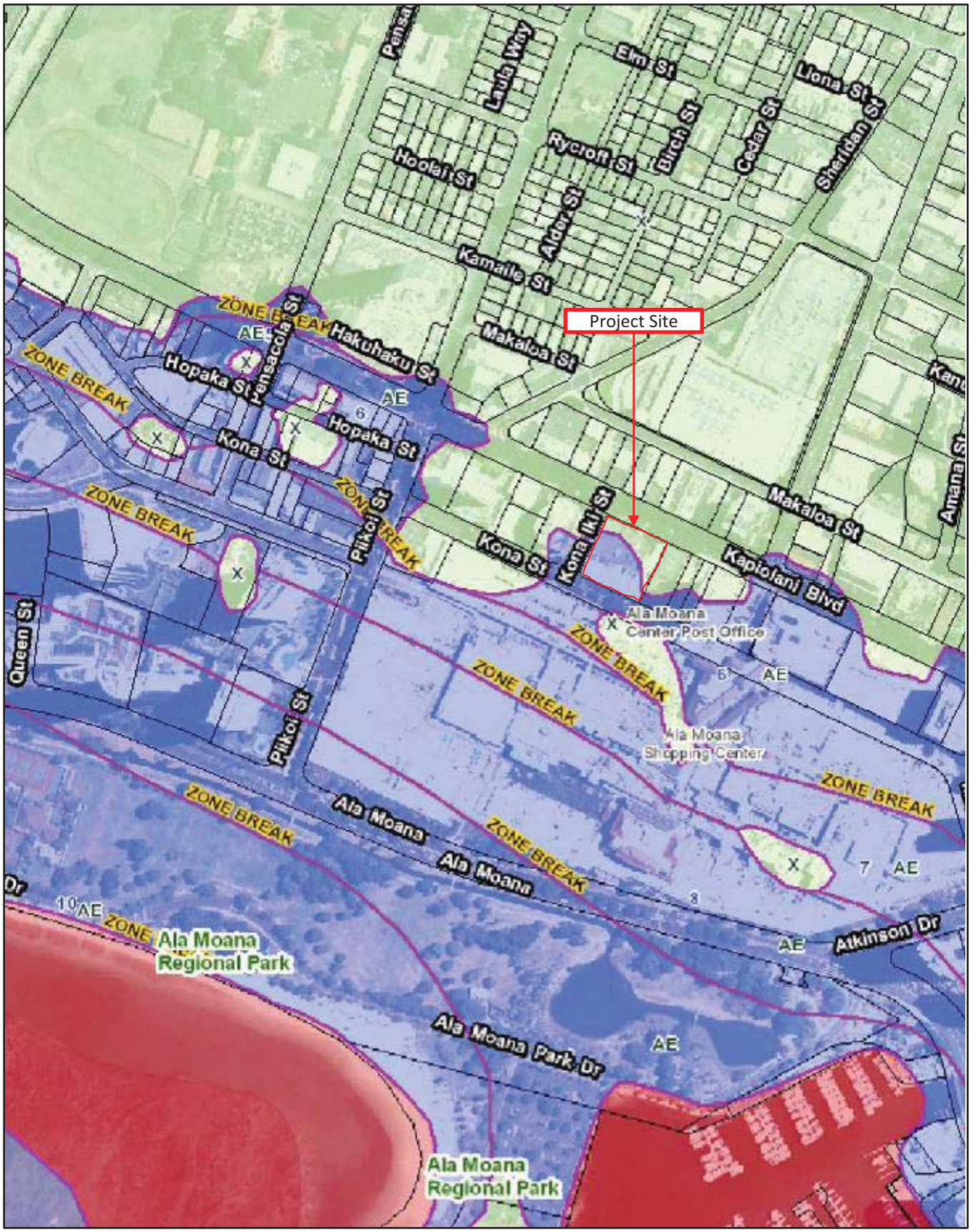
FIGURE 1

Preliminary Engineering Report For The Central Ala Moana
Samkoo Hawaii, LLC.

Map Sources:
ESRI (World Street Map)

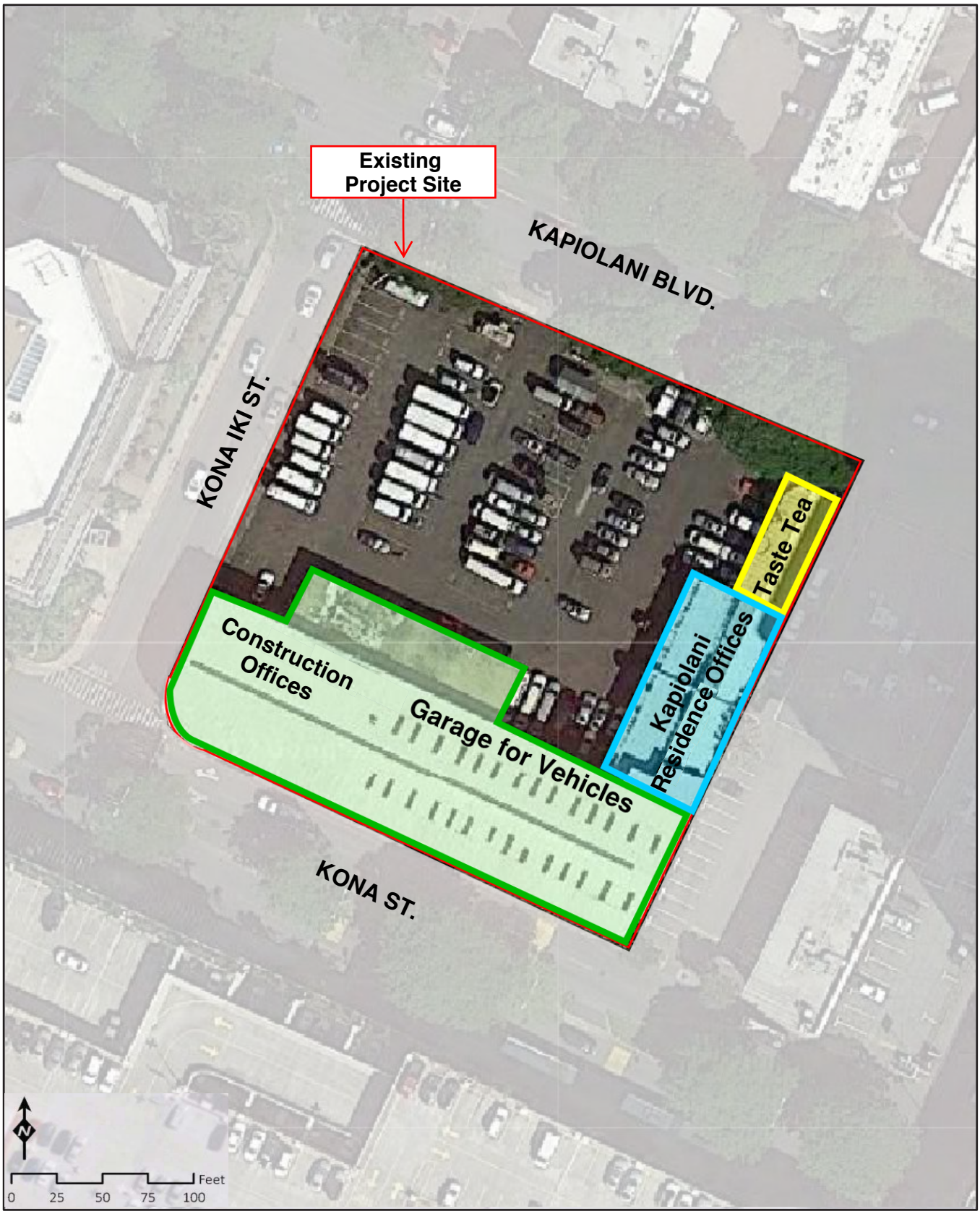
SSFM INTERNATIONAL

FIGURE 2: Flood Insurance Rate Map



FLOOD INSURANCE RATE MAP	FIGURE 2
Preliminary Engineering Report For The Central Ala Moana Samkoo Hawaii, LLC.	Map Sources: HOLIS SSFM INTERNATIONAL

FIGURE 3: Site Lease Establishments



SITE LEASE ESTABLISHMENTS

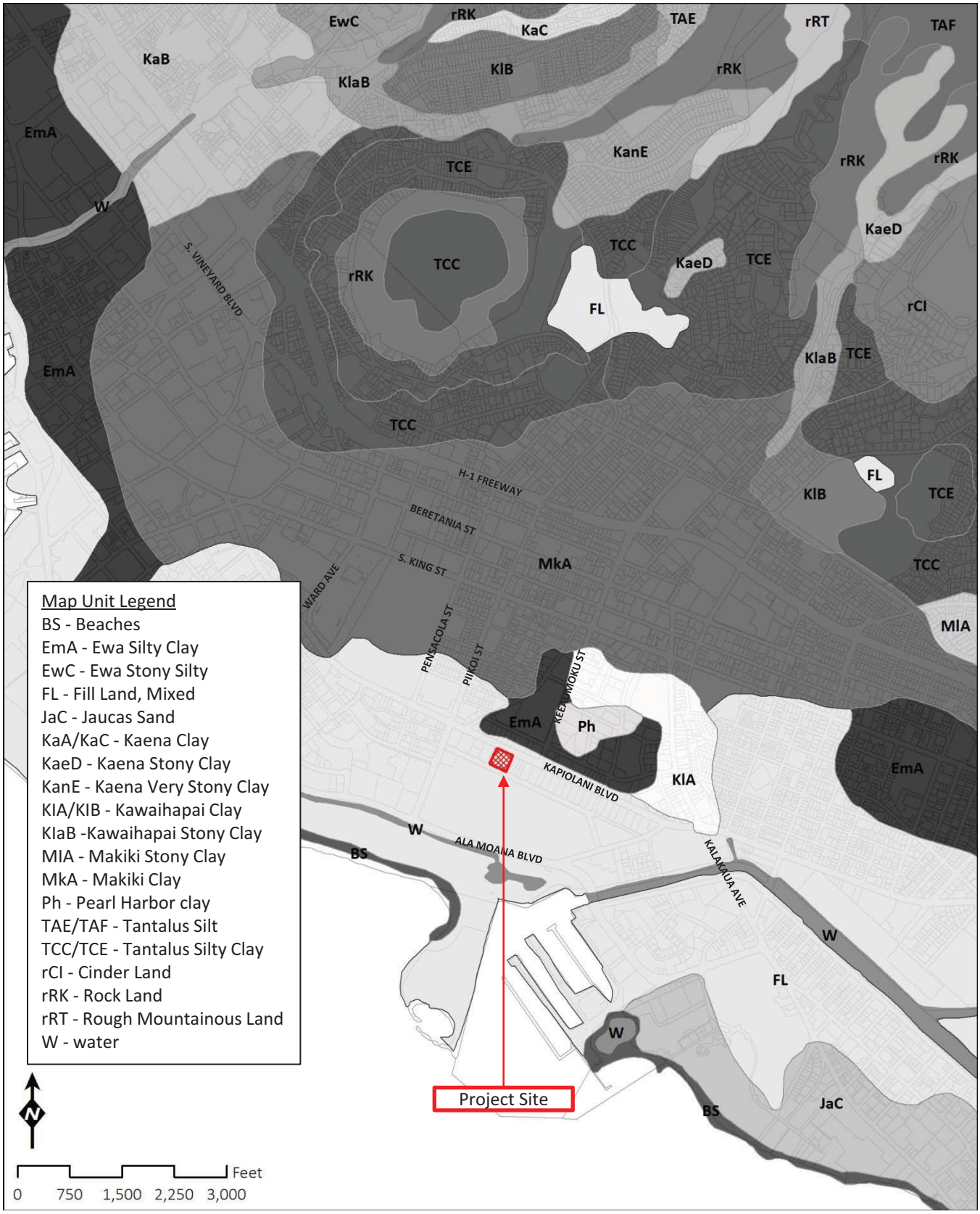
FIGURE 3

Preliminary Engineering Report For The Central Ala Moana
Samkoo Hawaii, LLC.

Map Sources:
Bing Maps (aerial)

SSFM INTERNATIONAL

FIGURE 4: Soils Map



Map Unit Legend
BS - Beaches
EmA - Ewa Silty Clay
EwC - Ewa Stony Silty
FL - Fill Land, Mixed
JaC - Jaucas Sand
KaA/KaC - Kaena Clay
KaeD - Kaena Stony Clay
KanE - Kaena Very Stony Clay
KlA/KlB - Kawaihapai Clay
KlaB -Kawaihapai Stony Clay
MIA - Makiki Stony Clay
MkA - Makiki Clay
Ph - Pearl Harbor clay
TAE/TAF - Tantalus Silt
TCC/TCE - Tantalus Silty Clay
rCl - Cinder Land
rRK - Rock Land
rRT - Rough Mountainous Land
W - water

SOILS MAP	FIGURE 4
Preliminary Engineering Report For The Central Ala Moana Samkoo Hawaii, LLC.	Map Sources: Soil Survey SSFM INTERNATIONAL

APPENDIX

Board of Water Supply: Water Capacity Pre-Approval Letter

BOARD OF WATER SUPPLY

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

KIRK CALDWELL, MAYOR

BRYAN P. ANDAYA, Chair
KAPUA SPROAT, Vice Chair
DAVID C. HULIHEE
KAY C. MATSUI
RAY C. SOON

ROSS S. SASAMURA, Ex-Officio
JADE T. BUTAY, Ex-Officio

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

ELLEN E. KITAMURA, P.E.
Deputy Manager and Chief Engineer

RECEIVED
DEC 0 6 2017
JML
FILE COPY
FILE

November 28, 2017

Ms. Jennifer M. Louie, P.E., LEED AP
SSFM International
501 Sumner Street, Suite 620
Honolulu, Hawaii 96817

Dear Ms. Louie:

Subject: Your Email Dated November 13, 2017 Requesting Comments on the Availability of Water to the Proposed 513-Unit Samkoo The Central Condominium, Located Along Kapiolani Boulevard Tax Map Key: 2-3-039: 011

Thank you for your email regarding the proposed 513-unit high-rise residential condominium.

The existing water system is adequate to provide peak hour pressures and off-site fire protection to the proposed development. However, please be advised that this information is based upon current data, and therefore, the Board of Water Supply (BWS) reserves the right to change any position or information stated herein up until the final approval of the building permit application. The final decision on the availability of water will be confirmed when the building permit application is submitted for approval.

The construction plans should be submitted for BWS review and approval.

The construction schedule should be coordinated with BWS to minimize impacts on the water system.

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

Water conservation measures are required for the proposed developments. These measures include the use of Water Sense labeled ultra-low-flow water fixtures and toilets, utilization of non-potable water for irrigation using rain catchment and chiller/air handler condensate, cooling tower conductivity meters and water softening recycling systems, drought tolerant plants, xeriscape landscaping, and efficient irrigation systems.

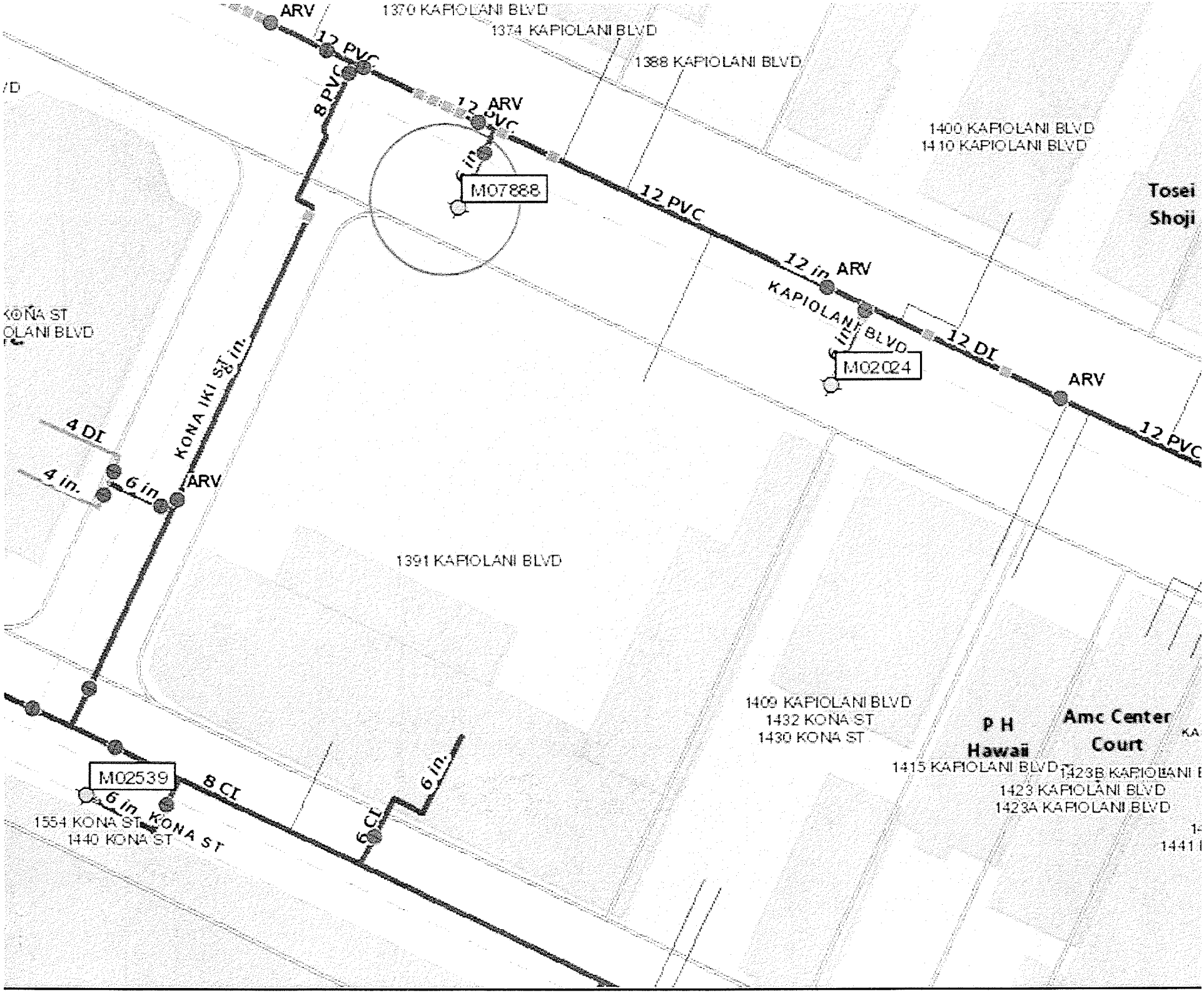
High-rise buildings with booster pumps will be required to install water hammer arrestors or expansion tanks to reduce pressure spikes and potential main breaks in our water system.

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

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

Very truly yours,

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


ARV
1370 KAPIOLANI BLVD
1374 KAPIOLANI BLVD
1388 KAPIOLANI BLVD
12 PVC
8 PVC
12 PVC
ARV
M07888
12 PVC
1400 KAPIOLANI BLVD
1410 KAPIOLANI BLVD
Tosei
Shoji
12 in
ARV
KAPIOLANI BLVD
12 DI
M02024
ARV
12 PVC
KONA ST
OLANI BLVD
KONA IKI ST
4 DI
4 in.
6 in
ARV
1391 KAPIOLANI BLVD
1409 KAPIOLANI BLVD
1432 KONA ST
1430 KONA ST
P H
Hawaii
Amc Center
Court
1415 KAPIOLANI BLVD
1423B KAPIOLANI
1423 KAPIOLANI BLVD
1423A KAPIOLANI BLVD
M02539
8 CI
6 in
6 in.
6 CI
1554 KONA ST
1440 KONA ST
KONA ST

DPP Waste Water Branch: Sewer Capacity Pre-Approval Letter

DEPARTMENT OF PLANNING AND PERMITTING

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET * HONOLULU, HAWAII 96813
Phone: (808) 768-8209 * Fax: (808) 768-4210

SEWER CONNECTION APPLICATION

APPLICATION NO.: **2017/SCA-1598** STATUS: **Approved**

DATE RECEIVED: **08/24/2017** IWDP APP. NO.:

PROJECT NAME: **2017/SCA-1598 SAMKOO HAWAII CONDOMINIUM**

$2,398,961.60
Estimated Wastewater System Facility Charge*

LOCATION:

Zone	Section	Plat	Parcel
2	3	039	011

1391 KAPIOLANI BLVD Honolulu / I **62,328** Sq. Ft.

SPECIFIC LOCATION: **1391 KAPIOLANI BOULEVARD**

APPLICANT: **SSFM INTERNATIONAL INC.**
ATTN: JENNIFER LOUIE
501 SUMNER STREET SUITE 620
HONOLULU, HAWAII 96817

DEVELOPMENT TYPE: **Dwelling, Multi-family** SEWER CONNECTION WORK DESIRED:

OTHER USES:

NON-RESIDENTIAL AREA: s.f. APPROXIMATE DATE OF CONNECTION: **08/01/2018**

PROPOSED UNITS		EXISTING UNITS		UNITS TO BE DEMOLISHED	
No. of New Units:	**518**	No. of Existing Units:	**0**	No. of Units to be Demolished:	**0**
Studios:	**94**	Studios:		Studios:	
1-Bedroom:	**141**	1-Bedroom:		1-Bedroom:	
2-Bedroom:	**283**	2-Bedroom:		2-Bedroom:	
3-Bedroom:		3-Bedroom:		3-Bedroom:	
4-Bedroom:		4-Bedroom:		4-Bedroom:	
5-Bedroom:		5-Bedroom:		5-Bedroom:	
6-Bedroom:		6-Bedroom:		6-Bedroom:	

REMARKS

APPROVAL DATE: **09/05/2017**

EXPIRATION DATE: **09/05/2019**

Valid 2-years after approval date. Construction plans shall be completed and approved within this 2-year period. Construction shall commence within 1-year after approval of plans.
** Applicable WSFC shall be collected at the prevailing rate in accordance with ROH 1990, Chapter 14, Sections 14-10.3, 14-10.4, 14-10.5 and Appendix 14-D.*

REVIEWED BY: ***Keith Miyashiro***

Site Development Division, Wastewater Branch

ExternalID: **060771534-001** JobId: **60771534**

SamKoo C&C Sewer Credit Confirmation Letters

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

PETER B. CARLISLE
MAYOR

DAVID K. TANOUE
DIRECTOR

JIRO A. SUMADA
DEPUTY DIRECTOR

11WWB053 (DMN)

October 27, 2011

Sam House Development, LLC
c/o David Shibata, Esq.
Rush Moore LLP
737 Bishop Street, Suite 2400
Honolulu, Hawaii 96813

Dear Mr. Shibata:

Subject: Request for Wastewater System Facility Charge Credits Under Memorandum of Understanding and Agreement dated December 19, 2007, as amended September 22, 2011 (as amended, the "MOUA", by and between Kalakaua Relief Line, LLC ("Company") and the City and County of Honolulu (the "City")

In response to the Company's November 18, 2010 request, as amended by letter dated June 28, 2011, for issuance of Wastewater System Facility Charge ("WSFC") Credits or ESDU under the MOUA, and in accordance with the provisions of Section 7.2 (Issuance of Credits) of the MOUA, the Department confirms that Sam House Development, LLC (1391 Kapiolani Project) is allocated the following Wastewater System Facility Charge Credits or ESDU as of the date hereof:

WSFC Credits or ESDU to be issued to Sam House Development, LLC pursuant to Exhibit 3 of the MOUA	*Less* Total WSFC Credits Or ESDU Used to Date	**Total WSFC Credits or ESDU Issued to Sam House Development, LLC as of October 18, 2011**
167.79	0.00	**167.79**

Should you have any questions, please contact Dennis Nishimura of our Wastewater Branch at 768-8197.

Very truly yours,

David K. Tanoue, Director
Department of Planning and Permitting

CONCUR:

FOR Timothy E. Steinberger, Director
Department of Environmental Services

DKT:dl
cc: Esther Roberts, Esq. (Case Lombardi & Pettit)

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

PETER B. CARLISLE
MAYOR

DAVID K. TANOUE
DIRECTOR

JIRO A. SUMADA
DEPUTY DIRECTOR

11WWB054 (DMN)

October 27, 2011

Samkoo Pacific, LLc
c/o David Shibata, Esq.
Rush Moore LLP
737 Bishop Street, Suite 2400
Honolulu, Hawaii 96813

Dear Mr. Shibata:

Subject: Request for Wastewater System Facility Charge Credits Under Memorandum of Understanding and Agreement dated December 19, 2007, as amended September 22, 2011 (as amended, the "MOUA", by and between Kalakaua Relief Line, LLC ("Company") and the City and County of Honolulu (the "City")

In response to the Company's November 18, 2010 request, as amended by letter dated June 28, 2011, for issuance of Wastewater System Facility Charge ("WSFC") Credits or ESDU under the MOUA, and in accordance with the provisions of Section 7.2 (Issuance of Credits) of the MOUA, the Department confirms that Samkoo Pacific, LLC (1625 Kapiolani Project) is allocated the following Wastewater System Facility Charge Credits or ESDU as of the date hereof:

WSFC Credits or ESDU to be issued to Samkoo Pacific, LLC pursuant to Exhibit 3 of the MOUA	*Less* Total WSFC Credits Or ESDU Used to Date	**Total WSFC Credits or ESDU Issued to Samkoo Pacific, LLC as of October 18, 2011**
128.13	0.00	**128.13**

Should you have any questions, please contact Dennis Nishimura of our Wastewater Branch at 768-8197.

Very truly yours,

David K. Tanoue, Director
Department of Planning and Permitting

CONCUR:

FOR Timothy E. Steinberger, Director
Department of Environmental Services

DKT:dl
cc: Esther Roberts, Esq. (Case Lombardi & Pettit)

SamKoo Memorandum of Understanding and Agreement

DEPARTMENT OF ENVIRONMENTAL SERVICES
CITY AND COUNTY OF HONOLULU
1000 ULUOHIA STREET, SUITE 308, KAPOLEI, HAWAII 96707
TELELPHONE: (808) 768-3486 ● FAX: (808) 768-3487 ● WEBSITE: http://www.co.honolulu.gov

MUFI HANNEMANN
MAYOR

ERIC S. TAKAMURA, Ph.D., P.E.
DIRECTOR

KENNETH A. SHIMIZU
DEPUTY DIRECTOR

ROSS S. TANIMOTO, P.E.
DEPUTY DIRECTOR

IN REPLY REFER TO:
WAS 07-369

December 21, 2007

Case Lombardi & Pettit
Attn: Esther S. Han, Esq.
Pacific Guardian Center, Mauka Tower
737 Bishop Street, Suite 2600
Honolulu, Hawaii 96813-3283

Dear Ms. Han:

Re: Memorandum of Understanding and Agreement –
Kalakaua Avenue Relief Sewer Line

Enclosed find an original fully executed original copy of the Memorandum of Understanding and Agreement – Kalakaua Avenue Relief Sewer Line.

Sincerely,

Timothy A. Houghton
Executive Assistant to the Director

Enclosure

MEMORANDUM OF UNDERSTANDING AND AGREEMENT
KALAKAUA AVENUE RELIEF SEWER LINE

THIS MEMORANDUM OF UNDERSTANDING AND AGREEMENT (this "Agreement") is made this 14th day of December, 2007, by and among KALAKAUA RELIEF LINE, LLC (the "Company"), a Hawaii limited liability company, and the CITY AND COUNTY OF HONOLULU (the "City").

RECITALS:

A. The Company is a Hawaii limited liability company whose initial member is FRC Waikiki, LLC, a Delaware limited liability company and owner of that certain parcel of land located at 1837 Kalakaua Avenue, Honolulu, Hawaii 96813 ("FRC Waikiki"). The Company will be comprised of FRC Waikiki and additional members who are owners or representatives of owners of certain lands located within the City and County of Honolulu, Oahu, Hawaii (each a "Member", and, collectively, the "Members"). The planned and continuing development of the lands owned by the Members of the Company or their representatives requires sewer transmission capacity to accommodate the projects planned for these lands (each, a "Designated Project").

B. The existing Kapiolani Trunk Sewer System lacks the capacity to accommodate the increase in sewer transmission demand anticipated for the Designated Projects. The Company recognizes the immediate need for additional sewer capacity to accommodate new development and proposes to design and construct a new sewer line within the City and County of Honolulu, Oahu, Hawaii (the "Kalakaua Avenue Relief Sewer Line" or the "Line") to benefit the planned development for the area and, upon completion of the Kalakaua Avenue Relief Sewer Line to transfer the Line to the City.

C. The lands to be benefited by the Line are shown on the map attached hereto as Exhibit 1 and incorporated herein by reference, designated as the "Tributary Area". The lands owned by the Members of the Company or their representatives to be specifically benefited by the Kalakaua Avenue Relief Sewer Line are shown on the map attached hereto as Exhibit 2 and incorporated herein by reference. The Designated Projects of the Members will connect within the Tributary Area to either the Kapiolani Trunk Sewer System or the Fort DeRussy Pump Station service area as specified on Exhibit 3 attached hereto and incorporated herein by reference.

D. The Company is entering into this Agreement for the benefit of the Members and their Designated Projects within the Tributary Area.

AGREEMENT:

NOW THEREFORE, the parties agree as follows:

1. Construction of Kalakaua Avenue Relief Sewer Line. The Company, at its expense, shall be responsible for the design, planning and permits, management and construction of the Line. The Line shall be designed and constructed based on the plans and specifications approved by the City. The City agrees to undertake to turnover to the Company those certain construction plans prepared by R.M. Towill Corporation ("RMTC") for the Line (the "Existing Plans"). The Company agrees to indemnify, defend and hold the City harmless against any loss, liability, damage, cost, claim or expense (including reasonable attorneys' fees) incurred by reason of the Company's use of the Existing Plans.

2. Completion of Kalakaua Avenue Relief Sewer Line. The Kalakaua Avenue Relief Sewer Line shall be completed in a timely manner and made available for transfer to the City not later than twelve months following issuance ofthe last required permit for the Line, subject to reasonable extensions due to force majeure, including, without limitation, shipping strikes and acts of God. The City will provide assistance in the design review and approval and permits needed for the Line.

3. Acceptance of Line. Upon the completion of the Kalakaua Avenue Relief Sewer Line, the Company will transfer the Line to the City, which transfer shall be completed pursuant to Chapter 14 of the Revised Ordinances of Honolulu 1990, as amended. The City agrees that, upon satisfactory completion of the Line and acceptable completion of all inspections of the Line as evidenced by a certificate(s) of completion of improvements from the City, the City shall grant approval and accept the Line.

4. Maintenance of Kalakaua Avenue Relief Sewer Line. Upon transfer to and acceptance of the Kalakaua Avenue Relief Sewer Line by the City, the City shall be responsible for the operation and maintenance of the Kalakaua Avenue Relief Sewer Line.

5. Allocation and Assignment of Sewer Capacities.

5.1 Allocation of Sewer Capacities. The City agrees to honor the Member capacity allocations attributable to the Credits (as defined below) and the assignment of capacity permitted by Section 5.2 as set forth herein. The Member capacity allocations, as provided by the Company and expressed in Exhibit 3 (the preliminary estimate of which appears on Exhibit 3 under column 10 labeled "Total E.S.D.U. (Credits)"), will not change except as provided for in Section 5.2, Assignment of Sewer Capacities, and Section 7.2.1, Issuance of Credits, below. The City agrees to process and conditionally approve (to the extent not previously approved by the City) sewer connection applications for each Member's Designated Project provided such sewer connection applications are within the capacity allocated to the Member as allocated or assigned pursuant to this Agreement and conform to all standard requirements. The City further agrees to allow issuance of building permits without levy of sewer connection fees provided conditional approval of a Member's sewer connection application has been provided together with certification of membership in the Company and payment of required capital contributions to the Company.

5.2 Assignment of Sewer Capacities. The Members of the Company shall be permitted to assign all or part of their allocated sewer capacity to other Designated Projects or any other project within the Tributary Area as identified in Exhibit 1, provided that any assignment of sewer capacity shall not exceed the total capacity required for such Project. The City shall require that any Member's assignee applying for a sewer connection, a building permit or a subdivision permit deliver to the City a letter of authorization from a Member reflecting such assignment at the time said application is submitted. Any assignment of sewer capacity by a Member pursuant to this Section shall also include an assignment of the total number of ESDU required for the amount of sewer capacity being assigned, provided that, in no event, shall any assignment exceed a Member's allocated capacity or associated ESDU. For example, if a Member seeks to assign sewer capacity for 60 multi-family dwelling units, such Member shall also assign 42 (60 multiplied by a factor of 0.7 pursuant to Section 14-10.3 of the Revised Ordinances of Honolulu) total number of ESDU.

6. Reservation of Sewer Capacities. Upon completion of the Line, the City agrees to provide the Company and its Members, whether utilizing the Line or by any other suitable alternative means, with sewer transmission capacity up to the aggregate amount allocated herein, as and when required by the Members of the Company for their respective Designated Projects.

7. Wastewater System Facility Charge Credits. In consideration of the Company's construction and delivery of the Line, the City agrees to make available to the Company Wastewater System Facility Charge Credits in the amount of the actual total construction (not including planning, design, and permitting) costs of the Line, as allowed under Sections 14-10.3 and 14-10.4, and Appendix 14-D of the Revised Ordinances of Honolulu 1990, as amended and further clarified under Wastewater Policy No. 2001/WWPOL-11 of the Department of Planning and Permitting (the "Credits" or "Total ESDU"), which are equal to the Members' allocated capacity, as shown in Exhibit 3. The computation of the Credits equal to the allocated capacity shall be based upon the wastewater system facility charge assessable with respect to such capacity as of the date the Line is transferred to and accepted by the City or the date the actual total costs of the Line are approved by the City, whichever is earlier.

By way of illustration only, the Company estimates the total costs of the Line to be $5,773,320.00. Assuming the Line is completed and transferred to the City in December 2008, at a total cost of $5,773,320.00, which costs are approved by the City, the City would make available to the Company Credits in the amount of $5,773,320.00, which are equal to 1105.36 Total ESDU, as reflected in, and as indicated in the capacity allocation set forth in, Exhibit 3. The computation of the Credits in this example is based upon the Wastewater System Facility Charge assessable with respect to the Allocated ESDU at the current Wastewater System Facility Charge for fiscal year 2008/09, which rates are subject to change.

7.1 No Further Assessment in Use of Credits Once Allocated and Assigned. The parties agree that once credits are allocated and assigned no further assessment or charge will be made by the City on any Member in the use of its Credits for any Designated Project or assigned Project~~,~~ (including, without limitation, in the event of a change in the Wastewater System Facility Charge attributable to the ESDU standard), unless the allocated capacity as reflected on Exhibit 3 is exceeded, in which event an additional assessment or charge may be applied to the increased capacity and related required ESDU. The Credits, as and when

earned, will be allocated and assigned by the City to the Members of the Company as set forth in Exhibit 3. The City agrees, without limitation as to the time period within which such Credits are used, and notwithstanding any early termination or expiration of this Agreement, to honor the allocation and assignment set forth on Exhibit 3 and any transfers of such Credits allocated.

7.2 Issuance of Credits. The parties agree that as soon as reasonably practicable upon (A) transfer to and acceptance by the City of the Line and (B) approval by the City of the actual total costs of the Line:

7.2.1 Exhibit 3 shall be amended to reflect the final allocation of Credits to the Members of the Company without prejudice to the rights of Members under Section 5 of this Agreement; and

7.2.2 Such final allocation of Credits shall be transmitted by the Department of Planning and Permitting of the City and County of Honolulu (DPP) to the Company confirming the number of Credits to be allocated and assigned to each Member and such Member's Designated Project under this Agreement.

8. Future Development Along Kapiolani Trunk Sewer System. Subsequent to the execution of this Agreement by the City and the Company, future development serviced in the Tributary Area shall be reviewed by DPP on a project by project basis

9. Term. This Agreement, including, without limitation, the reservation of sewer capacity in favor of each Member given hereunder, shall expire twenty (20) years from the date the Line is accepted by the City, provided that the Credits shall survive any termination of this Agreement.

10. Remedies. If any party to this Agreement fails to fulfill or perform any of its obligations hereunder, non-defaulting parties shall be entitled to all remedies available at law or in equity, including damages, specific performance and injunctive relief. In any dispute or litigation arising out of or in connection with this Agreement, the prevailing party shall be entitled to receive and recover its costs and expenses, including reasonable attorneys' fees, from the other party.

11. Notices. Any notice to be given to or served upon any of the parties hereto shall be deemed to have been sufficiently given or served for all purposes when actually delivered by messenger or by certified mail, return receipt requested, as follows:

In the case of the City:

Department of Environmental Services
City and County of Honolulu
1000 Uluohia Street, Suite 308
Kapolei, Hawaii 96707
Attention: Eric S. Takamura, Director

Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor

Honolulu, Hawaii 96813
Attention: Henry Eng, Director

If to the Company:

Kalakaua Relief Line, LLC
c/o FRC Waikiki, LLC, Manager
19900 MacArthur Boulevard, Suite 655
Irvine, California, 92612
Attention: Benjamin L. Ortega

With a copy to Case Lombardi & Pettit:

Case Lombardi & Pettit
737 Bishop Street, Suite 2600
Honolulu, Hawaii 96813
Attention: Dennis Lombardi, Esq.
Esther Han, Esq.

12. No Party Deemed Drafter. The parties agree that no party shall be deemed to be the drafter of this Agreement and further that in the event that this Agreement is ever construed by a court of law, such court shall not construe this Agreement or any provision of this Agreement against any party as the drafter of the Agreement.

13. Successors and Assigns. All of the terms, provisions, conditions and agreements contained herein shall inure to the benefit of and be binding upon each of the parties hereto, and their respective successors and permitted assigns, to the same extent as said terms, provisions, conditions and agreements inure to the benefit of and are binding upon each of the respective parties.

14. Governing Law. This Agreement shall be governed and construed in accordance with the laws of the State of Hawaii.

15. Recitals: Exhibits. All recitals set forth at the beginning of this Agreement shall be deemed to be incorporated as agreements of the parties in this Agreement. All Exhibits referred to in this Agreement shall be deemed to be incorporated herein by the reference made to them as fully as though the entire Exhibit were set forth within the body of this Agreement itself.

16. Survival. All agreements, representations, warranties, covenants, and undertakings of the parties contained herein shall survive the consummation of the transactions contemplated hereby and shall not be merged therein.

17. Amendments. This Agreement shall not be modified except by an instrument in writing signed by all of the parties.

18. Counterparts. This Agreement may be executed in counterparts, each of which so executed shall, irrespective of the date of its execution and delivery, be deemed an original and said counterparts together shall constitute one and the same instrument.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement effective on the day and year first above written.

CITY AND COUNTY OF HONOLULU

By _____
Eric S. Takamura
Director, Department of Environmental Services,
City and County of Honolulu

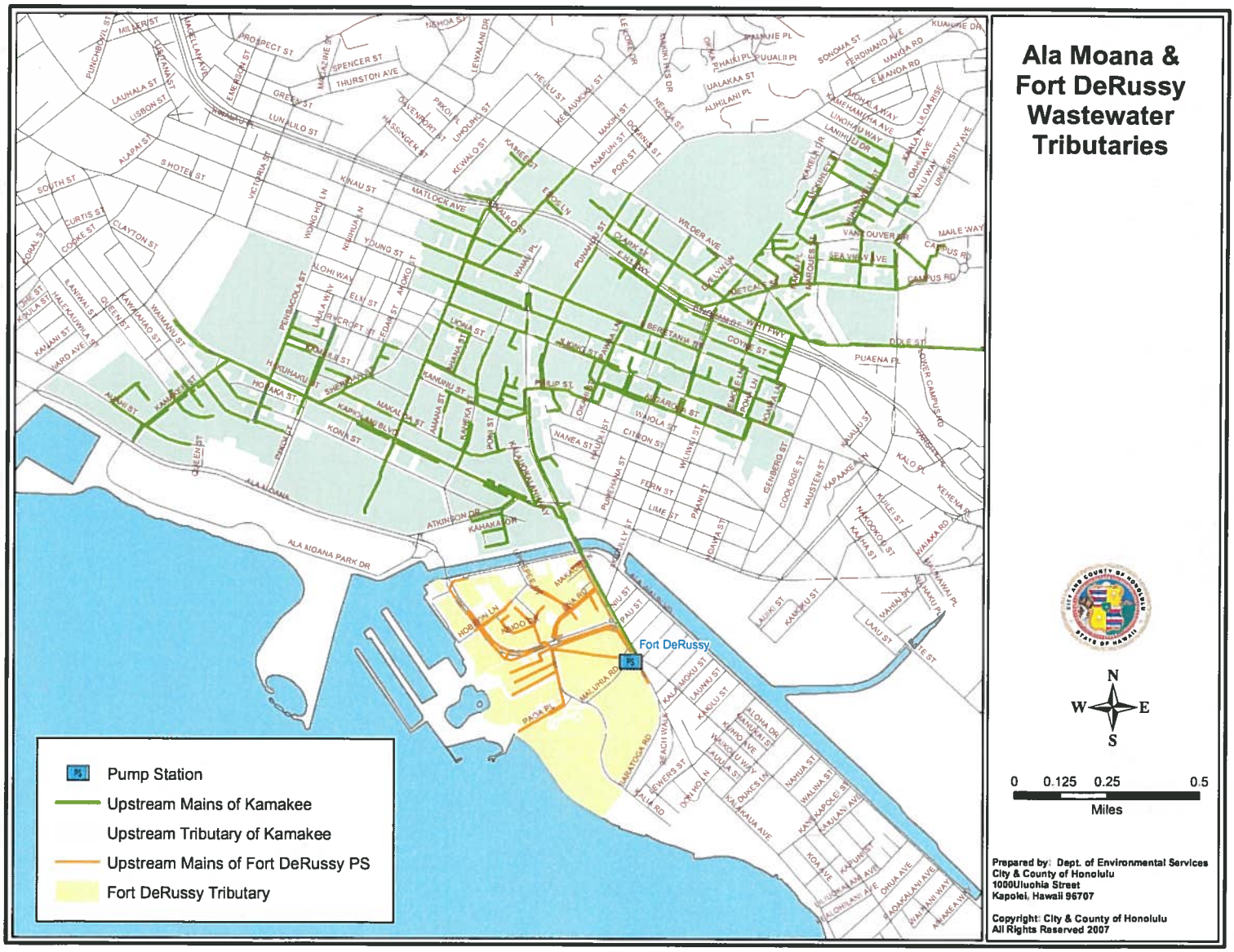
APPROVED AS TO FORM
AND LEGALITY

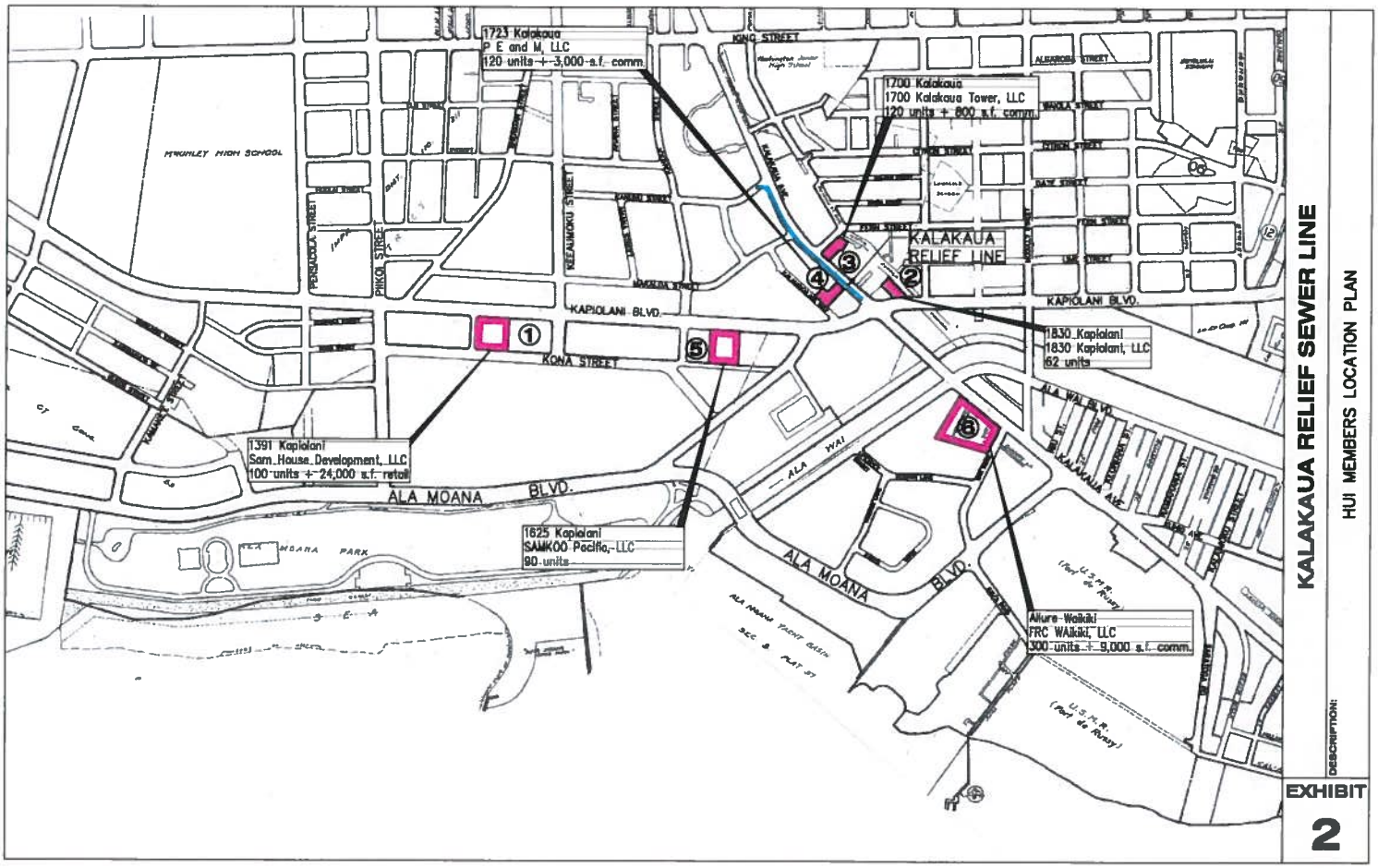
_____
Deputy Corporation Counsel

KALAKAUA RELIEF LINE, LLC

By FRC WAIKIKI, LLC, a Delaware limited
liability company
Its Manager

By _____
Steven D. Fifield
Its Manager


Ala Moana & Fort DeRussy Wastewater Tributaries
Fort DeRussy
Pump Station
Upstream Mains of Kamakee
Upstream Tributary of Kamakee
Upstream Mains of Fort DeRussy PS
Fort DeRussy Tributary
N
W
E
S
0 0.125 0.25 0.5
Miles
Prepared by: Dept. of Environmental Services
City & County of Honolulu
1000Uluohia Street
Kapolei, Hawaii 96707
Copyright: City & County of Honolulu
All Rights Reserved 2007


1723 Kalakaua
P E and M, LLC
120 units +- 3,000 s.f. comm.
1700 Kalakaua
1700 Kalakaua Tower, LLC
120 units + 800 s.f. comm.
KALAKAUA RELIEF LINE
1830 Kapiolani
1830 Kapiolani, LLC
62 units
1391 Kapiolani
Sam House Development, LLC
100 units +- 24,000 s.f. retail
1625 Kapiolani
SAMKOO Pacific, LLC
90 units
Allure-Waikiki
FRC Waikiki, LLC
300 units + 9,000 s.f. comm.
KING STREET
KAPIOLANI BLVD.
KONA STREET
ALA MOANA BLVD.
ALA WAI BLVD.
KALAKAUA AVE.
PIIKOI STREET
KEEAUMOKU STREET
PENSACOLA STREET
MCKINLEY HIGH SCHOOL
ALA MOANA PARK
ALA MOANA YACHT BASIN
U.S.N.R. (Port de Rivers)
KALAKAUA RELIEF SEWER LINE
HUI MEMBERS LOCATION PLAN
DESCRIPTION:
EXHIBIT
2

KALAKAUA RELIEF LINE, LLC

MEMBERS

As of December 4, 2007

	1	2	3	4	5	6	7	8	9	10	11	12
	Tax Map Key	Project Name	Connection	Owner (Member)	Consultant/ Applicant	No of Units	Demo Credits	No. Sewer Assesed Units	Required E.S.D.U.	Total E.S.D.U. (Credits)	Prorata Share Percentage	Total Capital Contributions
1	2-3-039: 011	1391 Kapi'olani	Kapiolani Trunk Sewer System	Sam House Development, LLC	Sato & Assoc., Inc.	100 + 24,000 s.f. retail		100 + 24,000 s.f. retail	82.50	169.77	15.36%	$886,687.37
2	2-3-032: 006	1830 Kapiolani	Kapiolani Trunk Sewer System	1830 Kapiolani LLC	Jim Hutchinson	62		62	43.40	89.31	8.08%	$466,451.30
3	2-3-032: 052	1700 Kalakaua	Kapiolani Trunk Sewer System	1700 Kalakaua Tower, LLC	Pankow-Al Fink	120 + 800 s.f. commercial		120 + 800 s.f. commercial	84.42	173.71	15.72%	$907,287.18
4	2-3-022: 009, 010, 025	1723 Kalakaua	Kapiolani Trunk Sewer System	P E and M, LLC	R.M. Towill Corp.	120 + 3,000 s.f. commercial		120 + 3,000 s.f. commercial	85.56	176.07	15.93%	$919,602.28
5	2-3-041: 006, 009	1625 Kapi'olani	Kapiolani Trunk Sewer System	SAMKOO Pacific, LLC	Sato & Assoc., Inc.	90		90	63.00	129.64	11.73%	$677,106.72
6	2-6-013: 001, 003, 004, 007, 008, 009, 011, 012	Allure Waikiki	Fort DeRussy Sewer Pump Station System	FRC Waikiki, LLC	Hida, Okamoto & Assoc., Inc.	300 + 9000 s.f. commercial	52	248 + 9000 s.f. commercial	178.29	366.87	33.19%	$1,916,185.15
									537.17	1105.36	100%	$5,773,320.00

$5,773,320.00

Notes:

1. $5,223.00 / ESDU

2. ESDU Calculation:

a. Multi Family Dwellings (5 or more units): ESDU = # of Units X 0.7 (Wastewater Factor)

b. Business/Commercial: ESDU = Area (s.f.) / 1920 (Wastewater Factor)

28321-3 / 764890

EXHIBIT 3

DEPARTMENT OF ENVIRONMENTAL SERVICES
CITY AND COUNTY OF HONOLULU
1000 ULUOHIA STREET, SUITE 308, KAPOLEI, HAWAII 96707
TELEPHONE: (808) 768-3486 ● FAX: (808) 768-3487 ● WEBSITE: http://envhonolulu.org

RECEIVED 9/28/11

PETER B. CARLISLE
MAYOR

TIMOTHY E. STEINBERGER, P.E.
DIRECTOR

MANUEL S. LANUEVO, P.E., LEED AP
DEPUTY DIRECTOR

ROSS S. TANIMOTO, P.E.
DEPUTY DIRECTOR

IN REPLY REFER TO:
PRO 11-106

September 22, 2011

Via Certified Mail

Mr. James Dow, Manager
Kalakaua Relief Line, LLC
c/o Allure Waikiki Marketing LLC
175 West Jackson Boulevard, Suite 540
Chicago, Illinois 60604

Dear Mr. Dow:

Subject: Amendment to Memorandum of Understanding and Agreement (MOUA) Kalakaua Avenue Relief Sewer Line Executed by Kalakaua Relief Line, LLC

We have reviewed your amendment request as transmitted by your letter dated, June 28, 2011. We have enclosed the Amendment to the MOUA – Kalakaua Avenue Relief Sewer Line with our approval signatures.

Should you have any questions, please call Tim Houghton, Executive Assistant, at 768-3475, or Jack Pobuk, CIP Program Coordinator, at 768-3464.

Sincerely,

Timothy E. Steinberger, P.E.
For Director

Enclosure

cc: Case Lombardi & Pettit

AMENDMENT TO MEMORANDUM OF UNDERSTANDING AND AGREEMENT
KALAKAUA AVENUE RELIEF SEWER LINE

THIS AMENDMENT TO MEMORANDUM OF UNDERSTANDING AND AGREEMENT (this "Amendment") is made this 22nd day of September, 2011, by and among KALAKAUA RELIEF LINE, LLC (the "Company"), a Hawaii limited liability company, and the CITY AND COUNTY OF HONOLULU (the "City").

RECITALS:

A. The Company and the City entered into that certain Memorandum of Understanding and Agreement dated December 19, 2007 (the "Agreement"). Capitalized terms used herein without definition shall have the meanings ascribed to such terms on the Agreement.

B. The Company has completed construction of the Line and has requested that the City issue Credits to the Company in the amount of the actual total construction costs of the Line in accordance with the terms of the Agreement. In connection with the issuance of Credits to the Company, the Agreement contemplates that Exhibit 3 thereto shall be amended to reflect the final allocations of Credits to the Members of the Company without prejudice to the rights of Members under Section 5 of the Agreement.

NOW, THEREFORE, in consideration of the premises and the mutual covenants contained herein, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereby covenant and agree to amend the Agreement as follows:

1. Amendment to Section 11. Section 11 of the Agreement shall be amended and restated in its entirety as follows (solely for convenience, modified language appears in italics, deleted language is not shown):

11. Notices. Any notice to be given to or served upon any of the parties hereto shall be deemed to have been sufficiently given or served for all purposes when actually delivered by messenger or by certified mail, return receipt requested, as follows:

In the case of the City:

Department of Environmental Services
City and County of Honolulu
1000 Uluohia Street, Suite 308
Kapolei, Hawaii 96707
Attention: *Tim Steinberger*, Director

Department of Planning and Permitting
City and County of Honolulu

650 South King Street, 7th Floor
Honolulu, Hawaii 96813
Attention: *David K. Tanoue*, Director

If to the Company:

Kalakaua Relief Line, LLC
c/o *Allure Waikiki Marketing, LLC*, Manager
175 W. Jackson Blvd., Suite 540
Chicago, IL 60604
Attention: *James J. Dow*

With a copy to Case Lombardi & Pettit:

Case Lombardi & Pettit
737 Bishop Street, Suite 2600
Honolulu, Hawaii 96813
Attention: Dennis Lombardi, Esq.
Esther Han *Roberts*, Esq.

2. Amendment to Exhibit 3 to Agreement. Exhibit 3 of the Agreement is hereby amended and replaced in its entirety with the Exhibit 3 attached hereto and incorporated herein by this reference.

3. No Other Amendments. In all other respects, the Agreement, except as amended by this Amendment, is unamended and unmodified and is in full force and effect.

4. Counterparts. The parties hereto agree that this Amendment may be executed in counterparts, each of which shall be deemed an original, and said counterparts shall together constitute one and the same instrument, binding all of the parties hereto, notwithstanding that all of the parties are not signatories to the original or the same counterparts. For all purposes, including, without limitation, the delivery of this Amendment, duplicate, unexecuted and unacknowledged pages of the counterparts may be discarded and the remaining pages assembled as one document.

[Signature Page Follows]

IN WITNESS WHEREOF, the parties hereto have executed this Agreement effective on the day and year first above written.

CITY AND COUNTY OF HONOLULU

By _____
Tim Steinberger
For Director, Department of Environmental Services,
City and County of Honolulu

APPROVED AS TO FORM
AND LEGALITY

_____
Deputy Corporation Counsel

KALAKAUA RELIEF LINE, LLC, a Hawaii limited liability company

By ALLURE WAIKIKI MARKETING, LLC, a Delaware limited liability company
Its Manager

By _____
James J. Dow
Its Vice President

Exhibit 3

See attached.

Exhibit "A"

	Members	Total Capital Contributions	Membership Interest	E.S.D.U. to be Issued per Member Based on Total Qualified Construction Costs
1.	Allure Waikiki Marketing, LLC (formerly FRC Waikiki, LLC) (Allure Waikiki Project)	$2,412,196.93	41.22%	400.98
2.	Sam House Development, LLC (1391 Kapiolani Project)	$929,724.14	15.89%	167.79
3.	Samkoo Pacific, LLC (1625 Kapiolani Project)	$709,971.16	12.13%	128.13
4.	1830 Kapiolani, LLC (1830 Kapiolani Project)	$587,193.98	10.03%	97.61
5.	1617 Fern LLC (1700 Kalakaua Project)	$1,142,141.80	19.52%	189.86
6.	Island Paradise Investments Limited Partnership (1723 Kalakaua Project)	$70,997.23	1.21%	12.81
TOTAL		$5,852,225.24	100%	997.18

SamKoo Allocation of Sewer Credits Letter

Kalakaua Relief Line, LLC
c/o Samkoo Hawaii, LLC
1391 Kapiolani Blvd., Suite 103
Honolulu, Hawaii 96814

February 28, 2017

VIA HAND DELIVERY
City and County of Honolulu
Department of Planning and Permitting
650 S. King Street
Honolulu, Hawaii 96813

Re: Kalakaua Relief Line, LLC
Transfer of Wastewater System Facility Charge Credits by Samkoo Hawaii, LLC, formerly known as Sam House Development, LLC, to Samkoo Pacific, LLC

Reference: Sewer Connection Application 2015/SCA-0508 for Tax Map Key Nos. (1) 2-3-041:009 and 006
Building Permit Application No.: A2016-02-0189

To Whom It May Concern:

Samkoo Hawaii, LLC, a Hawaii limited liability company, formerly known as Sam House Development, LLC ("Manager"), is the Manager of Kalakaua Relief Line, LLC, a Hawaii limited liability company ("KRL"). Both Manager and Samkoo Pacific, LLC, a Hawaii limited liability company ("Samkoo Pacific"), are Members of KRL. The City and County of Honolulu ("City") allocated to Manager a total of 167.79 Wastewater System Facility Charge Credits ("WSFC Credits") for its Designated Project (as identified in the Memorandum of Understanding and Agreement dated December 19, 2007, as amended September 22, 2011, by and between KRL and the City ("MOUA")), as confirmed by letter dated October 27, 2011 by David K. Tanoue, Director, Department of Planning and Permitting. The total amount paid to date for these credits is $929,724.14.

The City allocated to Samkoo Pacific a total of 128.13 WSFC Credits for its Designated Project (as identified in the MOUA), as confirmed by letter dated October 27, 2011 by David K. Tanoue, Director, Department of Planning and Permitting. The total amount paid to date for these credits is $709,971.16.

Section 10.3(iv) of the Operating Agreement of KRL, as amended, states that the Members of KRL agree that Manager and Samkoo Pacific shall always have the right to assign,

sell or otherwise transfer any WSFC Credits between themselves without obtaining the approval of KRL, Manager, or any of the other Members of KRL. Manager has agreed to transfer and assign all of Manager's right, title, and interest in its 167.79 WSFC Credits to Samkoo Pacific to be used for Samkoo Pacific's Designated Project (Kapiolani Residence located at 1625 and 1631 Kapiolani Boulevard; Tax Map Key Nos. (1) 2-3-041:009 and 006). The total number of credits to be used is 295.92, for a total payment of $1,639,695.30.

If you need any additional information or have any questions, please do not hesitate to contact me at 941-2300. Thank you.

Sincerely,

SAMKOO HAWAII, LLC,
a Hawaii limited liability company

By: _____
Timothy C. Yi
Its Manager

J. ARBORIST REPORT

Steve Nimz and Associates Inc.
Consulting Arborist Services
PO BOX 10026 Honolulu, Hawaii 96816
Office # (808) 734-5963
Email: Steve@stevenimz.com

October 30, 2017

SamKoo Hawaii LLC
Timothy Yi
1391 Kapiolani Blvd. Monkeypod Tree Assessment

The following Tree Assessment Report was requested by SamKoo Hawaii LLC regarding three large mature Monkeypod trees fronting 1391 Kapiolani Blvd. The three Monkeypod trees are growing in the City and County of Honolulu's 10-ft. wide planter strip. The trees were assessed for health and structure from Kona Iki St. southward toward Keeaumoku St. The trees are part of the historic Kapiolani Blvd. planting scheme.

Monkeypod #1 on the corner of Kapiolani Blvd. and Kona Iki St. has a 32-in. trunk diameter, 40-ft. tall, and has a 70-ft. crown spread. Tree health and structure are good with exposed surface roots that grow adjacent to the fire hydrant.

Monkeypod #2 has a 24-in. trunk diameter, 35-ft. tall, and has a 50-ft. crown spread. Tree health and structure are good with exposed surface roots.

Monkeypod #3 has a 32-in. trunk diameter, 40-ft. tall, and has an 80-ft. crown spread with large exposed surface roots that have cracked the curb and are pushing against the sidewalk. There is a large crossing; structural branch in the lower crown. Signs of root decay were observed. Tree health is good structure is fair.

A site inspection was conducted on 10/30/2017 with the SamKoo Hawaii LLC Design Team to review project design and discuss tree preservation and mitigation. The project design is set back from the sidewalk a sufficient distance to preserve the Monkeypod canopy with minimum pruning for trees #1 and 2. The planter strip will be improved with a low soil mound covering exposed surface roots. New ground covers will be planted with an irrigation system.

Monkeypod #3 is in conflict with ingress and egress driveway. The tree is too large to relocate based ontrunk size, extensive surface roots, tree structure, and conflict with numerous underground utilities. (site drawing) I recommend the Monkeypod #3 tree be removed and replaced with a new field stock Monkeypod tree fronting the project or in a more appropriate location to be determined by Division of Urban Forestry.

If you have any questions, please contact my office at 808-734-5963

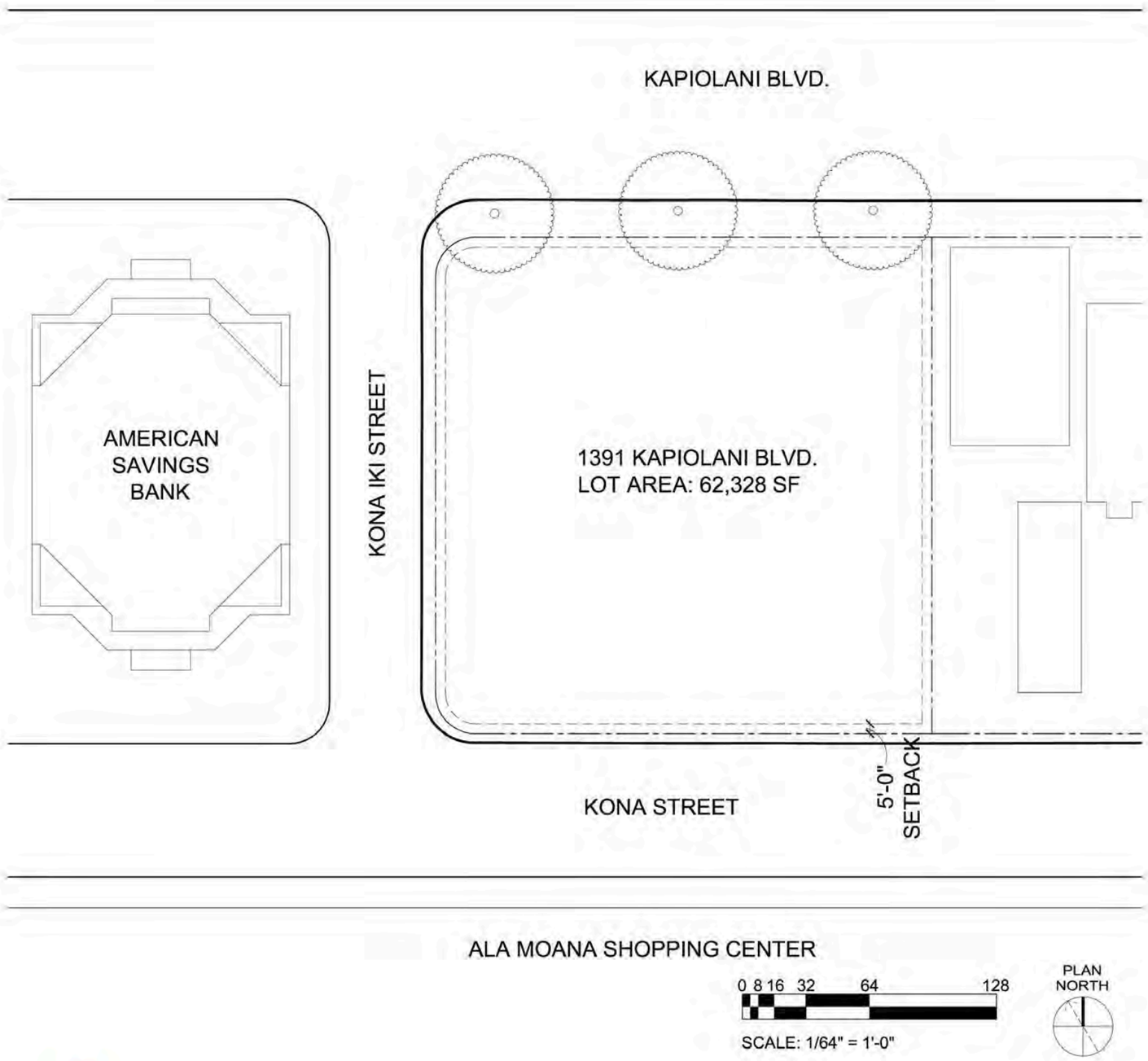
Respectfully yours,

Steve Nimz,
ASCA Consulting Arborist

ISA Certified Arborist # WE- 0314AM
ISA Tree Risk Assessment Certified

Tree #	Address	Species	Diameter (Inches)	Height (Feet)	Crown Spread (Feet)	Health Condition	Structural Condition	Mitigation Crown, Prune, Remove	Tree Protection Radius (Feet)	Damage: Sidewalk, Curb,Gutter, Roadway,Driveway	Comments
1	1391 Kapiolani Blvd	Monkeypod	32	40	70	G	G	CP RP	Preserve		Exposed surface roots
2	1392 Kapiolani Blvd	Monkeypod	24	35	50	G	G	CP RP	Preserve		Exposed surface roots
3	1393 Kapiolani Blvd	Monkeypod	32	40	80	G	F	REMOVE		Curb	Exposed surface roots. Cracking curb

THE CENTRAL
ALA MOANA



PROJECT SITE INFORMATION

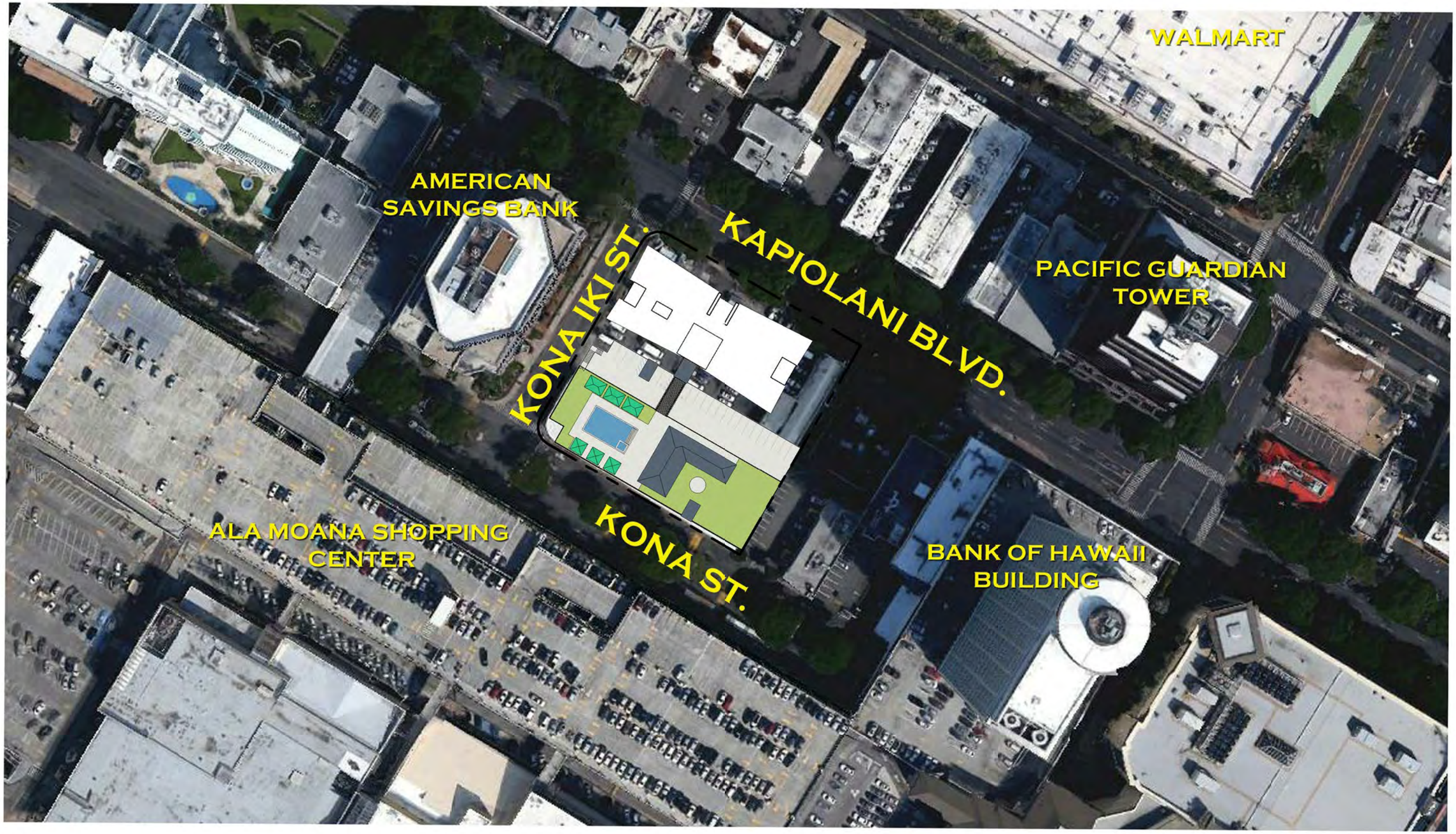
TAX MAP KEY NO:	2-3-039:011
SITE ADDRESS:	1391 KAPIOLANI BLVD. HONOLULU, HAWAII

LOT INFORMATION

LOT AREA:	
ACRES	1.431 ACRES
SQUARE FEET (SF)	62,328 SF
LOT DIMENSIONS:	
LENGTH:	250 FT.
DEPTH:	250 FT.

LAND CONTROL CODES & DEVELOPMENT STANDARDS

ZONING:	BMX-3 COMMUNITY BUSINESS DISTRICT
FLOOR ZONE:	AE / X
HISTORIC SITE REGISTRY:	NONE
LOT RESTRICTIONS:	NONE
SMA / SHORELINE:	NOT IN SMA
SPECIAL DISTRICT:	NOT IN SPECIAL DISTRICT
STATE LAND USE:	URBAN DISTRICT
HEIGHT LIMIT:	250 FT.
HEIGHT SETBACKS:	NO PORTION OF A STRUCTURE SHALL EXCEED A HEIGHT EQUAL TO TWICE THE DISTANCE FROM THE STRUCTURE TO THE VERTICAL PROJECTION OF THE CENTER LINE OF ANY STREET
STREET SETBACKS	
FRONT:	10 FT. FOR DWELLINGS; 5 FT. FOR OTHER USES
SIDE & REAR:	10 FT. FOR MULTI-FAMILY DWELLINGS; 0 FT. FOR OTHER USES
MAX. BUILDING AREA:	NOT REGULATED (PERCENT OF ZONING LOT)
MAX. DENSITY (FAR):	2.5 (OR 155,815 SF)
OPEN SPACE BONUS:	FOR EACH SQUARE FOOT OF PUBLIC OPEN SPACE PROVIDED, FIVE SQUARE FEET OF FLOOR AREA CAN BE ADDED, EXCLUSIVE OF ALL REQUIRED YARDS; FOR EACH SQUARE FOOT OF ARCADE AREA PROVIDE, THREE SQUARE FEET OF FLOOR AREA CAN BE ADDED, EXCLUSIVE OF ALL REQUIRED YARDS;
MAX. FAR WITH OPEN SPACE BONUS:	3.5 (OR 218,148 SF)
OFF-STREET PARKING:	REQUIREMENTS VARY BY USAGE
OFF-STREET LOADING:	REQUIREMENTS VARY BY USAGE



THE CENTRAL
ALA MOANA

VICINITY MAP

The Central Condominium | Address: 1391 KAPIOLANI BOULEVARD | Project Number: 17037 | Date: 09/08/17

SAMKOO

DESIGN PARTNERS INCORPORATED

THE CENTRAL
ALA MOANA

SITE PLAN

The Central Condominium | Address: 1391 KAPIOLANI BOULEVARD | Project Number: 17037 | Date: 09/08/17

SCALE: 1/32" = 1'-0" 0 16' 32' 64'

SAMKOO

DESIGN PARTNERS INCORPORATED

THE CENTRAL
ALA MOANA

The Central Condominium | Address: **1391 KAPIOLANI BOULEVARD** | Project Number: **17037** | Date: **09/08/17**

SAMKOO

DESIGN PARTNERS INCORPORATED

THE CENTRAL
ALA MOANA

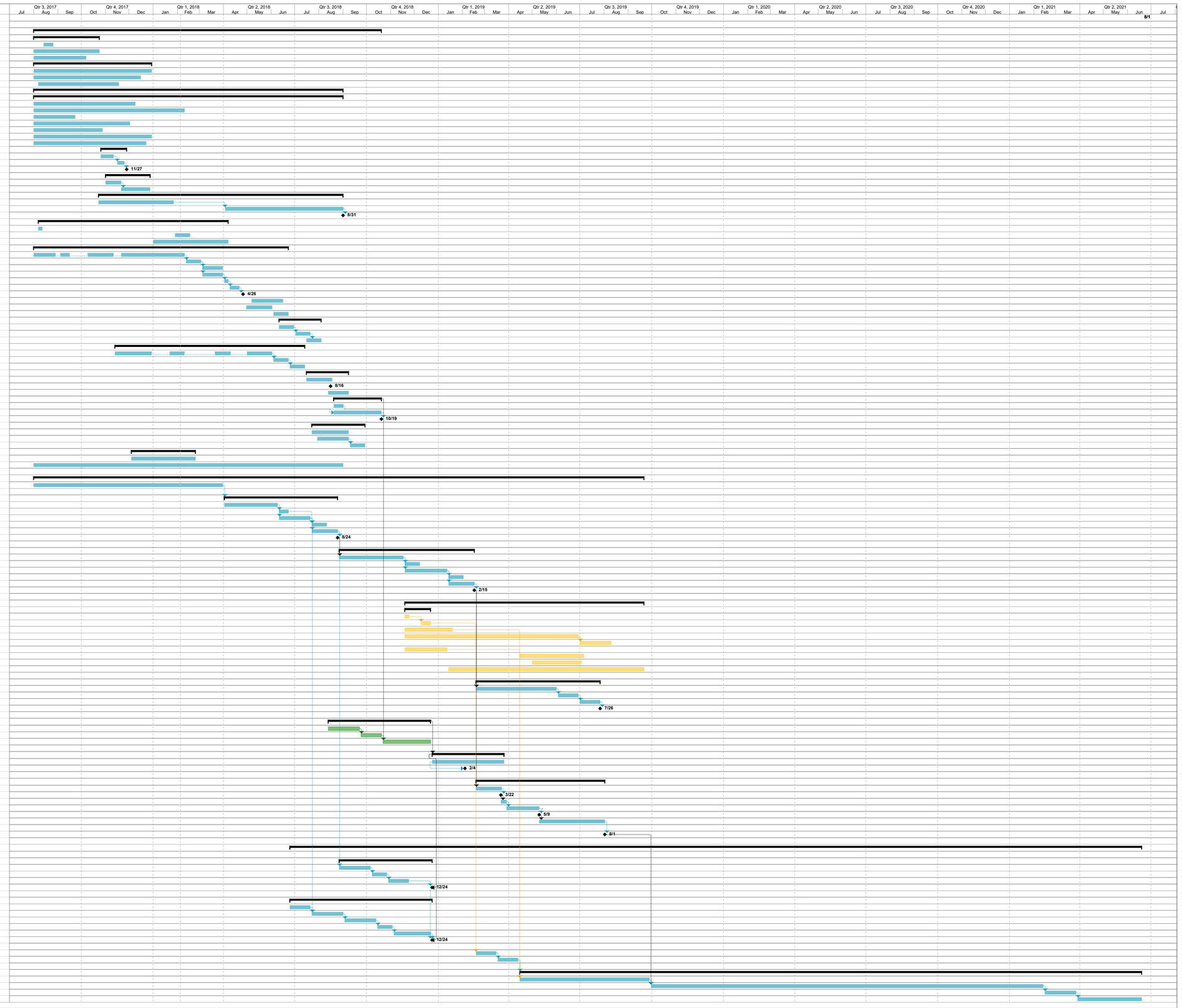
The Central Condominium | Address: **1391 KAPIOLANI BOULEVARD** | Project Number: **17037** | Date: **09/08/17**

SAMKOO

DESIGN PARTNERS INCORPORATED

K. PRELIMINARY PROJECT SCHEDULE

ID	Task Name	Duration	Start	Finish	Predecessors	Successors
1	**1391 SAMKOO THE CENTRAL CONDOMINIUM**	**1014 days**	**Tue 8/1/17**	**Fri 6/18/21**		
2						
3	**ENTITLEMENTS**	**319 days?**	**Tue 8/1/17**	**Fri 10/19/18**		
4	**INITIAL CONSULTAIONS**	**60 days**	**Tue 8/1/17**	**Mon 10/23/17**		
5	HHFDC STAFF AND LEADERSHIP MTG.	10 days	Mon 8/14/17	Fri 8/25/17		
6	HONOLULU CITY COUNCIL	60 days	Tue 8/1/17	Mon 10/23/17		
7	CITY ADMIN. DEPARTMENT	49 days	Tue 8/1/17	Fri 10/6/17		
8	**PROJECT DEFINITION**	**109 days**	**Tue 8/1/17**	**Fri 12/29/17**		
9	PRELIMINARY CONCEPT DESIGN	109 days	Tue 8/1/17	Fri 12/29/17		
10	PROJECT PROGRAM DEFINITION	99 days	Tue 8/1/17	Fri 12/15/17		
11	UPDATE PROJECT PROFILE	75 days	Mon 8/7/17	Fri 11/17/17		
12	**EA SUBMITTAL**	**284 days**	**Tue 8/1/17**	**Fri 8/31/18**		
13	**BASELINE STUDY**	**284 days**	**Tue 8/1/17**	**Fri 8/31/18**		
14	PH 1 ASSESSMENT CONFIRMATION	94 days	Tue 8/1/17	Fri 12/8/17		
15	MARKET STUDY	139 days	Tue 8/1/17	Fri 2/9/18		
16	ARCHAEOLOGICAL STUDY	39 days	Tue 8/1/17	Fri 9/22/17		
17	SITE ELECTRICAL ASSESSMENT	89 days	Tue 8/1/17	Fri 12/1/17		
18	SHADOW (SOLAR) STUDY	64 days	Tue 8/1/17	Fri 10/27/17		
19	PEDESTRIAN COMFORT - WIND STUDY	109 days	Tue 8/1/17	Fri 12/29/17		
20	SITE CONTEXT ASSESSMENT	104 days	Tue 8/1/17	Fri 12/22/17		
21	**PRELIM. ENGIN. REPORT**	**23 days**	**Thu 10/26/17**	**Mon 11/27/17**		
22	PER DRAFT	12 days	Thu 10/26/17	Fri 11/10/17		23
23	REVIEW AND COMMENT	7 days	Thu 11/16/17	Fri 11/24/17	22	24
24	FINAL PER SUBMISSION	0 days	Mon 11/27/17	Mon 11/27/17	23	
25	**TRAFFIC ANALYSIS**	**41 days**	**Wed 11/1/17**	**Wed 12/27/17**		
26	INTERSECTION COUNTS	14 days	Wed 11/1/17	Mon 11/20/17		27
27	UPDATED TIAR	27 days	Tue 11/21/17	Wed 12/27/17	26	
28	**FEMA**	**225 days**	**Mon 10/23/17**	**Fri 8/31/18**		
29	FLOOD MODELING WORK	70 days	Mon 10/23/17	Fri 1/26/18		30
30	LOMR SUBMISSION / REVIEW	109 days	Tue 4/3/18	Fri 8/31/18	29	31
31	FEMA APPROVAL	0 days	Fri 8/31/18	Fri 8/31/18	30	
32	**ENVIRONMENTAL ASSESSMENT PREP & SUPPORT**	**175 days?**	**Mon 8/7/17**	**Fri 4/6/18**		
33	PRECONSULTATION LETTERS	5 days	Mon 8/7/17	Fri 8/11/17		
34	CONSULTATION W/ EXEMPTION-TARGETED ANGENCY	15 days	Mon 1/29/18	Fri 2/16/18		
35	ALA MOANA / KAKAAKO N.B. PRESENTATION	70 days?	Mon 1/1/18	Fri 4/6/18		
36	**DRAFT ENVIRONMENTAL ASSESSMENT (DEA)**	**234 days**	**Tue 8/1/17**	**Fri 6/22/18**		
37	1ST DRAFT DEA (6 WK)	114 days	Tue 8/1/17	Fri 2/9/18		38
38	HHFDC REVIEW (3 WK)	15 days	Mon 2/12/18	Fri 3/2/18	37	39,40
39	FINAL DEA DEVELOPMENT (4 WK)	20 days	Mon 3/5/18	Fri 3/30/18	38	
40	HHFDC SIMULTANEOUS REVIEW (4 WK)	20 days	Mon 3/5/18	Fri 3/30/18	38	41
41	APPROVED DEA CONTINUOUS FORMATING	5 days	Mon 4/2/18	Fri 4/6/18	40	42
42	PRODUCTION, OEQC DOCS, MAILOUTS	10 days	Mon 4/9/18	Fri 4/20/18	41	43
43	OEQC SUBMISSION	0 days	Thu 4/26/18	Thu 4/26/18	42	
44	PUBLIC COMMENT PERIOD (5 WK)	30 days	Mon 5/7/18	Fri 6/15/18		
45	COUNCIL UPDATES & SUPPORT REQUESTS	25 days	Mon 4/30/18	Fri 6/1/18		
46	PUBLIC COMMENT RESPONSES	15 days	Mon 6/4/18	Fri 6/22/18		
47	**FINAL ENVIRONMENTAL ASSESSMENT (FEA) & FONSI**	**40 days**	**Mon 6/11/18**	**Fri 8/3/18**		
48	DRAFT FEA	15 days	Mon 6/11/18	Fri 6/29/18		49
49	HHFDC REVIEW (3 WK)	15 days	Mon 7/2/18	Fri 7/20/18	48	50FS-10 days
50	FINAL FEA & OEQC SUBMISSION	15 days	Mon 7/16/18	Fri 8/3/18	49FS-10 days	
51	**201H APPLICATION**	**175 days**	**Mon 11/13/17**	**Fri 7/13/18**		
52	DRAFT 201H APPLICATION (4 - 6 WK)	88 days	Mon 11/13/17	Fri 6/1/18		53
53	HHFDC REVIEW (3 WK)	15 days	Mon 6/4/18	Fri 6/22/18	52	54
54	FINAL 201h APPLICATION (3 WK)	15 days	Mon 6/25/18	Fri 7/13/18	53	
55	**HHFDC BOARD APPROVAL**	**40 days**	**Mon 7/16/18**	**Fri 9/7/18**		
56	PRESENTATION & BOARD MEETING	25 days	Mon 7/16/18	Fri 8/17/18		
57	BOARD APPROVAL	0 days	Thu 8/16/18	Thu 8/16/18		
58	DEVT AGREEMENT & DLURC REVIEWS	20 days	Mon 8/13/18	Fri 9/7/18		
59	**CITY COUNCIL REVIEW / APPROVAL**	**45 days**	**Mon 8/20/18**	**Fri 10/19/18**		111
60	TRANSMITTAL AND PREP	10 days	Mon 8/20/18	Fri 8/31/18		61FS-10 days
61	CITY COUNCIL REVIEW	45 days	Mon 8/20/18	Fri 10/19/18	60FS-10 days	62
62	CITY COUNCIL APPROVAL	0 days	Fri 10/19/18	Fri 10/19/18	61	
63	**LENDER PACKAGE DEV'T.**	**50 days?**	**Mon 7/23/18**	**Fri 9/28/18**		
64	INFORMATION COMPILATION	35 days?	Mon 7/23/18	Fri 9/7/18		
65	DRAFTING	30 days?	Mon 7/30/18	Fri 9/7/18		66
66	PRODUCTION & DISTRIBUTION	15 days?	Mon 9/10/18	Fri 9/28/18	65	
67	**GEOTECHNICAL**	**60 days**	**Mon 12/4/17**	**Fri 2/23/18**		
68	FINAL REPORT	60 days	Mon 12/4/17	Fri 2/23/18		
69	**STATE / CITY AGENCIES PROJECT UPDATE**	284 days	Tue 8/1/17	Fri 8/31/18		
70						
71	**DESIGN AND ENGINEERING**	**559 days?**	**Tue 8/1/17**	**Fri 9/20/19**		
72	**PRE-DEVELOPMENT DRAWINGS 35%**	174 days	Tue 8/1/17	Fri 3/30/18		74
73						
74	**SCHEMATIC DESIGN PHASE**	**105 days**	**Mon 4/2/18**	**Fri 8/24/18**	72	
75	PREPARE SD SET	50 days	Mon 4/2/18	Fri 6/8/18		76,77
76	DESIGN REVIEW SD SET w/ OWNER	10 days	Mon 6/11/18	Fri 6/22/18	75	78
77	CONTRACTOR PRICING SD 100%	30 days	Mon 6/11/18	Fri 7/20/18	75	78,79,137
78	SD VALUE ENGINEERING	15 days	Mon 7/23/18	Fri 8/10/18	77,76	
79	REVIEW AND UPDATE SD SET	25 days	Mon 7/23/18	Fri 8/24/18	77	80,130
80	FINAL APPROVAL SCHEMATIC DESIGN PACKAGE	0 days	Fri 8/24/18	Fri 8/24/18	79	83
81						
82	**DESIGN DEVELOPMENT PHASE**	**125 days?**	**Mon 8/27/18**	**Fri 2/15/19**		
83	PREPARE DD SET	60 days	Mon 8/27/18	Fri 11/16/18	80	84,85
84	DESIGN REVIEW DD SET w/ OWNER	15 days	Mon 11/19/18	Fri 12/7/18	83	
85	CONTRACTOR PRICING DD 100%	40 days	Mon 11/19/18	Fri 1/11/19	83	86,87
86	DD VALUE ENGINEERING	15 days	Mon 1/14/19	Fri 2/1/19	85	
87	REVIEW AND UPDATE DD SET	25 days	Mon 1/14/19	Fri 2/15/19	85	88
88	FINAL APPROVAL DESIGN DEVELOPMENT PACKAGE	0 days	Fri 2/15/19	Fri 2/15/19	87	103,118
89						
90	**SUBMIT PERMIT SET**	**220 days**	**Mon 11/19/18**	**Fri 9/20/19**		
91	**DEMOLITION**	**25 days**	**Mon 11/19/18**	**Fri 12/21/18**		
92	DEMOLITION PERMIT	5 days	Mon 11/19/18	Fri 11/23/18		93
93	FILE 10 DAY DOH DEMOLATION NOTICE	10 days	Mon 12/10/18	Fri 12/21/18	92	143
94	NPDES	45 days	Mon 11/19/18	Fri 1/18/19		147
95	SITE DEVELOPMENT PERMIT	8 mons	Mon 11/19/18	Fri 6/28/19		96
96	GRADING PERMIT	30 days	Mon 7/1/19	Fri 8/9/19	95	
97	FOUNDATION PERMIT	40 days	Mon 11/19/18	Fri 1/11/19		147
98	SUPERSTRUCTURAL PERMIT	60 days	Mon 4/15/19	Fri 7/5/19		
99	COURTESY INSPECTION PERMIT	45 days	Wed 5/1/19	Tue 7/2/19		
100	BUILDING PERMIT	180 days	Mon 1/14/19	Fri 9/20/19		
101						
102	**CONSTRUCTION DOCUMENTS PHASE**	**115 days?**	**Mon 2/18/19**	**Fri 7/26/19**		
103	PREPARE CD SET	75 days	Mon 2/18/19	Fri 5/31/19	88	104
104	DESIGN REVIEW CD SET w/ OWNER	20 days	Mon 6/3/19	Fri 6/28/19	103	105
105	REVIEW AND UPDATE CD SET	20 days	Mon 7/1/19	Fri 7/26/19	104	106
106	FINAL APPROVAL CONSTRUCTION DOCUMENT PACKAGE	0 days	Fri 7/26/19	Fri 7/26/19	105	
107						
108	**CPR PROCESS**	**95 days**	**Mon 8/13/18**	**Fri 12/21/18**		113
109	CPR DRAWINGS	30 days	Mon 8/13/18	Fri 9/21/18		110
110	HOUSE RULES, RESERVE STUDY,BY LAWS	20 days	Mon 9/24/18	Fri 10/19/18	109	111
111	REAL ESTATE COMMISSION CPR APPROVAL	45 days	Mon 10/22/18	Fri 12/21/18	110,59	
112						
113	**SALES**	**66 days**	**Mon 12/24/18**	**Mon 3/25/19**	108	133SF,141SF
114	LAUNCH SALES	66 days	Mon 12/24/18	Mon 3/25/19		115SS
115	75% SALES COMMITMENT	0 days	Mon 2/4/19	Mon 2/4/19	114SS	
116						
117	**PRICING AND NEGOTIATION**	**119 days**	**Mon 2/18/19**	**Thu 8/1/19**		
118	PRELIMINARY PRICING PERIOD	5 wks	Mon 2/18/19	Fri 3/22/19	88	119FS-1 day
119	PRELIMINARY PRICING DUE	0 days	Fri 3/22/19	Fri 3/22/19	118FS-1 day	120
120	PRICING ANALYSIS w/ OWNER	5 days	Fri 3/22/19	Thu 3/28/19	119	121
121	REVIEW PRICING ALTERNATES & CONTRACT NEGOTIATION	30 days	Fri 3/29/19	Thu 5/9/19	120	122
122	AWARD	0 days	Thu 5/9/19	Thu 5/9/19	121	123
123	CONSTRUCTION GMP CONTRACT PREPARATION	60 days	Fri 5/10/19	Thu 8/1/19	122	125
124						
125	**SIGN CONSTRUCTION CONTRACT**	0 days	**Thu 8/1/19**	**Thu 8/1/19**	123	148
126						
127	**CONSTRUCTION**	**780 days?**	**Mon 6/25/18**	**Fri 6/18/21**		
128						
129	**ON-SITE SALE CENTER RENOVATION**	**85 days**	**Mon 8/27/18**	**Mon 12/24/18**		
130	DESIGN	30 days	Mon 8/27/18	Fri 10/5/18	79	131
131	CONTRACTOR NEGOTIATION SELECTION	15 days	Mon 10/8/18	Fri 10/26/18	130	132
132	CONSTRUCTION	20 days	Mon 10/29/18	Fri 11/23/18	131	133,141
133	READY FOR SALE	0 days	Mon 12/24/18	Mon 12/24/18	132,113SF	
134						
135	**OFF-SITE SALE CENTER RENOVATION**	**130 days**	**Mon 6/25/18**	**Mon 12/24/18**		
136	LOCATION SELECTION	20 days	Mon 6/25/18	Fri 7/20/18		137
137	DESIGN	30 days	Mon 7/23/18	Fri 8/31/18	136,77	138
138	PERMITTING	30 days	Mon 9/3/18	Fri 10/12/18	137	139
139	CONTRACTOR NEGOTIATION SELECTION	15 days	Mon 10/15/18	Fri 11/2/18	138	140
140	CONSTRUCTION	35 days	Mon 11/5/18	Fri 12/21/18	139	141
141	READY FOR SALE	0 days	Mon 12/24/18	Mon 12/24/18	132,113SF,140	
142						
143	BUILDING DEMOLITION	20 days	Mon 2/18/19	Fri 3/15/19	93	144
144	CLEARING AND ROUGH GRADING	20 days	Mon 3/18/19	Fri 4/12/19	143	146
145						
146	**TOWER CONSTRUCTION**	**570 days**	**Mon 4/15/19**	**Fri 6/18/21**	144	
147	FOUNDATION WORK (PILE & GRADE BEAM)	6 mons	Mon 4/15/19	Fri 9/27/19	97,94	148
148	TOWER AND PARKING STRUCTURE	18 mons	Mon 9/30/19	Fri 2/12/21	147,125	149
149	FURNISHING	30 days	Mon 2/15/21	Fri 3/26/21	148	150
150	PROJECT CLOSE-OUT	60 days	Mon 3/29/21	Fri 6/18/21	149	



Project: 20180205_1391 The Central Condominium Norma
Date: Mon 2/5/18

Task | Split | Milestone | Summary | Project Summary | External Tasks | External Milestone | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | External Tasks | External Milestone | Progress | Deadline

L. WIND STUDY

DRAFT

Preliminary Wind Study

The Central, Ala Moana

Honolulu, Hawaii

Submitted to:

Design Partners, Inc.
Attn: Mr. Johnny Wu, Principal
1580 Makaloa Street, Suite 1100
Honolulu, Hawaii 96814
P: (808) 949-0044

December 22, 2017

Job No. 17-H035A

Englekirk
STRUCTURAL ENGINEERS

888 S. Figueroa Street
18th Floor
Los Angeles, California 90017

323.733.6673 T

www.englekirk.com

TABLE OF CONTENTS

Executive Summary 1

1.0 Introduction 5

2.0 Wind Environment at the Site 9
2.1 General Wind Environment 9
2.2 Typical Wind Environment in Honolulu, HI 11

3.0 Pedestrian Level Wind Study 19
3.1 Comfort Criteria 19
3.2 Wind Tunnel Studies 21
3.3 Preliminary Pedestrian-Level Wind Results 22
3.4 Pedestrian-Level Wind Mitigation 24

References 28

EXECUTIVE SUMMARY

Introduction: This report describes the methodology used and results from preliminary assessment of the effects of pedestrian-level wind (PLW) on The Central - Ala Moana, project in Honolulu, Hawaii. The project consists of a 43-story residential tower flanked by a 10-story parking structure, supported by an elevated amenity deck (i.e., the 11th Floor). The proposed site development is shown in Figure 1.1.

The assessment of the effects of PLW are typically accomplished using wind-tunnel testing that match full-scale meteorological data to physical modeling data. Inasmuch as this is a preliminary study, the opinions presented in this report are based on meteorological data for Honolulu, preliminary analyses of the site, and our experience with other wind studies for high-rise structures in Honolulu. Wind tunnel modeling was not a part of this preliminary assessment.

The frequency of occurrence, speed, and level of turbulence of winds at street level are important to the comfort and safety of pedestrians in pedestrian areas. Tall structures or rapidly changing terrain may intercept the faster wind speeds that flow higher above the ground. Consequently, pedestrian-level wind speeds can be significantly changed when a taller structure or sharply sloping terrain divert a portion of the higher-level wind speed either down the face of the structure or along the sloping terrain until that flow reaches pedestrian level. Because the diverted winds have higher speeds than those near the ground, the effects of those diverted winds can be significant. The proposed project rises substantially above the site and can cause accelerations of the wind speeds over the site that would otherwise not occur. The purpose of this study is to assess the degree to which this acceleration occurs.

Wind Environment: The wind environment at the site used in the pedestrian level wind comfort assessment was characterized by analysis of surface level wind observations collected by the National Weather Service at the Honolulu International Airport. This is the closest NWS station to the site and is located on the same side of the island as the proposed project. Wind data from the airport are considered relevant to this site due to the generally similar topography at both locations. Annual wind statistics were used in the analysis without regard to season because of the relatively warm climate in Honolulu.

Except during the winter period from December to February, where there are some statistically significant winds blowing from different directions around the compass, the prevailing winds are nearly all from the northeast and east-northeast. Even during the winter, the prevailing wind direction is similar to the rest of the year and represents the “trade winds.”

Comfort Criteria: Determining whether wind speeds are acceptable at specific locations requires establishing "comfort" criteria that define wind speeds that are usually acceptable for specific pedestrian uses. The term "10% exceedance speed" is used in the criteria to account for the frequency with which winds occur. The 10% exceedance speed is the speed that is exceeded on one day out of 10, or 10% of the time. This can also be thought of as a roughly weekly occurrence.

Wind speed comfort is subjective, but the following criteria have been applied successfully to projects involving similar uses. A point on the site where the wind speed of 7 mph is exceeded not more than 10% of the time will be considered comfortable for outdoor seating and quiet activities. In this instance, 7 mph is called the "ten percent exceedance speed." Ten-percent exceedance speed of 11 mph and less will be considered comfortable for standing and leisure walking, while those between 12 and 15 mph will be suitable for walking and other occasional, more active uses. Ten percent exceedance speeds in excess of 15 mph will result in potentially uncomfortable pedestrian conditions. Ten percent exceeded speeds reaching or exceeding 36 mph create potential safety hazards for pedestrians. Except during extreme wind events, it is not anticipated that there would be reported wind speeds of this magnitude for this site.

Wind tunnel modeling was not a part of this preliminary assessment, but this type of testing is recommended prior to finalizing the project design.

PLW Conditions Prior to Development: The reference suburban and open wind speeds for this site have 10% wind exceedance speeds of 7.5 mph and 12.5 mph, which suggest a naturally breezy site. The reference suburban and open wind speeds reflect the 10% wind exceedance speeds at a typical suburban site built-up with a mix of different building heights or a site exposed to the ocean without intervening development, respectively. In other words, these reference wind speeds provide a frame of reference to judge how the proposed development influences the pedestrian level wind speeds. As a result of the naturally breezy conditions, few points around and on the site are expected to satisfy the 7-mph criterion even if no development occurs, while approximately two to three times as many points are expected to satisfy the 11 mph criterion. All points on and around the site are expected to satisfy the 15-mph criterion.

PLW Conditions After Development: Based upon results from other PLW studies for high-rises in Honolulu, including one approximately one quarter-mile away, it is anticipated that there will be approximately the same number of points that satisfy the 7-mph criterion as there are for the PLW conditions prior to development. This is a direct reflection of the site's characteristic breeziness. The location of points not meeting the 7-mph criterion will not necessarily be the same for both PLW conditions due to the presence of the project.

The number of points that meet the 11-mph criterion is expected to be approximately two to three times the number of points that meet the 7-mph criterion. Points that do not meet the 11-mph criteria are expected to be directly adjacent or on-site. Most points are expected to satisfy the 15-mph criterion. If there are any points that do not satisfy the 15-mph criterion, it is anticipated that they will all occur on-site. It is anticipated that there will be no points close to exceeding the hazard condition (i.e., 10% mean exceedance speed of 36 mph).

There are several reasons why the proposed development is anticipated to have a generally benign impact on the off-site and on-site PLW environment.

1. The building has a heavily articulated façade that can be expected to limit acceleration of downwashing wind, as shown in Figure 3.2. The east and west façades do not have balconies, but the ribbing and fins on these sides of the building should help disrupt downwashing wind. The articulation on each façade of the building is expected to limit wind speed acceleration at the ground level and on the podium.
2. There is a significant “eyebrow” above ground level. The offsets or eyebrows are expected to disrupt the downwashing wind and reduce direct impact to pedestrians at ground level.
3. Although there are other high-rise buildings in the vicinity, there is also a significant amount of open space around each building as well as a mix of varying building heights. Both factors help prevent wind acceleration. Wind tunnel tests in similar environments show that the influence of tall structures is usually limited to areas immediately adjacent to or directly on the site.
4. For the most part, the amenity deck is shielded from prevailing winds by the residential tower.

Areas that may experience relatively high wind speeds may include portions of the amenity deck and the space between the residential tower and the parking structure. The amenity deck may experience higher wind speeds as prevailing winds are redirected around the residential tower as well as downwashing winds, although the setback of the amenity deck from the face of the residential tower may help disrupt downwashing winds that would otherwise impinge on this level. The depth of the relatively narrow space between the parking structure and the residential tower may help stagnate the downwashing wind. Neither of these factors is expected to significantly increase wind speeds beyond the boundaries of the site. The complex interaction between project elements and the wind and the difficulty in predicting the resulting behavior is an important reason why wind tunnel studies are recommended for projects of this size.

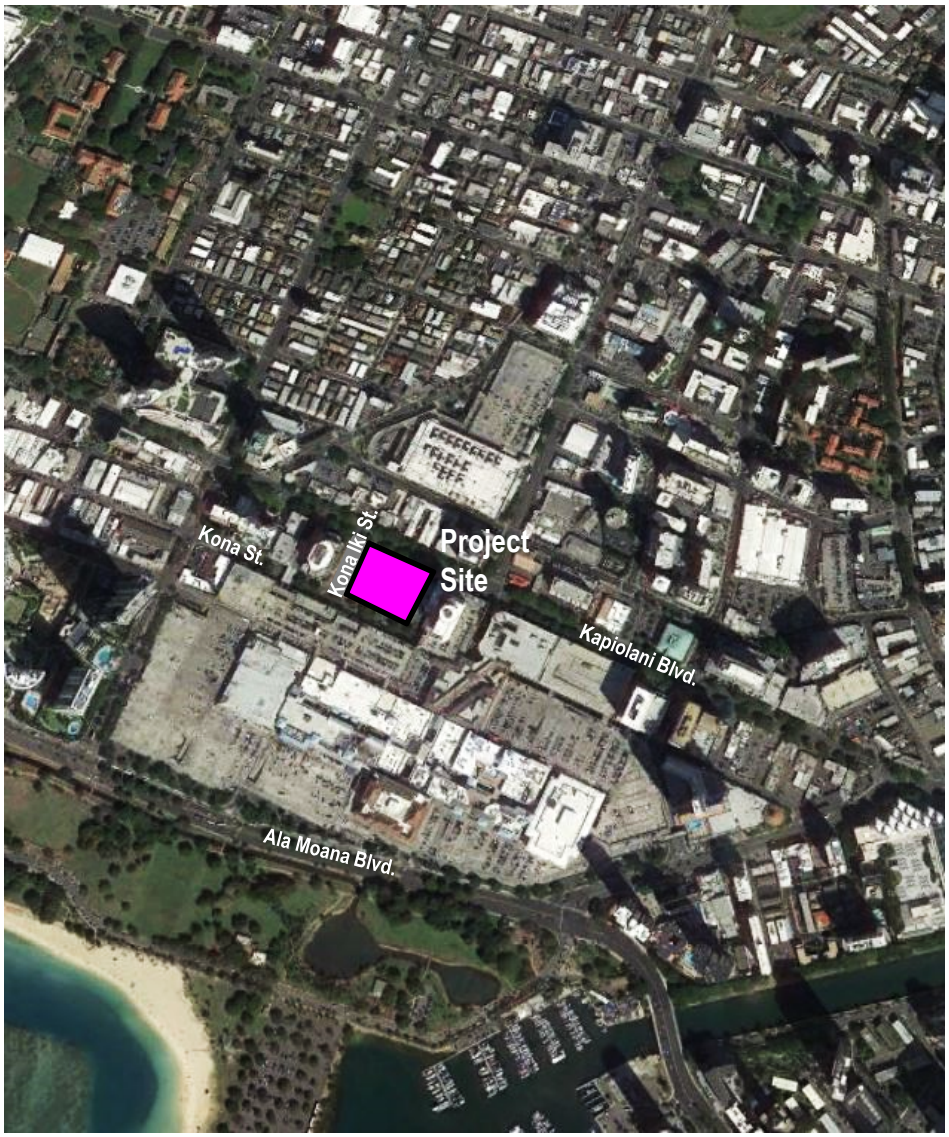
PLW Mitigation: As noted above, the design of the facade, siting of the amenity level relative to the tower, and the siting of the tower relative to the edges of the eyebrows are expected to mitigate the effect of the wind at pedestrian levels. Nevertheless, mitigation options for windier points include landscaping and screening.

1.0 INTRODUCTION

This report describes the methodology used and results from a preliminary assessment of the effects of pedestrian-level wind (PLW) on The Central - Ala Moana, project in Honolulu, Hawaii. The project consists of a 43-story residential tower flanked by a 10-story parking structure supported by an elevated amenity deck (i.e., the 11th Floor). The proposed site development is shown in Figure 1.1.

The assessment of the effects of PLW are typically accomplished using wind-tunnel testing that match full-scale meteorological data to physical modeling data. Inasmuch as this is a preliminary study, the opinions presented in this report are based on meteorological data for Honolulu, preliminary analyses of the site, and our experience with other wind studies for high-rise structures in Honolulu. Wind tunnel modeling was not a part of this preliminary assessment.

Traditionally, one application of the PLW evaluation process is in the environmental impact assessment of proposed buildings and other construction projects that may substantially alter pedestrian-level winds in site areas. Other applications of this process evaluate existing or potentially problematic wind conditions for specific building projects from the perspective of user satisfaction.



Source: Google Earth

Figure 1.1: Project Site: Kapiolani Blvd. and Kona Iki St., Honolulu, Hawaii

December 22, 2017
Job No. 17-H035A

Figure 1.2: Ground Level Site Plan

December 22, 2017
Job No. 17-H035A

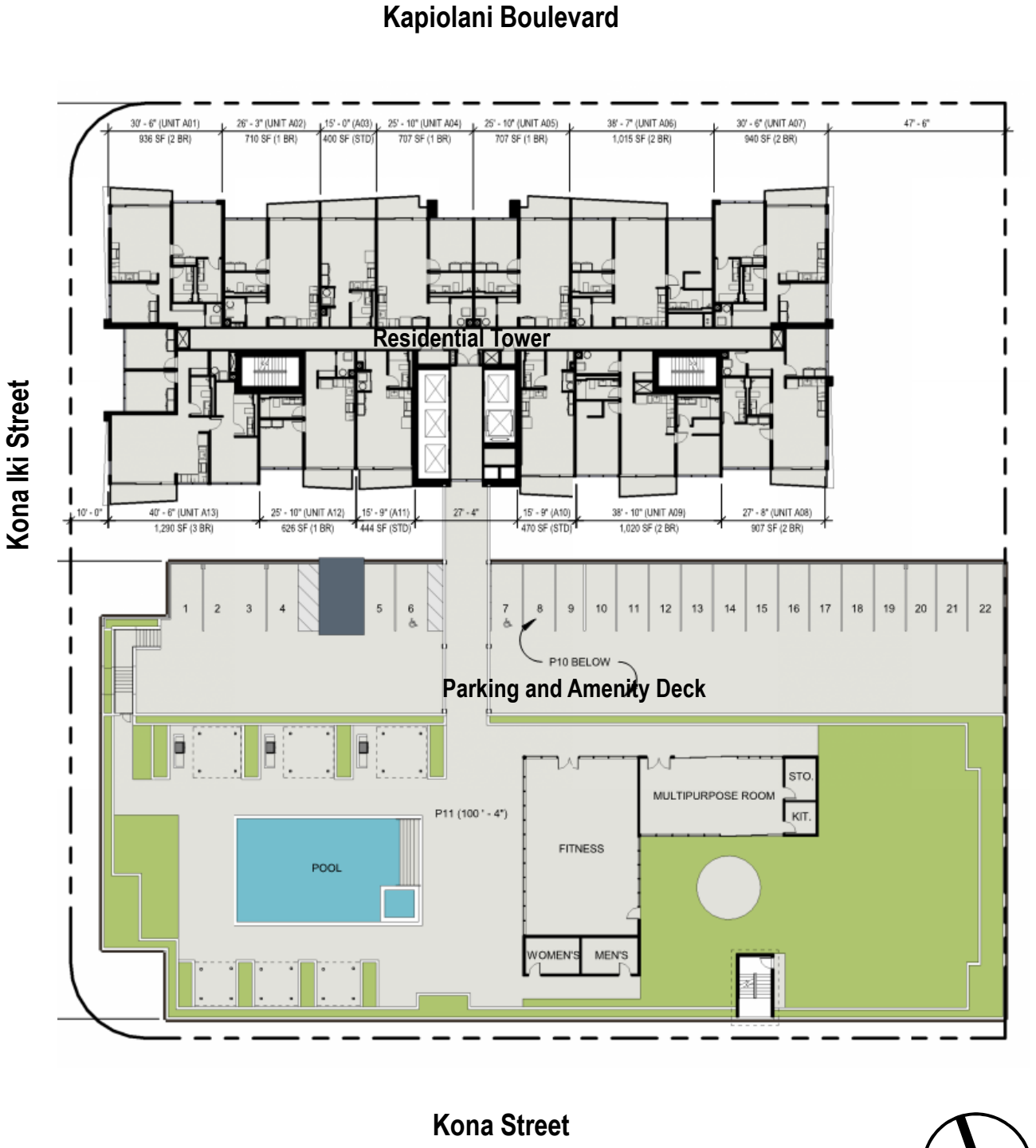


Figure 1.3: 11th Floor (Amenity Level) Site Plan

December 22, 2017
Job No. 17-H035A

2.0 WIND ENVIRONMENT AT THE SITE

2.1 General Wind Environment

The winds of interest in this evaluation flows along the interface between the boundary between the ground and the upper atmosphere. This interface, as shown in Figure 2.1, is called the “boundary layer.” Wind at the boundary layer is influenced by many factors, including general topography, characteristics of the built environment, and specifics of the local site. In general, wind speeds increase with height according to the “power law,” as shown graphically in Figure 2.2 for different wind environments.

Figure 2.2 also illustrates the effect of increasing surface roughness (i.e., “friction”) on the height of the boundary layer. Wind near the ground decelerates due to the “friction” between the wind molecules and the ground as well as the turbulent flow caused by surface roughness characteristics. Wind at higher elevations is less impacted by these near-surface characteristics, and the wind speed is therefore faster. The boundary layer is generally higher in urban environments where the surface roughness characteristics are more pronounced than in open country environments because of the ability of buildings to impact the flow of wind.

Surface topography influences wind speed by disrupting or channeling wind flow. Structures built on the top of a hill generally experience faster wind speeds, while structures shielded by vegetation or topographic features tend to experience slower wind speeds. Valleys can locally direct the flow of wind. The less shielded a building site is, the faster the wind can flow. Examples of poorly shielded sites include those located within or along the edges of bodies of water. Examples of better shielding include sites surrounded by gently rolling hills and vegetation.

The built environment can also influence the flow of wind. Long expanses of built-up areas, such as those in urban areas, tend to increase the surface roughness and result in reduced wind speeds. Structures surrounded by wide and flat plains tend to experience faster wind speeds. In general, a mix of structures of relatively uniform height separated by streets and randomly interspersed with taller structures results in a more significant reduction of wind speed than tall structures regularly arranged to create canyons in which the wind can flow without impediment.

In general, the building code recognizes three different wind exposures that reflect the topographic and urban densities discussed. The precise definitions can be found in ASCE 7, but the essential characteristics of each exposure are as follows:

Exposure B: Defined by surface roughness found in in urban and suburban areas, wood areas, or other terrain with numerous closely spaced obstructions having the size of single-family dwellings or larger. Exposure B would apply to sites where this type of surface roughness prevails in the upwind direction for a distance of at least 2,600 ft. or 20 times the building height, whichever is greater. The proposed site would qualify for Exposure B for the north, east and west facades.

Exposure C: Defined by surface roughness in open terrain with scattered obstructions having heights generally less than 30 ft. This category includes flat open country, grasslands, and all water surfaces in hurricane-prone areas. Exposure C would apply where Exposures B and D do not apply. The proposed site would qualify for Exposure C for the south facade.

Exposure D: Defined by surface roughness in flat, unobstructed areas and water surfaces. This category includes smooth mud flats, salt flats, and unbroken ice. Exposure D would apply where this type of surface roughness prevails in the upwind direction for a distance at least 5,000 ft. or 20 times the building height, whichever is greater. Exposure D would also extend from the shoreline inland for a distance of 600 ft. or 20 times the building height, whichever is greater, even when the upwind surface roughness is consistent with Exposures B and C. This exposure would apply to this site for winds blowing from the southeast to west-northwest because the shoreline is within 20 times the building height.

Conditions specific to the buildings at a given site can also influence the wind speed. Large, massive structures can impede the flow of wind such that sites downwind are shielded. On the other hand, tall, narrow structures can locally accelerate wind speeds. The actual impact of buildings at a given site is a complex phenomenon, but general observations can be made to help assess the likelihood of a specific project producing a locally unacceptable wind environment.

When wind impinges on a building, some of the wind is directed above the building, some of the wind is directed downward as down-washing wind, and some of the wind stagnates, as shown in Figure 2.3. At the corners of buildings, wind is directed around the building creating corner streams. The down-washing wind and the corner streams can create locally accelerated wind speeds at the ground level.

Wind directed above and over a building can create significant negative pressures on the leeward side of the building (i.e. the side away from the direct flow of the wind) and, in extreme cases, can create even higher wind speeds on the leeward side caused by vortex shedding within the zone of recirculation flow. Generally, however, the ground level at a distance approximately twice the building height is shielded from the effects of wind by the building.

On the upwind, or windward, side of the building, the down-washing winds can create an upwind vortex that can accelerate wind speeds. Highly articulated building facades, such as those with balconies, sunshades, and building setbacks at the lower levels, can mitigate the impact of the down-washing winds because they disrupt the flow of the wind. Smooth, simple building facades do not disrupt the down-washing winds and ground level wind speeds would be expected to be higher.

Corner streams can create very high localized negative wind pressures on the leeward side of the building, but building orientation and the degree of building façade articulation can directly impact the resulting wind speeds at ground level. Buildings that are oriented with their broad face perpendicular to the flow of the wind will disrupt the wind flow more effectively than buildings with their broad face parallel to the wind flow. Buildings with highly articulated corners will also disrupt the wind flow resulting in lower wind speeds.

2.2 Typical Wind Environment in Honolulu, Hawaii

The wind environment at the site used in the pedestrian level wind comfort assessment was characterized by analysis of surface level wind observations collected by the National Weather Service at the Honolulu International Airport. This is the closest NWS station to the site and is located on the same side of the island as the proposed project. Wind data from the airport are considered relevant to this site due to the generally similar topography at both locations. Annual wind statistics were used in the analysis without regard to season because of the relatively warm climate in Honolulu.

Figure 2.4 illustrates a wind rose that presents annual wind speed, frequency and direction for Honolulu, HI. Wind roses can be configured in different ways. In Figure 2.4, the length of each spoke corresponds to the frequency the wind blows from a given direction. The concentric circles represent frequency starting from 0% of the time at the center. Depending upon the frequency distribution of the wind, the circles may represent different frequency values that vary from month-to-month or at different sites. The colors illustrate distinct frequency categories showing the percentage of time that winds blow from a given direction within specified speed ranges, as shown in the Legend. The spokes correspond to the 16 cardinal compass directions (e.g., North, North northeast, Northeast, etc.).

The monthly variation in wind speed and direction in Honolulu is illustrated in Figure 2.5 using wind roses configured as shown in Figure 2.4 (i.e., the concentric circles represent probability of occurrence in a month and the colors represent wind speed). Except during the winter period from December to February, where there are some statistically significant winds blowing from different directions around the compass,

the prevailing winds are nearly all from the northeast and east-northeast. Even during the winter, the prevailing wind is similar to the rest of the year and represents the “trade winds.”

Figure 2.6 superimposes a yearly wind rose on the site plan illustrating how the prevailing winds correspond to the orientation of the residential tower and the amenity deck. This wind rose is configured as shown in Figure 2.4.

The analysis of extreme winds, such as tropical storms and hurricanes, would be accomplished by producing a 100,000 year simulation of hurricanes for this area of the Pacific. These winds are relevant when designing the structural systems of buildings or building exterior cladding, but are so infrequent that they are not relevant when considering pedestrian-level winds.

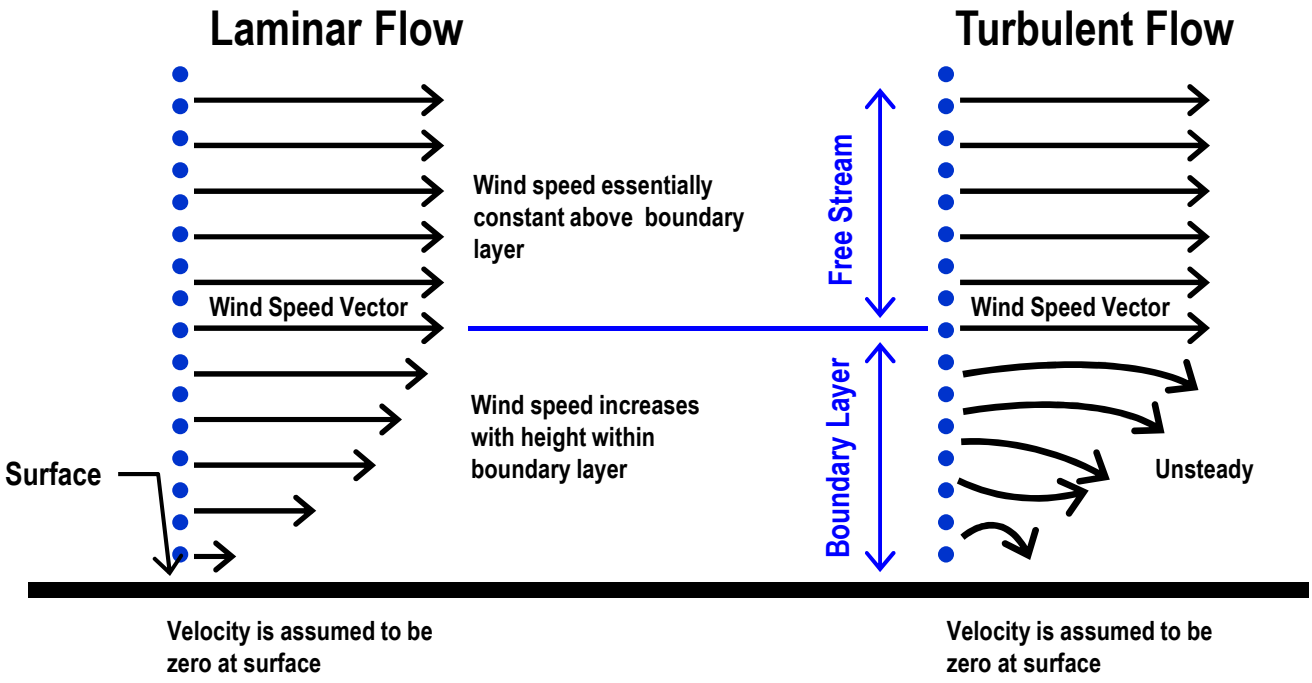
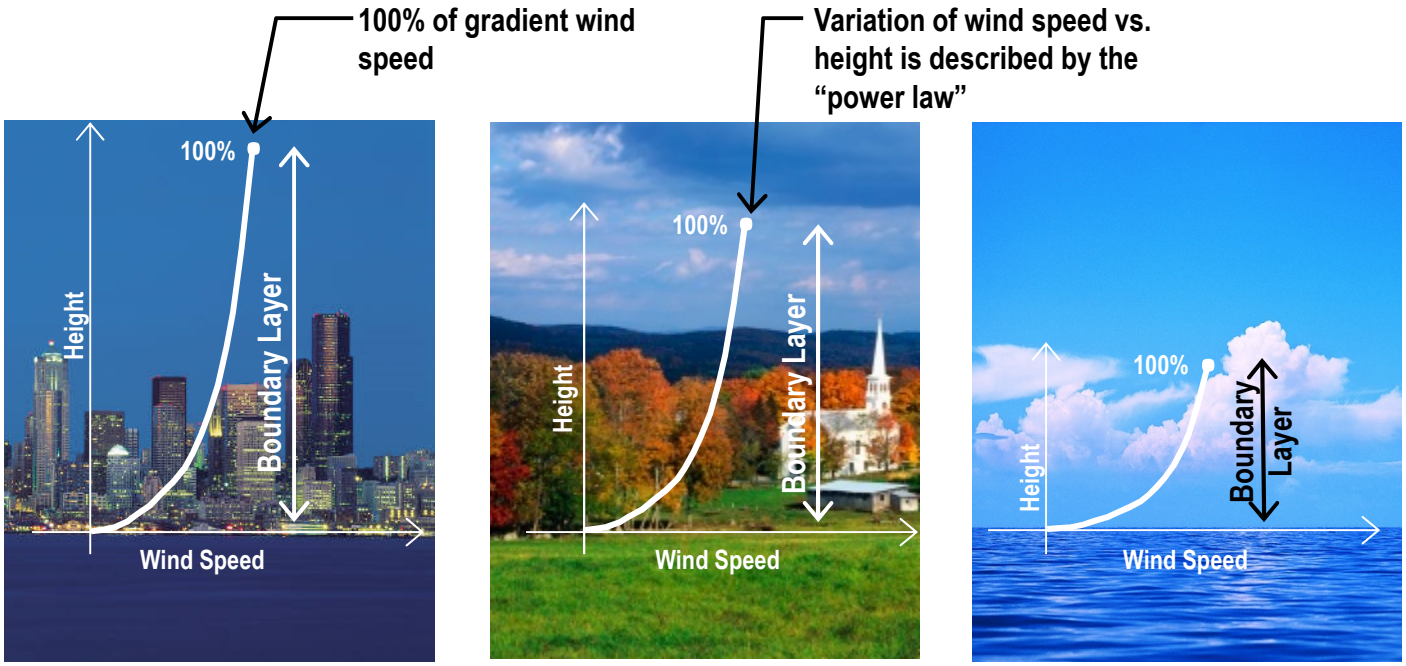


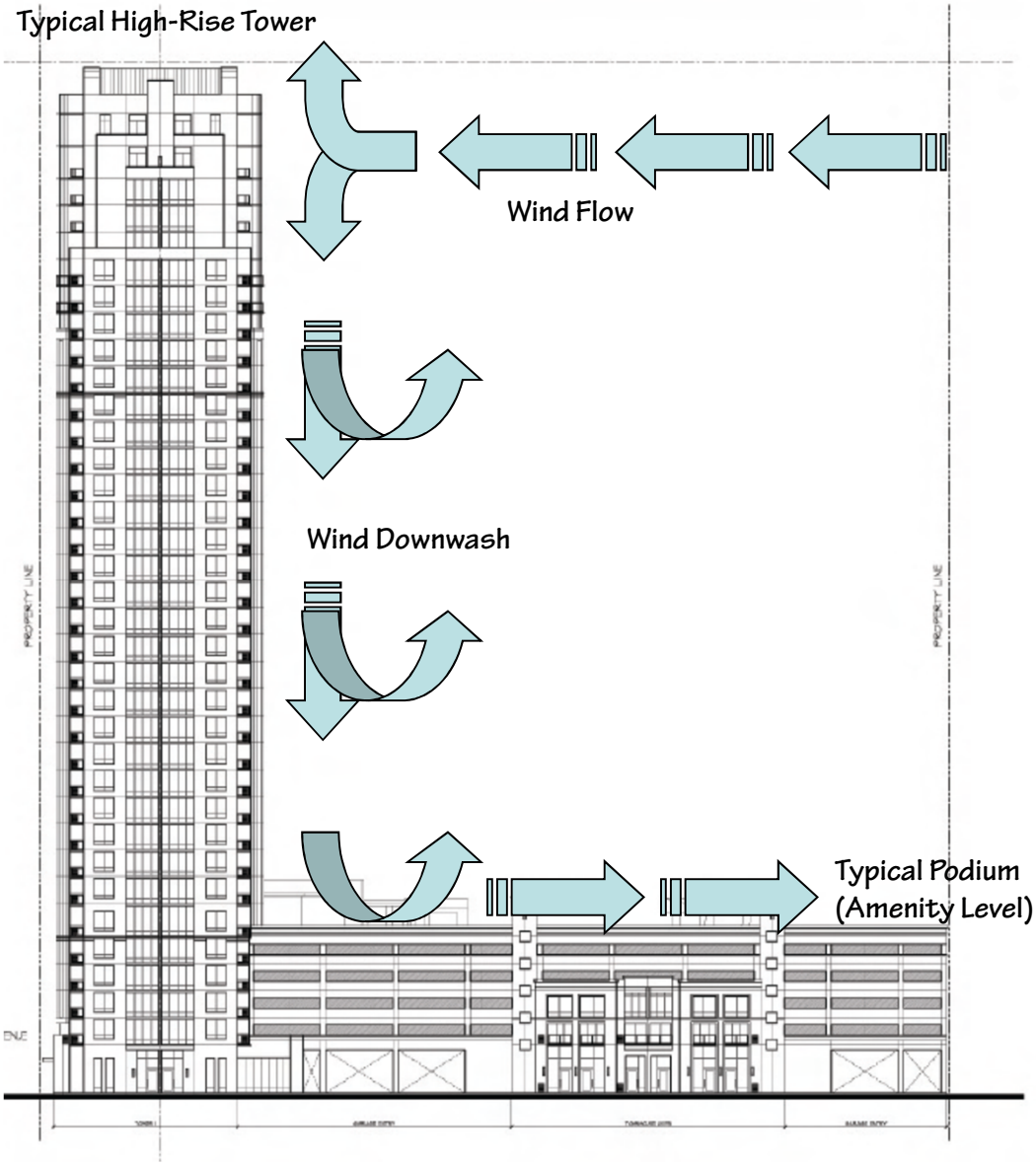
Figure 2.1: The Atmospheric Boundary Layer: Laminar and Turbulent Flow



Urban | Suburban/Rolling Terrain | Open

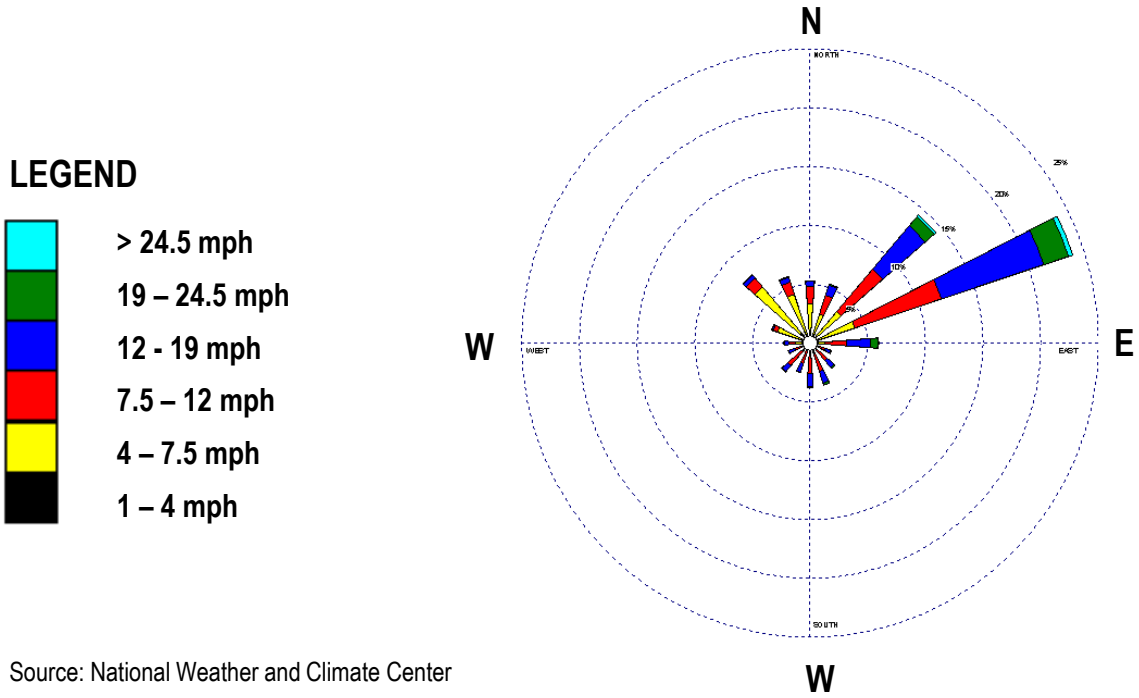
The height of the boundary layer increases with increasing surface roughness. An urban environment has higher surface roughness than does open country, so the boundary layer is higher in an urban environment. For a given height, the gradient wind speed will be lower in an urban environment than in other exposures, all other things being equal.

Figure 2.2: The Atmospheric Boundary Layer: Variation with Exposure Condition



Wind striking the face of building can be directed downward (downwash) and accelerated creating unpleasantly windy conditions for pedestrians. Articulated building facades (e.g., those with balconies) can significantly reduce wind acceleration.

Figure 2.3: Pedestrian Level Wind Flow Adjacent to Typical High-Rise Tower

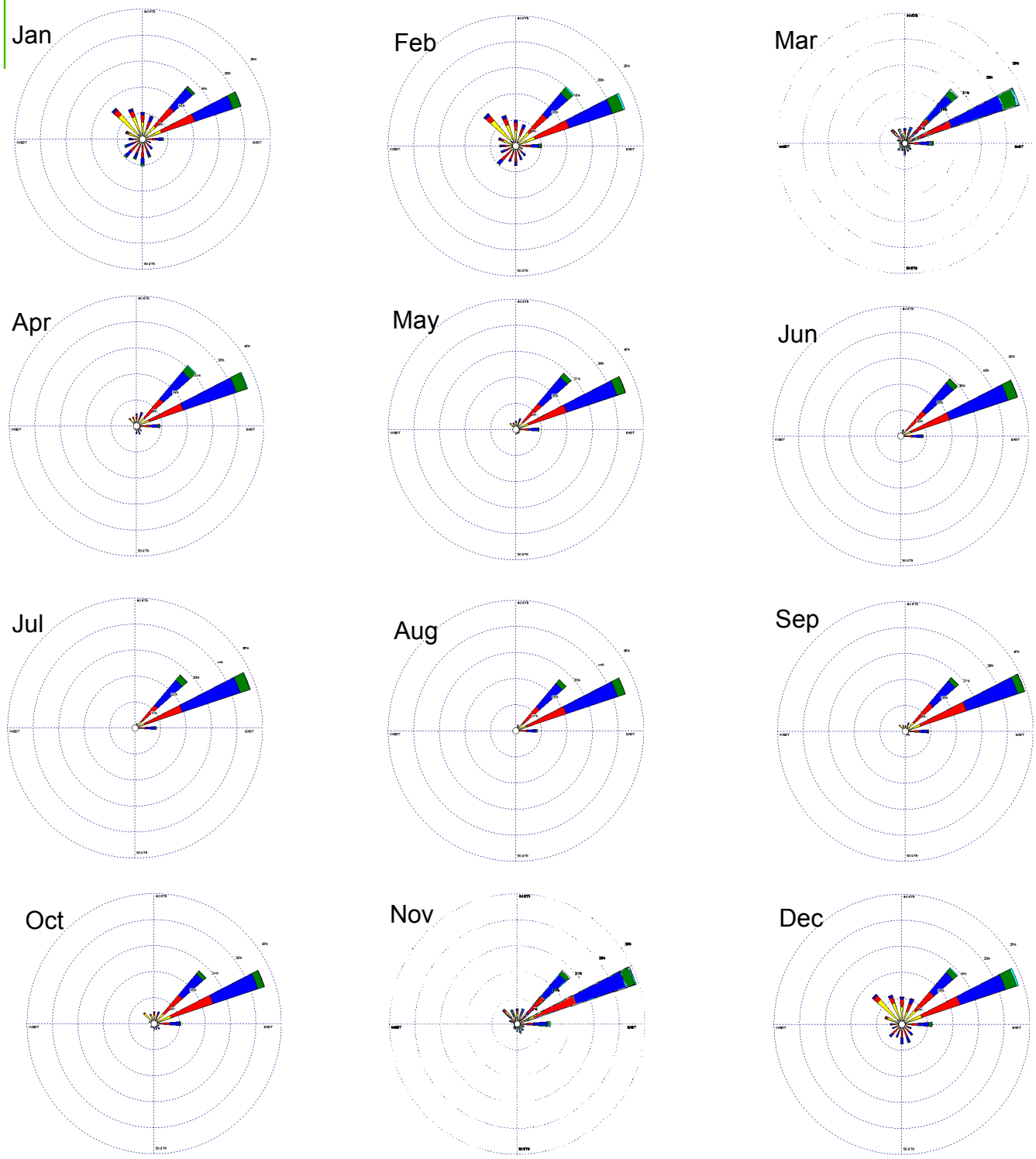


Source: National Weather and Climate Center

The wind rose illustrates wind speed, frequency and direction. The length of each spoke corresponds to the frequency the wind blows from a given direction. The concentric circles represent frequency starting from 0% of the time at the center. The color bands illustrate distinct frequency categories showing the percentage of time that winds blow from a given direction within specified speed ranges, as shown in the Legend. The spokes correspond to the 16 cardinal directions (e.g., North, North northeast, Northeast, etc.).

Figure 2.4: Annual Wind Rose for Honolulu, HI

December 22, 2017
Job No. 17-H035A



Note: The concentric circles on these wind roses do not all represent the same frequencies because they have been normalized to the same size for presentation purposes. Source: National Weather and Climate Center

Figure 2.5: Monthly Wind Roses for Honolulu, Hawaii

December 22, 2017
Job No. 17-H035A

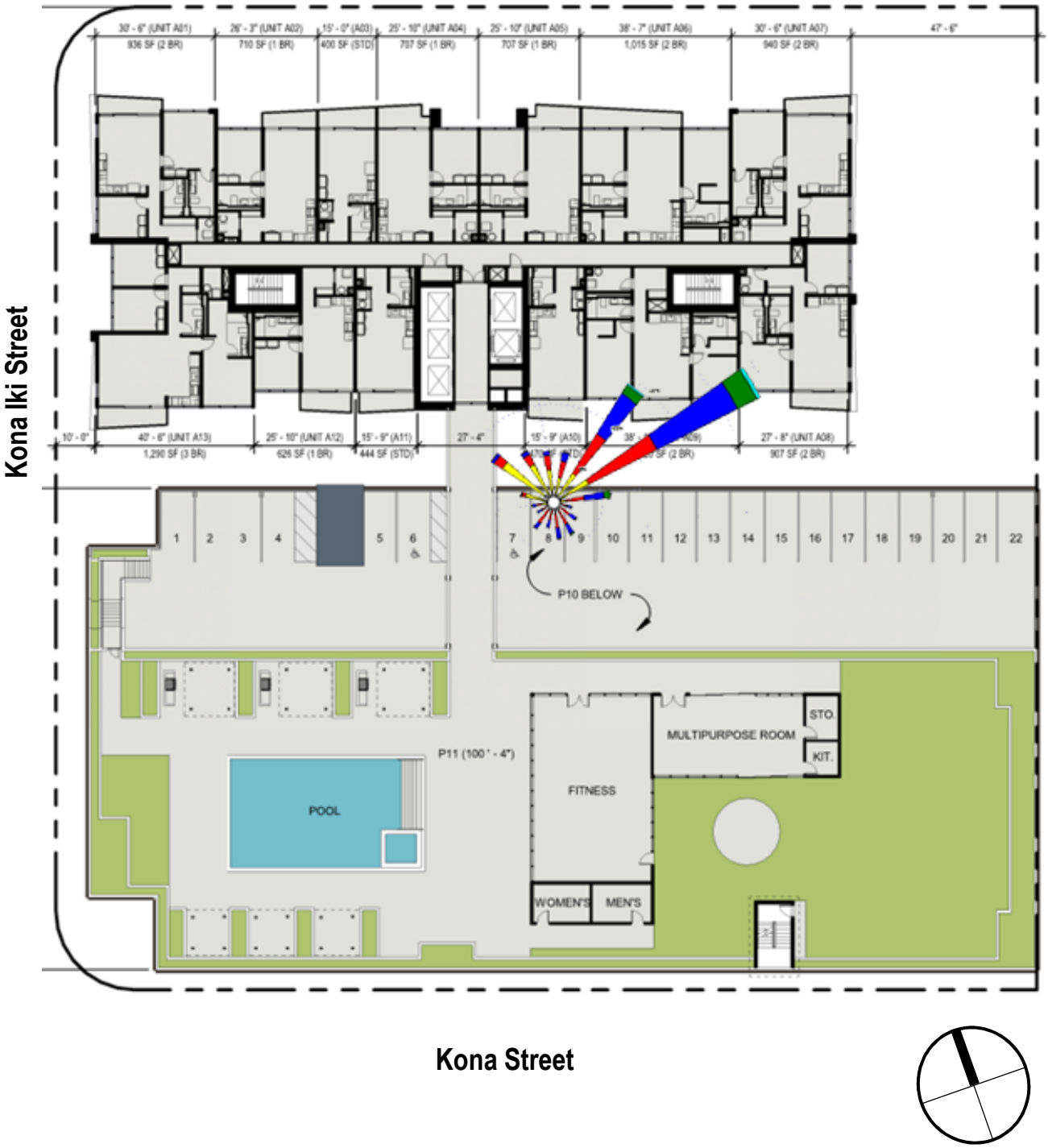


Figure 2.6: 11th Floor (Amenity Level) Site Plan and Wind Rose

December 22, 2017
Job No. 17-H035A

3.0 PEDESTRIAN LEVEL WIND STUDY

The frequency of occurrence, speed, and level of turbulence of winds at street level are important to the comfort and safety of pedestrians in pedestrian areas. Tall structures or rapidly changing terrain may intercept the faster wind speeds that flow higher above the ground. Consequently, pedestrian-level wind speeds can be significantly changed when a taller structure, or sharply sloping terrain divert a portion of the higher-level wind speed either down the face of the structure or along the sloping terrain until that flow reaches pedestrian level. Because the diverted winds have higher speeds than those near the ground, the effects of those diverted winds can be significant. The proposed project rises substantially above the site and can cause accelerations of the wind speeds over the site that would otherwise not occur. The purpose of this study is to assess the degree to which this acceleration occurs.

3.1 Comfort Criteria

Determining whether wind speeds are acceptable at specific locations requires establishing “comfort” criteria that define wind speeds that are usually acceptable for specific pedestrian uses. The term “10% exceedance speed” is used in the criteria to account for the frequency with which winds occur. The 10% exceedance speed is the speed that is exceeded on one day out of 10, or 10% of the time. This can also be thought of as a roughly weekly occurrence.

Wind speed comfort is subjective but the following criteria have been applied successfully to projects involving similar uses. A point on the site where the wind speed of 7 mph is exceeded not more than 10% of the time will be considered comfortable for outdoor seating and quiet activities. In this instance, 7 mph is called the “ten percent exceedance speed.” Ten-percent exceedance speed of 11 mph and less will be considered comfortable for standing and leisure walking, while those between 12 and 15 mph will be suitable for walking and other occasional, more active uses. Ten percent exceedance speeds in excess of 15 mph will result in potentially uncomfortable pedestrian conditions. Ten percent exceeded speeds reaching or exceeding 36 mph create potential safety hazards for pedestrians. Except during extreme wind events, it is not anticipated that there would be reported wind speeds of this magnitude for this site.

Table 3.1
Wind Speed Comfort Criteria

Maximum Wind Speed Exceeded 10% or Less of the Time	Comfort Criterion
7 mph	Considered comfortable for outdoor seating
11 mph	Considered comfortable for standing and leisure walking
15 mph	Considered acceptable for brisk walking and other occasional uses
Greater than 15 mph but less than 36 mph	Considered potentially uncomfortable condition for pedestrians
Greater than or equal to 36 mph	Considered potential hazardous condition for pedestrians

The seating criterion of 7 mph equivalent wind speed not-to-be exceeded more than 10% of the time year-round between 8 a.m. and 7 p.m. was based on the wind-speed seating criterion given by Penwarden (1973), Melbourne (1978), Arens (1981) and Arens et al. (1989). The interval time of interest was chosen when most of the population would be exposed to the wind. It was essentially an environmental quality decision based on the study of wind related complaints in shopping centers (Penwarden, 1973). Penwarden found that most complaints occurred when the limit of comfort (7 mph) was exceeded more than 10% of the time. The same also was found to be true for the 11-mph and 15-mph comfort criteria.

Additionally, Penwarden's suggestions for the onset of discomfort were based on mean speeds and did not contain effects of turbulence or gustiness in his assessment. This is precisely the reason gust wind speeds at the various locations must be considered. Since gusts of higher speed wind are considered acceptable if they occur infrequently, one set of results typically are presented as 10% exceeded mean wind speeds. The 10% exceeded wind speed is the estimated full-scale mean wind speed exceeded 10% of the time on an annual hourly averaged basis, i.e., one day out of ten the wind speed is expected to achieve this magnitude on an hourly basis.

Gustiness can also be incorporated into the data evaluation by comparing the mean wind speed to the gust speed for the same probability of exceedance. In general, if the gust speed is twice that of the mean wind speed, the wind gusts will be perceived as controlling the human comfort at a given location. Typically, a second set of results based on gusting wind speeds would also be presented. At this site, it is anticipated that wind gusts govern the perceived windiness at some points that would otherwise meet the stated mean wind speed criteria.

3.2 Wind Tunnel Studies

Wind tunnel testing was not performed for this preliminary wind study; nevertheless, a general discussion of how wind tunnel studies are conducted is instructive because this preliminary PLW study considers the results from a wind study conducted for a site approximately one-quarter mile way. The building at the adjacent site is similarly configured to the proposed project, and similar wind environments would be expected at both sites.

In a typical wind tunnel test, a scale model would be constructed, as shown in Figure 3.1. Although this model was constructed for an adjacent site, the proposed site is nearby, just to the right of the photograph. The model would include the proposed building and significant buildings within a 900 ft. to 1,800 ft. radius of the site such that the model would fit on a wind tunnel turntable. The model would include sufficiently accurate representations of building geometry to produce a reasonable representation of the pedestrian level wind environment. Areas beyond the constructed model would be simulated in the wind-tunnel using surface roughness parameters characteristic of the open water and suburban environment appropriate for this site. The flow approaching the detailed model would be generated by wind drawn over spires and a long fetch of roughness elements mounted on the floor of the test section. The spires and floor roughness are designed to produce the variation of mean wind speed with height and variation of turbulence intensity with height expected for natural winds approaching the site.

Since models used in a wind-tunnel simulation are typically orders of magnitude smaller than the full-scale object, it is not obvious that the results obtained in a test will correspond to nature. However, results from wind-tunnel tests can be representative of full-scale conditions, if critical simulation of flow parameters between the model and full-scale is satisfied. For exact modeling, all flow parameters should be matched, which is impracticable, if not impossible. Thus, similitude parameters, critical to the modeling of the present wind-tunnel simulation, must be selected.

For a pedestrian level wind study, wind speeds and turbulence intensities would be measured at representative locations both off-site and on-site. For example, off-site wind speed measurement points would be established around the building perimeter at ground level. On-site wind speed measurement points would be established in areas of interest (e.g., entrances, outdoor seating areas, pool decks, etc.). Wind speeds would be calculated for the sixteen cardinal wind directions (N, NNE, NE, ENE, E, ESE, SE, SSE, S, SSW, SW, WSW, W, WNW, NW, NNW). This provides a means for completely mapping to the historical wind data collected by the National Weather Service to conditions at the site.

Wind speed and the corresponding turbulence intensities would be measured using pedestrian level wind probes and digitally recorded for each measurement point at a sample rate of 500 Hz for 60 seconds.

This would yield 30,000 individual voltage values that would be individually converted to instantaneous wind speed readings using a calibration curve. The 30,000 samples would then be averaged to produce a single mean surface wind speed and the root-mean-square value for the turbulence intensity. The resulting mean speeds and turbulence intensities represent one-hour full-scale average time measurements when the wind-tunnel data is converted to full scale.

For each surface wind-speed measurement made in the wind tunnel, it is desirable to estimate an associated full-scale wind speed frequency distribution. The determination of the full-scale wind distribution will, of course, depend upon the nature of the meteorological conditions at the site. As discussed earlier, it is common to use the full-scale mean wind speed that is exceeded 10% of the time. Additionally, an evaluation of gust wind speeds would be carried out to ensure that locations with lower mean wind speeds would not be perceived as windy because they were subjected to significant gusty wind conditions.

The results from the wind tunnel testing are then presented for each of the wind speed criteria limits discussed previously helping to explain the breeziness of the site before and after development, areas of concern and, if necessary, the effectiveness of PLW mitigation measures.

3.3 Preliminary Pedestrian-Level Wind Results

The main objective of a PLW study is to predict the wind speeds that would exist on-site and off-site for the determination of the various corresponding comfort levels. Assessment of the PLW environment is typically accomplished using wind-tunnel testing that matches full-scale meteorological data to physical modeling data. Inasmuch as this is a preliminary study, the opinions presented in this report are based on meteorological data for Honolulu, preliminary analyses of the site and our experience with other wind studies for high-rise structures in Honolulu. Wind tunnel modeling was not a part of this preliminary assessment, but this type of testing is recommended prior to finalizing the project design.

PLW Conditions Prior to Development: The reference suburban and open wind speeds for this site have 10% wind exceedance speeds of 7.5 mph and 12.5 mph, which suggest a naturally breezy site. The reference suburban and open wind speeds reflect the 10% wind exceedance speeds at a typical suburban site built-up with a mix of different building heights or a site exposed to the ocean without intervening development, respectively. In other words, these reference wind speeds provide a frame of reference to judge how the proposed development influences the pedestrian level wind speeds. As a result of the naturally breezy conditions, few points around and on the site are expected to satisfy the 7-mph criterion even if no development occurs, while approximately two to three times as many points are

expected to satisfy the 11 mph criterion. All points on and around the site are expected to satisfy the 15-mph criterion.

PLW Conditions After Development: Based upon results from other PLW studies for high-rises in Honolulu, including one approximately one quarter-mile away, it is anticipated that there will be approximately the same number of points that satisfy the 7-mph criterion as there are for the PLW conditions prior to development. This is a direct reflection of the site's characteristic breeziness. The location of points not meeting the 7-mph criterion will not necessarily be the same for both PLW conditions due to the presence of the project.

The number of points that meet the 11-mph criterion is expected to be approximately two to three times the number of points that meet the 7-mph criterion. Points that do not meet the 11-mph criteria are expected to be directly adjacent or on-site. Most points are expected to satisfy the 15-mph criterion. If there are any points that do not satisfy the 15-mph criterion, it is anticipated that they will all occur on-site. It is anticipated that there will be no points close to exceeding the hazard condition (i.e., 10% mean exceedance speed of 36 mph).

There are several reasons why the proposed development is anticipated to have a generally benign impact on the off-site and on-site PLW environment.

1. The building has a heavily articulated façade that can be expected to limit acceleration of downwashing wind, as shown in Figure 3.2. The east and west façades do not have balconies, but the ribbing and fins on these sides of the building should help disrupt downwashing wind. The articulation on each façade of the building is expected to limit wind speed acceleration at the ground level and on the podium.
2. There is a significant "eyebrow" above ground level. The offsets or eyebrows are expected to disrupt the downwashing wind and reduce direct impact to pedestrians at ground level.
3. Although there are other high-rise buildings in the vicinity, there is also a significant amount of open space around each building as well as a mix of varying building heights. Both factors help prevent wind acceleration. Wind tunnel tests in similar environments show that the influence of tall structures is usually limited to areas immediately adjacent to or directly on the site.
4. For the most part, the amenity deck is shielded from prevailing winds by the residential tower.

Areas that may experience relatively high wind speeds may include portions of the amenity deck and the space between the residential tower and the parking structure. The amenity deck may experience higher wind speeds as prevailing winds are redirected around the residential tower as well as downwashing

winds, although the setback of the amenity deck from the face of the residential tower may help disrupt downwashing winds that would otherwise impinge on this level. The depth of the relatively narrow space between the parking structure and the residential tower may help stagnate the downwashing wind. Neither of these factors is expected to significantly increase wind speeds beyond the boundaries of the site. The complex interaction between project elements and the wind and the difficulty in predicting the resulting behavior is an important reason why wind tunnel studies are generally recommended for projects of this size.

3.4 Pedestrian-Level Wind Mitigation

As noted above, the design of the facade, siting of the amenity level relative to the tower, and the siting of the tower relative to the edges of the podium are expected to mitigate the effect of the wind at pedestrian levels. Nevertheless, mitigation options for windier points include landscaping and screening.

Although not modeled directly in most wind tunnel studies, landscaping around the tower would be expected to reduce the wind speeds. Landscaping must be relatively dense to provide effective protection. Overly flexible planting can itself be distracting if it moves too much in the wind.

Vertical and horizontal screening may also help reduce the wind speed. Vertical screening that is opaque to the wind (e.g., a glass wall) generally creates a protected area that is twice as deep as the screen is tall, whereas open screening is less effective. For example, screening that is 50% open will protect an area that is generally no deeper than the height of the screen. In addition to the eyebrows around the building, umbrellas may be able to provide localized protection.

Definitive advice regarding mitigation strategies is difficult to provide in the absence of wind tunnel testing that investigates specific mitigation measures. One important reason for this is that acceleration of the wind is a function of many factors, including, but not limited to, the direction of prevailing winds, the presence of adjacent buildings, and the relative mix of wind washing down the face of the building vs. channeled wind. Thus, strategies that rely on blocking prevailing wind may not prove as effective as intuition would suggest.

Observation of the wind in other Honolulu locations may provide insight as to whether the wind speeds are unduly objectionable. The windiest points are expected to correspond to typical open (unprotected) sites in the Honolulu area, while the balance of the windy points are expected to correspond to typical suburban (developed) sites in the Honolulu area. The warmer climate in Honolulu may increase pedestrian tolerance somewhat to otherwise objectionable wind speeds, although some objectionable

aspects of faster wind speeds are not necessarily related to temperature (e.g., movement of napkins and partially filled cups).

If accessibility requirements limit the maximum force needed to open a door, mechanical door openers may be required in areas where faster wind speeds are measured.

Wind study model, from another nearby project, viewed from northwest looking upwind into the wind tunnel. The proposed project site, not seen in the figure, is located to the right of the model. Upwind of the test section can be seen the devices used to simulate surface conditions beyond the detailed model.

Figure 3.1: Representative Wind Study Model (from another nearby project)

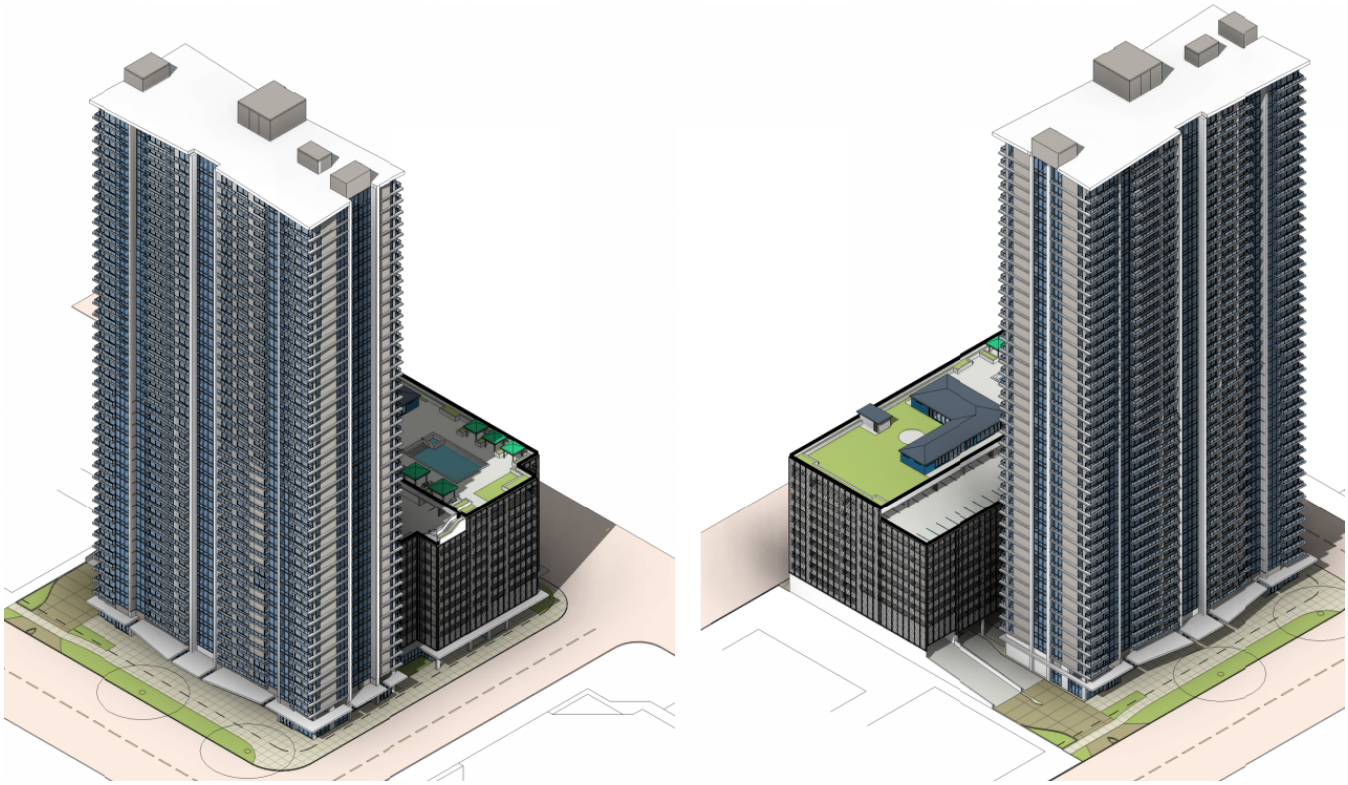


Figure 3.2: Isometric Views

REFERENCES

Arens, E. 1981 “Designing for an Acceptable Wind Environment”, *Trans. Engrg.*, ASCE, Vol. 107, No. Te 2, pp 127-141.

Arens, E., C., D. Ballanti, C.B. Bennett, S. Guldman, and B.R. White 1989 “Developing the San Francisco Wind Ordinance and its Guidelines for Compliance”, *Building and Environment*, Vol. 24, No. 4, pp 297-303.

Davenport, A.G. 1961 “The Application of Statistical Concept of Wind Loading of Structures”, *Proc. Inst. Civil Engrg*, 19, 449-472.

Hunt, J.C.R., E.C. Poulton, and J.C. Mumford 1976 “The Effects of Wind on People: New Criteria Based on Wind Tunnel Experiments,” *Building and Environment*, Vol. 13, pp 251-260.

Jackson, P.S. 1978 “The Evaluation of Windy Environments,” *Building and Environment* 13, pp 251-260.

Melbourne, W.H. 1978 “Criteria for Environmental Wind Conditions,” *Journal Wind Engineering and Industrial Aerodynamics*, Vol. 3, pp 241-249.

Penwarden, A.D. 1973 “Acceptable Wind Speeds in Towers,” *Building Science*, Vol. 8 No. 3, pp 259-267.

White, B. R. 1991 “Analysis and Wind-tunnel Simulation of Pedestrian-level Winds in San Francisco, *Journal Wind Engineering and Industrial Aerodynamics*, Vol. 41, pp 2353-2364.

White, B. R. 1991 “Analysis and Wind-tunnel Simulation of Pedestrian-level Winds in San Francisco, *Proceedings of the Eight International Conference on Wind Engineering*, University of Western Ontario, London, Ontario, Canada, July 8-12.

White, B. R. 1994 “Wind-tunnel Simulation of Pedestrian Level Wind in Los Angeles,” *Proceedings of the 2nd United Kingdom Wind Engineering Conference*, Wind Engineering Society, held at University of Warwick, England, September 19-22.

M. SHADOW STUDY

DESIGN PARTNERS INCORPORATED

Shadow Study

11 November 2017

The Central Ala Moana

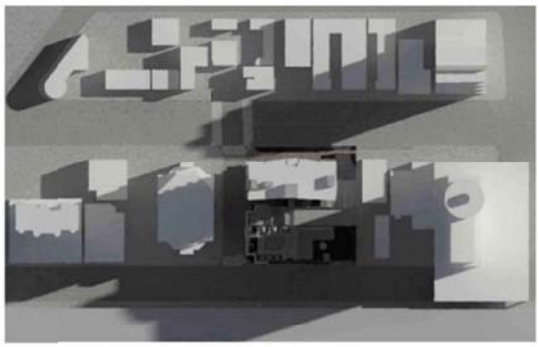
1391 Kapiolani Boulevard, Honolulu, Hawaii

Building shadows are important to consider in an area expecting significant high-rise development. During most of the year, the sun casts typical shadows found in the northern latitudes. However, as Hawaii lies between the equator and the Tropic of Cancer, unique shadows occur between late May and mid-July. Between these two dates, shadows are cast to the South rather than to the North. Careful consideration needs to be given to tower spacing, allowing solar access throughout the year.

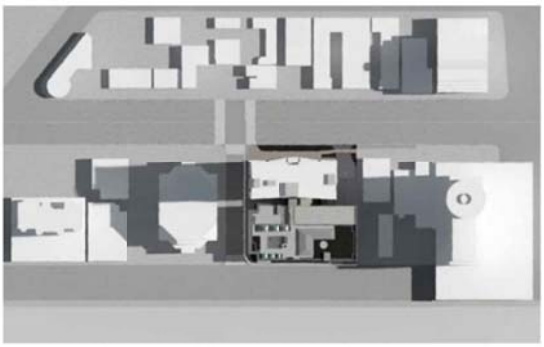
The Shadow Study provides a visual diagram describes the impact of the building and tower on surrounding properties at different times of the day and to understand the sun's position in relation to The Central Ala Moana throughout the day and year.

The following narratives present descriptive summaries of the findings of the solar study simulations.

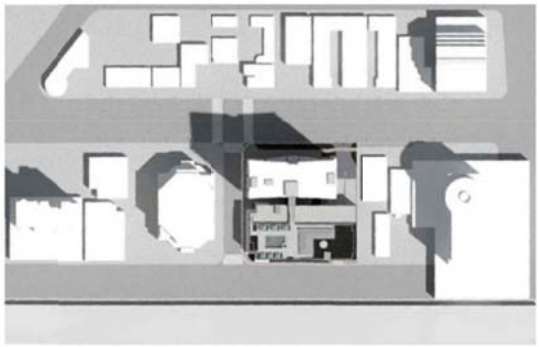
In March, at 8:00 am, the shadow primarily falls southwest on the American Saving Bank Building and Kona Street. And the Bank of Hawaii Building casts a shadow on south of the project site. The Central's shadow moves north and at noon has a small footprint primarily affecting Kapiolani Boulevard. The shadow continues to move east, casting a shadow that travel over the north neighbor's low-rise commercial complex and at 6:00 pm settles on the Pacific Guardian Tower.



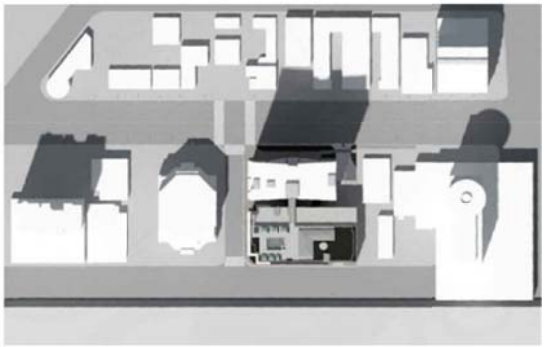
MARCH 21ST 08:00 h



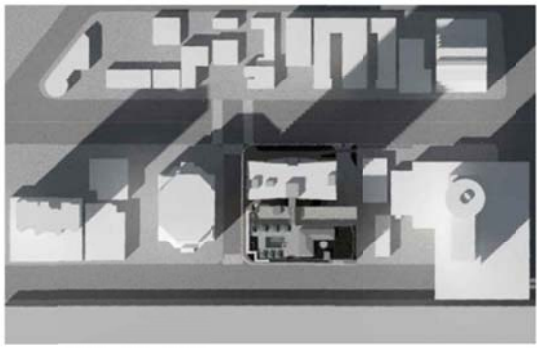
MARCH 21ST 10:00 h



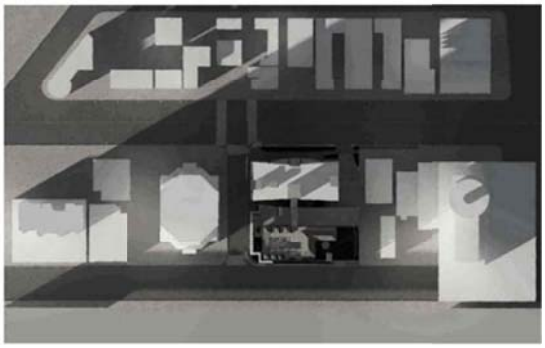
MARCH 21ST 12:00 h



MARCH 21ST 14:00 h

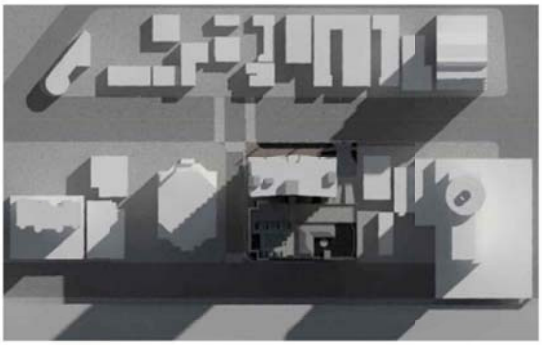


MARCH 21ST 16:00 h

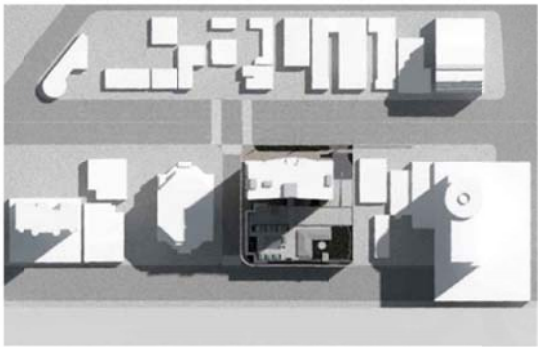


MARCH 21ST 18:00 h

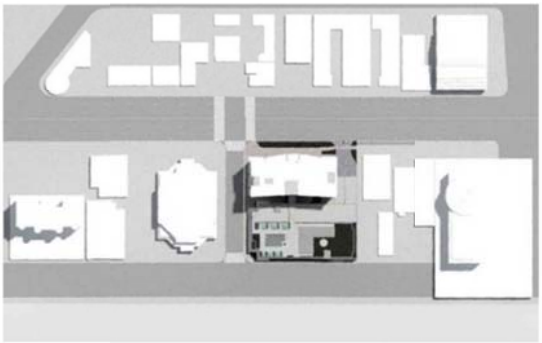
In June, at 8:00 am, the tower shadow falls on a portion of the American Saving Bank Building and small portions of Bank of Hawaii Building shadow located diagonally across the south-east corner of the project site. The shadow moves north in direction, and at noon it has very little footprint, primarily on the project site. The shadow continues to move east and at 6:00 pm, settles on the northern portion of the Bank of Hawaii Building and part of Kapiolani Boulevard.



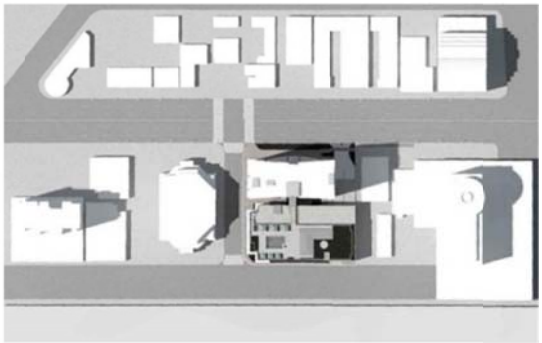
JUNE 21ST 08:00 h



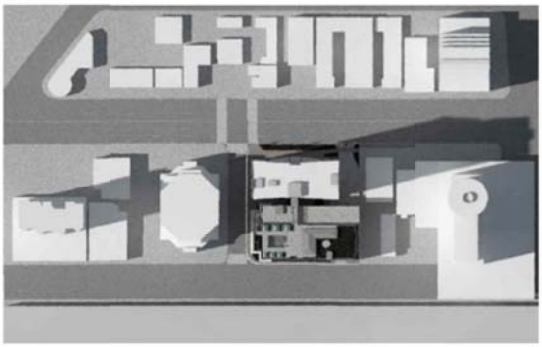
JUNE 21ST 10:00 h



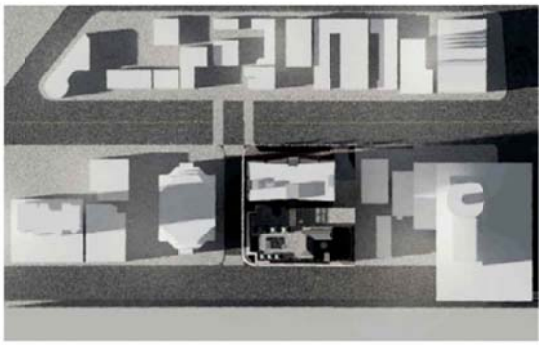
JUNE 21ST 12:00 h



JUNE 21ST 14:00 h

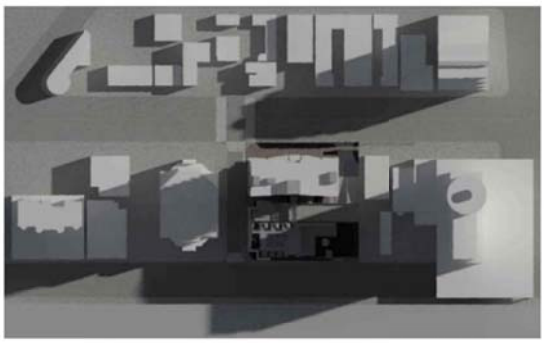


JUNE 21ST 16:00 h

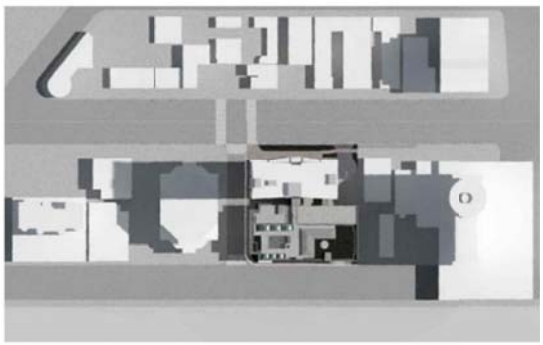


JUNE 21ST 18:00 h

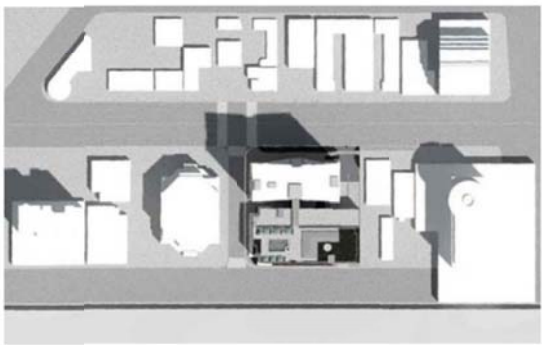
In September, at 8:00 am, the tower shadow falls southwest on the American Saving Bank Building. This shadow moves north and at noon has a small footprint primarily affecting Kapiolani Boulevard. The shadow continues to move east, casting a shadow that travel over the north neighbor's low-rise commercial complex and at 6:00 pm settles on the Pacific Guardian Tower.



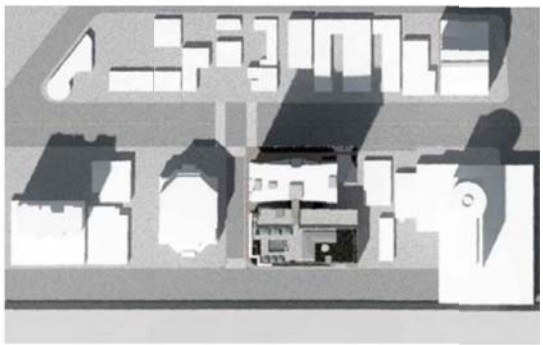
SEPTEMBER 21ST 08:00 h



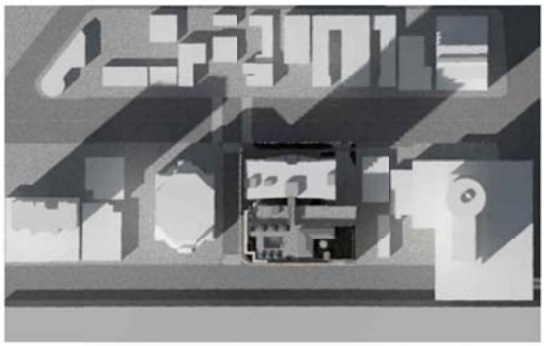
SEPTEMBER 21ST 10:00 h



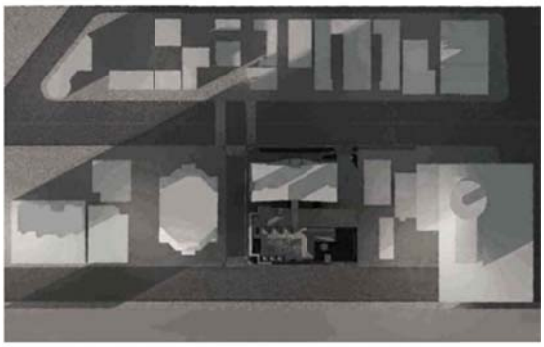
SEPTEMBER 21ST 12:00 h



SEPTEMBER 21ST 14:00 h

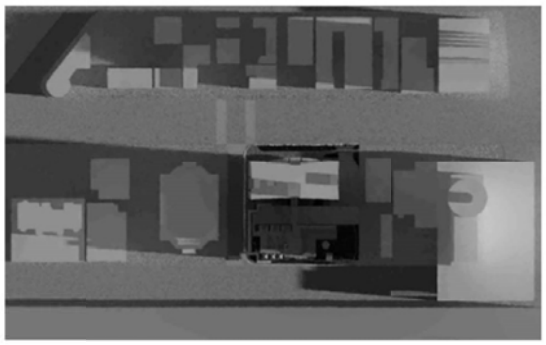


SEPTEMBER 21ST 16:00 h

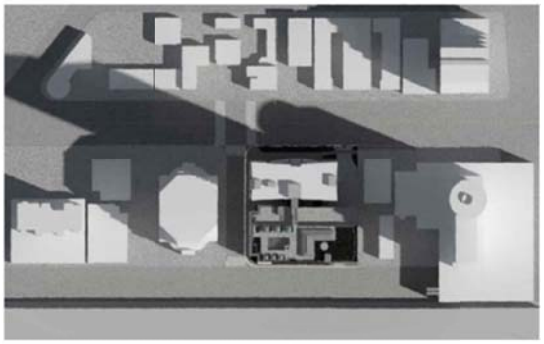


SEPTEMBER 21ST 18:00 h

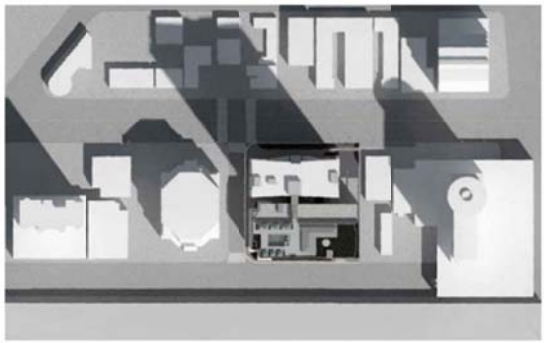
In December, at 8:00 am, the tower shadow falls further west on the American Saving Bank Building and shadow of Bank of Hawaii Building casts on the project site from the east. The shadow moves north and at noon has a long footprint affecting Kapiolani Boulevard and the north-west neighbor's low-rise commercial complex. The shadow continues to move east and at 6:00 pm, settles on the north-east neighbor's low-rise commercial complex.



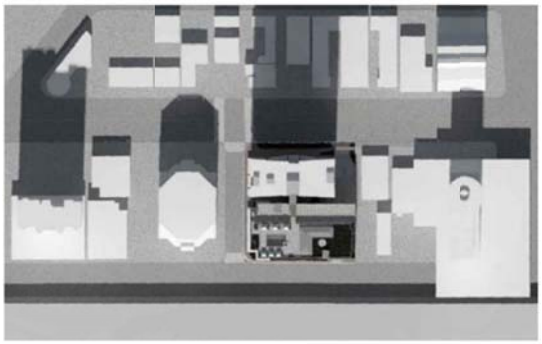
DECEMBER 21ST 08:00 h



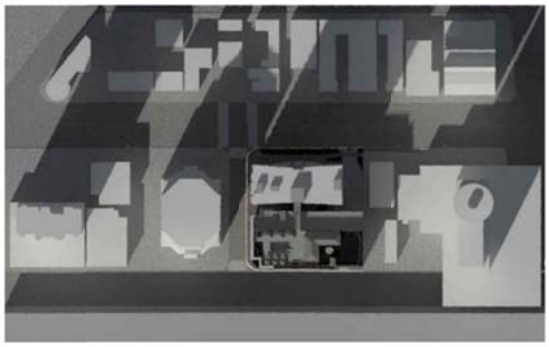
DECEMBER 21ST 10:00 h



DECEMBER 21ST 12:00 h



DECEMBER 21ST 14:00 h



DECEMBER 21ST 16:00 h

DECEMBER 21ST 18:00 h