

# BLOCK D

## WARD VILLAGE

### — APPENDICES —

Land Block 4, Project 1  
HCDA Planned Development Permit Application  
June 2023



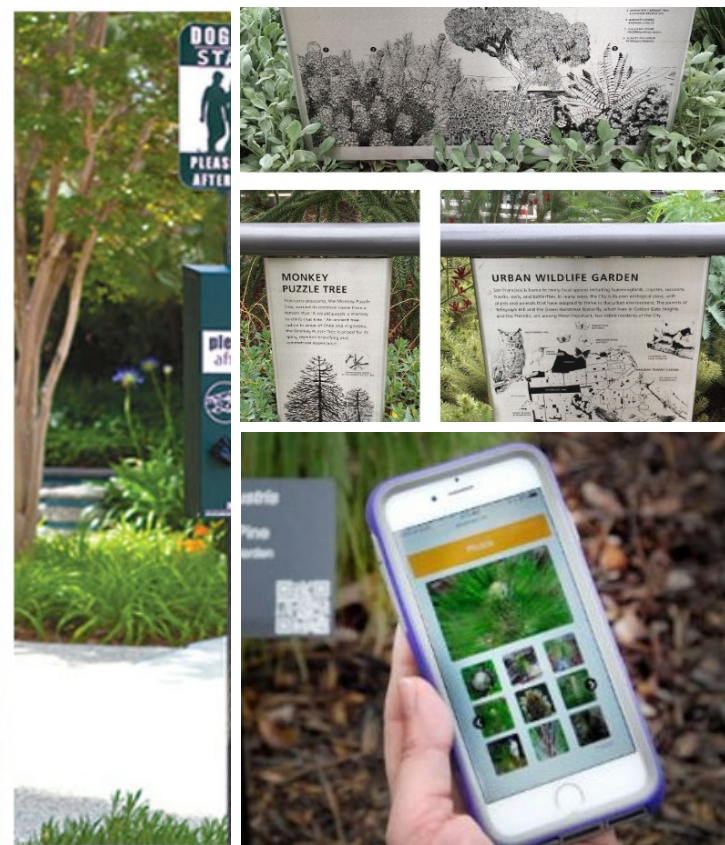
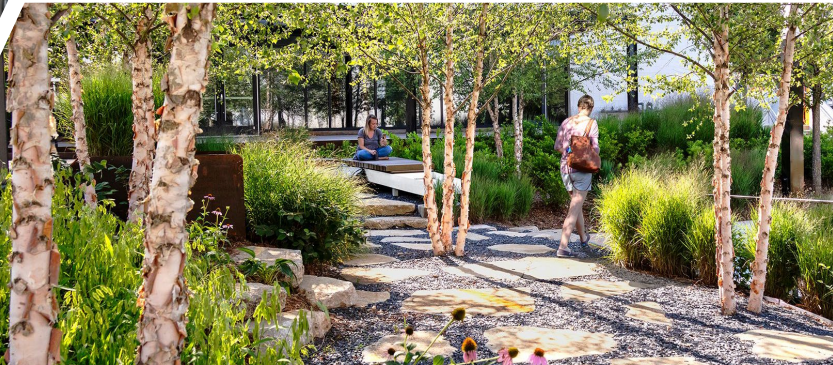
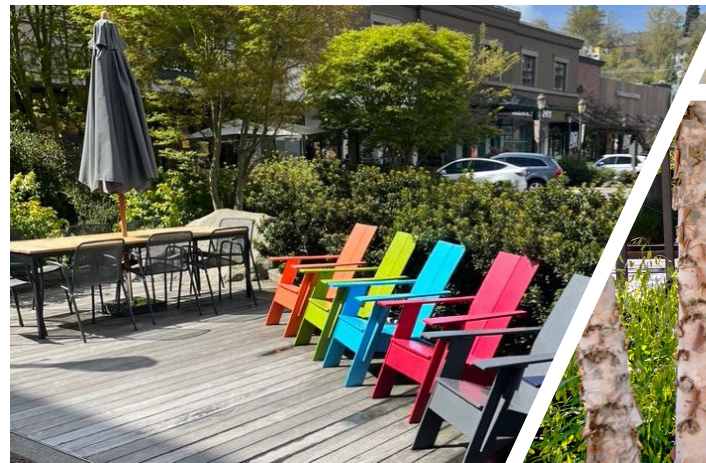
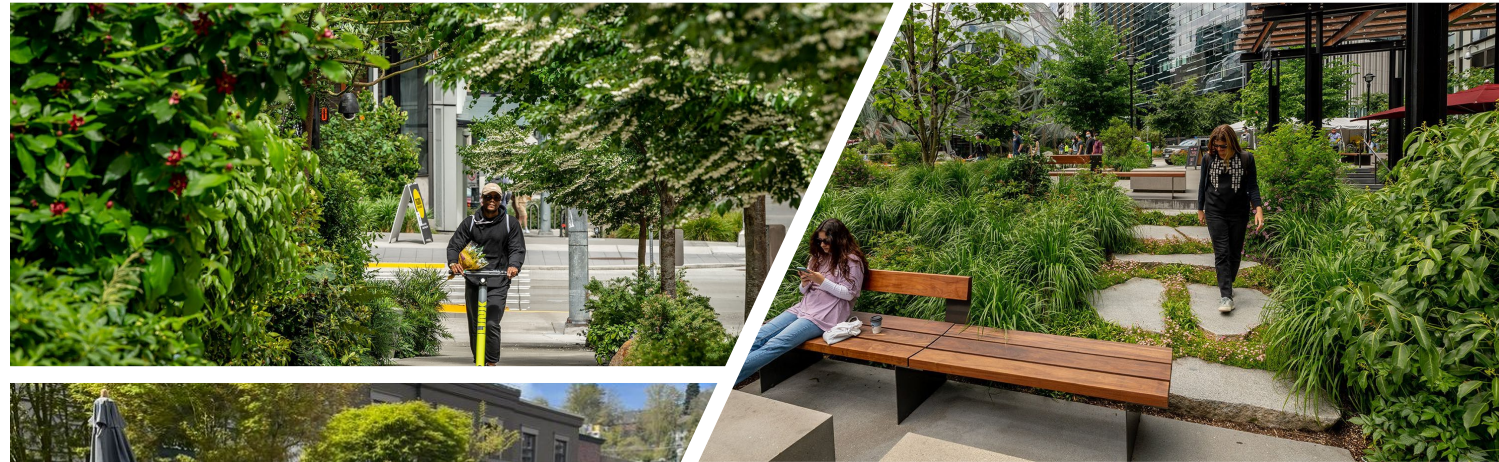
WARD VILLAGE.

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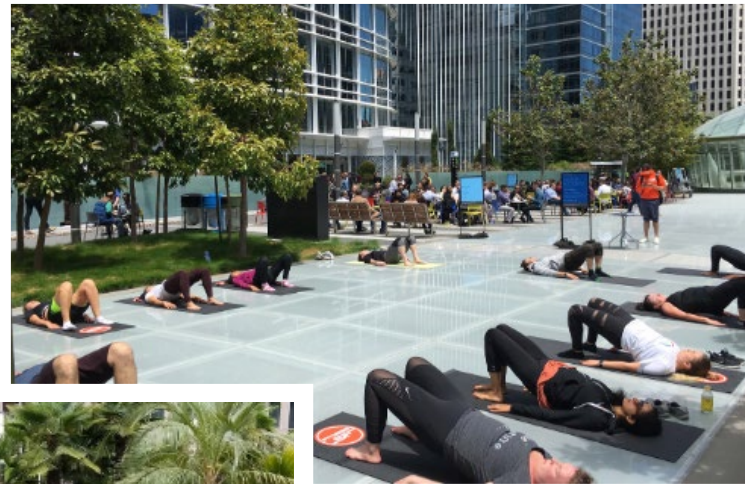
# APPENDIX A

ALA MOANA BOULEVARD LANDSCAPE  
AND PROGRAMMING INSPIRATION



# APPENDIX B

DIAMOND HEAD PLAZA PARK LANDSCAPE  
AND PROGRAMMING INSPIRATION



# APPENDIX C

## LEED CHECKLIST



**LEED v4 for BD+C: New Construction and Major Renovation**  
Project Checklist

Project Name: Ward Village Block D  
Date: April 11, 2023

Y ? N

0	1	0	Credit	Integrative Process	1
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<b>16</b>	<b>0</b>	<b>0</b>	<b>Location and Transportation</b>		<b>16</b>
16	0	0	Credit	LEED for Neighborhood Development Location	16
0	0	0	Credit	Sensitive Land Protection	1
0	0	0	Credit	High Priority Site	2
0	0	0	Credit	Surrounding Density and Diverse Uses	5
0	0	0	Credit	Access to Quality Transit	5
0	0	0	Credit	Bicycle Facilities	1
0	0	0	Credit	Reduced Parking Footprint	1
0	0	0	Credit	Green Vehicles	1

<b>3</b>	<b>5</b>	<b>2</b>	<b>Sustainable Sites</b>		<b>10</b>
Y			Prereq	Construction Activity Pollution Prevention	Required
0	1	0	Credit	Site Assessment	1
0	2	0	Credit	Site Development - Protect or Restore Habitat	2
0	1	0	Credit	Open Space	1
0	1	2	Credit	Rainwater Management	3
2	0	0	Credit	Heat Island Reduction	2
1	0	0	Credit	Light Pollution Reduction	1

<b>6</b>	<b>7</b>	<b>0</b>	<b>Water Efficiency</b>		<b>13</b>
Y			Prereq	Outdoor Water Use Reduction	Required
Y			Prereq	Indoor Water Use Reduction	Required
Y			Prereq	Building-Level Water Metering	Required
1	2	0	Credit	Outdoor Water Use Reduction	3
3	4	0	Credit	Indoor Water Use Reduction	7
1	1	0	Credit	Cooling Tower Water Use	2
1	0	0	Credit	Water Metering	1

<b>17</b>	<b>8</b>	<b>8</b>	<b>Energy and Atmosphere</b>		<b>33</b>
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Building-Level Energy Metering	Required
Y			Prereq	Fundamental Refrigerant Management	Required
4	2	0	Credit	Enhanced Commissioning	6
8	3	8	Credit	Optimize Energy Performance	19
0	1	0	Credit	Advanced Energy Metering	1
5	1	0	Credit	Renewable Energy Production	6
0	1	0	Credit	Enhanced Refrigerant Management	1

<b>2</b>	<b>7</b>	<b>6</b>	<b>Materials and Resources</b>		<b>15</b>
Y			Prereq	Storage and Collection of Recyclables	Required
Y			Prereq	Construction and Demolition Waste Management Planning	Required
0	3	3	Credit	Building Life-Cycle Impact Reduction	6
1	1	0	Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
0	2	0	Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
1	1	0	Credit	Building Product Disclosure and Optimization - Material Ingredients	2
0	0	3	Credit	Construction and Demolition Waste Management	3

<b>5</b>	<b>9</b>	<b>2</b>	<b>Indoor Environmental Quality</b>		<b>16</b>
Y			Prereq	Minimum Indoor Air Quality Performance	Required
Y			Prereq	Environmental Tobacco Smoke Control	Required
1	1	0	Credit	Enhanced Indoor Air Quality Strategies	2
1	2	0	Credit	Low-Emitting Materials	3
1	0	0	Credit	Construction Indoor Air Quality Management Plan	1
0	1	1	Credit	Indoor Air Quality Assessment	2
1	0	0	Credit	Thermal Comfort	1
1	1	0	Credit	Interior Lighting	2
0	2	1	Credit	Daylight	3
0	1	0	Credit	Quality Views	1
0	1	0	Credit	Acoustic Performance	1

<b>4</b>	<b>2</b>	<b>0</b>	<b>Innovation</b>		<b>6</b>
1	0	0	Credit	Innovation and Design	1
1	0	0	Credit	Innovation and Design	1
1	0	0	Credit	Innovation and Design	1
0	1	0	Credit	Innovation and Design	1
0	1	0	Credit	Innovation and Design	1
1	0	0	Credit	LEED Accredited Professional	1

<b>53</b>	<b>39</b>	<b>18</b>	<b>TOTALS</b>		Possible Points: <b>110</b>
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Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80 to 110









# APPENDIX D

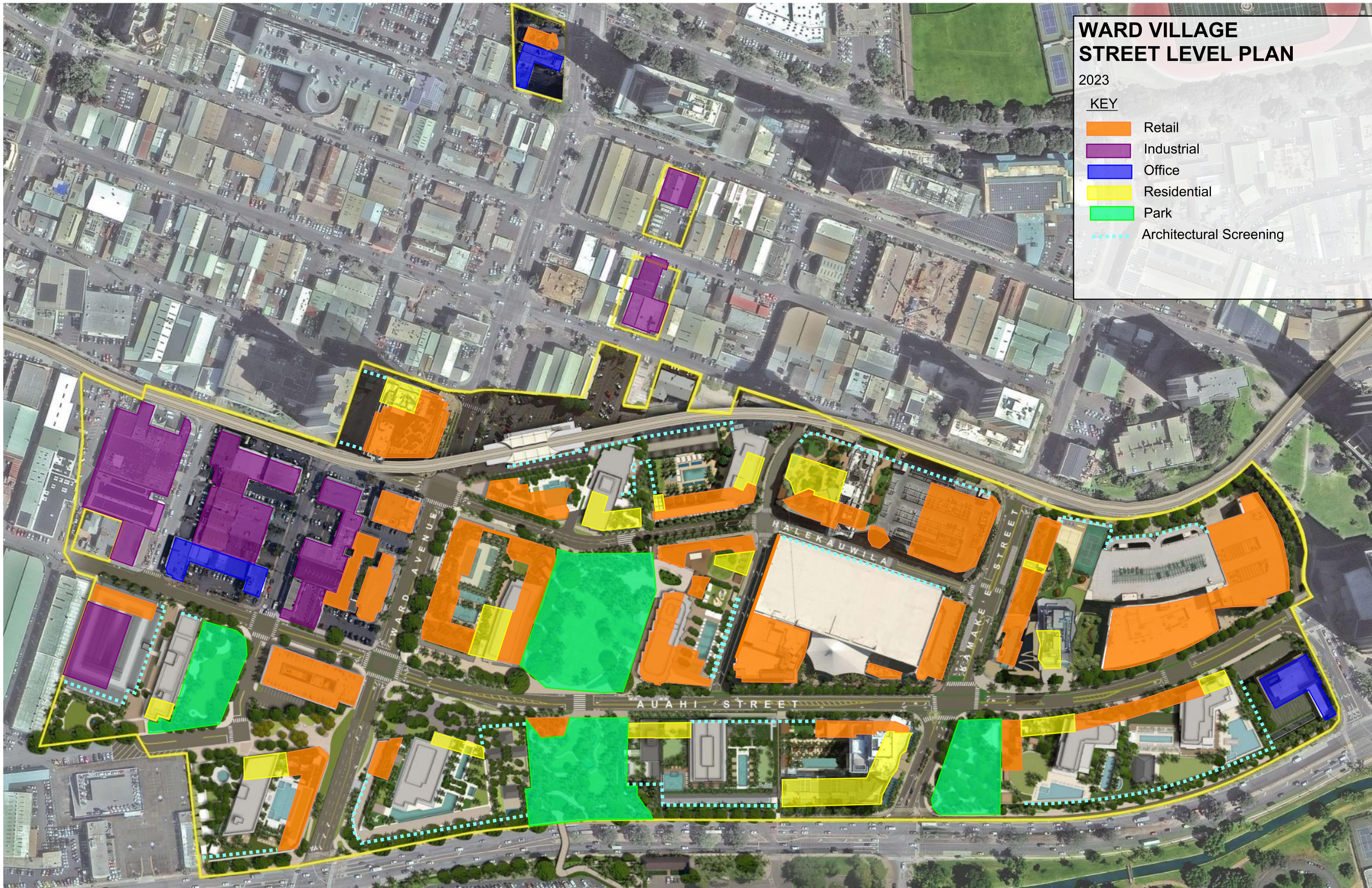
WARD VILLAGE STREET LEVEL PLAN

# WARD VILLAGE STREET LEVEL PLAN

2023

## KEY

-  Retail
-  Industrial
-  Office
-  Residential
-  Park
-  Architectural Screening



# APPENDIX E

SHPD LETTER

JOSH GREEN, M.D.  
GOVERNOR | KE KIA'AINA

SYLVIA LUKE  
LIEUTENANT GOVERNOR | KA HOPE KIA'AINA



STATE OF HAWAII | KA MOKU'AINA 'O HAWAI'I  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
KA 'OIHANA KUMUWAIWAI 'AINA

STATE HISTORIC PRESERVATION DIVISION  
KAKUHIHEWA BUILDING  
601 KAMOKILA BLVD, STE 555  
KAPOLEI, HAWAII 96707

DAWN N.S. CHANG  
CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE MANAGEMENT

LAURA H.E. KAAKUA  
FIRST DEPUTY

M. KALEO MANUEL  
DEPUTY DIRECTOR - WATER

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

April 24, 2023

Craig K. Nakamoto, Executive Director  
Hawai'i Community Development Authority  
547 Queen Street  
Honolulu, Hawai'i 96817  
[craig.k.nakamoto@hawaii.gov](mailto:craig.k.nakamoto@hawaii.gov)

IN REPLY REFER TO:  
Project No. 2021PR00032  
Doc. No. 2304SCH07  
Archaeology

Ms. Dawn Takeuchi-Apuna, Director  
Department of Planning and Permitting  
City and County of Honolulu  
Frank F. Fasi Municipal Building  
650 S. King Street, 7th Floor  
Honolulu, Hawai'i 96813  
c/o Clint Young  
[clint.young@honolulu.gov](mailto:clint.young@honolulu.gov)

Dear Mr. Nakamoto and Ms. Dawn Takeuchi-Apuna:

SUBJECT: **Chapter 6E-42 Historic Preservation Review  
Request to Support HCDA Proceeding with Permitting Process  
Victoria Ward Limited (VWL) Blocks D, E, and Diamond Head Plaza Project  
Honolulu Ahupua'a, Honolulu (Kona) District, Island of O'ahu  
TMK: (1) 2-3-005:006**

This letter provides the State Historic Preservation Division's (SHPD's) review of regarding the Hawaii Community Development Authority's (HCDA's) planned development permitting process for the Victoria Ward, Ltd. (VWL) and The Howard Hughes Corporation (HHC) project titled *Victoria Ward Limited (VWL) Blocks D, E, and Diamond Head Plaza Project*. This private project is subject to permitting under HCDA's 2005 Mauka Area Rules, and with permitting by the City and County of Honolulu, Department of Planning and Permitting (DPP).

**SHPD has no objection to the HCDA proceeding with their permitting process for the *Victoria Ward Limited (VWL) Blocks D, E, and Diamond Head Plaza Project*, with the following stipulations:**

1. HRS §6E-42 Historic Preservation Review Steps 1 through 5, as outlined in HAR §13-284-3(b), shall be completed and SHPD shall provide a letter documenting said completion to HCDA, DPP, and VWL/HCC indicating that the DPP permit process may continue;
2. DPP commits to stipulate as a permit condition on all project DPP permits involving ground disturbing work that project initiation may not proceed prior to receipt by HCDA, DPP, and VWL/HHC of SHPD's letter documenting completion of Steps 1 through 5; and
3. VWL/HHC commits to no initiation of project ground disturbing work requiring a DPP permit prior to receipt of SHPD's letter documenting completion of Steps 1 through 5.

Mr. Nakamoto and Ms. Dawn Takeuchi-Apuna  
April 24, 2023  
Page 2

VWL/HHC has submitted draft documents to SHPD for review in support of HAR §13-284-3(b) Steps 1–5. At this time, SHPD has not completed review of the project documents due to staffing issues. SHPD anticipates completion of review in several months. The Attachment provides a brief project summary.

**SHPD requests** HCDA, DDP, and VWL/HHC provide confirming commitment to the requested stipulations to SHPD to HICRIS Project No. 2021PR00032 using the Project Supplement option.

**SHPD will notify** HCDA, DDP, and VWL/HHC when our office has completed review and approval of all documents submitted in support of HAR §13-284-3(b) Steps 1–5, and the DPP permitting process may continue.

Please contact Susan A. Lebo, Archaeology Branch Chief, at [Susan.A.Lebo@hawaii.gov](mailto:Susan.A.Lebo@hawaii.gov) for any questions or concerns regarding this letter.

Aloha,  
*Alan Downer*

Alan S. Downer, PhD  
Administrator, State Historic Preservation Division  
Deputy State Historic Preservation Officer

cc: Ka'iulani Sodaro (HHC): [kaiulani.sodaro@howardhughes.com](mailto:kaiulani.sodaro@howardhughes.com)  
Matt McDermott (CSH): [mmcdermott@culturalsurveys.com](mailto:mmcdermott@culturalsurveys.com)

Attachment. Brief Project Summary

Cultural Surveys Hawai'i, Inc. (CSH) has conducted an archaeological inventory survey (AIS) for the *VWL Blocks D & E Diamond Head Plaza Project* at the request of Victoria Ward, Ltd. (VWL) and The Howard Hughes Corporation (HHC). The SHPD received the draft AIS report titled *Archaeological Inventory Survey Report for the Blocks D, E, and Diamond Head Plaza Project, Kaka'ako, Honolulu Ahupua'a, Honolulu (Kona) District, O'ahu, TMK: (1) 2-3-005:006* (Bennicas et al., October 2022 ) on October 28, 2022, and the draft archaeological monitoring plan (AMP) titled *Archaeological Monitoring Plan for the Blocks D, E, and Diamond Head Plaza Project, Kaka'ako, Honolulu Ahupua'a, Honolulu (Kona) District, O'ahu, TMK: (1) 2-3-005:006* (Bennicas and McDermott, December 2022) on December 19, 2022.

The VWL Blocks D and E and the Diamond Head Plaza are within the ~60.5-acre VWL/HHC property, a development area that is covered by the Ward Neighborhood Master Plan. The Master Plan is a long-range plan that is designed to evolve over an approximately 20-year period, as community needs change. Guidelines for the Master Plan are set forth in the HCDA's Mauka Area Plan.

The VWL Blocks D and E and the Diamond Head Plaza Project covers the city block surrounded by Auahi Street to the north, Queen Street to the east, Ala Moana Boulevard to the south, and Kamake'e Street to the west. The proposed project will include the construction of high rise towers with commercial space on the ground floor and a ground floor park on the west side of the block facing Kamake'e Street. Ground disturbance will include demolition and removal of existing buildings and other structures, boring and other excavation for installation of foundation pilings and footings, trench excavation for utility-line installation, and excavation for roadway and parking-area development and landscaping.

The draft AIS (Bennicas et al., October 2022) indicates two significant historic properties were documented within the Blocks D, E, and Diamond Head Plaza project area:

1. Site 50-80-14-06855 consists of traditional Hawaiian and historic subsurface cultural deposits, with 26 associated features including pit features of indeterminate function (Features 1a, 1b, 9a, 10c, 30a, 31a, 31b, 36a, 39a, 42c, 43a, 50a, 56a, 58a, and 59a), combustion features (Features 17a, 30b, 33a, 34b, and 42b), structural remnants (Features 27c, 48a, and 52a), post molds (Features 57a and 58b), and a refuse pit (Feature 29a). It has been assessed as significant under Criteria c, d, and e, pursuant to HAR §13-284-6.
2. Site 50-80-14-09160 consists of historicalburied surfaces and structural remnants associated with early to mid-twentieth century commercial and residential development. Components identified include buried asphalt, oil-rolled, and compacted surfaces, seven pit features (Features 2a, 10a, 10b, 11/12a, 14a, 27a, and 27b), six concrete structural remnants (Features 16a, 18a, 28a, 34a, 35a, and 40a), and one historical manhole (Feature 42a). It has been assessed as significant under Criterion d, pursuant to HAR §13-284-6.

# APPENDIX F

## TRAFFIC IMPACT REPORT

Traffic Impact Report

**Block D and Block E**

***TRAFFIC IMPACT REPORT***

***FOR***

***BLOCK D AND BLOCK E***



Prepared for:  
Victoria Ward, Ltd.

Prepared by:  
Wilson Okamoto Corporation

March 2023

*Prepared for:*

Victoria Ward Limited  
1240 Ala Moana Blvd., Suite 200  
Honolulu, HI 96814

*Prepared by:*

Wilson Okamoto Corporation  
1907 S. Beretania Street, Suite 400  
Honolulu, Hawaii 96826  
WOC Ref #8206-79

March 2023

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**I. INTRODUCTION**

**A. Purpose of Study**

The purpose of this study is to identify and assess the potential traffic impacts resulting from the Block D and Block E developments of the Ward Village Master Plan in Kakaako on the island of Oahu. A previous assessment including the Block D and Block E developments were included in the “Transportation Master Plan and Assessment for the Ward Village Master Plan” (hereafter referred to as the “Ward Village TMP”) originally dated October 2020 and updated in October 2022. This report is a supplemental study to specifically address the Block D and Block E developments and incorporate the most recent development plans which include residential, commercial, and restaurant uses. It should be noted that although the Block D and Block E developments are independent projects that will be developed, owned, and operated by two different legal entities and managed by two independent condominium associations, they are expected to be developed within the same time frame. As such, due to their proximity and similar development timeline, both projects were assessed under a single Traffic Impact Analysis Report.

**B. Scope of Study**

This report presents the findings and conclusions of the traffic study, the scope of which includes:

1. Description of the proposed project.
2. Evaluation of existing roadway and traffic operations in the vicinity.
3. Analysis of future roadway and traffic conditions without the proposed project.
4. Analysis and development of trip generation characteristics for the proposed project.
5. Superimposition of site-generated traffic over future traffic conditions.
6. The identification and analysis of traffic impacts resulting from the proposed project.
7. Recommendations of improvements, if appropriate, that would mitigate the traffic impacts resulting from the proposed project.

**II. PROJECT DESCRIPTION**

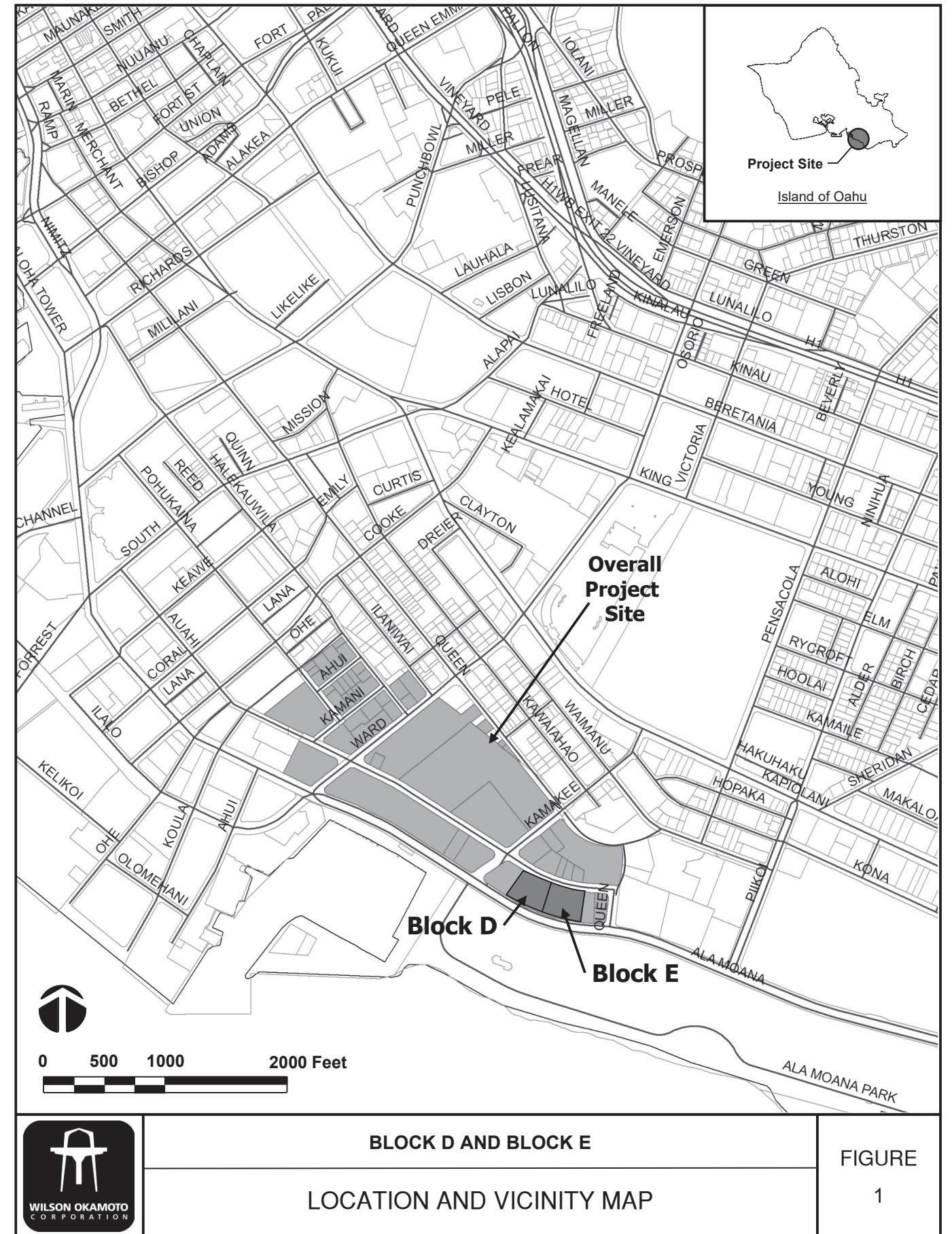
**A. Location**

The project sites for the proposed Block D and Block E developments currently house the Ward Centre shopping complex located adjacent to Auahi Street in Kakaako on the island of Oahu (see Figure 1). The project site is bounded by Auahi Street to the north, Ala Moana Boulevard to the south, Kamakee Street to the west and the IBM building (1240 Ala Moana development) to the east and is further identified as Tax Map Key (TMK) 2-3-05:006. The Block D development will be located on the west portion of the parcel while the project site for Block E will encompass the east portion of the parcel. Access to both developments are expected to be provided via new two-way driveways off Auahi Street.

**B. Project Characteristics**

The overall Ward Village Master Plan entails the redevelopment of most of the existing commercial, office, and industrial spaces implemented in five (5) phases over a span of 10-15 years. At the time of this report, Phase 1 which includes Blocks C (Waiea), K (Anaha), M (Aeo), and O (Kilohana), as well as the first development under Phase 2 referred to as Block N-East (Aalii), have been fully completed and occupied. The two remaining developments under Phase 2 are Blocks I (Koula) and C-West (Victoria Place). Construction for Block I was recently completed at the latter part of 2022, while work for Block C-West is ongoing and is expected to be completed by Year 2024. The development plans for the Phase 3 projects, which include Blocks H (The Park Ward Village), F (Ulana), and B (Kalae), have been accepted by the Honolulu Community Development Authority (HCDA) with Blocks H and F also currently under construction. Phase 3 is expected to be completed by Year 2026.

The next phase of development, Phase 4, is expected to include three additional block developments. The first development under Phase 4, the Block A development, is currently under design with completion expected by Year 2027. It should be noted that a separate Traffic Impact Report was previously prepared for that project dated October 2022. The Block A development is expected to be followed by the Block D and Block E developments with their completion also



anticipated by Year 2027. As previously mentioned, the Block D and Block E developments are expected to replace the existing Ward Centre shopping complex which currently includes approximately 80,000 square feet (sf) of retail uses and 43,900 sf of restaurant uses. The western portion of the project site will be comprised of a new pedestrian plaza and the Block D development, which is expected to include 300 residential units and 8,000 sf of restaurant uses. The eastern portion of the project site will be comprised of the Block E development which is expected to include 196 residential units and 5,000 sf of restaurant uses. Primary access to the proposed Block D development is expected to be provided via a two-way driveway near the west end of the development while access to the proposed Block E development is expected to be provided via a two-way driveway on the east edge of the project site. A secondary access located near the center of the parcel is expected to serve loading and service operations for both development blocks. It should be noted that a number of factors were considered during the conceptual phase of the project that has ultimately led to the proposed driveway locations. These considerations include:

- Driveway locations are constrained to be only along the Auahi Street frontage since no driveways may be provided along the State Highway, Ala Moana Boulevard. In addition, no driveways may be provided along the Kamakee Street frontage since the approved Master Plan for Ward Village requires a 1-acre public plaza to front Kamakee Street to act as a gateway between Ala Moana Regional Park and Ward Village. Finally, no access is available along the Diamond Head property line shared with the existing 1240 Ala Moana Boulevard development (IBM office building).
- Conceptual planning studied a combined commercial and residential ingress and egress off Auahi Street aligning with the existing South Shore Market/East Village Shops regional parking structure entry/exit so that a 4-way signalized intersection could service the block. However, market trends for the target buyer for the planned development demand secure, finished residential arrival, separated from back-of-house functions, commercial deliveries, trash truck accommodations thereby driving a design solution with a minimum of two driveways, one for residential access and the loading dock area.
- While two driveways would be plausible for a single ownership project with one driveway perhaps still aligned with the existing signalized intersection, the size of the development parcel and its associated developable floor area dictated subdivision into two discrete development lots with independent ownership.

Since the development lots are expected to be separate, each of the two projects would have two driveways, one residential and the other for loading dock access. As conceptual plans progressed, the design team was able to eliminate one of the four driveways by combining back-of-house access into a single driveway serving both project's loading docks. This strategy dictated placing the single commercial driveway along the common property line between the two projects.

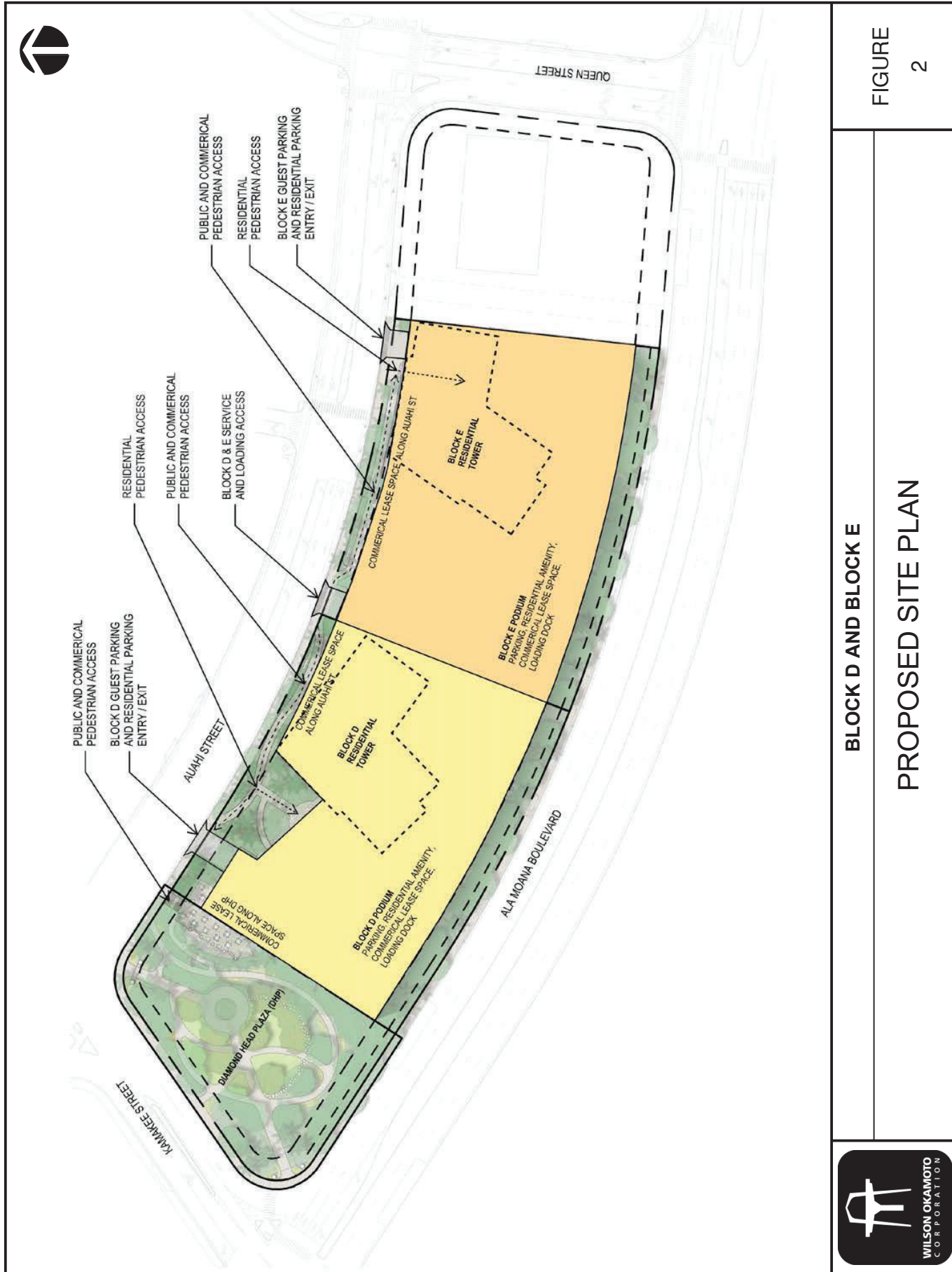
- Driveway locations were further constrained by a requirement of the Hawaii Community Development Authority (HCDA) for Ground Level activation, maximizing incorporating commercial lease spaces along the Auahi Street frontage. Such activation dictates that commercial lease spaces are not separated by too great a distance so that patrons are drawn from one storefront to the next. Therefore, the two independent residential driveways had to be pushed to the opposite ends of the Auahi frontage.

As such, the conceptual site plan used as the basis of this study reflects a 3-driveway configuration. Due to its proximity to Kamakee Street, the primary access for the proposed Block D development is expected to be restricted to right-turn in right-turn out movements only. The center driveway for service and loading operations as well as the proposed primary access for the Block E development on the east edge of the project site are also expected to be restricted to right-turn in right-turn out movements only due their proximity to the adjacent signalized intersection with the South Shore Market/East Village Shops driveway. It should be noted that the existing exit driveway for Ward Centre is aligned with the adjacent signalized intersection. Parking for the residential uses within the Block D and Block E developments is expected to be provided separately within the respective blocks with no internal connection between their respective parking areas. Parking for the commercial uses is expected be accommodated within the existing regional parking garage located across Auahi Street. Figure 2 shows the proposed site plan.

### III. BASELINE TRAFFIC CONDITIONS

#### A. Area Roadway System

East-west traffic flow through the Kakaako area is served by a number of existing major roadways which include Ala Moana Boulevard, Queen Street, and Kapiolani Boulevard that provide continuous east-west mobility through the project vicinity. These major roadways are supported by a network of connector roadways including Auahi Street, Pohukaina Street, and Halekauwila Street that provide



**BLOCK D AND BLOCK E  
PROPOSED SITE PLAN**

**FIGURE  
2**



alternate east-west routes through the surrounding areas. North-south traffic through the Kakaako area is served by a number of existing major roadways including Ward Avenue and Piikoi Street that support either one-way or two-way travel through the project vicinity. These major roadways are supported by a network of connector roadways including Cooke Street and Kamakee Street that provide alternate north-south routes through the surrounding areas.

**B. Traffic Volumes and Conditions**

**1. General**

**a. Field Investigation**

The traffic count data utilized for this study consisted of turning movement count surveys at 22 locations during the weekday morning peak hours of 6:00 AM and 9:00 AM and afternoon peak hours of 3:00 PM and 6:00 PM. The surveys were conducted during 2018 and supplemented during 2019 at the intersections along the following roadways:

- Along Kapiolani Boulevard at the intersections with Cooke Street, Ward Avenue, Kamakee Street, Queen Street, and Piikoi Street
- Along Auahi Street at the intersections with Cooke Street, Ward Avenue, Kamakee Street, and Queen Street and Queen Lane
- Along Halekauwila Street at the intersections with Cooke Street, Ward Avenue, and Kamakee Street
- Along Queen Street at the intersections with Cooke Street, Ward Avenue, Kamakee Street, and Queen Lane
- Along Ala Moana Boulevard at the intersections with Cooke Street, Ward Avenue, Kamakee Street, and Piikoi Street
- Pohukaina Street and Cooke Street
- Waimanu Street and Piikoi Street

Starting in 2020, the ongoing COVID-19 pandemic resulted in fluctuations in traffic volumes and shifts in travel patterns that limited the ability to collect updated traffic data. Since the end of 2021, traffic volumes and patterns have slowly been normalizing and as such, additional supplemental traffic data was collected in August and November 2022 at key intersection in the vicinity to incorporate these noted changes. The resulting baseline traffic volumes used for this

study reflect the incorporation of these considerations and are considered to be representative of Year 2022 existing conditions. As previously noted, the developments associated with Phase 1 and Block N East of Phase 2 have been completed and occupied. As such, the trips associated with these blocks were assumed to be captured within the surveyed traffic volumes. In addition, during the supplemental counts, the sites for Blocks H, F, B, A, and N West had been cleared of their existing uses, while Blocks C West and I were still under construction. Appendix A includes the traffic count data.

**b. Capacity Analysis Methodology**

The highway capacity analysis performed in this study is based upon procedures presented in the “Highway Capacity Manual”, Transportation Research Board, 2000, and the “Synchro” software, developed by Trafficware. It should be noted that the HCM 2010 and 2016 methodologies are available with the Synchro software; however, as previously discussed in the Ward Villages Master Plan, analysis conducted using that methodology is unable to accommodate all of the exclusive and shared-use lane configurations in the study area. As such, for the purpose of this report, the HCM 2000 methodology output was used for consistency with the overall traffic study. The analysis is based on the concept of Level of Service (LOS) to identify the traffic impacts associated with traffic demands during the peak periods of traffic.

LOS is a quantitative and qualitative assessment of traffic operations. Levels of Service are defined by LOS “A” through “F”; LOS “A” representing ideal or free-flow traffic operating conditions and LOS “F” unacceptable or potentially congested traffic operating conditions.

“Volume-to-Capacity” (v/c) ratio is another measure indicating the relative traffic demand to the road carrying capacity. A v/c ratio of one (1.00) indicates that the roadway is operating at or near capacity.

A v/c ratio of greater than 1.00 indicates that the traffic demand exceeds the road’s carrying capacity. The LOS definitions are included in Appendix B.

**2. Baseline Peak Hour Traffic**

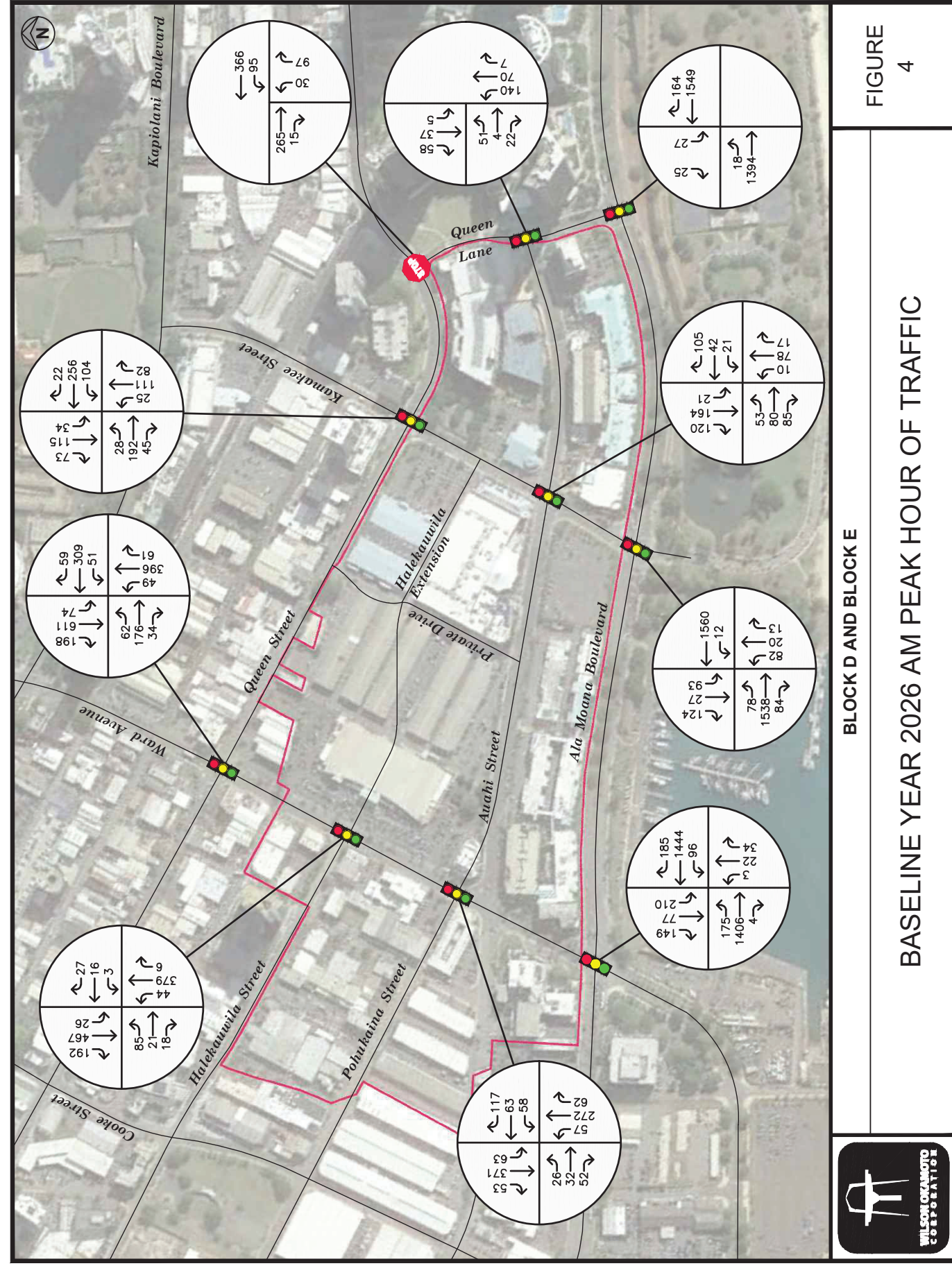
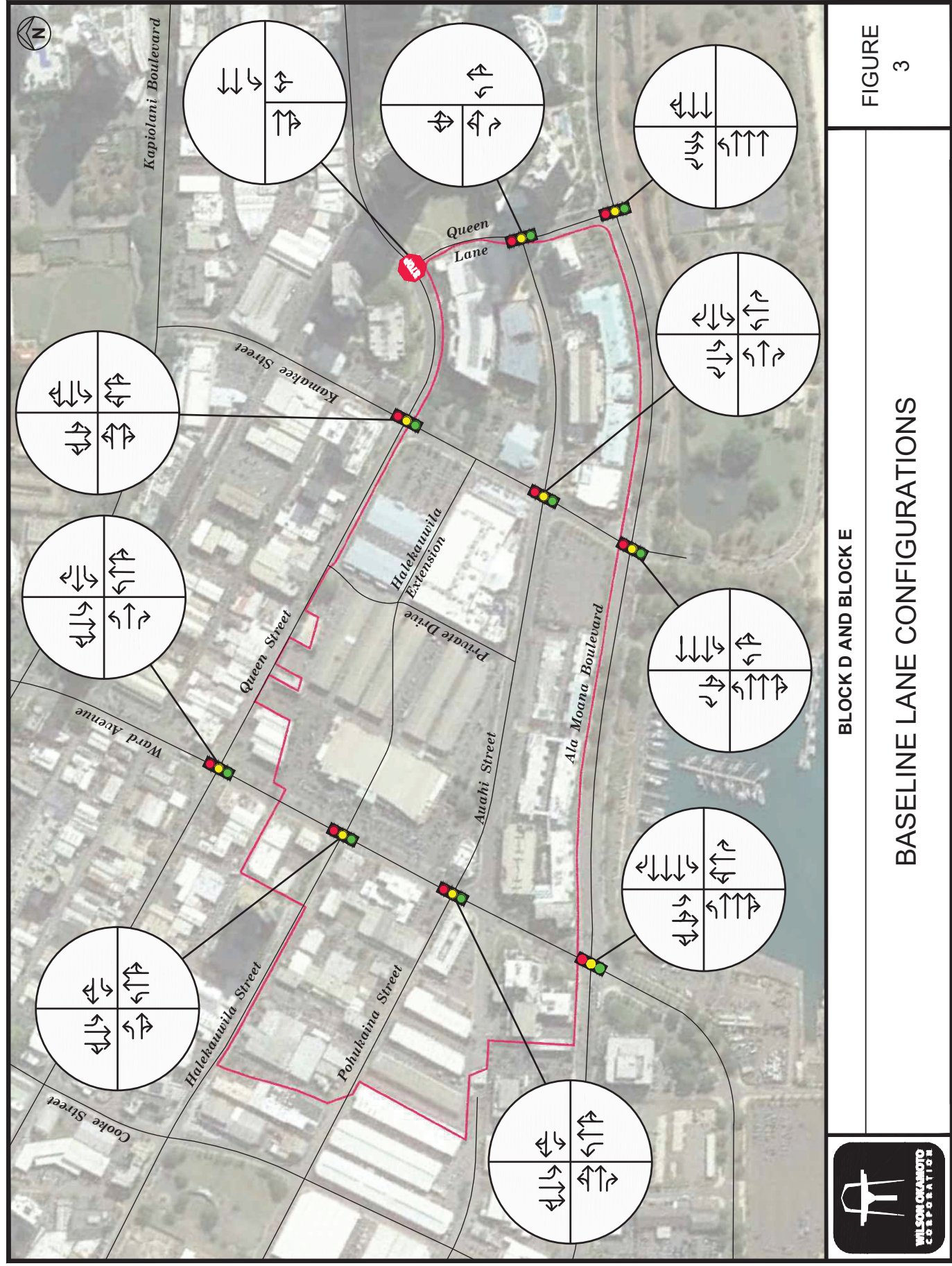
**a. General**

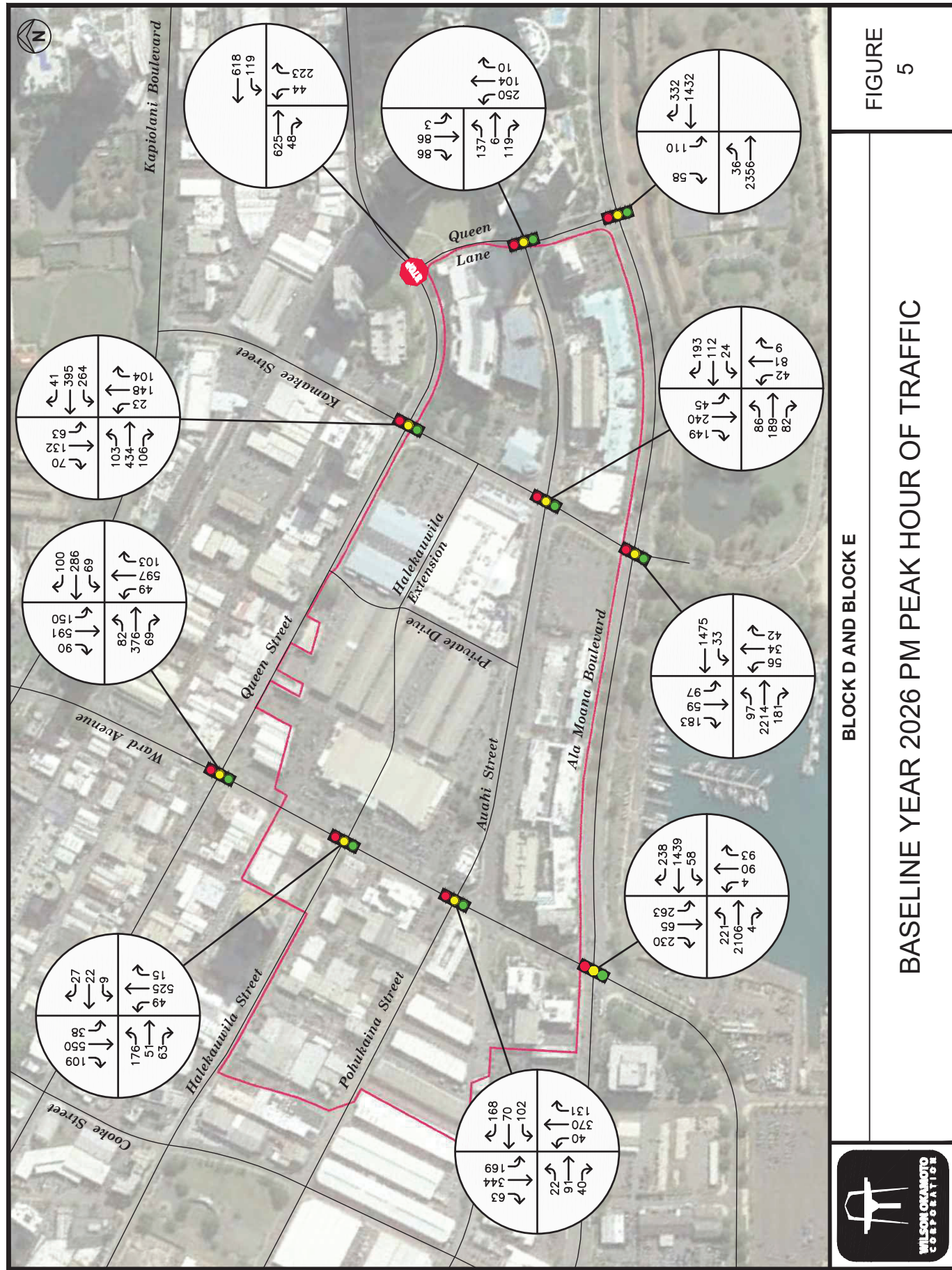
Figures 3-5 show the baseline Year 2026 lane configurations and AM and PM peak hour traffic volumes at key locations within the study area which includes the development of other projects in the vicinity, as well as Phases 1 to 3 of the Ward Village Master Plan which are expected to be completed prior to the proposed project. The AM peak hour of traffic generally occurs between 7:30 AM and 8:30 AM while the PM peak hour of traffic generally occurs between 4:30 PM and 5:30 PM. Although the peak hours of traffic generally occur around the same time periods at each of the study intersections, the absolute commuter peak hour time periods for each intersection may differ slightly. The analysis is based on these absolute commuter peak hour time periods to identify the traffic impacts resulting from the proposed project. LOS calculations for the study intersections are included in Appendix C.

The baseline traffic conditions are generally based on the projected Year 2026 conditions included in the Ward Villages TMP dated October 2022. It should be noted that the Year 2026 conditions include the following other considerations as outlined in the Ward Villages TMP:

- Ala Moana Pedestrian Bridge
- Ala Moana Boulevard and Kamakee Street Lane Use Modifications
- Kakaako Mauka Master Plan Block I

Improvements to the surrounding roadways are also planned in conjunction with the Ward Village Master Plan. These improvements include the realignment of Auahi Street east of Ward Avenue that will connect Auahi Street to Pohukaina Street and the completion of the





Halekauwila Extension from Robinson Lane to Ward Avenue. Both of these roadway projects are expected to be completed by Year 2026 and were included in the baseline calculations. Since the preparation of the TMP, additional projects were incorporated into baseline conditions as discussed in the following section.

**b. Other Considerations since the 2022 Ward Village TMP**

**i. Kaiāulu ‘o Kaka‘a ko Master Plan (KKMP) Increment 2**

The overall Kaiāulu ‘o Kaka‘ako Master Plan (KKMP) Increment 2 being planned by Kamehameha Schools entails the replacement of existing commercial and light industrial uses within the Kakaako Mauka area with a new mixed-use, multi-block neighborhood with residential and commercial uses as well as recreational spaces over the next 7 years. The first developments within Increment 2 are the Kakaako Blocks I and G developments. The Kakaako Block I development (also referred to as the Alia development) is located adjacent to Ala Moana Boulevard west of the Ward Village development and entails the redevelopment of existing uses to include approximately 482 residential units and 3,500 sf of retail uses with access provided via driveways off Ala Moana Boulevard and Auahi Street. Based on the information included in the “Traffic Impact Report for the Kakaako Block I Development” dated March 2022, the proposed multi-use development is expected to generate 130 trips during the AM and 159 trips during the PM peak period. As previously discussed, the trips associated with the KKMP Block I development were previously incorporated into the baseline conditions included in the Ward Village TMP. The Block G development is also located adjacent to Ala Moana Boulevard between Cooke Street and Coral Street and is expected to include

approximately 339 residential units, a 29,443 sf grocery store, 5,465 sf of restaurant uses, and 5,465 sf of retail uses. This development is also anticipated to be completed by Year 2026. Since additional information regarding the project's uses and timeline became available after the completion of the Ward Village TMP, trips associated with the Block G development were subsequently added to the Year 2026 baseline conditions. It should be noted that plans for other blocks within the KKMP are also expected to be forthcoming, however the specific development plans and timing for these blocks are not known at this time.

**ii. Right-Turn on Red Restrictions Along Ala Moana Boulevard**

As previously discussed in the Ward Village TMP, lane use modifications were recently implemented at the intersection of Ala Moana Boulevard and Kamakee Street to prohibit right-turn movements along the westbound direction of Ala Moana Boulevard. This modification was previously incorporated into the baseline conditions. Since the preparation of the Ward Village TMP, the State of Hawaii DOT has also implemented right-turn on red restrictions at select intersections along Ala Moana Boulevard. Within the study area, these include the following intersections along Ala Moana Boulevard:

- At Kamakee Street on the northbound and southbound approaches
- At Ward Avenue on the northbound and southbound approaches

As such, these turning restrictions were also incorporated into Year 2026 baseline conditions.

**c. Ward Avenue and Queen Street**

At the intersection with Queen Street, Ward Avenue carries 506 vehicles northbound and 883 vehicles southbound during the AM peak hour of traffic. During the PM peak period, the overall traffic volume is higher with 749 vehicles traveling northbound and 831 vehicles traveling southbound. The northbound approach operates at LOS "B" and LOS "C" during the AM and PM peak periods, respectively, while the southbound approach of the intersection operates at LOS "B" during both peak periods.

The Queen Street approaches of the intersection carry 272 vehicles eastbound and 419 vehicles westbound during the AM peak hour of traffic. During the PM peak period, traffic volumes are higher with 527 vehicles traveling eastbound and 455 vehicles traveling westbound. The eastbound approach operates at LOS "B" and LOS "C" during the AM and PM peak periods, respectively, while the westbound approach of the intersection operates at LOS "C" during both peak periods.

**d. Queen Street and Kamakee Street**

At the intersection with Kamakee Street, Queen Street carries 265 vehicles eastbound and 382 vehicles westbound during the AM peak hour of traffic. During the PM peak period, traffic volumes are higher with 643 vehicles traveling eastbound and 700 vehicles traveling westbound. The eastbound approach operates at LOS "B" and LOS "C" during the AM and PM peak periods, respectively, while the westbound approach operates at LOS "A" and LOS "B" during the AM and PM peak periods, respectively.

The Kamakee Street approaches carry 218 vehicles northbound and 222 vehicles southbound during the AM peak hour of traffic. During the PM peak period, the overall traffic volume is similar with 275 vehicles traveling northbound and 265 vehicles traveling



southbound. Both approaches of Kamakee Street operate at LOS “B” during the AM peak period and LOS “C” during the PM peak period.

**e. Queen Street and Queen Lane**

At the intersection with Queen Lane, Queen Street carries 280 vehicles eastbound and 461 vehicles westbound during the AM peak hour of traffic. During the PM peak period, traffic volumes are higher with 673 vehicles traveling eastbound and 737 vehicles traveling westbound. The westbound approach operates at LOS “A” during both peak periods.

The Queen Lane approach carries 127 vehicles northbound during the AM peak period and 267 vehicles during the PM peak period. The Queen Lane approach operates at LOS “B” during both peak periods.

**f. Ward Avenue and Halekauwila Street**

At the intersection with Halekauwila Street, Ward Avenue carries 429 vehicles northbound and 685 vehicles southbound during the AM peak hour of traffic. During the PM peak period, traffic volumes are higher with 589 vehicles traveling northbound and 697 vehicles traveling southbound. The northbound approach operates at LOS “A” during both peak periods, while the southbound approach operates at LOS “A” and LOS “B” during the AM and PM peak periods, respectively.

The Halekauwila Street approach of the intersection carries 124 vehicles eastbound and 46 vehicles westbound during the AM peak period. During the PM peak period, traffic volumes are higher with 290 vehicles traveling eastbound and 58 vehicles traveling westbound. The eastbound approach operates at LOS “B” during both peak periods, while the westbound approach operates at LOS “B” and LOS “A” during the AM and PM peak periods, respectively.

**g. Ward Avenue, Auahi Street, and Pohukaina Street**

At the intersection with Auahi Street, Ward Avenue carries 391 vehicles northbound and 487 vehicles southbound during the AM peak period. During the PM peak period, traffic volumes are higher with 541 vehicles traveling northbound and 576 vehicles traveling southbound. During the AM peak period both approaches of Ward Avenue operate at LOS “A” and LOS “B” during the AM and PM peak periods, respectively.

The Auahi Street approach of the intersection carries 238 vehicles westbound during the AM peak period and 340 vehicles during the PM peak period. The Auahi Street approach operates at LOS “B” during both peak periods. The Pohukaina Street approach of the intersection carries 110 eastbound vehicles during the AM peak period and 153 vehicles during the PM peak period and also operates at LOS “B” during both peak periods.

**h. Kamakee Street and Auahi Street**

At the intersection with Auahi Street, Kamakee Street carries 105 vehicles northbound and 305 vehicles southbound during the AM peak period. During the PM peak period, the traffic volumes are higher with 132 vehicles traveling northbound and 434 vehicles traveling southbound. The northbound approach operates at LOS “B” during both peak periods, while the southbound approach operates at LOS “B” and LOS “C” during the AM and PM peak periods, respectively.

Auahi Street carries 215 vehicles eastbound and 168 vehicles westbound during the AM peak period. During the PM peak period, traffic volumes are higher with 357 vehicles traveling eastbound and 329 vehicles traveling westbound. Both approaches on Auahi Street operate at LOS “B” during both peak periods.

**i. Auahi Street, Queen Lane, and Queen Street**

At the intersection with Queen Lane and Queen Street, Auahi Street carries 77 vehicles in the eastbound direction during the AM peak hour of traffic. During the PM peak period, the overall traffic volume is higher with 262 vehicles traveling eastbound. The Auahi Street approach operates at LOS “B” during both peak periods.

The Queen Lane approach of the intersection carries 100 vehicles southbound during the AM peak period and 175 vehicles northbound during the PM peak period. The Queen Lane approach operates at LOS “B” during both peak periods. The northbound approach is comprised of Queen Street which carries 217 vehicles during the AM peak period and 364 vehicles during the PM peak period. The Queen Street approach operates at LOS “B” during both peak periods.

**j. Ala Moana Boulevard and Ward Avenue**

At the intersection with Ward Avenue, Ala Moana Boulevard carries 1,585 vehicles eastbound and 1,725 vehicles westbound during the AM peak period. During the PM peak period, the overall traffic volume is similar with 2,331 vehicles traveling eastbound and 1,735 vehicles traveling westbound. Both approaches operate at LOS “D” and LOS “E” during the AM and PM peak periods, respectively.

The Ward Avenue approaches of the intersection carry 59 vehicles northbound and 436 vehicles southbound during the AM peak period. During the PM peak period, traffic volumes are higher with 187 vehicles traveling northbound and 558 vehicles traveling southbound. The northbound approach operates at LOS “D” during both peak periods while the southbound approach operates at LOS “D” and LOS “E” during the AM and PM peak periods, respectively.

**k. Ala Moana Boulevard, Kamakee Street, and Ala Moana Park Drive**

At the intersection with Kamakee Street, Ala Moana Boulevard carries 1,700 vehicles eastbound and 1,572 vehicles westbound during the AM peak period. During the PM peak period, the overall traffic volume is higher with 2,492 vehicles traveling eastbound and 1,508 vehicles traveling westbound. The eastbound approach operates at LOS “B” and LOS “C” during the AM and PM peak periods, respectively, while the westbound approach operates at LOS “B” during both peak periods.

The Kamakee Street approach of the intersection carries 244 vehicles southbound during the AM peak period and 339 vehicles during the PM peak period. The Kamakee Street approach operates at LOS “C” and LOS “D” during the AM and PM periods, respectively. The northbound approach is comprised of Ala Moana Park Drive which carries 115 vehicles during the AM peak period and 132 vehicles during the PM peak period. The Ala Moana Park Drive operates at LOS “C” and LOS “D” during the AM and PM peak periods, respectively.

**l. Ala Moana Boulevard and Queen Street**

At the intersection with Queen Street, Ala Moana Boulevard carries 1,412 vehicles eastbound and 1,713 vehicles westbound during the AM peak period. During the PM peak period, the overall traffic volume is higher with 2,392 vehicles traveling eastbound and 1,764 vehicles traveling westbound. The eastbound approach operates at LOS “A” and LOS “B” during the AM and PM peak periods, respectively, while the westbound approach operates at LOS “B” during both peak periods.

The Queen Street approach of the intersection carries 52 vehicles southbound during the AM peak period and 168 vehicles

during the PM peak period. The Kamakee Street approach operates at LOS “C” and LOS “D” during the AM and PM periods, respectively.

**IV. PROJECTED TRAFFIC CONDITIONS**

**A. Site-Generated Traffic**

**1. Trip Generation Methodology**

The trip generation methodology used in this study is based upon generally accepted techniques developed by the Institute of Transportation Engineers (ITE) and published in “Trip Generation, 10<sup>th</sup> Edition,” 2017. The ITE trip generation rates are developed empirically by correlating the vehicle trip generation data with various land use characteristics such as the number of vehicle trips generated per dwelling unit. It should be noted that a more recent edition of the Trip Generation was recently published at the end of 2021. Although average trip generation rates for some residential land uses have remained generally similar, the retail land uses have been updated to provide additional land use types. However, trip generation data for some of these uses are still limited. As such, for the purpose of this assessment, the 2017 edition was used. Tables 1 and 2 summarize the existing and proposed trip generation characteristics for the Block D and Block E development. It should be noted that the project represents an overall reduction in trips in the vicinity due to the change in land uses and reduced density with the proposed project.

**Table 1: Existing Peak Hour Trip Generation**

<b>SHOPPING CENTER</b>		
INDEPENDENT VARIABLE: 1,000 sf of development = 80.2		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	46
	EXIT	30
	TOTAL	76
PM PEAK	ENTER	146
	EXIT	160
	TOTAL	306

**Table 1: Existing Peak Hour Trip Generation (Cont’d)**

<b>HIGH-TURNOVER (SIT-DOWN) RESTAURANT</b>		
INDEPENDENT VARIABLE: 1,000 sf of development = 43.9		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	240
	EXIT	196
	TOTAL	436
PM PEAK	ENTER	266
	EXIT	162
	TOTAL	428
<b>TOTALS</b>		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	286
	EXIT	226
	TOTAL	512
PM PEAK	ENTER	412
	EXIT	322
	TOTAL	734

**Table 2: Proposed Peak Hour Trip Generation**

<b>MULTIFAMILY HOUSING (HIGH-RISE)</b>		
INDEPENDENT VARIABLE: # of Dwelling Units = 496		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	37
	EXIT	117
	TOTAL	154
PM PEAK	ENTER	109
	EXIT	70
	TOTAL	179
<b>HIGH-TURNOVER (SIT-DOWN) RESTAURANT</b>		
INDEPENDENT VARIABLE: 1,000 sf of development = 13		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	71
	EXIT	59
	TOTAL	130
PM PEAK	ENTER	78
	EXIT	49
	TOTAL	127

**Table 2: Proposed Peak Hour Trip Generation (Cont'd)**

TOTALS		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	108
	EXIT	176
	TOTAL	284
PM PEAK	ENTER	187
	EXIT	119
	TOTAL	306

The trip generation methodology developed by ITE also includes provisions for multi-modal trips. Multi-modal trips are trips made utilizing non-motorized modes of travel such as walking and biking, as well as trips made using transit. The project site is currently served by established, convenient transit routes that may reduce the number of vehicular trips added to the surrounding major roadways. As such, the trip generation characteristics for the existing and proposed project were adjusted to account for trips made using alternative modes of transportation. Table 3 summarizes the peak hour trip generation net difference from existing conditions incorporating the aforementioned factors. Detailed trip generation worksheets for the Block D and Block E developments are included in Appendix D.

**Table 3: Peak Hour Trip Generation Adjusted Net Difference from Existing**

TOTALS		
AM PEAK	ENTER	-111
	EXIT	-33
	TOTAL	-144
PM PEAK	ENTER	-108
	EXIT	-92
	TOTAL	-200

**2. Trip Distribution and Through Traffic Forecasting Methodology**

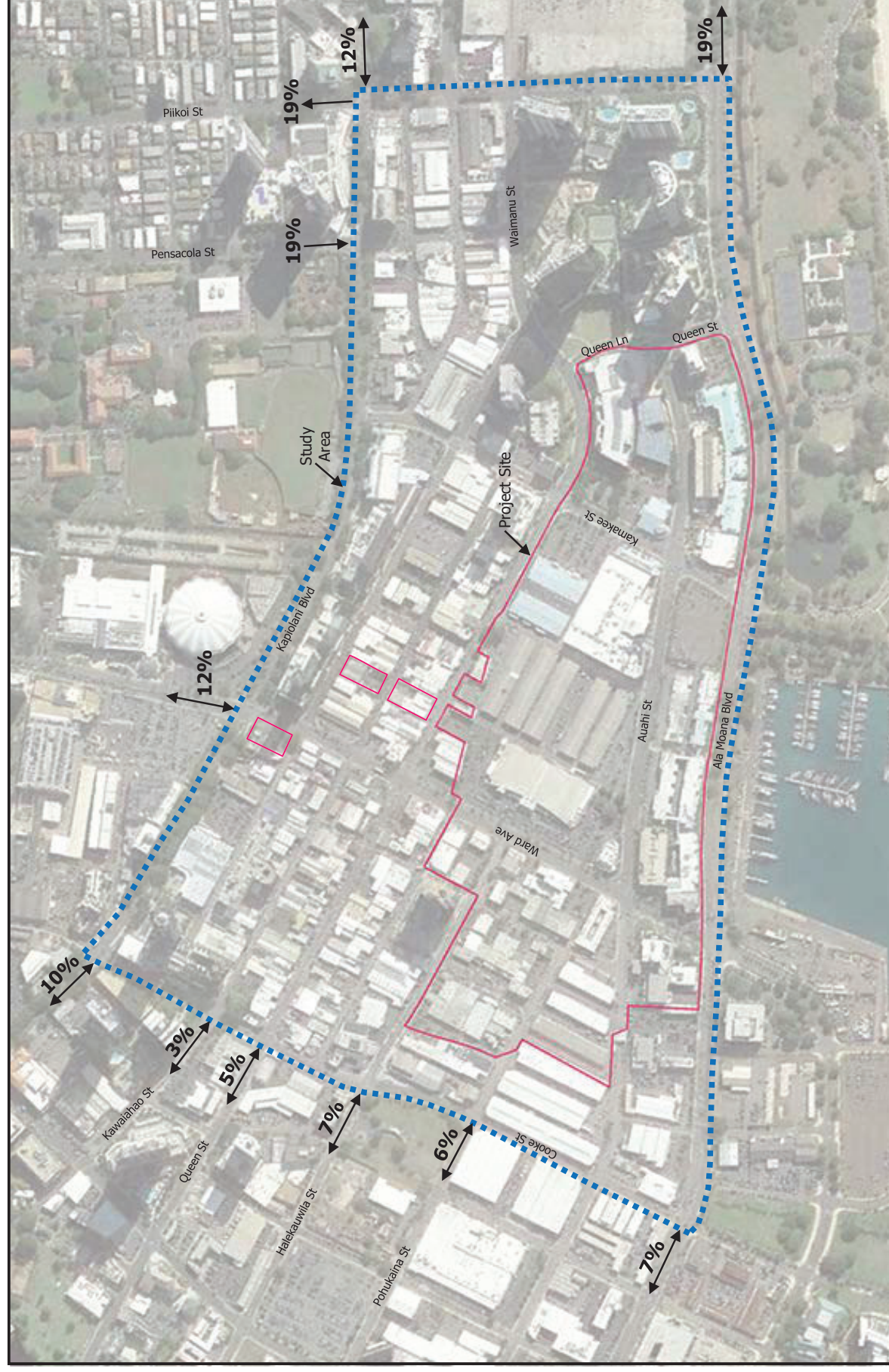
The directional distribution of site-generated trips was based on the relative distribution of traffic along the regional roadways in the vicinity of the project. These percentages are generally consistent with the regional forecasting model developed by the Oahu Metropolitan Planning Organization (OMPO) since the project is located within a developed, well-established area

in Honolulu. The OMPO model provides a macro level forecast of the anticipated overall travel demand for the island of Oahu utilizing Socio-Economic Data (SED) representing population distribution within a multitude of traffic analysis zones to forecast individual vehicle trips between destinations within the model. The model by OMPO provides a general framework of travel demand, however a more finite, micro-level approach was utilized to complete the specific distribution of site-generated trips at the study intersections based on their assumed origin/destination, allowed turning movements, and the relative convenience of the available routes. In addition, taking into the account the project's location within a well-developed area and anticipated development in the vicinity of the project, a growth rate of approximately 1.5% growth rate per year was assumed in the vicinity of the project. This is generally in line with OMPO's forecasting model which estimates population growth to be relatively linear to the Year 2035. As such, a growth factor was determined for Year 2027 and applied to the baseline through traffic demands along the regional roadways in the project vicinity. Figures 6 to 8 show the trip distribution percentages and the distribution of site-generated traffic during the AM and PM peak periods based on the OMPO model. As previously discussed, the proposed driveways for the Block D and Block E developments are expected to be restricted to right-turn in right-turn out movements only. In addition, parking for the residential uses will be accommodated on site while parking for the commercial uses are expected to use the existing regional parking areas within Ward Village. The trips associated with the proposed project were distributed at the study intersections based on their assumed origin/destination, allowed turning movements, and the relative convenience of the available routes.

**B. Other Considerations**

**1. Ward Village Master Plan Block A**

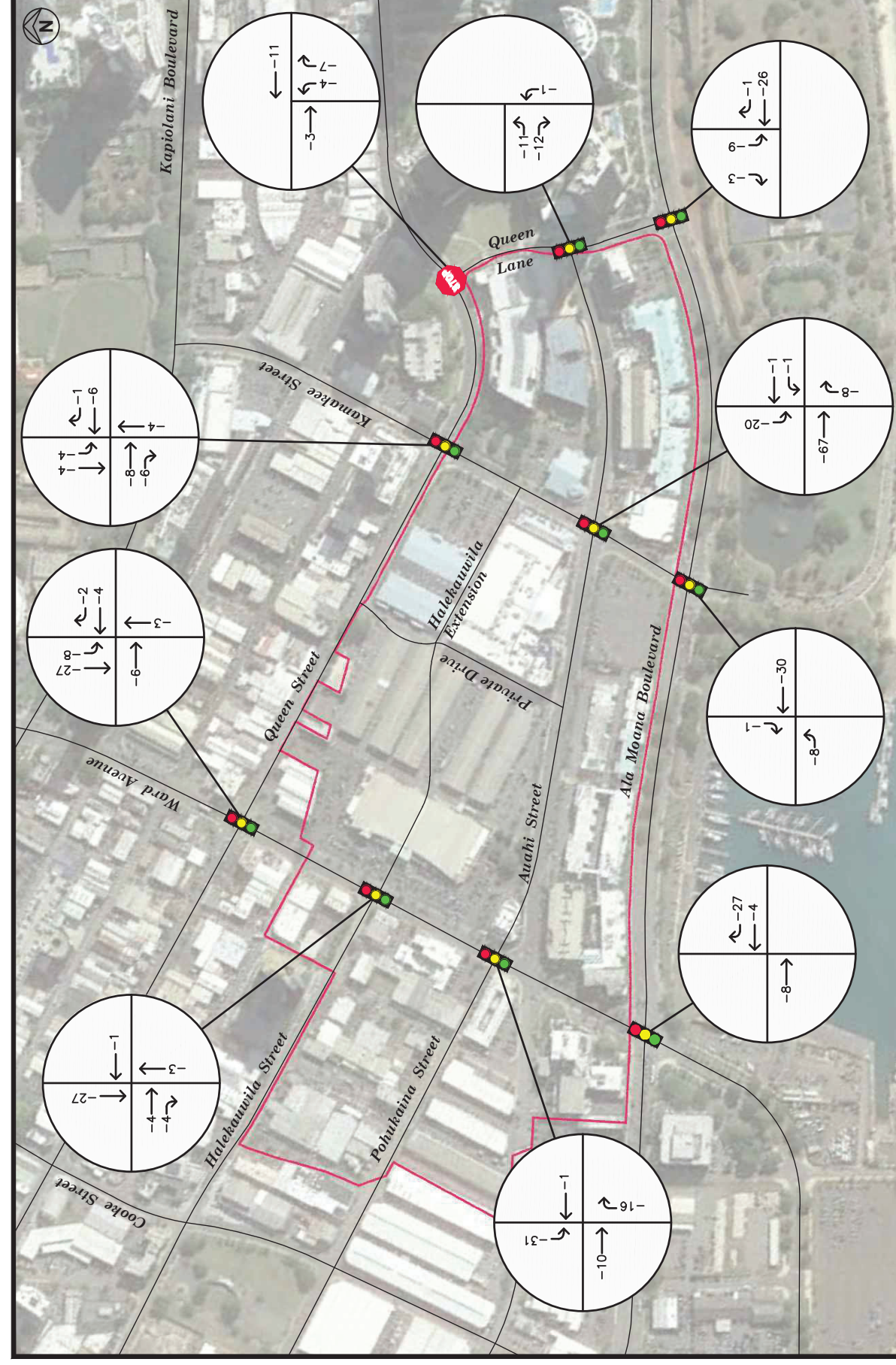
As previously discussed, the Block D and Block E developments will be preceded by the Block A development. The future Block A development located near the northwest corner of the Ward Avenue and Ala Moana



**BLOCK D AND BLOCK E**

**DISTRIBUTION OF EXTERNAL SITE-GENERATED TRIPS**

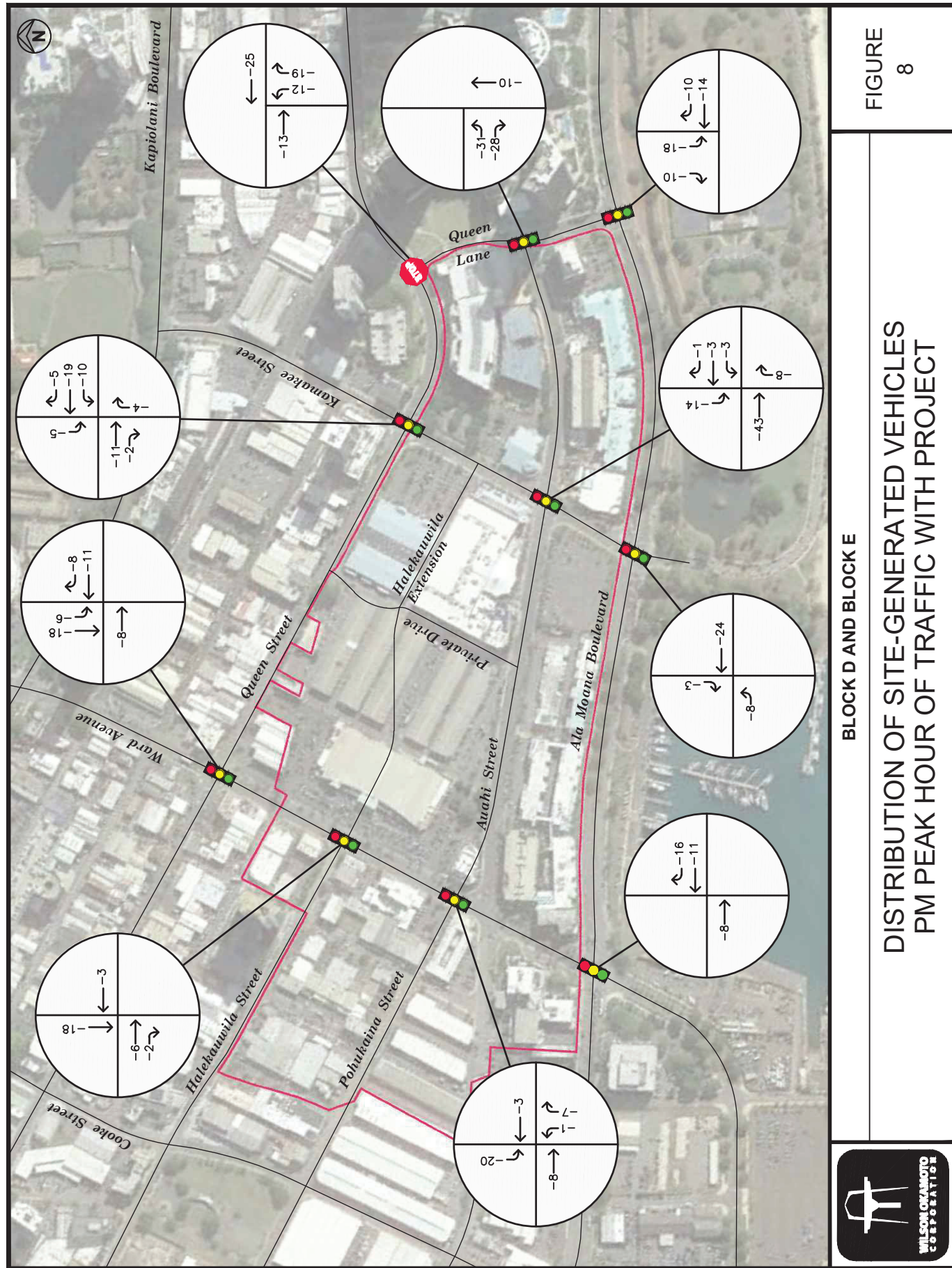
**FIGURE 6**



**BLOCK D AND BLOCK E**

**DISTRIBUTION OF SITE-GENERATED VEHICLES  
AM PEAK HOUR OF TRAFFIC WITH PROJECT**

**FIGURE 7**



Boulevard intersection is expected to include 505 residential units and 17,500 square feet (sf) of restaurant uses. A separate traffic study (dated October 2022) was prepared for this development. During the AM peak period, the proposed project is expected to generate 215 trips and 166 trips during the PM peak period. It should be noted that in conjunction with the realignment of Auahi Street, the segment of Auahi Street between Kamani Street and Ward Avenue is expected to be closed to vehicular traffic and incorporated into the Block A project site. The Block A development is expected to be completed and occupied by Year 2027 and as such were incorporated into without project conditions.

**2. Honolulu Rail Transit Project**

The City and County of Honolulu is currently developing a fixed guideway transit system that is planned to extend from Kapolei to the central Honolulu area thereby providing an alternate mode of travel through the Kakaako area. The proposed Honolulu High-Capacity Transit Corridor Project is intended to increase east-west mobility on Oahu’s most heavily congested corridor. In the vicinity of the Ward Village development, the guideway alignment is expected to run along Halekauwila Street, cross over to Queen Street, and then follow that roadway to Waimanu Street. However, on September 30, 2022, the Honolulu Authority for Rapid Transit (HART) announced the Federal Transit Administration (FTA) approved HART’s 2022 Recovery Plan, which proposed a truncated project scope with an interim terminus at the Civic Center, located at the intersection of Halekauwila Street and South Street. HART further announced that it remains committed to completing the full scope of the project to the Ala Moana Transit Center in a subsequent phase. Because the timing of the subsequent phase was not announced, the rail project was not incorporated into baseline or projected conditions.

**C. Total Traffic Volumes Without Project**

The projected Year 2027 AM and PM peak period traffic volumes and operating conditions without the Block D and Block E developments are shown in

Figures 9 and 10 and summarized in Table 4. The analysis incorporates the trips associated with the development of other projects in the area including Phase 1 to 3 and Block A of the Ward Villages Master Plan, Blocks I and G of the KKMP, and the anticipated ambient growth in traffic in the vicinity. In addition, the analysis also incorporates the aforementioned roadway improvements along Auahi Street and Halekauwila Street. The baseline levels of service are provided for comparison purposes. LOS calculations are included in Appendix E.

**Table 4: Baseline and Projected Year 2027 (Without Project) LOS Traffic Operating Conditions**

Intersection	Approach/ Critical Movement	AM		PM	
		Base-line*	Year 2027 w/o Proj	Base-line*	Year 2027 w/o Proj
Ward Ave/ Queen St	Eastbound	B	B	C	C
	Westbound	C	C	C	C
	Northbound	B	B	C	C
	Southbound	B	B	B	B
Queen St/ Kamakee St	Eastbound	B	B	C	C
	Westbound	A	A	B	B
	Northbound	B	B	C	C
	Southbound	B	B	C	C
Queen St/ Queen Ln	Westbound	A	A	A	A
	Northbound	B	B	B	B
Ward Ave/ Halekauwila St	Eastbound	B	B	B	B
	Westbound	B	B	A	A
	Northbound	A	A	A	B
	Southbound	A	A	B	B
Ward Ave/ Auahi St/ Pohukaina St	Eastbound	B	B	B	B
	Westbound	B	B	B	B
	Northbound	A	A	B	B
	Southbound	A	A	B	B

\*Year 2026 conditions which incorporate the completion of Phases 1 to 3 of the Ward Villages Master Plan.

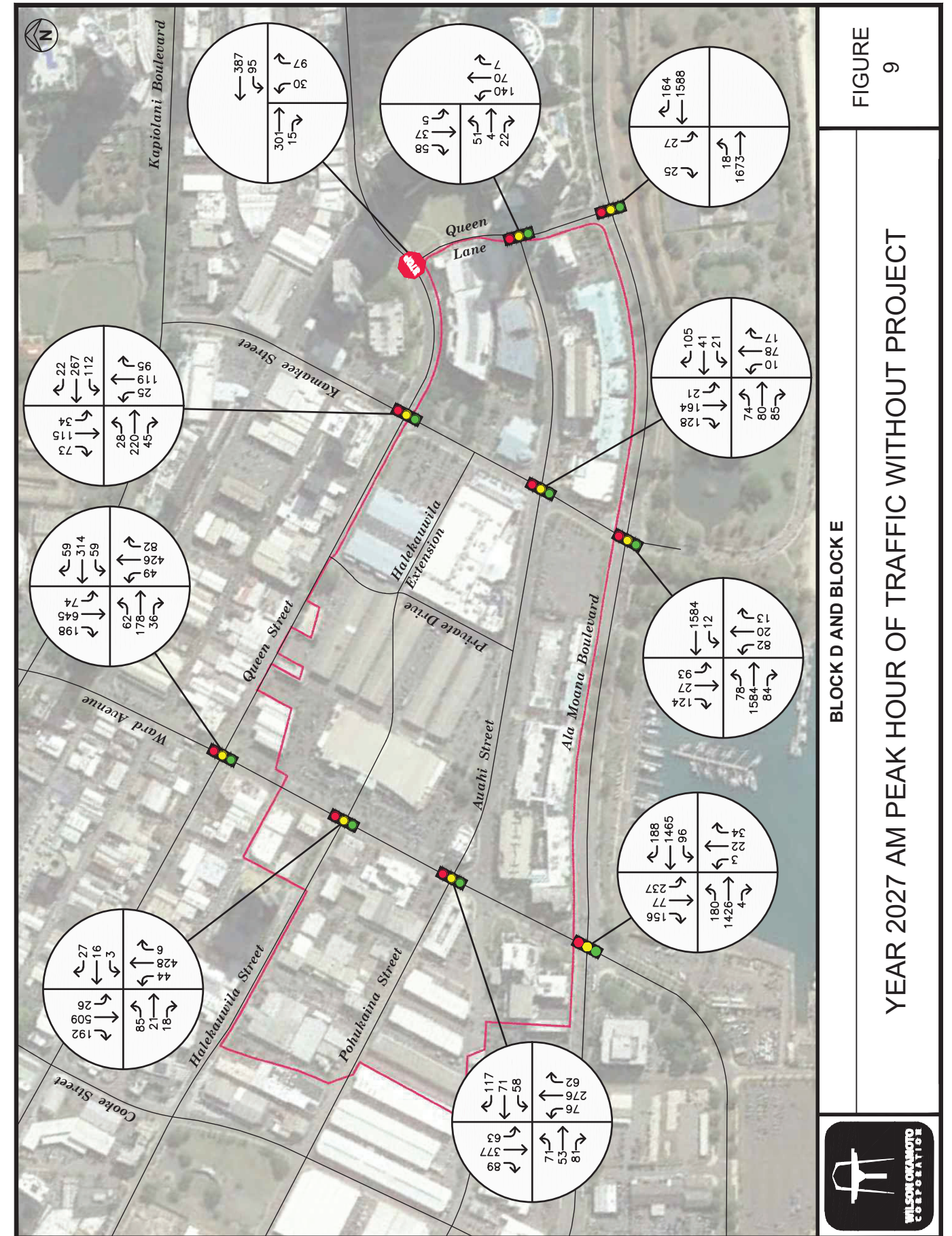


FIGURE 9

YEAR 2027 AM PEAK HOUR OF TRAFFIC WITHOUT PROJECT

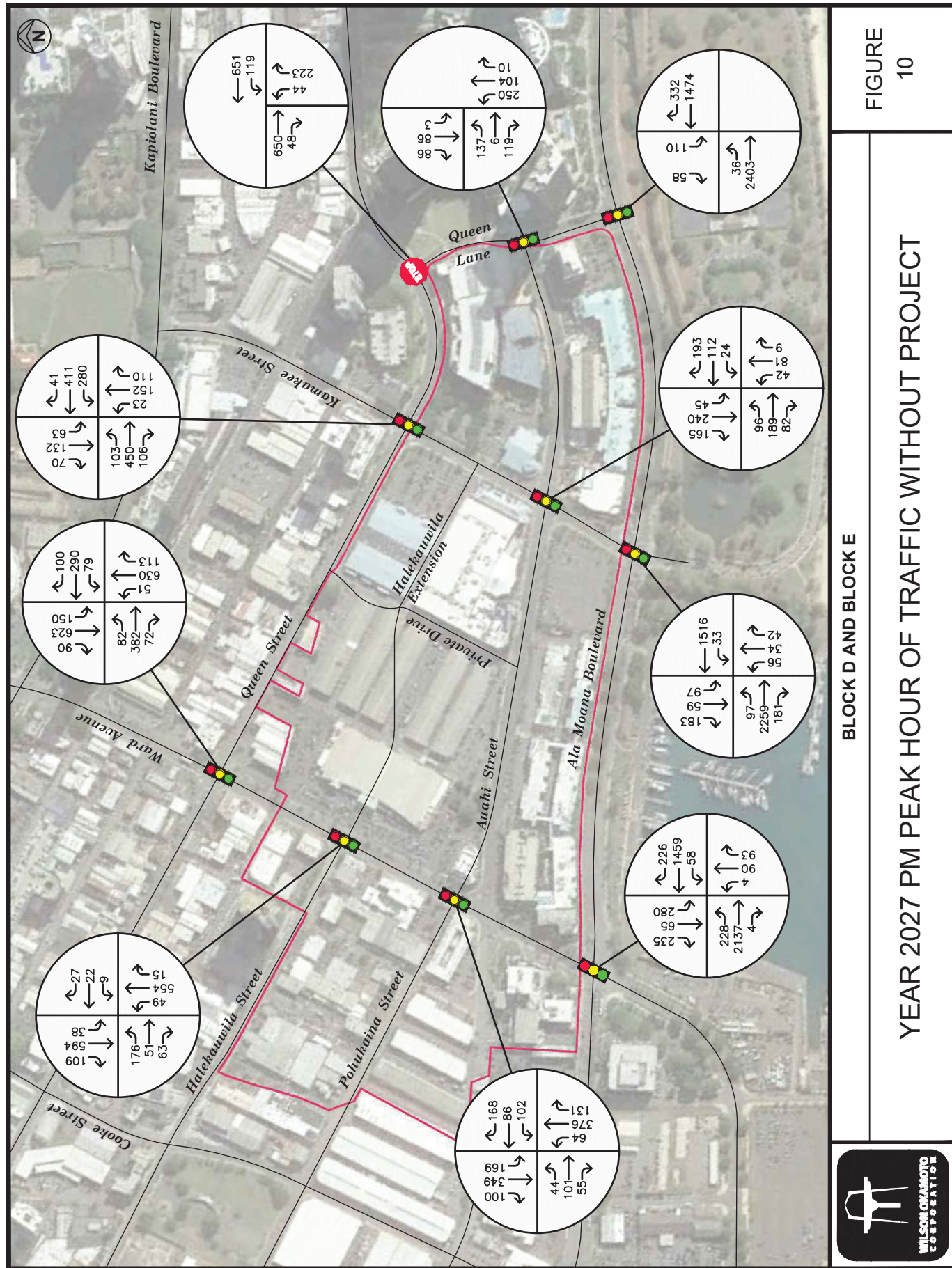


FIGURE 10

BLOCK D AND BLOCK E  
YEAR 2027 PM PEAK HOUR OF TRAFFIC WITHOUT PROJECT

Table 4: Baseline and Projected Year 2027 (Without Project) LOS Traffic Operating Conditions (Cont'd)

Intersection	Approach/ Critical Movement	AM		PM	
		Base-line*	Year 2027 w/o Proj	Base-line*	Year 2027 w/o Proj
Kamakee St/ Auahi St	Eastbound	B	B	B	B
	Westbound	B	B	B	B
	Northbound	B	B	B	B
	Southbound	B	B	C	C
Auahi St/ Queen Ln/ Queen St	Eastbound	B	B	B	B
	Northbound	B	B	B	B
	Southbound	B	B	B	B
Ala Moana Blvd/ Ward Ave	Eastbound	D	D	E	E
	Westbound	D	D	E	E
	Northbound	D	D	D	D
	Southbound	D	D	E	E
Ala Moana Blvd/ Kamakee St	Eastbound	B	B	C	C
	Westbound	B	B	B	B
	Northbound	C	C	D	D
	Southbound	C	C	D	D
Ala Moana Blvd/ Queen St	Eastbound	A	A	B	B
	Westbound	B	B	B	B
	Southbound	C	C	D	D

\*Year 2026 conditions which incorporate the completion of Phases 1 to 3 of the Ward Villages Master Plan.

Traffic operations under Year 2027 without project conditions are generally expected to remain similar to baseline conditions. Along Ala Moana Boulevard, traffic operations at the intersections with Kamakee Street and Queen Street are expected to continue operating at LOS “C” and LOS “D or better during the AM and PM peak periods, respectively, while those at the intersection with Ward Avenue are expected to continue operating at LOS “D” during the AM peak period and LOS “E” or better during the PM peak period. The low levels of service at that intersection is primarily due to the high volume of east-west through traffic at this intersection. Along Auahi Street, the approaches at the intersections with Ward Avenue and



Pohukaina Street are expected to continue operating at LOS “B” or better during the AM and PM peak periods, while those at the intersection with Kamakee Street are expected to continue operating at LOS “B” or better during the AM peak period and LOS “C” or better during the PM peak period. Traffic operations at the remaining study intersections are also expected to continue operating similar to baseline conditions.

**D. Total Traffic Volumes With Project**

Figures 11 and 12 show the Year 2027 cumulative AM and PM peak hour traffic conditions resulting from the completion of the Block D and Block E developments. The cumulative volumes consist of site-generated traffic superimposed over Year 2027 projected traffic demands. The traffic impacts resulting from the proposed project are addressed in the following section.

**V. TRAFFIC IMPACT ANALYSIS**

The Year 2027 cumulative AM and PM peak hour traffic conditions with the completion of the Block D and Block E developments are shown on Figures 11 and 12 and summarized in Table 5. The projected Year 2027 (Without Project) operating conditions are provided for comparison purposes. LOS calculations are included in Appendix G.

**Table 5: Projected Year 2027 (Without and With Project) LOS Traffic Operating Conditions**

Intersection	Approach/ Critical Movement	AM		PM	
		Year 2027		Year 2027	
		w/o Proj	w/ Proj	w/o Proj	w/ Proj
Ward Ave/ Queen St	Eastbound	B	B	C	C
	Westbound	C	C	C	C
	Northbound	B	B	C	C
	Southbound	B	B	B	B
Queen St/ Kamakee St	Eastbound	B	B	C	C
	Westbound	A	A	B	B
	Northbound	B	B	C	C
	Southbound	B	B	C	C
Queen St/ Queen Ln	Westbound	A	A	A	A
	Northbound	B	B	B	B

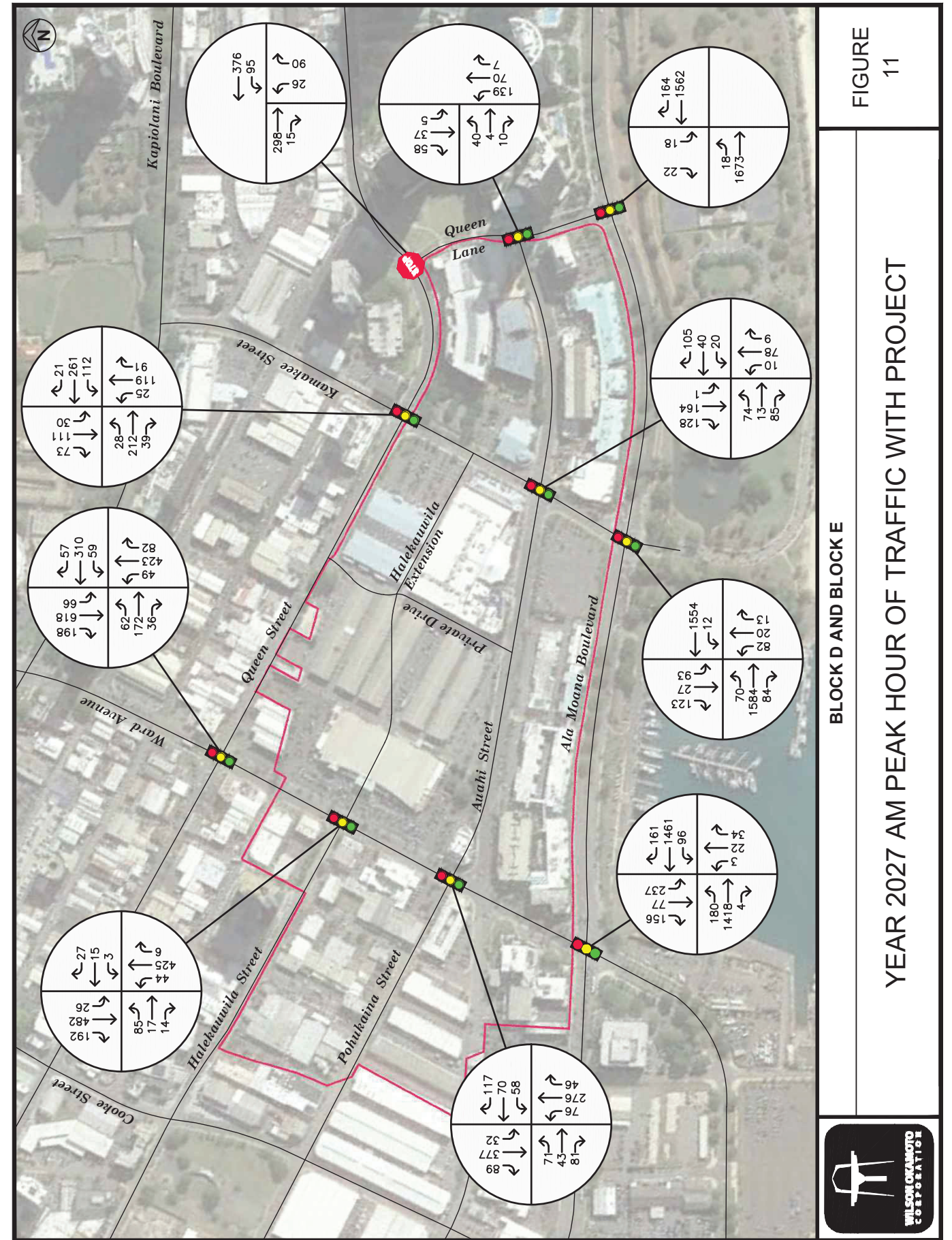
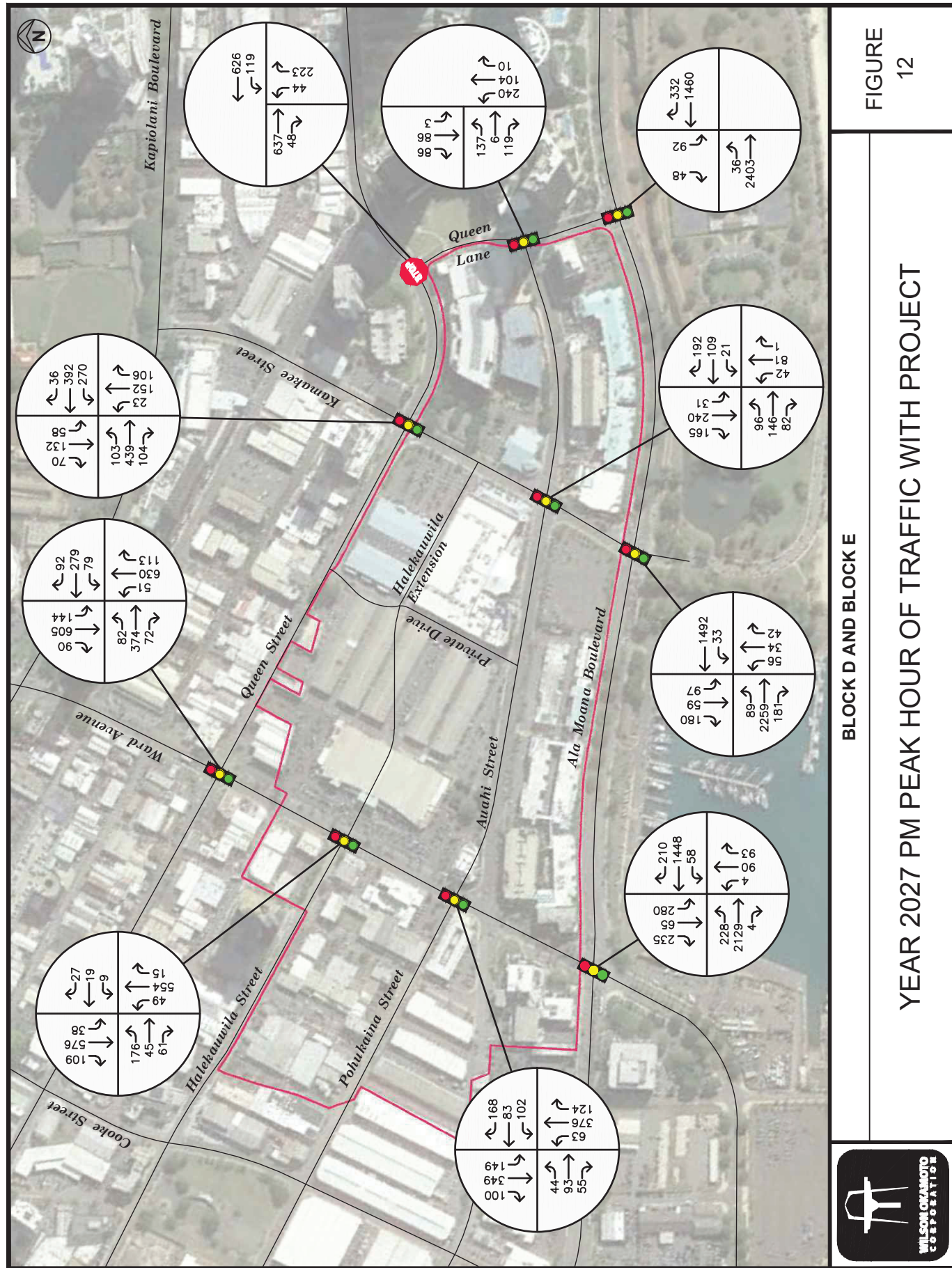


FIGURE 11

YEAR 2027 AM PEAK HOUR OF TRAFFIC WITH PROJECT

BLOCK D AND BLOCK E





**Table 5: Projected Year 2027 (Without and With Project) LOS Traffic Operating Conditions (Cont'd)**

Intersection	Approach/ Critical Movement	AM		PM	
		Year 2027		Year 2027	
		w/out Proj	w/ Proj	w/out Proj	w/ Proj
Ward Ave/ Halekauwila St	Eastbound	B	B	B	B
	Westbound	B	B	A	A
	Northbound	A	A	B	B
	Southbound	A	A	B	B
Ward Ave/ Auahi St/ Pohukaina St	Eastbound	B	B	B	B
	Westbound	B	B	B	B
	Northbound	A	A	B	B
Kamakee St/ Auahi St	Eastbound	B	B	B	C
	Westbound	B	B	B	B
	Northbound	B	B	B	B
Auahi St/ Queen Ln/ Queen St	Eastbound	B	B	B	B
	Northbound	B	B	B	B
	Southbound	B	A	B	B
Ala Moana Blvd/ Ward Ave	Eastbound	D	D	E	E
	Westbound	D	D	E	E
	Northbound	D	D	D	D
	Southbound	D	D	E	E
Ala Moana Blvd/ Kamakee St	Eastbound	B	B	C	C
	Westbound	B	B	B	B
	Northbound	C	C	D	D
	Southbound	C	C	D	D
Ala Moana Blvd/ Queen St	Eastbound	A	A	B	B
	Westbound	B	B	B	B
	Southbound	C	C	D	D

Traffic operations under Year 2027 with project conditions are generally expected to remain similar to without project conditions primarily due to an overall net reduction in trip generation from existing uses. Along Ward Avenue, traffic operations at the intersection

with Queen Street are expected to continue operating at LOS “C” or better during both peak periods, while those at the intersection with Halekauwila Street are expected to continue operating at LOS “B” or better during both peak periods. Along Kamakee Street, traffic operations at the intersections with Queen Street are expected to continue operating at LOS “B” or better during the AM peak period and LOS “C” or better during the PM peak period, while those at Auahi Street are expected to continue operating at LOS “B” during the AM peak period and LOS “C” or better during the PM peak period. At Ala Moana Boulevard, the approaches of the intersection are expected to continue operating at LOS “C” or better during the AM peak period and LOS “D” or better during the PM peak period. Traffic operations at the remaining study intersections are also anticipated to continue operating at levels of service similar to without project conditions.

## **VI. MULTIMODAL FACILITIES**

### **A. Pedestrian Facilities**

#### **1. Existing Conditions**

Improved pedestrian facilities such as sidewalks and crosswalks are currently provided along the roadways adjacent to the project site which include Auahi Street, Kamakee Street, Queen Street, and Ala Moana Boulevard. These facilities provide connections to destinations within Ward Village, as well as to the surrounding uses with pedestrian crossings facilitated via protected pedestrian phases at the signalized intersections along Auahi Street at Kamakee Street and Queen Street and along Ala Moana Boulevard, at the intersections with Kamakee Street and Queen Street. In addition, there is an existing traffic signal-controlled midblock crossing along Auahi Street between Kamakee Street and Queen Street.

#### **2. Projected Conditions**

Existing pedestrian facilities along the adjacent roadways are generally expected to be improved/maintained with the proposed project. The existing sidewalks fronting the project site along Auahi Street will be reconstructed in conjunction with the frontage improvements associated with the project, but the existing sidewalk width will be maintained. An elevated pedestrian walkway along the project frontage will also be provided running parallel to

the sidewalk. In addition, the overall pedestrian environment in the vicinity is expected to be enhanced via the addition of an open plaza adjacent to the Block D development at the corner of Auahi Street and Kamakee Street as well as trees and other landscaping treatments.

### **B. Bicycle Facilities**

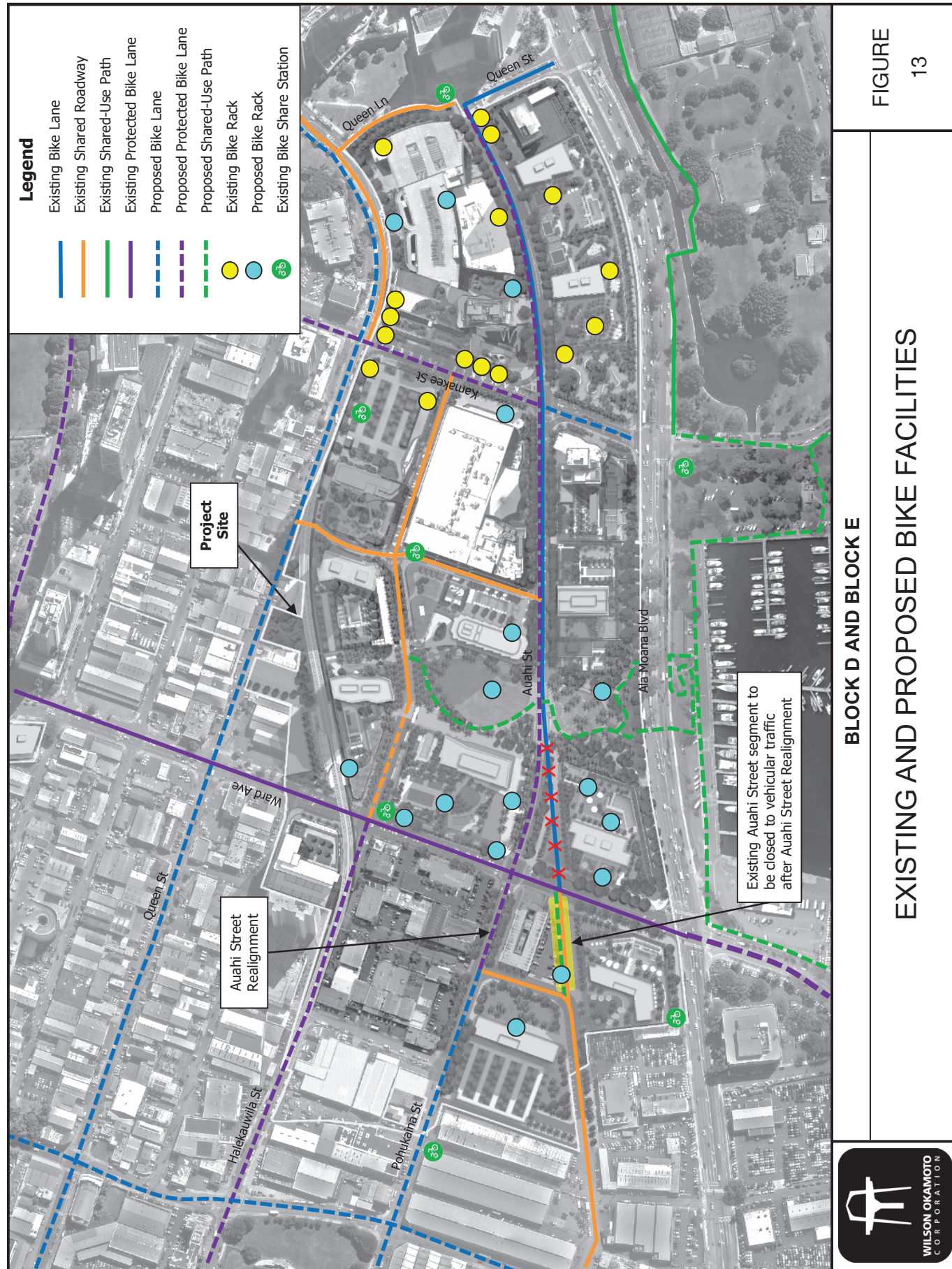
#### **1. Existing Facilities**

A number of bicycle parking areas are currently provided throughout Ward Village. In addition, the proposed Block D and Block E developments are located within close proximity to a number of BIKI bikeshare facilities, which are operated by Bikeshare Hawaii. The nearest BIKI station to the project site is located near the intersection of Auahi Street and Queen Lane with additional bike share stations located near the intersections of Kamakee Street with Ala Moana Boulevard and Kamakee Street with Queen Street.

Bicycle facilities, which generally consist of shared-use paths, bike lanes, protected bike lanes, or shared roadways with pavement markings called sharrows, are also provided in the vicinity of the project. Existing bike facilities currently include designated bike lanes along Auahi Street between Ward Avenue and Queen Street (one lane on each side of the roadway), a bike route along Queen Street east of Kamakee Street, and buffered bike lanes along Ward Avenue between Ala Moana Boulevard and South King Street. Figure 13 depicts the existing bicycle facilities in the vicinity of the proposed project.

#### **2. Bicycle Level of Traffic Stress**

Bicycle Level of Traffic Stress (LTS) is a metric developed by the Mineta Transportation Institute used to classify a roadway segment or intersection. The LTS ranking system is based on the amount of traffic stress imposed on cyclists based on variables such as street width, prevailing vehicle speed, and average daily traffic volumes. The Level of Traffic Stress ranges from 1 to 4 and can be assessed for a given segment or intersection via six tables provided by the Mineta Transportation Institute. The general descriptions of the LTS levels are as follows:



- LTS 1: Characterized by strong separation from all except low speed, low volume traffic. Simple crossings. Suitable for children.
- LTS 2: Except in low speed/low volume traffic situations, cyclists have their own place to ride that keeps them from having to interact with traffic except at formal crossings. There is a physical separation from higher speed and multilane traffic. Crossings are easy for an adult to navigate. This refers to a level of traffic stress that most adults can tolerate, particularly those sometimes classified as interested but concerned.
- LTS 3: Involves interaction with moderate speed or multilane traffic, or close proximity to higher speed traffic. Refers to a level of traffic stress acceptable to those classified as enthused and confident.
- LTS 4: Involves interaction with higher speed traffic or close proximity to high speed traffic. Refers to a level of stress acceptable only to those classified as strong and fearless.

It should be noted that current LTS methodology assumes no traffic stress is imposed on cyclists at signalized intersections. Guidance provided by the Mineta Transportation Institute includes categorizing signalized intersections as LTS 2. The LTS of the roadways in the vicinity of the proposed Block D and Block E developments are depicted in Figure 14. As shown in Figure 14, Ward Avenue is rated at LTS 2 due to the provision of buffered bike lanes along this roadway while Auahi Street is rated LTS 3. Based on the LTS ranking system, the level of traffic stress for bikes in mixed traffic increases with traffic speed and the number of lanes. Although the prevailing speeds along this roadway is within 5 miles of the posted speed limit of 25 miles per hour (mph), Auahi Street is currently comprised of 2 lanes or more with average daily traffic volumes that are greater than 3,000 vehicles per day, and as such, rated LTS 3.

**3. Projected Conditions**

The proposed project is expected to provide bicycle facilities on-site. These facilities are expected to include short- and long-term facilities for residents, guests, and employees to encourage the use of alternate modes of transportation. In addition, there are also future bike improvements planned as part of the overall Ward Village Master Plan. In conjunction with the Auahi Street Promenade project, that roadway is expected to be converted to a

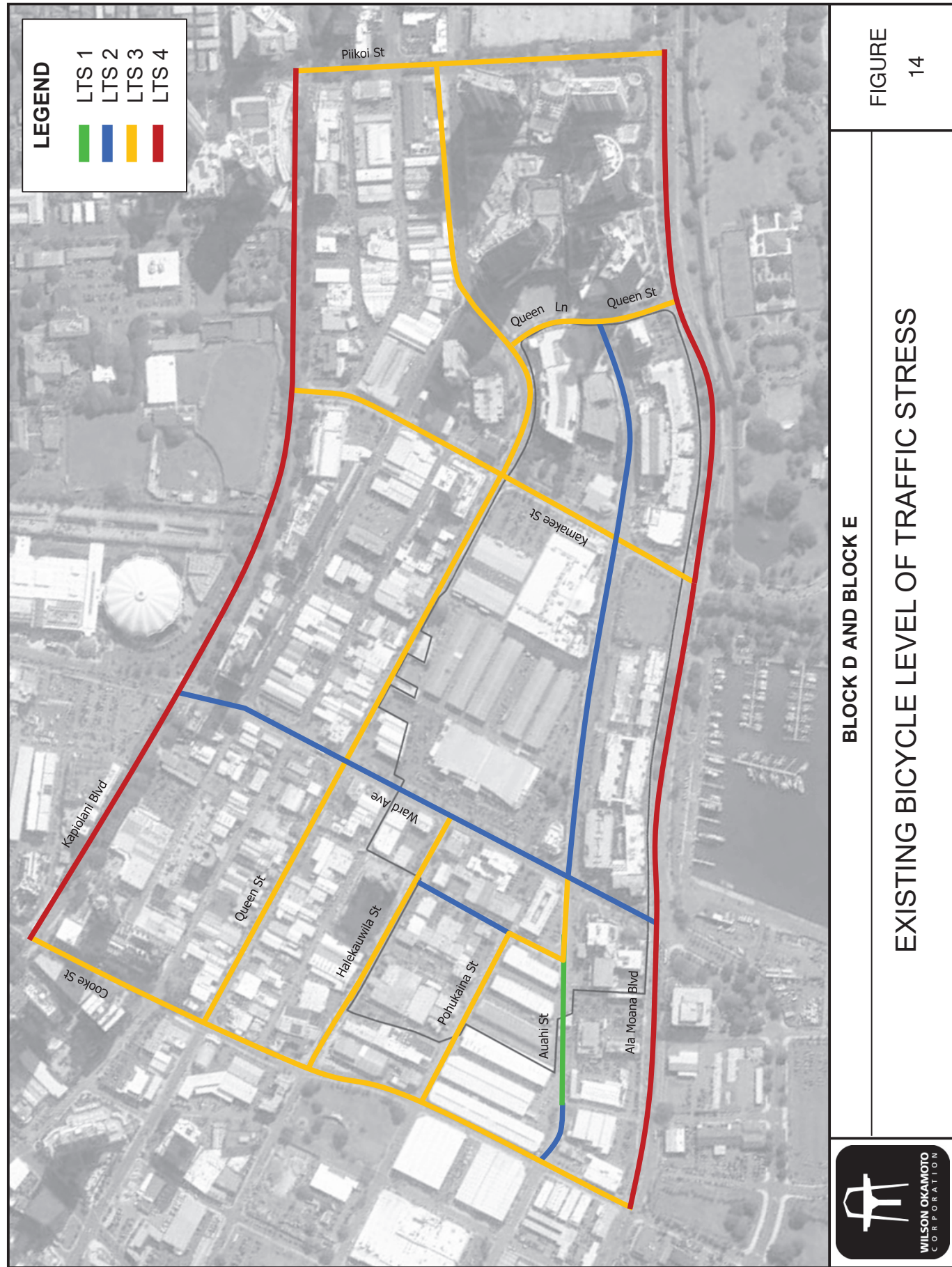


FIGURE 14

2-lane roadway to accommodate enhanced multimodal facilities with additional pavement striping installed to provide buffered bike lanes increasing the physical separation between bicyclists and vehicles. This project is expected to be completed by Year 2026.

There are also other bicycle improvements planned by the City and County of Honolulu Department Transportation Services (CCH-DTS) in the vicinity of the project as included in the Oahu Bike Plan (Updated 2019). These include the following:

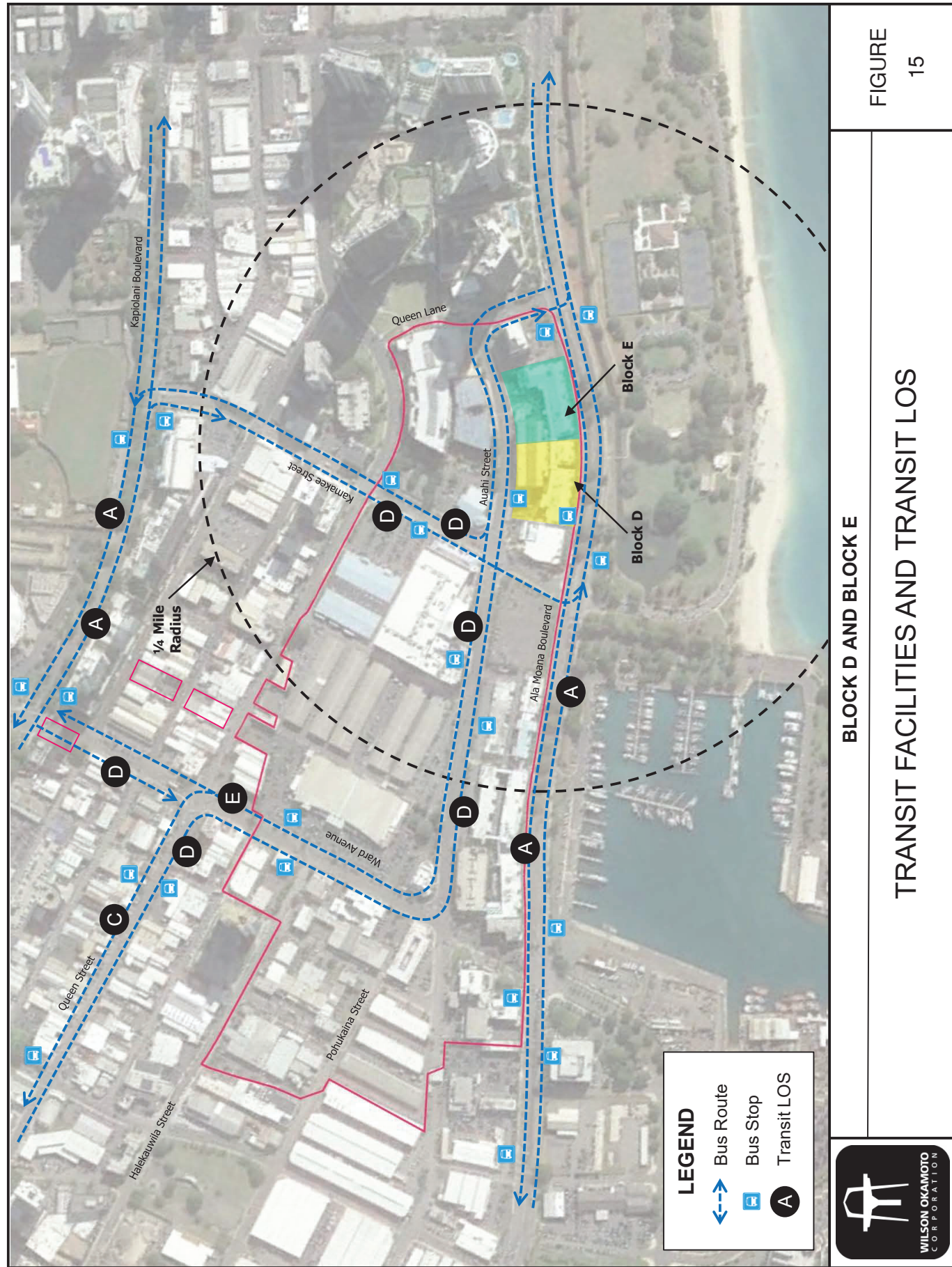
- Bike lanes along Kamakee Street between Auahi Street and Ala Moana Boulevard
- Bike lanes along Auahi Street between South Street and Ward Avenue
- Protected bike lanes along Halekauwila Street between Ala Moana Boulevard and Ward Avenue

Figure 13 depicts the future bicycle facilities in the vicinity of the project. The addition of the aforementioned bicycle facilities are expected to improve the level of traffic stress along the roadways in the project vicinity and increase bicycle connectivity; however, the time for these improvements are not known at this time.

**C. Transit Facilities**

**1. Existing Conditions**

Public transportation services in the vicinity of the project are provided by the City and County of Honolulu. These services currently consist of fixed route bus services, as well as door-to-door services for people who have difficulty accessing the fixed route services (HandiVan). The fixed route bus services in the project vicinity consist of regional routes along Ala Moana Boulevard and supplemented by local routes along Auahi Street and Kamakee Street. There are approximately 9 transit stops that are served by 9 bus routes within a quarter mile radius of the proposed project (see Figure 15). In addition to fixed bus routes, the project vicinity is also served by the Waikiki Trolley.



**2. Transit Capacity and Quality of Service Manual (TCQSM)**

Transit Capacity and Quality of Service is a metric used to measure transit availability, comfort, and convenience from both the passenger and transit service provider’s points of view. The framework for this metric is outlined in the Transit Cooperative Research Program (TCRP) Report 165: Transit Capacity and Quality of Service Manual, 3rd Edition (TCQSM) published in 2013 which provides research-based guidance on public transit capacity and quality of service. The quality of service concepts and methods contained in the TCQSM address real-world transit operations, comprehensive planning, and design needs. The research for and development of the TCQSM has also directly supported the development of the Multimodal Level of Service (LOS) analysis methodologies introduced in the Highway Capacity Manual (HCM) 2010 and subsequently refined in HCM 6. Multimodal LOS analyzes a roadway corridor comprised of street segments which are defined as a length of street between intersections where traffic may have to stop due to traffic control. Transit LOS can be directly compared to other transportation modes with LOS “A” representing the best quality of service and the letter “F” used to represent the worst quality of service. The assessment evaluates the quality of transit operations incorporating factors that bear all aspect of a transit trip including the pedestrian environment along the street, service frequency and reliability, and the availability of transit amenities at those stop locations.

**3. Transit Level of Service**

Figure 15 summarizes the existing transit LOS for the transit facilities within a quarter-mile radius of the project site. Transit LOS calculations are included in Appendix G. In general, there is good transit quality of service in the project vicinity. The project vicinity is served by a number of transit facilities that provide connections to local and regional bus routes with headways of 1 hour or less. Pedestrian facilities such as sidewalks and crosswalks facilitate access to and from these bus stop locations.

#### 4. Projected Conditions

Modifications to the existing transit facilities along Auahi Street are expected under projected conditions. In conjunction with the planned improvements along this roadway, the existing bus stops will be relocated to facilitate access to future planned developments within the Ward Village. West of Kamakee Street, the existing bus stops north and south of the roadway near the Ward Entertainment Center are expected to be relocated further west near The Park Ward Village (Block H) development and the Victoria Ward Mauka and Makai Parks. All bus and trolley stops along Auahi Street will be modified to include bus/trolley pull-in areas to facilitate through traffic along the roadway. It should be noted that although modifications are expected to these existing facilities, transit service to these bus stops are expected to remain similar to existing conditions. East of Kamakee Street, the existing bus stop along Auahi Street fronting the Block D development is also expected to be relocated. However, any modifications to bus stops in conjunction with the project will be coordinated with the Department of Transportation Services (DTS) which oversees transit service in the vicinity to ensure these modifications meet established guidelines for transit, including maximum distances between transit stops.

As previously mentioned, the City and County of Honolulu is currently developing a fixed guideway transit system that will extend from Kapolei to the central Honolulu area thereby providing an alternate mode of travel through the Kakaako area. In the vicinity of the project, the guideway alignment was originally expected to run along Halekauwila Street, cross over to Queen Street, and then follow that roadway to Waimanu Street. However, based on recent discussions about the project, a truncated project scope is now expected with an interim terminus at the Civic Center west of the Ward Village development. It should be noted that HART remains committed to completing the full scope of the project to the Ala Moana Transit Center in a subsequent phase, but the timing of the subsequent phase is unknown at this time. As such, this project was not incorporated into projected conditions.

#### VII. RECOMMENDATIONS

Based on the analysis of the traffic data, the following are the recommendations of this study to be incorporated in the project design.

1. Provide sufficient sight distance for motorists to safely enter and exit the project driveways to ensure visibility between pedestrians, bicyclists, motorists, or other users at these conflict points.
2. Provide adequate on-site loading and off-loading service areas to accommodate all anticipated vehicle types and prohibit off-site loading operations.
3. Provide adequate turn-around areas for service, delivery, and refuse collection vehicles to maneuver on-site to avoid vehicle-reversing maneuvers onto public roadways.
4. Provide sufficient turning radii at all project driveways to avoid or minimize vehicle encroachments to oncoming traffic lanes.
5. If access at the entrances to the parking areas are controlled, provide sufficient storage for entering vehicles at the parking area access controls (i.e. automatic gate, etc.) to ensure that queues do not extend onto the adjacent roadway. The layout and dimensions shall be determined during the design phase.
6. Restrict turning movements at the proposed primary project access for the Block D development along Auahi Street to right-turn in right-turn out movements only due to this driveway's proximity to Kamakee Street. Provide adequate channelization to reinforce the turning restriction. The specific configuration shall be determined during the design phase.
7. Restrict turning movements at the proposed primary access off Auahi Street for Block E to right-turn in right-turn out movements only due to this driveway's proximity to the adjacent signalized intersection with the South Shore Market/East Village Shops driveway to the west and the existing IBM building driveway to the east. Provide adequate channelization to reinforce the turning restriction. The specific configuration shall be determined during the design phase.
8. Restrict turning movements at the proposed loading/service driveway for the Block D and Block E developments along Auahi Street to right-turn in right-turn out movements only due to this driveway's proximity to an existing signalized intersection with the adjacent South Shore Market/East Village Shops. Access to this driveway should be actively managed to ensure the turning restrictions are adhered to and that there are no reversing maneuvers onto the adjacent roadways. Consideration should also be given to scheduling deliveries and other services during off peak periods when traffic volumes are less.

9. Work with the City and County of Honolulu Traffic Review Branch with regards to the proposed project access points. Modifications to traffic circulation in the vicinity as a result of the restriction of right-turns from Ala Moana Boulevard to Kamakee Street have limited and/or extended the available routes to and from the project site given the anticipated turning restrictions at the project driveways. In addition, the proposed driveways are in close proximity to an existing signalized intersection with the driveway for the adjacent South Shore Market/East Village Shops. As such, refinement of driveway connections may be needed to minimize potential vehicular conflicts and driver confusion regarding the right-of-way.
10. Provide improved pedestrian connections within the project boundaries to facilitate access to the surrounding roadways. Pedestrian facilities should be made accessible in conformance with the Americans With Disabilities Act (ADA).
11. Provide bicycle facilities within the project boundaries including designated and secured bicycle parking to encourage the use of this alternative mode of transportation. Access to these facilities should be safe, convenient, and clearly delineated, especially within the designated parking areas where conflicts with vehicular traffic are expected.
12. Update the study should development phasing, land use intensity, or land use mix change.
13. Continue to develop and/or enhance bicycle and pedestrian facilities, as well as public transportation services in the project vicinity as described in the “Transportation Master Plan and Assessment for the Ward Village Master Plan,” dated October 2022.
14. Coordinate the management of Block D and Block E with those discussed in the Ward Village TMP including the overall Transportation Demand Management (TDM) Plan.

### **VIII. CONCLUSION**

The overall Ward Village Master Plan is expected to be implemented in five (5) phases over a span of 10-15 years and entail the redevelopment of most of the existing commercial, office, and industrial spaces. Block D and Block E are part of Phase 4 of the master plan which is expected to include residential and restaurant uses. With the implementation of the aforementioned recommendations, traffic operations with the Block D and Block E developments are generally expected to remain similar to without project conditions, since the resulting project results in a net reduction in trip generation from existing conditions. The reduction in trips as result of this project is also anticipated to accommodate new trips resulting from other developments as part of the overall Ward

Village Master Plan. In addition, Victoria Ward Limited continues to work with the City and County of Honolulu to incorporate bicycle and enhanced pedestrian facilities into the development plans for the Ward Villages project to encourage alternative modes of travel and further minimize the impact of the proposed project to the surrounding roadways. However, since the Ward Village Master Plan is expected to be developed in phases over a period of 10+ years, it is recommended that Traffic Impact Analysis Reports (TIARs) continue to be prepared for each phase of the project to verify future conditions and ensure necessary mitigation measures are implemented.



APPENDIX A  
TRAFFIC COUNT DATA

Counted By: AH, GH  
Counters: D4-3889, D4-5674  
Weather: CLEAR

**Wilson Okamoto Corporation**  
1907 S. Beretania Street, Suite 400  
Honolulu, HI 96826

File Name : WAR QUE AM  
Site Code : 00000001  
Start Date : 3/7/2018  
Page No : 1

Groups Printed- Unshifted

Start Time	Ward Avenue Southbound				Queen Street Westbound				Ward Avenue Northbound				Queen Street Eastbound								
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 AM	4	131	18	0	153	1	14	1	6	22	5	21	3	1	30	5	9	10	6	30	235
06:15 AM	7	141	21	3	172	1	9	5	6	21	4	37	2	1	44	6	10	9	4	29	266
06:30 AM	3	132	28	0	163	7	25	2	6	40	10	39	6	1	56	8	19	15	6	48	307
06:45 AM	8	157	31	3	199	8	25	4	1	38	10	65	2	2	79	8	22	9	5	44	360
Total	22	561	98	6	687	17	73	12	19	121	29	162	13	5	209	27	60	43	21	151	1168
07:00 AM	7	138	47	5	197	7	37	9	11	64	7	81	11	0	99	19	17	7	12	55	415
07:15 AM	9	142	66	2	219	10	52	3	11	76	17	94	5	1	117	10	24	13	7	54	466
07:30 AM	4	171	56	4	235	17	63	0	13	93	11	97	4	8	120	9	24	15	11	59	507
07:45 AM	11	166	50	1	228	13	80	8	11	112	16	97	11	2	126	17	29	18	6	70	536
Total	31	617	219	12	879	47	232	20	46	345	51	369	31	11	482	55	94	53	36	238	1924
08:00 AM	7	166	73	5	251	12	70	8	8	98	11	86	7	2	106	14	30	11	8	63	518
08:15 AM	11	150	50	5	216	7	63	12	8	90	9	108	14	3	134	10	42	14	5	71	511
08:30 AM	7	138	34	1	180	9	36	9	2	56	21	97	7	4	129	18	33	22	4	77	442
08:45 AM	11	170	58	2	241	7	34	5	10	56	9	103	8	5	125	26	32	19	9	86	508
Total	36	624	215	13	888	35	203	34	28	300	50	394	36	14	494	68	137	66	26	297	1979
Grand Total	89	1802	532	31	2454	99	508	66	93	766	130	925	80	30	1165	150	291	162	83	686	5071
Approch %	3.6	73.4	21.7	1.3	48.4	12.9	66.3	8.6	12.1	15.1	11.2	79.4	6.9	2.6	23	21.9	42.4	23.6	12.1	13.5	
Total %	1.8	35.5	10.5	0.6		2	10	1.3	1.8		2.6	18.2	1.6	0.6		3	5.7	3.2	1.6		

Start Time	Ward Avenue Southbound				Queen Street Westbound				Ward Avenue Northbound				Queen Street Eastbound								
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:30 AM	4	171	56		231	17	63	0	80		11	97	4	112	9	24	15		48	471	
07:45 AM	11	166	50	227	231	13	80	8	101		16	97	11	124	17	29	18		64	516	
08:00 AM	7	166	73	246		12	70	8	90		11	86	7	104	14	30	11		55	495	
08:15 AM	11	150	50	211		7	63	12	82		9	108	14	131	10	42	14		66	490	
Total Volume	33	653	229	915		49	276	28	353		47	388	36	471	50	125	58		233	1972	
% App. PHF	3.6	71.4	25	.784		13.9	78.2	7.9	.874		10	82.4	7.6	.899	21.5	53.6	24.9		.883	.955	
		.750	.955	.784		.721	.863	.583	.874		.734	.898	.643	.899	.735	.744	.806				

Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Entire Intersection Begins at 07:30 AM

**Wilson Okamoto Corporation**  
1907 S. Beretania Street, Suite 400  
Honolulu, HI 96826

Counted By: AH, GH  
Counters: D4-3889, D4-5674  
Weather: CLEAR

File Name : WAR QUE PM  
Site Code : 00000001  
Start Date : 3/7/2018  
Page No : 1

Start Time	Ward Avenue Southbound						Queen Street Westbound						Ward Avenue Northbound						Queen Street Eastbound																																	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		Left		Thru		Right																							
	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	App. Total																						
03:00 PM	11	143	31	3	188	3	66	21	14	110	194	25	154	12	3	194	26	33	22	7	88	580	15	149	37	3	204	14	57	18	14	103	191	24	154	10	3	191	27	45	11	5	88	586								
03:15 PM	9	141	37	8	195	8	55	19	10	92	186	22	174	14	4	220	20	62	14	9	105	612	10	149	37	8	195	14	55	19	10	92	20	62	14	9	105	20	62	14	9	105	612									
03:30 PM	12	140	17	3	172	14	65	11	8	98	186	22	138	17	9	186	21	36	14	11	82	538	10	149	35	6	200	14	58	10	15	97	21	138	14	4	177	27	79	30	16	152	626									
03:45 PM	47	573	122	17	759	45	243	69	46	403	791	99	620	53	19	791	94	176	61	32	363	2316	52	543	118	23	736	53	231	53	42	379	61	600	72	17	750	104	289	80	49	522	2387									
04:00 PM	12	135	40	5	192	20	59	13	14	106	182	14	144	14	10	182	25	57	12	17	111	591	10	128	23	6	167	8	75	13	5	101	14	70	21	16	121	569														
04:15 PM	10	128	23	6	167	8	75	13	5	101	180	11	153	16	0	180	14	70	21	16	121	569	20	152	31	3	196	11	60	17	12	100	191	32	67	17	11	127	614													
04:30 PM	20	128	24	9	181	14	37	10	11	72	197	19	150	24	4	197	33	95	30	5	163	613	20	128	24	9	181	14	37	10	11	72	19	150	24	4	197	33	95	30	5	163	613									
04:45 PM	52	543	118	23	736	53	231	53	42	422	790	61	600	72	17	790	104	289	80	49	522	2387	52	543	118	23	736	53	231	53	42	422	69	618	82	21	790	99	340	98	52	589	2631									
05:00 PM	19	141	29	3	192	15	74	13	9	111	199	17	159	18	5	199	29	72	15	17	133	635	16	151	26	5	198	12	69	12	20	113	15	167	28	7	217	26	103	21	12	162	690									
05:15 PM	16	151	26	5	198	12	69	12	20	113	210	15	167	28	7	217	26	103	21	12	162	690	18	179	39	4	240	7	76	7	11	101	16	154	22	5	197	17	86	32	7	142	680									
05:30 PM	18	179	39	4	240	7	76	7	11	101	197	16	154	22	5	197	17	86	32	7	142	680	10	149	35	6	200	14	58	10	15	97	21	138	14	4	177	27	79	30	16	152	626									
05:45 PM	10	149	35	6	200	14	58	10	15	97	177	21	138	14	4	177	27	79	30	16	152	626	63	620	129	18	830	48	277	42	55	422	69	618	82	21	790	99	340	98	52	589	2631									
Total	63	620	129	18	830	48	277	42	55	422	790	69	618	82	21	790	99	340	98	52	589	2631	162	1736	369	58	2325	146	751	164	143	1204	229	1838	207	57	2331	297	805	239	133	1474	7334									
Grand Total	7	74.7	15.9	2.5	91.1	12.1	62.4	13.6	11.9	86.0	911	9.8	78.9	8.9	2.4	86.0	20.1	54.6	16.2	9	73.4	2334	2.2	23.7	5	0.8	31.7	2	10.2	2.2	1.9	16.4	3.1	25.1	2.8	0.8	31.8	4	11	3.3	1.8	20.1										
Approach %																																																				
Total %																																																				

Start Time	Ward Avenue Southbound						Queen Street Westbound						Ward Avenue Northbound						Queen Street Eastbound																																			
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		Left		Thru		Right																									
	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	App. Total																								
05:00 PM	19	141	29	3	192	15	74	13	9	111	199	17	159	18	5	199	29	72	15	17	133	635	16	151	26	5	198	12	69	12	20	113	15	167	28	7	217	26	103	21	12	162	690											
05:15 PM	16	151	26	5	198	12	69	12	20	113	210	15	167	28	7	217	26	103	21	12	162	690	18	179	39	4	240	7	76	7	11	101	16	154	22	5	197	17	86	32	7	142	680											
05:30 PM	18	179	39	4	240	7	76	7	11	101	197	16	154	22	5	197	17	86	32	7	142	680	10	149	35	6	200	14	58	10	15	97	21	138	14	4	177	27	79	30	16	152	626											
05:45 PM	10	149	35	6	200	14	58	10	15	97	177	21	138	14	4	177	27	79	30	16	152	626	63	620	129	18	830	48	277	42	55	422	69	618	82	21	790	99	340	98	52	589	2631											
Total	63	620	129	18	830	48	277	42	55	422	790	69	618	82	21	790	99	340	98	52	589	2631	162	1736	369	58	2325	146	751	164	143	1204	229	1838	207	57	2331	297	805	239	133	1474	7334											
Grand Total	7	74.7	15.9	2.5	91.1	12.1	62.4	13.6	11.9	86.0	911	9.8	78.9	8.9	2.4	86.0	20.1	54.6	16.2	9	73.4	2334	2.2	23.7	5	0.8	31.7	2	10.2	2.2	1.9	16.4	3.1	25.1	2.8	0.8	31.8	4	11	3.3	1.8	20.1												
Approach %																																																						
Total %																																																						

Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Entire Intersection Begins at 05:00 PM

Counted By: LF, GC  
Counters: TU-0651, TU-1958  
Weather: Clear

File Name : WarQue AM  
Site Code : 00000002  
Start Date : 8/30/2022  
Page No : 1

**Wilson Okamoto Corporation**  
1907 S. Beretania Street, Suite 400  
Honolulu HI, 96826

Start Time	Ward Avenue Southbound						Queen Street Westbound						Ward Avenue Northbound						Queen Street Eastbound																								
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		Left		Thru		Right														
	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	App. Total													
06:30 AM	14	111	20	3	148	1	12	5	4	22	42	9	25	4	4	42	8	7	7	13	35	247	14	127	30	2	173	5	29	18	0	52	3	49	6	7	65	7	14	5	5	31	321
06:45 AM	28	238	50	5	321	6	41	23	4	74	127	12	74	10	11	107	15	21	12	18	66	568	28	238	50	5	321	6	41	23	4	74	12	74	10	11	107	15	21	12	18	66	568
07:00 AM	9	87	49	4	149	6	56	18	3	83	149	2	59	8	5	74	16	22	10	10	58	364	10	112	48	6	176	9	60	15	0	84	5	78	3	11	97	15	23	6	8	52	409
07:15 AM	10	112	48	6	182	14	89	23	3	129	149	11	71	8	5	95	15	26	13	10	64	470	10	116	50	6	182	9	60	15	0	84	5	78	3	11	97	15	23	6	8	52	409
07:30 AM	17	124	61	2	204	9	60	7	2	78	149	6	68	13	5	92	22	46	5	9	82	456	17	124	61	2	204	9	60	7	2	78	6	68	13	5	92	22	46	5	9	82	456
07:45 AM	46	439	208	18	711	38	265	63																																			

**Wilson Okamoto Corporation**  
1907 S. Beretania Street, Suite 400  
Honolulu HI, 96826

Counted By: LF, GC  
Counters: TU-0651, TU-1958  
Weather: Clear

File Name : WarQue PM  
Site Code : 00000002  
Start Date : 8/30/2022  
Page No : 1

Groups Printed- Unshifted

Start Time	Ward Avenue Southbound				Queen Street Westbound				Ward Avenue Northbound				Queen Street Eastbound								
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	23	109	21	14	167	18	60	36	13	127	4	110	24	10	148	23	52	11	18	104	546
04:15 PM	34	129	22	5	190	25	79	28	2	134	7	129	18	10	164	19	77	12	12	120	608
04:30 PM	34	129	25	7	195	12	61	16	5	94	6	127	28	9	170	30	68	11	10	119	578
04:45 PM	35	102	20	7	164	15	70	24	6	115	8	102	23	14	147	17	72	15	11	115	541
Total	126	469	88	33	716	70	270	104	26	470	25	468	93	43	629	89	269	49	51	458	2273
05:00 PM	32	117	23	3	174	20	67	24	3	114	11	137	14	17	179	14	102	12	9	137	604
05:15 PM	37	111	23	13	184	15	61	36	12	124	14	149	25	16	204	21	90	20	28	159	671
05:30 PM	34	126	35	9	204	14	66	23	7	110	7	110	20	10	147	25	73	8	15	121	582
05:45 PM	30	127	16	5	178	15	61	29	5	110	5	92	17	8	122	17	67	16	10	110	520
Total	133	481	96	30	740	64	255	112	27	458	37	488	76	51	652	77	332	56	62	527	2377
Grand Total	259	950	184	63	1456	134	525	216	53	928	62	956	169	94	1281	166	601	105	113	985	4650
Apprch %	17.8	65.2	12.6	4.3		14.4	56.6	23.3	5.7		4.8	74.6	13.2	7.3		16.9	61	10.7	11.5		
Total %	5.6	20.4	4	1.4	31.3	2.9	11.3	4.6	1.1	20	1.3	20.6	3.6	2	27.5	3.6	12.9	2.3	2.4		21.2

Start Time	Ward Avenue Southbound				Queen Street Westbound				Ward Avenue Northbound				Queen Street Eastbound								
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:30 PM	34	129	25	188		12	61	16	89		6	127	28	161		30	68	11	109		547
04:45 PM	35	102	20	157		15	70	24	109		8	102	23	133		17	72	15	104		503
05:00 PM	32	117	22	171		20	67	24	111		11	137	14	162		14	102	12	128		572
05:15 PM	37	111	23	171		15	61	36	112		14	149	25	188		21	90	20	131		602
Total Volume	138	459	90	687		62	259	100	421		39	515	90	644		82	332	58	472		2224
% App. Total	20.1	66.8	13.1			14.7	61.5	23.8			6.1	80	14			17.4	70.3	12.3			
PHF	.932	.890	.900	.914		.775	.925	.694	.940		.696	.864	.804	.856		.683	.814	.725			.901

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Entire Intersection Begins at 04:30 PM

**Wilson Okamoto Corporation**  
1907 S. Beretania Street, Suite 400  
Honolulu, HI 96826

Counted By: LF, FS  
Counters: D4-5673, D4-5677  
Weather: CLEAR

File Name : WAR HAL AM  
Site Code : 00000002  
Start Date : 3/7/2018  
Page No : 1

Groups Printed- Unshifted

Start Time	Ward Avenue Southbound				Ward Avenue Northbound				Halekauwila Street Eastbound							
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 AM	1	103	47	151		15	20	3	5	43	10	1	7	6	24	218
06:15 AM	0	102	44	146		5	35	0	8	48	6	1	10	10	27	221
06:30 AM	0	95	47	142		2	48	0	12	62	9	1	6	32	48	252
06:45 AM	1	113	49	163		2	57	1	20	80	21	0	6	40	67	310
Total	2	413	187	602		24	160	4	45	233	46	3	29	88	166	1001
07:00 AM	3	94	46	143		6	78	0	17	101	22	0	10	17	49	293
07:15 AM	1	115	40	156		4	93	0	12	109	2	2	14	14	42	307
07:30 AM	3	135	56	194		3	89	2	13	107	22	1	2	15	40	341
07:45 AM	1	128	56	185		1	94	0	10	105	28	1	5	13	47	337
Total	8	472	198	678		14	354	2	52	422	96	4	19	59	178	1278
08:00 AM	2	129	42	173		4	86	1	12	103	20	1	5	14	40	316
08:15 AM	0	119	38	157		9	105	0	16	130	30	1	5	15	51	338
08:30 AM	4	105	37	146		7	107	2	10	126	15	2	11	8	36	308
08:45 AM	4	124	36	164		1	86	0	8	95	33	2	7	9	51	310
Total	10	477	153	640		21	384	3	46	454	98	6	28	46	178	1272
Grand Total	20	1362	538	1920		59	898	9	143	1109	240	13	76	193	522	3551
Apprch %	1	70.9	28			5.3	81	0.8	12.9		46	2.5	14.6	37		
Total %	0.6	38.4	15.2			1.7	25.3	0.3	4	31.2	6.8	0.4	2.1	5.4		

Start Time	Ward Avenue Southbound				Ward Avenue Northbound				Halekauwila Street Eastbound							
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:30 AM	3	135	56	194		3	89	2	94		22	1	2	25		313
07:45 AM	1	128	56	185		1	94	0	95		28	1	5	34		314
08:00 AM	2	129	42	173		4	86	1	91		20	1	5	26		290
08:15 AM	0	119	38	157		9	105	0	114		30	1	5	36		307
Total Volume	6	511	192	709		17	374	3	394		100	4	17	121		1224
% App. Total	0.8	72.1	27.1			4.3	94.9	0.8	82.6		82.6	3.3	14			
PHF	.500	.946	.857	.914		.472	.890	.375	.864		.833	1.00	.850			.975

Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Entire Intersection Begins at 07:30 AM

**Wilson Okamoto Corporation**

1907 S. Beretania Street, Suite 400  
Honolulu, HI 96826

Counted By: LF, FS  
Counters: D4-5673, D4-5677  
Weather: CLEAR

File Name : WAR HAL PM  
Site Code : 00000002  
Start Date : 3/7/2018  
Page No : 1

Start Time	Ward Avenue Southbound						Ward Avenue Northbound						Halekauwila Street Eastbound									
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total	
	03:00 PM	2	128	23	153	6	147	2	18	44	2	13	16	75	2	13	16	401	2	13	16	75
03:15 PM	2	130	29	161	6	130	2	43	39	1	11	45	96	1	11	45	438	1	11	45	96	438
03:30 PM	5	110	38	153	8	147	2	19	43	2	17	47	109	2	17	47	438	2	17	47	109	438
03:45 PM	2	126	27	155	6	109	1	18	43	2	10	14	69	2	10	14	358	2	10	14	69	358
Total	11	494	117	622	26	533	7	98	664	169	7	51	349	169	7	51	1635	169	7	51	349	1635
04:00 PM	3	119	35	157	8	109	0	25	142	46	4	9	69	46	4	9	368	46	4	9	69	368
04:15 PM	1	121	28	150	6	102	2	33	143	41	4	16	78	41	4	16	371	41	4	16	78	371
04:30 PM	5	146	20	171	5	110	2	22	139	59	1	21	99	59	1	21	409	59	1	21	99	409
04:45 PM	3	137	29	169	8	116	0	23	147	63	1	20	96	63	1	20	412	63	1	20	96	412
Total	12	523	112	647	27	437	4	103	571	209	10	66	342	209	10	66	1560	209	10	66	342	1560
05:00 PM	3	139	28	170	7	123	2	31	163	46	5	18	92	46	5	18	425	46	5	18	92	425
05:15 PM	5	159	16	180	6	115	1	13	135	81	2	20	121	81	2	20	436	81	2	20	121	436
05:30 PM	6	161	31	198	7	118	0	17	142	55	5	22	88	55	5	22	468	55	5	22	88	468
05:45 PM	2	152	42	196	5	86	1	17	109	43	4	12	75	43	4	12	380	43	4	12	75	380
Total	16	611	117	744	25	442	4	78	549	225	16	72	376	225	16	72	1669	225	16	72	376	1669
Grand Total	39	1628	346	2013	78	1412	15	279	1784	603	33	189	1067	603	33	189	4864	603	33	189	1067	4864
Approach %	1.9	80.9	17.2		4.4	79.1	0.8	15.6		56.5	3.1	17.7		5	22.7			5	22.7			
Total %	0.8	33.5	7.1	41.4	1.6	29	0.3	5.7	36.7	12.4	0.7	3.9	21.9									

Start Time	Ward Avenue Southbound						Ward Avenue Northbound						Halekauwila Street Eastbound									
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total	
	04:45 PM	3	137	29	169	8	116	0	25	142	46	4	9	69	46	4	9	368	46	4	9	69
05:00 PM	3	139	28	170	6	115	1	13	135	81	2	20	121	81	2	20	436	81	2	20	121	436
05:15 PM	5	159	16	180	7	118	0	17	142	55	5	22	88	55	5	22	468	55	5	22	88	468
05:30 PM	6	161	31	198	7	118	0	17	142	55	5	22	88	55	5	22	468	55	5	22	88	468
05:45 PM	2	152	42	196	5	86	1	17	109	43	4	12	75	43	4	12	380	43	4	12	75	380
Total	17	596	104	717	28	472	3	503	549	225	16	72	376	225	16	72	1669	225	16	72	376	1669
% App. Total	2.4	83.1	14.5		5.6	93.8	0.6			72.5	3.8	23.7										
PHF	.708	.925	.839	.905	.875	.959	.375	.953		.756	.650	.909	.820	.962								

Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Entire Intersection Begins at 04:45 PM

Counted By: MM, EV  
Counters: D4-3888, D4-5675  
Weather: CLEAR

**Wilson Okamoto Corporation**

1907 S. Beretania Street, Suite 400  
Honolulu, HI 96826

File Name : WAR AUA AM  
Site Code : 00000003  
Start Date : 3/7/2018  
Page No : 1

Start Time	Ward Avenue Southbound						Auahi Street Westbound						Ward Avenue Northbound						Auahi Street Eastbound					
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total			
	06:00 AM	29	65	5	104	5	9	8	14	36	4	30	15	2	2	2	51	2	2	5	10	19	210	
06:15 AM	28	48	8	88	3	4	10	10	27	6	26	24	10	66	2	4	4	11	21	202	202	202		
06:30 AM	17	58	5	92	11	3	9	14	37	9	35	20	3	67	2	5	8	8	23	219	219			
06:45 AM	19	78	8	108	5	8	9	7	29	14	48	12	6	80	1	9	4	8	22	239	239			
Total	93	249	26	392	24	24	36	45	129	33	139	71	21	264	7	20	21	37	85	870	870			
07:00 AM	16	63	3	85	18	11	11	8	48	19	54	5	3	81	3	9	4	5	21	235	235			
07:15 AM	12	85	14	112	11	22	15	6	54	18	69	12	2	101	4	9	7	1	21	288	288			
07:30 AM	9	105	11	128	15	14	10	6	45	18	73	6	1	98	6	5	17	2	30	301	301			
07:45 AM	15	90	12	122	26	18	14	6	64	12	75	6	3	96	3	12	7	2	24	306	306			
Total	52	343	40	447	70	65	50	26	211	67	271	29	9	376	16	35	35	10	96	1130	1130			
08:00 AM	15	85	7	112	12	17	17	5	51	11	61	13	1	86	4	6	5	5	20	269	269			
08:15 AM	18	78	8	107	13	11	11	11	46	17	69	14	0	100	4	8	3	2	17	270	270			
08:30 AM	11	67	13	97	13	8	16	3	40	19	92	12	0	123	6	18	10	3	37	297	297			
08:45 AM	18	84	11	120	11	15	9	7	42	11	67	21	3	102	5	19	6	5	35	299	299			
Total	62	314	39	436	49	51	53	26	179	58	289	60	4	411	19	51	24	15	109	1135	1135			
Grand Total	207	906	105	1275	143	140	139	97	519	158	699	160	34	1051	42	106	80	62	290	3135	3135			
Approach %	16.2	71.1	8.2	4.5	27.6	27	26.8	18.7	16.6	15	66.5	15.2	3.2		14.5	36.6	27.6	21.4						
Total %	6.6	28.9	3.3	1.8	4.6	4.5	4.4	3.1	16.6	5	22.3	5.1	1.1	33.5	1.3	3.4	2.6	2	9.3					

Start Time	Ward Avenue Southbound						Auahi Street Westbound						Ward Avenue Northbound						Auahi Street Eastbound					
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total			
	07:15 AM	12	85	14	111	11	22	15	48	18	69	12	6	99	4	9	7	20	278	278	278	278		
07:30 AM	9	105	11	125	15	14	10	39	18	73	6	6	97	6	5	17	28	289	289	289	289			
07:45 AM	15	90	12	117	26	18	14	58	12	75	6	6	93	3	12	7	22	290	290	290	290			
08:00 AM	15	85	7	107	12	17	17	46	11	61	13	85	4	6	5	15	253	253	253	253	253			
Total	51	365	44	460	64	71	56	191	59	278	37	374	17	32	36	85	1110	1110	1110	1110	1110			
% App. Total	11.1	79.3	9.6		33.5	37.2	29.3		15.8	74.3	9.9													
PHF	.850	.869	.786	.920	.615	.807	.824	.823	.823	.819	.927	.712	.944	.708	.667	.529	.759	.957						

Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Entire Intersection Begins at 07:15 AM

# Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400  
Honolulu, HI 96826

Counted By: BE, EV  
Counters: D4-3889, D4-5675  
Weather: CLEAR

File Name : WAR AUA PM  
Site Code : 00000003  
Start Date : 3/7/2018  
Page No : 1

## Groups Printed- Unshifted

Start Time	Ward Avenue Southbound					Auahi Street Westbound					Ward Avenue Northbound					Auahi Street Eastbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
03:00 PM	27	90	16	35	168	41	22	45	8	116	14	77	14	1	106	6	19	11	2	38	428
03:15 PM	26	91	16	23	156	59	14	55	13	141	11	57	15	3	86	9	19	15	4	47	430
03:30 PM	26	86	15	29	156	57	14	54	26	151	15	86	22	13	136	8	21	15	14	58	501
03:45 PM	22	83	13	5	123	29	11	41	9	90	16	63	12	4	95	9	22	13	8	52	360
Total	101	350	60	92	603	186	61	195	56	498	56	283	63	21	423	32	81	54	28	195	1719
04:00 PM	34	82	11	15	142	19	25	35	7	86	9	74	14	3	100	9	20	19	9	57	385
04:15 PM	34	87	19	11	151	27	13	33	6	79	10	77	11	3	101	7	17	9	6	39	370
04:30 PM	30	115	13	28	186	16	16	18	18	65	3	81	16	3	103	10	33	11	13	67	421
04:45 PM	40	94	12	21	167	23	12	20	16	71	6	73	17	3	99	9	22	10	7	48	385
Total	138	378	55	75	646	85	66	103	47	301	28	305	58	12	403	35	92	49	35	211	1561
05:00 PM	44	92	12	14	162	30	19	9	10	68	5	90	14	2	111	10	37	19	7	73	414
05:15 PM	33	110	11	17	171	15	17	13	7	52	15	61	17	6	99	6	33	20	4	63	385
05:30 PM	53	112	8	6	179	19	12	16	1	48	10	85	17	2	114	6	26	13	5	50	391
05:45 PM	46	99	12	16	173	16	18	32	9	75	6	49	17	0	72	4	17	13	3	37	357
Total	176	413	43	53	685	80	66	70	27	243	36	285	65	10	396	26	113	65	19	223	1547
Grand Total	415	1141	158	220	1934	351	193	368	130	1042	120	873	186	43	1222	93	286	168	82	629	4827
Approach %	21.5	59	8.2	11.4		33.7	18.5	35.3	12.5		9.8	71.4	15.2	3.5		14.8	45.5	26.7	13		
Total %	8.6	23.6	3.3	4.6	40.1	7.3	4	7.6	2.7	21.6	2.5	18.1	3.9	0.9	25.3	1.9	5.9	3.5	1.7	13	

Start Time	Ward Avenue Southbound					Auahi Street Westbound					Ward Avenue Northbound					Auahi Street Eastbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:00 PM																					
03:00 PM	27	90	16		133	41	22	45		108	14	77	14		105	6	19	11		36	382
03:15 PM	26	91	16		133	59	14	55		128	11	57	15		83	9	19	15		43	387
03:30 PM	26	86	15		127	57	14	54		125	15	86	22		123	8	21	15		44	419
03:45 PM	22	83	13		118	29	11	41		81	16	63	12		91	9	22	13		44	334
Total Volume	101	350	60		511	186	61	195		442	56	283	63		402	32	81	54		167	1522
% App. Total	19.8	68.5	11.7			42.1	13.8	44.1			13.9	70.4	15.7			19.2	48.5	32.3			
PHF	.935	.962	.938		.961	.788	.693	.886		.863	.875	.823	.716		.817	.889	.920	.900		.949	.908

Counted By: CD, SDR  
Counters: TU-2050, TU-2840  
Weather: Clear

File Name : WarAua AM  
Site Code : 00000003  
Start Date : 8/30/2022  
Page No : 1

## Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400  
Honolulu HI, 96826

## Groups Printed- Unshifted

Start Time	Ward Avenue Southbound					Auahi Street Westbound					Ward Avenue Northbound					Auahi Street Eastbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:30 AM	19	68	7	3	97	8	3	3	4	18	8	25	8	5	46	0	5	0	3	8	169
06:45 AM	18	67	4	4	93	2	1	8	10	21	12	32	19	5	68	1	3	3	3	10	192
Total	37	135	11	7	190	10	4	11	14	39	20	57	27	10	114	1	8	3	6	18	361
07:00 AM	10	56	5	2	73	10	8	4	2	24	9	39	15	1	64	2	8	4	7	21	182
07:15 AM	9	71	8	2	90	12	4	8	4	28	13	51	12	7	83	2	4	6	1	13	214
07:30 AM	7	78	10	4	99	4	8	4	3	19	12	55	12	3	82	0	2	9	4	15	215
07:45 AM	12	81	9	5	107	4	9	4	2	19	20	70	9	15	114	3	5	4	1	13	253
Total	38	286	32	13	369	30	29	20	11	90	54	215	48	26	343	7	19	23	13	62	864
08:00 AM	10	95	4	8	117	7	4	2	2	15	14	63	5	3	85	3	4	3	4	14	231
08:15 AM	17	91	9	2	119	9	7	5	5	26	6	53	9	1	69	2	6	2	2	12	226
Grand Total	102	607	56	30	795	56	44	38	32	170	94	388	89	40	611	13	37	31	25	106	1682
Approach %	12.8	76.4	7	3.8		32.9	25.9	22.4	18.8		15.4	63.5	14.6	6.5		12.3	34.9	29.2	23.6		
Total %	6.1	36.1	3.3	1.8	47.3	3.3	2.6	2.3	1.9	10.1	5.6	23.1	5.3	2.4	36.3	0.8	2.2	1.8	1.5	6.3	

Start Time	Ward Avenue Southbound					Auahi Street Westbound					Ward Avenue Northbound					Auahi Street Eastbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	7	78	10		95	4	8	4	4	16	12	55	12		79	0	2	9	11	201	
07:45 AM	12	81	9	9	102	4	9	4	4	17	20	70	9	9	99	3	5	4	4	12	230
08:00 AM	10	95	4	4	109	7	4	2	2	13	14	63	5	5	82	3	4	3	10	214	
08:15 AM	17	91	9	9	117	9	7	7	5	21	6	53	9	9	68	2	6	2	2	10	216
Total Volume	46	345	32	32	423	24	28	15	15	67	52	241	35	328	328	8	17	18	43	861	
% App. Total	10.9	81.6	7.6			35.8	41.8	22.4			15.9	73.5	10.7			18.6	39.5	41.9			
PHF	.676	.908	.800		.904	.667	.778	.750		.798	.650	.861	.729		.828	.667	.708	.500		.896	.936

**Wilson Okamoto Corporation**  
1907 S. Beretania Street, Suite 400  
Honolulu HI, 96826

Counted By: CD, LP  
Counters: TU-2050, TU-2840  
Weather: Clear

File Name : WarAua PM  
Site Code : 00000003  
Start Date : 8/30/2022  
Page No : 1

Groups Printed- Unshifted

Start Time	Ward Avenue Southbound						Auahi Street Westbound						Ward Avenue Northbound						Auahi Street Eastbound						
	Left	Thru	Right	Peds	App. Total		Left	Thru	Right	Peds	App. Total		Left	Thru	Right	Peds	App. Total		Left	Thru	Right	Peds	App. Total		
	04:00 PM	17	72	9	5	103		27	3	16	3	49		11	62	16	19	108		7	15	8	2	32	
04:15 PM	34	94	9	5	142		16	7	20	3	46		12	97	9	2	120		6	10	2	1	19		327
04:30 PM	29	78	3	9	119		20	14	21	3	58		6	84	13	7	110		2	14	14	4	34		321
04:45 PM	33	61	6	11	111		21	9	28	6	64		8	79	15	9	111		4	18	11	3	36		322
Total	113	305	27	30	475		84	33	85	15	217		37	322	53	37	449		19	57	35	10	121		1262
05:00 PM	21	76	9	15	121		25	14	32	3	74		8	70	23	19	120		6	21	11	10	48		363
05:15 PM	31	73	6	5	115		22	7	23	1	53		8	87	16	4	115		3	14	5	7	29		312
05:30 PM	28	78	7	7	120		14	15	23	5	57		6	69	21	2	98		0	16	12	7	35		310
05:45 PM	33	87	7	10	137		12	10	9	3	34		8	59	16	1	84		3	10	10	22	45		300
Total	113	314	29	37	493		73	46	87	12	218		30	285	76	26	417		12	61	38	46	157		1285
Grand Total	226	619	56	67	968		157	79	172	27	435		67	607	129	63	866		31	118	73	56	278		2547
Apprch %	23.3	63.9	5.8	6.9			36.1	18.2	39.5	6.2			7.7	70.1	14.9	7.3			11.2	42.4	26.3	20.1			
Total %	8.9	24.3	2.2	2.6	38		6.2	3.1	6.8	1.1	17.1		2.6	23.8	5.1	2.5	34		1.2	4.6	2.9	2.2			10.9

Start Time	Ward Avenue Southbound						Auahi Street Westbound						Ward Avenue Northbound						Auahi Street Eastbound						
	Left	Thru	Right	Peds	App. Total		Left	Thru	Right	Peds	App. Total		Left	Thru	Right	Peds	App. Total		Left	Thru	Right	Peds	App. Total		
	04:15 PM	34	94	9	3	137		16	7	20	43		12	97	9	9	118		6	10	2	2	18		316
04:30 PM	29	78	3	110		20	14	21	21	55		6	84	13	13	103		2	14	14	14	30		298	
04:45 PM	33	61	6	100		21	9	28	58		8	79	15	15	102		4	18	11	11	33		293		
05:00 PM	21	76	9	106		25	14	32	71		8	70	23	23	101		6	21	11	11	38		316		
Total Volume	117	309	27	453		82	44	101	227		34	330	60	60	424		18	63	38	38	119		1223		
% App. Total	25.8	68.2	6			36.1	19.4	44.5			8	77.8	14.2		15.1	52.9	31.9		15.1	52.9	31.9				
PHF	.860	.822	.750		.827		.820	.786	.789		.799		.708	.851	.652		.898		.750	.750	.679		.783		.968

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Entire Intersection Begins at 04:15 PM

Counted By: DY, YS  
Counters: D4-3890, D4-5671  
Weather: CLEAR

File Name : ALA WAR AM1  
Site Code : 00000004  
Start Date : 3/7/2018  
Page No : 1

**Wilson Okamoto Corporation**  
1907 S. Beretania Street, Suite 400  
Honolulu HI, 96826

Groups Printed- Unshifted

Start Time	Ward Avenue Southbound						Ala Moana Boulevard Westbound						Ward Avenue Northbound						Ala Moana Boulevard Eastbound						
	Left	Thru	Right	Peds	App. Total		Left	Thru	Right	Peds	App. Total		Left	Thru	Right	Peds	App. Total		Left	Thru	Right	Peds	App. Total		
	06:00 AM	36	17	15	0	68		13	157	11	5	186		0	3	3	0	6		32	206	0	4	242	
06:15 AM	21	22	9	3	55		6	188	11	5	210		0	2	4	5	11		43	231	0	3	277		553
06:30 AM	28	23	12	2	65		15	256	22	6	299		0	3	4	5	12		50	273	2	5	330		706
06:45 AM	36	30	28	1	95		15	301	29	2	347		0	4	3	1	8		61	365	1	3	430		880
Total	121	92	64	6	283		49	802	73	18	1042		0	12	14	11	37		186	1075	3	15	1279		2641
07:00 AM	44	30	28	6	108		15	343	26	4	388		0	6	12	7	25		53	352	1	5	411		932
07:15 AM	29	25	35	3	92		29	427	37	2	495		0	14	10	4	28		59	376	6	1	442		1057
07:30 AM	50	33	42	5	130		33	386	46	7	472		0	8	7	6	21		54	365	1	4	424		1047
07:45 AM	39	34	40	2	115		35	415	42	1	493		2	7	14	1	24		54	367	1	1	423		1055
Total	162	122	145	16	445		112	1571	151	14	1848		2	35	43	18	98		220	1460	9	11	1700		4091
08:00 AM	34	14	34	4	86		27	358	37	3	425		0	8	9	2	19		50	379	3	5	437		967
08:15 AM	39	42	10	3	94		24	365	47	8	444		1	15	9	2	27		53	368	1	6	428		993
08:30 AM	30	43	34	2	109		35	293	47	3	378		0	11	6	4	21		59	351	1	2	413		921
08:45 AM	30	27	32	2	91		27	291	33	4	355		0	14	15	0	29		56	336	0	2	394		869
Total	133	126	110	11	380		113	1307	164	18	1602		1	48	39	8	96		218	1434	5	15	1672		3750
Grand Total	416	340	319	33	1108		274	3780	388	50	4492		3	95	96	37	231		624	3969	17	41	4651		10482
Apprch %	37.5	30.7	28.8	3			6.1	84.1	8.6	1.1			1.3	41.1	41.6	16			13.4	85.3	0.4	0.9			
Total %	4	3.2	3	0.3	10.6		2.6	36.1	3.7	0.5	42.9		0	0.9	0.9	0.4	2.2		6	37.9	0.2	0.4			44.4

Start Time	Ward Avenue Southbound						Ala Moana Boulevard Westbound						Ward Avenue Northbound						Ala Moana Boulevard Eastbound						
	Left	Thru	Right	Peds	App. Total		Left	Thru	Right	Peds	App. Total		Left	Thru	Right	Peds	App. Total		Left	Thru	Right	Peds	App. Total		
	07:15 AM	29	25	35	3	89		29	427	37	3	493		0	14	10	10	24		59	376	6	6	441	
07:30 AM	50	33	42	4	125		33	386	46	7	465		0	8	7	7	15		54	365	1	4	420		1025
07:45 AM	39	34	40	2	113		35	415	42	4	492		2	7	14	14	23		54	367	1	1	422		1050
08:00 AM	34	14	34	3	82		27	358	37	3	422		0	8	9	9	17		50	379	3	4	432		953
Total Volume	152	106	151	11	409		124	1586	162	18	1872		2	37	40	40	79		217	1487	11	17	1715		4075
% App. Total	37.2	25.9	36.9				6.6	84.7	8.7				2.5	46.8	50.6				12.7	86.7	0.6				
PHF	.760	.779	.899		.818		.886	.929	.880		.949		.250	.661	.714		.823		.919	.981	.458		.972		.970

Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Entire Intersection Begins at 07:15 AM

# Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400  
Honolulu, HI 96826

Counted By: DY, HM  
Counters: D4-3890, D4-5671  
Weather: CLEAR

File Name : ALA WAR PM  
Site Code : 00000004  
Start Date : 3/7/2018  
Page No : 1

### Groups Printed- Unshifted

Start Time	Ward Avenue Southbound				Ala Moana Boulevard Westbound				Ward Avenue Northbound				Ala Moana Boulevard Eastbound								
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
03:00 PM	29	16	73	6	124	17	304	43	3	367	0	17	11	5	33	61	350	1	2	414	938
03:15 PM	46	10	88	13	157	12	384	35	6	437	0	21	10	8	39	47	415	0	3	465	1098
03:30 PM	49	13	94	6	162	15	330	48	3	396	2	22	23	1	48	70	439	0	2	511	1117
03:45 PM	45	20	56	4	125	8	250	102	6	366	1	18	19	5	43	40	435	1	4	480	1014
Total	169	59	311	29	568	52	1268	228	18	1566	3	78	63	19	163	218	1639	2	11	1870	4167
04:00 PM	49	10	39	5	103	5	290	49	8	352	1	18	23	10	52	45	467	0	8	520	1027
04:15 PM	47	15	44	4	110	12	346	32	7	397	1	19	28	5	53	56	469	0	5	530	1090
04:30 PM	71	19	55	6	151	13	287	81	11	392	3	32	38	3	76	45	427	2	8	482	1101
04:45 PM	48	14	54	16	132	12	311	50	6	379	1	19	34	12	66	36	498	0	10	544	1121
Total	215	58	192	31	496	42	1234	212	32	1520	6	88	123	30	247	182	1861	2	31	2076	4339
05:00 PM	68	11	63	8	150	16	279	44	15	354	4	27	51	7	89	53	366	0	2	421	1014
05:15 PM	68	20	53	8	149	13	355	51	7	426	1	34	36	10	81	35	451	0	4	490	1146
05:30 PM	63	18	56	3	140	6	309	54	6	375	0	19	26	12	57	43	486	2	3	534	1106
05:45 PM	69	11	59	5	144	10	301	37	12	360	0	16	24	10	50	43	420	0	1	464	1018
Total	268	60	231	24	583	45	1244	186	40	1515	5	96	137	39	277	174	1723	2	10	1909	4284
Grand Total	652	177	734	84	1647	139	3746	626	90	4601	14	262	323	88	687	574	5223	6	52	5855	12790
Approach %	39.6	10.7	44.6	5.1		3	81.4	13.6	2		2	38.1	47	12.8		9.8	89.2	0.1	0.9		
Total %	5.1	1.4	5.7	0.7	12.9	1.1	29.3	4.9	0.7	36	0.1	2	2.5	0.7	5.4	4.5	40.8	0	0.4	45.8	

Start Time	Ward Avenue Southbound				Ala Moana Boulevard Westbound				Ward Avenue Northbound				Ala Moana Boulevard Eastbound							
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total
04:45 PM	48	14	54	54	116	12	311	50	373	1	19	34	34	54	36	498	0	0	534	1077
05:00 PM	68	11	63	63	142	16	279	44	339	4	27	51	51	82	53	366	0	0	419	982
05:15 PM	68	20	53	53	141	13	355	51	419	1	34	36	36	71	35	451	0	0	486	1117
05:30 PM	63	18	56	56	137	6	309	54	369	0	19	26	26	45	43	486	2	2	531	1082
Total Volume	247	63	226	226	536	47	1254	199	1500	6	99	147	147	252	167	1801	2	2	1970	4258
% App. Total	46.1	11.8	42.2	42.2		3.1	83.6	13.3		2.4	39.3	58.3			8.5	91.4	0.1	0.1		
PHF	.908	.788	.897	.897	.944	.734	.883	.921	.895	.375	.728	.721		.768	.788	.904	.250		.922	.953

Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Entire Intersection Begins at 04:45 PM

Counted By: FS, GH  
Counters: D4-5672, D4-5674  
Weather: CLEAR

# Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400  
Honolulu, HI 96826

File Name : KAM AUA AM  
Site Code : 00000001  
Start Date : 3/13/2018  
Page No : 1

### Groups Printed- Unshifted

Start Time	Kamakee Street Southbound				Auahi Street Westbound				Kamakee Street Northbound				Auahi Street Eastbound								
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 AM	2	14	9	3	28	0	4	3	6	13	2	9	3	2	16	0	6	1	0	7	64
06:15 AM	2	13	13	5	33	1	9	2	2	14	7	7	1	1	16	2	5	3	2	12	75
06:30 AM	3	17	10	11	41	0	8	9	8	25	2	12	0	4	18	1	5	2	3	11	95
06:45 AM	0	18	12	7	37	0	7	7	5	19	7	17	4	6	34	8	8	2	3	21	111
Total	7	62	44	26	139	1	28	21	21	71	18	45	8	13	84	11	24	8	8	51	345
07:00 AM	2	27	21	7	57	3	15	9	5	32	7	8	2	3	20	4	12	3	4	23	132
07:15 AM	3	28	20	4	55	4	13	8	2	27	5	13	6	5	29	4	12	2	7	25	136
07:30 AM	2	25	20	5	52	4	21	9	5	39	7	13	3	5	28	1	8	4	3	16	135
07:45 AM	2	23	19	6	50	6	14	6	2	28	3	32	9	1	45	0	12	9	2	23	146
Total	9	103	80	22	214	17	63	32	14	126	22	66	20	14	122	9	44	18	16	87	549
08:00 AM	5	39	20	7	71	4	15	9	2	30	6	23	5	3	37	3	21	5	1	30	168
08:15 AM	4	37	23	8	72	0	14	9	3	26	10	18	11	7	46	3	19	1	5	28	172
08:30 AM	5	30	22	8	65	4	19	9	8	40	2	10	9	4	25	7	22	7	9	45	175
08:45 AM	7	31	21	13	72	3	12	12	12	39	3	21	3	3	30	3	29	3	4	39	180
Total	21	137	86	36	280	11	60	39	25	135	21	72	28	17	138	16	91	16	19	142	695
Grand Total	37	302	210	84	633	29	151	92	60	332	61	183	56	44	344	36	159	42	43	280	1589
Approach %	5.8	47.7	33.2	13.3		8.7	45.5	27.7	18.1		17.7	53.2	16.3	12.8		12.9	56.8	15	15.4		
Total %	2.3	19	13.2	5.3	39.8	1.8	9.5	5.8	3.8	20.9	3.8	11.5	3.5	2.8	21.6	2.3	10	2.6	2.7	17.6	

Start Time	Kamakee Street Southbound				Auahi Street Westbound				Kamakee Street Northbound				Auahi Street Eastbound								
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
08:00 AM	5	39	20	20	64	4	15	9	9	28	6	23	5	5	34	3	21	5	5	29	155
08:15 AM	4	37	23	23	64	0	14	9	9	23	10	18	11	11	39	3	19	1	1	23	149
08:30 AM	5	30	22	8	57	4	19	9	9	32	2	10	9	9	21	7	22	7	7	36	146
08:45 AM	7	31	21	13	59	3	12	12	12	27	3	21	3	3	27	3	29	3	4	35	148
Total Volume	21	137	86	36	244	11	60	39	25	110	21	72	28	28	121	16	91	16	19	123	598
% App. Total	8.6	56.1	35.2	13.2		10	54.5	35.5	23.1		17.4	59.5	23.1		.776	13	74	13			
PHF	.750	.878	.935	.935	.953	.688	.789	.813	.859	.859	.525	.783	.636		.776	.571	.784	.571		.854	.965

Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Entire Intersection Begins at 08:00 AM

# Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400  
Honolulu, HI 96826

Counted By: FS, GH  
Counters: D4-5672, D4-5674  
Weather: CLEAR

File Name : KAM AUA PM  
Site Code : 00000001  
Start Date : 3/13/2018  
Page No : 1

Groups Printed- Unshifted

Start Time	Kamakee Street Southbound				Auahi Street Westbound				Kamakee Street Northbound				Auahi Street Eastbound								
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
03:00 PM	7	49	24	31	111	13	27	17	24	81	7	17	11	25	60	6	56	5	20	87	339
03:15 PM	11	38	20	39	108	8	30	18	29	85	9	18	11	23	61	12	37	13	25	87	341
03:30 PM	10	30	23	24	87	10	27	15	23	75	5	17	6	23	51	13	53	6	6	78	291
03:45 PM	7	19	16	29	71	6	26	12	17	61	5	14	8	13	40	14	56	7	9	86	258
<b>Total</b>	<b>35</b>	<b>136</b>	<b>83</b>	<b>123</b>	<b>377</b>	<b>37</b>	<b>110</b>	<b>62</b>	<b>93</b>	<b>302</b>	<b>26</b>	<b>66</b>	<b>36</b>	<b>84</b>	<b>212</b>	<b>45</b>	<b>202</b>	<b>31</b>	<b>60</b>	<b>338</b>	<b>1229</b>
04:00 PM	10	29	19	38	96	5	23	5	20	53	4	21	8	11	44	15	44	4	14	77	270
04:15 PM	8	36	20	31	95	8	39	10	24	81	7	17	7	24	55	7	56	6	17	86	317
04:30 PM	19	42	14	60	135	9	31	5	48	93	9	15	12	15	51	15	48	11	14	88	367
04:45 PM	11	38	16	22	87	6	35	8	5	54	13	21	8	23	65	14	54	7	15	90	296
<b>Total</b>	<b>48</b>	<b>145</b>	<b>69</b>	<b>151</b>	<b>413</b>	<b>28</b>	<b>128</b>	<b>28</b>	<b>97</b>	<b>281</b>	<b>33</b>	<b>74</b>	<b>35</b>	<b>73</b>	<b>215</b>	<b>51</b>	<b>202</b>	<b>28</b>	<b>60</b>	<b>341</b>	<b>1250</b>
05:00 PM	12	29	16	27	84	9	31	10	37	87	10	15	14	36	75	15	54	9	19	97	343
05:15 PM	18	30	16	46	110	7	24	8	26	65	7	15	12	18	52	14	58	8	18	98	325
05:30 PM	16	29	14	32	91	6	21	10	18	55	8	15	14	23	60	8	70	9	24	111	317
05:45 PM	16	39	18	43	116	9	24	10	24	67	5	16	11	28	60	12	69	3	18	102	345
<b>Total</b>	<b>62</b>	<b>227</b>	<b>64</b>	<b>148</b>	<b>401</b>	<b>31</b>	<b>100</b>	<b>38</b>	<b>105</b>	<b>274</b>	<b>30</b>	<b>61</b>	<b>51</b>	<b>105</b>	<b>247</b>	<b>49</b>	<b>251</b>	<b>29</b>	<b>79</b>	<b>408</b>	<b>1330</b>
<b>Grand Total</b>	<b>145</b>	<b>408</b>	<b>216</b>	<b>422</b>	<b>1191</b>	<b>96</b>	<b>338</b>	<b>128</b>	<b>295</b>	<b>857</b>	<b>89</b>	<b>201</b>	<b>122</b>	<b>262</b>	<b>674</b>	<b>145</b>	<b>655</b>	<b>88</b>	<b>199</b>	<b>1087</b>	<b>3809</b>
<b>Approch %</b>	<b>12.2</b>	<b>34.3</b>	<b>18.1</b>	<b>35.4</b>		<b>11.2</b>	<b>39.4</b>	<b>14.9</b>	<b>34.4</b>		<b>13.2</b>	<b>29.8</b>	<b>18.1</b>	<b>38.9</b>		<b>13.3</b>	<b>60.3</b>	<b>8.1</b>	<b>18.3</b>		
<b>Total %</b>	<b>3.8</b>	<b>10.7</b>	<b>5.7</b>	<b>11.1</b>	<b>31.3</b>	<b>2.5</b>	<b>8.9</b>	<b>3.4</b>	<b>7.7</b>	<b>22.5</b>	<b>2.3</b>	<b>5.3</b>	<b>3.2</b>	<b>6.9</b>	<b>17.7</b>	<b>3.8</b>	<b>17.2</b>	<b>2.3</b>	<b>5.2</b>		<b>28.5</b>

Start Time	Kamakee Street Southbound				Auahi Street Westbound				Kamakee Street Northbound				Auahi Street Eastbound								
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	8	36	20	36	64	8	39	10	10	57	7	17	7	7	31	7	56	6	6	69	221
04:30 PM	19	42	14	32	75	9	31	5	5	45	9	15	12	12	36	15	48	11	74	230	
04:45 PM	11	38	16	36	65	6	35	8	8	49	13	21	8	8	42	14	54	7	75	231	
05:00 PM	12	29	16	36	57	9	31	10	10	50	10	15	14	14	39	15	54	9	78	224	
<b>Total Volume</b>	<b>50</b>	<b>145</b>	<b>66</b>	<b>66</b>	<b>261</b>	<b>32</b>	<b>136</b>	<b>33</b>	<b>33</b>	<b>201</b>	<b>39</b>	<b>68</b>	<b>41</b>	<b>148</b>	<b>148</b>	<b>51</b>	<b>212</b>	<b>33</b>	<b>296</b>	<b>906</b>	
<b>% App. Total</b>	<b>19.2</b>	<b>55.6</b>	<b>25.3</b>			<b>15.9</b>	<b>67.7</b>	<b>16.4</b>		<b>26.4</b>	<b>45.9</b>	<b>27.7</b>		<b>17.2</b>	<b>71.6</b>	<b>11.1</b>					
<b>PHF</b>	<b>.658</b>	<b>.863</b>	<b>.825</b>		<b>.870</b>	<b>.889</b>	<b>.872</b>	<b>.825</b>		<b>.882</b>	<b>.750</b>	<b>.810</b>	<b>.732</b>		<b>.881</b>	<b>.850</b>	<b>.946</b>	<b>.750</b>		<b>.949</b>	<b>.981</b>

# Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400  
Honolulu HI, 96826

Counted By: CD, MA  
Counters: TU-2049, TU-2605  
Weather: Clear

File Name : KamAua AM  
Site Code : 00000005  
Start Date : 8/31/2022  
Page No : 1

Groups Printed- Unshifted

Start Time	Kamakee Street Southbound				Auahi Street Westbound				Kamakee Street Northbound				Auahi Street Eastbound								
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:30 AM	3	20	7	12	42	0	3	1	11	15	3	11	5	9	28	2	8	4	9	23	108
06:45 AM	0	11	5	5	21	5	7	11	15	38	4	22	1	24	51	6	12	3	2	23	133
<b>Total</b>	<b>3</b>	<b>31</b>	<b>12</b>	<b>17</b>	<b>63</b>	<b>5</b>	<b>10</b>	<b>12</b>	<b>26</b>	<b>53</b>	<b>7</b>	<b>33</b>	<b>6</b>	<b>33</b>	<b>79</b>	<b>8</b>	<b>20</b>	<b>7</b>	<b>11</b>	<b>46</b>	<b>241</b>
07:00 AM	3	19	7	4	33	2	9	15	11	37	3	22	3	6	34	7	6	6	2	21	125
07:15 AM	4	28	7	20	59	7	4	19	17	47	1	17	7	4	29	2	7	0	1	10	145
07:30 AM	5	36	2	13	56	2	6	16	14	38	1	25	8	4	38	5	15	0	9	29	161
07:45 AM	4	34	7	7	52	6	7	14	13	40	0	22	5	16	43	6	16	3	17	42	177
<b>Total</b>	<b>16</b>	<b>117</b>	<b>23</b>	<b>44</b>	<b>200</b>	<b>17</b>	<b>26</b>	<b>64</b>	<b>55</b>	<b>162</b>	<b>5</b>	<b>86</b>	<b>23</b>	<b>30</b>	<b>144</b>	<b>20</b>	<b>44</b>	<b>9</b>	<b>29</b>	<b>102</b>	<b>608</b>
08:00 AM	6	30	6	4	46	7	6	11	23	47	1	30	10	9	50	2	19	3	15	39	182
08:15 AM	12	29	7	9	57	6	7	8	19	40	2	29	9	4	44	3	9	4	8	24	165
<b>Grand Total</b>	<b>37</b>	<b>207</b>	<b>48</b>	<b>74</b>	<b>366</b>	<b>35</b>	<b>49</b>	<b>95</b>	<b>123</b>	<b>302</b>	<b>15</b>	<b>178</b>	<b>48</b>	<b>76</b>	<b>317</b>	<b>33</b>	<b>92</b>	<b>23</b>	<b>63</b>	<b>211</b>	<b>1196</b>
<b>Approch %</b>	<b>10.1</b>	<b>56.6</b>	<b>13.1</b>	<b>20.2</b>		<b>11.6</b>	<b>16.2</b>	<b>31.5</b>	<b>40.7</b>		<b>4.7</b>	<b>56.2</b>	<b>15.1</b>	<b>24</b>	<b>24</b>	<b>15.6</b>	<b>43.6</b>	<b>10.9</b>	<b>29.9</b>		
<b>Total %</b>	<b>3.1</b>	<b>17.3</b>	<b>4</b>	<b>6.2</b>	<b>30.6</b>	<b>2.9</b>	<b>4.1</b>	<b>7.9</b>	<b>10.3</b>	<b>25.3</b>	<b>1.3</b>	<b>14.9</b>	<b>4</b>	<b>6.4</b>	<b>26.5</b>	<b>2.8</b>	<b>7.7</b>	<b>1.9</b>	<b>5.3</b>		<b>17.6</b>

Start Time	Kamakee Street Southbound				Auahi Street Westbound				Kamakee Street Northbound				Auahi Street Eastbound								
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	5	36	2	2	43	2	6	16	16	24	1	25	8	8	34	5	15	0	3	20	121
07:45 AM	4	34	7	7	45	6	7	14	14	27	0	22	5	5	27	6	16	3	3	25	124
08:00 AM	6	30	6	6	42	7	6	11	11	24	1	30	10	4	41	2	19	3	24	131	
08:15 AM	12	29	7	7	48	6	7	8	8	21	2	29	9	9	40	3	9	4	4	16	125
<b>Total Volume</b>	<b>27</b>	<b>129</b>	<b>22</b>	<b>178</b>	<b>178</b>	<b>21</b>	<b>26</b>	<b>49</b>	<b>96</b>	<b>96</b>	<b>4</b>	<b>106</b>	<b>32</b>	<b>142</b>	<b>142</b>	<b>16</b>	<b>59</b>	<b>10</b>	<b>85</b>	<b>501</b>	
<b>% App. Total</b>	<b>15.2</b>	<b>72.5</b>	<b>12.4</b>			<b>21.9</b>	<b>27.1</b>	<b>51</b>	<b>51</b>	<b>25.3</b>	<b>2.8</b>	<b>74.6</b>	<b>22.5</b>	<b>4</b>	<b>6.4</b>	<b>18.8</b>	<b>69.4</b>	<b>11.8</b>	<b>29.9</b>		<b>501</b>
<b>PHF</b>	<b>.563</b>	<b>.896</b>	<b>.786</b>		<b>.927</b>	<b>.750</b>	<b>.929</b>	<b>.766</b>		<b>.889</b>	<b>.500</b>	<b>.883</b>	<b>.800</b>		<b>.866</b>	<b>.667</b>	<b>.776</b>	<b>.625</b>		<b>.850</b>	<b>.956</b>



**Wilson Okamoto Corporation**  
1907 S. Beretania Street, Suite 400  
Honolulu HI, 96826

Counted By: CD, LP  
Counters: TU-2049, TU-2605  
Weather: Clear

File Name : KamAua PM  
Site Code : 00000005  
Start Date : 8/31/2022  
Page No : 1

Groups Printed- Unshifted

Start Time	Kamakee Street Southbound					Auahi Street Westbound					Kamakee Street Northbound					Auahi Street Eastbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	13	58	14	26	111	4	14	16	16	50	3	24	18	21	66	8	22	1	18	49	276
04:15 PM	8	47	18	16	89	9	15	17	20	61	6	39	7	17	69	7	21	5	25	58	277
04:30 PM	17	59	19	18	113	5	20	18	17	60	6	32	8	10	56	7	37	4	20	68	297
04:45 PM	8	45	15	22	90	9	13	20	20	62	5	29	5	15	54	13	34	6	25	78	284
Total	46	209	66	82	403	27	62	71	73	233	20	124	38	63	245	35	114	16	88	253	1134
05:00 PM	16	64	13	11	104	4	19	14	29	66	9	42	14	25	90	20	40	6	17	83	343
05:15 PM	5	45	10	19	79	5	21	20	29	75	6	52	8	31	97	11	44	6	25	86	337
05:30 PM	16	56	15	24	111	6	16	22	26	70	6	45	17	30	89	17	30	10	32	89	359
05:45 PM	11	45	10	29	95	5	16	10	16	47	6	41	7	23	77	7	24	3	42	76	295
Total	48	210	48	83	389	20	72	66	100	258	27	180	46	100	353	55	138	25	116	334	1334
Grand Total	94	419	114	165	792	47	134	137	173	491	47	304	84	163	598	90	252	41	204	587	2468
Apprch %	11.9	52.9	14.4	20.8		9.6	27.3	27.9	35.2	19.9	7.9	50.8	14	27.3		15.3	42.9	7	34.8		
Total %	3.8	17	4.6	6.7	32.1	1.9	5.4	5.6	7	19.9	1.9	12.3	3.4	6.6	24.2	3.6	10.2	1.7	8.3		23.8

Start Time	Kamakee Street Southbound					Auahi Street Westbound					Kamakee Street Northbound					Auahi Street Eastbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:45 PM	8	45	15	15	68	9	13	20	20	42	5	29	5	5	39	13	34	6	6	53	202
05:00 PM	16	64	13	13	93	4	19	14	14	37	9	42	14	14	65	20	40	6	6	66	261
05:15 PM	5	45	10	10	60	5	21	20	20	46	6	52	8	8	66	11	44	6	6	61	233
05:30 PM	16	56	15	15	87	6	16	22	22	44	6	45	17	30	89	17	30	10	32	89	359
Total Volume	45	210	53	53	308	24	69	76	76	169	26	168	44	44	238	61	148	28	28	237	952
% App. Total	14.6	68.2	17.2	17.2		14.2	40.8	45	45		10.9	70.6	18.5	18.5		25.7	62.4	11.8	11.8		
PHF	.703	.820	.883	.883	.828	.667	.821	.864	.864	.918	.722	.808	.647	.647	.875	.763	.841	.700	.700	.898	.912

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Entire Intersection Begins at 04:45 PM

**Wilson Okamoto Corporation**  
1907 S. Beretania Street, Suite 400  
Honolulu, HI 96826

Counted By: EV, YS  
Counters: D4-5675, D4-3889  
Weather: CLEAR

File Name : QUE KAM AM  
Site Code : 00000003  
Start Date : 3/13/2018  
Page No : 1

Groups Printed- Unshifted

Start Time	Kamakee Street Southbound					Queen Street Westbound					Kamakee Street Northbound					Queen Street Eastbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 AM	5	17	2	0	24	6	2	0	0	8	3	6	0	2	11	2	13	2	1	18	61
06:15 AM	7	15	7	0	29	11	8	1	1	21	1	5	0	0	6	5	11	2	4	22	78
06:30 AM	5	20	6	1	32	4	18	0	2	24	3	7	8	1	19	1	12	4	4	21	96
06:45 AM	2	22	15	0	39	8	16	4	2	30	5	15	5	2	27	2	19	3	5	29	125
Total	19	74	30	1	124	29	44	5	5	83	12	33	13	5	63	10	55	11	14	90	360
07:00 AM	4	32	9	1	46	21	46	1	1	69	1	13	6	1	21	3	14	4	3	24	160
07:15 AM	4	31	14	0	49	17	58	6	0	81	1	20	4	1	26	3	20	6	3	32	188
07:30 AM	4	24	23	2	53	12	84	5	1	102	4	14	1	2	21	3	36	6	9	54	230
07:45 AM	6	23	17	1	47	27	79	3	2	111	4	25	6	1	36	3	19	4	4	30	224
Total	18	110	63	4	195	77	267	15	4	363	10	72	17	5	104	12	89	20	19	140	802
08:00 AM	4	33	10	5	52	31	66	11	1	109	0	9	11	2	22	1	46	5	3	55	238
08:15 AM	6	28	12	4	50	26	44	4	1	75	10	17	8	5	40	3	42	10	3	58	223
08:30 AM	7	25	14	6	52	23	33	5	0	61	6	7	10	12	35	1	37	10	0	48	196
08:45 AM	14	28	8	9	59	21	30	4	1	56	3	5	7	5	20	7	37	7	2	53	188
Total	31	114	44	24	213	101	173	24	3	301	19	38	36	24	117	12	162	32	8	214	845
Grand Total	68	298	137	29	532	207	484	44	12	747	41	143	66	34	284	34	306	63	41	444	2007
Apprch %	12.8	56	25.8	5.5		27.7	64.8	5.9	1.6		14.4	50.4	23.2	12		7.7	68.9	14.2	9.2		
Total %	3.4	14.8	6.8	1.4	26.5	10.3	24.1	2.2	0.6	37.2	2	7.1	3.3	1.7	14.2	1.7	15.2	3.1	2	22.1	

Start Time	Kamakee Street Southbound					Queen Street Westbound					Kamakee Street Northbound					Queen Street Eastbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:30 AM	4	24	23	0	51	12	84	5	5	101	4	14	1	1	19	3	36	6	6	45	216
07:45 AM	6	23	17	46	92	27	79	3	3	109	4	25	6	6	35	3	19	4	4	26	216
08:00 AM	4	33	10	10	47	31	66	11	11	108	0	9	11	11	20	1	46	5	5	52	227
08:15 AM	6	28	12	12	46	26	44	4	4	74	10	17	8	8	35	3	42	10	5	55	210
Total Volume	20	108	62	62	190	96	273	23	23	392	18	65	26	26	109	10	143	25	178	869	
% App. Total	10.5	56.8	32.6	32.6		24.5	69.6	5.9	5.9		16.5	59.6	23.9	23.9		5.6	80.3	14	14		
PHF	.833	.818	.674	.674	.931	.774	.813	.523	.523	.899	.450	.650	.591	.591	.779	.833	.777	.625	.625	.809	.957



**Wilson Okamoto Corporation**

1907 S. Beretania Street, Suite 400  
Honolulu HI, 96826

Counted By: GC, LF  
Counters: TU-2606, TU-0654  
Weather: Clear

File Name : KamQue PM  
Site Code : 00000004  
Start Date : 8/31/2022  
Page No : 1

Groups Printed- Unshifted

Start Time	Kamakee Street Southbound				Queen Street Westbound				Kamakee Street Northbound				Queen Street Eastbound								
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	9	24	20	4	57	43	76	15	18	152	6	30	10	29	75	23	108	12	38	181	465
04:15 PM	16	26	10	0	52	25	76	13	8	122	3	35	19	12	69	16	68	15	23	122	365
04:30 PM	10	31	23	3	67	38	83	9	9	139	9	37	14	33	93	20	89	30	49	188	487
04:45 PM	19	24	14	6	63	35	93	11	12	151	8	29	16	38	91	25	115	15	35	190	495
Total	54	105	67	13	239	141	328	48	47	564	26	131	59	112	328	84	380	72	145	681	1812
05:00 PM	16	31	13	4	64	34	87	11	17	149	3	24	22	38	87	33	100	29	43	205	505
05:15 PM	18	26	14	12	70	49	85	10	10	154	3	32	19	35	89	19	84	13	32	148	461
05:30 PM	15	29	14	3	61	29	60	8	3	100	13	46	24	26	109	22	84	23	48	177	447
05:45 PM	9	21	21	4	55	29	64	11	11	115	2	23	7	32	64	17	88	19	48	172	406
Total	58	107	62	23	250	141	296	40	41	518	21	125	72	131	349	91	356	84	171	702	1819
Grand Total	112	212	129	36	489	282	624	88	88	1082	47	256	131	243	677	175	736	156	316	1383	3631
Apprch %	22.9	43.4	26.4	7.4		26.1	57.7	8.1	8.1		6.9	37.8	19.4	35.9		12.7	53.2	11.3	22.8		
Total %	3.1	5.8	3.6	1	13.5	7.8	17.2	2.4	2.4	29.8	1.3	7.1	3.6	6.7	18.6	4.8	20.3	4.3	8.7		38.1

Start Time	Kamakee Street Southbound				Queen Street Westbound				Kamakee Street Northbound				Queen Street Eastbound								
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:30 PM	10	31	23		64	38	83	9	9	130	9	37	14	14	60	20	89	30	30	139	393
04:45 PM	19	24	14		57	35	93	11	11	139	8	29	16	16	53	25	115	15	15	155	404
05:00 PM	16	31	13		60	34	87	11	11	132	3	24	22	22	49	33	100	29	29	162	403
05:15 PM	18	26	14		58	49	85	10	10	144	3	32	19	19	54	19	84	13	13	116	372
Total Volume	63	112	64		239	156	348	41	41	545	23	122	71	71	216	97	388	87	87	572	1572
% App. Total	26.4	46.9	26.8			28.6	63.9	7.5	7.5		10.6	56.5	32.9	32.9		17	67.8	15.2	15.2		
PHF	.829	.903	.696		.934	.796	.935	.932	.932	.946	.639	.824	.807	.807	.900	.735	.843	.725	.725	.883	.973

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Entire Intersection Begins at 04:30 PM

**Wilson Okamoto Corporation**

1907 S. Beretania Street, Suite 400  
Honolulu, HI 96826

Counted By: DY  
Counters: D4-5671  
Weather: CLEAR

File Name : QUE QUE AM  
Site Code : 00000004  
Start Date : 3/13/2018  
Page No : 1

Groups Printed- Unshifted

Start Time	Queen Street Westbound				Queens Lane Northbound				Queen Street Eastbound						
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total
06:00 AM	1	22	23		23	0	5	5	10	10	19	2	2	21	54
06:15 AM	10	26	36		36	2	4	2	8	4	12	4	4	16	60
06:30 AM	9	28	37		37	4	7	1	12	16	16	3	3	19	68
06:45 AM	11	38	49		49	7	11	7	25	25	19	3	3	22	96
Total	31	114	145		145	13	27	15	55	55	66	12	12	78	278
07:00 AM	9	63	72		72	4	12	2	18	18	29	1	1	30	120
07:15 AM	16	79	95		95	10	16	3	29	35	35	4	4	39	163
07:30 AM	20	83	103		103	3	16	6	25	40	40	3	3	43	171
07:45 AM	30	80	110		110	12	25	2	39	27	27	5	5	32	181
Total	75	305	380		380	29	69	13	111	131	131	13	13	144	635
08:00 AM	24	91	115		115	7	22	1	30	30	56	2	2	58	203
08:15 AM	18	73	91		91	6	22	3	31	31	50	3	3	53	175
08:30 AM	20	70	90		90	5	25	2	32	47	47	5	5	52	174
08:45 AM	20	62	82		82	11	25	6	42	46	46	3	3	49	173
Total	82	296	378		378	29	94	12	135	199	199	13	13	212	725
Grand Total	188	715	903		903	71	190	40	301	396	396	38	38	434	1638
Apprch %	20.8	79.2				23.6	63.1	13.3			91.2	8.8	8.8		
Total %	11.5	43.7	55.1			4.3	11.6	2.4	18.4	24.2	24.2	2.3	2.3	26.5	

Start Time	Queen Street Westbound				Queens Lane Northbound				Queen Street Eastbound						
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total
07:45 AM	30	80	110		110	12	25	5	37	37	27	5	5	32	179
08:00 AM	24	91	115		115	7	22	28	29	56	56	2	2	58	202
08:15 AM	18	73	91		91	6	22	3	28	50	50	3	3	53	172
08:30 AM	20	70	90		90	5	25	2	30	47	47	5	5	52	172
Total Volume	92	314	406		406	30	94	15	124	180	180	15	15	195	725
% App. Total	22.7	77.3				24.2	75.8	7.7		92.3	92.3	7.7	7.7		
PHF	.767	.863	.883		.883	.625	.940	.838	.838	.804	.804	.750	.750	.841	.897

Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Entire Intersection Begins at 07:45 AM

**Wilson Okamoto Corporation**  
1907 S. Beretania Street, Suite 400  
Honolulu, HI 96826

Counted By: DY  
Counters: D4-5671  
Weather: CLEAR

File Name : QUE QUE PM  
Site Code : 00000004  
Start Date : 3/13/2018  
Page No : 1

Groups Printed- Unshifted

Start Time	Queen Street Westbound			Queens Lane Northbound			Queen Street Eastbound			Int. Total	
	Left	Thru	App. Total	Left	Thru	App. Total	Left	Thru	App. Total		
03:00 PM	28	108	136	8	41	49	55	94	11	105	296
03:15 PM	24	106	130	6	42	48	59	103	14	117	306
03:30 PM	28	126	154	9	50	59	67	88	8	96	317
03:45 PM	21	106	127	3	39	42	45	90	7	97	269
<b>Total</b>	<b>101</b>	<b>446</b>	<b>547</b>	<b>26</b>	<b>172</b>	<b>226</b>	<b>226</b>	<b>375</b>	<b>40</b>	<b>415</b>	<b>1188</b>
04:00 PM	24	99	123	12	37	49	52	120	12	132	307
04:15 PM	33	113	146	22	70	92	98	98	7	105	349
04:30 PM	40	111	151	5	44	49	55	123	11	134	340
04:45 PM	23	130	153	11	62	73	80	132	15	147	380
<b>Total</b>	<b>120</b>	<b>453</b>	<b>573</b>	<b>50</b>	<b>213</b>	<b>285</b>	<b>285</b>	<b>473</b>	<b>45</b>	<b>518</b>	<b>1376</b>
05:00 PM	25	115	140	15	54	69	77	143	12	155	372
05:15 PM	26	100	126	13	59	72	78	139	10	149	353
05:30 PM	27	93	120	12	48	60	67	115	16	131	318
05:45 PM	33	100	133	16	53	69	80	108	18	126	339
<b>Total</b>	<b>111</b>	<b>408</b>	<b>519</b>	<b>56</b>	<b>214</b>	<b>302</b>	<b>302</b>	<b>505</b>	<b>56</b>	<b>561</b>	<b>1382</b>
<b>Grand Total</b>	<b>332</b>	<b>1307</b>	<b>1639</b>	<b>132</b>	<b>599</b>	<b>813</b>	<b>813</b>	<b>1353</b>	<b>141</b>	<b>1494</b>	<b>3946</b>
<b>Approch %</b>	<b>20.3</b>	<b>79.7</b>	<b>41.5</b>	<b>3.3</b>	<b>15.2</b>	<b>20.6</b>	<b>20.6</b>	<b>34.3</b>	<b>9.4</b>	<b>37.9</b>	
<b>Total %</b>	<b>8.4</b>	<b>33.1</b>		<b>3.3</b>	<b>2.1</b>			<b>34.3</b>	<b>3.6</b>		

Start Time	Queen Street Westbound			Queens Lane Northbound			Queen Street Eastbound			Int. Total	
	Left	Thru	App. Total	Left	Thru	App. Total	Left	Thru	App. Total		
04:30 PM	40	111	151	5	44	49	49	123	11	134	334
04:45 PM	23	130	153	11	70	81	73	132	15	147	373
05:00 PM	25	115	140	15	54	69	78	143	12	155	364
05:15 PM	26	100	126	13	59	72	72	139	10	149	347
<b>Total Volume</b>	<b>114</b>	<b>456</b>	<b>570</b>	<b>44</b>	<b>219</b>	<b>263</b>	<b>263</b>	<b>537</b>	<b>48</b>	<b>585</b>	<b>1418</b>
<b>% App. Total</b>	<b>20</b>	<b>80</b>	<b>93.1</b>	<b>16.7</b>	<b>83.3</b>	<b>90.1</b>	<b>90.1</b>	<b>91.8</b>	<b>8.2</b>	<b>94.4</b>	<b>95.0</b>
<b>PHF</b>	<b>.713</b>	<b>.877</b>		<b>.733</b>	<b>.883</b>			<b>.939</b>	<b>.800</b>	<b>.944</b>	

Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Entire Intersection Begins at 04:30 PM

Counted By: WL  
Counters: D4-3890  
Weather: CLEAR

**Wilson Okamoto Corporation**  
1907 S. Beretania Street, Suite 400  
Honolulu, HI 96826

File Name : AUA QUE QUE AM  
Site Code : 00000005  
Start Date : 3/13/2018  
Page No : 1

Groups Printed- Unshifted

Start Time	Queens Lane Southbound			Auahi Street Westbound			Queen Street Northbound			Auahi Street Eastbound			Int. Total	
	Left	Thru	App. Total	Left	Thru	App. Total	Left	Thru	App. Total	Left	Thru	App. Total		
06:00 AM	1	3	4	2	3	5	2	4	6	10	2	5	12	33
06:15 AM	0	5	5	5	1	6	6	1	0	10	1	3	13	42
06:30 AM	1	7	8	9	6	15	9	8	2	22	3	9	17	66
06:45 AM	3	1	4	7	10	17	7	10	0	25	6	2	11	61
<b>Total</b>	<b>5</b>	<b>16</b>	<b>21</b>	<b>23</b>	<b>23</b>	<b>46</b>	<b>23</b>	<b>24</b>	<b>2</b>	<b>67</b>	<b>12</b>	<b>11</b>	<b>38</b>	<b>202</b>
07:00 AM	0	5	5	8	9	17	8	12	2	25	4	5	14	71
07:15 AM	1	10	11	2	8	10	2	11	1	22	6	3	13	68
07:30 AM	1	11	12	9	21	30	9	14	0	40	6	6	19	108
07:45 AM	2	12	14	3	17	20	3	24	0	44	9	2	12	102
<b>Total</b>	<b>4</b>	<b>38</b>	<b>42</b>	<b>22</b>	<b>55</b>	<b>77</b>	<b>22</b>	<b>61</b>	<b>3</b>	<b>131</b>	<b>25</b>	<b>3</b>	<b>58</b>	<b>349</b>
08:00 AM	2	7	9	6	18	24	6	13	0	32	12	1	8	104
08:15 AM	1	9	10	2	19	21	2	18	2	41	14	0	6	112
08:30 AM	0	9	9	10	19	29	10	15	5	47	13	2	6	132
08:45 AM	3	9	12	6	14	20	6	14	1	37	12	0	12	116
<b>Total</b>	<b>6</b>	<b>34</b>	<b>40</b>	<b>24</b>	<b>70</b>	<b>94</b>	<b>24</b>	<b>60</b>	<b>8</b>	<b>157</b>	<b>51</b>	<b>3</b>	<b>32</b>	<b>464</b>
<b>Grand Total</b>	<b>15</b>	<b>88</b>	<b>104</b>	<b>69</b>	<b>149</b>	<b>183</b>	<b>69</b>	<b>144</b>	<b>13</b>	<b>355</b>	<b>88</b>	<b>6</b>	<b>59</b>	<b>1015</b>
<b>Approch %</b>	<b>5.8</b>	<b>34.2</b>	<b>40.5</b>	<b>19.5</b>	<b>42</b>	<b>37</b>	<b>13.8</b>	<b>40.6</b>	<b>3.7</b>	<b>26.3</b>	<b>26.3</b>	<b>1.8</b>	<b>17.7</b>	<b>54.2</b>
<b>Total %</b>	<b>1.5</b>	<b>8.7</b>	<b>10.2</b>	<b>4.9</b>	<b>14.7</b>	<b>14.2</b>	<b>6.8</b>	<b>14.2</b>	<b>1.3</b>	<b>35</b>	<b>8.7</b>	<b>0.6</b>	<b>5.8</b>	<b>17.8</b>

Start Time	Queens Lane Southbound			Westbound			Queen Street Northbound			Auahi Street Eastbound			Int. Total	
	Left	Thru	App. Total	Left	Thru	App. Total	Left	Thru	App. Total	Left	Thru	App. Total		
07:45 AM	2	12	14	0	17	17	0	24	0	41	9	1	2	12
08:00 AM	2	7	9	0	18	18	0	13	0	31	12	1	8	21
08:15 AM	1	9	10	0	19	19	2	18	2	39	14	0	6	20
08:30 AM	0	9	9	0	19	19	5	15	5	39	13	2	6	21
<b>Total Volume</b>	<b>5</b>	<b>37</b>	<b>42</b>	<b>0</b>	<b>73</b>	<b>73</b>	<b>7</b>	<b>70</b>	<b>7</b>	<b>150</b>	<b>48</b>	<b>4</b>	<b>22</b>	<b>74</b>
<b>% App. Total</b>	<b>5.2</b>	<b>38.1</b>	<b>56.7</b>	<b>0</b>	<b>48.7</b>	<b>47.7</b>	<b>4.7</b>	<b>46.7</b>	<b>4.7</b>	<b>64.9</b>	<b>64.9</b>	<b>5.4</b>	<b>29.7</b>	<b>32.1</b>
<b>PHF</b>	<b>.625</b>	<b>.771</b>	<b>.859</b>	<b>.000</b>	<b>.961</b>	<b>.915</b>	<b>.350</b>	<b>.729</b>	<b>.350</b>	<b>.915</b>	<b>.857</b>	<b>.500</b>	<b>.688</b>	<b>.955</b>

Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Entire Intersection Begins at 07:45 AM

**Wilson Okamoto Corporation**

1907 S. Beretania Street, Suite 400  
Honolulu, HI 96826

Counted By: WL  
Counters: D4-3890  
Weather: CLEAR

File Name : AUA QUE QUE PM  
Site Code : 00000005  
Start Date : 3/13/2018  
Page No : 1

Groups Printed- Unshifted

Start Time	Queens Lane Southbound			Auahi Street Westbound			Queen Street Northbound			Auahi Street Eastbound			Int. Total		
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru		Right	Peds
03:00 PM	3	21	17	22	63	7	7	2	22	77	24	9	12	21	66
03:15 PM	4	16	17	11	48	1	1	30	20	70	22	4	12	21	59
03:30 PM	1	16	21	11	49	6	6	20	16	46	38	4	20	16	78
03:45 PM	1	8	18	19	46	23	23	26	18	7	14	2	26	15	57
Total	9	61	73	63	206	37	37	108	75	245	98	19	70	73	260
04:00 PM	1	22	10	20	53	7	7	17	17	4	31	3	16	16	66
04:15 PM	0	22	16	25	63	21	21	28	37	4	36	3	23	44	106
04:30 PM	1	21	25	20	67	23	23	36	14	2	27	5	20	38	90
04:45 PM	2	14	18	14	48	21	21	37	30	5	27	4	22	32	85
Total	4	79	69	79	231	72	72	118	98	276	121	15	81	130	347
05:00 PM	2	17	21	22	62	16	16	26	27	2	35	1	25	33	94
05:15 PM	1	23	14	16	54	23	23	20	36	3	27	1	37	28	93
05:30 PM	0	26	19	12	57	16	16	26	18	5	34	4	28	29	95
05:45 PM	0	20	27	30	77	22	22	26	23	0	37	0	29	30	96
Total	3	86	81	80	250	77	77	98	104	48	133	6	119	120	378
Grand Total	16	226	223	222	687	186	186	324	277	31	352	40	270	323	985
Approch %	2.3	32.9	32.5	32.3		100		41.5	35.5	4	35.7	4.1	27.4	32.8	
Total %	0.6	8.6	8.5	8.4	26	7		12.3	10.5	1.2	13.3	1.5	10.2	12.2	37.3

Start Time	Queens Lane Southbound			Westbound			Queen Street Northbound			Auahi Street Eastbound			Int. Total		
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru		Right	Peds
05:00 PM	2	17	21	21	61	0	0	26	27	2	35	1	25	33	94
05:15 PM	1	23	14	14	52	0	0	20	36	3	27	1	37	28	93
05:30 PM	0	26	19	12	61	0	0	26	18	5	34	4	28	29	95
05:45 PM	0	20	27	30	77	0	0	26	23	0	37	0	29	30	96
Total Volume	3	86	81	81	250	0	0	98	104	10	133	6	119	120	378
% App. Total	1.8	50.6	47.6	47.6	90.4	0.000	0.000	46.2	49.1	4.7	51.6	2.3	46.1	46.1	98.8
PHF	.375	.827	.750	.750				.942	.722	.500	.898	.375	.804	.977	

Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Entire Intersection Begins at 05:00 PM

**Wilson Okamoto Corporation**

1907 S. Beretania Street, Suite 400  
Honolulu, HI 96826

Counted By: FS, GH  
Counters: D4-5677, D4-5673  
Weather: CLEAR

File Name : ALA KAM AM  
Site Code : 00000001  
Start Date : 3/14/2018  
Page No : 1

Groups Printed- Unshifted

Start Time	Kamakee Street Southbound			Ala Moana Boulevard Westbound			Ala Moana Park Drive Northbound			Ala Moana Boulevard Eastbound			Int. Total		
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru		Right	Peds
06:00 AM	1	3	6	4	14	1	176	3	11	191	4	1	0	1	6
06:15 AM	5	9	7	4	25	0	148	6	4	158	5	20	1	3	29
06:30 AM	2	3	13	3	21	1	276	9	8	294	4	1	4	5	14
06:45 AM	8	6	13	4	31	2	301	7	10	320	8	0	2	5	15
Total	16	21	39	15	91	4	901	25	33	963	21	22	7	14	64
07:00 AM	5	1	22	9	37	3	371	8	14	396	9	6	2	4	21
07:15 AM	8	7	23	5	43	2	432	14	15	463	22	2	3	4	31
07:30 AM	5	4	19	7	35	5	417	4	20	446	26	6	2	7	41
07:45 AM	2	8	21	12	43	2	431	16	13	462	19	4	5	5	33
Total	20	20	85	33	158	12	1651	42	62	1767	76	18	12	20	126
08:00 AM	7	8	32	3	50	3	426	11	7	447	15	8	3	2	28
08:15 AM	3	7	26	4	40	3	318	3	7	331	13	5	6	6	30
08:30 AM	6	12	18	6	42	6	335	6	9	356	19	6	2	5	32
08:45 AM	3	8	31	7	49	2	274	4	9	289	19	2	6	2	29
Total	19	35	107	20	181	14	1353	24	32	1423	66	21	17	15	119
08:00 AM	55	76	231	68	430	30	3905	91	127	4153	163	61	36	49	309
Approch %	12.8	17.7	53.7	15.8		0.7	94	2.2	3.1	46	52.8	19.7	11.7	15.9	3.4
Total %	0.6	0.8	2.6	0.8	4.8	0.3	43.3	1	1.4	1.8	1.8	0.7	0.4	0.5	0.5

Start Time	Kamakee Street Southbound			Ala Moana Boulevard Westbound			Ala Moana Park Drive Northbound			Ala Moana Boulevard Eastbound			Int. Total		
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru		Right	Peds
07:15 AM	8	7	23	3	38	2	432	14	448	22	2	3	3	27	20
07:30 AM	5	4	19	28	54	5	417	4	426	26	6	2	2	34	16
07:45 AM	2	8	21	31	62	2	431	16	449	19	4	5	5	28	18
08:00 AM	7	8	32	47	94	3	426	11	440	15	8	3	26	30	14
Total Volume	22	27	95	144	544	12	1706	45	1763	82	20	13	115	84	68
% App. Total	15.3	18.8	66	66	250	0.7	96.8	2.6	1763	71.3	17.4	11.3	4.3	90.4	5.3
PHF	.688	.844	.742	.766		.600	.987	.703	.982	.788	.625	.650	.846	.808	.948

Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Entire Intersection Begins at 07:15 AM

**Wilson Okamoto Corporation**

1907 S. Beretania Street, Suite 400  
Honolulu, HI 96826

Counted By: FS, GH  
Counters: D4-5677, D4-5673  
Weather: CLEAR

File Name : ALA KAM PM  
Site Code : 00000001  
Start Date : 3/14/2018  
Page No : 1

Groups Printed- Unshifted

Start Time	Kamakee Street Southbound					Ala Moana Boulevard Westbound					Ala Moana Park Drive Northbound					Ala Moana Boulevard Eastbound				
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total
03:00 PM	17	12	26	12	67	7	318	14	30	369	12	5	5	9	31	22	405	29	456	923
03:15 PM	11	5	45	3	64	15	330	10	8	363	20	1	11	13	45	13	496	33	542	1014
03:30 PM	10	13	35	14	72	6	317	13	22	358	21	9	4	12	46	21	456	43	520	996
03:45 PM	12	10	30	14	66	7	317	17	13	354	21	7	9	11	48	12	486	45	543	1011
Total	50	40	136	43	269	35	1282	54	73	1444	74	22	29	45	170	68	1843	150	2061	3944
04:00 PM	5	9	32	9	55	9	344	11	14	378	12	0	11	11	34	16	508	43	567	1034
04:15 PM	9	16	30	13	68	7	388	14	14	423	10	5	9	4	28	5	477	40	522	1041
04:30 PM	6	13	41	10	70	8	347	24	26	405	18	9	7	11	45	13	528	49	590	1110
04:45 PM	17	13	28	3	61	9	333	19	11	372	16	5	15	7	43	13	544	49	606	1082
Total	37	51	131	35	254	33	1412	68	65	1578	56	19	42	33	150	47	2057	181	2285	4267
05:00 PM	14	8	43	8	73	7	279	11	13	310	26	11	7	10	54	20	516	42	578	1015
05:15 PM	9	11	35	11	66	5	330	18	18	371	11	8	7	9	35	14	532	39	585	1057
05:30 PM	8	10	33	9	60	2	322	14	19	357	20	10	10	15	55	18	523	38	579	1051
05:45 PM	8	8	43	2	61	5	290	21	29	345	28	8	9	7	52	19	485	26	530	988
Total	39	37	154	30	260	19	1221	64	79	1383	85	37	33	41	196	71	2056	145	2272	4111
Grand Total	126	128	421	108	783	87	3915	186	217	4405	215	78	104	119	516	186	5956	476	6618	12322
Approach %	16.1	16.3	53.8	13.8	6.4	0.7	31.8	1.5	1.8	35.7	1.7	0.6	0.8	1	4.2	1.5	48.3	3.9	53.7	
Total %	1	1	3.4	0.9	6.4															

Start Time	Kamakee Street Southbound					Ala Moana Boulevard Westbound					Ala Moana Park Drive Northbound					Ala Moana Boulevard Eastbound				
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total
04:00 PM	5	9	32	3	46	9	344	11	11	364	12	0	11	23	16	508	43	567	1000	
04:15 PM	9	16	30	3	55	7	388	14	14	409	10	5	9	24	5	477	40	522	1010	
04:30 PM	6	13	41	4	60	8	347	24	24	379	18	9	7	34	13	528	49	590	1063	
04:45 PM	17	13	28	3	58	9	333	19	19	361	16	5	15	36	13	544	49	606	1061	
Total Volume	37	51	131	13	219	33	1412	68	68	1513	56	19	42	117	47	2057	181	2285	4134	
% App. Total	16.9	23.3	59.8	5.8	2.2	93.3	4.5	47.9	16.2	35.9	47.7	16.2	35.9	2.1	90	7.9	7.9	7.9	7.9	
PHF	.544	.797	.799	.913	.913	.917	.910	.708	.925	.925	.778	.528	.700	.813	.734	.945	.923	.943	.943	.972

Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Entire Intersection Begins at 04:00 PM

Counted By: LF, WL  
Counters: D4-5674, D4-5672  
Weather: CLEAR

**Wilson Okamoto Corporation**

1907 S. Beretania Street, Suite 400  
Honolulu, HI 96826

File Name : ALA QUE AM  
Site Code : 00000002  
Start Date : 3/14/2018  
Page No : 1

Groups Printed- Unshifted

Start Time	Queen Street Southbound					Ala Moana Boulevard Westbound					Ala Moana Boulevard Eastbound				
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total
06:00 AM	3	4	2	3	10	182	9	191	4	211	2	211	4	217	418
06:15 AM	4	2	8	4	14	169	12	181	9	195	1	195	9	205	400
06:30 AM	9	3	4	4	16	249	12	261	10	260	2	260	10	272	549
06:45 AM	4	1	5	5	10	294	16	310	11	355	0	355	11	366	686
Total	20	10	20	20	50	894	49	943	34	1021	5	1021	34	1060	2053
07:00 AM	4	7	5	5	16	356	21	377	13	385	4	368	13	385	778
07:15 AM	7	4	4	5	16	435	14	449	5	407	2	400	5	407	872
07:30 AM	8	4	4	5	17	409	23	432	12	377	4	361	12	377	826
07:45 AM	4	5	6	6	15	440	31	471	6	320	6	320	10	336	822
Total	23	20	21	21	64	1640	89	1729	40	1449	16	1449	40	1505	3298
08:00 AM	8	12	7	7	27	402	29	431	12	373	6	373	12	391	849
08:15 AM	8	8	9	9	25	307	30	337	2	325	3	325	2	330	692
08:30 AM	8	6	13	13	27	330	29	359	9	326	4	326	9	339	725
08:45 AM	12	6	8	8	26	264	24	288	8	270	8	270	11	289	603
Total	36	32	37	37	105	1303	112	1415	34	1294	21	1294	34	1349	2869
Grand Total	79	62	78	78	219	3837	250	4087	108	3764	42	3764	108	3914	8220
Approach %	36.1	28.3	35.6	0.9	2.7	46.7	6.1	49.7	2.8	96.2	1.1	96.2	2.8	47.6	
Total %	1	0.8	0.9				3		0.5	45.8	0.5	45.8	1.3		

Start Time	Queen Street Southbound					Ala Moana Boulevard Westbound					Ala Moana Boulevard Eastbound				
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total
07:15 AM	7	4	4	4	11	435	14	449	2	400	2	400	400	862	
07:30 AM	8	4	4	5	12	409	23	432	4	361	4	361	365	809	
07:45 AM	4	5	4	5	9	440	31	471	6	326	6	326	326	806	
08:00 AM	8	4	12	12	20	402	29	431	6	373	6	373	379	830	
Total Volume	27	25	25	25	52	1686	97	1783	18	1454	18	1454	1472	3307	
% App. Total	51.9	48.1			.650	94.6	5.4	.946	1.2	98.8	1.2	98.8	.909	.959	
PHF	.844	.521				.958	.782	.946	.750	.915					

Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Entire Intersection Begins at 07:15 AM



## LEVEL OF SERVICE DEFINITIONS

### LEVEL-OF-SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

**Level of Service (LOS)** for signalized intersections is defined in terms of delay, which is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. Specifically, level-of-service (LOS) criteria are stated in terms of the average control delay per vehicle, typically a 15-min analysis period. The criteria are given in the following table.

**Table 1: Level-of-Service Criteria for Signalized Intersections**

Level of Service	Control Delay per Vehicle (sec/veh)
A	≤10.0
B	>10.0 and ≤20.0
C	>20.0 and ≤35.0
D	>35.0 and ≤55.0
E	>55.0 and ≤80.0
F	>80.0

Delay is a complex measure and depends on a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group.

**Level of Service A** describes operations with low control delay, up to 10 sec per vehicle. This level of service occurs when progression is extremely favorable and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.

**Level of Service B** describes operations with control delay greater than 10 and up to 20 sec per vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of delay.

**Level of Service C** describes operations with control delay greater than 20 and up to 35 sec per vehicle. These higher delays may result from only fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. Cycle failure occurs when a given green phase does not serve queued vehicles and overflows occur. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.

**Level of Service D** describes operations with control delay greater than 35 and up to 55 sec per vehicle. At level of service D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

**Level of Service E** describes operation with control delay greater than 55 and up to 80 sec per vehicle. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent.

**Level of Service F** describes operations with control delay in excess of 80 sec per vehicle. This level, considered to be unacceptable to most drivers, often occurs with oversaturation, that is, when arrival flow rates exceed the capacity lane groups. It may also occur at high v/c ratios with many individual cycle failures. Poor progression and long cycle lengths may also contribute significantly to high delay levels.



## LEVEL OF SERVICE DEFINITIONS

### LEVEL-OF-SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

**Level of Service (LOS)** criteria are given in Table 1. As used here, control delay is defined as the total elapsed time from the time a vehicle stops at the end of the queue to the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position, including deceleration of vehicles from free-flow speed to the speed of vehicles in the queue.

The average total delay for any particular minor movement is a function of the service rate or capacity of the approach and the degree of saturation. If the degree of saturation is greater than about 0.9, average control delay is significantly affected by the length of the analysis period.

**Table 1: Level-of-Service Criteria for  
Unsignalized Intersections**

Level of Service	Average Control Delay (Sec/Veh)
A	≤10.0
B	>10.0 and ≤15.0
C	>15.0 and ≤25.0
D	>25.0 and ≤35.0
E	>35.0 and ≤50.0
F	>50.0

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## APPENDIX C

### CAPACITY ANALYSIS CALCULATIONS BASELINE PEAK PERIOD TRAFFIC ANALYSIS

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HCM Signalized Intersection Capacity Analysis  
15: Ward Ave & Queen St

02/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖	→	↗	↖	→	↗	↖	↗		↖	↗	↘	
Traffic Volume (vph)	62	176	34	51	309	59	49	396	61	74	611	198	
Future Volume (vph)	62	176	34	51	309	59	49	396	61	74	611	198	
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	5.0	5.0		5.0	5.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95		
Frpb, ped/bikes	1.00	1.00	0.92	1.00	1.00	0.98	1.00	0.98		1.00	0.99		
Flpb, ped/bikes	0.99	1.00	1.00	0.95	1.00	1.00	1.00	1.00		1.00	1.00		
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.96		
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1760	1863	1463	1681	1863	1549	1770	3403		1770	3362		
Flt Permitted	0.41	1.00	1.00	0.63	1.00	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (perm)	767	1863	1463	1120	1863	1549	1770	3403		1770	3362		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	65	185	36	54	325	62	52	417	64	78	643	208	
RTOR Reduction (vph)	0	0	25	0	0	44	0	14	0	0	35	0	
Lane Group Flow (vph)	65	185	11	54	325	18	52	467	0	78	816	0	
Confl. Peds. (#/hr)	14		94	94		14	35		115	115		35	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA		
Protected Phases		4			8		5	2		1	6		
Permitted Phases	4		4	8		8							
Actuated Green, G (s)	19.1	19.1	19.1	19.1	19.1	19.1	3.4	24.5		6.2	27.3		
Effective Green, g (s)	19.1	19.1	19.1	19.1	19.1	19.1	3.4	24.5		6.2	27.3		
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.29	0.29	0.05	0.38		0.10	0.42		
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	226	549	431	330	549	456	92	1286		169	1416		
v/s Ratio Prot		0.10			c0.17		0.03	0.14		c0.04	c0.24		
v/s Ratio Perm	0.08		0.01	0.05		0.01							
v/c Ratio	0.29	0.34	0.02	0.16	0.59	0.04	0.57	0.36		0.46	0.58		
Uniform Delay, d1	17.6	17.9	16.2	16.9	19.5	16.3	30.0	14.5		27.7	14.3		
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2	0.7	0.4	0.0	0.2	1.7	0.0	7.7	0.2		2.0	0.6		
Delay (s)	18.3	18.3	16.3	17.2	21.2	16.3	37.7	14.7		29.7	14.9		
Level of Service	B	B	B	B	C	B	D	B		C	B		
Approach Delay (s)		18.0			20.1			16.9			16.1		
Approach LOS		B			C			B			B		
<b>Intersection Summary</b>													
HCM 2000 Control Delay	17.4		HCM 2000 Level of Service					B					
HCM 2000 Volume to Capacity ratio	0.60												
Actuated Cycle Length (s)	64.8			Sum of lost time (s)				15.0					
Intersection Capacity Utilization	71.6%		ICU Level of Service					C					
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis  
15: Ward Ave & Queen St

03/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖	→	↗	↖	→	↗	↖	↗		↖	↗	↘	
Traffic Volume (vph)	82	376	69	69	286	100	49	597	103	150	591	90	
Future Volume (vph)	82	376	69	69	286	100	49	597	103	150	591	90	
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	5.0	5.0		5.0	5.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95		
Frpb, ped/bikes	1.00	1.00	0.92	1.00	1.00	0.96	1.00	0.96		1.00	0.97		
Flpb, ped/bikes	0.99	1.00	1.00	0.97	1.00	1.00	1.00	1.00		1.00	1.00		
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98		
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1744	1863	1453	1711	1863	1526	1770	3335		1770	3355		
Flt Permitted	0.41	1.00	1.00	0.27	1.00	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (perm)	755	1863	1453	479	1863	1526	1770	3335		1770	3355		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	86	396	73	73	301	105	52	628	108	158	622	95	
RTOR Reduction (vph)	0	0	53	0	0	76	0	14	0	0	12	0	
Lane Group Flow (vph)	86	396	20	73	301	29	52	722	0	158	705	0	
Confl. Peds. (#/hr)	30		86	86		30			180			180	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA		
Protected Phases		4			8		5	2		1	6		
Permitted Phases	4		4	8		8							
Actuated Green, G (s)	21.7	21.7	21.7	21.7	21.7	21.7	3.2	29.1		11.8	37.7		
Effective Green, g (s)	21.7	21.7	21.7	21.7	21.7	21.7	3.2	29.1		11.8	37.7		
Actuated g/C Ratio	0.28	0.28	0.28	0.28	0.28	0.28	0.04	0.38		0.15	0.49		
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	211	520	406	133	520	426	72	1250		269	1629		
v/s Ratio Prot		c0.21			0.16		0.03	c0.22		c0.09	0.21		
v/s Ratio Perm	0.11		0.01	0.15		0.02							
v/c Ratio	0.41	0.76	0.05	0.55	0.58	0.07	0.72	0.58		0.59	0.43		
Uniform Delay, d1	22.7	25.6	20.4	23.8	24.0	20.5	36.8	19.3		30.6	13.0		
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2	1.3	6.5	0.1	4.6	1.6	0.1	29.8	0.7		3.3	0.2		
Delay (s)	24.0	32.1	20.5	28.4	25.6	20.6	66.6	20.0		33.9	13.2		
Level of Service	C	C	C	C	C	C	E	B		C	B		
Approach Delay (s)		29.3			24.9			23.1			16.9		
Approach LOS		C			C			C			B		
<b>Intersection Summary</b>													
HCM 2000 Control Delay	22.7		HCM 2000 Level of Service					C					
HCM 2000 Volume to Capacity ratio	0.64												
Actuated Cycle Length (s)	77.6			Sum of lost time (s)				15.0					
Intersection Capacity Utilization	76.9%		ICU Level of Service					D					
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis  
16: Kamakee St & Queen St

02/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔			↔	↔
Traffic Volume (vph)	28	192	45	104	256	22	25	111	82	34	115	73
Future Volume (vph)	28	192	45	104	256	22	25	111	82	34	115	73
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	5.0
Lane Util. Factor		0.95		1.00	0.95		1.00	1.00			1.00	1.00
Frpb, ped/bikes		0.99		1.00	1.00		1.00	0.98			1.00	0.92
Flpb, ped/bikes		1.00		1.00	1.00		0.95	1.00			1.00	1.00
Frt		0.97		1.00	0.99		1.00	0.94			1.00	0.85
Flt Protected		0.99		0.95	1.00		0.95	1.00			0.99	1.00
Satd. Flow (prot)		3395		1770	3488		1675	1718			1834	1462
Flt Permitted		0.90		0.95	1.00		0.66	1.00			0.89	1.00
Satd. Flow (perm)		3071		1770	3488		1162	1718			1646	1462
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	29	200	47	108	267	23	26	116	85	35	120	76
RTOR Reduction (vph)	0	19	0	0	7	0	0	34	0	0	0	57
Lane Group Flow (vph)	0	257	0	108	283	0	26	167	0	0	155	19
Confl. Peds. (#/hr)	30		57	57		30	92		38	38		92
Turn Type	Perm	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2		1	6			8			4	
Permitted Phases	2						8			4		4
Actuated Green, G (s)		15.9		6.9	27.8		12.4	12.4			12.4	12.4
Effective Green, g (s)		15.9		6.9	27.8		12.4	12.4			12.4	12.4
Actuated g/C Ratio		0.32		0.14	0.55		0.25	0.25			0.25	0.25
Clearance Time (s)		5.0		5.0	5.0		5.0	5.0			5.0	5.0
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		972		243	1931		287	424			406	361
v/s Ratio Prot				c0.06	0.08			c0.10				
v/s Ratio Perm		c0.08					0.02				0.09	0.01
v/c Ratio		0.26		0.44	0.15		0.09	0.39			0.38	0.05
Uniform Delay, d1		12.8		19.9	5.4		14.6	15.8			15.7	14.4
Progression Factor		1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		0.1		1.3	0.0		0.1	0.6			0.6	0.1
Delay (s)		12.9		21.2	5.5		14.7	16.4			16.3	14.5
Level of Service		B		C	A		B	B			B	B
Approach Delay (s)		12.9			9.7			16.2			15.7	
Approach LOS		B			A			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			13.0									
HCM 2000 Volume to Capacity ratio			0.35									
Actuated Cycle Length (s)			50.2									
Intersection Capacity Utilization			78.2%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
16: Kamakee St & Queen St

03/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔			↔	↔
Traffic Volume (vph)	103	434	106	264	395	41	23	148	104	63	132	70
Future Volume (vph)	103	434	106	264	395	41	23	148	104	63	132	70
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	5.0
Lane Util. Factor		0.95		1.00	0.95		1.00	1.00			1.00	1.00
Frpb, ped/bikes		0.96		1.00	1.00		1.00	0.97			1.00	0.63
Flpb, ped/bikes		1.00		1.00	1.00		0.75	1.00			0.99	1.00
Frt		0.98		1.00	0.99		1.00	0.94			1.00	0.85
Flt Protected		0.99		0.95	1.00		0.95	1.00			0.98	1.00
Satd. Flow (prot)		3284		1770	3475		1322	1702			1814	998
Flt Permitted		0.78		0.95	1.00		0.56	1.00			0.69	1.00
Satd. Flow (perm)		2596		1770	3475		775	1702			1269	998
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	107	452	110	275	411	43	24	154	108	66	138	73
RTOR Reduction (vph)	0	19	0	0	9	0	0	28	0	0	0	54
Lane Group Flow (vph)	0	650	0	275	445	0	24	234	0	0	204	19
Confl. Peds. (#/hr)	25		190				25	179			48	179
Turn Type	Perm	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2		1	6			8			4	
Permitted Phases	2						8			4		4
Actuated Green, G (s)		25.0		16.5	46.5		19.2	19.2			19.2	19.2
Effective Green, g (s)		25.0		16.5	46.5		19.2	19.2			19.2	19.2
Actuated g/C Ratio		0.33		0.22	0.61		0.25	0.25			0.25	0.25
Clearance Time (s)		5.0		5.0	5.0		5.0	5.0			5.0	5.0
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		857		385	2134		196	431			321	253
v/s Ratio Prot				c0.16	0.13			0.14				
v/s Ratio Perm		c0.25					0.03				c0.16	0.02
v/c Ratio		0.76		0.71	0.21		0.12	0.54			0.64	0.07
Uniform Delay, d1		22.7		27.4	6.5		21.8	24.4			25.1	21.5
Progression Factor		1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		3.9		6.2	0.0		0.3	1.4			4.1	0.1
Delay (s)		26.5		33.6	6.5		22.0	25.8			29.2	21.6
Level of Service		C		C	A		C	C			C	C
Approach Delay (s)		26.5			16.7			25.5			27.2	
Approach LOS		C			B			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			22.8									
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			75.7									
Intersection Capacity Utilization			84.6%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
17: Queens Ln & Queen St

02/09/2023

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↘	↑↑	↖	
Traffic Volume (veh/h)	265	15	95	366	30	97
Future Volume (Veh/h)	265	15	95	366	30	97
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	294	17	106	407	33	108
Pedestrians	8					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	1					
Right turn flare (veh)						
Median type	TWLTL			None		
Median storage veh	2					
Upstream signal (ft)	564			680		
pX, platoon unblocked						
vC, conflicting volume			319	726	164	
vC1, stage 1 conf vol	310					
vC2, stage 2 conf vol	416					
vCu, unblocked vol			319	726	164	
tC, single (s)			4.1	*5.8	*5.9	
tC, 2 stage (s)	4.8					
tF (s)			2.2	3.5	3.3	
p0 queue free %			91	94	88	
cM capacity (veh/h)			1230	586	888	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	196	115	106	204	204	141
Volume Left	0	0	106	0	0	33
Volume Right	0	17	0	0	0	108
cSH	1700	1700	1230	1700	1700	792
Volume to Capacity	0.12	0.07	0.09	0.12	0.12	0.18
Queue Length 95th (ft)	0	0	7	0	0	16
Control Delay (s)	0.0	0.0	8.2	0.0	0.0	10.5
Lane LOS			A	B		
Approach Delay (s)	0.0		1.7	10.5		
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay	2.4					
Intersection Capacity Utilization			32.0%	ICU Level of Service		A
Analysis Period (min)	15					
* User Entered Value						

HCM Unsignalized Intersection Capacity Analysis  
17: Queens Ln & Queen St

03/09/2023

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↘	↑↑	↖	
Traffic Volume (veh/h)	625	48	119	618	44	223
Future Volume (Veh/h)	625	48	119	618	44	223
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	658	51	125	651	46	235
Pedestrians	27					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	2					
Right turn flare (veh)						
Median type	TWLTL			None		
Median storage veh	2					
Upstream signal (ft)	564			687		
pX, platoon unblocked			0.96	0.96	0.96	
vC, conflicting volume			736	1286	382	
vC1, stage 1 conf vol	710					
vC2, stage 2 conf vol	576					
vCu, unblocked vol			652	1222	284	
tC, single (s)			4.1	*5.8	*5.9	
tC, 2 stage (s)	4.8					
tF (s)			2.2	*3.0	*3.0	
p0 queue free %			86	90	71	
cM capacity (veh/h)			877	471	797	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	439	270	125	326	326	281
Volume Left	0	0	125	0	0	46
Volume Right	0	51	0	0	0	235
cSH	1700	1700	877	1700	1700	716
Volume to Capacity	0.26	0.16	0.14	0.19	0.19	0.39
Queue Length 95th (ft)	0	0	12	0	0	47
Control Delay (s)	0.0	0.0	9.8	0.0	0.0	13.2
Lane LOS			A	B		
Approach Delay (s)	0.0		1.6	13.2		
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay	2.8					
Intersection Capacity Utilization			51.8%	ICU Level of Service		A
Analysis Period (min)	15					
* User Entered Value						

HCM Signalized Intersection Capacity Analysis  
24: Ward Ave & Halekauwila St

02/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	↖
Traffic Volume (vph)	85	21	18	3	16	27	44	379	6	26	467	192
Future Volume (vph)	85	21	18	3	16	27	44	379	6	26	467	192
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		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	1.00		1.00	1.00		1.00	0.96	
Flpb, ped/bikes	1.00	1.00		0.96	1.00		0.96	1.00		0.97	1.00	
Frft	1.00	0.93		1.00	0.90		1.00	1.00		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1689		1696	1685		1700	3528		1711	3265	
Flt Permitted	0.73	1.00		0.73	1.00		0.37	1.00		0.52	1.00	
Satd. Flow (perm)	1357	1689		1304	1685		671	3528		933	3265	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	88	22	19	3	16	28	45	391	6	27	481	198
RTOR Reduction (vph)	0	13	0	0	19	0	0	1	0	0	52	0
Lane Group Flow (vph)	88	28	0	3	25	0	45	396	0	27	627	0
Confl. Peds. (#/hr)			78	78			85		47	47		85
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	14.8	14.8		14.8	14.8		23.9	23.9		23.9	23.9	
Effective Green, g (s)	14.8	14.8		14.8	14.8		23.9	23.9		23.9	23.9	
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.49	0.49		0.49	0.49	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	412	513		396	512		329	1731		457	1602	
v/s Ratio Prot		0.02			0.01			0.11			c0.19	
v/s Ratio Perm	c0.06			0.00			0.07			0.03		
v/c Ratio	0.21	0.05		0.01	0.05		0.14	0.23		0.06	0.39	
Uniform Delay, d1	12.6	12.0		11.8	12.0		6.8	7.1		6.5	7.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.0		0.0	0.0		0.2	0.1		0.1	0.2	
Delay (s)	12.9	12.0		11.8	12.0		7.0	7.2		6.6	8.0	
Level of Service	B	B		B	B		A	A		A	A	
Approach Delay (s)		12.6			12.0			7.2			7.9	
Approach LOS		B			B			A			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		8.3										
HCM 2000 Volume to Capacity ratio		0.32										
Actuated Cycle Length (s)		48.7						10.0				
Intersection Capacity Utilization		57.4%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
24: Ward Ave & Halekauwila St

03/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	↖
Traffic Volume (vph)	176	51	63	9	22	27	49	525	15	38	550	109
Future Volume (vph)	176	51	63	9	22	27	49	525	15	38	550	109
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		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.94		1.00	1.00		1.00	1.00		1.00	0.96	
Flpb, ped/bikes	1.00	1.00		0.91	1.00		0.93	1.00		0.93	1.00	
Frft	1.00	0.92		1.00	0.92		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1600		1613	1709		1643	3508		1652	3330	
Flt Permitted	0.72	1.00		0.68	1.00		0.35	1.00		0.43	1.00	
Satd. Flow (perm)	1348	1600		1156	1709		610	3508		748	3330	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	183	53	66	9	23	28	51	547	16	40	573	114
RTOR Reduction (vph)	0	42	0	0	18	0	0	2	0	0	19	0
Lane Group Flow (vph)	183	77	0	9	33	0	51	561	0	40	668	0
Confl. Peds. (#/hr)			185	185			160		121	121		160
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.9	17.9		17.9	17.9		20.9	20.9		20.9	20.9	
Effective Green, g (s)	17.9	17.9		17.9	17.9		20.9	20.9		20.9	20.9	
Actuated g/C Ratio	0.37	0.37		0.37	0.37		0.43	0.43		0.43	0.43	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	494	586		424	626		261	1502		320	1426	
v/s Ratio Prot		0.05			0.02			0.16			c0.20	
v/s Ratio Perm	c0.14			0.01			0.08			0.05		
v/c Ratio	0.37	0.13		0.02	0.05		0.20	0.37		0.12	0.47	
Uniform Delay, d1	11.3	10.3		9.9	10.0		8.7	9.5		8.4	10.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.1		0.0	0.0		0.4	0.2		0.2	0.2	
Delay (s)	11.8	10.4		9.9	10.0		9.1	9.7		8.6	10.2	
Level of Service	B	B		A	B		A	A		A	B	
Approach Delay (s)		11.2			10.0			9.6			10.1	
Approach LOS		B			A			A			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		10.1										
HCM 2000 Volume to Capacity ratio		0.42										
Actuated Cycle Length (s)		48.8						10.0				
Intersection Capacity Utilization		57.4%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
34: Ward Ave & Pohukaina St/Auahi St

02/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	↖
Traffic Volume (vph)	26	32	52	58	60	117	57	272	62	63	371	53
Future Volume (vph)	26	32	52	58	60	117	57	272	62	63	371	53
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		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.98		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		0.98	1.00		0.98	1.00		0.97	1.00	
Frt	1.00	0.91		1.00	0.90		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1757	1653		1733	1656		1730	3397		1718	3447	
Flt Permitted	0.64	1.00		0.70	1.00		0.50	1.00		0.54	1.00	
Satd. Flow (perm)	1186	1653		1278	1656		904	3397		982	3447	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	27	33	54	60	62	122	59	283	65	66	386	55
RTOR Reduction (vph)	0	37	0	0	84	0	0	22	0	0	13	0
Lane Group Flow (vph)	27	50	0	60	101	0	59	326	0	66	428	0
Confl. Peds. (#/hr)	19		50	50		19	55		63	63		55
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	13.1	13.1		13.1	13.1		19.2	19.2		19.2	19.2	
Effective Green, g (s)	13.1	13.1		13.1	13.1		19.2	19.2		19.2	19.2	
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.45	0.45		0.45	0.45	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	367	511		395	512		410	1541		445	1564	
v/s Ratio Prot		0.03			c0.06			0.10			c0.12	
v/s Ratio Perm	0.02			0.05			0.07			0.07		
v/c Ratio	0.07	0.10		0.15	0.20		0.14	0.21		0.15	0.27	
Uniform Delay, d1	10.3	10.4		10.6	10.7		6.7	7.0		6.8	7.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.1		0.2	0.2		0.2	0.1		0.2	0.1	
Delay (s)	10.4	10.5		10.8	10.9		6.9	7.0		6.9	7.3	
Level of Service	B	B		B	B		A	A		A	A	
Approach Delay (s)		10.5			10.9			7.0			7.2	
Approach LOS		B			B			A			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			8.2				HCM 2000 Level of Service					A
HCM 2000 Volume to Capacity ratio			0.24									
Actuated Cycle Length (s)			42.3				Sum of lost time (s)				10.0	
Intersection Capacity Utilization			60.1%				ICU Level of Service				B	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
34: Ward Ave & Pohukaina St/Auahi St

03/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	↖
Traffic Volume (vph)	22	91	40	102	70	168	40	370	131	169	344	63
Future Volume (vph)	22	91	40	102	70	168	40	370	131	169	344	63
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		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.98		1.00	0.93		1.00	0.94		1.00	0.99	
Flpb, ped/bikes	0.94	1.00		0.96	1.00		0.96	1.00		0.90	1.00	
Frt	1.00	0.95		1.00	0.89		1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1660	1743		1695	1546		1697	3200		1601	3406	
Flt Permitted	0.57	1.00		0.67	1.00		0.49	1.00		0.42	1.00	
Satd. Flow (perm)	989	1743		1187	1546		877	3200		709	3406	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	24	100	44	112	77	185	44	407	144	186	378	69
RTOR Reduction (vph)	0	16	0	0	90	0	0	48	0	0	20	0
Lane Group Flow (vph)	24	128	0	112	172	0	44	503	0	186	427	0
Confl. Peds. (#/hr)	150		85	85		150	71		194	194		71
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.0	24.0		24.0	24.0		26.7	26.7		26.7	26.7	
Effective Green, g (s)	24.0	24.0		24.0	24.0		26.7	26.7		26.7	26.7	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.44	0.44		0.44	0.44	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	391	689		469	611		385	1407		311	1498	
v/s Ratio Prot		0.07			c0.11			0.16			0.13	
v/s Ratio Perm	0.02			0.09			0.05			c0.26		
v/c Ratio	0.06	0.19		0.24	0.28		0.11	0.36		0.60	0.28	
Uniform Delay, d1	11.4	12.0		12.3	12.5		10.0	11.3		12.9	10.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.1		0.3	0.3		0.1	0.2		3.1	0.1	
Delay (s)	11.4	12.1		12.5	12.7		10.2	11.5		16.0	11.0	
Level of Service	B	B		B	B		B	B		B	B	
Approach Delay (s)		12.0			12.7			11.4			12.5	
Approach LOS		B			B			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			12.1				HCM 2000 Level of Service					B
HCM 2000 Volume to Capacity ratio			0.45									
Actuated Cycle Length (s)			60.7				Sum of lost time (s)				10.0	
Intersection Capacity Utilization			79.1%				ICU Level of Service				D	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
35: Kamakee St & Auahi St

02/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	→	↗	↖	→	↗	↖	→	↗	↖	→	↗
Traffic Volume (vph)	53	80	85	21	42	105	10	78	17	21	164	120
Future Volume (vph)	53	80	85	21	42	105	10	78	17	21	164	120
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	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frb, ped/bikes	1.00	0.98		1.00	1.00	0.95	1.00	1.00	0.91	1.00	1.00	0.93
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.96	1.00	1.00	0.94	1.00	1.00
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1685		1770	1863	1507	1701	1863	1444	1660	1863	1475
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.65	1.00	1.00	0.70	1.00	1.00
Satd. Flow (perm)	1770	1685		1770	1863	1507	1162	1863	1444	1231	1863	1475
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	55	83	89	22	44	109	10	81	18	22	171	125
RTOR Reduction (vph)	0	51	0	0	0	81	0	0	11	0	0	77
Lane Group Flow (vph)	55	121	0	22	44	28	10	81	7	22	171	48
Confl. Peds. (#/hr)	33		33			36			69		69	49
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2		2	6		6
Actuated Green, G (s)	4.1	16.7		1.5	14.1	14.1	21.0	21.0	21.0	21.0	21.0	21.0
Effective Green, g (s)	4.1	16.7		1.5	14.1	14.1	21.0	21.0	21.0	21.0	21.0	21.0
Actuated g/C Ratio	0.08	0.31		0.03	0.26	0.26	0.39	0.39	0.39	0.39	0.39	0.39
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	133	519		48	484	392	450	721	559	476	721	571
v/s Ratio Prot	c0.03	c0.07		0.01	0.02			0.04			c0.09	
v/s Ratio Perm						0.02	0.01		0.00	0.02		0.03
v/c Ratio	0.41	0.23		0.46	0.09	0.07	0.02	0.11	0.01	0.05	0.24	0.08
Uniform Delay, d1	23.9	14.0		25.9	15.2	15.1	10.3	10.6	10.2	10.4	11.2	10.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1	0.2		6.8	0.1	0.1	0.0	0.1	0.0	0.0	0.2	0.1
Delay (s)	26.0	14.2		32.7	15.3	15.2	10.3	10.7	10.2	10.4	11.4	10.6
Level of Service	C	B		C	B	B	B	B	B	B	B	B
Approach Delay (s)		17.1			17.4			10.6			11.0	
Approach LOS		B			B			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay	14.0			HCM 2000 Level of Service			B					
HCM 2000 Volume to Capacity ratio	0.27											
Actuated Cycle Length (s)	54.2			Sum of lost time (s)			15.0					
Intersection Capacity Utilization	59.2%			ICU Level of Service			B					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
35: Kamakee St & Auahi St

03/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	→	↗	↖	→	↗	↖	→	↗	↖	→	↗
Traffic Volume (vph)	86	189	82	24	112	193	42	81	9	45	240	149
Future Volume (vph)	86	189	82	24	112	193	42	81	9	45	240	149
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	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frb, ped/bikes	1.00	0.97		1.00	1.00	0.87	1.00	1.00	0.83	1.00	1.00	0.83
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.90	1.00	1.00	0.86	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1722		1770	1863	1382	1588	1863	1311	1525	1863	1313
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.52	1.00	1.00	0.70	1.00	1.00
Satd. Flow (perm)	1770	1722		1770	1863	1382	865	1863	1311	1129	1863	1313
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	88	193	84	24	114	197	43	83	9	46	245	152
RTOR Reduction (vph)	0	17	0	0	0	116	0	0	6	0	0	108
Lane Group Flow (vph)	88	260	0	24	114	81	43	83	3	46	245	44
Confl. Peds. (#/hr)			92			104	99		104	104		99
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2		2	6		6
Actuated Green, G (s)	6.7	34.3		1.7	29.3	29.3	20.6	20.6	20.6	20.6	20.6	20.6
Effective Green, g (s)	6.7	34.3		1.7	29.3	29.3	20.6	20.6	20.6	20.6	20.6	20.6
Actuated g/C Ratio	0.09	0.48		0.02	0.41	0.41	0.29	0.29	0.29	0.29	0.29	0.29
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	165	824		42	762	565	248	536	377	324	536	377
v/s Ratio Prot	c0.05	c0.15		0.01	0.06			0.04			c0.13	
v/s Ratio Perm						0.06	0.05		0.00	0.04		0.03
v/c Ratio	0.53	0.32		0.57	0.15	0.14	0.17	0.15	0.01	0.14	0.46	0.12
Uniform Delay, d1	31.0	11.4		34.6	13.3	13.3	19.1	19.0	18.2	18.9	20.9	18.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.3	0.2		17.4	0.1	0.1	0.3	0.1	0.0	0.2	0.6	0.1
Delay (s)	34.2	11.7		52.0	13.4	13.4	19.5	19.1	18.2	19.1	21.5	18.9
Level of Service	C	B		D	B	B	B	B	B	B	C	B
Approach Delay (s)		17.1			16.2			19.2			20.4	
Approach LOS		B			B			B			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay	18.2			HCM 2000 Level of Service			B					
HCM 2000 Volume to Capacity ratio	0.40											
Actuated Cycle Length (s)	71.6			Sum of lost time (s)			15.0					
Intersection Capacity Utilization	64.8%			ICU Level of Service			C					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
36: Queens Lane/Queens Ln & Auahi St

02/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗				↖	↗			↕	
Traffic Volume (vph)	51	4	22	0	0	0	140	70	7	5	37	58
Future Volume (vph)	51	4	22	0	0	0	140	70	7	5	37	58
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	
Lane Util. Factor		1.00	1.00				1.00	1.00			1.00	
Frb, ped/bikes		1.00	0.98				1.00	1.00			0.94	
Flpb, ped/bikes		0.97	1.00				1.00	1.00			1.00	
Frt		1.00	0.85				1.00	0.99			0.92	
Flt Protected		0.96	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1727	1546				1770	1831			1609	
Flt Permitted		0.96	1.00				0.95	1.00			0.99	
Satd. Flow (perm)		1727	1546				1770	1831			1597	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	54	4	23	0	0	0	147	74	7	5	39	61
RTOR Reduction (vph)	0	0	19	0	0	0	0	3	0	0	38	0
Lane Group Flow (vph)	0	58	4	0	0	0	147	78	0	0	67	0
Confl. Peds. (#/hr)	23		14	14		23			21	21		60
Turn Type	Perm	NA	Perm				Prot	NA		Perm	NA	
Protected Phases		4					5	2			6	
Permitted Phases	4		4							6		
Actuated Green, G (s)		8.4	8.4				8.0	32.0			19.0	
Effective Green, g (s)		8.4	8.4				8.0	32.0			19.0	
Actuated g/C Ratio		0.17	0.17				0.16	0.63			0.38	
Clearance Time (s)		5.0	5.0				5.0	5.0			5.0	
Vehicle Extension (s)		3.0	3.0				3.0	3.0			3.0	
Lane Grp Cap (vph)		287	257				280	1162			602	
v/s Ratio Prot							c0.08	0.04				
v/s Ratio Perm		0.03	0.00								c0.04	
v/c Ratio		0.20	0.01				0.53	0.07			0.11	
Uniform Delay, d1		18.1	17.5				19.5	3.5			10.2	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		0.3	0.0				1.8	0.0			0.1	
Delay (s)		18.5	17.6				21.2	3.5			10.3	
Level of Service		B	B				C	A			B	
Approach Delay (s)		18.2			0.0			14.9			10.3	
Approach LOS		B			A			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		14.4					HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio		0.23										
Actuated Cycle Length (s)		50.4					Sum of lost time (s)			15.0		
Intersection Capacity Utilization		34.7%					ICU Level of Service			A		
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
36: Queens Lane/Queens Ln & Auahi St

03/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗				↖	↗			↕	
Traffic Volume (vph)	137	6	119	0	0	0	250	104	10	3	86	86
Future Volume (vph)	137	6	119	0	0	0	250	104	10	3	86	86
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	
Lane Util. Factor		1.00	1.00				1.00	1.00			1.00	
Frb, ped/bikes		1.00	0.94				1.00	0.99			0.89	
Flpb, ped/bikes		0.87	1.00				1.00	1.00			1.00	
Frt		1.00	0.85				1.00	0.99			0.93	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1550	1490				1770	1815			1550	
Flt Permitted		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (perm)		1550	1490				1770	1815			1545	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	138	6	120	0	0	0	253	105	10	3	87	87
RTOR Reduction (vph)	0	0	89	0	0	0	0	4	0	0	39	0
Lane Group Flow (vph)	0	144	31	0	0	0	253	111	0	0	138	0
Confl. Peds. (#/hr)	80		48	48		80			77	77		120
Turn Type	Perm	NA	Perm				Prot	NA		Perm	NA	
Protected Phases		4					5	2			6	
Permitted Phases	4		4							6		
Actuated Green, G (s)		15.3	15.3				14.2	34.7			15.5	
Effective Green, g (s)		15.3	15.3				14.2	34.7			15.5	
Actuated g/C Ratio		0.26	0.26				0.24	0.58			0.26	
Clearance Time (s)		5.0	5.0				5.0	5.0			5.0	
Vehicle Extension (s)		3.0	3.0				3.0	3.0			3.0	
Lane Grp Cap (vph)		395	379				418	1049			399	
v/s Ratio Prot							c0.14	0.06				
v/s Ratio Perm		0.09	0.02								c0.09	
v/c Ratio		0.36	0.08				0.61	0.11			0.35	
Uniform Delay, d1		18.4	17.0				20.4	5.7			18.1	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		0.6	0.1				2.5	0.0			0.5	
Delay (s)		18.9	17.1				22.9	5.7			18.7	
Level of Service		B	B				C	A			B	
Approach Delay (s)		18.1			0.0			17.5			18.7	
Approach LOS		B			A			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		18.0					HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio		0.43										
Actuated Cycle Length (s)		60.0					Sum of lost time (s)			15.0		
Intersection Capacity Utilization		57.3%					ICU Level of Service			B		
Analysis Period (min)		15										
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
41: Ala Moana Blvd & Ward Ave

02/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↔↔↔		↔	↔↔↔	↔		↔↔	↔	↔	↔↔		
Traffic Volume (vph)	175	1406	4	96	1426	185	3	22	34	210	77	149	
Future Volume (vph)	175	1406	4	96	1426	185	3	22	34	210	77	149	
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	5.0	5.0	5.0		
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00		0.95	1.00	0.91	0.91		
Frbp, ped/bikes	1.00	1.00		1.00	1.00	0.85		1.00	0.93	1.00	0.94		
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00		
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	0.92		
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99	1.00	0.95	0.99		
Satd. Flow (prot)	1770	5083		1770	5085	1339		3519	1473	1610	2918		
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.99	1.00	0.95	0.99		
Satd. Flow (perm)	1770	5083		1770	5085	1339		3519	1473	1610	2918		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	184	1480	4	101	1501	195	3	23	36	221	81	157	
RTOR Reduction (vph)	0	0	0	0	0	101	0	0	0	0	0	0	
Lane Group Flow (vph)	184	1484	0	101	1501	94	0	26	36	159	300	0	
Confl. Peds. (#/hr)			13			94			51			73	
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	Perm	Split	NA		
Protected Phases	5	2		1	6		8	8		4	4		
Permitted Phases						6			8				
Actuated Green, G (s)	17.5	51.7		11.6	45.8	45.8		25.0	25.0	25.7	25.7		
Effective Green, g (s)	17.5	51.7		11.6	45.8	45.8		25.0	25.0	25.7	25.7		
Actuated g/C Ratio	0.13	0.39		0.09	0.34	0.34		0.19	0.19	0.19	0.19		
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	231	1961		153	1738	457		656	274	308	559		
v/s Ratio Prot	c0.10	0.29		0.06	c0.30			0.01		0.10	c0.10		
v/s Ratio Perm						0.07			c0.02				
v/c Ratio	0.80	0.76		0.66	0.86	0.20		0.04	0.13	0.52	0.54		
Uniform Delay, d1	56.5	35.7		59.3	41.2	31.2		44.7	45.4	48.6	48.8		
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00		
Incremental Delay, d2	17.1	1.7		10.2	4.7	0.2		0.0	0.2	1.5	1.0		
Delay (s)	73.6	37.4		69.5	45.9	31.4		44.7	45.7	50.0	49.8		
Level of Service	E	D		E	D	C		D	D	D	D		
Approach Delay (s)		41.4			45.7			45.3			49.9		
Approach LOS		D			D			D			D		
<b>Intersection Summary</b>													
HCM 2000 Control Delay		44.4		HCM 2000 Level of Service					D				
HCM 2000 Volume to Capacity ratio		0.62											
Actuated Cycle Length (s)		134.0		Sum of lost time (s)					20.0				
Intersection Capacity Utilization		88.4%		ICU Level of Service					E				
Analysis Period (min)		15											
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis  
41: Ala Moana Blvd & Ward Ave

03/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↔↔↔		↔	↔↔↔	↔		↔↔	↔	↔	↔↔		
Traffic Volume (vph)	221	2106	4	58	1439	238	4	90	93	263	65	230	
Future Volume (vph)	221	2106	4	58	1439	238	4	90	93	263	65	230	
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	5.0	5.0	5.0		
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00		0.95	1.00	0.91	0.91		
Frbp, ped/bikes	1.00	1.00		1.00	1.00	0.80		1.00	0.86	1.00	0.96		
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00		
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	0.90		
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	0.99		
Satd. Flow (prot)	1770	5083		1770	5085	1262		3532	1367	1610	2924		
Flt Permitted	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	0.99		
Satd. Flow (perm)	1770	5083		1770	5085	1262		3532	1367	1610	2924		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	233	2217	4	61	1515	251	4	95	98	277	68	242	
RTOR Reduction (vph)	0	0	0	0	0	125	0	0	0	0	0	0	
Lane Group Flow (vph)	233	2221	0	61	1515	126	0	99	98	205	382	0	
Confl. Peds. (#/hr)			41			107			94			31	
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	Perm	Split	NA		
Protected Phases	5	2		1	6		8	8		4	4		
Permitted Phases						6			8				
Actuated Green, G (s)	22.0	69.1		6.0	53.1	53.1		35.0	35.0	27.6	27.6		
Effective Green, g (s)	22.0	69.1		6.0	53.1	53.1		35.0	35.0	27.6	27.6		
Actuated g/C Ratio	0.14	0.44		0.04	0.34	0.34		0.22	0.22	0.18	0.18		
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	246	2227		67	1712	424		783	303	281	511		
v/s Ratio Prot	c0.13	c0.44		0.03	0.30			0.03		0.13	c0.13		
v/s Ratio Perm						0.10			c0.07				
v/c Ratio	0.95	1.00		0.91	0.88	0.30		0.13	0.32	0.73	0.96dr		
Uniform Delay, d1	67.3	44.2		75.6	49.4	38.5		49.1	51.4	61.5	61.7		
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00		
Incremental Delay, d2	42.5	18.3		79.0	5.9	0.4		0.1	0.6	9.1	5.9		
Delay (s)	109.8	62.5		154.6	55.3	38.9		49.2	52.0	70.6	67.7		
Level of Service	F	E		F	E	D		D	D	E	E		
Approach Delay (s)		67.0			56.3			50.6			68.7		
Approach LOS		E			E			D			E		
<b>Intersection Summary</b>													
HCM 2000 Control Delay		62.7		HCM 2000 Level of Service					E				
HCM 2000 Volume to Capacity ratio		0.79											
Actuated Cycle Length (s)		157.7		Sum of lost time (s)					20.0				
Intersection Capacity Utilization		102.2%		ICU Level of Service					G				
Analysis Period (min)		15											
dr Defacto Right Lane. Recode with 1 though lane as a right lane.													
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis  
43: Ala Moana Park Dr/Kamakee St & Ala Moana Blvd

02/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	78	1538	84	12	1560	0	82	20	13	93	27	124
Future Volume (vph)	78	1538	84	12	1560	0	82	20	13	93	27	124
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			5.0	5.0
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			0.96	1.00
Frft	1.00	0.99		1.00	1.00		1.00	0.94			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.96	1.00
Satd. Flow (prot)	1770	5032		1770	5085		1770	1713			1723	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.66	1.00			0.75	1.00
Satd. Flow (perm)	1770	5032		1770	5085		1223	1713			1349	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	80	1586	87	12	1608	0	85	21	13	96	28	128
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	80	1669		12	1608		85	34		0	124	128
Confl. Peds. (#/hr)			18			27			55	55		
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		6
Actuated Green, G (s)	8.5	62.5		1.3	55.3		27.0	27.0			27.0	27.0
Effective Green, g (s)	8.5	62.5		1.3	55.3		27.0	27.0			27.0	27.0
Actuated g/C Ratio	0.08	0.59		0.01	0.52		0.26	0.26			0.26	0.26
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	142	2972		21	2657		312	437			344	403
v/s Ratio Prot	c0.05	0.33		0.01	c0.32			0.02				
v/s Ratio Perm							0.07				c0.09	0.08
v/c Ratio	0.56	0.56		0.57	0.61		0.27	0.08			0.36	0.32
Uniform Delay, d1	46.9	13.3		52.0	17.6		31.5	29.9			32.3	31.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	5.0	0.2		32.5	0.4		0.5	0.1			0.6	0.5
Delay (s)	51.9	13.5		84.4	18.0		32.0	30.0			33.0	32.4
Level of Service	D	B		F	B		C	C			C	C
Approach Delay (s)		15.3			18.5			31.4			32.7	
Approach LOS		B			B			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		18.4										
HCM 2000 Volume to Capacity ratio		0.53										
Actuated Cycle Length (s)		105.8						15.0				
Intersection Capacity Utilization		74.1%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
43: Ala Moana Park Dr/Kamakee St & Ala Moana Blvd

03/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	97	2214	181	33	1475	0	56	34	42	97	59	183
Future Volume (vph)	97	2214	181	33	1475	0	56	34	42	97	59	183
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			5.0	5.0
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.95			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			0.95	1.00
Frft	1.00	0.99		1.00	1.00		1.00	0.92			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.97	1.00
Satd. Flow (prot)	1770	4989		1770	5085		1770	1616			1718	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.53	1.00			0.76	1.00
Satd. Flow (perm)	1770	4989		1770	5085		988	1616			1345	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	100	2282	187	34	1521	0	58	35	43	100	61	189
RTOR Reduction (vph)	0	6	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	100	2463		34	1521		58	78		0	161	189
Confl. Peds. (#/hr)			33			35			65	65		
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		6
Actuated Green, G (s)	13.5	94.4		6.4	87.3		33.5	33.5			33.5	33.5
Effective Green, g (s)	13.5	94.4		6.4	87.3		33.5	33.5			33.5	33.5
Actuated g/C Ratio	0.09	0.63		0.04	0.58		0.22	0.22			0.22	0.22
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	160	3154		75	2973		221	362			301	355
v/s Ratio Prot	c0.06	c0.49		0.02	0.30			0.05				
v/s Ratio Perm							0.06				c0.12	0.12
v/c Ratio	0.62	0.78		0.45	0.51		0.26	0.22			0.53	0.53
Uniform Delay, d1	65.5	19.9		69.7	18.4		47.7	47.2			51.0	51.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	7.4	1.3		4.3	0.1		0.6	0.3			1.8	1.5
Delay (s)	72.9	21.3		74.0	18.5		48.4	47.5			52.9	52.5
Level of Service	E	C		E	B		D	D			D	D
Approach Delay (s)		23.3			19.7			47.9			52.7	
Approach LOS		C			B			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		25.0										
HCM 2000 Volume to Capacity ratio		0.72										
Actuated Cycle Length (s)		149.3						15.0				
Intersection Capacity Utilization		88.3%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
44: Ala Moana Blvd & Queens St

02/09/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑↑↑	↑↑↑		↖	↗
Traffic Volume (vph)	18	1394	1549	164	27	25
Future Volume (vph)	18	1394	1549	164	27	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.91	0.91		0.97	1.00
Frb, ped/bikes	1.00	1.00	1.00		1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	5085	4996		3433	1506
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	5085	4996		3433	1506
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	19	1452	1614	171	28	26
RTOR Reduction (vph)	0	0	8	0	0	20
Lane Group Flow (vph)	19	1452	1777	0	28	6
Confl. Peds. (#/hr)				23		39
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	2.6	72.8	65.2		23.2	23.2
Effective Green, g (s)	2.6	72.8	65.2		23.2	23.2
Actuated g/C Ratio	0.02	0.69	0.62		0.22	0.22
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	43	3492	3073		751	329
v/s Ratio Prot	0.01	c0.29	c0.36		c0.01	
v/s Ratio Perm						0.00
v/c Ratio	0.44	0.42	0.58		0.04	0.02
Uniform Delay, d1	51.0	7.3	12.2		32.6	32.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	7.1	0.1	0.3		0.0	0.0
Delay (s)	58.1	7.4	12.5		32.6	32.5
Level of Service	E	A	B		C	C
Approach Delay (s)		8.0	12.5		32.6	
Approach LOS		A	B		C	
<b>Intersection Summary</b>						
HCM 2000 Control Delay			10.8		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.45			
Actuated Cycle Length (s)			106.0		Sum of lost time (s)	15.0
Intersection Capacity Utilization			63.5%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis  
44: Ala Moana Blvd & Queens St

03/09/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑↑↑	↑↑↑		↖	↗
Traffic Volume (vph)	36	2356	1432	332	110	58
Future Volume (vph)	36	2356	1432	332	110	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.91	0.91		0.97	1.00
Frb, ped/bikes	1.00	1.00	0.99		1.00	0.91
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	5085	4869		3433	1437
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	5085	4869		3433	1437
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	38	2480	1507	349	116	61
RTOR Reduction (vph)	0	0	21	0	0	49
Lane Group Flow (vph)	38	2480	1835	0	116	12
Confl. Peds. (#/hr)				52	29	65
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	6.9	105.7	93.8		27.5	27.5
Effective Green, g (s)	6.9	105.7	93.8		27.5	27.5
Actuated g/C Ratio	0.05	0.74	0.66		0.19	0.19
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	85	3753	3189		659	275
v/s Ratio Prot	0.02	c0.49	0.38		c0.03	
v/s Ratio Perm						0.01
v/c Ratio	0.45	0.66	0.58		0.18	0.04
Uniform Delay, d1	66.3	9.6	13.7		48.4	47.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.7	0.4	0.3		0.1	0.1
Delay (s)	70.0	10.0	13.9		48.5	47.2
Level of Service	E	B	B		D	D
Approach Delay (s)		10.9	13.9		48.1	
Approach LOS		B	B		D	
<b>Intersection Summary</b>						
HCM 2000 Control Delay			13.6		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.58			
Actuated Cycle Length (s)			143.2		Sum of lost time (s)	15.0
Intersection Capacity Utilization			79.3%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

**APPENDIX D**  
**TRIP GENERATIONS CALCULATIONS**

Trip Generation		10th Edition																			
Number of Units	Units	Land Use Number	Land Use No./Type	Weekday			AM PEAK			PM PEAK											
				Trip Rate per Unit	Total Trips	Trip Rate per Unit	In Trips	Out Trips	Trip Rate per Unit	In Trips	Out Trips	Trip Rate per Unit	In Trips	Out Trips							
<b>Block E - Phase 4</b>																					
<b>Existing</b>																					
40,0755	ksf	820	Shopping Center	37.75	1513	0.94	38	62	0.58	23	38	0.36	15	3.81	153	48	1.83	73	52	1.98	80
21,9515	ksf	932	High-Turnover (Sit-Down) Restaurant (formerly #8)	112.18	2463	9.94	218	55	5.47	120	45	4.47	98	9.77	214	62	6.06	133	38	3.71	81
			<i>Existing Subtotal</i>		3976		256		143		113		113		367			206			161
			<i>Internal Capture</i>		-2755		-92		-54		-38		75		-195			-107			-88
			<i>Existing Total</i>		1821		164		89		75		75		172			99			73
<b>Proposed</b>																					
196	units	222	High-Rise Apartment	4.45	872	0.31	61	24	0.07	15	76	0.24	46	0.36	71	61	0.22	43	39	0.14	28
0	ksf	820	Shopping Center	37.75	0	0.94	0	62	0.58	0	38	0.36	0	3.81	0	48	1.83	0	52	1.98	0
5	ksf	932	High-Turnover (Sit-Down) Restaurant (formerly #8)	112.18	561	9.94	50	55	5.47	27	45	4.47	23	9.77	49	62	6.06	30	38	3.71	19
			Subtotal Res		872		61		15		46		46		71			43			28
			Block E - Trip Reduction Alt		-133		-13		-3		-10		-20		-11			-7			-4
			<b>Block E Residential</b>		<b>-627</b>		<b>-75</b>		<b>-55</b>		<b>-20</b>		<b>-38</b>		<b>-69</b>			<b>-31</b>			<b>-21</b>
<b>SubTotal Retail</b>																					
			Block E - total Trip Reduction		561		50		27		23		23		49			30			19
			Block E - retail Trip Reduction		-777		-39		-16		-23		-23		-64			-38			-26
			<b>Block E Retail Total</b>		<b>-644</b>		<b>-26</b>		<b>-13</b>		<b>-13</b>		<b>-9</b>		<b>-53</b>			<b>-26</b>			<b>-22</b>
			<b>Block E Retail Total</b>		<b>-538</b>		<b>-17</b>		<b>-8</b>		<b>-9</b>		<b>-21</b>		<b>-47</b>			<b>-26</b>			<b>-21</b>

Number of Units	Units	Land Use Number	Land Use No./Type	Weekday Trip Rate per Unit	Total Trips	AM PEAK			PM PEAK												
						Trip Rate per Unit	Number of Trips	In %	Out %	Trip Rate per Unit	Number of Trips	In %	Out %								
<b>Block D - Phase 4</b>																					
<b>Existing</b>																					
40,075	ksf	820	Shopping Center	37.75	1513	0.94	38	62	0.58	23	38	0.36	15	3.81	153	48	1.83	73	52	1.98	80
21,957	ksf	932	High-Turnover (Sit-Down) Restaurant (formerly #8)	112.18	2463	9.94	218	55	5.47	120	45	4.47	98	9.77	214	62	6.06	133	38	3.71	81
			<i>Existing Subtotal</i>		3976		256	143		143			113		367			206			161
			<i>Internal Capture</i>		-2155		-92	-54		-54			-38		-195			-107			-88
			<i>Existing Total</i>		1821		164	89		89			75		172			99			73
<b>Proposed</b>																					
300	units	222	High-Rise Apartment	4.45	1335	0.31	93	24	0.07	22	76	0.24	71	0.36	108	61	0.22	66	39	0.14	42
0	ksf	820	Shopping Center	37.75	0	0.94	0	62	0.58	0	38	0.36	0	3.81	0	48	1.83	0	52	1.98	0
8	ksf	932	High-Turnover (Sit-Down) Restaurant (formerly #8)	112.18	897	9.94	80	55	5.47	44	45	4.47	36	9.77	78	62	6.06	48	38	3.71	30
			<i>Subtotal Res</i>		1335		93	22		22			71		108			66			42
			<i>Block D - Trip Reduction Alt</i>		-204		-21	-5		-5			-16		-17			-11			-6
			<b>Block D Residential</b>		<b>-235</b>		<b>-51</b>	<b>-50</b>		<b>-50</b>			<b>-1</b>		<b>-38</b>			<b>-19</b>			<b>-19</b>
<b>SubTotal Retail</b>																					
			<i>Block D - Total Trip Reduction</i>		897		80	44		44			36		78			48			30
			<i>Block D - Retail Trip Reduction</i>		-1210		-61	-25		-25			-36		-98			-59			-39
			<i>Block D - Retail Trip Reduction</i>		-1006		-40	-20		-20			-20		-81			-48			-33
			<b>Block D Retail Total</b>		<b>-564</b>		<b>-1</b>	<b>2</b>		<b>2</b>			<b>-3</b>		<b>-46</b>			<b>-25</b>			<b>-21</b>

APPENDIX E

CAPACITY ANALYSIS CALCULATIONS  
PROJECTED YEAR 2027 PEAK PERIOD TRAFFIC  
ANALYSIS WITHOUT PROJECT

HCM Signalized Intersection Capacity Analysis  
15: Ward Ave & Queen St

02/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	→	↗	↖	→	↗	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	62	178	36	59	314	59	49	426	82	74	645	198
Future Volume (vph)	62	178	36	59	314	59	49	426	82	74	645	198
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	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Frpb, ped/bikes	1.00	1.00	0.89	1.00	1.00	0.98	1.00	0.97	1.00	0.99	1.00	0.99
Flpb, ped/bikes	0.99	1.00	1.00	0.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	1.00	0.96	1.00	0.96
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1759	1863	1404	1630	1863	1548	1770	3356	1770	3373	1770	3373
Flt Permitted	0.41	1.00	1.00	0.63	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	753	1863	1404	1078	1863	1548	1770	3356	1770	3373	1770	3373
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	65	187	38	62	331	62	52	448	86	78	679	208
RTOR Reduction (vph)	0	0	27	0	0	43	0	18	0	0	32	0
Lane Group Flow (vph)	65	187	11	62	331	19	52	516	0	78	855	0
Confl. Peds. (#/hr)	15		146	146		15			144			30
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Prot	NA	Prot	NA
Protected Phases		4			8		5	2		1		6
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	19.7	19.7	19.7	19.7	19.7	19.7	3.4	25.0		6.2	27.8	
Effective Green, g (s)	19.7	19.7	19.7	19.7	19.7	19.7	3.4	25.0		6.2	27.8	
Actuated g/C Ratio	0.30	0.30	0.30	0.30	0.30	0.30	0.05	0.38		0.09	0.42	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	225	556	419	322	556	462	91	1273		166	1422	
v/s Ratio Prot		0.10			c0.18		0.03	0.15		c0.04	c0.25	
v/s Ratio Perm	0.09		0.01	0.06		0.01						
v/c Ratio	0.29	0.34	0.03	0.19	0.60	0.04	0.57	0.41		0.47	0.60	
Uniform Delay, d1	17.7	18.0	16.3	17.2	19.7	16.4	30.5	15.0		28.3	14.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.4	0.0	0.3	1.7	0.0	8.4	0.2		2.1	0.7	
Delay (s)	18.4	18.4	16.4	17.5	21.4	16.4	38.9	15.2		30.4	15.5	
Level of Service	B	B	B	B	C	B	D	B		C	B	
Approach Delay (s)		18.1			20.2			17.3			16.7	
Approach LOS		B			C			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		17.7			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.61										
Actuated Cycle Length (s)		65.9			Sum of lost time (s)			15.0				
Intersection Capacity Utilization		72.2%			ICU Level of Service			C				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
15: Ward Ave & Queen St

03/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	→	↗	↖	→	↗	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	82	382	72	79	290	100	51	630	113	150	623	90
Future Volume (vph)	82	382	72	79	290	100	51	630	113	150	623	90
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	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Frpb, ped/bikes	1.00	1.00	0.87	1.00	1.00	0.88	1.00	0.94	1.00	0.99	1.00	0.99
Flpb, ped/bikes	0.93	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1653	1863	1380	1673	1863	1388	1770	3251	1770	3434	1770	3434
Flt Permitted	0.41	1.00	1.00	0.26	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	705	1863	1380	455	1863	1388	1770	3251	1770	3434	1770	3434
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	86	402	76	83	305	105	54	663	119	158	656	95
RTOR Reduction (vph)	0	0	55	0	0	76	0	15	0	0	11	0
Lane Group Flow (vph)	86	402	21	83	305	29	54	767	0	158	740	0
Confl. Peds. (#/hr)	136		142	142		136			294			52
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Prot	NA	Prot	NA
Protected Phases		4			8		5	2		1		6
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	21.9	21.9	21.9	21.9	21.9	21.9	3.7	29.3		11.8	37.4	
Effective Green, g (s)	21.9	21.9	21.9	21.9	21.9	21.9	3.7	29.3		11.8	37.4	
Actuated g/C Ratio	0.28	0.28	0.28	0.28	0.28	0.28	0.05	0.38		0.15	0.48	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	197	523	387	127	523	389	83	1221		267	1646	
v/s Ratio Prot		c0.22			0.16		0.03	c0.24		c0.09	0.22	
v/s Ratio Perm	0.12		0.02	0.18		0.02						
v/c Ratio	0.44	0.77	0.06	0.65	0.58	0.08	0.65	0.63		0.59	0.45	
Uniform Delay, d1	23.0	25.7	20.5	24.7	24.1	20.6	36.5	19.9		30.9	13.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	6.7	0.1	11.5	1.7	0.1	16.8	1.0		3.5	0.2	
Delay (s)	24.5	32.4	20.6	36.2	25.8	20.7	53.3	20.9		34.3	13.7	
Level of Service	C	C	C	D	C	C	D	C		C	B	
Approach Delay (s)		29.6			26.4			23.0			17.3	
Approach LOS		C			C			C			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		23.1			HCM 2000 Level of Service			C				
HCM 2000 Volume to Capacity ratio		0.67										
Actuated Cycle Length (s)		78.0			Sum of lost time (s)			15.0				
Intersection Capacity Utilization		77.8%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
16: Kamakee St & Queen St

02/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔			↔	↔
Traffic Volume (vph)	28	220	45	112	267	22	25	119	95	34	115	73
Future Volume (vph)	28	220	45	112	267	22	25	119	95	34	115	73
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	5.0
Lane Util. Factor		0.95		1.00	0.95		1.00	1.00			1.00	1.00
Frpb, ped/bikes		0.99		1.00	1.00		1.00	0.99			1.00	0.94
Flpb, ped/bikes		1.00		1.00	1.00		0.96	1.00			1.00	1.00
Frt		0.98		1.00	0.99		1.00	0.93			1.00	0.85
Flt Protected		1.00		0.95	1.00		0.95	1.00			0.99	1.00
Satd. Flow (prot)		3409		1770	3493		1694	1727			1841	1482
Flt Permitted		0.90		0.95	1.00		0.66	1.00			0.88	1.00
Satd. Flow (perm)		3093		1770	3493		1175	1727			1642	1482
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	29	229	47	117	278	23	26	124	99	35	120	76
RTOR Reduction (vph)	0	16	0	0	7	0	0	37	0	0	0	57
Lane Group Flow (vph)	0	289	0	117	294	0	26	186	0	0	155	19
Confl. Peds. (#/hr)	12		64			12	73		5	5		73
Turn Type	Perm	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2		1	6			8			4	
Permitted Phases	2						8			4		4
Actuated Green, G (s)		16.1		7.1	28.2		12.4	12.4			12.4	12.4
Effective Green, g (s)		16.1		7.1	28.2		12.4	12.4			12.4	12.4
Actuated g/C Ratio		0.32		0.14	0.56		0.25	0.25			0.25	0.25
Clearance Time (s)		5.0		5.0	5.0		5.0	5.0			5.0	5.0
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		984		248	1946		287	423			402	363
v/s Ratio Prot				c0.07	0.08			c0.11				
v/s Ratio Perm		c0.09					0.02				0.09	0.01
v/c Ratio		0.29		0.47	0.15		0.09	0.44			0.39	0.05
Uniform Delay, d1		13.0		20.0	5.4		14.7	16.2			15.9	14.6
Progression Factor		1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		0.2		1.4	0.0		0.1	0.7			0.6	0.1
Delay (s)		13.1		21.4	5.5		14.9	16.9			16.5	14.7
Level of Service		B		C	A		B	B			B	B
Approach Delay (s)		13.1			9.9			16.7			15.9	
Approach LOS		B			A			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		13.3										
HCM 2000 Volume to Capacity ratio		0.38										
Actuated Cycle Length (s)		50.6										
Intersection Capacity Utilization		74.4%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
16: Kamakee St & Queen St

03/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔			↔	↔
Traffic Volume (vph)	103	450	106	280	411	41	23	152	110	63	132	70
Future Volume (vph)	103	450	106	280	411	41	23	152	110	63	132	70
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	5.0
Lane Util. Factor		0.95		1.00	0.95		1.00	1.00			1.00	1.00
Frpb, ped/bikes		0.98		1.00	1.00		1.00	0.99			1.00	0.75
Flpb, ped/bikes		1.00		1.00	1.00		0.83	1.00			1.00	1.00
Frt		0.98		1.00	0.99		1.00	0.94			1.00	0.85
Flt Protected		0.99		0.95	1.00		0.95	1.00			0.98	1.00
Satd. Flow (prot)		3346		1770	3482		1472	1730			1830	1184
Flt Permitted		0.78		0.95	1.00		0.55	1.00			0.66	1.00
Satd. Flow (perm)		2637		1770	3482		857	1730			1235	1184
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	107	469	110	292	428	43	24	158	115	66	138	73
RTOR Reduction (vph)	0	18	0	0	9	0	0	29	0	0	0	54
Lane Group Flow (vph)	0	668	0	292	462	0	24	244	0	0	204	19
Confl. Peds. (#/hr)	15		117			15	127		8	8		127
Turn Type	Perm	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2		1	6			8			4	
Permitted Phases	2						8			4		4
Actuated Green, G (s)		26.2		17.1	48.3		20.0	20.0			20.0	20.0
Effective Green, g (s)		26.2		17.1	48.3		20.0	20.0			20.0	20.0
Actuated g/C Ratio		0.33		0.22	0.62		0.26	0.26			0.26	0.26
Clearance Time (s)		5.0		5.0	5.0		5.0	5.0			5.0	5.0
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		882		386	2147		218	441			315	302
v/s Ratio Prot				c0.17	0.13			0.14				
v/s Ratio Perm		c0.25					0.03				c0.17	0.02
v/c Ratio		0.76		0.76	0.22		0.11	0.55			0.65	0.06
Uniform Delay, d1		23.2		28.7	6.6		22.3	25.3			26.0	22.1
Progression Factor		1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		3.8		8.2	0.1		0.2	1.5			4.5	0.1
Delay (s)		27.0		36.9	6.7		22.6	26.8			30.5	22.1
Level of Service		C		D	A		C	C			C	C
Approach Delay (s)		27.0			18.2			26.4			28.3	
Approach LOS		C			B			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		23.8										
HCM 2000 Volume to Capacity ratio		0.72										
Actuated Cycle Length (s)		78.3										
Intersection Capacity Utilization		86.2%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
17: Queens Ln & Queen St

02/09/2023

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↘	↑↑	↖	
Traffic Volume (veh/h)	301	15	95	387	30	97
Future Volume (Veh/h)	301	15	95	387	30	97
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	334	17	106	430	33	108
Pedestrians	8					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	1					
Right turn flare (veh)						
Median type	TWLTL		None			
Median storage (veh)	2					
Upstream signal (ft)	564		680			
pX, platoon unblocked						
vC, conflicting volume			359	778	184	
vC1, stage 1 conf vol	350					
vC2, stage 2 conf vol	427					
vCu, unblocked vol			359	778	184	
tC, single (s)			4.1	*5.8	*5.9	
tC, 2 stage (s)	4.8					
tF (s)			2.2	3.5	3.3	
p0 queue free %			91	94	88	
cM capacity (veh/h)			1188	570	867	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	223	128	106	215	215	141
Volume Left	0	0	106	0	0	33
Volume Right	0	17	0	0	0	108
cSH	1700	1700	1188	1700	1700	772
Volume to Capacity	0.13	0.08	0.09	0.13	0.13	0.18
Queue Length 95th (ft)	0	0	7	0	0	17
Control Delay (s)	0.0	0.0	8.3	0.0	0.0	10.7
Lane LOS			A	B		
Approach Delay (s)	0.0		1.6		10.7	
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay	2.3					
Intersection Capacity Utilization			32.8%	ICU Level of Service		A
Analysis Period (min)	15					
* User Entered Value						

HCM Unsignalized Intersection Capacity Analysis  
17: Queens Ln & Queen St

03/09/2023

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↘	↑↑	↖	↗
Traffic Volume (veh/h)	650	48	119	651	44	223
Future Volume (Veh/h)	650	48	119	651	44	223
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	684	51	125	685	46	235
Pedestrians	27					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	2					
Right turn flare (veh)						
Median type	TWLTL		None			
Median storage (veh)	2					
Upstream signal (ft)	564		687			
pX, platoon unblocked			0.94	0.94	0.94	
vC, conflicting volume			762	1329	394	
vC1, stage 1 conf vol	736					
vC2, stage 2 conf vol	592					
vCu, unblocked vol			622	1225	232	
tC, single (s)			4.1	*5.8	*5.9	
tC, 2 stage (s)	4.8					
tF (s)			2.2	*3.0	*3.0	
p0 queue free %			86	90	72	
cM capacity (veh/h)			878	466	830	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	456	279	125	342	342	281
Volume Left	0	0	125	0	0	46
Volume Right	0	51	0	0	0	235
cSH	1700	1700	878	1700	1700	736
Volume to Capacity	0.27	0.16	0.14	0.20	0.20	0.38
Queue Length 95th (ft)	0	0	12	0	0	45
Control Delay (s)	0.0	0.0	9.8	0.0	0.0	12.9
Lane LOS			A	B		
Approach Delay (s)	0.0		1.5		12.9	
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay	2.7					
Intersection Capacity Utilization			52.5%	ICU Level of Service		A
Analysis Period (min)	15					
* User Entered Value						



HCM Signalized Intersection Capacity Analysis  
24: Ward Ave & Halekauwila St

02/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	↖	
Traffic Volume (vph)	85	21	18	3	16	27	44	428	6	26	509	192	
Future Volume (vph)	85	21	18	3	16	27	44	428	6	26	509	192	
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		5.0	5.0		
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95		
Frpb, ped/bikes	1.00	0.97		1.00	0.97		1.00	1.00		1.00	0.97		
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.96	1.00		1.00	1.00		
Frt	1.00	0.93		1.00	0.90		1.00	1.00		1.00	0.96		
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1770	1688		1770	1631		1704	3529		1770	3278		
Flt Permitted	0.73	1.00		0.73	1.00		0.35	1.00		0.49	1.00		
Satd. Flow (perm)	1357	1688		1360	1631		631	3529		919	3278		
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	88	22	19	3	16	28	45	441	6	27	525	198	
RTOR Reduction (vph)	0	13	0	0	20	0	0	1	0	0	45	0	
Lane Group Flow (vph)	88	28	0	3	24	0	45	446	0	27	678	0	
Confl. Peds. (#/hr)			78			47	85		47			85	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA		
Protected Phases		4			8			2			6		
Permitted Phases	4			8			2			6			
Actuated Green, G (s)	14.9	14.9		14.9	14.9		25.1	25.1		25.1	25.1		
Effective Green, g (s)	14.9	14.9		14.9	14.9		25.1	25.1		25.1	25.1		
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.50	0.50		0.50	0.50		
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	404	503		405	486		316	1771		461	1645		
v/s Ratio Prot		0.02			0.01			0.13			c0.21		
v/s Ratio Perm	c0.06			0.00			0.07			0.03			
v/c Ratio	0.22	0.05		0.01	0.05		0.14	0.25		0.06	0.41		
Uniform Delay, d1	13.2	12.5		12.3	12.5		6.7	7.1		6.4	7.8		
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00		
Incremental Delay, d2	0.3	0.0		0.0	0.0		0.2	0.1		0.1	0.2		
Delay (s)	13.4	12.6		12.4	12.5		6.9	7.2		6.4	8.0		
Level of Service	B	B		B	B		A	A		A	A		
Approach Delay (s)		13.2			12.5			7.1			7.9		
Approach LOS		B			B			A			A		
<b>Intersection Summary</b>													
HCM 2000 Control Delay		8.3		HCM 2000 Level of Service				A					
HCM 2000 Volume to Capacity ratio		0.34											
Actuated Cycle Length (s)		50.0		Sum of lost time (s)				10.0					
Intersection Capacity Utilization		58.5%		ICU Level of Service				B					
Analysis Period (min)		15											
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis  
24: Ward Ave & Halekauwila St

03/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	↖	
Traffic Volume (vph)	176	51	63	9	22	27	49	554	15	38	594	109	
Future Volume (vph)	176	51	63	9	22	27	49	554	15	38	594	109	
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		5.0	5.0		
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95		
Frpb, ped/bikes	1.00	0.93		1.00	0.93		1.00	1.00		1.00	0.96		
Flpb, ped/bikes	0.89	1.00		0.90	1.00		0.93	1.00		0.93	1.00		
Frt	1.00	0.92		1.00	0.92		1.00	1.00		1.00	0.98		
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1569	1590		1598	1586		1645	3509		1649	3333		
Flt Permitted	0.72	1.00		0.68	1.00		0.31	1.00		0.39	1.00		
Satd. Flow (perm)	1195	1590		1144	1586		536	3509		685	3333		
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	183	53	66	9	23	28	51	577	16	40	619	114	
RTOR Reduction (vph)	0	39	0	0	17	0	0	2	0	0	18	0	
Lane Group Flow (vph)	183	80	0	9	34	0	51	591	0	40	715	0	
Confl. Peds. (#/hr)	121		185	185		121	160		121	121		160	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA		
Protected Phases		4			8			2			6		
Permitted Phases	4			8			2			6			
Actuated Green, G (s)	21.9	21.9		21.9	21.9		21.8	21.8		21.8	21.8		
Effective Green, g (s)	21.9	21.9		21.9	21.9		21.8	21.8		21.8	21.8		
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.41	0.41		0.41	0.41		
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	487	648		466	646		217	1424		278	1353		
v/s Ratio Prot		0.05			0.02			0.17			c0.21		
v/s Ratio Perm	c0.15			0.01			0.10			0.06			
v/c Ratio	0.38	0.12		0.02	0.05		0.24	0.41		0.14	0.53		
Uniform Delay, d1	11.1	9.9		9.5	9.6		10.5	11.4		10.1	12.1		
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00		
Incremental Delay, d2	0.5	0.1		0.0	0.0		0.6	0.2		0.2	0.4		
Delay (s)	11.6	10.0		9.5	9.7		11.0	11.6		10.3	12.4		
Level of Service	B	B		A	A		B	B		B	B		
Approach Delay (s)		11.0			9.6			11.5			12.3		
Approach LOS		B			A			B			B		
<b>Intersection Summary</b>													
HCM 2000 Control Delay		11.7		HCM 2000 Level of Service				B					
HCM 2000 Volume to Capacity ratio		0.45											
Actuated Cycle Length (s)		53.7		Sum of lost time (s)				10.0					
Intersection Capacity Utilization		58.5%		ICU Level of Service				B					
Analysis Period (min)		15											
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis  
34: Ward Ave & Pohukaina St/Auahi St

02/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↕		↔	↕	↔
Traffic Volume (vph)	71	53	81	58	71	117	76	276	62	63	377	89
Future Volume (vph)	71	53	81	58	71	117	76	276	62	63	377	89
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		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Flpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		0.98	1.00		0.97	1.00		0.97	1.00	
Frt	1.00	0.91		1.00	0.91		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1759	1653		1728	1668		1718	3399		1718	3388	
Flt Permitted	0.63	1.00		0.67	1.00		0.48	1.00		0.54	1.00	
Satd. Flow (perm)	1175	1653		1215	1668		859	3399		977	3388	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	74	55	84	60	74	122	79	288	65	66	393	93
RTOR Reduction (vph)	0	60	0	0	81	0	0	21	0	0	22	0
Lane Group Flow (vph)	74	79	0	60	115	0	79	332	0	66	464	0
Confl. Peds. (#/hr)	19		67	67		19	75		63	63		75
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	12.2	12.2		12.2	12.2		20.4	20.4		20.4	20.4	
Effective Green, g (s)	12.2	12.2		12.2	12.2		20.4	20.4		20.4	20.4	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.48	0.48		0.48	0.48	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	336	473		347	477		411	1627		467	1622	
v/s Ratio Prot		0.05			c0.07			0.10			c0.14	
v/s Ratio Perm	0.06			0.05			0.09			0.07		
v/c Ratio	0.22	0.17		0.17	0.24		0.19	0.20		0.14	0.29	
Uniform Delay, d1	11.6	11.4		11.4	11.6		6.4	6.4		6.2	6.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2		0.2	0.3		0.2	0.1		0.1	0.1	
Delay (s)	11.9	11.6		11.7	11.9		6.6	6.5		6.3	6.8	
Level of Service	B	B		B	B		A	A		A	A	
Approach Delay (s)		11.7			11.9			6.5			6.7	
Approach LOS		B			B			A			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		8.3			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.27										
Actuated Cycle Length (s)		42.6			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		70.3%			ICU Level of Service			C				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
34: Ward Ave & Pohukaina St/Auahi St

03/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↕		↔	↕	↔
Traffic Volume (vph)	44	101	55	102	86	168	64	376	131	169	349	100
Future Volume (vph)	44	101	55	102	86	168	64	376	131	169	349	100
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		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Flpb, ped/bikes	1.00	0.97		1.00	0.91		1.00	0.94		1.00	0.97	
Flpb, ped/bikes	0.92	1.00		0.94	1.00		0.96	1.00		0.91	1.00	
Frt	1.00	0.95		1.00	0.90		1.00	0.96		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1628	1712		1666	1533		1707	3203		1603	3328	
Flt Permitted	0.55	1.00		0.65	1.00		0.46	1.00		0.42	1.00	
Satd. Flow (perm)	934	1712		1138	1533		823	3203		702	3328	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	48	111	60	112	95	185	70	413	144	186	384	110
RTOR Reduction (vph)	0	21	0	0	73	0	0	47	0	0	35	0
Lane Group Flow (vph)	48	150	0	112	207	0	70	510	0	186	459	0
Confl. Peds. (#/hr)	200		122	122		200	66		194	194		96
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.1	24.1		24.1	24.1		26.6	26.6		26.6	26.6	
Effective Green, g (s)	24.1	24.1		24.1	24.1		26.6	26.6		26.6	26.6	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.44	0.44		0.44	0.44	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	370	679		451	608		360	1403		307	1458	
v/s Ratio Prot		0.09			c0.14			0.16			0.14	
v/s Ratio Perm	0.05			0.10			0.09			c0.26		
v/c Ratio	0.13	0.22		0.25	0.34		0.19	0.36		0.61	0.31	
Uniform Delay, d1	11.6	12.1		12.2	12.8		10.5	11.4		13.0	11.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.2		0.3	0.3		0.3	0.2		3.4	0.1	
Delay (s)	11.8	12.3		12.5	13.1		10.7	11.6		16.4	11.2	
Level of Service	B	B		B	B		B	B		B	B	
Approach Delay (s)		12.2			12.9			11.5			12.6	
Approach LOS		B			B			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		12.3			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.48										
Actuated Cycle Length (s)		60.7			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		79.8%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
35: Kamakee St & Auahi St

02/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	→	↗	↖	→	↗	↖	→	↗	↖	→	↗
Traffic Volume (vph)	74	80	85	21	41	105	10	78	17	21	164	128
Future Volume (vph)	74	80	85	21	41	105	10	78	17	21	164	128
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	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.92
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.98	1.00	1.00
Frft	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1672		1770	1863	1506	1680	1863	1512	1729	1863	1452
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.65	1.00	1.00	0.70	1.00	1.00
Satd. Flow (perm)	1770	1672		1770	1863	1506	1148	1863	1512	1282	1863	1452
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	77	83	89	22	43	109	10	81	18	22	171	133
RTOR Reduction (vph)	0	53	0	0	0	82	0	0	11	0	0	81
Lane Group Flow (vph)	77	119	0	22	43	27	10	81	7	22	171	52
Confl. Peds. (#/hr)			51			36	63		25	25		63
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2		2	6		6
Actuated Green, G (s)	4.8	17.5		1.2	13.9	13.9	21.6	21.6	21.6	21.6	21.6	21.6
Effective Green, g (s)	4.8	17.5		1.2	13.9	13.9	21.6	21.6	21.6	21.6	21.6	21.6
Actuated g/C Ratio	0.09	0.32		0.02	0.25	0.25	0.39	0.39	0.39	0.39	0.39	0.39
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	153	529		38	468	378	448	727	590	500	727	567
v/s Ratio Prot	c0.04	c0.07		0.01	0.02			0.04			c0.09	
v/s Ratio Perm						0.02	0.01		0.00	0.02		0.04
v/c Ratio	0.50	0.23		0.58	0.09	0.07	0.02	0.11	0.01	0.04	0.24	0.09
Uniform Delay, d1	24.1	13.9		26.8	15.9	15.8	10.4	10.7	10.3	10.4	11.3	10.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.6	0.2		19.6	0.1	0.1	0.0	0.1	0.0	0.0	0.2	0.1
Delay (s)	26.7	14.1		46.4	15.9	15.9	10.4	10.8	10.3	10.5	11.5	10.7
Level of Service	C	B		D	B	B	B	B	B	B	B	B
Approach Delay (s)		18.0			19.7			10.7			11.1	
Approach LOS		B			B			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		14.8		HCM 2000 Level of Service				B				
HCM 2000 Volume to Capacity ratio		0.27										
Actuated Cycle Length (s)		55.3		Sum of lost time (s)				15.0				
Intersection Capacity Utilization		57.9%		ICU Level of Service				B				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
35: Kamakee St & Auahi St

03/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	→	↗	↖	→	↗	↖	→	↗	↖	→	↗
Traffic Volume (vph)	96	189	82	24	112	193	42	81	9	45	240	165
Future Volume (vph)	96	189	82	24	112	193	42	81	9	45	240	165
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	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.95		1.00	1.00	0.75	1.00	1.00	0.81	1.00	1.00	0.76
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.88	1.00	1.00	0.85	1.00	1.00
Frft	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1689		1770	1863	1195	1550	1863	1287	1501	1863	1206
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.52	1.00	1.00	0.70	1.00	1.00
Satd. Flow (perm)	1770	1689		1770	1863	1195	843	1863	1287	1111	1863	1206
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	98	193	84	24	114	197	43	83	9	46	245	168
RTOR Reduction (vph)	0	17	0	0	0	117	0	0	6	0	0	120
Lane Group Flow (vph)	98	260	0	24	114	80	43	83	3	46	245	48
Confl. Peds. (#/hr)			153			218	120		114	114		143
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8		8	4		4
Actuated Green, G (s)	6.9	34.1		2.0	29.2	29.2	20.6	20.6	20.6	20.6	20.6	20.6
Effective Green, g (s)	6.9	34.1		2.0	29.2	29.2	20.6	20.6	20.6	20.6	20.6	20.6
Actuated g/C Ratio	0.10	0.48		0.03	0.41	0.41	0.29	0.29	0.29	0.29	0.29	0.29
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	170	803		49	758	486	242	535	369	319	535	346
v/s Ratio Prot	c0.06	c0.15		0.01	0.06			0.04			c0.13	
v/s Ratio Perm						0.07	0.05		0.00	0.04		0.04
v/c Ratio	0.58	0.32		0.49	0.15	0.17	0.18	0.16	0.01	0.14	0.46	0.14
Uniform Delay, d1	31.0	11.7		34.3	13.4	13.5	19.2	19.1	18.2	19.0	21.0	19.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.7	0.2		7.5	0.1	0.2	0.4	0.1	0.0	0.2	0.6	0.2
Delay (s)	35.7	11.9		41.9	13.5	13.7	19.5	19.2	18.3	19.2	21.6	19.2
Level of Service	D	B		D	B	B	B	B	B	B	C	B
Approach Delay (s)		18.1			15.6			19.2			20.5	
Approach LOS		B			B			B			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		18.4		HCM 2000 Level of Service				B				
HCM 2000 Volume to Capacity ratio		0.41										
Actuated Cycle Length (s)		71.7		Sum of lost time (s)				15.0				
Intersection Capacity Utilization		65.8%		ICU Level of Service				C				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
36: Queens Lane/Queens Ln & Auahi St

02/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗				↖	↕			↔	
Traffic Volume (vph)	51	4	22	0	0	0	140	70	7	5	37	58
Future Volume (vph)	51	4	22	0	0	0	140	70	7	5	37	58
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	
Lane Util. Factor		1.00	1.00				1.00	1.00			1.00	
Frb, ped/bikes		1.00	0.98				1.00	1.00			0.94	
Flpb, ped/bikes		0.97	1.00				1.00	1.00			1.00	
Frt		1.00	0.85				1.00	0.99			0.92	
Flt Protected		0.96	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1727	1546				1770	1831			1609	
Flt Permitted		0.96	1.00				0.95	1.00			0.99	
Satd. Flow (perm)		1727	1546				1770	1831			1597	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	54	4	23	0	0	0	147	74	7	5	39	61
RTOR Reduction (vph)	0	0	19	0	0	0	0	3	0	0	38	0
Lane Group Flow (vph)	0	58	4	0	0	0	147	78	0	0	67	0
Confl. Peds. (#/hr)	23		14	14		23			21	21		60
Turn Type	Perm	NA	Perm				Prot	NA		Perm	NA	
Protected Phases		4					5	2			6	
Permitted Phases	4		4							6		
Actuated Green, G (s)		8.4	8.4				8.0	32.0			19.0	
Effective Green, g (s)		8.4	8.4				8.0	32.0			19.0	
Actuated g/C Ratio		0.17	0.17				0.16	0.63			0.38	
Clearance Time (s)		5.0	5.0				5.0	5.0			5.0	
Vehicle Extension (s)		3.0	3.0				3.0	3.0			3.0	
Lane Grp Cap (vph)		287	257				280	1162			602	
v/s Ratio Prot							c0.08	0.04				
v/s Ratio Perm		0.03	0.00								c0.04	
v/c Ratio		0.20	0.01				0.53	0.07			0.11	
Uniform Delay, d1		18.1	17.5				19.5	3.5			10.2	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		0.3	0.0				1.8	0.0			0.1	
Delay (s)		18.5	17.6				21.2	3.5			10.3	
Level of Service		B	B				C	A			B	
Approach Delay (s)		18.2			0.0			14.9			10.3	
Approach LOS		B			A			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		14.4					HCM 2000 Level of Service		B			
HCM 2000 Volume to Capacity ratio		0.23										
Actuated Cycle Length (s)		50.4					Sum of lost time (s)		15.0			
Intersection Capacity Utilization		34.7%					ICU Level of Service		A			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
36: Queens Lane/Queens Ln & Auahi St

03/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗				↖	↕			↔	
Traffic Volume (vph)	137	6	119	0	0	0	250	104	10	3	86	86
Future Volume (vph)	137	6	119	0	0	0	250	104	10	3	86	86
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	
Lane Util. Factor		1.00	1.00				1.00	1.00			1.00	
Frb, ped/bikes		1.00	0.94				1.00	0.99			0.89	
Flpb, ped/bikes		0.87	1.00				1.00	1.00			1.00	
Frt		1.00	0.85				1.00	0.99			0.93	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1551	1490				1770	1815			1551	
Flt Permitted		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (perm)		1551	1490				1770	1815			1545	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	138	6	120	0	0	0	253	105	10	3	87	87
RTOR Reduction (vph)	0	0	89	0	0	0	0	4	0	0	40	0
Lane Group Flow (vph)	0	144	31	0	0	0	253	111	0	0	137	0
Confl. Peds. (#/hr)	80		48	48		80			77	77		120
Turn Type	Perm	NA	Perm				Prot	NA		Perm	NA	
Protected Phases		4					5	2			6	
Permitted Phases	4		4							6		
Actuated Green, G (s)		15.3	15.3				14.2	34.6			15.4	
Effective Green, g (s)		15.3	15.3				14.2	34.6			15.4	
Actuated g/C Ratio		0.26	0.26				0.24	0.58			0.26	
Clearance Time (s)		5.0	5.0				5.0	5.0			5.0	
Vehicle Extension (s)		3.0	3.0				3.0	3.0			3.0	
Lane Grp Cap (vph)		396	380				419	1048			397	
v/s Ratio Prot							c0.14	0.06				
v/s Ratio Perm		0.09	0.02								c0.09	
v/c Ratio		0.36	0.08				0.60	0.11			0.34	
Uniform Delay, d1		18.3	17.0				20.3	5.7			18.1	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		0.6	0.1				2.5	0.0			0.5	
Delay (s)		18.9	17.0				22.8	5.7			18.7	
Level of Service		B	B				C	A			B	
Approach Delay (s)		18.0			0.0			17.5			18.7	
Approach LOS		B			A			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		17.9					HCM 2000 Level of Service		B			
HCM 2000 Volume to Capacity ratio		0.43										
Actuated Cycle Length (s)		59.9					Sum of lost time (s)		15.0			
Intersection Capacity Utilization		57.3%					ICU Level of Service		B			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
41: Ala Moana Blvd & Ward Ave

02/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	180	1426	4	96	1465	188	3	22	34	237	77	156
Future Volume (vph)	180	1426	4	96	1465	188	3	22	34	237	77	156
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	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00		0.95	1.00	0.91	0.91	
Frbp, ped/bikes	1.00	1.00		1.00	1.00	0.84		1.00	0.93	1.00	0.95	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99	1.00	0.95	0.99	
Satd. Flow (prot)	1770	5083		1770	5085	1337		3519	1473	1610	2926	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.99	1.00	0.95	0.99	
Satd. Flow (perm)	1770	5083		1770	5085	1337		3519	1473	1610	2926	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	189	1501	4	101	1542	198	3	23	36	249	81	164
RTOR Reduction (vph)	0	0	0	0	0	99	0	0	0	0	0	0
Lane Group Flow (vph)	189	1505	0	101	1542	99	0	26	36	169	325	0
Confl. Peds. (#/hr)			13			94			51			73
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6			8			
Actuated Green, G (s)	17.5	52.8		11.5	46.8	46.8		25.2	25.2	25.8	25.8	
Effective Green, g (s)	17.5	52.8		11.5	46.8	46.8		25.2	25.2	25.8	25.8	
Actuated g/C Ratio	0.13	0.39		0.08	0.35	0.35		0.19	0.19	0.19	0.19	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	228	1983		150	1758	462		655	274	307	557	
v/s Ratio Prot	c0.11	0.30		0.06	c0.30			0.01		0.10	c0.11	
v/s Ratio Perm						0.07			c0.02			
v/c Ratio	0.83	0.76		0.67	0.88	0.21		0.04	0.13	0.55	0.58	
Uniform Delay, d1	57.4	35.7		60.1	41.6	31.3		45.1	45.9	49.5	49.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	21.3	1.7		11.3	5.3	0.2		0.0	0.2	2.1	1.6	
Delay (s)	78.8	37.5		71.4	46.8	31.5		45.2	46.1	51.6	51.4	
Level of Service	E	D		E	D	C		D	D	D	D	
Approach Delay (s)		42.1			46.5			45.7			51.5	
Approach LOS		D			D			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		45.3										
HCM 2000 Volume to Capacity ratio		0.64										
Actuated Cycle Length (s)		135.3							20.0			
Intersection Capacity Utilization		88.9%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
41: Ala Moana Blvd & Ward Ave

03/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	228	2137	4	58	1459	226	4	90	93	280	65	235
Future Volume (vph)	228	2137	4	58	1459	226	4	90	93	280	65	235
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	5.0	5.0	5.0	
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00		0.95	1.00	0.91	0.91	
Frbp, ped/bikes	1.00	1.00		1.00	1.00	0.80		1.00	0.86	1.00	0.96	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	0.99	
Satd. Flow (prot)	1770	5083		1770	5085	1262		3532	1367	1610	2930	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	0.99	
Satd. Flow (perm)	1770	5083		1770	5085	1262		3532	1367	1610	2930	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	240	2249	4	61	1536	238	4	95	98	295	68	247
RTOR Reduction (vph)	0	0	0	0	0	117	0	0	0	0	0	0
Lane Group Flow (vph)	240	2253	0	61	1536	121	0	99	98	212	398	0
Confl. Peds. (#/hr)			41			107			94			31
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6			8			
Actuated Green, G (s)	22.0	69.1		6.0	53.1	53.1		35.0	35.0	27.8	27.8	
Effective Green, g (s)	22.0	69.1		6.0	53.1	53.1		35.0	35.0	27.8	27.8	
Actuated g/C Ratio	0.14	0.44		0.04	0.34	0.34		0.22	0.22	0.18	0.18	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	246	2224		67	1710	424		782	303	283	515	
v/s Ratio Prot	c0.14	c0.44		0.03	0.30			0.03		0.13	c0.14	
v/s Ratio Perm						0.10			c0.07			
v/c Ratio	0.98	1.01		0.91	0.90	0.29		0.13	0.32	0.75	0.97dr	
Uniform Delay, d1	67.7	44.4		75.7	49.8	38.5		49.2	51.5	61.7	62.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	50.1	22.4		79.0	6.7	0.4		0.1	0.6	10.4	7.1	
Delay (s)	117.8	66.8		154.7	56.5	38.9		49.3	52.1	72.1	69.1	
Level of Service	F	E		F	E	D		D	D	E	E	
Approach Delay (s)		71.7			57.5			50.7			70.2	
Approach LOS		E			E			D			E	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		65.6										
HCM 2000 Volume to Capacity ratio		0.81										
Actuated Cycle Length (s)		157.9							20.0			
Intersection Capacity Utilization		102.9%										
Analysis Period (min)		15										
dr Defacto Right Lane. Recode with 1 though lane as a right lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
43: Ala Moana Park Dr/Kamakee St & Ala Moana Blvd

02/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔↔		↔	↔↔↔		↔	↔			↔	↔
Traffic Volume (vph)	78	1584	84	12	1584	0	82	20	13	93	27	124
Future Volume (vph)	78	1584	84	12	1584	0	82	20	13	93	27	124
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			5.0	5.0
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			0.96	1.00
Frft	1.00	0.99		1.00	1.00		1.00	0.94			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.96	1.00
Satd. Flow (prot)	1770	5034		1770	5085		1770	1713			1723	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.66	1.00			0.75	1.00
Satd. Flow (perm)	1770	5034		1770	5085		1220	1713			1348	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	80	1633	87	12	1633	0	85	21	13	96	28	128
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	80	1716		12	1633		85	34		0	124	128
Confl. Peds. (#/hr)			18				27		55	55		
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		6
Actuated Green, G (s)	8.5	62.3		2.3	56.1		27.0	27.0			27.0	27.0
Effective Green, g (s)	8.5	62.3		2.3	56.1		27.0	27.0			27.0	27.0
Actuated g/C Ratio	0.08	0.58		0.02	0.53		0.25	0.25			0.25	0.25
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	141	2942		38	2676		309	433			341	400
v/s Ratio Prot	c0.05	c0.34		0.01	c0.32			0.02				
v/s Ratio Perm							0.07				c0.09	0.08
v/c Ratio	0.57	0.58		0.32	0.61		0.28	0.08			0.36	0.32
Uniform Delay, d1	47.3	14.0		51.4	17.6		31.9	30.3			32.7	32.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	5.2	0.3		4.7	0.4		0.5	0.1			0.7	0.5
Delay (s)	52.4	14.3		56.1	18.0		32.4	30.4			33.4	32.8
Level of Service	D	B		E	B		C	C			C	C
Approach Delay (s)		16.0			18.3			31.9			33.1	
Approach LOS		B			B			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		18.6										
HCM 2000 Volume to Capacity ratio		0.53										
Actuated Cycle Length (s)		106.6						15.0				
Intersection Capacity Utilization		74.6%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
43: Ala Moana Park Dr/Kamakee St & Ala Moana Blvd

03/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔↔		↔	↔↔↔		↔	↔			↔	↔
Traffic Volume (vph)	97	2259	181	33	1516	0	56	34	42	97	59	183
Future Volume (vph)	97	2259	181	33	1516	0	56	34	42	97	59	183
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			5.0	5.0
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.95			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			0.95	1.00
Frft	1.00	0.99		1.00	1.00		1.00	0.92			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.97	1.00
Satd. Flow (prot)	1770	4991		1770	5085		1770	1615			1717	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.53	1.00			0.76	1.00
Satd. Flow (perm)	1770	4991		1770	5085		983	1615			1342	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	100	2329	187	34	1563	0	58	35	43	100	61	189
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	100	2511		34	1563		58	78		0	161	189
Confl. Peds. (#/hr)			33				35		65	65		
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		6
Actuated Green, G (s)	13.4	95.9		6.4	88.9		33.5	33.5			33.5	33.5
Effective Green, g (s)	13.4	95.9		6.4	88.9		33.5	33.5			33.5	33.5
Actuated g/C Ratio	0.09	0.64		0.04	0.59		0.22	0.22			0.22	0.22
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	157	3173		75	2997		218	358			298	351
v/s Ratio Prot	c0.06	c0.50		0.02	0.31			0.05				
v/s Ratio Perm							0.06				c0.12	0.12
v/c Ratio	0.64	0.79		0.45	0.52		0.27	0.22			0.54	0.54
Uniform Delay, d1	66.4	20.1		70.5	18.3		48.5	47.9			51.8	51.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	8.2	1.4		4.3	0.2		0.7	0.3			2.0	1.6
Delay (s)	74.5	21.5		74.8	18.5		49.1	48.2			53.8	53.4
Level of Service	E	C		E	B		D	D			D	D
Approach Delay (s)		23.6			19.7			48.6			53.6	
Approach LOS		C			B			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		25.2										
HCM 2000 Volume to Capacity ratio		0.73										
Actuated Cycle Length (s)		150.8						15.0				
Intersection Capacity Utilization		89.2%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
44: Ala Moana Blvd & Queens St

02/09/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑↑↑	↑↑↑		↖	↗
Traffic Volume (vph)	18	1673	1588	164	27	25
Future Volume (vph)	18	1673	1588	164	27	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.91	0.91		0.97	1.00
Frb, ped/bikes	1.00	1.00	1.00		1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	5085	4998		3433	1505
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	5085	4998		3433	1505
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	19	1743	1654	171	28	26
RTOR Reduction (vph)	0	0	8	0	0	20
Lane Group Flow (vph)	19	1743	1817	0	28	6
Confl. Peds. (#/hr)				23		39
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	2.7	75.3	67.6		23.2	23.2
Effective Green, g (s)	2.7	75.3	67.6		23.2	23.2
Actuated g/C Ratio	0.02	0.69	0.62		0.21	0.21
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	44	3529	3113		734	321
v/s Ratio Prot	0.01	c0.34	c0.36		c0.01	
v/s Ratio Perm						0.00
v/c Ratio	0.43	0.49	0.58		0.04	0.02
Uniform Delay, d1	52.1	7.7	12.1		33.8	33.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	6.7	0.1	0.3		0.0	0.0
Delay (s)	58.8	7.8	12.4		33.8	33.7
Level of Service	E	A	B		C	C
Approach Delay (s)		8.4	12.4		33.8	
Approach LOS		A	B		C	
<b>Intersection Summary</b>						
HCM 2000 Control Delay			10.8		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.46			
Actuated Cycle Length (s)			108.5		Sum of lost time (s)	15.0
Intersection Capacity Utilization			64.2%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis  
44: Ala Moana Blvd & Queens St

03/09/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑↑↑	↑↑↑		↖	↗
Traffic Volume (vph)	36	2403	1474	332	110	58
Future Volume (vph)	36	2403	1474	332	110	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.91	0.91		0.97	1.00
Frb, ped/bikes	1.00	1.00	0.99		1.00	0.91
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	5085	4873		3433	1434
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	5085	4873		3433	1434
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	38	2529	1552	349	116	61
RTOR Reduction (vph)	0	0	19	0	0	50
Lane Group Flow (vph)	38	2529	1882	0	116	12
Confl. Peds. (#/hr)				52	29	65
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	7.0	108.8	96.8		27.6	27.6
Effective Green, g (s)	7.0	108.8	96.8		27.6	27.6
Actuated g/C Ratio	0.05	0.74	0.66		0.19	0.19
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	84	3779	3222		647	270
v/s Ratio Prot	0.02	c0.50	0.39		c0.03	
v/s Ratio Perm						0.01
v/c Ratio	0.45	0.67	0.58		0.18	0.04
Uniform Delay, d1	67.8	9.6	13.7		49.9	48.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.8	0.5	0.3		0.1	0.1
Delay (s)	71.7	10.1	14.0		50.0	48.7
Level of Service	E	B	B		D	D
Approach Delay (s)		11.0	14.0		49.6	
Approach LOS		B	B		D	
<b>Intersection Summary</b>						
HCM 2000 Control Delay			13.7		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.59			
Actuated Cycle Length (s)			146.4		Sum of lost time (s)	15.0
Intersection Capacity Utilization			80.2%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

**APPENDIX F**  
**CAPACITY ANALYSIS CALCULATIONS**  
**PROJECTED YEAR 2027 PEAK PERIOD TRAFFIC**  
**ANALYSIS WITH PROJECT**

**HCM Signalized Intersection Capacity Analysis**  
**15: Ward Ave & Queen St**

02/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	172	36	59	310	57	49	423	82	66	618	198
Future Volume (vph)	62	172	36	59	310	57	49	423	82	66	618	198
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	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frb, ped/bikes	1.00	1.00	0.89	1.00	1.00	0.98	1.00	0.97		1.00	0.99	
Flpb, ped/bikes	0.99	1.00	1.00	0.92	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1759	1863	1406	1630	1863	1548	1770	3356		1770	3368	
Flt Permitted	0.41	1.00	1.00	0.64	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	761	1863	1406	1095	1863	1548	1770	3356		1770	3368	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	65	181	38	62	326	60	52	445	86	69	651	208
RTOR Reduction (vph)	0	0	27	0	0	42	0	18	0	0	34	0
Lane Group Flow (vph)	65	181	11	62	326	18	52	513	0	69	825	0
Confl. Peds. (#/hr)	15		146	146		15			144			30
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	19.1	19.1	19.1	19.1	19.1	19.1	3.4	25.0		6.0	27.6	
Effective Green, g (s)	19.1	19.1	19.1	19.1	19.1	19.1	3.4	25.0		6.0	27.6	
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.29	0.29	0.05	0.38		0.09	0.42	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	223	546	412	321	546	454	92	1288		163	1427	
v/s Ratio Prot		0.10			c0.18		0.03	0.15		c0.04	c0.24	
v/s Ratio Perm	0.09		0.01	0.06		0.01						
v/c Ratio	0.29	0.33	0.03	0.19	0.60	0.04	0.57	0.40		0.42	0.58	
Uniform Delay, d1	17.8	18.0	16.4	17.2	19.7	16.4	30.1	14.6		27.9	14.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.4	0.0	0.3	1.8	0.0	7.7	0.2		1.8	0.6	
Delay (s)	18.5	18.4	16.4	17.5	21.5	16.5	37.9	14.8		29.7	14.9	
Level of Service	B	B	B	B	C	B	D	B		C	B	
Approach Delay (s)		18.1			20.3			16.8			16.0	
Approach LOS		B			C			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			17.3				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			65.1				Sum of lost time (s)				15.0	
Intersection Capacity Utilization			71.8%				ICU Level of Service				C	
Analysis Period (min)			15									
c Critical Lane Group												



HCM Signalized Intersection Capacity Analysis  
15: Ward Ave & Queen St

03/10/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	→	↗	↖	→	↗	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	82	374	72	79	279	92	51	630	113	144	605	90
Future Volume (vph)	82	374	72	79	279	92	51	630	113	144	605	90
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	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.87	1.00	1.00	0.88	1.00	0.94		1.00	0.99	
Flpb, ped/bikes	0.93	1.00	1.00	0.94	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1651	1863	1381	1672	1863	1389	1770	3252		1770	3432	
Flt Permitted	0.42	1.00	1.00	0.26	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	726	1863	1381	462	1863	1389	1770	3252		1770	3432	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	86	394	76	83	294	97	54	663	119	152	637	95
RTOR Reduction (vph)	0	0	55	0	0	70	0	15	0	0	12	0
Lane Group Flow (vph)	86	394	21	83	294	27	54	767	0	152	720	0
Confl. Peds. (#/hr)	136		142	142		136			294			52
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	21.4	21.4	21.4	21.4	21.4	21.4	3.7	29.7		11.6	37.6	
Effective Green, g (s)	21.4	21.4	21.4	21.4	21.4	21.4	3.7	29.7		11.6	37.6	
Actuated g/C Ratio	0.28	0.28	0.28	0.28	0.28	0.28	0.05	0.38		0.15	0.48	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	199	513	380	127	513	382	84	1243		264	1660	
v/s Ratio Prot		c0.21			0.16		0.03	c0.24		c0.09	0.21	
v/s Ratio Perm	0.12		0.02	0.18		0.02						
v/c Ratio	0.43	0.77	0.06	0.65	0.57	0.07	0.64	0.62		0.58	0.43	
Uniform Delay, d1	23.2	25.9	20.7	24.9	24.2	20.8	36.4	19.4		30.8	13.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	6.8	0.1	11.5	1.6	0.1	15.6	0.9		3.0	0.2	
Delay (s)	24.7	32.7	20.8	36.3	25.8	20.9	52.0	20.3		33.8	13.3	
Level of Service	C	C	C	D	C	C	D	C		C	B	
Approach Delay (s)		29.8			26.6			22.4			16.8	
Approach LOS		C			C			C			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		22.8										
HCM 2000 Volume to Capacity ratio		0.66										
Actuated Cycle Length (s)		77.7										
Intersection Capacity Utilization		77.4%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
16: Kamakee St & Queen St

02/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↖	↗		↖	↗		↖	↗	↖
Traffic Volume (vph)	28	212	39	112	261	21	25	119	91	30	111	73
Future Volume (vph)	28	212	39	112	261	21	25	119	91	30	111	73
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	5.0
Lane Util. Factor		0.95		1.00	0.95		1.00	1.00			1.00	1.00
Frpb, ped/bikes		0.99		1.00	1.00		1.00	0.99			1.00	0.94
Flpb, ped/bikes		1.00		1.00	1.00		0.96	1.00			1.00	1.00
Frt		0.98		1.00	0.99		1.00	0.93			1.00	0.85
Flt Protected		1.00		0.95	1.00		0.95	1.00			0.99	1.00
Satd. Flow (prot)		3417		1770	3494		1694	1730			1842	1483
Flt Permitted		0.90		0.95	1.00		0.66	1.00			0.89	1.00
Satd. Flow (perm)		3097		1770	3494		1183	1730			1662	1483
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	29	221	41	117	272	22	26	124	95	31	116	76
RTOR Reduction (vph)	0	14	0	0	7	0	0	35	0	0	0	57
Lane Group Flow (vph)	0	277	0	117	287	0	26	184	0	0	147	19
Confl. Peds. (#/hr)	12		64			12	73		5	5		73
Turn Type	Perm	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2		1	6		8	8		4	4	
Permitted Phases	2						8			4		4
Actuated Green, G (s)		16.0		7.1	28.1		12.4	12.4			12.4	12.4
Effective Green, g (s)		16.0		7.1	28.1		12.4	12.4			12.4	12.4
Actuated g/C Ratio		0.32		0.14	0.56		0.25	0.25			0.25	0.25
Clearance Time (s)		5.0		5.0	5.0		5.0	5.0			5.0	5.0
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		981		248	1944		290	424			408	364
v/s Ratio Prot				c0.07	0.08			c0.11				
v/s Ratio Perm		c0.09					0.02				0.09	0.01
v/c Ratio		0.28		0.47	0.15		0.09	0.43			0.36	0.05
Uniform Delay, d1		12.9		20.0	5.4		14.7	16.1			15.8	14.6
Progression Factor		1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		0.2		1.4	0.0		0.1	0.7			0.5	0.1
Delay (s)		13.1		21.4	5.4		14.8	16.8			16.3	14.6
Level of Service		B		C	A		B	B			B	B
Approach Delay (s)		13.1			10.0			16.6				15.7
Approach LOS		B			A			B				B
<b>Intersection Summary</b>												
HCM 2000 Control Delay		13.2										B
HCM 2000 Volume to Capacity ratio		0.37										
Actuated Cycle Length (s)		50.5									15.0	
Intersection Capacity Utilization		71.9%									C	
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
16: Kamakee St & Queen St

03/10/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔			↔	↔
Traffic Volume (vph)	103	439	104	270	392	36	23	152	106	58	132	70
Future Volume (vph)	103	439	104	270	392	36	23	152	106	58	132	70
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	5.0
Lane Util. Factor		0.95		1.00	0.95		1.00	1.00			1.00	1.00
Frpb, ped/bikes		0.96		1.00	1.00		1.00	0.97			1.00	0.63
Flpb, ped/bikes		1.00		1.00	1.00		0.74	1.00			0.99	1.00
Frt		0.98		1.00	0.99		1.00	0.94			1.00	0.85
Flt Protected		0.99		0.95	1.00		0.95	1.00			0.99	1.00
Satd. Flow (prot)		3289		1770	3482		1315	1703			1817	998
Flt Permitted		0.79		0.95	1.00		0.56	1.00			0.69	1.00
Satd. Flow (perm)		2610		1770	3482		782	1703			1277	998
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	107	457	108	281	408	38	24	158	110	60	138	73
RTOR Reduction (vph)	0	18	0	0	8	0	0	28	0	0	0	55
Lane Group Flow (vph)	0	654	0	281	438	0	24	240	0	0	198	18
Confl. Peds. (#/hr)	25		190			25	179		48	48		179
Turn Type	Perm	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2		1	6			8			4	
Permitted Phases	2						8			4		4
Actuated Green, G (s)		25.4		16.6	47.0		18.8	18.8			18.8	18.8
Effective Green, g (s)		25.4		16.6	47.0		18.8	18.8			18.8	18.8
Actuated g/C Ratio		0.34		0.22	0.62		0.25	0.25			0.25	0.25
Clearance Time (s)		5.0		5.0	5.0		5.0	5.0			5.0	5.0
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		874		387	2159		193	422			316	247
v/s Ratio Prot				c0.16	0.13			0.14				
v/s Ratio Perm		c0.25					0.03				c0.16	0.02
v/c Ratio		0.75		0.73	0.20		0.12	0.57			0.63	0.07
Uniform Delay, d1		22.4		27.5	6.3		22.1	25.0			25.4	21.8
Progression Factor		1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		3.5		6.6	0.0		0.3	1.8			3.8	0.1
Delay (s)		25.9		34.1	6.3		22.4	26.7			29.2	22.0
Level of Service		C		C	A		C	C			C	C
Approach Delay (s)		25.9			17.1			26.4			27.3	
Approach LOS		C			B			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		22.9										
HCM 2000 Volume to Capacity ratio		0.70										
Actuated Cycle Length (s)		75.8						15.0				
Intersection Capacity Utilization		84.8%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis  
17: Queens Ln & Queen St

02/09/2023

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔	↔	↔	↔
Traffic Volume (veh/h)	298	15	95	376	26	90
Future Volume (Veh/h)	298	15	95	376	26	90
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	331	17	106	418	29	100
Pedestrians					8	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					1	
Right turn flare (veh)						
Median type	TWLT			None		
Median storage veh	2					
Upstream signal (ft)	564			680		
pX, platoon unblocked						
vC, conflicting volume			356		768	182
vC1, stage 1 conf vol					348	
vC2, stage 2 conf vol					421	
vCu, unblocked vol			356		768	182
tC, single (s)			4.1		*5.8	*5.9
tC, 2 stage (s)					4.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			91		95	88
cM capacity (veh/h)			1191		573	868
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	221	127	106	209	209	129
Volume Left	0	0	106	0	0	29
Volume Right	0	17	0	0	0	100
cSH	1700	1700	1191	1700	1700	778
Volume to Capacity	0.13	0.07	0.09	0.12	0.12	0.17
Queue Length 95th (ft)	0	0	7	0	0	15
Control Delay (s)	0.0	0.0	8.3	0.0	0.0	10.5
Lane LOS			A			B
Approach Delay (s)	0.0		1.7			10.5
Approach LOS						B
<b>Intersection Summary</b>						
Average Delay			2.2			
Intersection Capacity Utilization			32.1%		ICU Level of Service	A
Analysis Period (min)			15			
* User Entered Value						

HCM Unsignalized Intersection Capacity Analysis  
17: Queens Ln & Queen St

03/10/2023

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↖	↑↑	↖	
Traffic Volume (veh/h)	637	48	119	626	44	223
Future Volume (Veh/h)	637	48	119	626	44	223
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	671	51	125	659	46	235
Pedestrians	27					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	2					
Right turn flare (veh)						
Median type	TWLTL		None			
Median storage (veh)	2					
Upstream signal (ft)	564		687			
pX, platoon unblocked			0.96	0.96	0.96	0.96
vC, conflicting volume			749	1303	388	
vC1, stage 1 conf vol	724					
vC2, stage 2 conf vol	580					
vCu, unblocked vol			654	1231	277	
tC, single (s)			4.1	*5.8	*5.9	
tC, 2 stage (s)	4.8					
tF (s)			2.2	*3.0	*3.0	
p0 queue free %			86	90	71	
cM capacity (veh/h)			871	467	800	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	447	275	125	330	330	281
Volume Left	0	0	125	0	0	46
Volume Right	0	51	0	0	0	235
cSH	1700	1700	871	1700	1700	716
Volume to Capacity	0.26	0.16	0.14	0.19	0.19	0.39
Queue Length 95th (ft)	0	0	12	0	0	47
Control Delay (s)	0.0	0.0	9.8	0.0	0.0	13.2
Lane LOS			A			B
Approach Delay (s)	0.0		1.6		13.2	
Approach LOS					B	
<b>Intersection Summary</b>						
Average Delay	2.8					
Intersection Capacity Utilization			52.1%	ICU Level of Service		A
Analysis Period (min)	15					
* User Entered Value						

HCM Signalized Intersection Capacity Analysis  
24: Ward Ave & Halekauwila St

02/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↑	↗	↖	↑	↗	↖	↑	↗
Traffic Volume (vph)	85	17	14	3	15	27	44	428	6	26	482	192
Future Volume (vph)	85	17	14	3	15	27	44	428	6	26	482	192
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		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frb, ped/bikes	1.00	0.98		1.00	0.96		1.00	1.00		1.00	0.96	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.96	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.90		1.00	1.00		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1698		1770	1621		1701	3529		1770	3269	
Flt Permitted	0.73	1.00		0.74	1.00		0.37	1.00		0.49	1.00	
Satd. Flow (perm)	1358	1698		1372	1621		656	3529		919	3269	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	88	18	14	3	15	28	45	441	6	27	497	198
RTOR Reduction (vph)	0	10	0	0	20	0	0	1	0	0	48	0
Lane Group Flow (vph)	88	22	0	3	23	0	45	446	0	27	647	0
Confl. Peds. (#/hr)			78				47		85		47	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases			4				2				6	
Permitted Phases	4				8		2				6	
Actuated Green, G (s)	14.9	14.9		14.9	14.9		24.6	24.6		24.6	24.6	
Effective Green, g (s)	14.9	14.9		14.9	14.9		24.6	24.6		24.6	24.6	
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.50	0.50		0.50	0.50	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	408	511		412	487		326	1753		456	1624	
v/s Ratio Prot			0.01				0.13				c0.20	
v/s Ratio Perm	c0.06			0.00			0.07			0.03		
v/c Ratio	0.22	0.04		0.01	0.05		0.14	0.25		0.06	0.40	
Uniform Delay, d1	12.9	12.3		12.1	12.3		6.7	7.2		6.5	7.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.0		0.0	0.0		0.2	0.1		0.1	0.2	
Delay (s)	13.2	12.3		12.1	12.3		6.9	7.2		6.5	8.0	
Level of Service	B	B		B	B		A	A		A	A	
Approach Delay (s)			13.0				7.2				7.9	
Approach LOS			B				A				A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			8.3				HCM 2000 Level of Service				A	
HCM 2000 Volume to Capacity ratio			0.33									
Actuated Cycle Length (s)			49.5				Sum of lost time (s)				10.0	
Intersection Capacity Utilization			57.8%				ICU Level of Service				B	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
24: Ward Ave & Halekauwila St

03/10/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	↖
Traffic Volume (vph)	176	45	61	9	19	27	49	554	15	38	576	109
Future Volume (vph)	176	45	61	9	19	27	49	554	15	38	576	109
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		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.93		1.00	0.93		1.00	1.00		1.00	0.96	
Flpb, ped/bikes	0.90	1.00		0.90	1.00		0.93	1.00		0.93	1.00	
Frt	1.00	0.91		1.00	0.91		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1590	1579		1595	1582		1641	3509		1649	3327	
Flt Permitted	0.73	1.00		0.69	1.00		0.32	1.00		0.39	1.00	
Satd. Flow (perm)	1215	1579		1151	1582		553	3509		684	3327	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	183	47	64	9	20	28	51	577	16	40	600	114
RTOR Reduction (vph)	0	38	0	0	17	0	0	2	0	0	19	0
Lane Group Flow (vph)	183	73	0	9	31	0	51	591	0	40	695	0
Confl. Peds. (#/hr)	121		185	185		121	160		121	121		160
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	22.0	22.0		22.0	22.0		21.8	21.8		21.8	21.8	
Effective Green, g (s)	22.0	22.0		22.0	22.0		21.8	21.8		21.8	21.8	
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.41	0.41		0.41	0.41	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	496	645		470	646		224	1421		277	1348	
v/s Ratio Prot		0.05			0.02			0.17			c0.21	
v/s Ratio Perm	c0.15			0.01			0.09			0.06		
v/c Ratio	0.37	0.11		0.02	0.05		0.23	0.42		0.14	0.52	
Uniform Delay, d1	11.1	9.9		9.5	9.6		10.5	11.4		10.1	12.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.1		0.0	0.0		0.5	0.2		0.2	0.3	
Delay (s)	11.5	9.9		9.5	9.6		11.0	11.6		10.3	12.4	
Level of Service	B	A		A	A		B	B		B	B	
Approach Delay (s)		10.9			9.6			11.6			12.3	
Approach LOS		B			A			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		11.7						HCM 2000 Level of Service			B	
HCM 2000 Volume to Capacity ratio		0.44										
Actuated Cycle Length (s)		53.8						Sum of lost time (s)			10.0	
Intersection Capacity Utilization		58.0%						ICU Level of Service			B	
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
34: Ward Ave & Pohukaina St/Auahi St

02/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	↖
Traffic Volume (vph)	71	43	81	58	70	117	76	276	46	32	377	89
Future Volume (vph)	71	43	81	58	70	117	76	276	46	32	377	89
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		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.97	1.00		0.97	1.00		0.97	1.00	
Frt	1.00	0.90		1.00	0.91		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1761	1635		1724	1669		1720	3431		1718	3389	
Flt Permitted	0.64	1.00		0.67	1.00		0.48	1.00		0.55	1.00	
Satd. Flow (perm)	1177	1635		1224	1669		860	3431		993	3389	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	74	45	84	60	73	122	79	288	48	33	393	93
RTOR Reduction (vph)	0	57	0	0	76	0	0	16	0	0	25	0
Lane Group Flow (vph)	74	72	0	60	119	0	79	320	0	33	461	0
Confl. Peds. (#/hr)	14		67	67		14	75		63	63		75
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	13.1	13.1		13.1	13.1		18.2	18.2		18.2	18.2	
Effective Green, g (s)	13.1	13.1		13.1	13.1		18.2	18.2		18.2	18.2	
Actuated g/C Ratio	0.32	0.32		0.32	0.32		0.44	0.44		0.44	0.44	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	373	518		388	529		378	1511		437	1493	
v/s Ratio Prot		0.04			c0.07			0.09			c0.14	
v/s Ratio Perm	0.06			0.05			0.09			0.03		
v/c Ratio	0.20	0.14		0.15	0.23		0.21	0.21		0.08	0.31	
Uniform Delay, d1	10.3	10.1		10.1	10.4		7.1	7.1		6.7	7.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.1		0.2	0.2		0.3	0.1		0.1	0.1	
Delay (s)	10.5	10.2		10.3	10.6		7.4	7.2		6.8	7.6	
Level of Service	B	B		B	B		A	A		A	A	
Approach Delay (s)		10.3			10.5			7.2			7.5	
Approach LOS		B			B			A			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		8.4						HCM 2000 Level of Service			A	
HCM 2000 Volume to Capacity ratio		0.27										
Actuated Cycle Length (s)		41.3						Sum of lost time (s)			10.0	
Intersection Capacity Utilization		68.0%						ICU Level of Service			C	
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
34: Ward Ave & Pohukaina St/Auahi St

03/10/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	↖
Traffic Volume (vph)	44	93	55	102	83	168	63	376	124	149	349	100
Future Volume (vph)	44	93	55	102	83	168	63	376	124	149	349	100
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		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Flpb, ped/bikes	1.00	0.97		1.00	0.91		1.00	0.95		1.00	0.97	
Flpb, ped/bikes	0.92	1.00		0.94	1.00		0.97	1.00		0.91	1.00	
Frt	1.00	0.94		1.00	0.90		1.00	0.96		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1631	1706		1668	1532		1709	3222		1606	3330	
Flt Permitted	0.56	1.00		0.65	1.00		0.46	1.00		0.42	1.00	
Satd. Flow (perm)	957	1706		1149	1532		823	3222		710	3330	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	48	102	60	112	91	185	69	413	136	164	384	110
RTOR Reduction (vph)	0	22	0	0	76	0	0	43	0	0	35	0
Lane Group Flow (vph)	48	140	0	112	200	0	69	506	0	164	459	0
Confl. Peds. (#/hr)	200		122	122		200	66		194	194		96
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.0	24.0		24.0	24.0		24.9	24.9		24.9	24.9	
Effective Green, g (s)	24.0	24.0		24.0	24.0		24.9	24.9		24.9	24.9	
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.42	0.42		0.42	0.42	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	389	695		468	624		347	1362		300	1407	
v/s Ratio Prot		0.08			c0.13			0.16			0.14	
v/s Ratio Perm	0.05			0.10			0.08			c0.23		
v/c Ratio	0.12	0.20		0.24	0.32		0.20	0.37		0.55	0.33	
Uniform Delay, d1	10.9	11.3		11.5	11.9		10.7	11.6		12.8	11.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.1		0.3	0.3		0.3	0.2		2.0	0.1	
Delay (s)	11.0	11.4		11.7	12.2		11.0	11.8		14.8	11.5	
Level of Service	B	B		B	B		B	B		B	B	
Approach Delay (s)		11.3			12.1			11.7			12.3	
Approach LOS		B			B			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		12.0			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.44										
Actuated Cycle Length (s)		58.9			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		78.6%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
35: Kamakee St & Auahi St

02/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↖	↖	↗	↖	↖	↗	↖
Traffic Volume (vph)	74	13	85	20	40	105	10	78	9	1	164	128
Future Volume (vph)	74	13	85	20	40	105	10	78	9	1	164	128
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	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.96		1.00	1.00	0.95	1.00	1.00	0.96	1.00	1.00	0.92
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.98	1.00	1.00
Frt	1.00	0.87		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1549		1770	1863	1506	1680	1863	1512	1729	1863	1452
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.65	1.00	1.00	0.70	1.00	1.00
Satd. Flow (perm)	1770	1549		1770	1863	1506	1148	1863	1512	1282	1863	1452
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	77	14	89	21	42	109	10	81	9	1	171	133
RTOR Reduction (vph)	0	61	0	0	0	82	0	0	5	0	0	81
Lane Group Flow (vph)	77	42	0	21	42	27	10	81	4	1	171	52
Confl. Peds. (#/hr)			51			36	63		25	25		63
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2		2	6		6
Actuated Green, G (s)	4.7	17.3		1.2	13.8	13.8	21.6	21.6	21.6	21.6	21.6	21.6
Effective Green, g (s)	4.7	17.3		1.2	13.8	13.8	21.6	21.6	21.6	21.6	21.6	21.6
Actuated g/C Ratio	0.09	0.31		0.02	0.25	0.25	0.39	0.39	0.39	0.39	0.39	0.39
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	150	486		38	466	377	450	730	592	502	730	569
v/s Ratio Prot	c0.04	c0.03		0.01	0.02		0.04			c0.09		
v/s Ratio Perm						0.02	0.01		0.00	0.00		0.04
v/c Ratio	0.51	0.09		0.55	0.09	0.07	0.02	0.11	0.01	0.00	0.23	0.09
Uniform Delay, d1	24.1	13.3		26.7	15.8	15.8	10.3	10.6	10.2	10.2	11.2	10.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.9	0.1		16.2	0.1	0.1	0.0	0.1	0.0	0.0	0.2	0.1
Delay (s)	27.1	13.4		42.9	15.9	15.8	10.3	10.7	10.2	10.2	11.4	10.6
Level of Service	C	B		D	B	B	B	B	B	B	B	B
Approach Delay (s)		19.2			19.2			10.6			11.1	
Approach LOS		B			B			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		14.8			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.21										
Actuated Cycle Length (s)		55.1			Sum of lost time (s)			15.0				
Intersection Capacity Utilization		57.9%			ICU Level of Service			B				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
35: Kamakee St & Auahi St

03/10/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖	↗		↖	↗	↗	↖	↗	↗	↖	↗	↗	
Traffic Volume (vph)	96	146	82	21	109	192	42	81	1	31	240	165	
Future Volume (vph)	96	146	82	21	109	192	42	81	1	31	240	165	
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	5.0	5.0	5.0	5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.94		1.00	1.00	0.81	1.00	1.00	0.77	1.00	1.00	0.71	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.81	1.00	1.00	0.81	1.00	1.00	
Frft	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1660		1770	1863	1286	1437	1863	1222	1435	1863	1120	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.55	1.00	1.00	0.70	1.00	1.00	
Satd. Flow (perm)	1770	1660		1770	1863	1286	836	1863	1222	1062	1863	1120	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	
Adj. Flow (vph)	98	149	84	21	111	196	43	83	1	32	245	168	
RTOR Reduction (vph)	0	25	0	0	0	129	0	0	1	0	0	108	
Lane Group Flow (vph)	98	208	0	21	111	67	43	83	0	32	245	60	
Confl. Peds. (#/hr)	161		147	147		161	177		141	141		177	
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	
Protected Phases	7	4		3	8			2			6		
Permitted Phases						8	2		2	6		6	
Actuated Green, G (s)	6.7	29.7		1.7	24.7	24.7	25.9	25.9	25.9	25.9	25.9	25.9	
Effective Green, g (s)	6.7	29.7		1.7	24.7	24.7	25.9	25.9	25.9	25.9	25.9	25.9	
Actuated g/C Ratio	0.09	0.41		0.02	0.34	0.34	0.36	0.36	0.36	0.36	0.36	0.36	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	164	681		41	636	439	299	667	437	380	667	401	
v/s Ratio Prot	c0.06	c0.13		0.01	0.06			0.04			c0.13		
v/s Ratio Perm						0.05	0.05		0.00	0.03		0.05	
v/c Ratio	0.60	0.31		0.51	0.17	0.15	0.14	0.12	0.00	0.08	0.37	0.15	
Uniform Delay, d1	31.5	14.4		34.9	16.7	16.5	15.7	15.6	14.9	15.4	17.1	15.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.7	0.3		10.4	0.1	0.2	0.2	0.1	0.0	0.1	0.3	0.2	
Delay (s)	37.3	14.6		45.3	16.8	16.7	15.9	15.7	14.9	15.4	17.5	15.9	
Level of Service	D	B		D	B	B	B	B	B	B	B	B	
Approach Delay (s)		21.3			18.6			15.7			16.7		
Approach LOS		C			B			B			B		
<b>Intersection Summary</b>													
HCM 2000 Control Delay	18.4			HCM 2000 Level of Service				B					
HCM 2000 Volume to Capacity ratio	0.37												
Actuated Cycle Length (s)	72.3			Sum of lost time (s)				15.0					
Intersection Capacity Utilization	66.0%			ICU Level of Service				C					
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis  
36: Queens Lane/Queens Ln & Auahi St

02/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↖	↗				↖	↗			↖	↗	
Traffic Volume (vph)	40	4	10	0	0	0	139	70	7	5	37	58	
Future Volume (vph)	40	4	10	0	0	0	139	70	7	5	37	58	
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	1.00				1.00	1.00			1.00	1.00	
Frpb, ped/bikes		1.00	0.98				1.00	1.00			1.00	0.94	
Flpb, ped/bikes		0.97	1.00				1.00	1.00			1.00	1.00	
Frft		1.00	0.85				1.00	0.99			1.00	0.92	
Flt Protected		0.96	1.00				0.95	1.00			1.00	1.00	
Satd. Flow (prot)		1729	1546				1770	1831			1609	1609	
Flt Permitted		0.96	1.00				0.95	1.00			0.99	0.99	
Satd. Flow (perm)		1729	1546				1770	1831			1598	1598	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	42	4	11	0	0	0	146	74	7	5	39	61	
RTOR Reduction (vph)	0	0	10	0	0	0	0	2	0	0	36	0	
Lane Group Flow (vph)	0	46	1	0	0	0	146	79	0	0	69	0	
Confl. Peds. (#/hr)	23		14	14		23			21	21		60	
Turn Type	Perm	NA	Perm				Prot	NA		Perm	NA		
Protected Phases		4					5	2			6		
Permitted Phases	4		4							6			
Actuated Green, G (s)		6.6	6.6				8.2	33.4			20.2		
Effective Green, g (s)		6.6	6.6				8.2	33.4			20.2		
Actuated g/C Ratio		0.13	0.13				0.16	0.67			0.40		
Clearance Time (s)		5.0	5.0				5.0	5.0			5.0		
Vehicle Extension (s)		3.0	3.0				3.0	3.0			3.0		
Lane Grp Cap (vph)		228	204				290	1223			645		
v/s Ratio Prot							c0.08	0.04					
v/s Ratio Perm		0.03	0.00								c0.04		
v/c Ratio		0.20	0.01				0.50	0.06			0.11		
Uniform Delay, d1		19.4	18.9				19.0	2.9			9.3		
Progression Factor		1.00	1.00				1.00	1.00			1.00		
Incremental Delay, d2		0.4	0.0				1.4	0.0			0.1		
Delay (s)		19.8	18.9				20.4	2.9			9.4		
Level of Service		B	B				C	A			A		
Approach Delay (s)		19.6			0.0		14.2				9.4		
Approach LOS		B			A		B				A		
<b>Intersection Summary</b>													
HCM 2000 Control Delay	13.7			HCM 2000 Level of Service				B					
HCM 2000 Volume to Capacity ratio	0.22												
Actuated Cycle Length (s)	50.0			Sum of lost time (s)				15.0					
Intersection Capacity Utilization	34.3%			ICU Level of Service				A					
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis  
36: Queens Lane/Queens Ln & Auahi St

03/10/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗				↖	↕			↔	
Traffic Volume (vph)	137	6	119	0	0	0	240	104	10	3	86	86
Future Volume (vph)	137	6	119	0	0	0	240	104	10	3	86	86
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	
Lane Util. Factor		1.00	1.00				1.00	1.00			1.00	
Flpb, ped/bikes		1.00	0.94				1.00	0.99			0.89	
Flpb, ped/bikes		0.87	1.00				1.00	1.00			1.00	
Frt		1.00	0.85				1.00	0.99			0.93	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1552	1490				1770	1815			1552	
Flt Permitted		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (perm)		1552	1490				1770	1815			1547	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	138	6	120	0	0	0	242	105	10	3	87	87
RTOR Reduction (vph)	0	0	89	0	0	0	0	4	0	0	40	0
Lane Group Flow (vph)	0	144	31	0	0	0	242	111	0	0	137	0
Confl. Peds. (#/hr)	80		48	48		80			77	77		120
Turn Type	Perm	NA	Perm				Prot	NA		Perm	NA	
Protected Phases		4					5	2			6	
Permitted Phases	4		4							6		
Actuated Green, G (s)		15.3	15.3				13.8	34.2			15.4	
Effective Green, g (s)		15.3	15.3				13.8	34.2			15.4	
Actuated g/C Ratio		0.26	0.26				0.23	0.57			0.26	
Clearance Time (s)		5.0	5.0				5.0	5.0			5.0	
Vehicle Extension (s)		3.0	3.0				3.0	3.0			3.0	
Lane Grp Cap (vph)		399	383				410	1043			400	
v/s Ratio Prot							c0.14	0.06				
v/s Ratio Perm		0.09	0.02								c0.09	
v/c Ratio		0.36	0.08				0.59	0.11			0.34	
Uniform Delay, d1		18.1	16.8				20.3	5.7			17.9	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		0.6	0.1				2.3	0.0			0.5	
Delay (s)		18.7	16.9				22.6	5.8			18.4	
Level of Service		B	B				C	A			B	
Approach Delay (s)		17.8			0.0			17.2			18.4	
Approach LOS		B			A			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		17.7										B
HCM 2000 Volume to Capacity ratio		0.43										
Actuated Cycle Length (s)		59.5						Sum of lost time (s)		15.0		
Intersection Capacity Utilization		57.2%						ICU Level of Service		B		
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
41: Ala Moana Blvd & Ward Ave

02/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	180	1418	4	96	1461	161	3	22	34	237	77	156
Future Volume (vph)	180	1418	4	96	1461	161	3	22	34	237	77	156
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		5.0	5.0
Lane Util. Factor		1.00	0.91		1.00	0.91		1.00	1.00		0.95	0.91
Flpb, ped/bikes		1.00	1.00		1.00	1.00		0.84	0.84		1.00	0.93
Flpb, ped/bikes		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Frt		1.00	1.00		1.00	1.00		0.85	0.85		1.00	0.92
Flt Protected		0.95	1.00		0.95	1.00		1.00	1.00		0.99	0.99
Satd. Flow (prot)		1770	5083		1770	5085		1337	1337		3519	1473
Flt Permitted		0.95	1.00		0.95	1.00		1.00	1.00		0.99	0.99
Satd. Flow (perm)		1770	5083		1770	5085		1337	1337		3519	1473
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	189	1493	4	101	1538	169	3	23	36	249	81	164
RTOR Reduction (vph)	0	0	0	0	0	85	0	0	0	0	0	0
Lane Group Flow (vph)	189	1497	0	101	1538	84	0	26	36	169	325	0
Confl. Peds. (#/hr)			13			94			51			73
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6			8			
Actuated Green, G (s)		17.5	52.7		11.5	46.7		46.7	46.7		25.2	25.2
Effective Green, g (s)		17.5	52.7		11.5	46.7		46.7	46.7		25.2	25.2
Actuated g/C Ratio		0.13	0.39		0.09	0.35		0.35	0.35		0.19	0.19
Clearance Time (s)		5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		229	1981		150	1756		461	461		655	274
v/s Ratio Prot		c0.11	0.29		0.06	c0.30		0.01	0.01		0.10	c0.11
v/s Ratio Perm						0.06					c0.02	
v/c Ratio		0.83	0.76		0.67	0.88		0.18	0.18		0.04	0.13
Uniform Delay, d1		57.4	35.7		60.0	41.5		30.9	30.9		45.1	45.9
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		20.9	1.7		11.3	5.2		0.2	0.2		2.1	1.6
Delay (s)		78.3	37.4		71.3	46.8		31.1	31.1		45.1	46.1
Level of Service		E	D		E	D		C	C		D	D
Approach Delay (s)			42.0			46.7					45.7	51.4
Approach LOS			D			D					D	D
<b>Intersection Summary</b>												
HCM 2000 Control Delay		45.3										D
HCM 2000 Volume to Capacity ratio		0.64										
Actuated Cycle Length (s)		135.2						Sum of lost time (s)		20.0		
Intersection Capacity Utilization		88.7%						ICU Level of Service		E		
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
41: Ala Moana Blvd & Ward Ave

03/10/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘	
Traffic Volume (vph)	228	2129	4	58	1448	210	4	90	93	280	65	235	
Future Volume (vph)	228	2129	4	58	1448	210	4	90	93	280	65	235	
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	5.0	5.0	5.0		
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00		0.95	1.00	0.91	0.91		
Frbp, ped/bikes	1.00	1.00		1.00	1.00	0.80		1.00	0.86	1.00	0.96		
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00		
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85	1.00	0.91		
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	0.99		
Satd. Flow (prot)	1770	5083		1770	5085	1262		3532	1367	1610	2930		
Flt Permitted	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	0.99		
Satd. Flow (perm)	1770	5083		1770	5085	1262		3532	1367	1610	2930		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	240	2241	4	61	1524	221	4	95	98	295	68	247	
RTOR Reduction (vph)	0	0	0	0	0	110	0	0	0	0	0	0	
Lane Group Flow (vph)	240	2245	0	61	1524	111	0	99	98	212	398	0	
Confl. Peds. (#/hr)			41			107				94		31	
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	Perm	Split	NA		
Protected Phases	5	2		1	6		8	8		4	4		
Permitted Phases						6			8				
Actuated Green, G (s)	22.0	69.1		6.0	53.1	53.1		35.0	35.0	27.8	27.8		
Effective Green, g (s)	22.0	69.1		6.0	53.1	53.1		35.0	35.0	27.8	27.8		
Actuated g/C Ratio	0.14	0.44		0.04	0.34	0.34		0.22	0.22	0.18	0.18		
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	246	2224		67	1710	424		782	303	283	515		
v/s Ratio Prot	c0.14	c0.44		0.03	0.30			0.03		0.13	c0.14		
v/s Ratio Perm						0.09			c0.07				
v/c Ratio	0.98	1.01		0.91	0.89	0.26		0.13	0.32	0.75	0.97dr		
Uniform Delay, d1	67.7	44.4		75.7	49.7	38.2		49.2	51.5	61.7	62.0		
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00		
Incremental Delay, d2	50.1	21.4		79.0	6.3	0.3		0.1	0.6	10.4	7.1		
Delay (s)	117.8	65.8		154.7	56.0	38.5		49.3	52.1	72.1	69.1		
Level of Service	F	E		F	E	D		D	D	E	E		
Approach Delay (s)		70.8			57.2			50.7			70.2		
Approach LOS		E			E			D			E		
<b>Intersection Summary</b>													
HCM 2000 Control Delay		65.1		HCM 2000 Level of Service					E				
HCM 2000 Volume to Capacity ratio		0.80											
Actuated Cycle Length (s)		157.9		Sum of lost time (s)					20.0				
Intersection Capacity Utilization		102.8%		ICU Level of Service					G				
Analysis Period (min)		15											
dr Defacto Right Lane. Recode with 1 though lane as a right lane.													
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis  
43: Ala Moana Park Dr/Kamakee St & Ala Moana Blvd

02/09/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘	
Traffic Volume (vph)	70	1584	84	12	1554	0	82	20	13	93	27	123	
Future Volume (vph)	70	1584	84	12	1554	0	82	20	13	93	27	123	
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		5.0	5.0		
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		1.00	1.00		
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	1.00		
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00		
Frt	1.00	0.99		1.00	1.00		1.00	0.94		1.00	0.85		
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.96	1.00		
Satd. Flow (prot)	1770	5034		1770	5085		1770	1713		1724	1583		
Flt Permitted	0.95	1.00		0.95	1.00		0.66	1.00		0.75	1.00		
Satd. Flow (perm)	1770	5034		1770	5085		1226	1713		1350	1583		
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	72	1633	87	12	1602	0	85	21	13	96	28	127	
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	0	0	
Lane Group Flow (vph)	72	1716	0	12	1602	0	85	34	0	0	124	127	
Confl. Peds. (#/hr)			18			27			55			6	
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm	
Protected Phases	7	4		3	8			2		2	6	6	
Permitted Phases						2						6	
Actuated Green, G (s)	8.0	61.6		1.3	54.9		27.0	27.0			27.0	27.0	
Effective Green, g (s)	8.0	61.6		1.3	54.9		27.0	27.0			27.0	27.0	
Actuated g/C Ratio	0.08	0.59		0.01	0.52		0.26	0.26			0.26	0.26	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	134	2956		21	2661		315	440			347	407	
v/s Ratio Prot	c0.04	c0.34		0.01	0.32			0.02					
v/s Ratio Perm							0.07				c0.09	0.08	
v/c Ratio	0.54	0.58		0.57	0.60		0.27	0.08			0.36	0.31	
Uniform Delay, d1	46.7	13.6		51.5	17.4		31.1	29.5			31.9	31.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00	
Incremental Delay, d2	4.1	0.3		32.5	0.4		0.5	0.1			0.6	0.4	
Delay (s)	50.8	13.9		84.0	17.8		31.5	29.6			32.5	31.9	
Level of Service	D	B		F	B		C	C			C	C	
Approach Delay (s)		15.3			18.3			31.0			32.2		
Approach LOS		B			B			C			C		
<b>Intersection Summary</b>													
HCM 2000 Control Delay		18.2		HCM 2000 Level of Service					B				
HCM 2000 Volume to Capacity ratio		0.53											
Actuated Cycle Length (s)		104.9		Sum of lost time (s)					15.0				
Intersection Capacity Utilization		74.0%		ICU Level of Service					D				
Analysis Period (min)		15											
c Critical Lane Group													



HCM Signalized Intersection Capacity Analysis  
43: Ala Moana Park Dr/Kamakee St & Ala Moana Blvd

03/10/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↖↖		↖	↖↖↖		↖	↖			↖	↖
Traffic Volume (vph)	89	2259	181	33	1492	0	56	34	42	97	59	180
Future Volume (vph)	89	2259	181	33	1492	0	56	34	42	97	59	180
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			5.0	5.0
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.95			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			0.95	1.00
Frt	1.00	0.99		1.00	1.00		1.00	0.92			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.97	1.00
Satd. Flow (prot)	1770	4991		1770	5085		1770	1615			1717	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.53	1.00			0.76	1.00
Satd. Flow (perm)	1770	4991		1770	5085		983	1615			1342	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	92	2329	187	34	1538	0	58	35	43	100	61	186
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	92	2511	0	34	1538	0	58	78	0	0	161	186
Confl. Peds. (#/hr)			33			35			65	65		
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		6
Actuated Green, G (s)	12.7	95.9		6.4	89.6		33.5	33.5			33.5	33.5
Effective Green, g (s)	12.7	95.9		6.4	89.6		33.5	33.5			33.5	33.5
Actuated g/C Ratio	0.08	0.64		0.04	0.59		0.22	0.22			0.22	0.22
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	149	3173		75	3021		218	358			298	351
v/s Ratio Prot	c0.05	c0.50		0.02	0.30			0.05				
v/s Ratio Perm							0.06				c0.12	0.12
v/c Ratio	0.62	0.79		0.45	0.51		0.27	0.22			0.54	0.53
Uniform Delay, d1	66.7	20.1		70.5	17.8		48.5	47.9			51.8	51.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	7.4	1.4		4.3	0.1		0.7	0.3			2.0	1.4
Delay (s)	74.1	21.5		74.8	17.9		49.1	48.2			53.8	53.2
Level of Service	E	C		E	B		D	D			D	D
Approach Delay (s)		23.4			19.2			48.6			53.5	
Approach LOS		C			B			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		24.9										
HCM 2000 Volume to Capacity ratio		0.73										
Actuated Cycle Length (s)		150.8						15.0				
Intersection Capacity Utilization		89.2%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis  
44: Ala Moana Blvd & Queens St

02/09/2023

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↖↖↖	↖↖↖		↖↖	↖
Traffic Volume (vph)	18	1673	1562	164	18	22
Future Volume (vph)	18	1673	1562	164	18	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.91	0.91		0.97	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	5085	4997		3433	1505
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	5085	4997		3433	1505
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	19	1743	1627	171	19	23
RTOR Reduction (vph)	0	0	8	0	0	18
Lane Group Flow (vph)	19	1743	1790	0	19	5
Confl. Peds. (#/hr)				23		39
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	2.7	73.8	66.1		23.2	23.2
Effective Green, g (s)	2.7	73.8	66.1		23.2	23.2
Actuated g/C Ratio	0.03	0.69	0.62		0.22	0.22
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	44	3507	3086		744	326
v/s Ratio Prot	0.01	c0.34	c0.36		c0.01	
v/s Ratio Perm						0.00
v/c Ratio	0.43	0.50	0.58		0.03	0.02
Uniform Delay, d1	51.4	7.8	12.2		33.0	32.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	6.7	0.1	0.3		0.0	0.0
Delay (s)	58.1	7.9	12.4		33.0	32.9
Level of Service	E	A	B		C	C
Approach Delay (s)		8.5	12.4		33.0	
Approach LOS		A	B		C	
<b>Intersection Summary</b>						
HCM 2000 Control Delay		10.8				
HCM 2000 Volume to Capacity ratio		0.45				
Actuated Cycle Length (s)		107.0				15.0
Intersection Capacity Utilization		63.7%				
Analysis Period (min)		15				
c Critical Lane Group						



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵	↑↑↑	↑↑↑		↵↵	↵
Traffic Volume (vph)	36	2403	1460	332	92	48
Future Volume (vph)	36	2403	1460	332	92	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.91	0.91		0.97	1.00
Frpb, ped/bikes	1.00	1.00	0.99		1.00	0.91
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	5085	4871		3433	1434
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	5085	4871		3433	1434
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	38	2529	1537	349	97	51
RTOR Reduction (vph)	0	0	20	0	0	41
Lane Group Flow (vph)	38	2529	1866	0	97	10
Confl. Peds. (#/hr)				52	29	65
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	7.0	109.4	97.4		27.5	27.5
Effective Green, g (s)	7.0	109.4	97.4		27.5	27.5
Actuated g/C Ratio	0.05	0.74	0.66		0.19	0.19
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	84	3786	3229		642	268
v/s Ratio Prot	0.02	c0.50	0.38		c0.03	
v/s Ratio Perm						0.01
v/c Ratio	0.45	0.67	0.58		0.15	0.04
Uniform Delay, d1	68.1	9.5	13.5		49.9	48.8
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.8	0.5	0.3		0.1	0.1
Delay (s)	71.9	10.0	13.8		50.0	48.9
Level of Service	E	A	B		D	D
Approach Delay (s)		10.9	13.8		49.7	
Approach LOS		B	B		D	
<b>Intersection Summary</b>						
HCM 2000 Control Delay			13.3		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.59			
Actuated Cycle Length (s)			146.9		Sum of lost time (s)	15.0
Intersection Capacity Utilization			80.2%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

APPENDIX G  
TRANSIT LOS CALCULATIONS



Lance,

Thank you so much for expediting this!

**Jenny Tapat Morrill, P.E.**  
Project Manager



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**From:** Watanabe, Lance K. <[kwatanabe@honolulu.gov](mailto:kwatanabe@honolulu.gov)>  
**Sent:** Tuesday, May 2, 2023 7:15 AM  
**To:** Jennylyn Tapat Morrill <[JTapat@wilsonokamoto.com](mailto:JTapat@wilsonokamoto.com)>  
**Cc:** kandrade1 <[kandrade1@honolulu.gov](mailto:kandrade1@honolulu.gov)>  
**Subject:** Block N West

Jenny – TRB has no comments and has accepted the TIR dated March 2023.

I will try my best to get you our comments for Block D & E by the end of the week.

Thanks,  
Lance

# APPENDIX G

## INFRASTRUCTURE AVAILABILITY REPORT

**FINAL**

**Blocks D, Diamond Head Plaza and Block E  
Infrastructure Availability Report**

**Honolulu, Oahu, Hawaii  
Tax Map Key: 2-3-005:006**

Prepared for  
**Victoria Ward Limited**  
1240 Ala Moana Boulevard, Suite 202  
Honolulu, HI 96814

Prepared by  
**Wilson Okamoto Corporation**  
1907 South Beretania Street, Suite 400  
Honolulu, HI 96826

February 2023

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## APPENDIX A

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- Honolulu Board of Water Supply: Request Letter and Adequacy Letter
- Honolulu Fire Department: HFD Requirements and Email Correspondence
- City and County of Honolulu – Department of Planning and Permitting, Civil Engineering Branch: LID Correspondence with Keith Miyashiro
- Hawaiian Electric Company: Request Letter and Will Serve Letter
- Hawaiian Telcom: Request Letter and Assessment Letter
- Spectrum (Formerly Oceanic and Charter Communications): Utility Assessment Request Letter and Will Serve Letter
- Hawaii Gas: Email Correspondence
- Traffic Review Branch: Email Correspondence

**1 INTRODUCTION****1.1 Purpose**

The purpose of this report is to confirm the availability of infrastructure utilities to accommodate the demands proposed by the project. The utilities researched include water, sanitary sewer, drainage, electrical, communication, cable, and gas.

**1.2 Proposed Project Location and Description**

Victoria Ward, Ltd. proposes the development of a plaza and two high-rise condominium towers with commercial (restaurant) space for Blocks D and E in Kaka'ako on the island of Oahu (see Figures 1-1 and 1-2). The plaza, which will be called Diamond Head Plaza, proposes approximately 0.88 acres of park space. Block D proposes 300 residential units and 8,000 sf of restaurant space. Block E proposes 196 residential units and 5,000 sf of restaurant space. The project site is approximately 4.48 acres, generally located at TMK: 2-3-005:006. The project site will be bounded by the Auahi Street to the north, Kamakee to the west, Ala Moana Boulevard to the south, and existing IBM building to the east.

**1.3 Existing Topography**

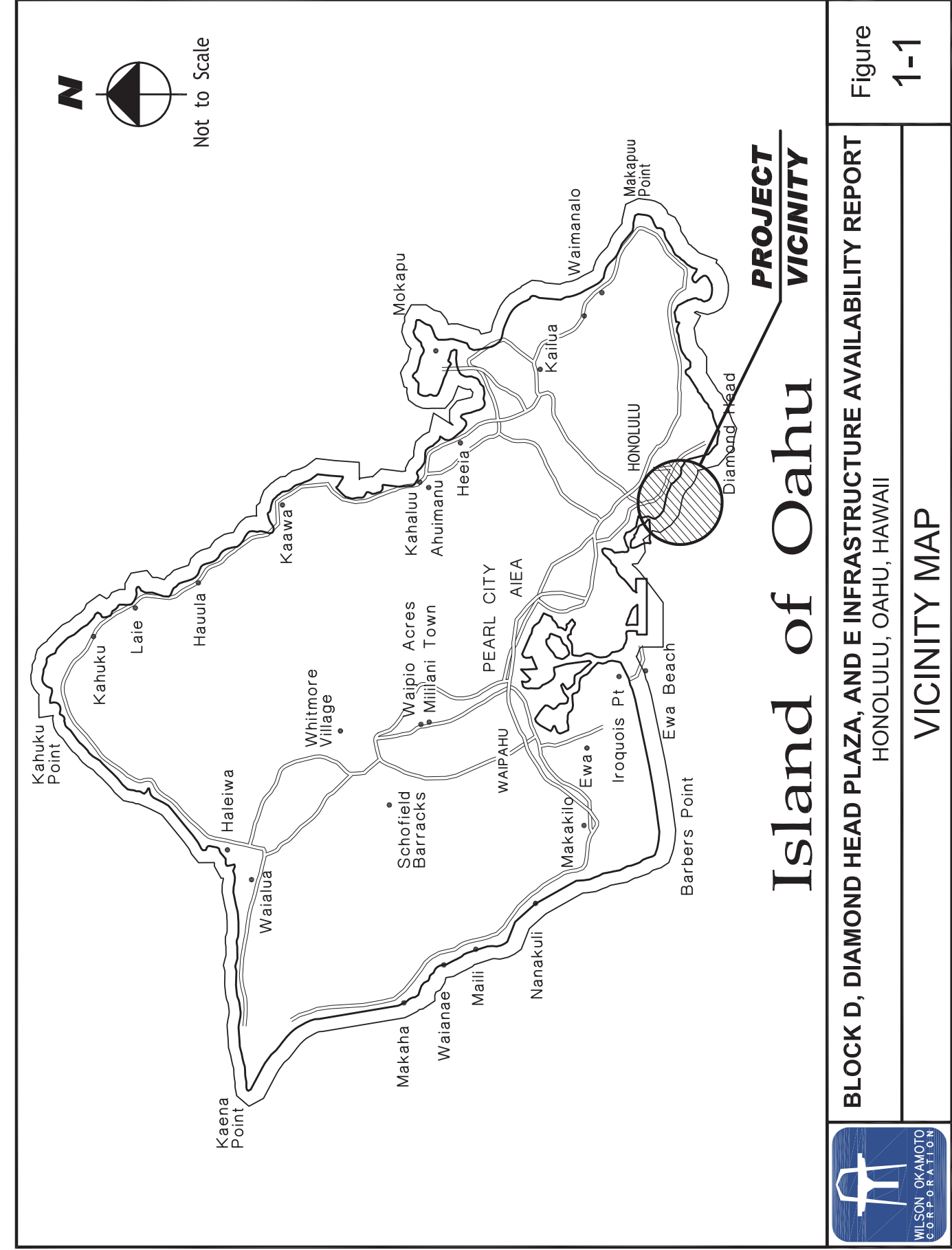
The project site is composed of three commercial/retail buildings and a parking structure with commercial space. Sewer manholes are located in various locations along Auahi Street, Kamakee Street, and Ala Moana Boulevard, which bound the vicinity of the project area. Drain inlets and drain manholes are observed within the project vicinity to collect and convey storm water runoff. See Figure 1-3 for topographic survey prepared June 29, 2020 by Control Point Surveying Inc.

**1.4 Flood Hazard**

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Community Panel No: 15003C0362G dated January 19, 2011 shows that the project is located in Zone AE (EL 9-ft) and AE (EL 10-ft) (see Figure 1-4). Zone AE is characterized as a special flood hazard area, where the annual chance of flooding (100 year flood) is determined as 1%. The projects will be designed to comply with Base Flood Elevation 10-ft.

**1.5 Sea Level Rise**

The Pacific Islands Ocean Observing System (PacIOOS) Hawai'i Sea Level Rise Viewer shows that portions of the project area will be within the 3.2-ft sea level rise Exposure Area due to combined passive flooding and annual high wave flooding is at the northern side of the project site (see Figure 1-5). The project will be designed to comply with a Base Flood Elevation of 10-ft, which will be above the projected sea level rise exposure.



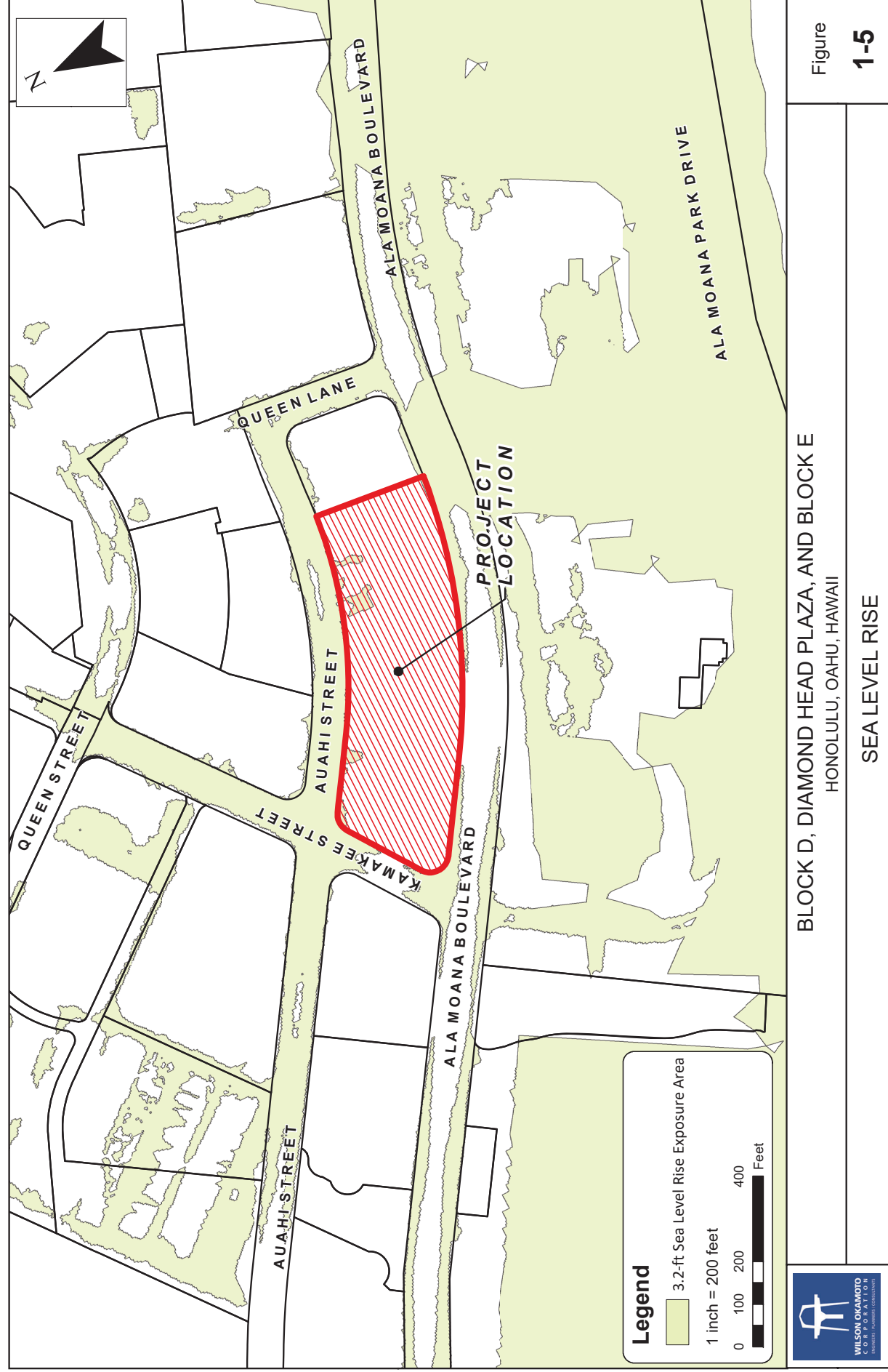
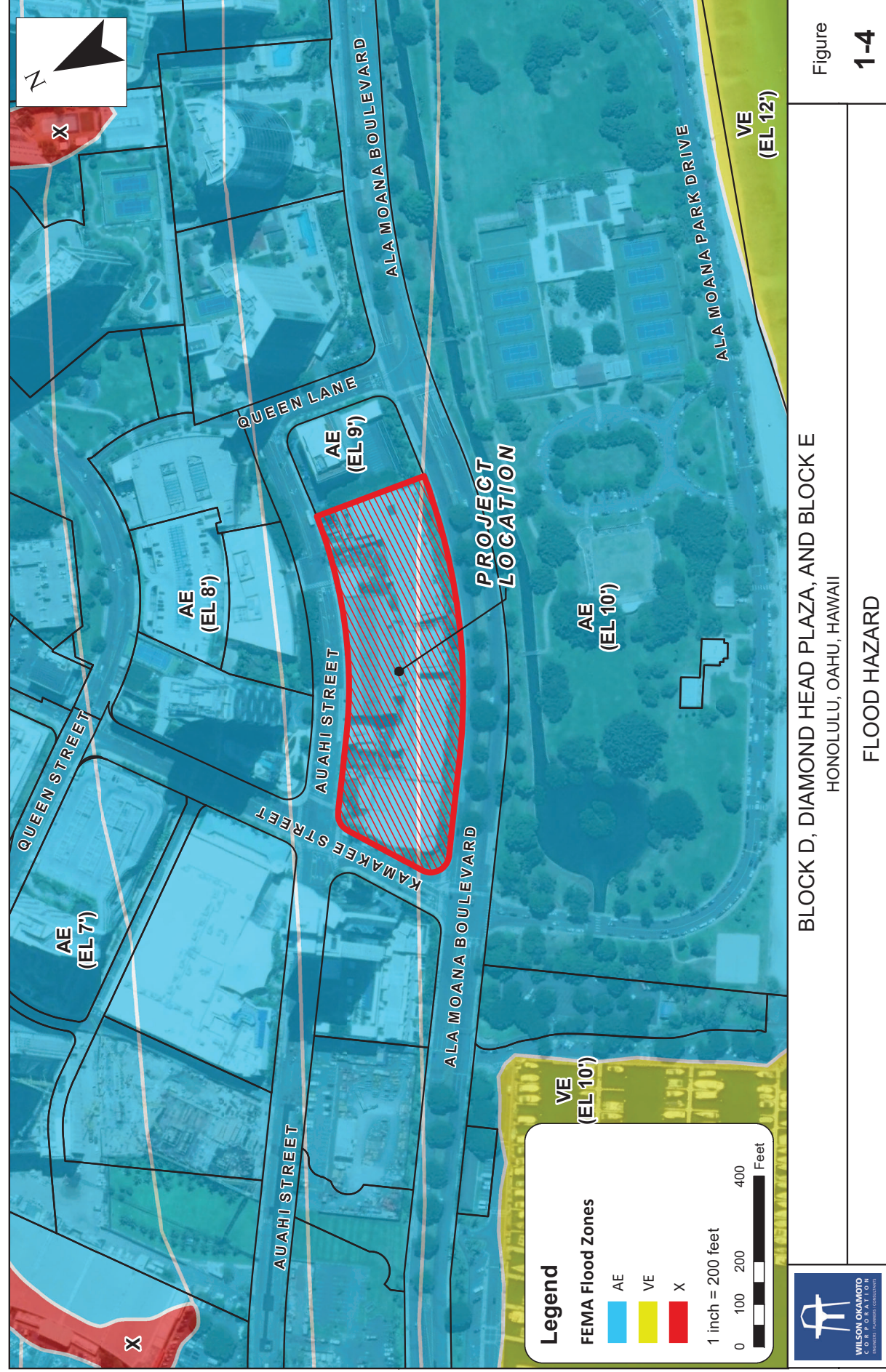





**1 inch = 200 feet**  
 0 100 200 400 Feet  
**Figure 1-2**  
**BLOCK D, DIAMOND HEAD PLAZA, AND BLOCK E**  
 HONOLULU, OAHU, HAWAII  
**LOCATION MAP**




**1 inch = 80 feet**  
 0 40 80 Feet  
**Figure 1-3**  
**BLOCK D, DIAMOND HEAD PLAZA, AND BLOCK E**  
 HONOLULU, OAHU, HAWAII  
**EXISTING CONDITION**



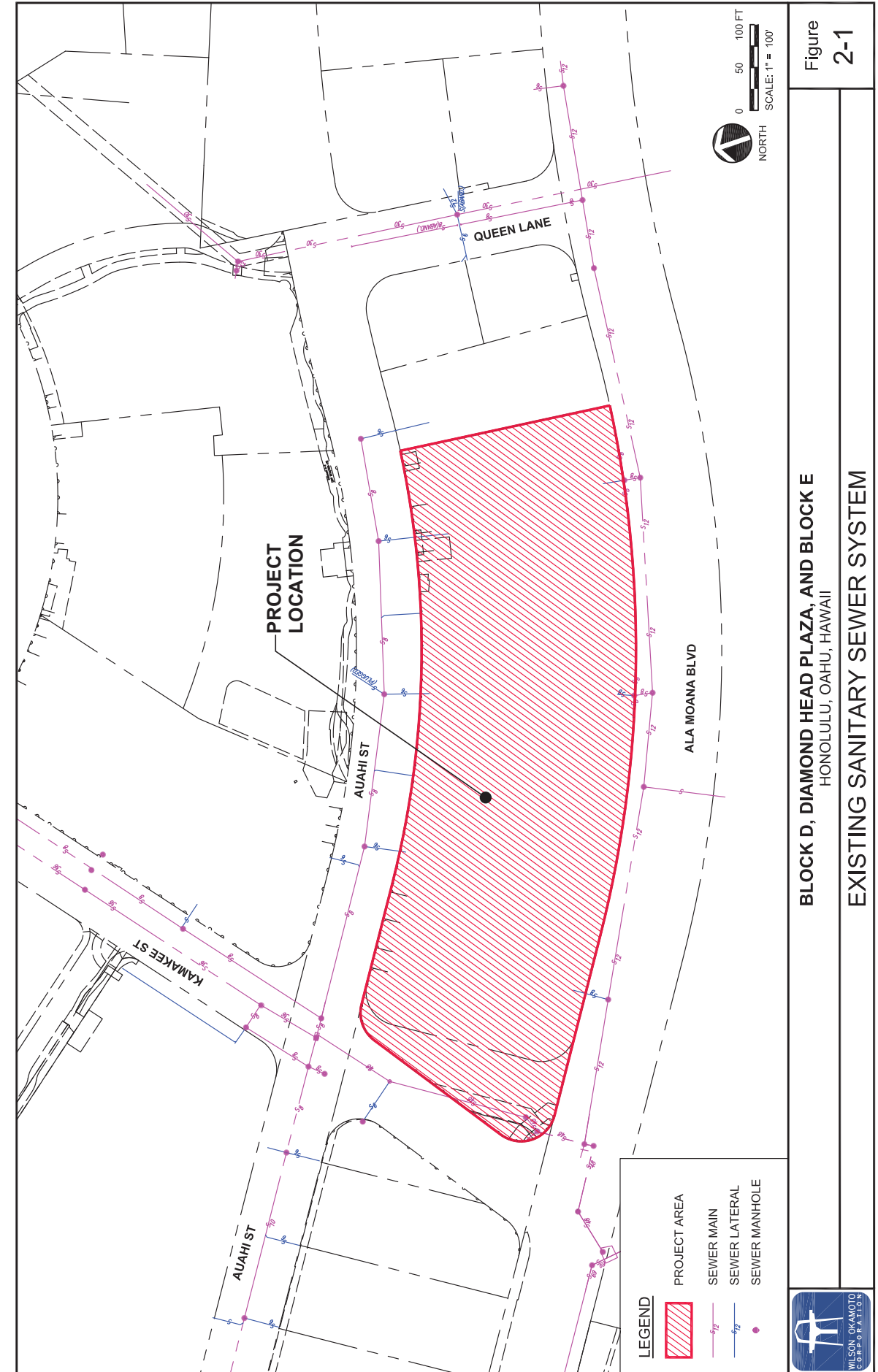
## 2 UTILITIES

### 2.1 Sanitary Sewer System

The sanitary sewer system servicing the Kaka`ako Makai area and the project area is owned by the City and County of Honolulu (City) and maintained by its Department of Environmental Services (ENV). The wastewater flow from the project area is discharged into the Ala Moana Wastewater Pump Station and is then conveyed to the City's Sand Island Wastewater Treatment Plant, which serves the Honolulu area from Kuliouou to Moanalua.

The project proposes an 18-inch sewer main which is to be constructed within Auahi Street and will connect to the existing 36-inch main in Kamakee Street. See Figure 2-1 which identifies the existing sewer system within the project vicinity.

A sewer connection application was submitted on July 29, 2022 to the City Department of Planning and Permitting (DPP), Wastewater Branch (WWB) to confirm the existing sanitary sewer system can accommodate the project. Three approved SCAs dated February 13, 2023 were issued – 2023/SCA-161 for Block D, 2023/SCA-162 for Block E, and 2023/SCA-181 for Diamond Head Plaza – confirming available capacity (see Appendix A).



**2.2 Water System**

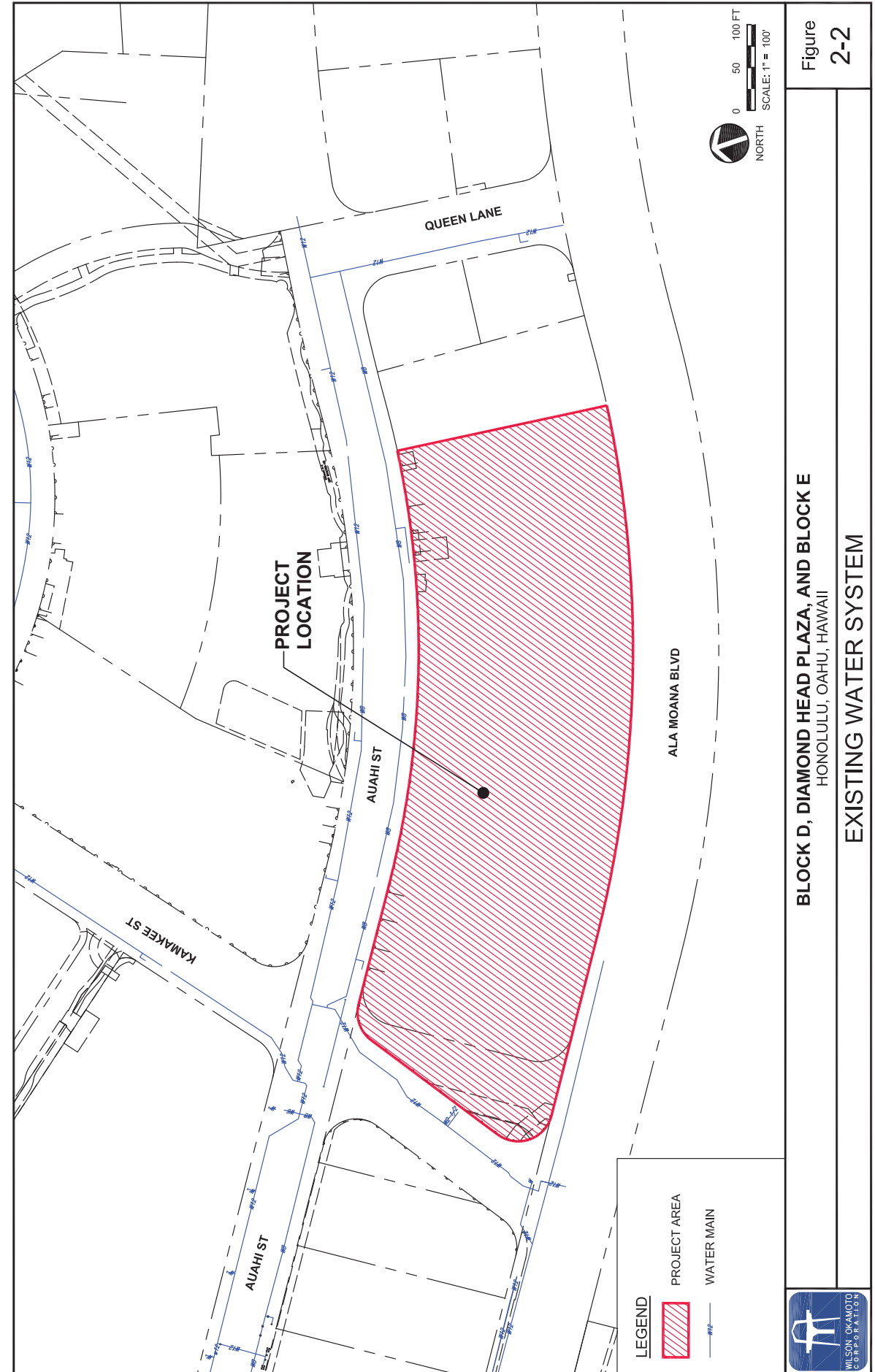
**2.2.1 Potable Water**

Potable water service for the project will be provided by the City and County of Honolulu’s Board of Water Supply (BWS). The BWS’s water system in the project area consists of a system of looped transmission mains, fire hydrants and water meters.

The project proposes connection to an existing 8-inch water main in Auahi Street to accommodate both residential towers and commercial spaces. An existing 2.5-inch lateral along Kamakee Street is proposed to be used for irrigation service to Diamond Head Plaza. The size and location of the laterals will be confirmed during the final design phase. See Figure 2-2 which identifies the existing water system within the project vicinity. A letter request to BWS dated December 22, 2022 was sent to confirm that the existing water system can accommodate the project. An adequacy letter dated January 20, 2023 was received confirming available capacity (see Appendix A).

**2.2.2 Fire Protection**

Fire protection will be provided by public fire hydrants. Water supply from a public fire hydrant must be provided within 450 feet from the furthest point of the building to the fire access road. A fire sprinkler system will be installed in the building. The size and location of the fire line will be confirmed during the final design phase. The Honolulu Fire Department (HFD) was consulted on January 17, 2023 to discuss the project and proposed fire protection methods. A figure was prepared as per the recommendations by HFD (see Appendix A). Recommendations provided by HFD will be maintained during the final design phase.



**2.3 Site Drainage and Low Impact Development**

The drainage system within the City right-of-way and City drainage easements servicing the Kakaʻako Makai area and the project area is owned by the City and maintained by its Department of Facilities Maintenance (DFM). Drainage systems within private property are owned and maintained by the respective property owners.

Majority of runoff generated from the Block D and Block E project sites will be collected via building drains and conveyed underground for connection to existing City owned drainage structures along Auahi Street and Ala Moana Boulevard. Perimeter areas along Auahi Street and Ala Moana Boulevard will sheet flow into existing curb and gutter, and ultimately into City owned drainage structures.

Majority of runoff generated from the Diamond Head Plaza project site will be collected via area drains and conveyed underground for connection to existing City owned drainage structures. Perimeter areas along Auahi Street, Kamakee Street, and Ala Moana Boulevard will sheet flow into existing curb and gutter, and ultimately into City owned drainage structures.

The proposed drainage patterns, discharge rate, and discharge volume will be designed to match existing conditions. The projects are not anticipated to adversely impact the existing City drainage system. See Figure 2-3 for the existing drainage system within the project site.

DPP Civil Engineering Branch (CEB) was consulted on January 17, 2023 to share the project’s conceptual storm water quality design (see Appendix A). It is proposed to treat the majority of the Block D and Block E projects by alternative compliance, utilizing a manufactured treatment device. Remaining site areas will utilize appropriate site design strategies.

It is proposed to treat the Diamond Head Plaza site by bio-filtration methods to the maximum extent practicable. Remaining site areas will utilize appropriate site design strategies.

This methodology was generally acceptable to CEB and it has been understood that official review will be performed during the permitting process.

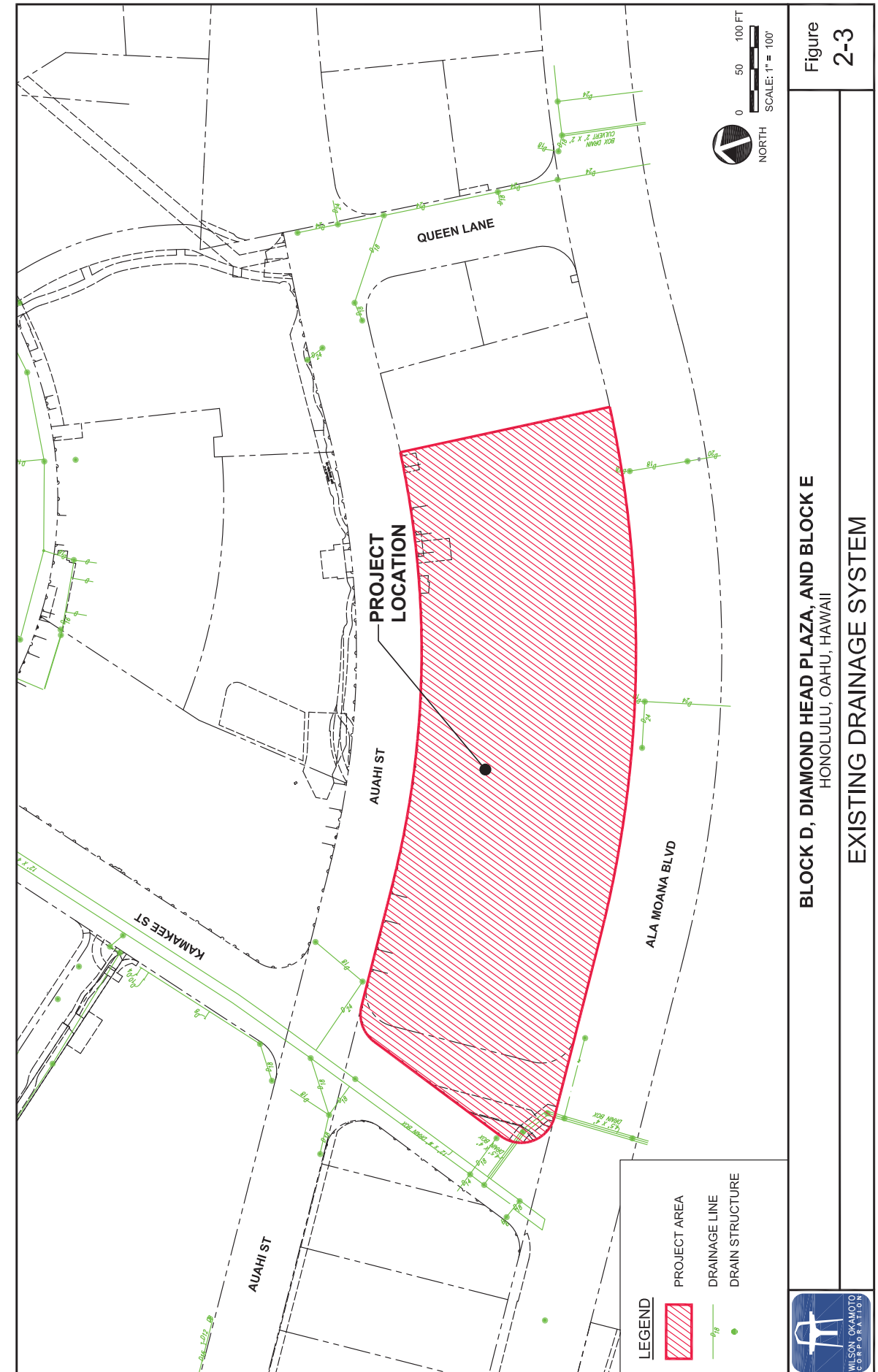


Figure 2-3

BLOCK D, DIAMOND HEAD PLAZA, AND BLOCK E  
HONOLULU, OAHU, HAWAII  
EXISTING DRAINAGE SYSTEM



## 2.4 Electrical Power Facilities

Hawaiian Electric Company (HECo) was consulted on December 19, 2022 by Ronald N. S. Ho & Associates, Inc. to confirm that the existing electrical system can accommodate the project. A Will Serve letter was received on February 18, 2023 confirming that existing and proposed additional 25kv circuits will provide sufficient capacity to feed future Block D and E (see Appendix A).

## 2.5 Telephone System

Hawaiian Telecom Inc. was consulted on December 19, 2022 by Ronald N. S. Ho & Associates, Inc. to confirm that the existing communication system can accommodate the project. An assessment letter dated December 21, 2022 was received confirming available service connection for the Block D and E project (see Appendix A).

## 2.6 Cable Television System

Spectrum (formerly Oceanic and Charter Communications) was consulted on December 19, 2022 by Ronald N. S. Ho & Associates, Inc. to confirm that the existing cable system can accommodate the project. A Will Serve letter dated February 3, 2023 was received confirming available capacity for the Block D and E project (see Appendix A).

## 2.7 Gas System

Hawaii Gas was consulted on December 22, 2022 to confirm that the existing gas system can accommodate the project. An email correspondence was received on January 9, 2023 confirming available capacity for the Block D and E project (see Appendix A).

## 3 TRAFFIC

### 3.1 Traffic Impact Analysis Report

A Traffic Impact Analysis Report (TIAR) was submitted on March 16, 2023 to the City Department of Planning and Permitting (DPP), Traffic Review Branch (TRB) to identify and assess the potential traffic impacts resulting from the Block D & E development. An email correspondence was received on May 16, 2023 confirming that the findings in the report are acceptable (see Appendix A).

**APPENDIX A**

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- Hawaiian Telcom: Request Letter and Email Correspondence
- Spectrum (Formerly Oceanic and Charter Communications): Utility Assessment Request Letter and Will Serve Letter
- Hawaii Gas: Email Correspondence
- Traffic Review Branch: Email Correspondence

**City and County of Honolulu - Department of Planning and Permitting  
Wastewater Branch**

**Approved Sewer Connection Application**

**SITE DEVELOPMENT DIVISION MASTER APPLICATION FORM**

All required documents and fees must accompany this application form. Please visit [www.honolulu.gov](http://www.honolulu.gov) for applicable procedures and fees under the menu heading Application & Forms, Site Engineering and Subdivision Permits. Electronic submittal of permit applications and other permit-related documents constitutes agreement by the applicant or authorized representative to transact business electronically with this department, in accordance with HRS Chapter 489E.

**I. PERMIT VARIANCE APPROVAL**

- Check one or more as appropriate:
- |                                      |  |  |  |
|--------------------------------------|--|--|--|
| <input type="checkbox"/> Grading     | <input checked="" type="checkbox"/> Sewer Connection | <input type="checkbox"/> Flood Hazard Variance | <input type="checkbox"/> Subdivision, Easement Consolidation |
| <input type="checkbox"/> Grubbing    | <input type="checkbox"/> Flood Determination         | <input type="checkbox"/> Floodway Permit       | <input type="checkbox"/> Park Dedication                     |
| <input type="checkbox"/> Stockpiling | <input type="checkbox"/> Flood Map Revision          | <input type="checkbox"/> Ag. Site Development  | <input type="checkbox"/> Lot Determination                   |
| <input type="checkbox"/> Trenching   |  |  |  |

Complete Sections I, II, III and all other sections as possible

**II. LOT AND LAND USE INFORMATION**

TAX MAP KEY(S) 2-3-005:006 Lot Area: 114,205/2.62 sq.ft./ac.  
Zoning District: Kakaako Dev District Development Plan Designation: HCDA Kakaako Dev District Mauka Area State Land Use District: Urban  
Street Address/Location of Property: Ala Moana Blvd., Honolulu, HI 96814  
Present Use of Property/Building: Commercial  
Project Name (if any): Ward Village - Block D  
Request/Proposal (describe the nature of the request, proposed activity or project): The project proposes 300 residential units and 8,000 sf restaurant space.

**III. APPLICANT INFORMATION**

<b>Owner/Developer</b>	<b>Engineer/Architect</b>	<b>Contractor (or Agent for Subdivision apps only)</b>
Name (& title) <u>Victoria Ward Limited</u>	<u>Brett Kuamoo</u>	
Mailing Address <u>1240 Ala Moana Blvd., Suite 200</u>	<u>1907 S. Beretania Street, Suite 400,</u>	
<u>Honolulu, HI 96814</u>	<u>Honolulu, HI 96826</u>	
City State Zip	City State Zip	City State Zip
Phone Number(s) <u>(808) 591-411</u>	<u>(808) 946-2277</u>	
Email Address	<u>BKuamoo@wilsonokamoto.com</u>	
APPLICANT <u>Brett Kuamoo</u>	<u>Senior Engineer</u>	<u>Brett Kuamoo</u>
Print NAME of applicant	Print TITLE of applicant	Signature of applicant

**IV. FOR GRADING/GRUBBING/STOCKPILING INFORMATION ONLY**

Estimated Dates: Start: \_\_\_\_\_ Completion: \_\_\_\_\_ Borrow Material: \_\_\_\_\_  
Area of work (sf or acres): \_\_\_\_\_ Borrow Site: \_\_\_\_\_  
Disturbed area (sf or acres): \_\_\_\_\_ Disposal Material: \_\_\_\_\_  
Estimated Quantity (cy): Cut: \_\_\_\_\_ Fill: \_\_\_\_\_ Disposal Site: \_\_\_\_\_

**V. DESIGNATED ESCP COORDINATOR OR CWPPP**

Check One:  Erosion and sediment Control Plan (ESCP) Coordinator  Certified Water Pollution Plan Preparer (CWPPP)

Contact information of ESCP Coordinator/ CWPPP :  
Mailing address: \_\_\_\_\_  
Phone Number: \_\_\_\_\_ Email Address: \_\_\_\_\_

**AUTHORIZATION CLEARANCE**

This statement of authorization is used in reference to the information provided for in sections I, II, III and V above.

I/We, \_\_\_\_\_, hereby authorize \_\_\_\_\_ to act in my/our behalf in obtaining/closing  
Print NAME and TITLE of person giving authority Print NAME of person receiving authority  
the Grading/Grubbing/Stockpiling/Trenching permit for the project and designate ESCP coordinator or CWPPP  
Print NAME of ESCP Coordinator/CWPPP

Signature of Owner/Developer giving authority \_\_\_\_\_ Date \_\_\_\_\_ ESCP Coordinator / CWPPP Signature \_\_\_\_\_ Date \_\_\_\_\_

**FOR DIVISION USE ONLY:**

Date of Application: \_\_\_\_\_ Received By: \_\_\_\_\_ Application No.: \_\_\_\_\_  
Grading Permit No.: \_\_\_\_\_  
Trenching Permit No.: \_\_\_\_\_

SEE REVERSE FOR APPLICATIONS FOR TRENCHING AND SEWER CONNECTION

**VI. FOR TRENCHING INFORMATION ONLY**

Work to be performed for: \_\_\_\_\_ Work to be done:  Service Connection  Repair  Borings  
Estimated Dates: Start: \_\_\_\_\_ Completion: \_\_\_\_\_ Other: \_\_\_\_\_  
Estimated Value of work: \$ \_\_\_\_\_ Dimensions: \_\_\_\_\_ ft/in \_\_\_\_\_ ft/in \_\_\_\_\_ ft/in  
in the city right - of - way length width depth

AGENCY CLEARANCES	SIGNATURE	DATE	ADDRESS	PHONE NO.
DPP, Wastewater Branch			650 So. King St., FMB, 1st Flr.	768-8210
DTS, Traffic Signal			650 So. King St., FMB, 2nd Flr.	768-8388
DDC, Street Lightning			650 So. King St., FMB, 9th Flr.	768-8431
BWS, Customer Care			630 So. Beretania St., 1st Flr.	748-5460
Hawaiian Electric, Construction Installation			820 Ward Avenue, 4th Flr.	543-5654
Hawaiian Telcom, Excavation			1177 Bishop St., Security Entrance Adams Lane	546-7746
Gasco., Inc., Maps & Records			515 Kamakee St., 1st Flr.	594-5575
Oceanic Cablevision, Engineering & Constr.			200 Akamainui St.	625-8443
DFM, Division of Road Maintenance (if trenching 250 lineal feet or more)			99-999 Iwaena Street, #214	484-7695

DPP: Dept. of Planning and Permitting DTS: Dept. of Transportation Services DDC: Dept. of Design and Construction BWS: Board of Water Supply DFM: Dept. of Facility Maintenance

**Note to agencies providing clearances:** Signature on this form may be reproduced (scanned and emailed) and submitted electronically for permitting purposes in accordance with HRS Chapter 489E. Original wet Signatures may be retained by the applicant(s).

**Note to the applicants receiving clearances:** The utilities listed above may not represent all underground utilities located within City rights-of-ways, nor do there utility clearances relieve the permittee from complying with all other applicable codes, rules, regulations, and/or permit procedures including, but not limited to, additional clearances and requirements for other utilities (i.e. irrigation, data transmission, etc.) located within City rights-of-ways. Pursuant to ROH 1990, Section 14-17.6, the permittee shall indemnify and save harmless the city for any injuries or damages to any person or property received or sustained by any person as a consequence of any act or acts of the permittee on work done under the trenching permit.

**VII. FOR SEWER CONNECTION INFORMATION ONLY** *To receive a response via e-mail, provide email address below and check box here:*

Residential: No. of Proposed Units 300 (Provide breakdown below) BKuamoo@wilsonokamoto.com  
\_\_\_\_\_ Studios 115 1 Bedroom 110 2 Bedrooms 75 3 Bedrooms \_\_\_\_\_ 4 Bedrooms \_\_\_\_\_ Other

Non-Residential: (See attached sewer table for required category and quantity and provide any additional information in the remarks)

CATEGORY(IES)	QUANTITY(IES)	NEW WATER METER SIZE(S)
Restaurant (seats per day)	8,000 SF (3,600 seats/day)	1"

Date of Connection: 2027 (approximate) Connection Work Desired:  Use Existing Lateral  Other

Dimensions: \_\_\_\_\_ ft. \_\_\_\_\_ in. \_\_\_\_\_ ft.  
length size depth

Existing Structures/Dwellings on Property: (Provide breakdown below)

TYPE (i.e. Singel Family)	QUANTITY(IES)	REMAIN	DEMOLISH
Commercial	114,205 SF	0 SF	114,205 SF

Remarks: (Provide any additional information on the lines provided) *To receive a response via e-mail, provide email address below and check box here:*   
BKuamoo@wilsonokamoto.com

**FOR DIVISION USE ONLY:**

Date of Application: \_\_\_\_\_ Received By: \_\_\_\_\_ Application No.: \_\_\_\_\_

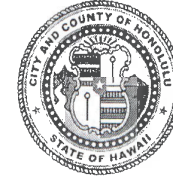


# SEWER TABLE

This table is used for required category and quantity for non-residential connections. (See sect. V1 "Sewer Connection Information Only" of the Site Development Master Application form).

TAX MAP KEY(S) 2-3-005: 006

CATEGORY	UNITS QUANTITY	CATEGORY	UNITS QUANTITY
Animal Clinic	Employees	Meat Processing	gpd*
Aquarium	Employees	Medical Clinic	Employees
Auto Repair	Employees	Military	gpd*
Bakery	Employees	Milk Processing	gpd*
Banks	Employees	Mortuaries	Employees
Bowling Alley	Employees	Motel	Rooms
Car Dealership	Employees	Museum	Employees
Car Wash	Employees	Newspaper Agencies	Employees
Caterers	Employees	Noodle Factory	Employees
Church	Employees	Nursery	Employees
Commercial (Misc.)	Sq. Ft. of Floor Space	Nursing, Convalescent Home	Employees and Beds
Commercial Kennel	Employees	Office Building	Employees
Convent	Sisters	Park w/ comfort station only	Employees
Day Care, Pre-School	Children	Parking Structure	Employees
Delicatessen	Employees	Personal Services	Employees
Dental Clinic	Employees	Photo Finishers	Employees
Dentist's Office	Employees	Photo Processing	Employees
District Park	Employees	Pineapple Processing	gpd*
Doctor's Office	Employees	Police Station	Employees
Dormitory	Rooms	Potato Chip Manufacturing	gpd*
Drinking Establishment	Employees	Poultry Processing	gpd*
Dry Cleaning	gpd *	Prison	Prisoners
Elementary School	Students	Private Clubs	Employees
Eye Glass Manufacturing	Employees	Residential Care Home	Employees and Beds
Fast Foods	Employees	Resort Condo	Rooms
Fire Station	Employees	Restaurant	Seats per day 3600
Florist	Employees	Retail	Sq. Ft. of Retail Floor Space
General Industry (Misc.)	Sq. Ft. of Floor Space	Rooming House	Rooms
Golf Course w/Clubhouse	Employees	Schools (other)	Students
Government Offices	Employees	Service Station	Employees
Grocery Store	Employees	Shopping Center	Sq. Ft. of Retail Floor Space
Half-way House	Employees and Beds	Soy Bean Factory	gpd*
Health Spa	Employees	Sports Arena	gpd*
High Schools	Students	Stadium	gpd*
Hospital	Beds	Sugar Processing	gpd*
Hostel	Rooms	Supermarket	Employees
Hotel	Rooms	Theater	Seats per day
Hotel Development	Acres	Tofu Factory	gpd*
Intermediate Schools	Students	Warehouse	Employees
Jewelry Manufacturing	Employees	YMCA (Lodging)	Rooms
Laundromats	Machines	Zoo	Employees
Library	Employees		



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.: **2023/SCA-0161** STATUS: **Approved with Conditions** **\$1,405,238.40**  
 DATE RECEIVED: **01/23/2023** IWDP APP. NO.:  
 PROJECT NAME: **2023/SCA-0161 Ward Village Block D**  
 Estimated Wastewater System Facility Charge\*

LOCATION:

Zone	Section	Plat	Parcel
<b>2</b>	<b>3</b>	<b>005</b>	<b>006</b>

**196,817** Sq. Ft.

SPECIFIC LOCATION: **Ala Moana Blvd.**

APPLICANT: **BRETT K KUAMOO**  
 1907 South Beretania Street Suite 400  
 Honolulu, Hawaii 96826-1301

DEVELOPMENT TYPE: **Dwelling, Multi-family** SEWER CONNECTION WORK DESIRED: **New**

OTHER USES: **Restaurant: 8,000 sf (3,600 seats/day)**

NON-RESIDENTIAL AREA: s.f. APPROXIMATE DATE OF CONNECTION:

PROPOSED UNITS	EXISTING UNITS	UNITS TO BE DEMOLISHED
No. of New Units: <b>300</b>	No. of Existing Units: <b>0</b>	No. of Units to be Demolished: <b>0</b>
Studios:	Studios:	Studios:
1-Bedroom: <b>115</b>	1-Bedroom:	1-Bedroom:
2-Bedroom: <b>110</b>	2-Bedroom:	2-Bedroom:
3-Bedroom: <b>75</b>	3-Bedroom:	3-Bedroom:
4-Bedroom:	4-Bedroom:	4-Bedroom:
5-Bedroom:	5-Bedroom:	5-Bedroom:
6-Bedroom:	6-Bedroom:	6-Bedroom:

REMARKS **Submit construction plans for review and approval.**

Approved with **02/13/2023** 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.

EXPIRATION DATE: **02/12/2025** \* 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: **Jing Meng**

Site Development Division, Wastewater Branch

FOR DIVISION USE ONLY:

Date of Application: \_\_\_\_\_ Received By: \_\_\_\_\_ Application No.: \_\_\_\_\_

**SITE DEVELOPMENT DIVISION MASTER APPLICATION FORM**

All required documents and fees must accompany this application form. Please visit [www.honolulu.gov](http://www.honolulu.gov) for applicable procedures and fees under the menu heading Application & Forms, Site Engineering and Subdivision Permits. Electronic submittal of permit applications and other permit-related documents constitutes agreement by the applicant or authorized representative to transact business electronically with this department, in accordance with HRS Chapter 489E.

**I. PERMIT VARIANCE APPROVAL**

Check one or more as appropriate:

<input type="checkbox"/> Grading	<input checked="" type="checkbox"/> Sewer Connection	<input type="checkbox"/> Flood Hazard Variance	<input type="checkbox"/> Subdivision, Easement Consolidation
<input type="checkbox"/> Grubbing	<input type="checkbox"/> Flood Determination	<input type="checkbox"/> Floodway Permit	<input type="checkbox"/> Park Dedication
<input type="checkbox"/> Stockpiling	<input type="checkbox"/> Flood Map Revision	<input type="checkbox"/> Ag. Site Development	<input type="checkbox"/> Lot Determination
<input type="checkbox"/> Trenching			

Complete Sections I, II, III and all other sections as possible

**II. LOT AND LAND USE INFORMATION**

TAX MAP KEY(S) 2-3-005:006 Lot Area: 79,647/1.83 sq.ft./ac.  
Zoning District: Kakaako Dev District Development Plan Designation: HCDA Kakaako Dev District Mauka Area State Land Use District: Urban  
Street Address/Location of Property: Ala Moana Blvd., Honolulu, HI 96814  
Present Use of Property/Building: Commercial  
Project Name (if any): Ward Village - Block E  
Request/Proposal (describe the nature of the request, proposed activity or project): The project proposes 196 residential units and 5,000 sf restaurant space.

**III. APPLICANT INFORMATION**

<b>Owner/Developer</b>	<b>Engineer/Architect</b>	<b>Contractor (or Agent for Subdivision apps only)</b>
Name (& title) <u>Victoria Ward Limited</u>	<u>Brett Kuamoo</u>	
Mailing Address <u>1240 Ala Moana Blvd., Suite 200</u>	<u>1907 S. Beretania Street, Suite 400,</u>	
<u>Honolulu, HI 96814</u>	<u>Honolulu, HI 96826</u>	
City State Zip <u>(808) 591-411</u>	City State Zip <u>(808) 946-2277</u>	
Phone Number(s)	<u>BKuamoo@wilsonokamoto.com</u>	
Email Address		
APPLICANT <u>Brett Kuamoo</u>	<u>Senior Engineer</u>	<u>Brett Kuamoo</u>
Print NAME of applicant	Print TITLE of applicant	Signature of applicant

**IV. FOR GRADING/GRUBBING/STOCKPILING INFORMATION ONLY**

Estimated Dates: Start: \_\_\_\_\_ Completion: \_\_\_\_\_ Borrow Material: \_\_\_\_\_  
Area of work (sf or acres): \_\_\_\_\_ Borrow Site: \_\_\_\_\_  
Disturbed area (sf or acres): \_\_\_\_\_ Disposal Material: \_\_\_\_\_  
Estimated Quantity (cy): Cut: \_\_\_\_\_ Fill: \_\_\_\_\_ Disposal Site: \_\_\_\_\_

**V. DESIGNATED ESCP COORDINATOR OR CWPPP**

Check One:  Erosion and sediment Control Plan (ESCP) Coordinator  Certified Water Pollution Plan Preparer (CWPPP)

Contact information of ESCP Coordinator/ CWPPP :  
Mailing address: \_\_\_\_\_  
Phone Number: \_\_\_\_\_ Email Address: \_\_\_\_\_

**AUTHORIZATION CLEARANCE**

This statement of authorization is used in reference to the information provided for in sections I, II, III and V above.

I/We, \_\_\_\_\_, hereby authorize \_\_\_\_\_ to act in my/our behalf in obtaining/closing the Grading/Grubbing/Stockpiling/Trenching permit for the project and designate ESCP coordinator or CWPPP

Print NAME and TITLE of person giving authority \_\_\_\_\_ Print NAME of person receiving authority \_\_\_\_\_  
Print NAME of ESCP Coordinator/CWPPP \_\_\_\_\_

Signature of Owner/Developer giving authority \_\_\_\_\_ Date \_\_\_\_\_ ESCP Coordinator / CWPPP Signature \_\_\_\_\_ Date \_\_\_\_\_

**FOR DIVISION USE ONLY:**

Date of Application: \_\_\_\_\_ Received By: \_\_\_\_\_ Application No.: \_\_\_\_\_  
Grading Permit No.: \_\_\_\_\_  
Trenching Permit No.: \_\_\_\_\_

SEE REVERSE FOR APPLICATIONS FOR TRENCHING AND SEWER CONNECTION

**VI. FOR TRENCHING INFORMATION ONLY**

Work to be performed for: \_\_\_\_\_ Work to be done:  Service Connection  Repair  Borings  
Estimated Dates: Start: \_\_\_\_\_ Completion: \_\_\_\_\_ Other: \_\_\_\_\_  
Estimated Value of work: \$ \_\_\_\_\_ Dimensions: \_\_\_\_\_ ft/in \_\_\_\_\_ ft/in \_\_\_\_\_ ft/in  
in the city right - of - way

AGENCY CLEARANCES	SIGNATURE	DATE	ADDRESS	PHONE NO.
DPP, Wastewater Branch			650 So. King St., FMB, 1st Flr.	768-8210
DTS, Traffic Signal			650 So. King St., FMB, 2nd Flr.	768-8388
DDC, Street Lightning			650 So. King St., FMB, 9th Flr.	768-8431
BWS, Customer Care			630 So. Beretania St., 1st Flr.	748-5460
Hawaiian Electric, Construction Installation			820 Ward Avenue, 4th Flr.	543-5654
Hawaiian Telcom, Excavation			1177 Bishop St., Security Entrance Adams Lane	546-7746
Gasco., Inc., Maps & Records			515 Kamakee St., 1st Flr.	594-5575
Oceanic Cablevision, Engineering & Constr.			200 Akamainui St.	625-8443
DFM, Division of Road Maintenance (if trenching 250 lineal feet or more)			99-999 Iwaena Street, #214	484-7695

DPP: Dept. of Planning and Permitting DTS: Dept. of Transportation Services DDC: Dept. of Design and Construction BWS: Board of Water Supply DFM: Dept. of Facility Maintenance

**Note to agencies providing clearances:** Signature on this form may be reproduced (scanned and emailed) and submitted electronically for permitting purposes in accordance with HRS Chapter 489E. Original wet Signatures may be retained by the applicant(s).

**Note to the applicants receiving clearances:** The utilities listed above may not represent all underground utilities located within City rights-of-ways, nor do there utility clearances relieve the permittee from complying with all other applicable codes, rules, regulations, and/or permit procedures including, but not limited to, additional clearances and requirements for other utilities (i.e. irrigation, data transmission, etc.) located within City rights-of-ways. Pursuant to ROH 1990, Section 14-17.6, the permittee shall indemnify and save harmless the city for any injuries or damages to any person or property received or sustained by any person as a consequence of any act or acts of the permittee on work done under the trenching permit.

**VII. FOR SEWER CONNECTION INFORMATION ONLY** *To receive a response via e-mail, provide email address below and check box here:*

Residential: No. of Proposed Units 196 (Provide breakdown below) BKuamoo@wilsonokamoto.com  
\_\_\_\_\_ Studios \_\_\_\_\_ 1 Bedroom 114 2 Bedrooms 82 3 Bedrooms \_\_\_\_\_ 4 Bedrooms \_\_\_\_\_ Other

Non-Residential: (See attached sewer table for required category and quantity and provide any additional information in the remarks)

CATEGORY(IES)	QUANTITY(IES)	NEW WATER METER SIZE(S)
<u>Restaurant (seats per day)</u>	<u>5,000 SF (2,250 seats/day)</u>	<u>1"</u>

Date of Connection: 2027 (approximate) Connection Work Desired:  Use Existing Lateral  Other  
Dimensions: \_\_\_\_\_ ft. \_\_\_\_\_ in. \_\_\_\_\_ ft.

Existing Structures/Dwellings on Property: (Provide breakdown below)

TYPE (i.e. Singel Family)	QUANTITY(IES)	REMAIN	DEMOLISH
<u>Commercial</u>	<u>79,647 SF</u>	<u>0 SF</u>	<u>79,647 SF</u>

Remarks: (Provide any additional information on the lines provided) *To receive a response via e-mail, provide email address below and check box here:*   
BKuamoo@wilsonokamoto.com

**FOR DIVISION USE ONLY:**

Date of Application: \_\_\_\_\_ Received By: \_\_\_\_\_ Application No.: \_\_\_\_\_

# SEWER TABLE

This table is used for required category and quantity for non-residential connections. (See sect. V1 "Sewer Connection Information Only" of the Site Development Master Application form).

TAX MAP KEY(S) 2-3-005: 006

CATEGORY	UNITS QUANTITY	CATEGORY	UNITS QUANTITY
Animal Clinic	Employees	Meat Processing	gpd*
Aquarium	Employees	Medical Clinic	Employees
Auto Repair	Employees	Military	gpd*
Bakery	Employees	Milk Processing	gpd*
Banks	Employees	Mortuaries	Employees
Bowling Alley	Employees	Motel	Rooms
Car Dealership	Employees	Museum	Employees
Car Wash	Employees	Newspaper Agencies	Employees
Caterers	Employees	Noodle Factory	Employees
Church	Employees	Nursery	Employees
Commercial (Misc.)	Sq. Ft. of Floor Space	Nursing, Convalescent Home	Employees and Beds
Commercial Kennel	Employees	Office Building	Employees
Convent	Sisters	Park w/ comfort station only	Employees
Day Care, Pre-School	Children	Parking Structure	Employees
Delicatessen	Employees	Personal Services	Employees
Dental Clinic	Employees	Photo Finishers	Employees
Dentist's Office	Employees	Photo Processing	Employees
District Park	Employees	Pineapple Processing	gpd*
Doctor's Office	Employees	Police Station	Employees
Dormitory	Rooms	Potato Chip Manufacturing	gpd*
Drinking Establishment	Employees	Poultry Processing	gpd*
Dry Cleaning	gpd *	Prison	Prisoners
Elementary School	Students	Private Clubs	Employees
Eye Glass Manufacturing	Employees	Residential Care Home	Employees and Beds
Fast Foods	Employees	Resort Condo	Rooms
Fire Station	Employees	Restaurant	Seats per day 2,250
Florist	Employees	Retail	Sq. Ft. of Retail Floor Space
General Industry (Misc.)	Sq. Ft. of Floor Space	Rooming House	Rooms
Golf Course w/Clubhouse	Employees	Schools (other)	Students
Government Offices	Employees	Service Station	Employees
Grocery Store	Employees	Shopping Center	Sq. Ft. of Retail Floor Space
Half-way House	Employees and Beds	Soy Bean Factory	gpd*
Health Spa	Employees	Sports Arena	gpd*
High Schools	Students	Stadium	gpd*
Hospital	Beds	Sugar Processing	gpd*
Hostel	Rooms	Supermarket	Employees
Hotel	Rooms	Theater	Seats per day
Hotel Development	Acres	Tofu Factory	gpd*
Intermediate Schools	Students	Warehouse	Employees
Jewelry Manufacturing	Employees	YMCA (Lodging)	Rooms
Laundromats	Machines	Zoo	Employees
Library	Employees		



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.: **2023/SCA-0162** STATUS: **Approved with Conditions** **\$923,593.60**  
 DATE RECEIVED: **01/23/2023** IWDP APP. NO.:  
 PROJECT NAME: **2023/SCA-0162 Ward Village - Block E**  
 Estimated Wastewater System Facility Charge\*

LOCATION:

Zone	Section	Plat	Parcel
2	3	005	006

196,817 Sq. Ft.

SPECIFIC LOCATION: **Ala Moana Blvd.**

APPLICANT: **BRETT K KUAMOO**  
 1907 South Beretania Street Suite 400  
 Honolulu, Hawaii 96826-1301

DEVELOPMENT TYPE: **Dwelling, Multi-family** SEWER CONNECTION WORK DESIRED: **New**

OTHER USES: **Restaurant: 5,000 sf (2,250 seats/day)**

NON-RESIDENTIAL AREA: s.f. APPROXIMATE DATE OF CONNECTION:

PROPOSED UNITS	EXISTING UNITS	UNITS TO BE DEMOLISHED
No. of New Units: <b>196</b>	No. of Existing Units: <b>0</b>	No. of Units to be Demolished: <b>0</b>
Studios:	Studios:	Studios:
1-Bedroom:	1-Bedroom:	1-Bedroom:
2-Bedroom: <b>114</b>	2-Bedroom:	2-Bedroom:
3-Bedroom: <b>82</b>	3-Bedroom:	3-Bedroom:
4-Bedroom:	4-Bedroom:	4-Bedroom:
5-Bedroom:	5-Bedroom:	5-Bedroom:
6-Bedroom:	6-Bedroom:	6-Bedroom:

REMARKS **Submit construction plans for review and approval.**

Approved with **02/13/2023**  
 Conditions

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.

EXPIRATION DATE: **02/12/2025**

\* 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: **Jing Meng**

Site Development Division, Wastewater Branch

FOR DIVISION USE ONLY:

Date of Application: \_\_\_\_\_ Received By: \_\_\_\_\_ Application No.: \_\_\_\_\_

ExternalID: **109056742-001**

JobId: **109056742**

Initial Print Date: Monday February 13, 2023 2:20 PM

Page 1 of 1

**SITE DEVELOPMENT DIVISION MASTER APPLICATION FORM**

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**I. PERMIT VARIANCE APPROVAL**

Check one or more as appropriate:

- |                                      |  |  |  |
|--------------------------------------|--|--|--|
| <input type="checkbox"/> Grading     | <input checked="" type="checkbox"/> Sewer Connection | <input type="checkbox"/> Flood Hazard Variance | <input type="checkbox"/> Subdivision, Easement Consolidation |
| <input type="checkbox"/> Grubbing    |  | <input type="checkbox"/> Flood Determination   | <input type="checkbox"/> Park Dedication                     |
| <input type="checkbox"/> Stockpiling |  | <input type="checkbox"/> Floodway Permit       | <input type="checkbox"/> Lot Determination                   |
| <input type="checkbox"/> Trenching   |  | <input type="checkbox"/> Flood Map Revision    | <input type="checkbox"/> Ag. Site Development                |


Complete Sections I, II, III and all other sections as possible

**II. LOT AND LAND USE INFORMATION**

TAX MAP KEY(S) 2-3-005:006 Lot Area: 43,560 /1.00 sq.ft./ac.  
Zoning District: Kakaako Dev. District Development Plan Designation: HCDA Kakaako Dev District State Land Use District: Urban  
Street Address/Location of Property: Ward Avenue, Honolulu, HI 96814  
Present Use of Property/Building: Commercial  
Project Name (if any): Ward Village - Diamond Head Plaza  
Request/Proposal (describe the nature of the request, proposed activity or project): The project proposes a development of a park.

**III. APPLICANT INFORMATION**

Owner/Developer	Engineer/Architect	Contractor (or Agent for Subdivision apps only)
Name (& title) <u>Victoria Ward Limited</u>	<u>Brett Kuamoo</u>	
Mailing Address <u>1240 Ala Moana Blvd., Suite 200</u> <u>Honolulu HI 96814</u> City State Zip	<u>1907 S. Beretania St., Suite 400</u> <u>Honolulu HI 96826</u> City State Zip	City State Zip
Phone Number(s) <u>(808) 591-411</u>	<u>(808) 946-2277</u>	
Email Address	<u>BKuamoo@wilsonokamoto.com</u>	

APPLICANT BRETT KUAMOO Senior Engineer   
Print NAME of applicant Print TITLE of applicant Signature of applicant

**IV. FOR GRADING/GRUBBING/STOCKPILING INFORMATION ONLY**

Estimated Dates: Start: \_\_\_\_\_ Completion: \_\_\_\_\_ Borrow Material: \_\_\_\_\_  
Area of work (sf or acres): \_\_\_\_\_ Borrow Site: \_\_\_\_\_  
Disturbed area (sf or acres): \_\_\_\_\_ Disposal Material: \_\_\_\_\_  
Estimated Quantity (cy): Cut: \_\_\_\_\_ Fill: \_\_\_\_\_ Disposal Site: \_\_\_\_\_

**V. AUTHORIZED AGENT**

This statement of authorization is used in reference to the information provided for in sections I, II and III above.  
I/We, \_\_\_\_\_, hereby authorize \_\_\_\_\_  
Print NAME and TITLE of person giving authority Print NAME of person receiving authority (Authorized Agent)  
to act in my/our behalf in obtaining/closing the Grading/Grubbing/Stockpiling/Trenching permit for the project.  
\_\_\_\_\_  
Signature of Owner/Developer giving authority Date

**FOR DIVISION USE ONLY:**

Grading Permit No.: \_\_\_\_\_ Application No.: \_\_\_\_\_  
Trenching Permit No.: \_\_\_\_\_ Date of Application: \_\_\_\_\_  
Received By: \_\_\_\_\_

**VI. FOR TRENCHING INFORMATION ONLY** Tax Map Key(s): 2-3-005:006

Work to be performed for: \_\_\_\_\_ Work to be done:  Service Connection  Repair  Borings  
Estimated Dates: Start: \_\_\_\_\_ Completion: \_\_\_\_\_ Other: \_\_\_\_\_  
Estimated Value of work: \$ \_\_\_\_\_ Dimensions: \_\_\_\_\_ ft/in \_\_\_\_\_ ft/in \_\_\_\_\_ ft/in  
in the city right - of - way length width depth

AGENCY CLEARANCES	SIGNATURE	DATE	ADDRESS	PHONE NO.
DPP, Wastewater Branch			650 So. King St., FMB, 1st Flr.	768-8210
DTS, Traffic Signal			650 So. King St., FMB, 2nd Flr.	768-8388
DDC, Street Lightning			650 So. King St., FMB, 11th Flr.	768-8431
BWS, Customer Care			630 So. Beretania St., 1st Flr.	748-5460
Hawaiian Electric Co., Inc., Construction Installation			820 Ward Avenue, 4th Flr. bryan.yonaha@hawaiianelectric.com	543-5654
Hawaiian Telcom, Excavation			1177 Bishop St., Lobby	546-7746
Gasco., Inc., Maps & Records			515 Kamakee St., 1st Flr.	594-5575
Spectrum, Engineering & Construction			200 Akamainui St. haw.engineering.research@charter.com	625-8443
DFM, Division of Road Maintenance (if trenching 200 linear feet or more)			99-999 Iwaena Street, #214	484-7695

DPP: Dept. of Planning and Permitting DTS: Dept. of Transportation Services DDC: Dept. of Design and Construction BWS: Board of Water Supply DFM: Dept. of Facility Maintenance

**Note to agencies providing clearances:** Signature on this form may be reproduced (scanned and emailed) and submitted electronically for permitting purposes in accordance with HRS Chapter 489E. Original wet Signatures may be retained by the applicant(s).

**Note to the applicants receiving clearances:** The utilities listed above may not represent all underground utilities located within City rights-of-ways, nor do their utility clearances relieve the permittee from complying with all other applicable codes, rules, regulations, and/or permit procedures including, but not limited to, additional clearances and requirements for other utilities (i.e. irrigation, data transmission, etc.) located within City rights-of-ways. Pursuant to ROH 1990, Section 14-17.6, the permittee shall indemnify and save harmless the city for any injuries or damages to any person or property received or sustained by any person as a consequence of any act or acts of the permittee on work done under the trenching permit.

**VII. FOR SEWER CONNECTION INFORMATION ONLY** To receive a response via e-mail, provide email address below and check box here:

Residential: No. of Proposed Units \_\_\_\_\_ (Provide breakdown below) \_\_\_\_\_ Studios \_\_\_\_\_ 1 Bedroom \_\_\_\_\_ 2 Bedrooms \_\_\_\_\_ 3 Bedrooms \_\_\_\_\_ 4 Bedrooms \_\_\_\_\_ Other \_\_\_\_\_  
BKuamoo@wilsonokamoto.com

Non-Residential: (See attached sewer table for required category and quantity and provide any additional information in the remarks)

CATEGORY(IES)	QUANTITY(IES)	NEW WATER METER SIZE(S)
Water Feature Backwash Water (gpd)	900 gpd	5/8"

Date of Connection: 2027 (approximate) Connection Work Desired:  Use Existing Lateral  Other  
Dimensions: \_\_\_\_\_ ft. \_\_\_\_\_ in. \_\_\_\_\_ ft.

Existing Structures/Dwellings on Property: (Provide breakdown below)	TYPE (i.e. Single Family)	QUANTITY(IES)	REMAIN	DEMOLISH
Commercial		40, 540 sf	0 sf	40, 540 sf

Remarks: (Provide any additional information on the lines provided) \_\_\_\_\_  
BKuamoo@wilsonokamoto.com

**FOR DIVISION USE ONLY:**

Date of Application: \_\_\_\_\_ Received By: \_\_\_\_\_ Application No.: \_\_\_\_\_



# SEWER CONNECTION APPLICATION

APPLICATION NO.: **2023/SCA-0181** STATUS: **Approved with Conditions** **\$6,616.00**  
 DATE RECEIVED: **01/23/2023** IWDP APP. NO.: **Estimated Wastewater System Facility Charge**  
 PROJECT NAME: **2023/SCA-0181 Ward Village - Diamond Head Plaza**

LOCATION:

Zone	Section	Plat	Parcel
<b>2</b>	<b>3</b>	<b>005</b>	<b>006</b>

196,817 Sq. Ft.

SPECIFIC LOCATION: **Ward Avenue**

APPLICANT: **BRETT K KUAMOO**  
 1907 South Beretania Street Suite 400  
 Honolulu, Hawaii 96826-1301

DEVELOPMENT TYPE: **Commercial (Misc.)** SEWER CONNECTION WORK DESIRED: **New**  
 OTHER USES: **Park, water feature backwash water (900 gpd)**  
 NON-RESIDENTIAL AREA: s.f. APPROXIMATE DATE OF CONNECTION:

<u>PROPOSED UNITS</u>	<u>EXISTING UNITS</u>	<u>UNITS TO BE DEMOLISHED</u>
No. of New Units: <b>0</b>	No. of Existing Units: <b>0</b>	No. of Units to be Demolished: <b>0</b>
Studios:	Studios:	Studios:
1-Bedroom:	1-Bedroom:	1-Bedroom:
2-Bedroom:	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 **Submit construction plans for review and approval. Storm water is not allowed to discharge to the city sewer system.**

Approved with **02/14/2023** Conditions *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.*

EXPIRATION DATE: **02/13/2025** *\* 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: **Jing Meng**

  
 Site Development Division, Wastewater Branch

Honolulu Board of Water Supply

Request Letter  
 Adequacy Letter



8206-78  
Letter to Robert Chun  
Page 2  
December 22, 2022

8206-78  
December 22, 2022

City and County of Honolulu  
Board of Water Supply  
Customer Care Operating Unit  
630 South Beretania Street  
Honolulu, HI 96813

Attention: Mr. Robert Chun

Subject: Ward Village Blocks D and E – BWS Water System Adequacy

Dear Mr. Chun:

We are requesting Board of Water Supply assistance to determine the adequacy of the existing source, storage, and water distribution systems in Kaka’ako to support residential and restaurant space located at TMK: 2-3-005:006. Block D proposes 300 residential units and 8,000 sf of restaurant space. Block E proposes 196 residential units and 5,000 sf of restaurant space.

The development will include the construction of the following:

1. Block D
  - Residential Units – 300 Units
    - 1-Bedroom Unit – 115 Units
    - 2-Bedroom Unit – 110 Units
    - 3-Bedroom Unit – 75 Units
  - Restaurant Space – 8,000 sf
2. Block E
  - Residential Units – 196 Units
    - 2-Bedroom Unit – 114 Units
    - 3-Bedroom Unit – 82 Units
  - Restaurant Space – 5,000 sf

In addition to your review of the existing water system, we are requesting Board of Water Supply flow information, pressure information, record drawings, and facility maps related to the property. Any existing

facility information that can be provided will be used in the project planning and design process to minimize potential conflicts during construction.

Feel free to call me at (808) 292-8681 or email me at [BKuamoo@wilsonokamoto.com](mailto:BKuamoo@wilsonokamoto.com) should you have any questions or require additional information.

Sincerely,

Brett K. Kuamoo, PE  
Senior Engineer

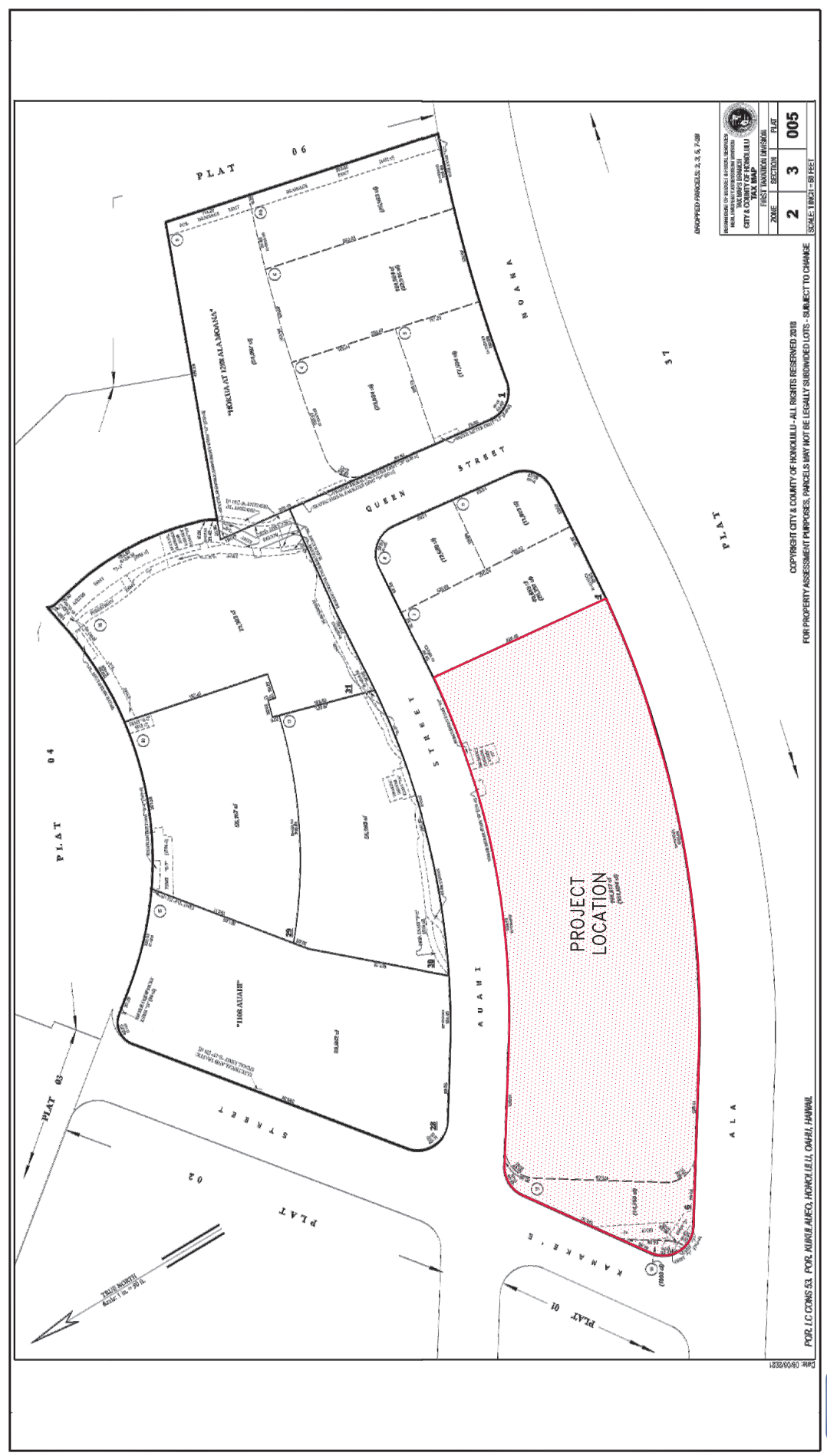
Enclosures: Project Vicinity and Location Map  
Tax Map Key



**WARD VILLAGE BLOCKS D AND E**  
**HONOLULU, OAHU, HAWAII**

**LOCATION MAP**

Figure  
**1-2**



**WARD VILLAGE BLOCK D AND E / HONOLULU, OAHU, HAWAII**

**TAX MAP KEY**

FIGURE 2



UNAPPORTIONED PARCELS: 2, 3, 5, 7, 8P		
HONOLULU, OAHU, HAWAII CITY & COUNTY OF HONOLULU FIRST HANAIALA DISTRICT		
ZONE: 2	SECTION: 3	PLAT: 005
SCHEMATIC SHEET		

COPYRIGHT CITY & COUNTY OF HONOLULU - ALL RIGHTS RESERVED 2018  
 FOR PROPERTY ASSESSMENT PURPOSES, PARCELS MAY NOT BE LEGALLY SUBDIVIDED LOTS - SUBJECT TO CHANGE

FOR LC CORP. S3, FOR KUMU AHEO, HONOLULU, OAHU, HAWAII

DATE: 05/05/2023

**BOARD OF WATER SUPPLY**

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



January 20, 2023

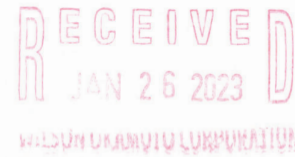
RICK BLANGIARDI, MAYOR

BRYAN P. ANDAYA, Chair  
KAPUA SPROAT, Vice Chair  
MAX J. SWORD  
NA'ALEHU ANTHONY  
JONATHAN KANESHIRO

DAWN B. SZEWCZYK, P.E., Ex-Officio  
EDWIN H. SNIFFEN, Ex-Officio

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

ERWIN M. KAWATA  
Deputy Manager



Mr. Brett K. Kuamoo, P.E.  
Wilson Okamoto Corporation  
1907 South Beretania Street, Suite 400  
Honolulu, Hawaii 96826

Dear Mr. Kuamoo:

Subject: Your Letter Dated December 22, 2022 Regarding Availability of Water and Flow and Pressure Data for the Proposed Ward Village Blocks D and E Project – Tax Map Key: 2-3-005: 006

Thank you for your letter regarding the proposed mixed-use development of 300-units and 8,000 square feet of restaurant space for Block D, and 196-units and 5,000 square feet of commercial space for Block E.

The existing water system is currently adequate to accommodate the proposed residential redevelopment. However, please be advised that the existing Honolulu water system capacity has been reduced due to the shut-down of the Halawa Shaft pumping station as a proactive measure to prevent fuel contamination from the Navy's Red Hill Bulk Storage Tank fuel releases. The final decision on the availability of water will be confirmed when the building permit application is submitted for approval, pending evaluation of the water system conditions at that time on a first-come, first-served basis. 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.

We continue to request 10% voluntary water conservation of all customers until new sources are completed and require water conservation measures in all new developments. If water consumption significantly increases, progressively restrictive conservation measures may be required to avoid low water pressures and disruptions of water service.

Presently, there is no moratorium on the issuance of new and additional water services. Water distributed via the BWS water systems remain safe for consumption. The BWS is closely monitoring water usage and will keep the public informed with the latest findings. Please visit our website at <http://www.boardofwatersupply.com> and <http://www.protectoahuwat.org> for the latest updates and water conservation tips.

When water is made available, the applicant will be required to pay our Water System Facilities Charges (WSFC) for resource development, transmission, and daily storage.

Water conservation measures are required for all proposed developments. These measures include utilization of nonpotable water for irrigation using gray water, rain catchment, drought tolerant plants, xeriscape landscaping, efficient irrigation systems, such as a drip system and moisture sensors, and the use of Water Sense labeled ultra-low flow water fixtures and toilets. Prior to BWS approval of water availability, the developer is required to submit a Water Conservation and Reuse Plan for BWS review and approval.

Mr. Brett K. Kuamoo  
January 20, 2023  
Page 2

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.

Proposed mixed-use developments are required to install separate domestic water meters and laterals serving the residential and non-residential spaces.

The proposed project is subject to BWS Cross-Connection Control and Backflow Prevention requirements prior to the issuance of the Building Permit Applications.

The construction drawings should be submitted for our approval, and the construction schedule should be coordinated to minimize impact to the water system.

The BWS has suspended fire flow tests on fire hydrants as a water conservation measure. However, you may use the following calculated flow data for Fire Hydrant No. M03205, M03206, M03208, and M01764:

Fire Hydrant Number	Location	Static Pressure (psi)	Residual Pressure (psi)	Flow (gpm)
M03205	Kamakee St	76	59	4,000
M03206	Auahi Street	76	57	4,000
M03208	Auahi Street	76	45	4,000
M01764	Ala Moana Blvd	76	46	4,000

The data is based on the existing water system, and the static pressure represents the theoretical pressure at the point of calculation with the reservoir full and no demands on the water system. The static pressure is not indicative of the actual pressure in the field. Therefore, in order to determine the flows that are available to the site, you will have to determine the actual field pressure by taking on-site pressure readings at various times of the day and correlating that field data with the above hydraulic design data.

The map showing the location of the fire hydrants is attached.

The on-site fire protection requirements should be coordinated with the Fire Prevention Bureau of the Honolulu Fire Department.

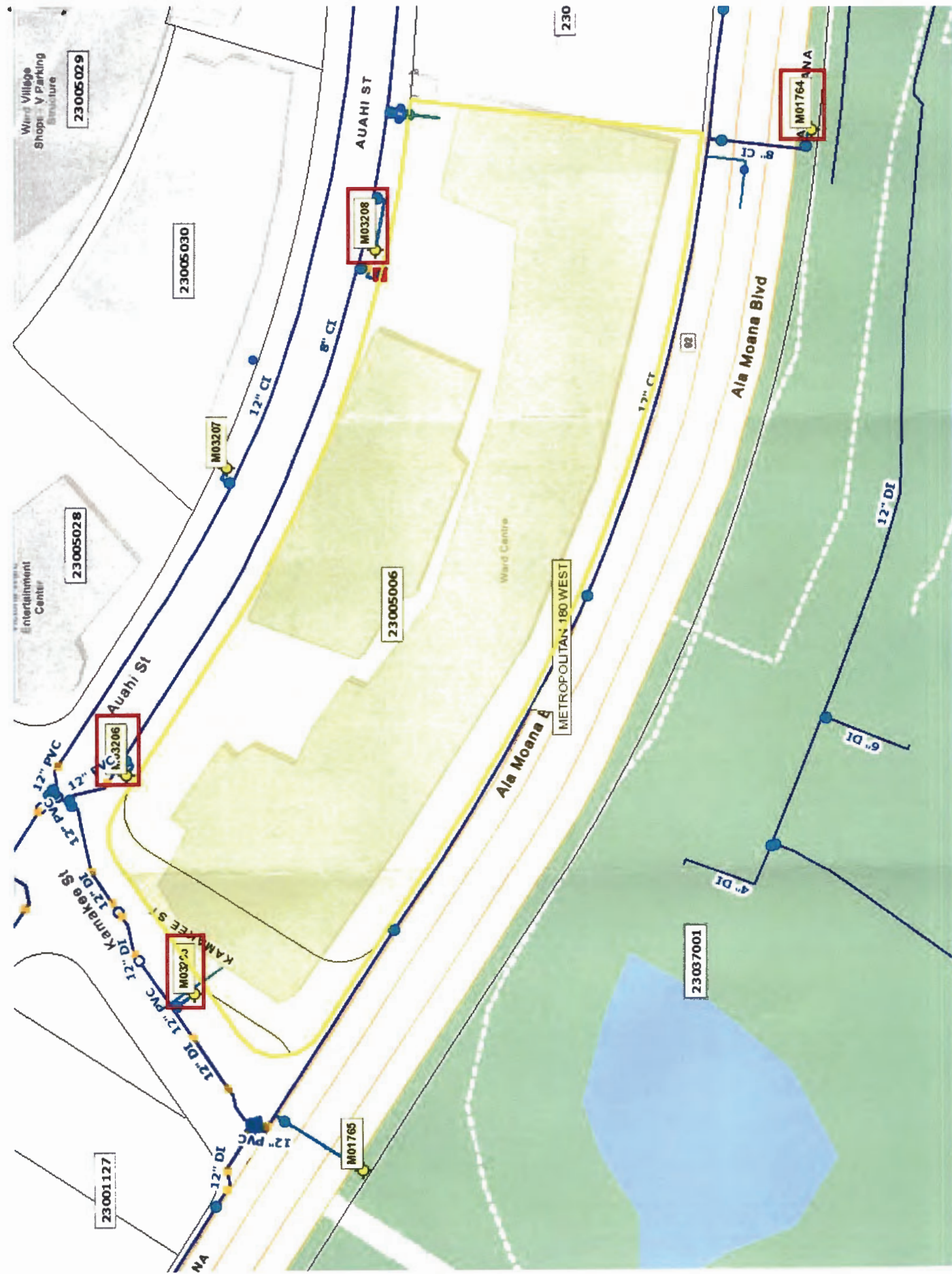
If you have any questions, please contact Barry Usagawa of our Water Resources Division, at (808) 748-5900.

Very truly yours,

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

Attachment





Honolulu Fire Department

HFD REQUIREMENTS

**From:** Zapata, Ricardo A <rzapata@honolulu.gov>  
**Sent:** Tuesday, January 24, 2023 12:36 PM  
**To:** Brett Kuamoo  
**Subject:** RE: Ward Village - Blocks D+E - HFD Review

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

Brett,  
 This looks good, except that the 400 ft. requirement does not need to be to a corner. There simply needs to be one or more hydrants within 400 ft. of any point of the building.  
 Ricardo

**From:** Brett Kuamoo [mailto:BKuamoo@wilsonokamoto.com]  
**Sent:** Tuesday, January 24, 2023 8:28 AM  
**To:** Zapata, Ricardo A <rzapata@honolulu.gov>  
**Cc:** Rika Okino <ROkino@wilsonokamoto.com>  
**Subject:** RE: Ward Village - Blocks D+E - HFD Review

**CAUTION:** Email received from an **EXTERNAL** sender. Please confirm the content is safe prior to opening attachments or links.

Hello Ricardo,

Thank you for the call this morning. In summary:

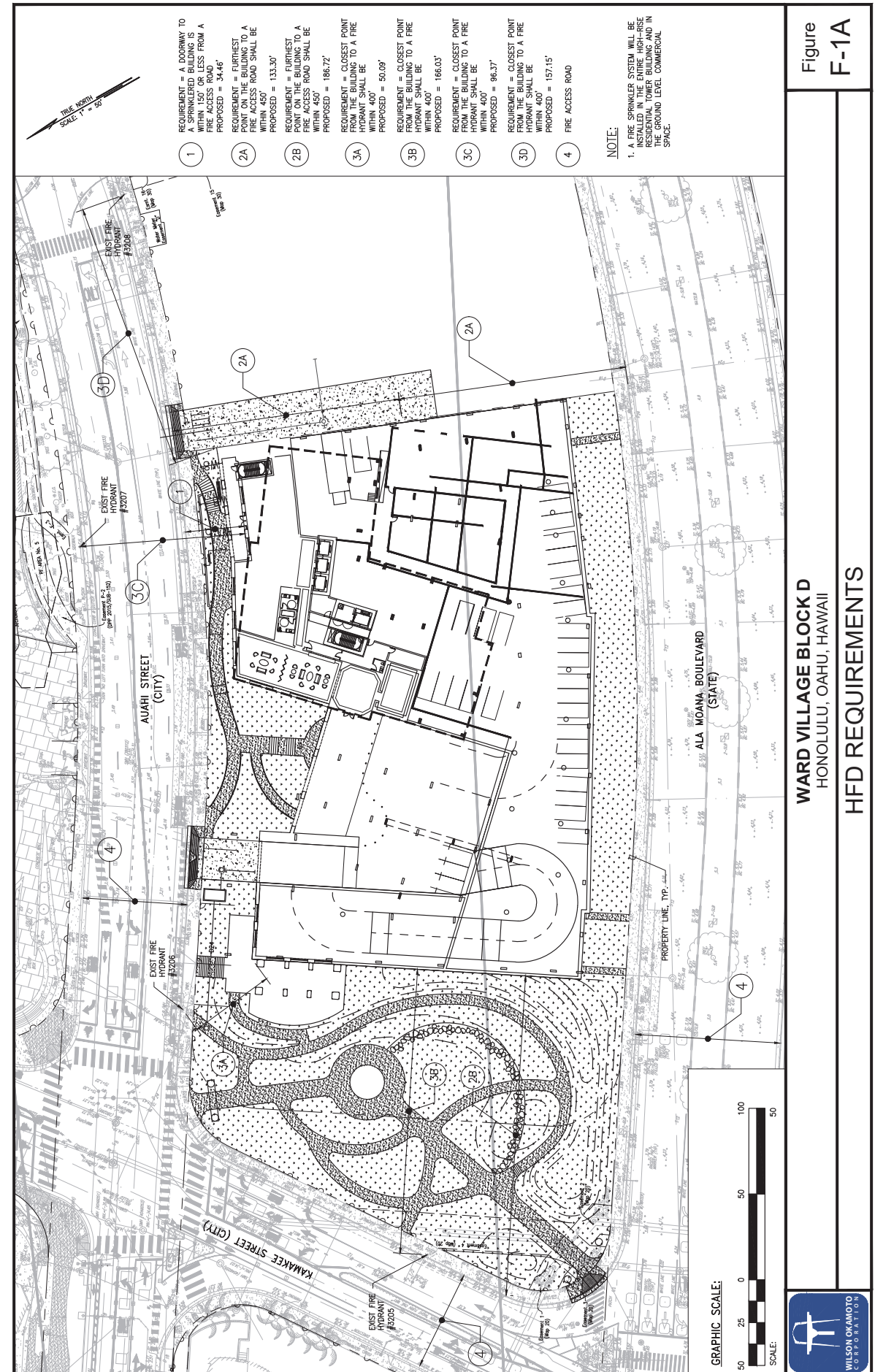
- HFD noted that FDC's need to be provided within 100-ft of a fire hydrant.
  - WOC clarified FDC's are proposed along Auahi Street, which will be located within 100-ft for a fire hydrant.
- HFD clarified intent of requirement for fire hydrant to be within 400-ft of the nearest building corner, for buildings with fire sprinkler system.
  - WOC appreciates clarification and understands that building has adequate hydrants along Ala Moana Blvd.

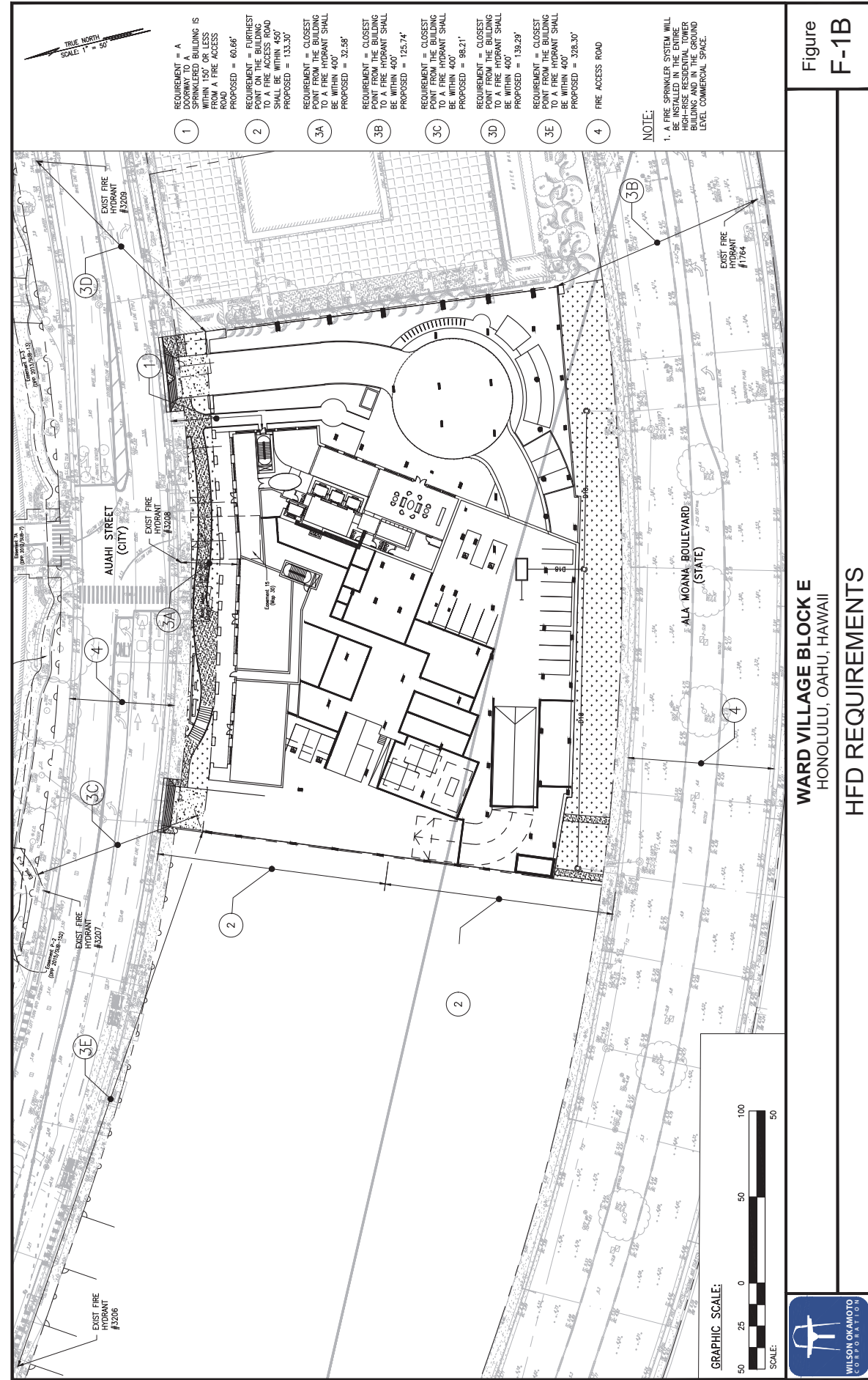
As we understand from our conversation, the project generally conforms to the Fire Code as it relates to the site elements. Formal review/approval will occur with building permit review.

Please let me know if any questions or corrections to our understanding.

Mahalo,  
**Brett K. Kuamoo, P.E.**  
 Senior Engineer  
 T (808) 946-2277 F (808) 946-2253

This message contains information that might be confidential and privileged. Unless you are the addressee or are authorized by the sender, you may not use, copy or disclose the information contained in this message. If you have received this message in error, please delete it and advise the sender.





City and County of Honolulu - Department of Planning and Permitting  
Civil Engineering Branch

LID Correspondence with Keith Miyashiro

**From:** Miyashiro, Keith K <kmiyashiro1@honolulu.gov>  
**Sent:** Tuesday, January 24, 2023 9:47 AM  
**To:** 'Brett Kuamoo'  
**Cc:** Rika Okino  
**Subject:** RE: Ward Village - Blocks D+E - MTD for SWQ Treatment

Thanks for the clarification Brett,

**Keith K. Miyashiro**  
 Civil Engineer  
 City and County of Honolulu  
 Department of Planning and Permitting  
 Civil Engineering Branch  
 650 S. King Street, Honolulu, HI 96813  
**Email:** [kmiyashiro1@honolulu.gov](mailto:kmiyashiro1@honolulu.gov)  
**Phone:** 808-768-8106

**From:** Brett Kuamoo <BKuamoo@wilsonokamoto.com>  
**Sent:** Tuesday, January 24, 2023 9:03 AM  
**To:** Miyashiro, Keith K <kmiyashiro1@honolulu.gov>  
**Cc:** Rika Okino <ROkino@wilsonokamoto.com>  
**Subject:** RE: Ward Village - Blocks D+E - MTD for SWQ Treatment

**CAUTION:** Email received from an **EXTERNAL** sender. Please confirm the content is safe prior to opening attachments or links.

Hello Keith,

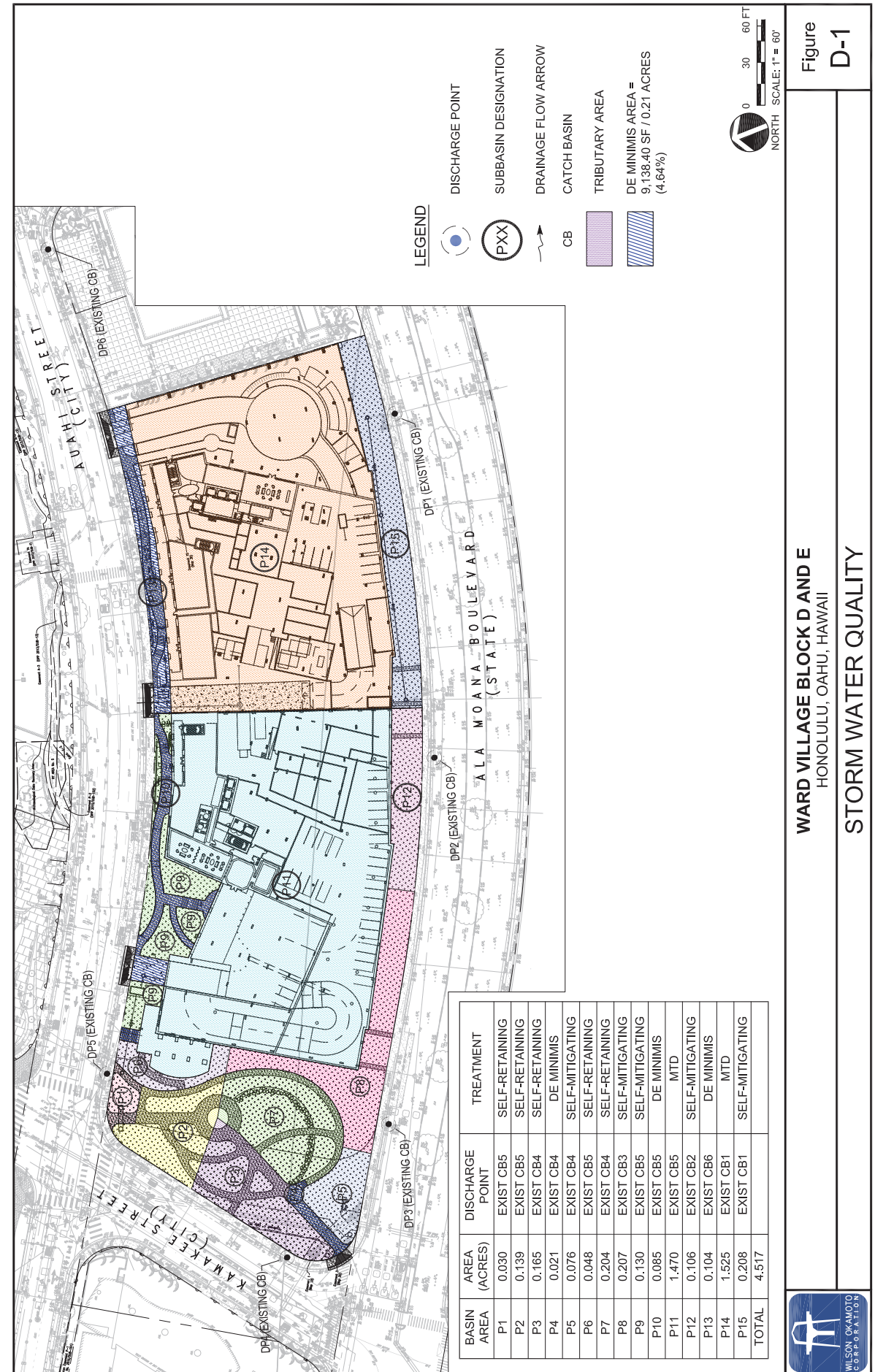
Thank you for the reply and clarifications. Please see response to your inquiries below:

- The slope of the landscaping along Ala Moana Boulevard is anticipated to be steep (3:1), to make up grade from the FFE of 10.25-ft, down to the existing sidewalk grade of approximately 4.5-ft.
  - This would be too steep to implement a bio-filtration method, but we will continue to study option to utilize bio-filtration as the design progresses.
  - Likely this area will become self-mitigating or another site design strategy.
- Understood that this review is a courtesy for general conformance and that formal review/approval will occurring during formal plan review.
- Noted regarding the driveways.
  - We will coordinate this further with TRB.

Feel free to contact me should you have any further questions.

Mahalo,  
**Brett K. Kuamoo, P.E.**  
 Senior Engineer  
 T (808) 946-2277 F (808) 946-2253

This message contains information that might be confidential and privileged. Unless you are the addressee or are authorized by the sender, you may not use, copy or disclose the information contained in this message. If you have received this message in error, please delete it and advise the sender.





**Hawaiian Electric Company**

**Request Letter and Will Serve Letter**

December 19, 2022

Hawaiian Electric  
P. O. Box 2750  
Honolulu, Hawaii 96840

Attention: Eric Shimono, P.E.

Project: Ward Village Block E Utility Assessment

Enclosures: (a) Block D and E Concept Site Plan  
(b) TMK No. 2-3-005:006

Please be advised that we are working with Wilson Okamoto Corporation who is under contract to Howard Hughes Corporation to develop a utility assessment report for the Block E development (TMK No. 2-3-005:006). Please find attached for your review and comment enclosure (a) and enclosure (b) which indicate the conceptual site plan and location. It is currently anticipated that the building will consist of 196 dwelling units and 5,000 of restaurant space. Based on a diversified per unit demand load of 5 kVA, a pro-rated common area demand load of 3 kVA per residential unit and, a demand load of 11 VA per square foot for the restaurant space, the preliminary diversified peak demand load would be 1,623 kVA. This peak demand load is for planning purposes and it should be noted that the building load, when calculated based on the currently enforced edition of the National Electrical Code, will be higher than this calculation. Please advise on the following:

1. HECO's preferred service connection point for this development. It is understood based on HE Advanced Planning Analysis that this building will be connected to the 25 kV distribution system. If off-site improvements are required to provide service to this site, please advise as to the nature and scope of the improvements and whether the Developer might be expected to participate in the cost of these off-site improvements. If the Developer's cost participation is anticipated, please provide an order-of-magnitude budget of the cost.
2. HECO would provide a "will serve" letter for this project which will be included in the project's development application for approval by the Hawaii Community Development Authority.

We are trying to complete the draft utility assessment report as quickly as feasible and would appreciate any information you can furnish within the next three weeks. Your assistance in expediting this matter is greatly appreciated. Should you have any questions, please call me at (808) 941-0577.

Very truly yours,

Steven H. Sakai, P.E.  
Vice President

cc: Gary Fukumoto, HECO  
Brett Kuamoo, WOC



February 18, 2023

Mr. Steve Sakai  
Ronald N.S. Ho & Associates  
2153 N. King Street #201  
Honolulu, HI. 96819

Dear Mr. Sakai:

Re: Ward Village – Block D

This is in response to your request for a “Will Serve” letter for the subject project.

We have existing distribution circuits along Auahi Street that could potentially be used to serve the future development. Please keep in mind that these circuits may need to be upgraded depending on the ultimate size of this project’s load. At this time we do not have sufficient information and detailed plans to make this determination.

We request that you keep us informed on the status of your project, and look forward to working with you on your design as they are being developed. As soon as you have detailed plans, please create a Service Request with us, and be sure to allow sufficient time for us to work on the project.

Please let us know if we can be of assistance in any other way. Should you have any questions, please call me at 543-7590.

Sincerely,

Shimono,  
Eric

Digitally signed by  
Shimono, Eric  
Date: 2023.02.18  
22:19:02 -10'00'

Eric Shimono  
Supervising Engineer  
Customer Engineering Department



February 18, 2023

Mr. Steve Sakai  
Ronald N.S. Ho & Associates  
2153 N. King Street #201  
Honolulu, HI. 96819

Dear Mr. Sakai:

Re: Ward Village – Block E

This is in response to your request for a “Will Serve” letter for the subject project.

We have existing distribution circuits along Auahi Street that could potentially be used to serve the future development. Please keep in mind that these circuits may need to be upgraded depending on the ultimate size of this project’s load. At this time we do not have sufficient information and detailed plans to make this determination.

We request that you keep us informed on the status of your project. As soon as you have detailed plans, please create a Service Request with us, and be sure to allow sufficient time for us to work on the project.

Please let us know if we can be of assistance in any other way. Should you have any questions, please call me at 543-7590.

Sincerely,

Shimono,  
Eric

Digitally signed by  
Shimono, Eric  
Date: 2023.02.18  
22:20:03 -10'00'

Eric Shimono  
Supervising Engineer  
Customer Engineering Department

**Hawaiian Telcom****Request Letter and Assessment Letter**

December 19, 2022

Hawaiian Telecom Inc.  
1177 Bishop Street, 10th Floor  
Honolulu, Hawaii 96813

Attention: Mr. Daniel Masutomi

Project: Ward Village Block E Utility Assessment

Enclosures: (a) Block D and E Concept Site Plan  
(b) TMK No. 2-3-005:006

Please be advised that we are working with Wilson Okamoto Corporation who is under contract to Howard Hughes Corporation to develop a utility assessment report for the Block E development (TMK No. 2-3-005:006). Please find attached for your review and comment enclosure (a) and enclosure (b) which indicate the conceptual site plan and location. It is currently anticipated that the building will consist of 196 dwelling units and 5,000 of restaurant space. Please advise on the following:

1. HTCO's preferred service connection point for this development. Also please verify that HTCO's distribution system in the area has sufficient capacity to provide service to this development. If off-site improvements are required to provide service to this site, please advise as to the nature and scope of the improvements and whether the Developer might be expected to participate in the cost of these off-site improvements. If the Developer's cost participation is anticipated, please provide an order-of-magnitude budget of the cost.
2. If we may obtain the existing HTCO distribution maps for any existing overhead and underground facilities within or adjacent to the site. These will assist with the development of the utility assessment.

We are trying to complete the draft utility assessment report as quickly as feasible and would appreciate any information you can furnish within the next three weeks. Your assistance in expediting this matter is greatly appreciated. Should you have any questions, please call me at (808) 941-0577.

Very truly yours,

Steven H. Sakai, P.E.  
Vice President

cc: Jonathan Delahoyde, HTCO  
Brett Kuamoo, WOC

December 21, 2022

Steven H. Sakai  
Ronald N.S. Ho & Associates, Inc.

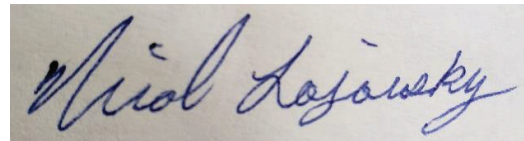
Subject: Will Serve Letter – Ward Village Block D & E

Dear Mr. Sakai:

Thank you for sharing information on your proposed Ward Village Block D and E Concept Site Plan. We understand that this project will be on the island of Oahu at TMK No. 2-3-005:006. We are excited to be a part of the development and would gladly provide access to Hawaiian Telcom's services to this new development.

If you have any questions, please do not hesitate to contact me at (808) 546-4858 or email [Nicole.Lajousky@hawaiiantel.com](mailto:Nicole.Lajousky@hawaiiantel.com).

Sincerely,



Nicole Lajousky  
Network OSP Engineer  
Strategic Fiber Deployment  
Hawaiian Telcom

Cc: Ward Village Block D Utility Assessment; Ward Village Block E Utility Assessment

**Charter Communications aka Spectrum**

**Utility Assessment Request Letter  
and Will Serve Letter**







**Ronald N. S. Ho & Associates, Inc. electrical engineers**

Sean K. Sugai, P.E. • Steven H. Sakai, P.E. • Dennis I. Toba, P.E. • Ronald N. S. Ho, P.E. • Billy J. Ornellas, P.E.

December 19, 2022

Spectrum Oceanic  
200 Akamainui Street  
Mililani, Hawaii 96789

Attention: Ms. Allyson Ka'ai

Project: Ward Village Block D Utility Assessment

Enclosures: (a) Block D and E Concept Site Plan  
(b) TMK No. 2-3-005:006

Please be advised that we are working with Wilson Okamoto Corporation who is under contract to Howard Hughes Corporation to develop a utility assessment report for the Block D development (TMK No. 2-3-005:006). Please find attached for your review and comment enclosure (a) and enclosure (b) which indicate the conceptual site plan and location. It is currently anticipated that the building will consist of 300 dwelling units and 8,000 of restaurant space. Please advise on the following:

1. Spectrum's preferred service connection point for this development. Also, please verify that Spectrum's distribution system in the area has sufficient capacity to provide service to this development. If off-site improvements are required to provide service to this site, please advise as to the nature and scope of the improvements and whether the Developer might be expected to participate in the cost of these off-site improvements. If the Developer's cost participation is anticipated, please provide an order-of-magnitude budget of the cost.
2. If we may obtain the existing Spectrum distribution maps for any existing overhead and underground facilities within or adjacent to the site. These will assist with the development of the utility assessment.

We are trying to complete the draft utility assessment report as quickly as feasible and would appreciate any information you can furnish within the next three weeks. Your assistance in expediting this matter is greatly appreciated. Should you have any questions, please call me at (808) 941-0577.

Very truly yours,

Steven H. Sakai, P.E.  
Vice President

cc: Randy Makizuru, Spectrum  
Brett Kuamoo, WOC



2/3/2023

The Howard Hughes Corporation  
Ward Management Development Company, LLC.  
1240 Ala Moana Blvd.  
Honolulu, HI 96814  
Attention: Doug Johnstone

**Re: Will Serve Letter for Block D and E Concept Site Plan**

Dear Doug Johnstone,

Oceanic Time Warner Cable LLC ("Spectrum"), directly or through its parent or affiliate companies, is an innovative provider of cable television, video, data, voice and other services (collectively, the "Services"). Ward Management Development Company, LLC. ("Developer") is the developer of a proposed project located at TMK No. 2-3-005:006. Oceanic's understanding is that the Developer wishes to make the Services available to residents and/or commercial tenants at the Project.

This is confirm that Spectrum is willing and able to provide the Services to the Project subject to all of the terms and conditions of its applicable franchise agreement with the State of Hawaii, all applicable federal, state and county laws, rules and regulations, and all other terms and conditions stated in this letter. Developer and/or its successors in interest will enter into a mutually agreeable services agreement with Spectrum, which shall specify the provision of equipment and facilities for the provision of the Services, the specific type(s) of Services provided, and other terms and conditions (which may include terms relating to the provision of easements, conduits, and accommodations for equipment

The issuance of this letter by Spectrum, inclusive of the foregoing terms and conditions, is based upon the representations of the Developer to Spectrum with respect to the location and scope of the Project as of the date of this letter. Please contact us should you have any questions regarding the foregoing.

Chavez Summerville

*Chavez Summerville*

200 Akamainui Street | Mililani, HI | 96789  
Director, Spectrum Community Solutions  
Cell: 727.373.8506

**Hawaii Gas**

**Email Correspondence**

**From:** Keith Yamamoto <kkyamamo@hawaiigas.com>  
**Sent:** Monday, January 9, 2023 9:26 AM  
**To:** Rika Okino  
**Cc:** Brett Kuamoo  
**Subject:** RE: Ward Village - Blocks D + E - Hawaii Gas Service  
**Attachments:** Ward Villlage Blocks D E-390238-HG-APPPS-P.pdf

Rika,

Gas service is for this project is available from Kamakee Street or Auahi Street. Attached gas map for your reference.

Thanks,  
Keith

---



---

**From:** Ikwatanabe <Ikwatanabe@honolulu.gov>  
**Sent:** Tuesday, May 16, 2023 9:26 AM  
**To:** Jennylyn Tapat Morrill  
**Cc:** kandrade1  
**Subject:** RE: Block N West

Jenny,

TRB accepts the TIR dated March 2023. We will continue to work with the consultant regarding the proposed access points for the project during the design phases of the projects.

Thanks,  
Lance

---

**From:** Jennylyn Tapat Morrill <JTapat@wilsonokamoto.com>  
**Sent:** Monday, May 15, 2023 3:22 PM  
**To:** Watanabe, Lance K. <Ikwatanabe@honolulu.gov>  
**Cc:** Andrade, Kamakaokalani M <kandrade1@honolulu.gov>  
**Subject:** RE: Block N West

CAUTION: Email received from an EXTERNAL sender. Please confirm the content is safe prior to opening attachments or links.

Hi Lance,

Thanks again for expediting your review of the Block N West TIR. I just wanted to check if you've also had a chance to look over the TIR for Blocks D/E or if you have any questions.

Thank you,  
**Jenny Tapat Morrill, P.E.**  
Project Manager



1907 South Beretania Street, Suite 400  
Honolulu, Hawaii 96826  
T (808) 946-2277 F (808) 946-2253  
W <http://www.wilsonokamoto.com>

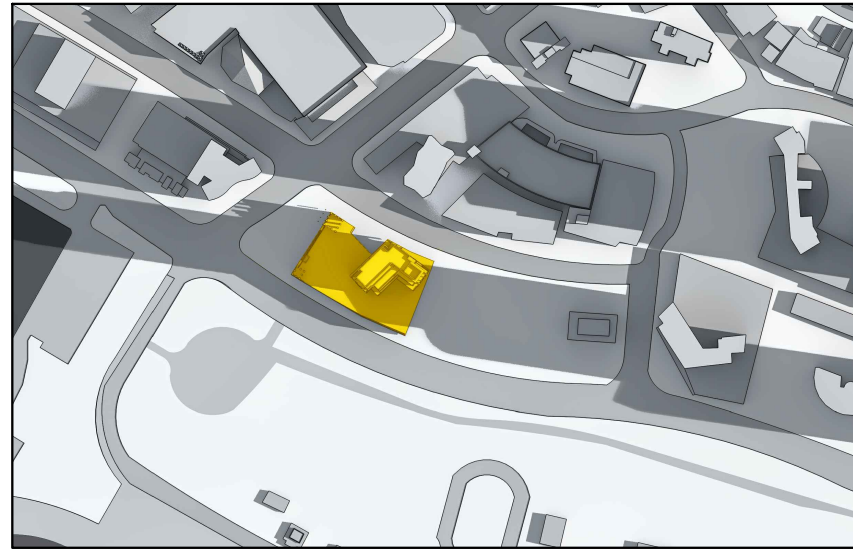
This message contains information that might be confidential and privileged. Unless you are the addressee or are authorized by the sender, you may not use, copy or disclose the information contained in this message. If you have received this message in error, please delete it and advise the sender.

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**From:** Jennylyn Tapat Morrill  
**Sent:** Tuesday, May 2, 2023 7:19 AM  
**To:** Watanabe, Lance K. <[Ikwatanabe@honolulu.gov](mailto:Ikwatanabe@honolulu.gov)>  
**Cc:** kandrade1 <[kandrade1@honolulu.gov](mailto:kandrade1@honolulu.gov)>  
**Subject:** RE: Block N West

# APPENDIX H

SHADE/SHADOW STUDY



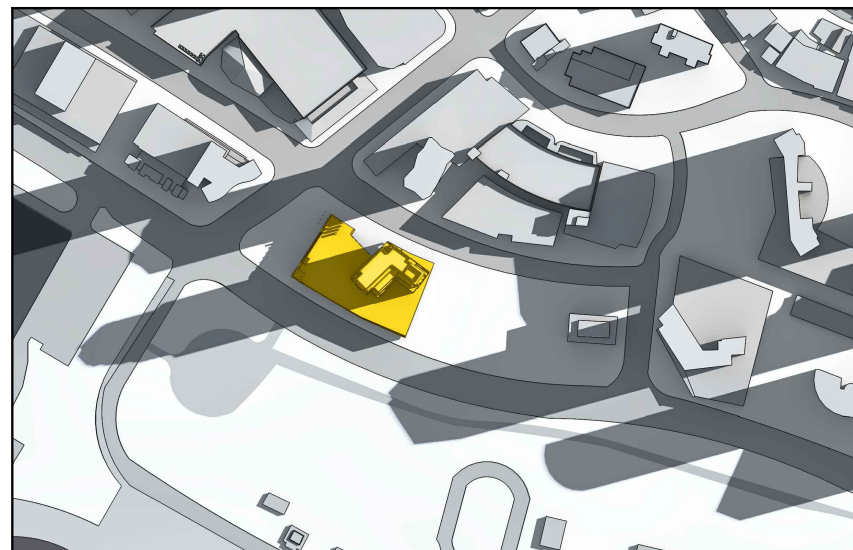
MARCH 21, 9 AM



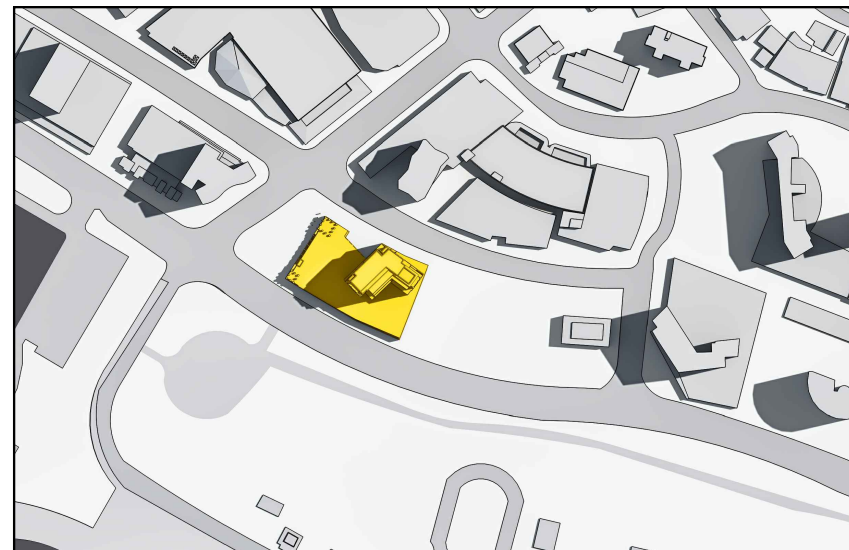
MARCH 21, 12 PM



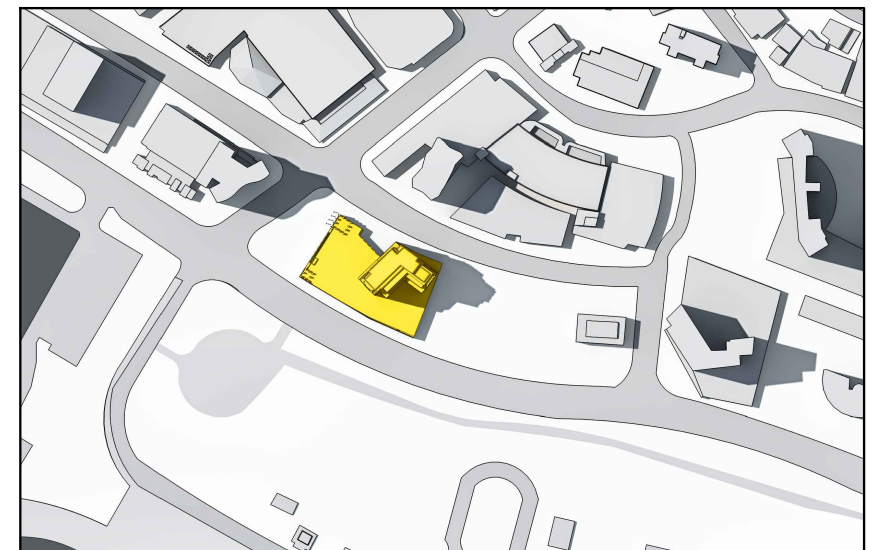
MARCH 21, 3 PM



JUNE 21, 9 AM



JUNE 21, 12 PM



JUNE 21, 3 PM



DECEMBER 21, 9 AM



DECEMBER 21, 12 PM



DECEMBER 21, 3 PM

# APPENDIX I

WIND CONSULTANT LETTER



601 SW 2<sup>nd</sup> Ave, #1140  
Portland OR, 97204

Tel: +1.503.243.2556

February 14, 2023

David Yamane  
The Howard Hughes Corporation  
1240 Ala Moana Boulevard, Suite 200  
Honolulu, HI 96814  
T: 808.426.7686  
david.yamane@howardhughes.com

**Re: Ward Village Block D  
RWDI Reference No. 2300436**

Dear Mr. Yamane,

RWDI USA LLC (RWDI) has been retained by Architects Hawaii Limited (AHL) to conduct wind tunnel studies for the pedestrian wind conditions, structural wind loads, cladding wind loads, as well as outdoor thermal comfort door operability, wind driven rains, and solar reflections for the proposed Ward Village Block D development in Honolulu, Hawaii.

The proposed development includes a 38-story residential building with an outdoor amenity podium on the 6<sup>th</sup> floor. The site is bounded by Queen Street, Kamakee Street, Ala Moana Boulevard and Auahi Street. For wind related studies the winds around the proposed development will be simulated in one of RWDI's boundary-layer wind tunnels for the existing and proposed configurations by using a scale model of the study building and its surroundings. Wind tunnel measurements for 36 wind directions will be taken across the site and the structure itself, and then combined with long-term meteorological data collected from the nearby Honolulu International Airport to predict the wind speeds and frequencies in full scale. This data will then be analyzed for the various wind related studies being performed.

Immediately following the wind tunnel tests, a report will be issued to summarize our main findings through tables and figures.

The Solar reflections study is a bit different in that it utilizes a 3D computer model is used to input the form of the building, reflectivity of surfaces, and the meteorological data for the site to quantify the visual impacts and localized heat that may result from the building design.

If you have any questions, please do not hesitate to contact us.

Yours truly,

**RWDI**

Jasha Kistler, PE.  
Senior Project Manager / Associate Principal



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# APPENDIX J

ACOUSTICAL CONSULTANT LETTER

31 January 2023

Daniel Moats  
**Architects Hawaii Limited**  
733 Bishop Street, Suite 3100  
Honolulu, HI 96813  
dmoats@ahl.design

**Subject: Ward Village Block D  
Environmental Noise Study  
Salter Project 23-0014**

Dear Daniel:

We have conducted an environmental noise study for the project. The purpose of the study is to quantify the noise environment at the site, compare the measured data with applicable standards, and propose mitigation measures as necessary. This report summarizes the results.

## PROJECT CRITERIA

The Hawai'i Building Code (i.e., 2012 International Building Code) does not include standards for environmental noise intrusion. However, the Department of Housing and Urban Development (HUD) has a criterion of  $DNL^1$  45 dB for multi-family residential projects, which matches the criterion in the California Building Code and is used by Howard Hughes (HHC) for other Ward Village projects. We have used that as the criterion for this project.

## NOISE ENVIRONMENT

The project is a new 35-story condominium tower bounded by Ala Moana Boulevard and Auahi Street, on the block between Kamakee Street and Queen Street in Honolulu. The noise environment at the site is predominantly controlled by vehicular traffic along Ala Moana Boulevard and Auahi Street.

---

1  $DNL$  (Day-Night Average Sound Level) – A descriptor for a 24-hour A-weighted average noise level.  $DNL$  accounts for the increased acoustical sensitivity of people to noise during the nighttime hours.  $DNL$  penalizes sound levels by 10 dB during the hours from 10 PM to 7 AM. For practical purposes, the  $DNL$  and  $CNEL$  are usually interchangeable.  $DNL$  is sometimes written as  $L_{DN}$ .



To quantify the existing noise environment, we conducted two long-term noise measurements from 9 to 12 January 2023 along Ala Moana Boulevard and Auahi Street. The monitors were at a height of 12 feet above grade. This data was used in conjunction with our collected data from other Ward Village and nearby projects. See **Figure 1** for the measurement locations and measured noise levels.

Based on our measured data, we created a 3-D noise model to calculate noise levels at the building facade. Our model includes noise from the planned HART (Honolulu Authority for Rapid Transit) elevated tracks that will run near the project site. In the absence of a project traffic study, we added 1 dB to the data in our calculations to account for future traffic increases.

## RECOMMENDATIONS

We used the SD area plans sent 18 January 2023, which show room sizes and locations, and window areas. We calculated the window  $STC^2$  ratings needed to meet the project criterion (see **Figures 2 to 5**). Our calculations are based on the following:

- All rooms will have hard-surfaced flooring
- Ceilings are 9 feet high
- Windows will be punched
- The exterior assembly will achieve at least  $STC$  45 (e.g., a three-coat stucco system)

The recommended  $STC$  ratings are for full window assemblies (glass and frame) rather than just the glass itself. Tested sound-rated assemblies should be used.

For reference, typical one-inch glazing assemblies (two 1/4-inch thick panes with a 1/2-inch airspace) achieve approximately  $STC$  32. Where  $STC$  ratings above 33 are required, at least one pane will need to be laminated.

Where windows need to be closed to meet the project criterion, an alternative method of supplying fresh air (e.g., mechanical ventilation) should be considered. This applies to all residences. This issue should be discussed with the project mechanical engineer.

\* \* \*

---

2  $STC$  (Sound Transmission Class) – A single-number rating defined in ASTM E90 that quantifies the airborne sound insulating performance of a partition under laboratory conditions. Increasing  $STC$  ratings correspond to improved airborne sound insulation.

This concludes our environmental noise study for Ward Village Block D. Should you have any questions, please give us a call.

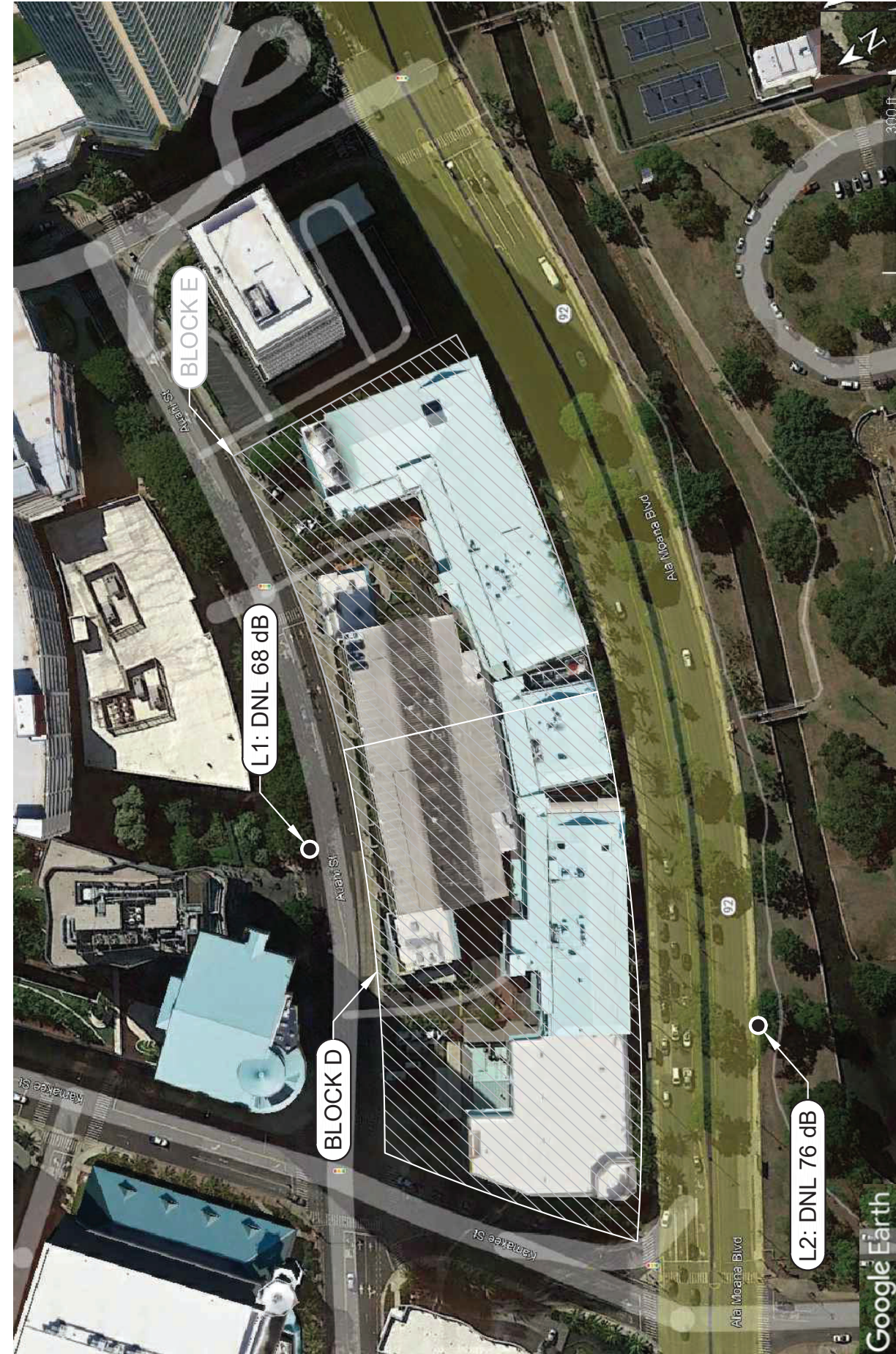
Best,

**SALTER**

Blake Wells, LEED GA  
Associate

Enclosures as noted

Eric Mori, PE  
Senior Vice President



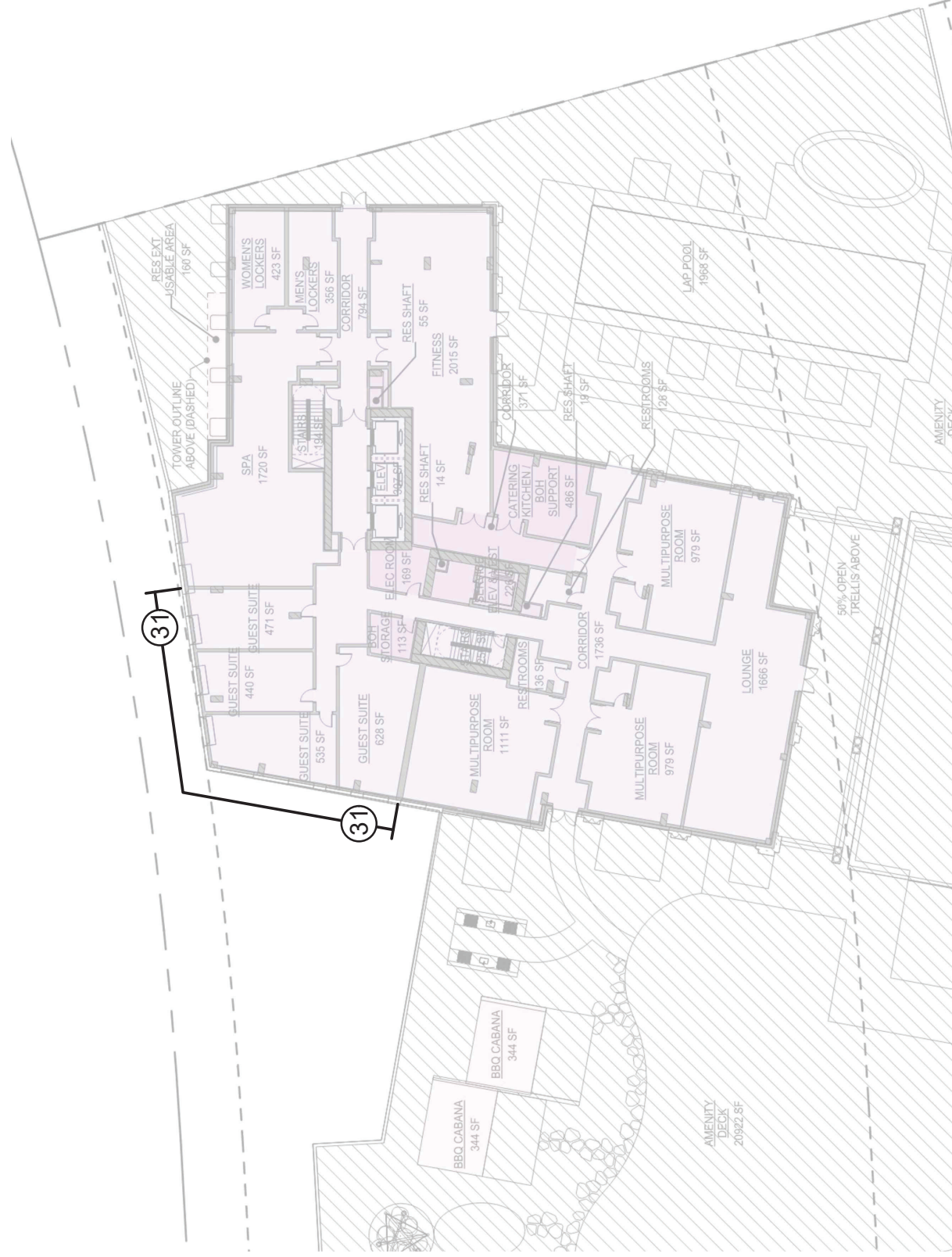
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**WARD VILLAGE – BLOCK D  
MEASUREMENT LOCATIONS AND MEASURED  
NOISE LEVELS**

**FIGURE 1**

Salter #  
23-0014

BMW/EBM  
01.31.23



NOTE: STC RATINGS ARE FOR THE COMPLETE ASSEMBLY (E.G., GLASS, FRAME, AND OPERABLE SECTIONS) BASED ON TEST REPORTS FROM AN NVLAP-ACCREDITED LAB

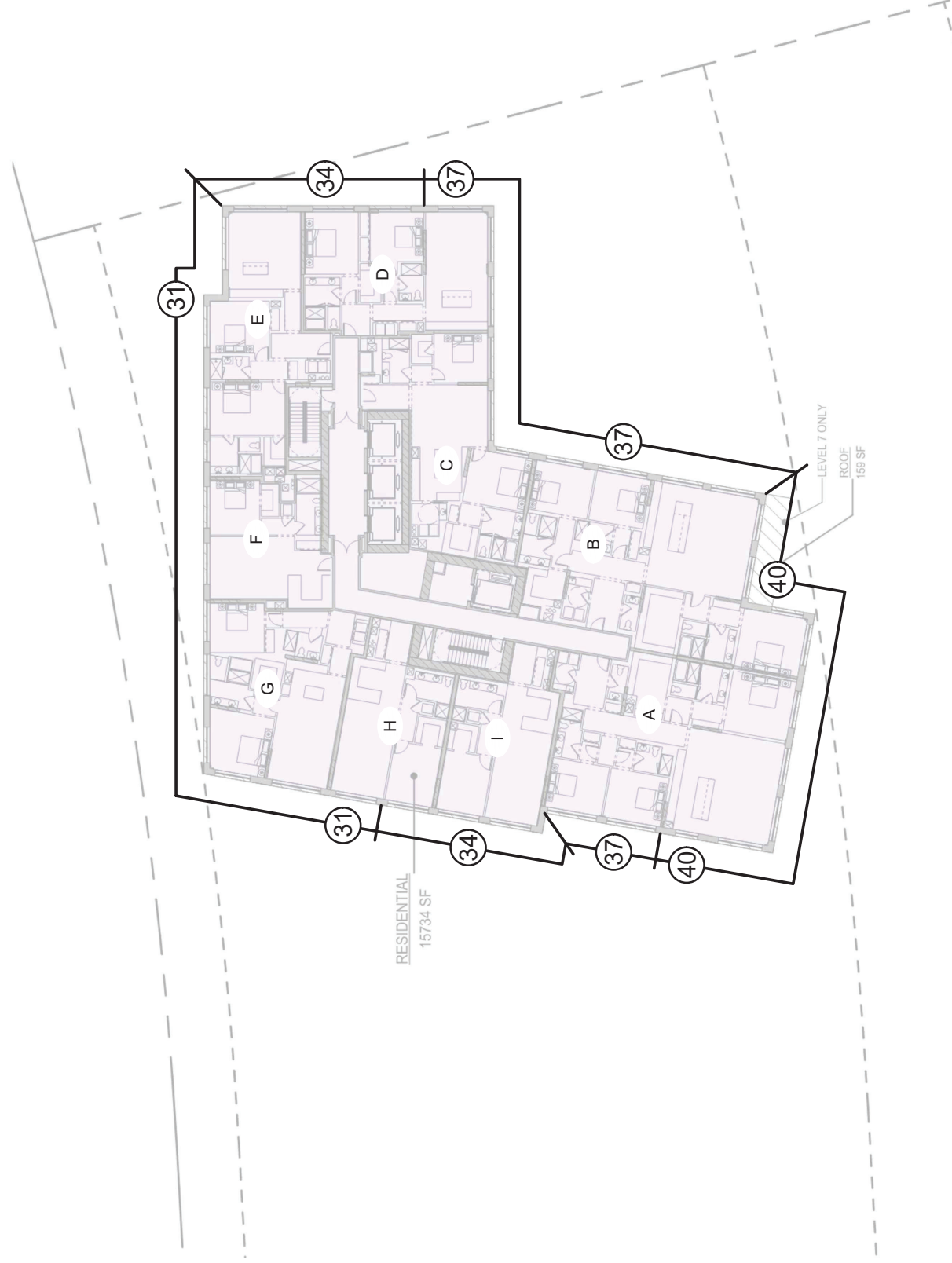
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**WARD VILLAGE – BLOCK D  
MINIMUM CODE–REQUIRED STC RATINGS FOR  
WINDOWS AND EXTERIOR DOORS (FLOOR 6)**

**FIGURE 2**

Salter #  
22–0014

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01.31.23



NOTE: STC RATINGS ARE FOR THE COMPLETE ASSEMBLY (E.G., GLASS, FRAME, AND OPERABLE SECTIONS) BASED ON TEST REPORTS FROM AN NVLAP-ACCREDITED LAB

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**WARD VILLAGE – BLOCK D  
MINIMUM CODE–REQUIRED STC RATINGS FOR  
WINDOWS AND EXTERIOR DOORS (FLOORS 7 TO 24)**

**FIGURE 3**

Salter #  
22–0014

BMW/EBM  
01.31.23



NOTE: STC RATINGS ARE FOR THE COMPLETE ASSEMBLY (E.G., GLASS, FRAME, AND OPERABLE SECTIONS) BASED ON TEST REPORTS FROM AN NVLAP-ACCREDITED LAB

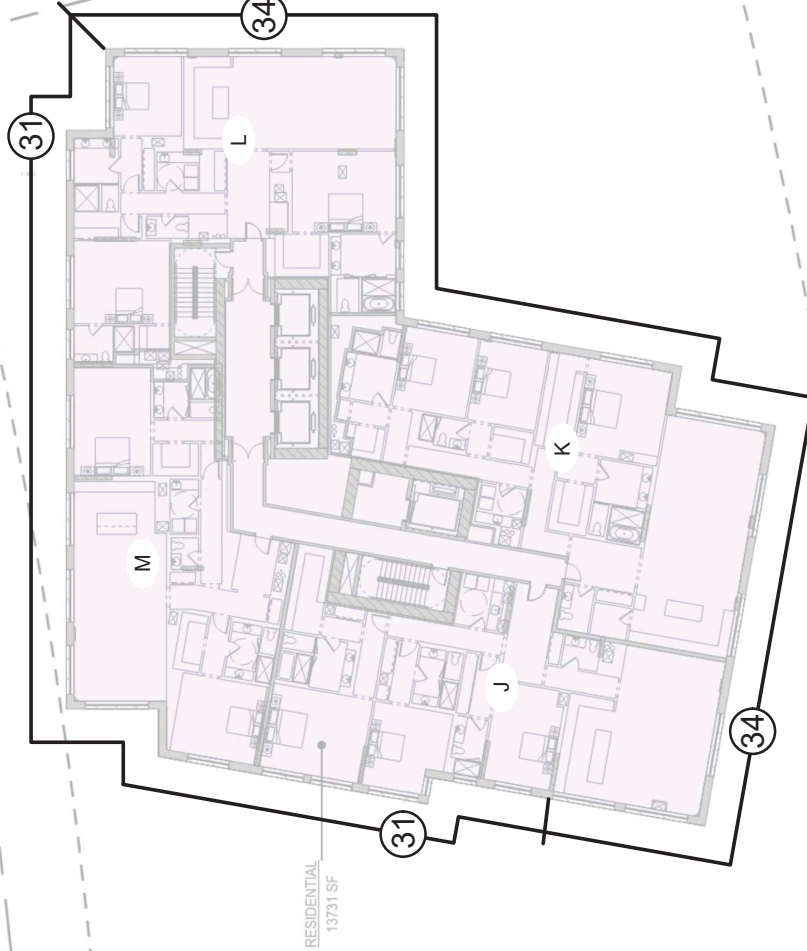
### WARD VILLAGE – BLOCK D MINIMUM CODE-REQUIRED STC RATINGS FOR WINDOWS AND EXTERIOR DOORS (FLOORS 25 TO 32)

#### FIGURE 4

Salter #  
22-0014

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01.31.23

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NOTE: STC RATINGS ARE FOR THE COMPLETE ASSEMBLY (E.G., GLASS, FRAME, AND OPERABLE SECTIONS) BASED ON TEST REPORTS FROM AN NVLAP-ACCREDITED LAB

### WARD VILLAGE – BLOCK D MINIMUM CODE-REQUIRED STC RATINGS FOR WINDOWS AND EXTERIOR DOORS (FLOORS 33 TO 35)

#### FIGURE 5

Salter #  
22-0014

BMW/EBM  
01.31.23

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