

APPENDIX C

TRAFFIC IMPACT REPORT



Lee Cranmer

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From: Pete Pascua <ppascua@wilsonokamoto.com>
Sent: Tuesday, November 24, 2020 12:54 PM
To: susan.j.tamura@hawaii.gov
Cc: deepak.neupane@hawaii.gov
Subject: FW: Ward Village Block H TIR

Aloha Susan,

Hope you are doing well and all is well at HCDA.

Below is an email from Lance Watanabe of DPP-TRB acknowledging acceptance of the Ward Village Block H TIR. Apparently, his earlier emails to you were bouncing back as undeliverable so I thought I give it a try. If you have any related question you may contact Lance or myself.

Would also appreciate if you could acknowledge receipt of this message.

Thank you and Happy Holidays!

Pete G. Pascua, P.E.
Sr. Vice President and Director



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From: Watanabe, Lance K. [mailto:lkwatanabe@honolulu.gov]
Sent: Tuesday, November 24, 2020 8:11 AM
To: 'susan.tamura@hawaii.gov' <susan.tamura@hawaii.gov>
Cc: Pete Pascua <ppascua@wilsonokamoto.com>
Subject: Ward Village Block H TIR

Susan,

This email is to acknowledge DPP-TRB acceptance of the Ward Village Block H Traffic Impact Report (TIR) dated November 2020. We will continue to work with the developer to through the design phase to ensure that all recommendations contained in the TIR are implemented.

Thanks,
Lance

Lance Watanabe, P.E.

Traffic Impact Report

Ward Village Block H



Prepared for:
Victoria Ward Limited

Prepared by:
Wilson Okamoto Corporation

August 2020

TRAFFIC IMPACT REPORT

**FOR
BLOCK H**

Prepared for:

Victoria Ward Limited
1240 Ala Moana Blvd., Suite 200
Honolulu, HI 96813

Prepared by:

Wilson Okamoto Corporation
1907 S. Beretania Street, Suite 400
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August 2020

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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 H development of the Ward Village Master Plan in Kakaako on the island of Oahu. A previous assessment including the Block H development was included in the “Transportation Master Plan and Assessment for the Ward Villages Master Plan” (hereafter referred to as the “Ward Villages Master Plan”) dated October 2018. This report is a supplemental study to specifically address the Block H development and incorporate the most recent development plans which include residential, commercial, and restaurant uses.

B. Scope of Study

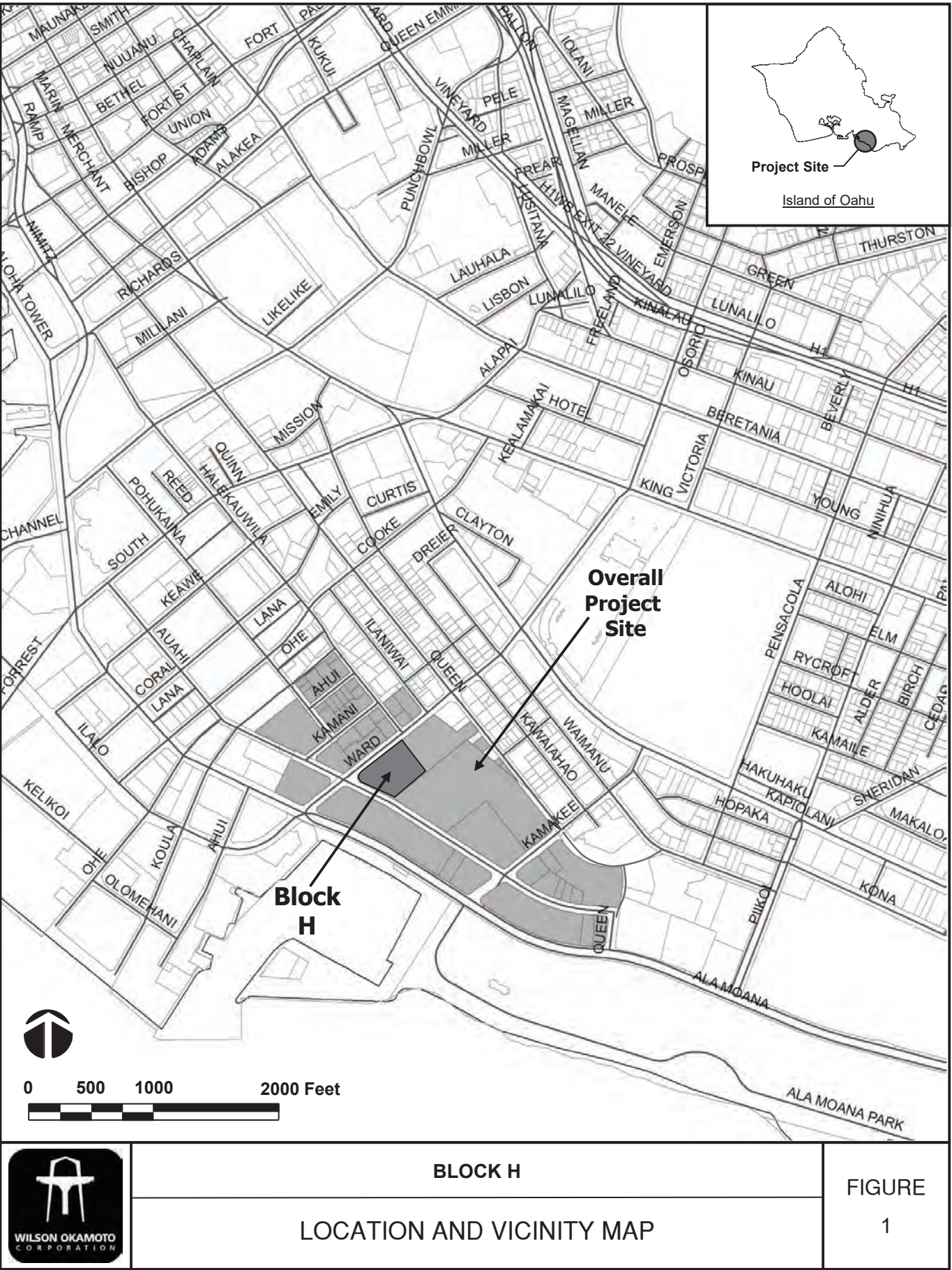
This report presents the findings and conclusions of the traffic study, the scope of which includes:

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. Superimposing 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

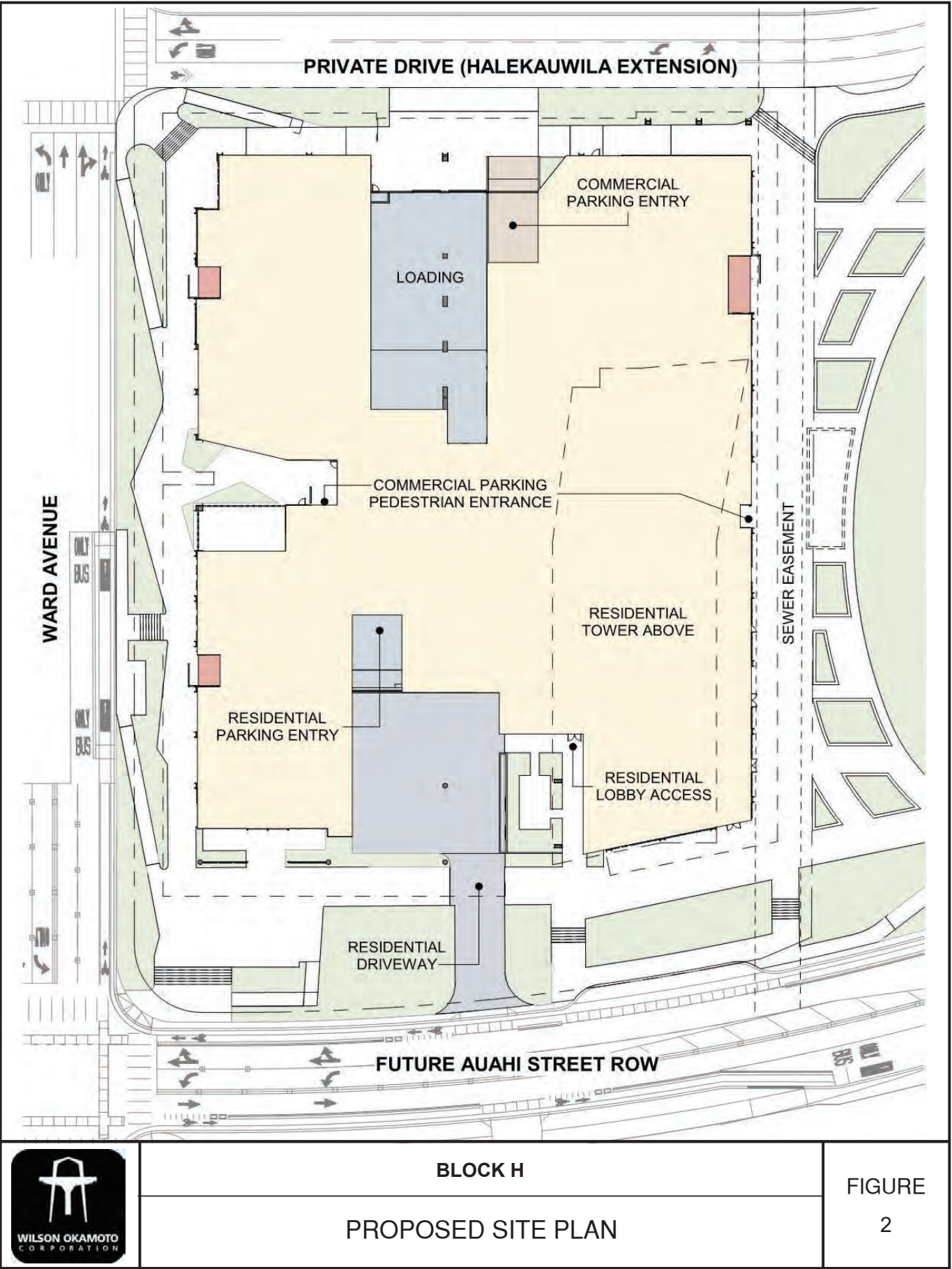
The project site for the proposed Block H development is located adjacent to Ward Avenue in Kakaako on the island of Oahu (see Figure 1). The project site is bounded by Ward Avenue to the west, Auahi Street to the south, and commercial uses to the north and east. Access to the project site is expected to be provided via two-way driveways off the Halekauwila Street Extension and Auahi Street.



B. Project Characteristics

The overall Ward Village Master Plan entails the future redevelopment of Ward Center, Ward Village Shops, and other surrounding commercial and office buildings implemented in five (5) phases over the next 10-15 years. At the time of this report, Phase 1 has been completed which includes Blocks C East (Waiea), K (Anaha), M (Ae'o), and O (Ke Kilohana). Phase 2, which includes Blocks N-East, I, and C-West, is currently under construction with phase completion expected by Year 2023.

The Block H development is the first development included in Phase 3 of the overall Ward Village Master Plan and is expected to be completed by Year 2024. The existing project site currently includes commercial and retail uses. At the time of the field investigations, the project site included 44,225 square feet (sf) of commercial uses and 3,879 sf for restaurant uses. The proposed project entails the replacement of the existing uses with a new development that includes 600 residential units, 30,000 sf of retail uses, and 15,000 sf of restaurant uses. In conjunction with the development of Block H, roadway improvements are also planned to complete the extension of Halekauwila Street east of Ward Avenue providing an alternate east-west access to Kamakee Street in the project vicinity. Access to the project site is expected to be provided via driveways off the future Halekauwila Street Extension and Auahi Street. The driveway off the future Halekauwila Street Extension is expected to provide access to a parking garage for the development's retail and restaurant uses, as well as to the building's delivery and service area, while a two-way driveway off Auahi Street is expected to provide access to a pick-up/drop off area and a parking garage for the development's residential uses. Due to the proximity of the intersection with Ward Avenue, the driveway off Auahi Street is expected to be restricted to right-turn in right-turn out traffic movements only. In addition, a pullout for passenger loading/unloading is also proposed along Auahi Street east of the proposed driveway, with a similar pull out proposed along the Halekauwila Street Extension east of the entrance to the commercial parking garage. It should be noted that the commercial parking garage for the Block H development is also expected to support parking for the commercial uses in the adjacent blocks. Figure 2 shows the



proposed project site plan under ultimate conditions after the completion of another planned roadway improvement in conjunction with the overall Ward Village master plan which entails the realignment of Auahi Street to connect to Pohukaina Street. That improvement is also expected to be completed by Year 2024.

III. EXISTING 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 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. Figure 3 shows the existing lane use at key locations within the study area.

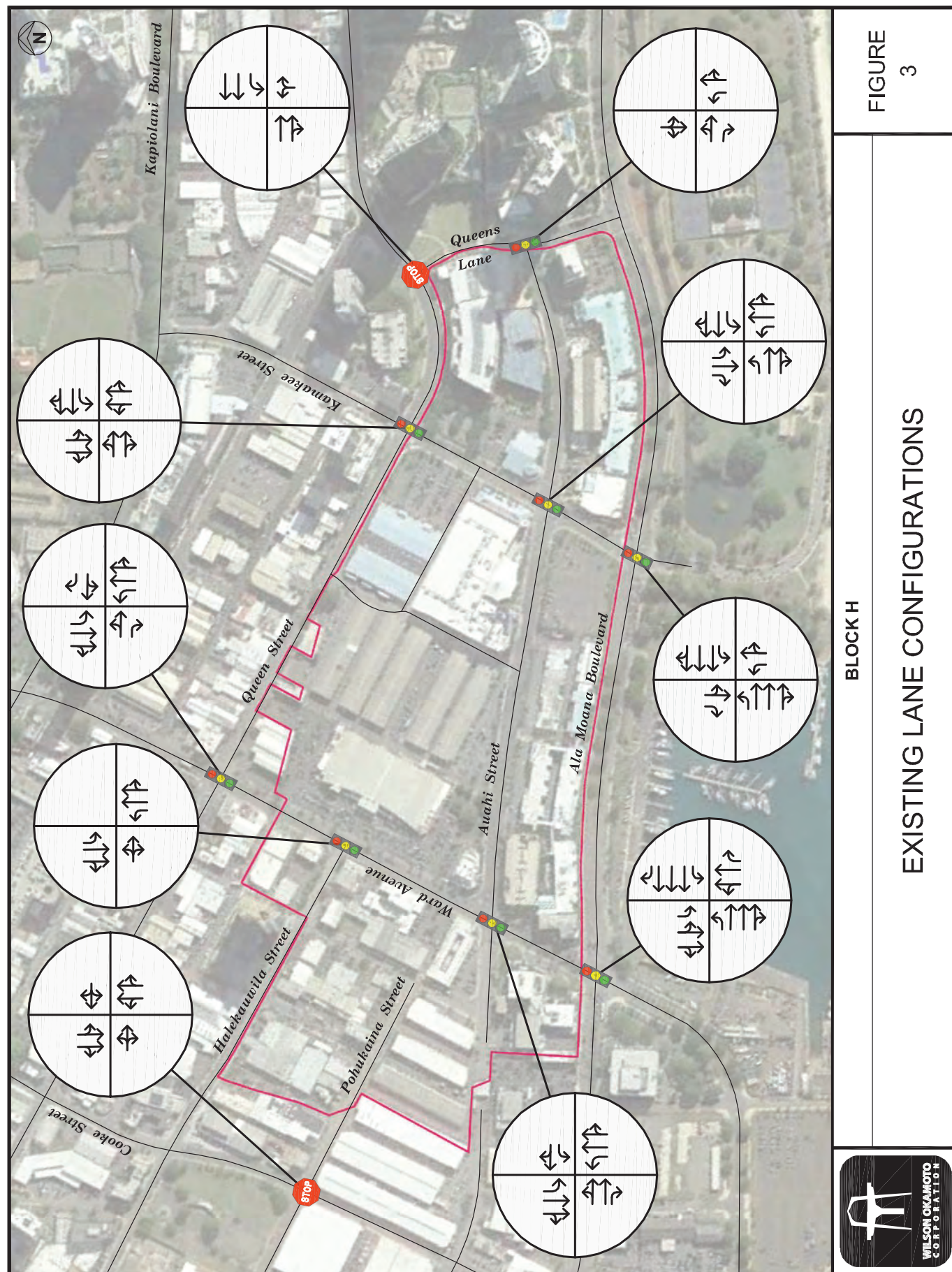
B. Traffic Volumes and Conditions

1. General

a. Field Investigation

The existing 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 March and April 2018 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 Queens 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 Queens 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

It should be noted that at the time field investigations were conducted, Blocks C East and K had been completed and occupied and as such, the trips associated with these blocks are assumed to be captured within the surveyed existing volumes. In addition, the project sites for Blocks N East, I, C West, N West, B East, B West, and A had been cleared of their existing uses at the time of the field investigation. Appendix A includes the existing 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 methodology is 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.

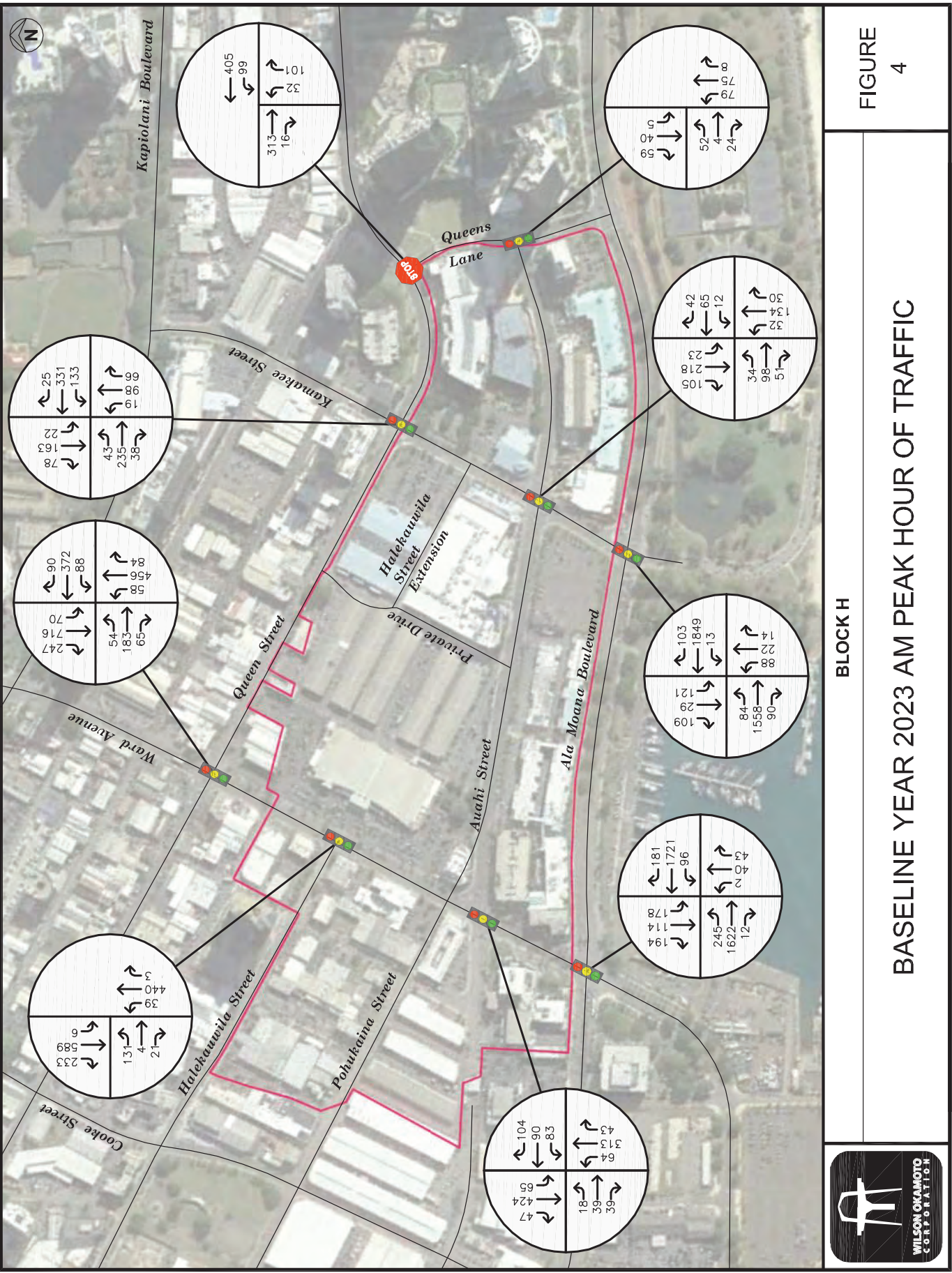
“Volume-to-Capacity” (v/c) ratio is another measure indicating the relative traffic demand to the road carrying capacity. A v/c ratio of one (1.00) indicates that the roadway is operating at or near capacity. A v/c ratio of greater than 1.00 indicates that the traffic demand exceeds the road’s carrying capacity. The LOS definitions are included in Appendix B.

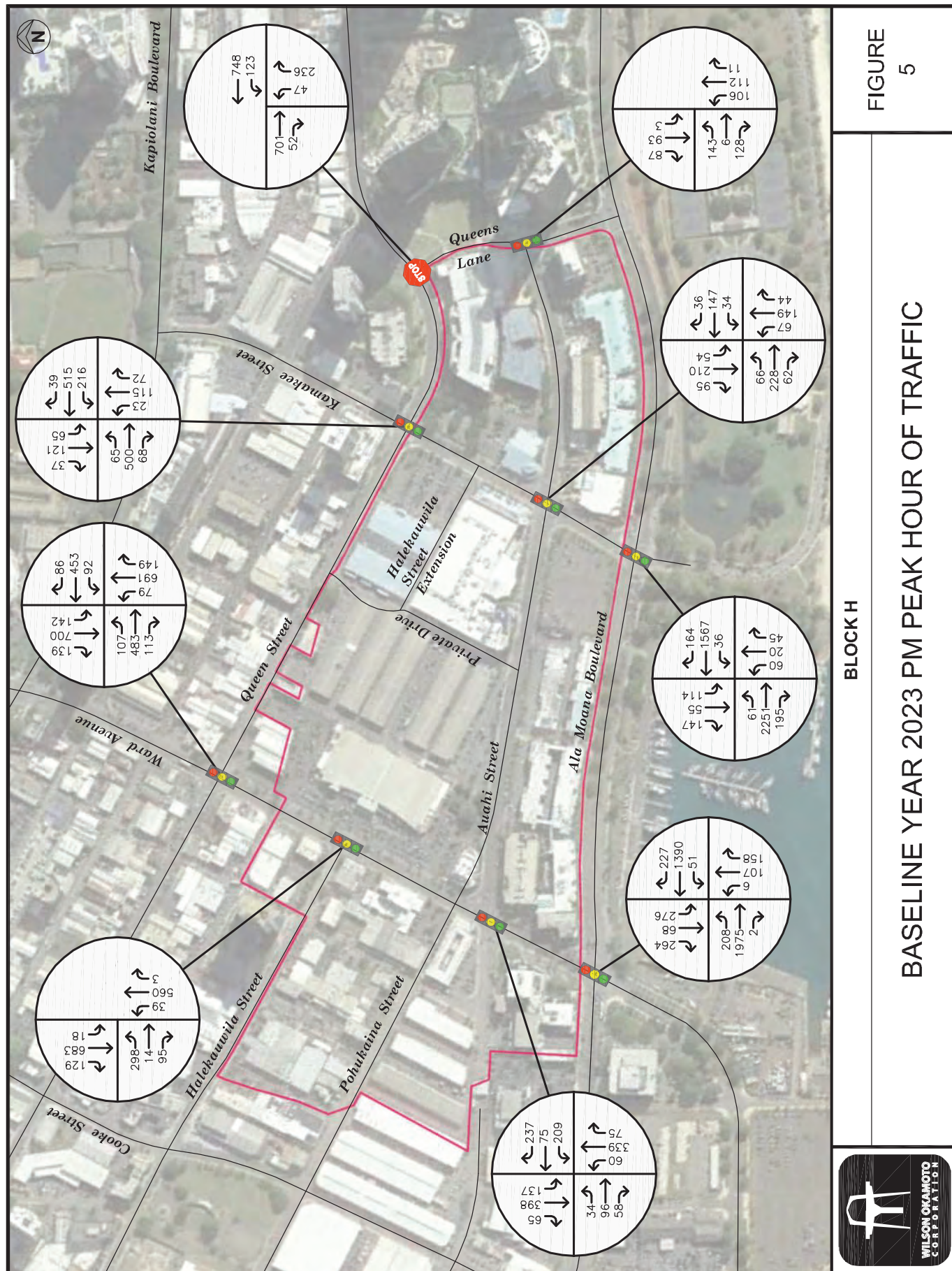
2. Baseline Peak Hour Traffic

a. General

Figures 4 and 5 show the baseline Year 2023 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 and 2 of the Ward Village Master Plan. Those phases are expected to include residential and commercial/retail uses for Blocks C East, K, M, O, N East, I, and C West. The baseline traffic conditions are based on the projected Year 2023 conditions included in the “Traffic Impact Report for Block C West” dated April 2019. It should be noted that in conjunction with the development of Block N East, that project is expected to improve the intersection of Ward Avenue with Queen Street to provide an exclusive left-turn lane and a shared through and right-turn lane along both approaches of Queen Street.

The AM peak hour of traffic generally occurs between 7:15 AM and 8:15 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.

b. Ward Avenue and Queen Street

At the intersection with Queen Street, Ward Avenue carries 598 vehicles northbound and 1,033 vehicles southbound during the AM peak hour of traffic. During the PM peak period, the overall traffic volume is higher with 919 vehicles traveling northbound and 979 vehicles traveling southbound. The northbound and southbound approaches of the intersection operate at LOS “C” during the AM and PM peak periods.

The Queen Street approaches of the intersection carry 302 vehicles eastbound and 550 vehicles westbound during the AM peak hour of traffic. During the PM peak period, traffic volumes are higher with 703 vehicles traveling eastbound and 631 vehicles traveling westbound. The eastbound approach of Queen Street operates at LOS “B” and LOS “D” during the AM and PM peak periods, respectively, while the westbound approach operates at LOS “C” and LOS “D” during the AM and PM peak periods, respectively.

c. Queen Street and Kamakee Street

At the intersection with Kamakee Street, Queen Street carries 316 vehicles eastbound and 489 vehicles westbound during the AM peak hour of traffic. During the PM peak period, traffic volumes are higher with 633 vehicles traveling eastbound and 799 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 approaches carry 183 vehicles northbound and 263 vehicles southbound during the AM peak hour of traffic. During the PM peak period, the overall traffic volume is similar with 210 vehicles traveling northbound and 223 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.

d. Queen Street and Queens Lane

At the intersection with Queens Lane, Queen Street carries 327 vehicles eastbound and 504 vehicles westbound during the AM peak period. During the PM peak period, traffic volumes are higher with 753 vehicles traveling eastbound and 871 vehicles traveling westbound. The westbound left-turn traffic movement operates at LOS “A” during both peak periods.

Queens Lane carries 133 vehicles northbound during the AM peak period and 283 vehicles during the PM peak period. The Queens Lane approach operates at LOS “B” during both peak periods.

e. Ward Avenue and Halekauwila Street

At the intersection with Halekauwila Street, Ward Avenue carries 482 vehicles northbound and 828 vehicles southbound during the AM peak hour of traffic. During the PM peak period, traffic volumes are higher with 602 vehicles traveling northbound and 830 vehicles traveling southbound. Both approaches of Ward Avenue operate at LOS “A” during the AM peak period and LOS “B” during the PM peak period.

The Halekauwila Street approach of the intersection carries 156 vehicles eastbound during the AM peak period and 407 vehicles during the PM peak period. The eastbound approach of Halekauwila Street operates at LOS “B” during both peak periods.

f. Ward Avenue and Auahi Street

At the intersection with Auahi Street, Ward Avenue carries 420 vehicles northbound and 536 vehicles southbound during the AM peak period. During the PM peak period, traffic volumes are higher with 474 vehicles traveling northbound and 600 vehicles traveling southbound. During the AM peak period both approaches of Ward

Avenue operates at LOS “A” while both approaches operate at LOS “B” during the PM peak period.

The Auahi Street approaches of the intersection carry 96 vehicles eastbound and 277 vehicles westbound during the AM peak period. During the PM peak period, traffic volumes are higher with 188 vehicles traveling eastbound and 521 vehicles traveling westbound. The Auahi Street approaches operate at LOS “B” during both peak periods.

g. Kamakee Street and Auahi Street

At the intersection with Auahi Street, Kamakee Street carries 196 vehicles northbound and 346 vehicles southbound during the AM peak period. During the PM peak period, the traffic volumes are higher with 260 vehicles traveling northbound and 359 vehicles traveling southbound. Both approaches of Kamakee Street operate at LOS “A” during the AM peak period and LOS “B” during the PM peak period.

Auahi Street carries 183 vehicles eastbound and 119 vehicles westbound during the AM peak period. During the PM peak period, traffic volumes are higher with 356 vehicles traveling eastbound and 217 vehicles traveling westbound. The eastbound approach operates at LOS “B” during both peak periods while the westbound approach operates at LOS “C” and LOS “B” during the AM and PM peak periods, respectively.

h. Auahi Street, Queens Lane, and Queen Street

At the intersection with Queens Lane and Queen Street, Auahi Street carries 80 vehicles eastbound during the AM peak period and 277 vehicles during the PM peak period. The eastbound approach of Auahi Street operates at LOS “B” during both peak periods.

The Queens Lane approach carries 104 vehicles southbound during the AM peak period and 183 vehicles during the PM peak period. The Queens Lane approach operates at LOS “A”

during AM peak period and LOS “B” during the PM peak period. The northbound approach is comprised of Queen Street which carries 162 vehicles during the AM peak period and 229 vehicles during the PM peak period. The Queen Street approach operates at LOS “B” during both peak periods.

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

At the intersection with Ward Avenue, Ala Moana Boulevard carries 1,879 vehicles eastbound and 1,997 vehicles westbound during the AM peak period. During the PM peak period, the overall traffic volume is similar with 2,185 vehicles traveling eastbound and 1,668 vehicles traveling westbound. The eastbound approach operates at LOS “D” during both peak periods, while the westbound approach at LOS “E” and LOS “D” during the AM and PM peak periods, respectively.

The Ward Avenue approaches of the intersection carry 85 vehicles northbound and 486 vehicles southbound during the AM peak period. During the PM peak period, traffic volumes are higher with 271 vehicles traveling northbound and 608 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.

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

At the intersection with Kamakee Street, Ala Moana Boulevard carries 1,732 vehicles eastbound and 1,965 vehicles westbound during the AM peak period. During the PM peak period, the overall traffic volume is higher with 2,507 vehicles traveling eastbound and 1,767 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 “C” and LOS “B” during the AM and PM peak periods, respectively.

The Kamakee Street approach of the intersection carry 259 vehicles southbound during the AM peak period and 316 vehicles during the PM peak period. The Kamakee Street approach operates at LOS “D” during both peak periods. The northbound approach is comprised of Ala Moana Park Drive which carries 124 vehicles during the AM peak period and 125 vehicles during the PM peak period. The Ala Moana Park Drive operates at LOS “D” during both peak periods.

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, 10th 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. The trip generation methodology developed by ITE also includes provisions for internal capture of trips and multi-modal trips. Internal capture of trips accounts for vehicles that visit more than one destination within the same area without adding external vehicular trips to the surrounding major roadways. 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. In addition, the City and County of Honolulu is currently developing a fixed guideway transit system that will extend from Kapolei to potentially the central Honolulu area, thereby providing an alternate mode of travel through the Kakaako area. However, the planned system is not expected to be completed prior to the completion of the Block H development and as such, trip reductions associated with the fixed guideway transit system were not incorporated into projected conditions. The trip generation characteristics for the proposed project were adjusted to

account for the influence of internal capture of trips and multi-modal trips, as well as to account for the removal and replacement of the existing uses. Tables 1 and 2 summarize the adjusted existing and proposed trip generation characteristics for the Block H development. Appendix D includes a detailed trip generation worksheet for the Block H development.

Table 1: Adjusted Existing Peak Hour Trip Generation

SHOPPING CENTER		
INDEPENDENT VARIABLE: 1,000 sf of development = 44.22		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	16
	EXIT	11
	TOTAL	27
PM PEAK	ENTER	39
	EXIT	39
	TOTAL	78
HIGH-TURNOVER (SIT-DOWN) RESTAURANT		
INDEPENDENT VARIABLE: 1,000 sf of development = 3.88		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	13
	EXIT	12
	TOTAL	25
PM PEAK	ENTER	11
	EXIT	7
	TOTAL	18
TOTALS		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	29
	EXIT	23
	TOTAL	52
PM PEAK	ENTER	50
	EXIT	46
	TOTAL	96

Table 2: Adjusted Proposed Peak Hour Trip Generation

MULTIFAMILY HOUSING (HIGH-RISE)		
INDEPENDENT VARIABLE: Dwelling Units = 600		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	36
	EXIT	110
	TOTAL	146
PM PEAK	ENTER	111
	EXIT	72
	TOTAL	183
SHOPPING CENTER		
INDEPENDENT VARIABLE: 1,000 sf of development = 30		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	9
	EXIT	5
	TOTAL	14
PM PEAK	ENTER	34
	EXIT	33
	TOTAL	67
HIGH-TURNOVER (SIT-DOWN) RESTAURANT		
INDEPENDENT VARIABLE: 1,000 sf of development = 15		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	45
	EXIT	30
	TOTAL	75
PM PEAK	ENTER	57
	EXIT	31
	TOTAL	88
TOTALS		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	90
	EXIT	145
	TOTAL	235
PM PEAK	ENTER	202
	EXIT	136
	TOTAL	338
NET DIFFERENCE FROM EXISTING		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	61
	EXIT	122
	TOTAL	183
PM PEAK	ENTER	152
	EXIT	90
	TOTAL	242

2. Trip Distribution and Through Traffic Forecasting Methodology

The travel forecast utilized for this study is based on the OMPO regional forecasting model which contains estimated land usage for the island of Oahu by the Year 2035 including the development of other projects such as the adjacent Kamehameha Schools/Bishop Estate (KSBE) lands to the west. The travel forecast utilized for the OMPO model is based on Socio-Economic Data (SED) which represents the population distribution within a multitude of traffic analysis zones. The model utilizes this data to forecast individual vehicle trips between destinations within the model. The use of the OMPO model more accurately reflects the anticipated impacts of development on the island more than the use of historical travel patterns or traffic count data. 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 mentioned, parking for the commercial and restaurant uses is expected to be accommodated on-site via the access provided off the future Halekauwila Street Extension, while access to parking for the residential uses are expected to be provided via the driveway off Auahi Street. Due to the proximity of the Auahi Street driveway to Ward Avenue, that driveway is expected to be restricted to right-turn in right-turn out movements only. 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. In addition, population estimates for the island of Oahu indicate that growth is expected to be relatively linear to the Year 2035. As such, a corresponding growth factor was interpolated for the Year 2024.

B. Other Considerations

1. Block F Development

There is another planned development associated with the overall Ward Village in the vicinity of Block H. The Block F development located west of Ward Avenue is expected to replace existing uses to include 748 residential units, 5,625 sf of retail uses, 2,700 sf of restaurant uses, and 35,590

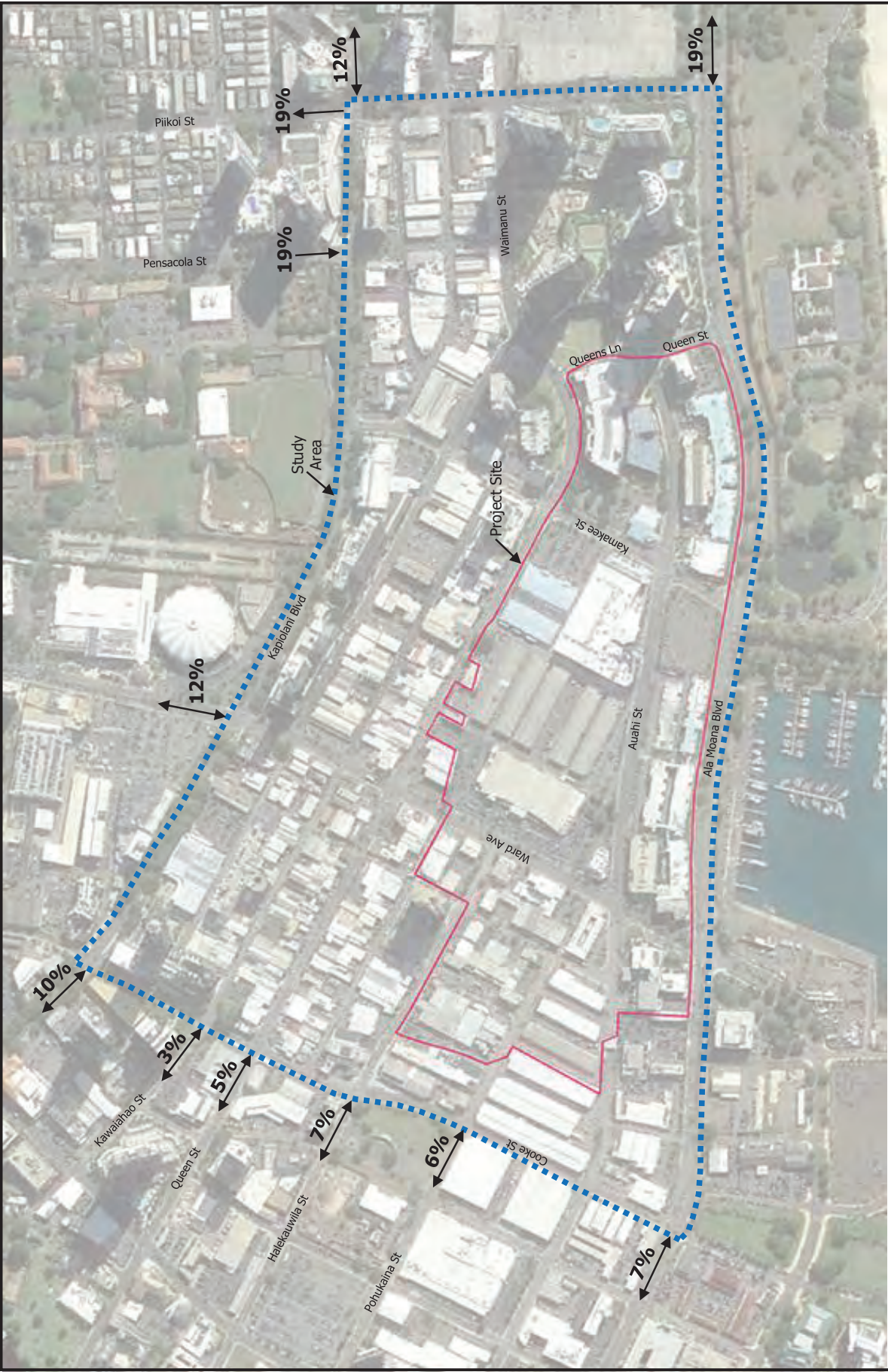
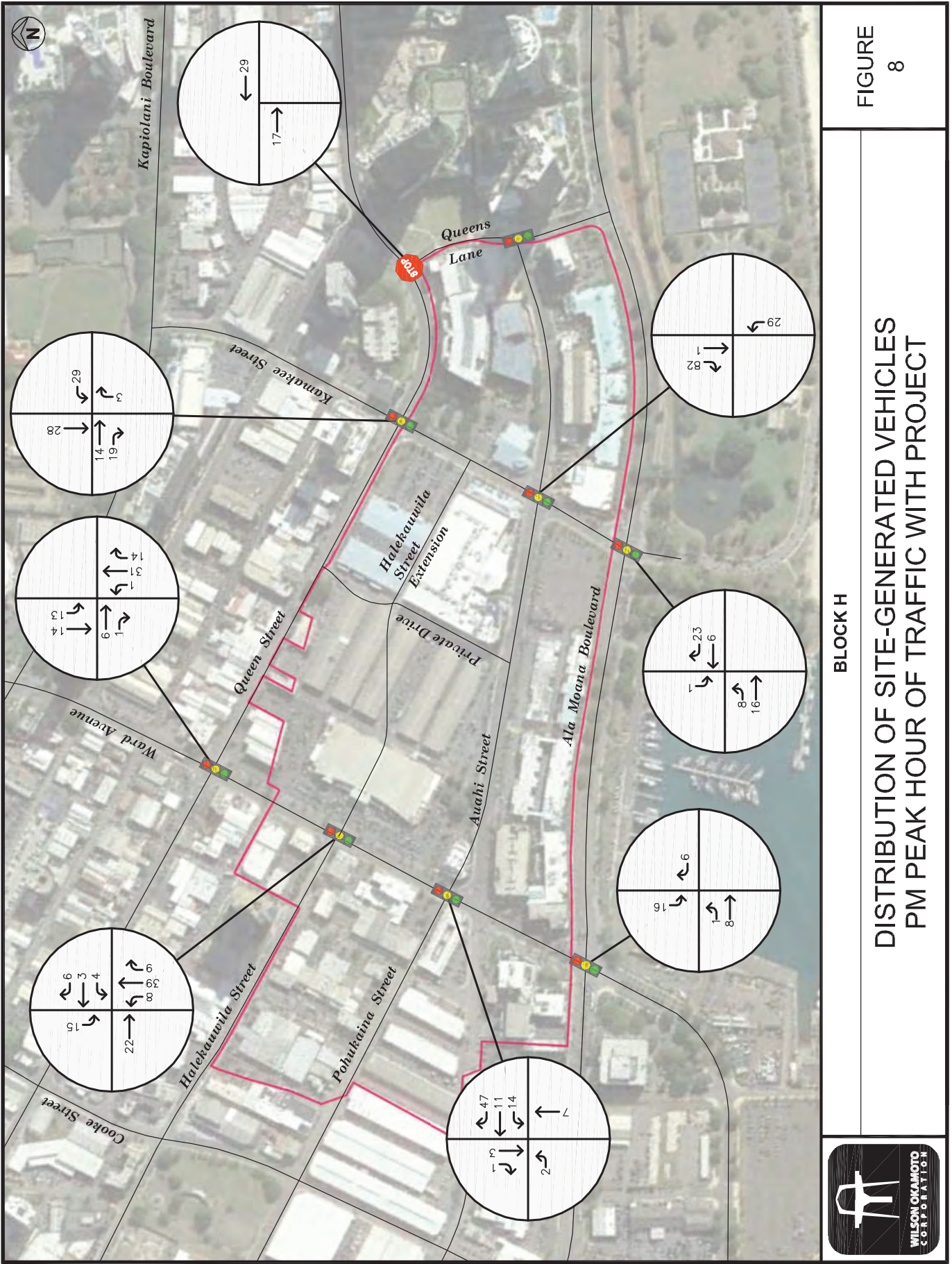
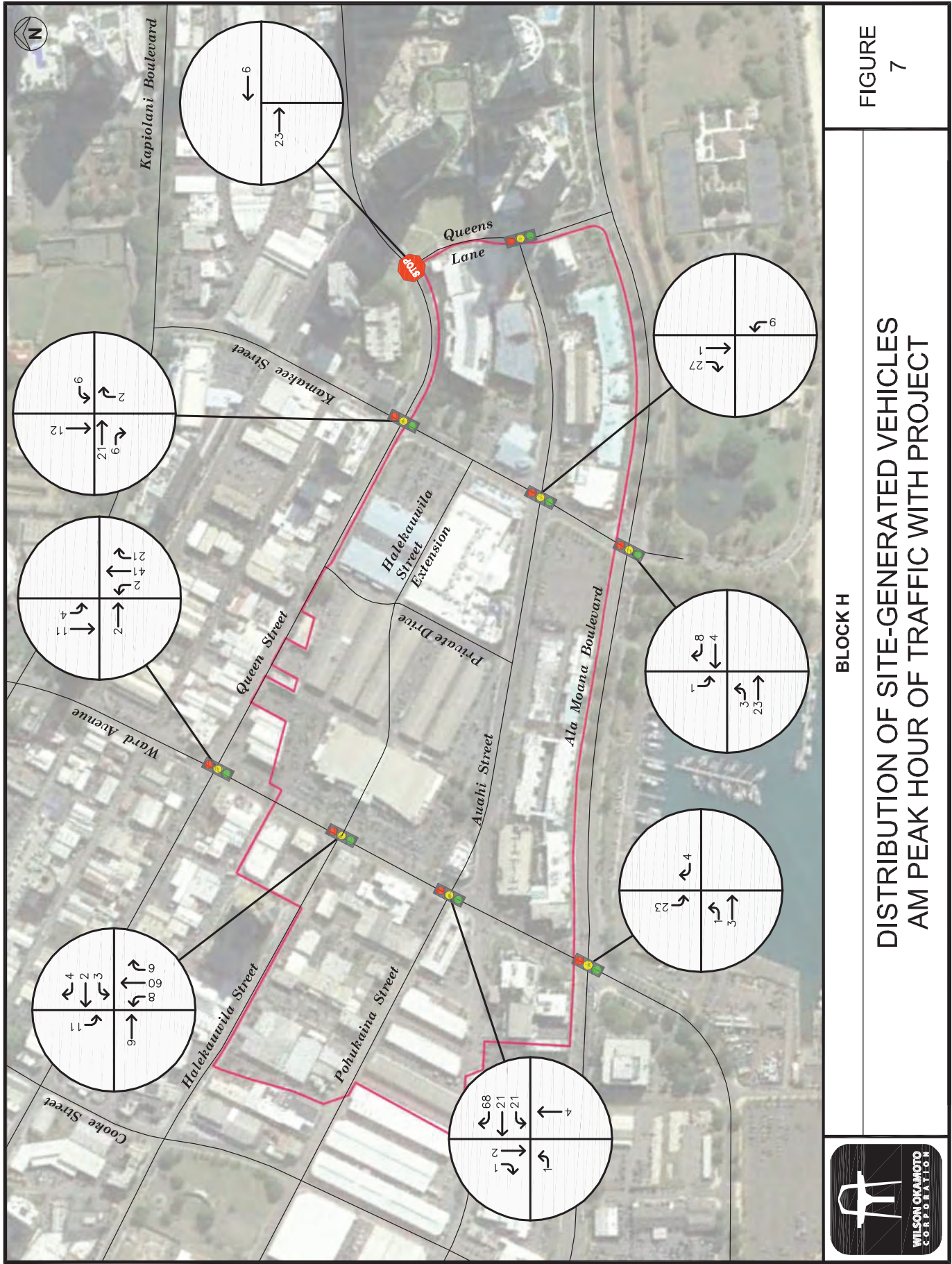


FIGURE
6

BLOCK H
DISTRIBUTION OF EXTERNAL SITE-GENERATED TRIPS





sf of general light industry uses. Access to the project site is expected to be provided via internally connected two-way driveways off Pohukania Street and Auahi Street. The Block F development is expected to be completed in Year 2024 and as such, was incorporated into the projected conditions.

2. Auahi Street Realignment

In conjunction with the development of the overall Ward Village Master Plan, a number of roadway improvements are also planned in the project vicinity including the improvements associated with Auahi Street. These improvements entail the realignment of Auahi Street east of Ward Avenue to intersect Pohukaina Street and conversion of that roadway from a four-lane roadway to a two-lane roadway to accommodate enhanced pedestrian and bicycle facilities. The realignment of Auahi Street is expected to provide a more direct and continuous east-west route through the Kakaako area and provide further mobility throughout the area. It should be noted that with the realignment of Auahi Street, the existing segment of that roadway between Kamani Street and Ward Avenue will be closed to vehicular traffic with the remaining portion of Auahi Street only serving as access for Block F. The realignment of Auahi Street is expected to be completed by Year 2024 and as such, this improvement was incorporated into the Year 2024 project scenarios.

C. Total Traffic Volumes Without Project

The projected Year 2024 AM and PM peak period traffic volumes and operating conditions without the Block H development are shown in Figures 9 and 10 and summarized in Table 3. The analysis incorporates the trips associated with the development of other projects in the area including Blocks C East, K, O, N East, I, C West, and F of the Ward Villages Master Plan and the anticipated ambient growth in traffic in the vicinity. In addition, the analysis also incorporates the roadway improvements associated with the realignment of Auahi Street. The baseline levels of service are provided for comparison purposes. LOS calculations are included in Appendix E.

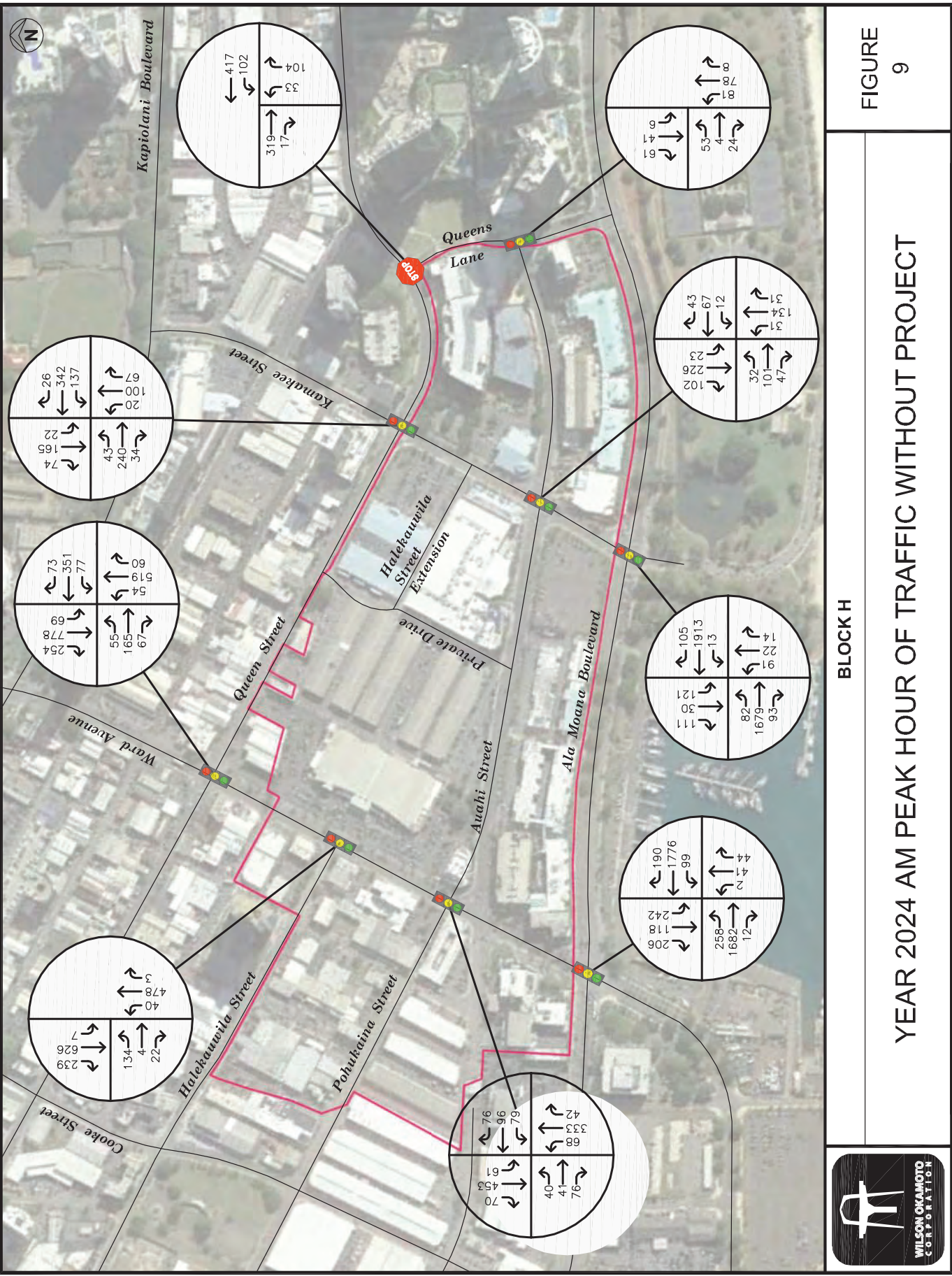


Table 3: Baseline and Projected Year 2024 (Without Project) LOS Traffic Operating Conditions (Cont'd)

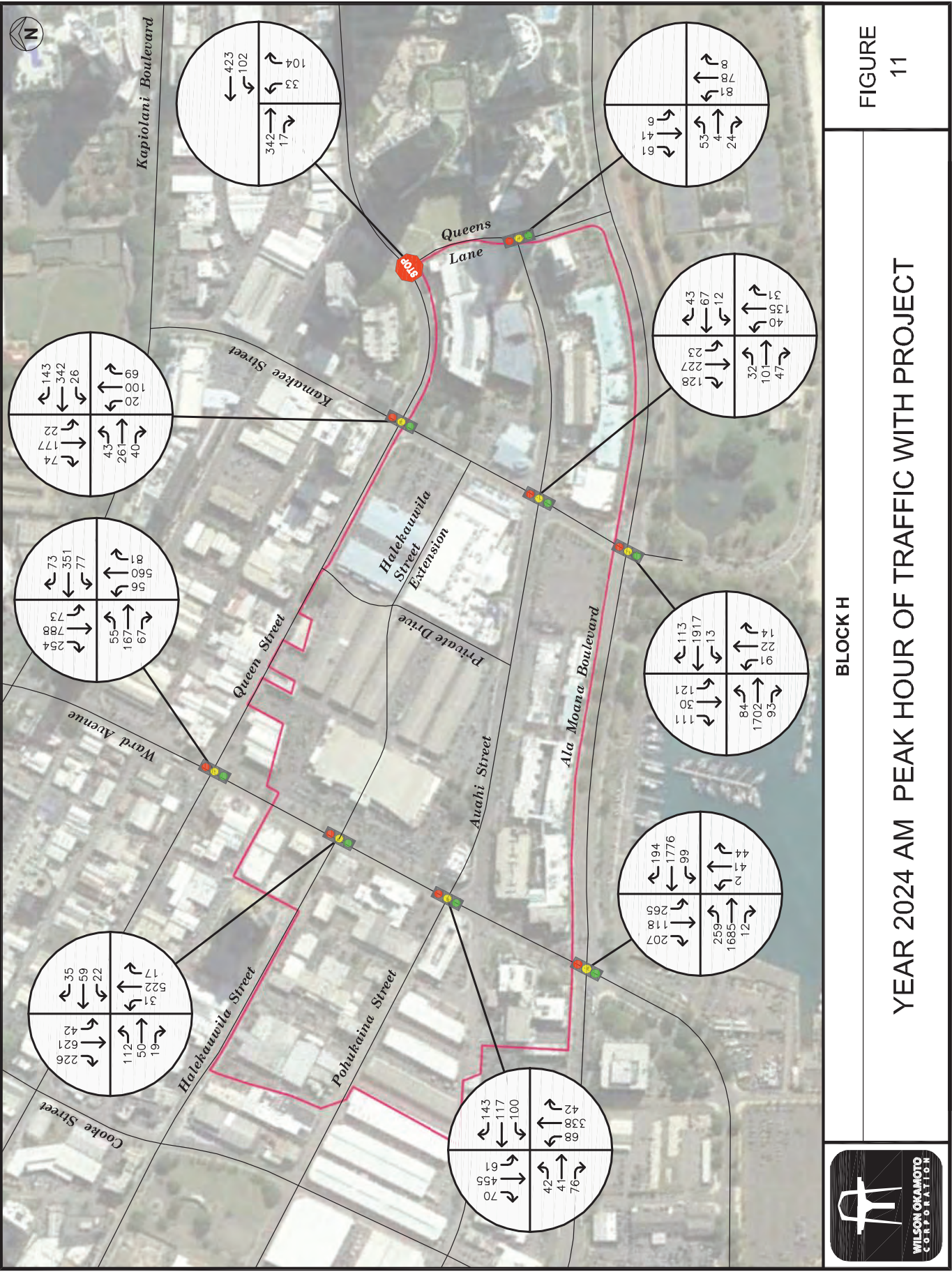
Intersection	Approach/ Critical Movement	AM		PM	
		Base- line*	Year 2024 w/out Proj	Base- line*	Year 2024 w/out Proj
Ala Moana Blvd/ Kamakee St	Eastbound	B	B	C	C
	Westbound	C	C	B	B
	Northbound	D	D	D	D
	Southbound	D	D	D	D

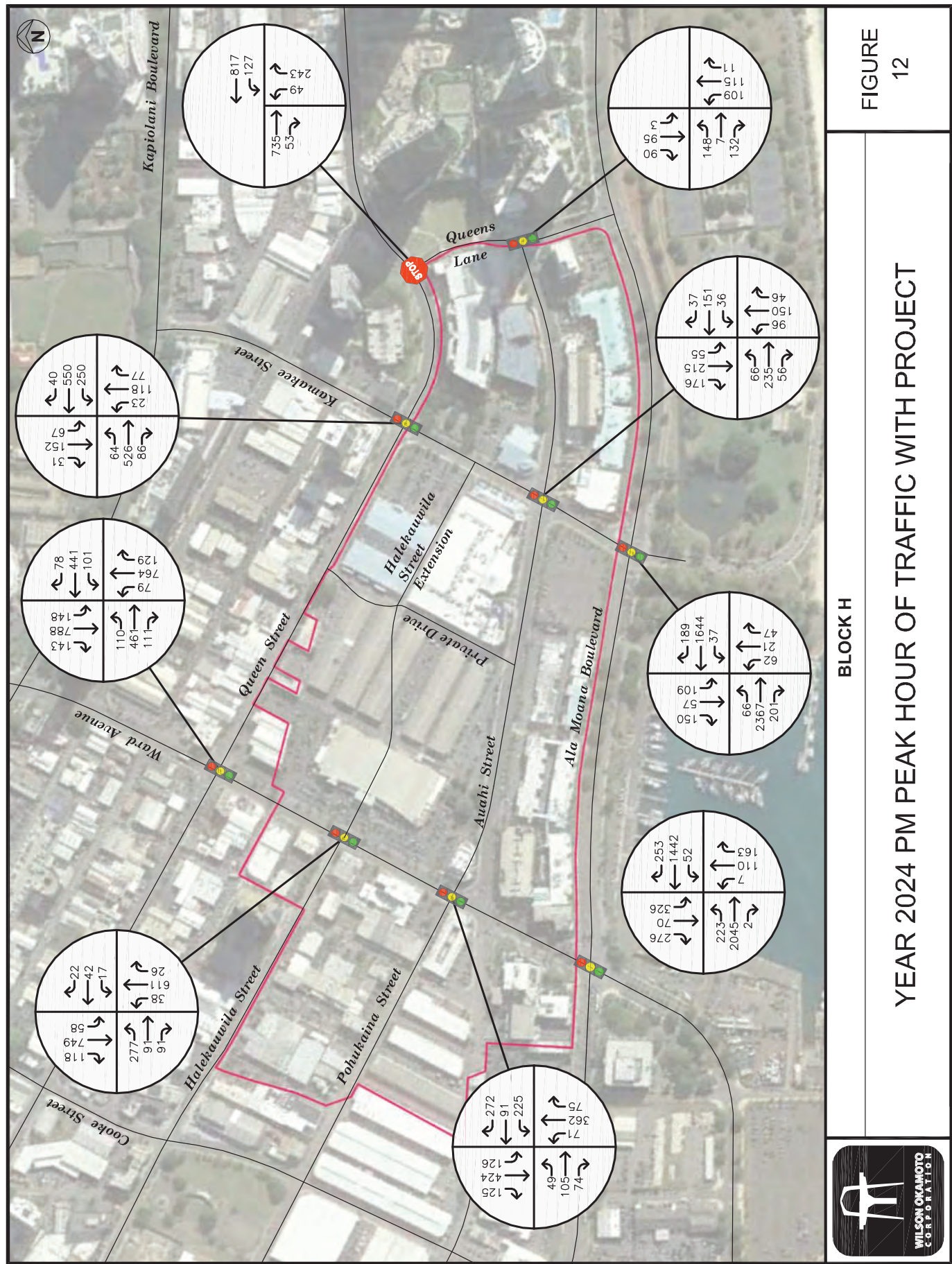
*Year 2023 conditions which incorporate the completion of Blocks C East, K, M, O, N East, I, and C West.
**Intersection improvements implemented.

Traffic operations under Year 2024 without project conditions are generally expected to remain similar to baseline conditions. Along Kamakee Street, traffic operations at the intersection with Queen Street are expected to continue operating at LOS “B” during the AM peak period and LOS “C” or better during the PM peak period, whereas those at the intersection with Auahi Street are expected to continue operating at LOS “C” or better during the AM peak period and LOS “B” during the PM peak period. Along Ala Moana Boulevard, traffic operations at the intersections with Kamakee Street are expected to continue operating at LOS “D” or better during both peak periods while those at the intersection with Ward Avenue are expected to continue operating at LOS “E” or better during both peak periods. The low levels of service at this intersection is primarily due to the high volume of east-west through traffic at this intersection. Traffic operations at the remaining study intersections along Ward Avenue and Queen Street are also expected to continue operating similar to baseline conditions.

D. Total Traffic Volumes With Project

Figures 11 and 12 show the Year 2024 cumulative AM and PM peak hour traffic conditions resulting from the completion of the Block H development. The cumulative volumes consist of site-generated traffic superimposed over Year 2024 projected traffic demands. The traffic impacts resulting from the proposed project are addressed in the following section.





V. TRAFFIC IMPACT ANALYSIS

The Year 2024 cumulative AM and PM peak hour traffic conditions with the completion of the Block H development are shown on Figures 11 and 12 and summarized in Table 4. The analysis incorporates the completion of the extension of Halekauwila Street east of Ward Avenue to connect with the existing Halekauwila Street extension west of Kamakee Street, as well as modifications at the intersection of Ward Avenue with Halekauwila Street to provide an exclusive left-turn lane and a shared through and right-turn lane on the eastbound approach. The projected Year 2024 (Without Project) operating conditions are provided for comparison purposes. LOS calculations are included in Appendix G.

Table 4: Projected Year 2024 (Without and With Project)
LOS Traffic Operating Conditions

Intersection	Approach/ Critical Movement	AM		PM	
		Year 2024		Year 2024	
		w/out Proj	w/ Proj	w/out Proj	w/ Proj
Ward Ave/ Queen St	Eastbound	C	C	D	D
	Westbound	C	C	D	D
	Northbound	B	C	C	C
	Southbound	C	C	C	C
Queen St/ Kamakee St	Eastbound	B	B	C	C
	Westbound	B	B	B	B
	Northbound	B	B	C	C
	Southbound	B	B	C	C
Queen St/ Queens Ln	Westbound	A	A	A	A
	Northbound	B	B	C	C
Ward Ave/ Halekauwila St*	Eastbound	B	B	B	B
	Westbound	-	B	-	B
	Northbound	A	A	B	B
	Southbound	A	A	B	B
Ward Ave/ Auahi St/ Pohukaina St	Eastbound	A	A	B	B
	Westbound	A	A	B	B
	Northbound	A	A	B	B
	Southbound	A	A	B	B

*Intersection improvements implemented

**Table 4: Projected Year 2024 (Without and With Project)
LOS Traffic Operating Conditions (Cont'd)**

Intersection	Approach/ Critical Movement	AM		PM	
		Year 2024		Year 2024	
		w/out Proj	w/ Proj	w/out Proj	w/ Proj
Kamakee St/ Auahi St	Eastbound	B	B	B	B
	Westbound	C	C	B	B
	Northbound	A	A	B	B
	Southbound	B	B	B	B
Queens Ln/ Queen St/ Auahi St	Eastbound	B	B	B	B
	Northbound	B	B	B	B
	Southbound	A	A	B	B
Ala Moana Blvd/ Ward Ave	Eastbound	E	E	E	E
	Westbound	E	E	E	E
	Northbound	D	D	D	D
	Southbound	D	D	E	E
Ala Moana Blvd/ Kamakee St	Eastbound	B	B	C	C
	Westbound	C	C	B	B
	Northbound	D	D	D	D
	Southbound	D	D	D	D

*Intersection improvements implemented

Traffic operations under Year 2024 with project conditions are generally expected to remain similar to without project conditions despite the addition of site-generated vehicles to the surrounding roadways. Along Queen Street, traffic operations at the intersections 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, while those at the intersection with Ward Avenue 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. Along Auahi Street, the approaches at the intersections with Ward Avenue, and Queen Street and Queen Lane are expected to continue operating at LOS “B” or better during both peak periods whereas those at Kamakee Street are expected to continue operating at LOS “C” or better during the AM peak period and LOS “B” 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

Currently, improved pedestrian facilities such as sidewalks and crosswalks are provided along the roadways in the vicinity of the project including Ala Moana Boulevard, Auahi Street, Kamakee Street, Ward Avenue, Queen Street, and Halekauwila Street. These facilities facilitate connections to destinations within the Ward Village as well as to the surrounding uses in the project vicinity. In addition, pedestrian crossings are facilitated by protected pedestrian phases at signalized crossings at the study intersections along Ward Avenue, Kamakee Street, and Queen Street.

2. Projected Conditions

The proposed project is expected to maintain the existing pedestrian facilities with additional improvements planned in conjunction with the overall Ward Village Master Plan to enhance the overall pedestrian experience in the vicinity. These improvements include the conversion of Auahi Street from a four-lane roadway into a two-lane roadway to accommodate a pedestrian promenade along the north side of that roadway. In addition, the proposed Block H development is located adjacent to the Village Green which is expected to include a pedestrian mall that will provide a north-south connection between Halekauwila Street and Ala Moana Boulevard.

B. Bicycle Facilities

1. Existing Facilities

Bicycle facilities generally consists of shared-use paths, bike lanes, protected bike lanes, or shared roadways with pavement markings called sharrows. Existing bike facilities in the vicinity of the project currently include a bike route along Queen Street east of Kamakee Street, as well as designated bike lanes along Auahi Street between Ward Avenue and Queen Street (one lane on each side of the roadway).

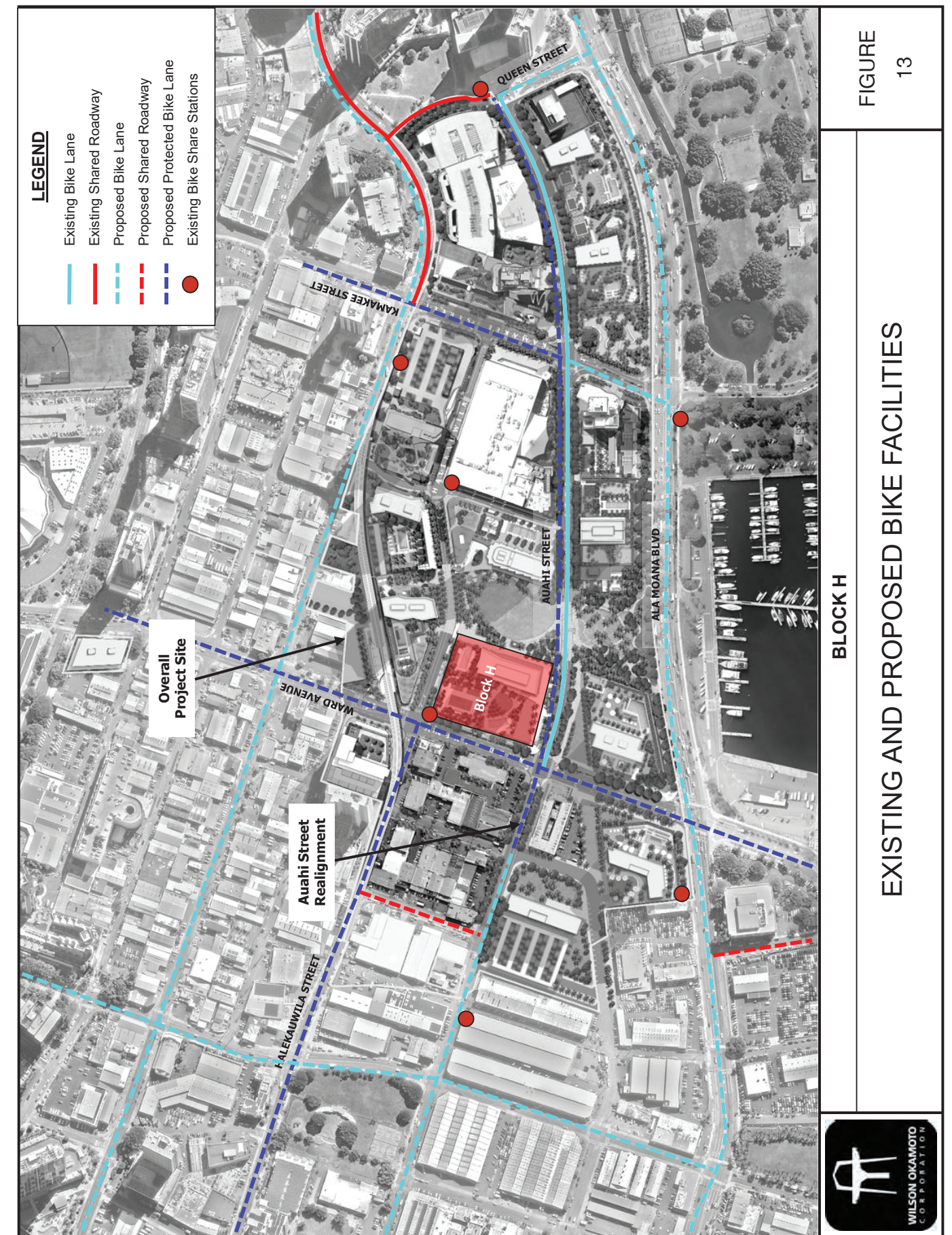
The proposed Block H development is also located within close proximity of BIKI bikeshare facilities, which are operated by Bikeshare Hawaii. The closest station to the project site is located near the intersection of Ward Avenue and Halekauwila Street with additional bike share stations located near the intersections of Kamakee Street and Halekauwila Street and Kamakee Street and Queen Street. See Figure 13 for existing and proposed bicycle facilities.

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 H development are depicted in Figure 14. As shown in Figure 13, Queen Street, Queens Lane, Ward Avenue, and Kamakee Street are rated LTS 3 since bicyclists along these roadways share the travel way with other motorists. 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 these roadways are within 5 miles of the posted speed limit of 25 miles per hour (mph), these roadways are comprised of 2 lanes or more with average daily traffic volumes that are greater than 3,000 vehicles per day, and as such, are rated LTS 3.

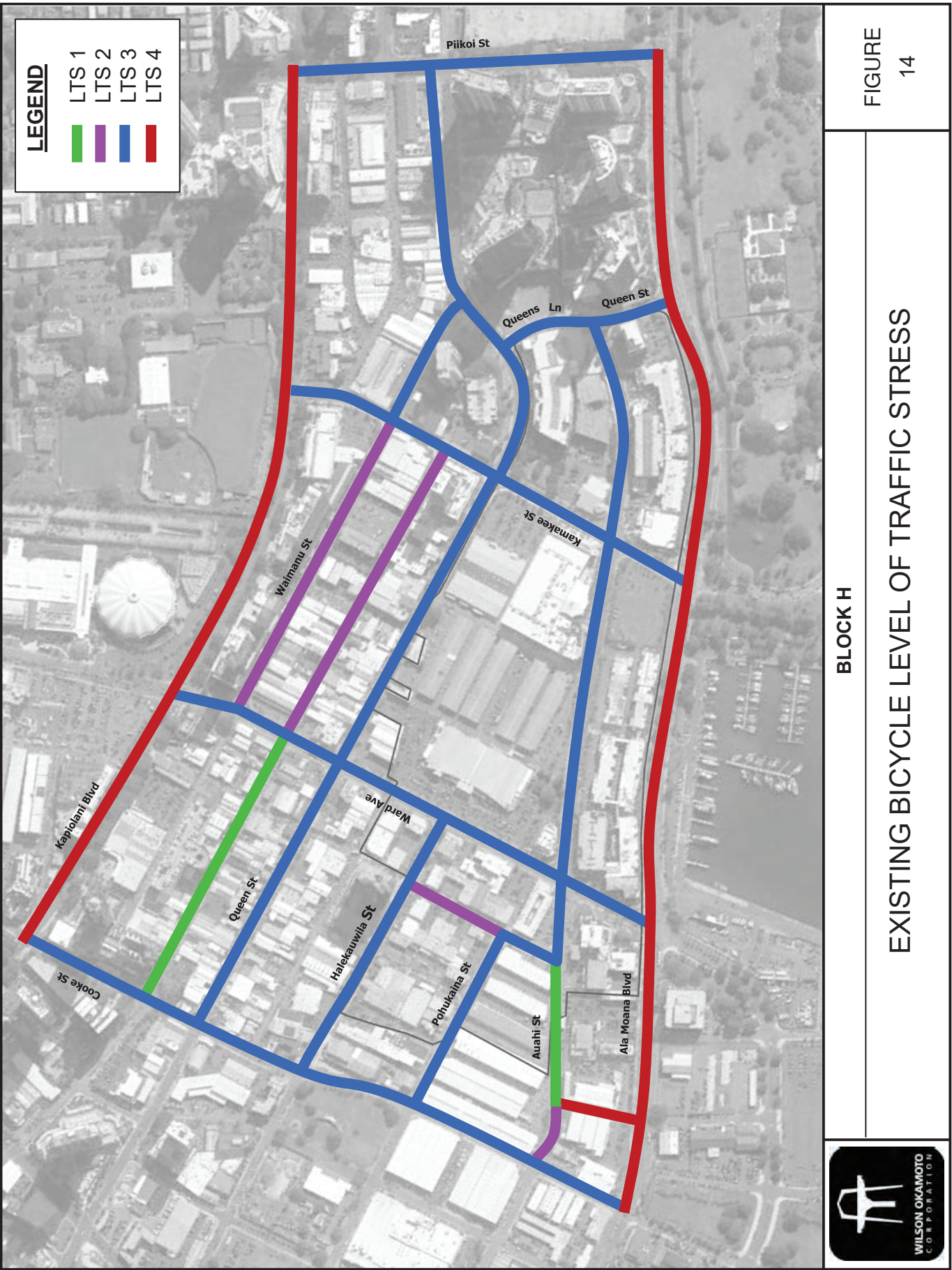
3. Projected Conditions

The proposed project is expected to provide short-term and long-term bicycle facilities for residents, guests, and employees to encourage the use of alternate modes of transport. In the vicinity of the project, there are also future improvements planned to enhance bicycle connectivity within the Ward Village area as well to the surrounding uses. As previously discussed, there are plans to modify Auahi Street to convert the existing 4-lane roadway to a 2-lane roadway with the existing bike lanes converted to buffered bike lanes to provide additional separation between bicyclists and vehicles along that roadway. As such, this improvement by the overall development is expected to reduce the level of traffic stress for bicyclists along Auahi Street. In addition, the Oahu Bike Plan published by City and County of Honolulu Department Transportation Services (DTS) also include plans to provide bike lanes along Queen Street and protected bike lanes along Ward Avenue, Halekauwila Street, and Kamakee Street. The addition of bicycle facilities are expected to improve the level of traffic stress along the roadways in the project vicinity.

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

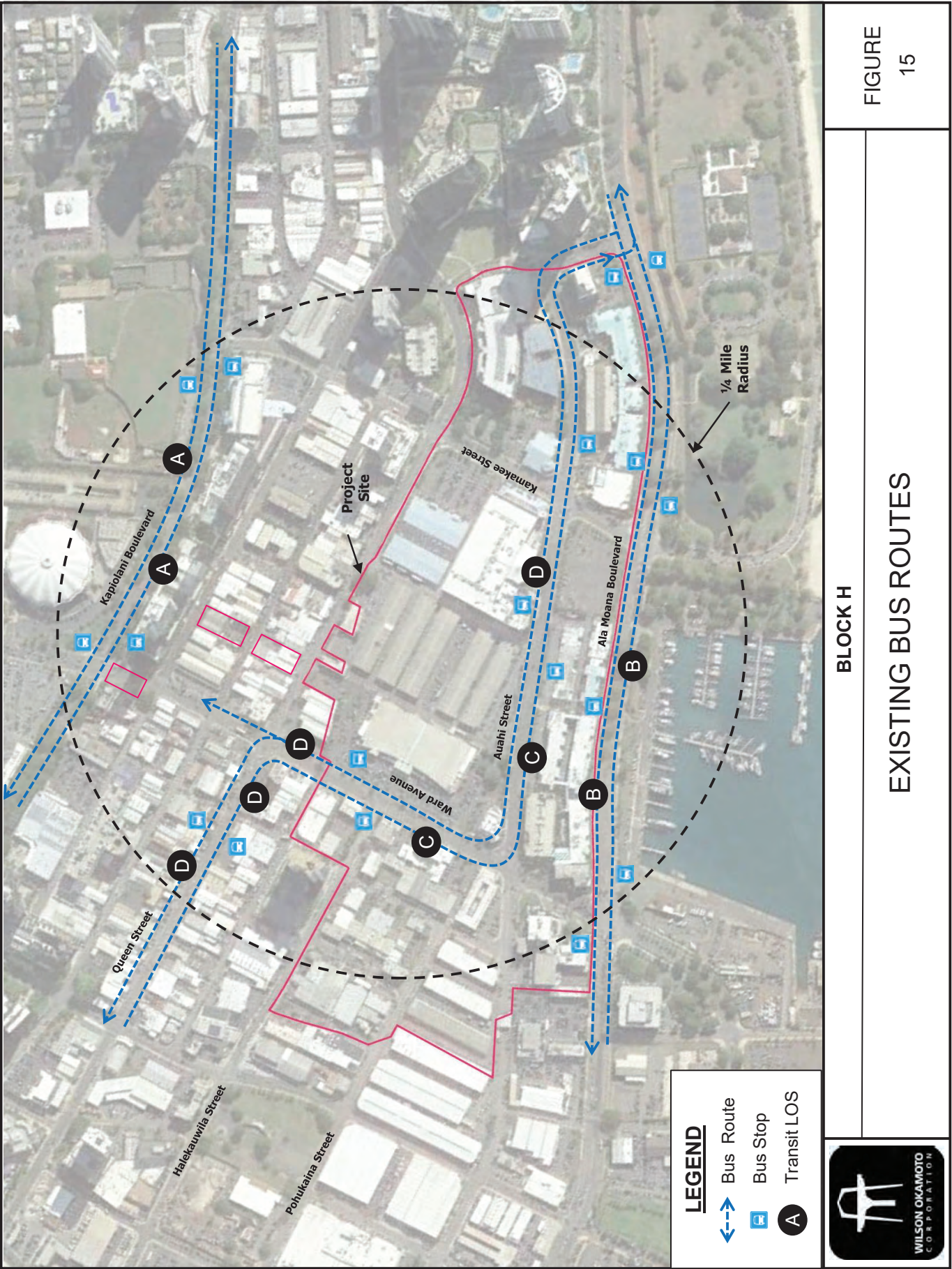


route bus services, as well as door-to-door services for people who have difficulty accessing the fixed route services (HandiVan). The fixed route bus services in the project vicinity consist of regional routes along Ala Moana Boulevard and Kapiolani Boulevard and supplemented by local routes along Auahi Street and Queen Street. There are approximately 11 transit stops that are served by 14 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 a number of trolley companies including Oli Oli (JTB), Lealea (H.I.S.), Waikiki Trolley, and JALPAK.

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. The environment within the project vicinity is pedestrian friendly with sidewalks and crosswalks that facilitate access to and from the bus stop locations.

4. Projected Conditions

In general, the existing transit facilities are expected to be maintained under projected conditions, with the exception of those along Auahi Street. In conjunction with the planned improvements along Auahi Street, the existing bus stops will be relocated to facilitate access to future planned developments within the Ward Village with additional bus stops provided to further enhance convenient access to transit. East of Kamakee Street, an existing bus stop located south of the roadway is expected to be relocated further east near Queen Street, while a new bus stop will be provided on the north side of the roadway near the driveway that serves the adjacent Ward Village Shops. 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 Block H development and the Village Green. 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. Although some of the bus stop locations are expected to be modified under project conditions, service to those stops are not expected to change significantly and as such, the levels of service for transit in the vicinity of the project are anticipated to remain similar to existing conditions.

In addition, 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 Ward Villages development, the guideway alignment is expected to run along Halekauwila Street, cross over to Queen Street and then follow that roadway to Waimanu Street. The planned transit system is expected to be completed by Year 2025, a year after the completion of the Block H development. The fixed guideway transit system is also expected to include a transit station north of the Block H development.

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. Maintain 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 and prohibit off-site loading operations.
3. Prohibit vehicles exiting the loading areas from reversing onto the Halekauwila Street Extension. Monitor the loading area and assist vehicles navigating in and out of the loading area to ensure no conflict with approach vehicles and pedestrians. Restrict deliveries to early morning or other off-peak periods to minimize the impact of vehicles accessing the loading areas on vehicular, pedestrian, and bicycle traffic.
4. Provide sufficient turning radii at all project driveways to avoid or minimize vehicle encroachments to oncoming traffic lanes.
5. Provide adequate sight distance at the driveway along the Halekauwila Street Extension to ensure visibility between vehicles accessing the parking garage and those accessing the loading area. If necessary, utilize on-site personnel to minimize potential conflict between these two areas.
6. Locate the proposed project driveways off the Halekauwila Street Extension and Auahi Street a sufficient distance from Ward Avenue to minimize conflict between entering and exiting vehicles with through traffic along those roadways. The specific configurations shall be determined during the design phase.
7. Restrict turning movements in the project driveway off Auahi Street to right-turn in and right-turn out movements only due to its proximity to Ward Avenue, as well as the limited roadway width and laneage of Auahi Street at the driveway. Provide adequate channelization to direct vehicular movements exiting the driveway. The specific configuration shall be determined during the design phase.

8. Prohibit stopping, standing, and loading along Auahi Street fronting the project site to minimize potential conflict with the bicyclists and pedestrians along that roadway.
9. Provide adequate signage at the proposed drop-off/pick-up area along the Halekauwila Street Extension and Auahi Street adjacent to the project site indicating a passenger loading area, as well as citing the maximum allowable vehicle dwell time and parking restriction. In addition, monitor the area to ensure queues do not extend beyond the provided pull-out storage bay length.
10. Consider using on-site personnel to monitor the vehicles using the drop-off/pick-up area along Auahi Street to minimize vehicle dwell times and parking violations. In addition, queueing from this area should be monitored to ensure queues do not block the adjacent bike lane.
11. Confirm adequate sight distance at the proposed drop-off/pick-up area along Auahi Street to ensure vehicles along the drop-off/pick-up area and bicyclists along the adjacent bike lane are aware of the presence of each other at this location.
12. Remove existing parking along Ward Avenue fronting the project site to facilitate the movement of northbound through traffic along Ward Avenue and to support the implementation of the planned bicycle facilities along that roadway.
13. If access at the entrance to the parking garage is 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 Halekauwila Street Extension. The layout and dimensions shall be determined during the design phase.
14. Provide adequate turning and passing areas within the proposed porte-cochere off Auahi Street and monitor queuing to ensure that queues do not extend onto the adjacent public roadways. The layout and dimensions shall be determined during the design phase.
15. Update the study should development phasing, land use intensity, or land use mix change.
16. 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 Villages Master Plan," dated October 2018.

VIII. CONCLUSION

The project site for the Ward Village Master Plan currently encompasses Ward Entertainment Center, Ward Village Shops, and other surrounding commercial and office buildings. The overall master plan is expected to be implemented in five (5) phases over the next 10-15 years and entail the redevelopment of most of the existing commercial, office, and industrial spaces. Block H is a part of Phase 3 of the master plan which is expected to include residential, commercial, and restaurant uses. In addition, in conjunction with the development of Block H, roadway improvements to extend Halekauwila Street east of Ward Avenue is also expected to provide an alternate east-west route through the area. With the implementation of the aforementioned recommendations, traffic operations with the Block H development are generally expected to remain similar to without project conditions. In addition, the Howard Hughes Corporation will continue 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

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 AM
Site Code : 00000001
Start Date : 3/7/2018
Page No : 1

Groups Printed- Unshifted																							
Ward Avenue Southbound						Queen Street Westbound						Ward Avenue Northbound						Queen Street Eastbound					
Start Time	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	462	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		
Apprch %	3.6	73.4	21.7	1.3		12.9	66.3	8.6	12.1		11.2	79.4	6.9	2.6		21.9	42.4	23.6	12.1				
Total %	1.8	35.5	10.5	0.6	48.4	2	10	1.3	1.8	15.1	2.6	18.2	1.6	0.6	23	3	5.7	3.2	1.6	13.5			

Ward Avenue Southbound					Queen Street Westbound					Ward Avenue Northbound					Queen Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total			
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																			
07:30 AM	4	171	56	231	17	63	0	80	11	97	4	112	9	24	15	48			
07:45 AM	11	166	50	227	13	80	8	101	16	97	11	124	17	29	18	64			
08:00 AM	7	166	73	246	12	70	8	90	11	86	7	104	14	30	11	55			
08:15 AM	11	150	50	211	7	63	12	82	9	108	14	131	10	42	14	66			
Total Volume	33	653	229	915	49	276	28	353	47	388	36	471	50	125	58	233			
% App. Total	3.6	71.4	25		13.9	78.2	7.9		10	82.4	7.6		21.5	53.6	24.9				
PHF	.750	.955	.784	.930	.721	.863	.583	.874	.734	.898	.643	.899	.735	.744	.806	.883			

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

Groups Printed- Unshifted																			
Ward Avenue Southbound					Queen Street Westbound					Ward Avenue Northbound					Queen Street Eastbound				
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total			
03:00 PM	11	143	31	3	188	9	66	21	14	110	25	154	12	3	194	88			
03:15 PM	15	149	37	3	204	14	57	18	14	103	24	154	10	3	191	88			
03:30 PM	9	141	37	8	195	8	55	19	10	92	28	174	14	4	220	105			
03:45 PM	12	140	17	3	172	14	65	11	8	98	22	138	17	9	186	82			
Total	47	573	122	17	759	45	243	69	46	403	99	620	53	19	791	363			
04:00 PM	12	135	40	5	192	20	59	13	14	106	14	144	14	10	182	111			
04:15 PM	10	128	23	6	167	8	75	13	5	101	11	153	16	0	180	121			
04:30 PM	10	152	31	3	196	11	60	17	12	100	17	153	18	3	191	127			
04:45 PM	20	128	24	9	181	14	37	10	11	72	19	150	24	4	197	163			
Total	52	543	118	23	736	53	231	53	42	379	61	600	72	17	750	522			
05:00 PM	19	141	29	3	192	15	74	13	9	111	17	159	18	5	199	133			
-05:15 PM	16	151	26	5	198	12	69	12	20	113	15	167	28	7	217	162			
05:30 PM	18	179	39	4	240	7	76	7	11	101	16	154	22	5	197	142			
05:45 PM	10	149	35	6	200	14	58	10	15	97	21	138	14	4	177	152			
Total	63	620	129	18	830	48	277	42	55	422	69	618	82	21	790	589			
Grand Total	162	1736	369	58	2325	146	751	164	143	1204	229	1838	207	57	2331	1474			
Approch %	7	74.7	15.9	2.5		12.1	62.4	13.6	11.9		9.8	78.9	8.9	2.4		20.1			
Total %	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	20.1			

		Ward Avenue Southbound				Queen Street Westbound				Ward Avenue Northbound				Queen Street Eastbound			
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. 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																	
05:00 PM	19	141	29	189	15	74	13	102	17	159	18	194	29	72	15	116	
05:15 PM	16	151	26	193	12	69	12	93	15	167	28	210	26	103	21	150	
05:30 PM	18	179	39	236	7	76	7	90	16	154	22	192	17	86	32	135	
05:45 PM	10	149	35	194	14	58	10	82	21	138	14	173	27	79	30	136	
Total Volume	63	620	129	812	48	277	42	367	69	618	82	769	99	340	98	537	
% App. Total	7.8	76.4	15.9		13.1	75.5	11.4		9	80.4	10.7		18.4	63.3	18.2		
PHF	.829	.866	.827	.860	.800	.911	.808	.900	.821	.925	.732	.915	.853	.825	.766	.895	

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

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

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

Groups Printed- Unshifted																
Ward Avenue Southbound						Ward Avenue Northbound						Halekauwila Street Eastbound				
Start Time	Left	Thru	Right	App. Total		Left	Thru	Right	Peds	App. Total		Left	Thru	Right	Peds	App. Total
06:00 AM	1	103	47	151		15	20	3	5	43		10	1	7	6	24
06:15 AM	0	102	44	146		5	35	0	8	48		6	1	10	10	27
06:30 AM	0	95	47	142		2	48	0	12	62		9	1	6	32	48
06:45 AM	1	113	49	163		2	57	1	20	80		21	0	6	40	67
Total	2	413	187	602		24	160	4	45	233		46	3	29	88	166
07:00 AM	3	94	46	143		6	78	0	17	101		22	0	10	17	49
07:15 AM	1	115	40	156		4	93	0	12	109		24	2	2	14	42
07:30 AM	3	135	56	194		3	89	2	13	107		22	1	2	15	40
07:45 AM	1	128	56	185		1	94	0	10	105		28	1	5	13	47
Total	8	472	198	678		14	354	2	52	422		96	4	19	59	178
08:00 AM	2	129	42	173		4	86	1	12	103		20	1	5	14	40
08:15 AM	0	119	38	157		9	105	0	16	130		30	1	5	15	51
08:30 AM	4	105	37	146		7	107	2	10	126		15	2	11	8	36
08:45 AM	4	124	36	164		1	86	0	8	95		33	2	7	9	51
Total	10	477	153	640		21	384	3	46	454		98	6	28	46	178
Grand Total	20	1362	538	1920		59	898	9	143	1109		240	13	76	193	522
Approch %	1	70.9	28			5.3	81	0.8	12.9			46	2.5	14.6	37	
Total %	0.6	38.4	15.2	54.1		1.7	25.3	0.3	4	31.2		6.8	0.4	2.1	5.4	14.7

Ward Avenue Southbound					Ward Avenue Northbound					Halekauwila Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total		
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														
07:30 AM	3	135	56	194	3	89	2	94	22	1	2	25		
07:45 AM	1	128	56	185	1	94	0	95	28	1	5	34		
08:00 AM	2	129	42	173	4	86	1	91	20	1	5	26		
08:15 AM	0	119	38	157	9	105	0	114	30	1	5	36		
Total Volume	6	511	192	709	17	374	3	394	100	4	17	121		
% App. Total	0.8	72.1	27.1		4.3	94.9	0.8		82.6	3.3	14			
PHF	.500	.946	.857	.914	.472	.890	.375	.864	.833	1.00	.850	.840		

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																							
Ward Avenue Southbound						Auahi Street Westbound						Ward Avenue Northbound						Auahi Street Eastbound					
Start Time	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	15	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		
Approch %	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			

				Ward Avenue Southbound				Auahi Street Westbound				Ward Avenue Northbound				Auahi Street Eastbound			
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. 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			
03:15 PM	26	91	16	133	59	14	55	128	11	57	15	83	9	19	15	43			
03:30 PM	26	86	15	127	57	14	54	125	15	86	22	123	8	21	15	44			
03:45 PM	22	83	13	118	29	11	41	81	16	63	12	91	9	22	13	44			
Total Volume	101	350	60	511	186	61	195	442	56	283	63	402	32	81	54	167			
% 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			

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																							
Ward Avenue Southbound						Ala Moana Boulevard Westbound						Ward Avenue Northbound						Ala Moana Boulevard Eastbound					
Start Time	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	36	17	15	0	68	13	157	11	5	186	0	3	3	0	6	32	206	0	4	242	502		
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	902	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		
Approch %	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	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total
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																
07:15 AM	29	25	35	89	29	427	37	493	0	14	10	24	59	376	6	441
07:30 AM	50	33	42	125	33	386	46	465	0	8	7	15	54	365	1	420
07:45 AM	39	34	40	113	35	415	42	492	2	7	14	23	54	367	1	422
08:00 AM	34	14	34	82	27	358	37	422	0	8	9	17	50	379	3	432
Total Volume	152	106	151	409	124	1586	162	1872	2	37	40	79	217	1487	11	1715
% 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

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

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

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

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																			
Kamakee Street Southbound					Auahi Street Westbound					Kamakee Street Northbound					Auahi Street Eastbound				
Start Time	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	7			
06:15 AM	2	13	13	5	33	1	9	2	2	14	7	7	1	1	16	12			
06:30 AM	3	17	10	11	41	0	8	9	8	25	2	12	0	4	18	95			
06:45 AM	0	18	12	7	37	0	7	7	5	19	7	17	4	6	34	21			
Total	7	62	44	26	139	1	28	21	21	71	18	45	8	13	84	51			
07:00 AM	2	27	21	7	57	3	15	9	5	32	7	8	2	3	20	23			
07:15 AM	3	28	20	4	55	4	13	8	2	27	5	13	6	5	29	25			
07:30 AM	2	25	20	5	52	4	21	9	5	39	7	13	3	5	28	16			
07:45 AM	2	23	19	6	50	6	14	6	2	28	3	32	9	1	45	23			
Total	9	103	80	22	214	17	63	32	14	126	22	66	20	14	122	87			
08:00 AM	5	39	20	7	71	4	15	9	2	30	6	23	5	3	37	30			
08:15 AM	4	37	23	8	72	0	14	9	3	26	10	18	11	7	46	28			
08:30 AM	5	30	22	8	65	4	19	9	8	40	2	10	9	4	25	45			
08:45 AM	7	31	21	13	72	3	12	12	12	39	3	21	3	3	30	39			
Total	21	137	86	36	280	11	60	39	25	135	21	72	28	17	138	142			
Grand Total	37	302	210	84	633	29	151	92	60	332	61	183	56	44	344	280			
Approch %	5.8	47.7	33.2	13.3		8.7	45.5	27.7	18.1		17.7	53.2	16.3	12.8					
Total %	2.3	19	13.2	5.3	39.8	2.8	9.5	5.8	3.8	20.9	3.8	11.5	3.5	2.8	21.6	17.6			

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

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																					
Kamakee Street Southbound						Auahi Street Westbound					Kamakee Street Northbound					Auahi Street Eastbound					
Start Time	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
Total	35	136	83	123	377	37	110	62	93	302	26	66	36	84	212	45	202	31	60	338	1229
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
Total	48	145	69	151	413	28	128	28	97	281	33	74	35	73	215	51	202	28	60	341	1250
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
Total	62	127	64	148	401	31	100	38	105	274	30	61	51	105	247	49	251	29	79	408	1330
Grand Total	145	408	216	422	1191	96	338	128	295	857	89	201	122	262	674	145	655	88	199	1087	3809
Apprch %	12.2	34.3	18.1	35.4		11.2	39.4	14.9	34.4		13.2	29.8	18.1	38.9		13.3	60.3	8.1	18.3		
Total %	3.8	10.7	5.7	11.1	31.3	2.5	8.9	3.4	7.7	22.5	2.3	5.3	3.2	6.9	17.7	3.8	17.2	2.3	5.2	28.5	

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

Counted By: LF
Counters: D4-5673
Weather: CLEAR

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

File Name : KAM MID AM
Site Code : 00000002
Start Date : 3/13/2018
Page No : 1

Groups Printed- Unshifted													
Kamakee Street Southbound						Kamakee Street Northbound				Halekauwila Street Eastbound			
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
06:00 AM	27	2	0	29	0	10	0	10	1	0	1	2	41
06:15 AM	19	6	1	26	3	8	3	14	0	2	2	4	44
06:30 AM	24	3	3	30	3	24	2	29	0	2	3	5	64
06:45 AM	27	7	2	36	4	28	1	33	0	3	6	9	78
Total	97	18	6	121	10	70	6	86	1	7	12	20	227
07:00 AM	46	7	4	57	5	19	1	25	1	4	2	7	89
07:15 AM	49	3	3	55	5	22	1	28	2	2	0	4	87
07:30 AM	44	6	3	53	0	24	4	28	3	2	4	9	90
07:45 AM	43	7	0	50	1	35	0	36	2	3	3	8	94
Total	182	23	10	215	11	100	6	117	8	11	9	28	360
08:00 AM	62	2	2	66	4	30	0	34	4	2	0	6	106
08:15 AM	56	7	2	65	0	30	0	30	2	2	0	4	99
08:30 AM	54	6	0	60	2	24	2	28	3	3	2	8	96
08:45 AM	54	5	1	60	0	35	1	36	2	6	3	11	107
Total	226	20	5	251	6	119	3	128	11	13	5	29	408
Grand Total	505	61	21	587	27	289	15	331	20	31	26	77	995
Apprch %	86	10.4	3.6		8.2	87.3	4.5		26	40.3	33.8		
Total %	50.8	6.1	2.1	59	2.7	29	1.5	33.3	2	3.1	2.6	7.7	

		Kamakee Street Southbound				Kamakee Street Northbound				Halekauwila Street Eastbound			
Start Time	Thru	Right	App. Total		Left	Thru	App. Total		Left	Right	App. Total		
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													
08:00 AM	62	2	64		4	30	34		4	2	6		
08:15 AM	56	7	63		0	30	30		2	2	4		
08:30 AM	54	6	60		2	24	26		3	3	6		
08:45 AM	54	5	59		0	35	35		2	6	8		
Total Volume	226	20	246		6	119	125		11	13	24		
% App. Total	91.9	8.1	95.2		4.8	95.2	95.2		45.8	54.2	95.0		
PHF	.911	.714	.961		.375	.850	.893		.688	.542	.750		

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

Counted By: LF
Counters: D4-5673
Weather: CLEAR

File Name : KAM MID PM
Site Code : 00000002
Start Date : 3/13/2018
Page No : 1

Groups Printed- Unshifted													
Kamakee Street Southbound							Kamakee Street Northbound						
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Left	Thru	Peds	App. Total	Left	Right	Int. Total
03:00 PM	81	14	2	97	3	34	6	43	12	2	7	21	161
03:15 PM	72	8	7	87	2	47	1	50	8	6	12	26	163
03:30 PM	56	18	4	78	2	42	0	44	3	7	6	16	138
03:45 PM	43	13	3	59	4	34	0	38	7	2	2	11	108
Total	252	53	16	321	11	157	7	175	30	17	27	74	570
04:00 PM	58	14	9	81	4	40	0	44	9	5	8	22	147
04:15 PM	60	9	6	75	1	31	1	33	11	3	4	18	126
04:30 PM	72	11	5	88	4	29	1	34	9	7	4	20	142
04:45 PM	60	22	7	89	7	38	2	47	8	10	8	26	162
Total	250	56	27	333	16	138	4	158	37	25	24	86	577
05:00 PM	60	12	7	79	2	35	7	44	8	1	4	13	136
05:15 PM	67	15	2	84	5	36	2	43	6	4	6	16	143
05:30 PM	60	21	2	83	5	29	3	37	8	3	6	17	137
05:45 PM	74	18	10	102	10	29	0	39	6	10	7	23	164
Total	261	66	21	348	22	129	12	163	28	18	23	69	580
Grand Total	763	175	64	1002	49	424	23	496	95	60	74	229	1727
Apprch %	76.1	17.5	6.4		9.9	85.5	4.6		41.5	26.2	32.3		
Total %	44.2	10.1	3.7	58	2.8	24.6	1.3	28.7	5.5	3.5	4.3	13.3	

Kamakee Street Southbound							Kamakee Street Northbound						
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Left	Thru	Peds	App. Total	Left	Right	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:30 PM													
04:30 PM	72	11		83	4	29		33		9	7	16	132
04:45 PM	60	22		82	7	38		45		8	10	18	145
05:00 PM	60	12		72	2	35		37		8	1	9	118
05:15 PM	67	15		82	5	36		41		6	4	10	133
Total Volume	259	60		319	18	138		156		31	22	53	528
% App. Total	81.2	18.8			11.5	88.5				58.5	41.5		
PHF	.899	.682		.961	.643	.908		.867		.861	.550	.736	.910

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

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

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

Groups Printed- Unshifted													
Kamakee Street Southbound							Queen Street Westbound						
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Int. Total
06:00 AM	5	17	2	0	24	6	2	0	0	8	3	6	18
06:15 AM	7	15	7	0	29	11	8	1	1	21	5	0	22
06:30 AM	5	20	6	1	32	4	18	0	2	24	3	7	21
06:45 AM	2	22	15	0	39	8	16	4	2	30	5	15	29
Total	19	74	30	1	124	29	44	5	5	83	12	33	90
07:00 AM	4	32	9	1	46	21	46	1	1	69	1	13	24
07:15 AM	4	31	14	0	49	17	58	6	0	81	1	20	26
07:30 AM	4	24	23	2	53	12	84	5	1	102	4	14	21
07:45 AM	6	23	17	1	47	27	79	3	2	111	4	25	36
Total	18	110	63	4	195	77	267	15	4	363	10	72	140
08:00 AM	4	33	10	5	52	31	66	11	1	109	0	9	21
08:15 AM	6	28	12	4	50	26	44	4	1	75	10	17	22
08:30 AM	7	25	14	6	52	23	33	5	0	61	6	7	10
08:45 AM	14	28	8	9	59	21	30	4	1	56	3	5	7
Total	31	114	44	24	213	101	173	24	3	301	19	38	24
08:00 AM	4	33	10	5	52	31	66	11	1	109	0	9	11
08:15 AM	6	28	12	4	50	26	44	4	1	75	10	17	8
08:30 AM	7	25	14	6	52	23	33	5	0	61	6	7	10
08:45 AM	14	28	8	9	59	21	30	4	1	56	3	5	7
Total	31	114	44	24	213	101	173	24	3	301	19	38	36
08:00 AM	4	33	10	5	52	31	66	11	1	109	0	9	11
08:15 AM	6	28	12	4	50	26	44	4	1	75	10	17	8
08:30 AM	7	25	14	6	52	23	33	5	0	61	6	7	10
08:45 AM	14	28	8	9	59	21	30	4	1	56	3	5	7
Total	31	114	44	24	213	101	173	24	3	301	19	38	36
08:00 AM	4	33	10	5	52	31	66	11	1	109	0	9	11
08:15 AM	6	28	12	4	50	26	44	4	1	75	10	17	8
08:30 AM	7	25	14	6	52	23	33	5	0	61	6	7	10
08:45 AM	14	28	8	9	59	21	30	4	1	56	3	5	7
Total	31	114	44	24	213	101	173	24	3	301	19	38	36
08:00 AM	4	33	10	5	52	31	66	11	1	109	0	9	11
08:15 AM	6	28	12	4	50	26	44	4	1	75	10	17	8
08:30 AM	7	25	14	6	52	23	33	5	0	61	6	7	10
08:45 AM	14	28	8	9	59	21	30	4	1	56	3	5	7
Total	31	114	44	24	213	101	173	24	3	301	19	38	36
08:00 AM	4	33	10	5	52	31	66	11	1	109	0	9	11
08:15 AM	6	28	12	4	50	26	44	4	1	75	10	17	8
08:30 AM	7	25	14	6	52	23	33	5	0	61	6	7	10
08:45 AM	14	28	8	9	59	21	30	4	1	56	3	5	7
Total	31	114	44	24	213	101	173	24	3	301	19	38	36
08:00 AM	4	33	10	5	52	31	66	11	1	109	0	9	11
08:15 AM	6	28	12	4	50	26	44	4	1	75	10	17	8
08:30 AM	7	25	14	6	52	23	33	5	0	61	6	7	10
08:45 AM	14	28	8	9	59	21	30	4	1	56	3	5	7
Total	31	114	44	24	213	101	173	24	3	301	19	38	36
08:00 AM	4	33	10	5	52	31	66	11	1	109	0	9	11
08:15 AM	6	28	12	4	50	26	44	4	1	75	10	17	8
08:30 AM	7	25	14	6	52	23	33	5	0	61	6	7	10
08:45 AM	14	28	8	9	59	21	30	4	1	56	3	5	7
Total	31	114	44	24	213	101	173	24	3	301	19	38	36
08:00 AM	4	33	10	5	52	31	66	11	1	109	0	9	11
08:15 AM	6	28	12	4	50	26	44	4	1	75	10	17	8
08:30 AM	7	25	14	6	52	23	33	5	0	61	6	7	10
08:45 AM	14	28	8	9	59	21	30	4	1	56	3	5	7
Total	31	114	44	24	213	101	173	24	3	301	19	38	36
08:00 AM	4	33	10	5	52	31	66	11	1	109	0	9	11
08:15 AM	6	28	12	4	50	26	44	4	1	75	10	17	8
08:30 AM	7	25	14	6	52	23	33	5	0	61	6	7	10
08:45 AM	14	28	8	9	59	21	30	4	1	56	3	5	7
Total	31	114	44	24	213	101	173	24	3	301	19	38	36
08:00 AM	4	33	10	5	52	31	66	11	1	109	0	9	11
08:15 AM	6	28	12	4	50	26	44	4	1	75	10	17	8
08:30 AM	7	25	14	6	52	23	33	5	0	61	6	7	10
08:45 AM	14	28	8	9	59	21	30	4	1	56	3	5	7
Total	31	114	44	24	213	101	173	24	3	301	19	38	36
08:00 AM	4	33	10	5	52	31	66	11	1	109	0	9	11
08:15 AM	6	28	12	4	50	26	44	4	1	75	10	17	8
08:30 AM	7	25	14	6	52	23	33	5	0	61	6	7	10
08:45 AM	14	28	8	9	59	21	30	4	1	56	3	5	7
Total	31	114	44	24	213	101	173	24	3	301	19	38	36
08:00 AM	4	33	10	5	52	31	66	11	1	109	0	9	11
08:15 AM	6	28	12	4	50	26	44	4	1	75	10	17	8
08:30 AM	7	25	14	6	52	23	33	5	0	61	6	7	10
08:45 AM	14	28	8	9	59	21	30	4	1	56	3	5	7
Total	31	114	44	24	213	101	173	24	3	301	19	38	36
08:00 AM	4	33	10	5	52	31	66	11	1	109	0	9	11
08:15 AM	6	28	12	4	50	26	44	4	1	75	10	17	8
08:30 AM	7	25	14	6	52	23	33	5	0	61	6	7	10
08:45 AM	14	28	8	9	59	21	30	4	1	56	3	5	7
Total	31	114	44	24	213	101	173	24	3	301	19	38	36

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 PM
Site Code : 00000003
Start Date : 3/13/2018
Page No : 1

Groups Printed- Unshifted											
Kamakee Street Southbound						Queen Street Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Queen Street Eastbound
03:00 PM	15	34	14	9	72	42	41	3	0	86	Left
03:15 PM	13	31	15	10	69	36	36	6	1	79	Thru
03:30 PM	11	29	8	11	59	36	53	8	2	99	Right
03:45 PM	9	18	7	2	36	28	59	5	1	93	Peds
Total	48	112	44	32	236	142	189	22	4	357	App. Total
04:00 PM	8	27	7	6	48	30	59	10	0	99	Left
04:15 PM	12	21	6	5	44	38	74	11	2	125	Thru
04:30 PM	14	30	3	4	51	36	41	10	1	88	Right
04:45 PM	12	23	5	4	44	40	82	10	1	133	Peds
Total	46	101	21	19	187	144	256	41	4	445	App. Total
05:00 PM	17	29	8	6	60	37	75	9	2	123	Left
05:15 PM	14	19	6	2	41	41	71	14	3	129	Thru
05:30 PM	17	36	9	3	65	26	68	3	2	99	Right
05:45 PM	12	41	5	6	64	30	62	3	1	96	Peds
Total	60	125	28	17	230	134	276	29	8	447	App. Total
Grand Total	154	338	93	68	653	420	721	92	16	1249	Left
Apprch %	23.6	51.8	14.2	10.4		33.6	57.7	7.4	1.3		Thru
Total %	4	8.8	2.4	1.8	16.9	10.9	18.7	2.4	0.4	32.4	Right

Groups Printed- Unshifted											
Kamakee Street Southbound						Queen Street Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Queen Street Eastbound
04:45 PM	12	23	5		40	40	82	10		132	Left
05:00 PM	17	29	8		54	37	75	9		121	Thru
05:15 PM	14	19	6		39	41	71	14		126	Right
05:30 PM	17	36	9		62	26	68	3		97	Peds
Total Volume	60	107	28		195	144	296	36		476	App. Total
% App. Total	30.8	54.9	14.4			30.3	62.2	7.6			Left
PHF	.882	.743	.778		.786	.878	.902	.643		.902	Thru
											Right

Groups Printed- Unshifted											
Kamakee Street Northbound						Queen Street Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:45 PM	4	23	12		39	6	98	12		116	327
05:00 PM	5	20	15		40	10	88	8		106	321
05:15 PM	8	27	11		46	12	93	21		126	337
05:30 PM	9	21	7		32	9	94	15		118	309
Total Volume	21	91	45		157	37	373	56		466	1294
% App. Total	13.4	58	28.7			7.9	80	12			
PHF	.656	.843	.750		.853	.771	.952	.667		.925	.960

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											
Queen Street Westbound						Queens Lane Northbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Queen Street Eastbound
06:00 AM	1	22	23		23	0	5	10		19	Left
06:15 AM	10	26	36		36	2	4	8		12	Thru
06:30 AM	9	28	37		37	4	7	12		16	Right
06:45 AM	11	38	49		49	7	11	25		19	Peds
Total	31	114	145		145	13	27	55		66	App. Total
07:00 AM	9	63	72		72	4	12	18		29	Left
07:15 AM	16	79	95		95	10	16	29		35	Thru
07:30 AM	20	83	103		103	3	16	25		40	Right
07:45 AM	30	80	110		110	12	25	39		27	Peds
Total	75	305	380		380	29	69	111		131	App. Total
08:00 AM	24	91	115		115	7	22	30		56	Left
08:15 AM	18	73	91		91	6	22	31		50	Thru
08:30 AM	20	70	90		90	5	25	32		47	Right
08:45 AM	20	62	82		82	11	25	42		46	Peds
Total	82	296	378		378	29	94	135		199	App. Total
Grand Total	188	715	903		903	71	190	301		396	Left
Apprch %	20.8	79.2				23.6	63.1			91.2	Thru
Total %	11.5	43.7	55.1			4.3	11.6	18.4		24.2	Right

Groups Printed- Unshifted											
Queen Street Westbound						Queens Lane Northbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Queen Street Eastbound
07:45 AM	30	80	110		110	12	25	37		27	Left
08:00 AM	24	91	115		115	7	22	29		56	Thru
08:15 AM	18	73	91		91	6	22	28		50	Right
08:30 AM	20	70	90		90	5	25	30		47	Peds
08:45 AM	20	62	82		82	11	25	42		46	App. Total
Total Volume	92	314	406		406	30	94	124		180	Left
% App. Total	22.7	77.3				24.2	75.8			92.3	Thru
PHF	.767	.863	.883		.883	.625	.940	.838		.804	Right

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													
Queen Street Westbound				Queens Lane Northbound				Queen Street Eastbound					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Thru	Right	App. Total	Int. Total	Total
03:00 PM	28	108		136	8		41	6	55	11	105		296
03:15 PM	24	106		130	6		42	11	59	14	117		306
03:30 PM	28	126		154	9		50	8	67	8	96		317
03:45 PM	21	106		127	3		39	3	45	7	97		269
Total	101	446		547	26		172	28	226	40	415		1188
04:00 PM	24	99		123	12		37	3	52	12	132		307
04:15 PM	33	113		146	22		70	6	98	7	105		349
04:30 PM	40	111		151	5		44	6	55	11	134		340
04:45 PM	23	130		153	11		62	7	80	15	147		380
Total	120	453		573	50		213	22	285	45	518		1376
05:00 PM	25	115		140	15		54	8	77	12	155		372
05:15 PM	26	100		126	13		59	6	78	10	149		353
05:30 PM	27	93		120	12		48	7	67	16	131		318
05:45 PM	33	100		133	16		53	11	80	18	126		339
Total	111	408		519	56		214	32	302	56	561		1382
Grand Total	332	1307		1639	132		599	82	813	141	1494		3946
Apprch %	20.3				16.2		73.7	10.1		9.4			
Total %	8.4			41.5	3.3		15.2	2.1	20.6	3.6	37.9		

Queen Street Westbound				Queens Lane Northbound				Queen Street Eastbound					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Thru	Right	App. Total	Int. Total	Total
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													
04:30 PM	40			151	5		44	49	123	11	134		334
04:45 PM	23	130		153	11		62	73	132	15	147		373
05:00 PM	25	115		140	15		54	69	143	12	155		364
05:15 PM	26	100		126	13		59	72	139	10	149		347
Total Volume	114	456		570	44		219	263	537	48	585		1418
% App. Total	20	80			16.7		83.3		91.8	8.2			
PHF	.713			.931	.733		.883	.901	.939	.800	.944		.950

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 AM
Site Code : 00000005
Start Date : 3/13/2018
Page No : 1

Queens Lane Southbound				Auahi Street Westbound				Queen Street Northbound				Auahi Street Eastbound			
Start Time	Left	Thru	Right	Peds	App. Total	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right
06:00 AM	1	3	2	3	9	2	2	3	4	0	3	10	2	0	5
06:15 AM	0	5	7	2	14	5	5	5	1	0	4	10	1	0	3
06:30 AM	1	7	6	4	18	9	9	6	8	2	6	22	3	0	1
06:45 AM	3	1	5	1	10	7	7	10	10	0	5	25	6	0	2
Total	5	16	20	10	51	23	23	24	23	2	18	67	12	0	11
07:00 AM	0	5	6	3	14	8	8	9	12	2	2	25	4	1	5
07:15 AM	1	10	9	1	21	2	2	8	11	1	2	22	6	1	3
07:30 AM	1	11	9	7	28	9	9	21	14	0	5	40	6	0	6
07:45 AM	2	12	16	1	31	3	3	17	24	0	3	44	9	1	2
Total	4	38	40	12	94	22	22	55	61	3	12	131	25	3	16
08:00 AM	2	7	14	5	28	6	6	18	13	0	1	32	12	1	8
08:15 AM	1	9	10	5	25	2	2	19	18	2	2	41	14	0	6
08:30 AM	0	9	15	12	36	10	10	19	15	5	8	47	13	2	6
08:45 AM	3	9	5	6	23	6	6	14	14	1	8	37	12	0	12
Total	6	34	44	28	112	24	24	70	60	8	19	157	51	3	32
08:00 AM	2	88	104	50	257	69	69	149	144	13	49	355	88	6	59
08:15 AM	5.8	34.2	40.5	19.5		100		42	40.6	3.7	13.8		26.3	1.8	17.7
Total %	1.5	8.7	10.2	4.9	25.3	6.8	6.8	14.7	14.2	1.3	4.8	35	8.7	0.6	5.8

Queens Lane Southbound				Westbound				Queen Street Northbound				Auahi Street Eastbound			
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right
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															
07:45 AM	2	12		30	0			0	41				9	1	2
08:00 AM	2	7	14	23	0			0	31				12	1	8
08:15 AM	1	9	10	20	0			2	39				14	0	6
08:30 AM	0	9	15	24	0			5	39				13	2	6
Total Volume	5	37	55	97	0			7	150				48	4	22
% App. Total	5.2	38.1	56.7					4.7					64.9	5.4	29.7
PHF	.625	.771	.859	.808	.000			.350	.915			.881	.857	.500	.688

Beretania Street, Suite 400
Honolulu, HI 96826

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

	Start Time	Queens Lane Southbound				Westbound				Queen Street Northbound				Auahi Street Eastbound			
		Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. 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																	
	05:00 PM	2	17	21	40	0				26	27	2	55	35	1	25	61
	05:15 PM	1	23	14	38	0				20	36	3	59	27	1	37	65
	05:30 PM	0	26	19	45	0				26	18	5	49	34	4	28	66
	05:45 PM	0	20	27	47	0				26	23	0	49	37	0	29	66
	Total Volume	3	86	81	170	0				98	104	10	212	133	6	119	258
	% App. Total	1.8	50.6	47.6						46.2	49.1	4.7		51.6	2.3	46.1	
	PHF	.375	.827	.750	.904	.000				.942	.722	.500	.898	.899	.375	.804	.977

Beretania Street, Suite 400
Honolulu, HI 96826

File Name : AUA MID AM
Site Code : 00000006
Start Date : 3/13/2018
Page No : 1

	Parking Garage Southbound				Auahi Street Westbound				Parking Garage Exit Northbound				Auahi Street Eastbound			
	Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	App. Total		
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																
08:00 AM	0	2			22	6	28	0	0	3	3	7	18	25		
08:15 AM	0	4			21	10	31	1	1	4	6	10	18	28		
08:30 AM	0	4			26	5	31	2	0	4	6	7	20	27		
08:45 AM	2	3			15	5	20	4	1	3	8	2	21	23		
Total Volume	2	13	15		84	26	110	7	2	14	23	26	77	103		
% App. Total	13.3	86.7			76.4	23.6		30.4	8.7	60.9		25.2	74.8			
PHF	250	813	750		808	650	887	438	500	875	719	650	917	909		

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

Counted By: BB
Counters: D4-5677
Weather: CLEAR

File Name : AUA MID PM
Site Code : 00000006
Start Date : 3/13/2018
Page No : 1

Groups Printed- Unshifted											
Parking Garage Southbound				Auahi Street Westbound				Parking Garage Exit Northbound			
Start Time	Left	Thru	Right	Peds	App. Total	Thru	Right	Left	Thru	Right	Peds
03:00 PM	0	6	28	34	42	29	13	15	0	10	11
03:15 PM	2	11	31	44	50	41	9	16	0	13	30
03:30 PM	1	7	29	37	41	41	4	9	3	17	16
03:45 PM	0	8	24	32	37	29	8	16	1	12	12
Total	3	32	112	147	174	140	34	56	4	52	69
04:00 PM	1	7	32	40	48	21	7	28	4	20	12
04:15 PM	1	8	34	43	50	38	12	50	1	20	14
04:30 PM	1	5	39	45	48	48	16	64	1	10	14
04:45 PM	2	9	40	51	56	46	10	56	1	10	11
Total	5	29	145	179	198	153	45	198	7	60	51
05:00 PM	1	11	13	25	44	34	10	44	0	13	10
05:15 PM	5	7	31	43	50	28	6	34	1	11	2
05:30 PM	2	4	40	46	50	30	10	40	3	10	19
05:45 PM	4	10	45	59	69	44	14	58	8	17	16
Total	12	32	129	173	214	136	40	176	46	51	47
Grand Total	20	93	386	499	548	429	119	548	17	163	167
Approch %	4	18.6	77.4		30.7	78.3	21.7	6	0.7	6.4	6.5
Total %	0.8	3.6	15.1	19.5	21.4	16.8	4.6	6	0.7	6.4	6.5

Groups Printed- Unshifted											
Parking Garage Southbound				Auahi Street Westbound				Parking Garage Exit Northbound			
Start Time	Left	Thru	Right	Peds	App. Total	Thru	Right	Left	Thru	Right	Peds
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	1	8	9	17	26	38	12	50	11	1	20
04:30 PM	1	5	6	12	18	48	16	64	15	1	10
04:45 PM	2	9	11	22	32	46	10	56	12	1	10
05:00 PM	1	11	12	24	36	34	10	44	13	0	13
Total Volume	5	33	38	76	116	166	48	214	51	3	53
% App. Total	13.2	86.8		77.6	22.4	77.6	22.4	47.7	2.8	49.5	107
PHF	.625	.750	.792		.836	.865	.750	.850	.750	.663	.836
Grand Total	20	93	386	499	548	429	119	548	17	163	167
Approch %	4	18.6	77.4		30.7	78.3	21.7	6	0.7	6.4	6.5
Total %	0.8	3.6	15.1	19.5	21.4	16.8	4.6	6	0.7	6.4	6.5

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

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

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

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

Groups Printed- Unshifted											
Kamakee Street Southbound				Ala Moana Boulevard Westbound				Ala Moana Park Drive Northbound			
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left
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											
07:15 AM	8	7	23	38	76	2	432	14	448	22	2
07:30 AM	5	4	19	28	56	5	417	4	426	26	6
07:45 AM	2	8	21	31	42	2	431	16	449	19	4
08:00 AM	7	8	32	47	54	3	426	11	440	15	8
Total Volume	22	27	95	144	294	12	1706	45	1763	82	20
% App. Total	15.3	18.8	66		77.6	0.7	96.8	2.6	71.3	17.4	11.3
PHF	.688	.844	.742		.766	.600	.987	.703	.982	.650	.846
Grand Total	55	76	231	68	430	30	3905	91	127	4153	163
Approch %	12.8	17.7	53.7	15.8		0.7	94	2.2	3.1	52.8	19.7
Total %	0.6	0.8	2.6	0.8	4.8	0.3	43.3	1	1.4	46	1.8

Groups Printed- Unshifted											
Kamakee Street Southbound				Ala Moana Boulevard Westbound				Ala Moana Park Drive Northbound			
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left
07:15 AM	8	7	23	38	76	2	432	14	448	22	2
07:30 AM	5	4	19	28	56	5	417	4	426	26	6
07:45 AM	2	8	21	31	42	2	431	16	449	19	4
08:00 AM	7	8	32	47	54	3	426	11	440	15	8
Total Volume	22	27	95	144	294	12	1706	45	1763	82	20
% App. Total	15.3	18.8	66		77.6	0.7	96.8	2.6	71.3	17.4	11.3
PHF	.688	.844	.742		.766	.600	.987	.703	.982	.650	.846
Grand Total	55	76	231	68	430	30	3905	91	127	4153	163
Approch %	12.8	17.7	53.7	15.8		0.7	94	2.2	3.1	52.8	19.7
Total %	0.6	0.8	2.6	0.8	4.8	0.3	43.3	1	1.4	46	1.8

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

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

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

Groups Printed- Unshifted													
Queen Street Southbound							Ala Moana Boulevard Westbound						
Start Time	Left	Right	Peds	App. Total	Thru	Right	Thru	Right	Peds	App. Total	Left	Thru	App. Total
03:00 PM	31	9	6	46	357	53	2	412	11	435	8	454	912
03:15 PM	17	6	8	31	298	26	13	337	11	499	11	521	889
03:30 PM	25	12	40	77	322	37	4	363	10	492	16	518	958
03:45 PM	26	10	12	48	346	38	0	384	9	498	4	511	943
Total	99	37	66	202	1323	154	19	1496	41	1924	39	2004	3702
04:00 PM	28	12	25	65	302	39	0	341	10	505	5	520	926
04:15 PM	25	14	16	55	422	44	11	477	2	512	30	544	1076
04:30 PM	19	14	5	38	324	47	0	371	14	529	7	550	959
04:45 PM	26	15	15	56	323	40	13	376	13	542	13	568	1000
Total	98	55	61	214	1371	170	24	1565	39	2088	55	2182	3961
05:00 PM	40	15	16	71	291	49	5	345	7	537	15	559	975
05:15 PM	34	14	11	59	286	35	6	327	11	500	23	534	920
05:30 PM	29	23	4	56	303	46	5	354	9	532	25	566	976
05:45 PM	33	17	25	75	306	46	16	368	11	519	15	545	988
Total	136	69	56	261	1186	176	32	1394	38	2088	78	2204	3859
Grand Total	333	161	183	677	3880	500	75	4455	118	6100	172	6390	11522
Apprch %	49.2	23.8	27	5.9	87.1	11.2	1.7	38.7	1.8	95.5	2.7	55.5	
Total %	2.9	1.4	1.6		33.7	4.3	0.7		1	52.9	1.5		

Queen Street Southbound							Ala Moana Boulevard Westbound						
Start Time	Left	Right	Peds	App. Total	Thru	Right	Thru	Right	Peds	App. Total	Left	Thru	App. 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	25	14	14	39	422	44	44	466	2	512	514	1019	
04:30 PM	19	14	14	33	324	47	47	371	14	529	543	947	
04:45 PM	26	15	15	41	323	40	363	13	542	555	566	959	
05:00 PM	40	15	15	55	291	49	49	340	7	537	544	939	
Total Volume	110	58	58	168	1360	180	1540	36	2120	2156	3864		
% App. Total	65.5	34.5	34.5	88.3	88.3	11.7	918	.826	1.7	98.3	.971		
PHF	.688		.967	.764	.806	.918			.643	.978		.948	

Counted By: HM, EV
Counters: D4-5671, D4-5675
Weather: CLEAR

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

File Name : ALA PII AM
Site Code : 00000003
Start Date : 3/14/2018
Page No : 1

Groups Printed- Unshifted													
Piikoi Street Southbound							Ala Moana Boulevard Westbound						
Start Time	Left	Right	Peds	App. Total	Thru	Right	Thru	Right	Peds	App. Total	Left	Thru	App. Total
06:00 AM	11	12	2	25	84	33	0	117	38	179	217	359	
06:15 AM	8	19	4	31	166	61	10	237	31	161	192	460	
06:30 AM	22	29	4	55	266	74	13	353	55	201	256	664	
06:45 AM	31	28	11	70	293	70	13	376	84	264	348	794	
Total	72	88	21	181	809	238	36	1083	208	805	1013	2277	
07:00 AM	36	22	4	62	357	103	17	477	90	299	389	928	
07:15 AM	32	34	6	72	413	99	4	516	85	308	393	981	
07:30 AM	42	37	9	88	421	90	13	524	96	271	367	979	
07:45 AM	29	51	5	85	423	71	9	503	69	269	338	926	
Total	139	144	24	307	1614	363	43	2020	340	1147	1487	3814	
08:00 AM	29	39	7	75	382	83	9	474	104	281	385	934	
08:15 AM	39	22	9	70	349	86	9	444	78	244	322	836	
08:30 AM	37	36	6	79	292	79	14	385	91	242	333	797	
08:45 AM	23	45	12	80	260	104	7	371	73	193	266	717	
Total	128	142	34	304	1283	352	39	1674	346	960	1306	3284	
Grand Total	339	374	79	792	3706	953	118	4777	894	2912	3806	9375	
Apprch %	42.8	47.2	10	8.4	77.6	19.9	2.5	51	23.5	76.5	31.1	40.6	
Total %	3.6	4	0.8		39.5	10.2	1.3		9.5	31.1			

Piikoi Street Southbound							Ala Moana Boulevard Westbound						
Start Time	Left	Right	Peds	App. Total	Thru	Right	Thru	Right	Peds	App. Total	Left	Thru	App. Total
Peak Hour Analysis From 06:00 AM to 08:30 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:15 AM													
07:15 AM	32	34	34	66	413	99	99	512	85	308	393	971	
07:30 AM	42	37	42	79	421	90	90	494	96	271	367	957	
07:45 AM	29	51	51	80	423	71	71	494	69	269	338	912	
08:00 AM	29	39	39	68	382	83	83	465	104	281	385	918	
Total Volume	132	161	161	293	1639	343	343	1982	354	1129	1483	3758	
% App. Total	45.1	54.9	54.9	82.7	82.7	17.3	17.3	968	23.9	76.1	943	.968	
PHF	.786		.789	.916	.969	.866			.851	.916			

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

Counted By: HM, EV
Counters: D4-5671, D4-5675
Weather: CLEAR

File Name : ALA PII PM
Site Code : 00000003
Start Date : 3/14/2018
Page No : 1

Groups Printed- Unshifted											
Pili'oi Street Southbound						Ala Moana Boulevard Westbound					
Start Time	Thru	Right	Left	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Thru
03:00 PM	5	2	47	66	136	307	83	12	402	64	376
03:15 PM	14	2	40	36	21	308	87	29	424	93	431
03:30 PM	24	9	48	40	23	267	78	13	358	104	425
03:45 PM	20	6	39	38	36	336	91	29	456	65	455
Total	63	19	174	180	103	1218	339	83	1640	326	1687
04:00 PM	43	18	46	45	14	295	85	13	393	94	449
04:15 PM	27	8	49	62	30	383	109	22	514	84	469
04:30 PM	36	11	50	51	33	327	103	14	444	68	475
04:45 PM	32	11	62	63	13	281	92	21	394	106	474
Total	131	50	207	221	90	1286	389	70	1745	352	1867
05:00 PM	43	18	55	51	17	287	86	15	388	83	491
05:15 PM	27	8	37	53	33	298	97	11	406	95	466
05:30 PM	36	11	67	55	29	242	93	22	357	120	432
05:45 PM	20	6	50	67	22	337	90	19	446	102	444
Total	119	59	209	226	101	1164	366	67	1597	400	1833
Grand Total	313	128	590	627	294	3668	1094	220	4982	1078	5387
Apprch %	71	29	39	41.5	19.5	73.6	22	4.4	38.4	16.7	83.3
Total %	7	2.9	4.6	4.8	2.3	28.3	8.4	1.7	38.4	8.3	41.6

Pili'oi Street Southbound						Ala Moana Boulevard Westbound					
Start Time	Thru	Right	Left	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Thru
04:15 PM	49	62	111	383	109	492	84	469	553	84	469
04:30 PM	50	51	101	327	103	430	68	475	543	68	475
04:45 PM	62	63	125	281	92	373	106	474	580	106	474
05:00 PM	55	51	106	287	86	373	83	491	574	83	491
Total Volume	216	227	443	1278	390	1668	341	1909	2250	341	1909
% App. Total	48.8	51.2	88.6	76.6	23.4	84.8	15.2	84.8	97.2	15.2	84.8
PHF	.871	.901	.886	.834	.894	.848	.804	.972	.970	.804	.972

Counted By: BE, DY
Counters: D4-3889, D4-3890
Weather: CLEAR

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

File Name : PII WAI AM
Site Code : 00000004
Start Date : 3/14/2018
Page No : 1

Groups Printed- Unshifted											
Pili'oi Street Southbound						Ala Moana Center Ramp Westbound					
Start Time	Thru	Right	Left	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Thru
06:00 AM	5	2	7	0	3	82	3	6	91	21	7
06:15 AM	14	2	16	3	1	85	5	6	96	34	9
06:30 AM	24	9	33	2	4	118	11	11	140	29	16
06:45 AM	20	6	26	1	5	124	13	7	144	58	17
Total	63	19	82	6	13	409	32	30	471	142	49
07:00 AM	17	13	30	2	6	190	21	5	216	74	28
07:15 AM	27	8	35	7	5	163	9	8	180	94	35
07:30 AM	32	24	56	7	4	175	24	9	208	70	43
07:45 AM	43	14	57	13	9	28	19	11	173	87	37
Total	119	59	178	29	24	671	73	33	777	325	143
08:00 AM	43	18	61	8	7	146	16	8	170	85	47
08:15 AM	20	10	30	10	15	40	15	12	182	89	47
08:30 AM	36	11	47	10	15	38	20	15	179	73	56
08:45 AM	32	11	43	9	17	170	9	9	188	83	56
Total	131	50	181	37	55	611	64	44	719	330	206
Grand Total	313	128	441	72	92	1691	169	107	1967	797	398
Apprch %	71	29	27.4	35	37.6	86	8.6	5.4	44.1	44.4	22.2
Total %	7	2.9	9.9	1.6	2.1	37.9	3.8	2.4	44.1	17.8	8.9

Pili'oi Street Southbound						Ala Moana Center Ramp Westbound					
Start Time	Thru	Right	Left	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Thru
08:00 AM	43	18	61	8	7	23	16	8	162	85	47
08:15 AM	20	10	30	10	15	40	15	19	170	89	47
08:30 AM	36	11	47	10	15	25	20	15	164	73	56
08:45 AM	32	11	43	9	17	26	9	9	179	83	56
Total Volume	131	50	181	37	55	92	61	64	675	330	206
% App. Total	72.4	27.6	40.2	59.8	23.4	90.5	9.5	29.4	759	43.5	27.1
PHF	.762	.694	.742	.809	.885	.899	.800	.932	.968	.927	.920

Pili'oi Street Northbound						Waimanu Street Eastbound					
Start Time	Thru	Right	Left	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Thru
08:00 AM	43	18	61	8	7	23	16	8	162	85	47
08:15 AM	20	10	30	10	15	40	15	19	170	89	47
08:30 AM	36	11	47	10	15	25	20	15	164	73	56
08:45 AM	32	11	43	9	17	26	9	9	179	83	56
Total Volume	131	50	181	37	55	92	61	64	675	330	206
% App. Total	72.4	27.6	40.2	59.8	23.4	90.5	9.5	29.4	759	43.5	27.1
PHF	.762	.694	.742	.809	.885	.899	.800	.932	.968	.927	.920

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

Counted By: TS, EV
Counters: D4-5671, D4-5675
Weather: CLEAR

File Name : KAP COO PM
Site Code : 00000001
Start Date : 3/15/2018
Page No : 1

Groups Printed- Unshifted																							
Cooke Street Southbound						Kapiolani Boulevard Westbound						Cooke Street Northbound						Kapiolani Boulevard Eastbound					
Start Time	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	6	7	11	8	32	51	164	32	16	263	18	59	29	9	115	4	195	23	19	241	651		
03:15 PM	1	5	4	4	14	63	137	25	7	232	24	67	36	9	136	2	225	22	10	259	641		
03:30 PM	2	6	5	9	22	81	194	30	16	321	24	69	30	10	133	4	242	15	22	283	759		
03:45 PM	5	5	6	14	30	80	164	34	18	296	24	59	38	4	125	1	269	22	19	311	762		
Total	14	23	26	35	98	275	659	121	57	1112	90	254	133	32	509	11	931	82	70	1094	2813		
04:00 PM	3	20	6	15	44	85	156	32	12	285	16	59	44	15	134	6	203	19	27	255	718		
04:15 PM	6	10	7	18	41	68	164	32	26	290	21	75	52	27	175	5	289	25	12	331	837		
04:30 PM	4	20	12	10	46	69	136	52	23	280	16	62	62	23	163	1	311	22	22	356	845		
04:45 PM	4	14	11	12	41	66	154	46	15	281	32	82	77	20	211	2	339	16	22	379	912		
Total	17	64	36	55	172	288	610	162	76	1136	85	278	235	85	683	14	1142	82	83	1321	3312		
05:00 PM	6	11	2	10	29	70	195	37	24	326	16	59	57	29	161	2	349	13	34	398	914		
05:15 PM	0	7	4	18	29	69	154	32	20	275	26	72	55	23	176	7	353	10	24	394	874		
05:30 PM	3	4	2	3	12	48	138	23	9	218	15	63	32	31	141	0	309	25	18	352	723		
05:45 PM	1	4	6	13	24	56	119	18	17	210	8	62	21	18	109	3	248	18	10	279	622		
Total	10	26	14	44	94	243	606	110	70	1029	65	256	165	101	587	12	1259	66	86	1423	3133		
Grand Total	41	113	76	134	364	806	1875	393	203	3277	240	788	533	218	1779	37	3332	230	239	3838	9258		
Apprch %	11.3	31	20.9	36.8		24.6	57.2	12	6.2		13.5	44.3	30	12.3		1	86.8	6	6.2				
Total %	0.4	1.2	0.8	1.4	3.9	8.7	20.3	4.2	2.2	35.4	2.6	8.5	5.8	2.4	19.2	0.4	36	2.5	2.6	41.5			

Cooke Street Southbound					Kapiolani Boulevard Westbound					Cooke Street Northbound					Kapiolani Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total			
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																			
04:30 PM	4	20	12	36	69	136	52	257	16	62	62	140	1	311	22	334			
04:45 PM	4	14	11	29	66	154	46	266	32	82	77	191	2	339	16	357			
05:00 PM	6	11	2	19	70	195	37	302	16	59	57	132	2	349	13	364			
05:15 PM	0	7	4	11	69	154	32	255	26	72	55	153	7	353	10	370			
Total Volume	14	52	29	95	274	639	167	1080	90	275	251	616	12	1352	61	1425			
% App. Total	14.7	54.7	30.5		25.4	59.2	15.5		14.6	44.6	40.7		0.8	94.9	4.3				
PHF	.583	.650	.604	.660	.979	.819	.803	.894	.703	.838	.815	.806	.429	.958	.693	.954			

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

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

File Name : KAP WAR AM
Site Code : 00000002
Start Date : 3/15/2018
Page No : 1

Groups Printed- Unshifted																					
Ward Avenue Southbound					Kapiolani Boulevard Westbound					Ward Avenue Northbound					Kapiolani Boulevard Eastbound						
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. Total	
06:00 AM	25	102	31	6	164	14	57	3	7	81	13	28	11	10	62	51	17	3	71	378	
06:15 AM	23	153	36	7	219	33	94	9	17	153	16	53	6	11	86	37	17	14	68	526	
06:30 AM	30	140	31	25	226	46	152	21	11	230	20	52	6	12	90	81	21	26	128	674	
06:45 AM	42	167	52	46	307	58	206	33	51	348	19	91	3	27	140	76	22	32	130	925	
Total	120	562	150	84	916	151	509	66	86	812	68	224	26	60	378	245	77	75	397	2503	
07:00 AM	44	118	66	22	250	53	227	45	40	365	31	112	10	25	178	85	26	24	135	928	
07:15 AM	58	174	59	36	327	47	283	41	55	426	32	142	8	13	195	112	27	31	170	1118	
07:30 AM	62	156	66	30	314	53	329	27	42	451	41	114	7	29	191	147	20	33	200	1156	
07:45 AM	42	196	61	20	319	65	286	17	32	400	26	91	13	23	153	116	18	10	144	1016	
Total	206	644	252	108	1210	218	1125	130	169	1642	130	459	38	90	717	460	91	98	649	4218	
08:00 AM	51	199	60	24	334	61	288	26	15	390	34	63	19	8	124	128	34	10	172	1020	
08:15 AM	44	204	62	18	328	65	237	16	20	338	28	78	14	8	128	118	25	2	145	939	
08:30 AM	56	183	47	13	299	29	152	22	22	225	35	78	10	17	140	130	33	11	174	838	
08:45 AM	37	177	44	11	269	42	144	9	10	205	26	82	20	10	138	137	20	6	163	775	
Total	188	763	213	66	1230	197	821	73	67	1158	123	301	63	43	530	513	112	29	654	3572	
Grand Total	514	1969	615	258	3356	566	2455	269	322	3612	321	984	127	193	1625	1218	280	202	1700	10293	
Apprch %	15.3	58.7	18.3	7.7		15.7	68	7.4	8.9		19.8	60.6	7.8	11.9		71.6	16.5	11.9			
Total %	5	19.1	6	2.5	32.6	5.5	23.9	2.6	3.1	35.1	3.1	9.6	1.2	1.9	15.8	11.8	2.7	2	16.5		

Groups Printed- Unshifted																			
Ward Avenue Southbound					Kapiolani Boulevard Westbound					Ward Avenue Northbound					Kapiolani Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total			
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																			
07:15 AM	58	174	59	291	47	283	41	371	32	142	8	182	112	27	139	983			
07:30 AM	62	156	66	284	53	329	27	409	41	114	7	162	147	20	167	1022			
07:45 AM	42	196	61	299	65	286	17	368	26	91	13	130	116	18	134	931			
08:00 AM	51	199	60	310	61	288	26	375	34	63	19	116	128	34	162	963			
Total Volume	213	725	246	1184	226	1186	111	1523	133	410	47	590	503	99	602	3899			
% App. Total	18	61.2	20.8		14.8	77.9	7.3		22.5	69.5	8		83.6	16.4					
PHF	.859	.911	.932	.955	.869	.901	.677	.931	.811	.722	.618	.810	.855	.728	.901	.954			

Wilson Okamoto Corporation

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

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

File Name : KAP WAR PM
Site Code : 0000002
Start Date : 3/15/2018
Page No : 1

Groups Printed- Unshifted																							
Ward Avenue Southbound						Kapiolani Boulevard Westbound						Ward Avenue Northbound						Kapiolani Boulevard Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. Total			
03:00 PM	59	134	35	7	235	39	180	20	13	252	38	124	28	7	197	211	31	8	250	934			
03:15 PM	68	156	32	6	262	39	174	14	24	251	25	145	44	18	232	213	34	14	261	1006			
03:30 PM	59	156	48	11	274	0	249	27	11	287	27	115	43	16	201	289	28	13	330	1099			
03:45 PM	72	168	41	17	298	0	244	28	16	288	24	143	50	8	225	264	31	8	303	1114			
Total	258	614	156	41	1069	78	847	89	64	1078	114	527	165	49	855	977	124	43	1144	4146			
04:00 PM	65	126	46	16	253	1	216	38	22	277	40	108	44	18	210	258	36	9	303	1043			
04:15 PM	64	157	35	11	267	0	227	21	18	266	30	130	42	9	211	301	27	11	339	1083			
04:30 PM	67	145	31	17	260	0	222	33	25	280	28	121	41	15	205	349	28	18	395	1140			
04:45 PM	80	165	36	7	288	0	228	26	11	265	26	137	46	18	227	397	43	8	448	1228			
Total	276	593	148	51	1068	1	893	118	76	1088	124	496	173	60	853	1305	134	46	1485	4494			
05:00 PM	69	165	41	21	296	0	273	26	25	324	40	131	48	23	242	380	36	15	431	1293			
05:15 PM	73	163	31	13	280	5	234	19	22	280	26	140	54	19	239	337	24	10	371	1170			
05:30 PM	54	140	31	14	239	39	147	31	16	233	39	112	31	20	202	311	38	15	364	1038			
05:45 PM	70	149	33	8	260	33	141	14	19	207	29	107	40	14	190	246	36	10	292	949			
Total	266	617	136	56	1075	77	795	90	82	1044	134	490	173	76	873	1274	134	50	1458	4450			
Grand Total	800	1824	440	148	3212	156	2535	297	222	3210	372	1513	511	185	2581	3556	392	139	4087	13090			
Apprch %	24.9	56.8	13.7	4.6		4.9	79	9.3	6.9		14.4	58.6	19.8	7.2		87	9.6	3.4					
Total %	6.1	13.9	3.4	1.1	24.5	1.2	19.4	2.3	1.7	24.5	2.8	11.6	3.9	1.4	19.7	27.2	3	1.1	31.2				

	Ward Avenue Southbound				Kapiolani Boulevard Westbound				Ward Avenue Northbound				Kapiolani Boulevard Eastbound			
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total
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																
04:30 PM	67	145	31	243	0	222	33	255	28	121	41	190	349	28	377	1065
04:45 PM	80	165	36	281	0	228	26	254	26	137	46	209	397	43	440	1184
05:00 PM	69	165	41	275	0	273	26	299	40	131	48	219	380	36	416	1209
05:15 PM	73	163	31	267	5	234	19	258	26	140	54	220	337	24	361	1106
Total Volume	289	638	139	1066	5	957	104	1066	120	529	189	838	1463	131	1594	4564
% App. Total	27.1	59.8	13		0.5	89.8	9.8		14.3	63.1	22.6		91.8	8.2		
PHF	.903	.967	.848	.948	.250	.876	.788	.891	.750	.945	.875	.952	.921	.762	.906	.944

Wilson Okamoto Corporation

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

Counted By: WL, LF
Counters: D4-5677, D4-5672
Weather: CLEAR

File Name : KAP KAM AM
Site Code : 00000003
Start Date : 3/15/2018
Page No : 1

	Groups Printed- Unshifted																							
	Kapiolani Boulevard								Kamakee Street								Kapiolani Boulevard							
	Westbound				Northbound				Eastbound				Westbound				Northbound				Eastbound			
Start Time	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Left	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. Total							
06:00 AM	22	99	3	124	4	5	2	11	82	12	7	82	63	12	10	7	217							
06:15 AM	27	152	2	181	18	6	9	33	68	13	10	68	45	13	10	68	282							
06:30 AM	20	268	1	289	13	10	14	37	101	12	13	126	101	12	13	126	452							
06:45 AM	32	291	5	328	30	17	6	53	129	25	12	129	92	25	12	129	510							
Total	101	810	11	922	65	38	31	134	405	62	42	405	301	62	42	405	1461							
07:00 AM	35	387	1	423	27	7	13	47	159	15	13	159	131	15	13	159	629							
07:15 AM	45	403	4	452	27	10	7	44	214	27	43	214	144	27	43	214	710							
07:30 AM	51	414	2	467	31	15	14	60	259	17	49	259	193	17	49	259	786							
07:45 AM	50	361	8	419	41	16	9	66	225	6	68	225	151	6	68	225	710							
Total	181	1565	15	1761	126	48	43	217	857	65	173	857	619	65	173	857	2835							
08:00 AM	39	362	4	405	24	24	13	61	250	15	55	250	180	15	55	250	716							
08:15 AM	39	278	6	323	19	12	21	52	194	11	23	194	160	11	23	194	569							
08:30 AM	26	222	3	251	23	22	10	55	215	16	27	215	172	16	27	215	521							
08:45 AM	18	174	8	200	10	27	9	46	206	24	15	206	167	24	15	206	452							
Total	122	1036	21	1179	76	85	53	214	865	66	120	865	679	66	120	865	2258							
Grand Total	404	3411	47	3862	267	171	127	565	2127	193	335	2127	1599	193	335	2127	6554							
Approach %	10.5	88.3	1.2		47.3	30.3	22.5			9.1	15.7		75.2	9.1	15.7									
Total %	6.2	52	0.7	58.9	4.1	2.6	1.9	8.6	32.5	2.9	5.1	32.5	24.4	2.9	5.1	32.5								

	Start Time	Kapiolani Boulevard Westbound				Kamakee Street Northbound				Kapiolani Boulevard Eastbound			
		Left	Thru	App. Total		Left	Right	App. Total		Thru	Right	App. Total	
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													
	07:15 AM	45	403	448		27	10	37		144	27	171	656
	07:30 AM	51	414	465		31	15	46		193	17	210	721
	07:45 AM	50	361	411		41	16	57		151	6	157	625
	08:00 AM	39	362	401		24	24	48		180	15	195	644
	Total Volume	185	1540	1725		123	65	188		668	65	733	2646
	% App. Total	10.7	89.3			65.4	34.6			91.1	8.9		
	PHF	.907	.930	.927		.750	.677	.825		.865	.602	.873	.917

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

Counted By: WL, LF
Counters: D4-5677, D4-5672
Weather: CLEAR

File Name : KAP KAM PM
Site Code : 00000003
Start Date : 3/15/2018
Page No : 1

Groups Printed- Unshifted													
Kapiolani Boulevard Westbound							Kamakee Street Northbound						
Start Time	Left	Thru	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Thru	Right	Peds	Int. Total
03:00 PM	28	201	3	232	29	37	17	17	83	249	28	14	606
03:15 PM	18	195	9	222	27	43	12	12	82	322	13	22	661
03:30 PM	0	211	4	215	40	43	15	15	98	338	23	23	697
03:45 PM	1	255	8	264	18	48	22	22	88	377	19	40	788
Total	47	862	24	933	114	171	66	66	351	1286	83	99	2752
04:00 PM	3	222	4	229	43	32	20	20	95	338	14	13	689
04:15 PM	1	226	6	233	21	40	20	20	81	394	19	22	749
04:30 PM	0	215	8	223	39	54	15	15	108	412	33	27	803
04:45 PM	6	206	4	216	31	53	33	33	117	502	26	19	880
Total	10	869	22	901	134	179	88	88	401	1646	92	81	3121
05:00 PM	1	220	9	230	49	55	16	16	120	442	29	25	846
05:15 PM	0	225	5	230	26	53	25	25	104	444	36	18	832
05:30 PM	32	177	9	218	30	45	22	22	97	347	26	20	708
05:45 PM	31	175	2	208	23	33	25	25	81	359	15	16	679
Total	64	797	25	886	128	186	88	88	402	1592	106	79	3065
Grand Total	121	2528	71	2720	376	536	242	242	1154	4524	281	259	8938
Apprch %	4.4	92.9	2.6		32.6	46.4	21	21		89.3	5.5	5.1	
Total %	1.4	28.3	0.8	30.4	4.2	6	2.7	2.7	12.9	50.6	3.1	2.9	56.7

Groups Printed- Unshifted													
Kapiolani Boulevard Westbound							Kamakee Street Northbound						
Start Time	Left	Thru	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Thru	Right	Peds	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:30 PM													
04:30 PM	0	215		215	39	54			93	412	33		753
04:45 PM	6	206		212	31	53			84	502	26		824
05:00 PM	1	220		221	49	55			104	442	29		796
05:15 PM	0	225		225	26	53			79	444	36		784
Total Volume	7	866		873	145	215			360	1800	124		3157
% App. Total	0.8	99.2			40.3	59.7				93.6	6.4		
PHF	.292	.962		.970	.740	.977			.865	.896	.861		.958

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

Counted By: DY, BE
Counters: D4-5673, D4-3890
Weather: CLEAR

File Name : KAP PII AM
Site Code : 00000004
Start Date : 3/15/2018
Page No : 1

Groups Printed- Unshifted													
Kapiolani Boulevard Westbound							Piikoi Street Northbound						
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Thru	Right	Peds	Int. Total
06:00 AM	99	22	7	128	7	96	4	1	108	82	4	1	323
06:15 AM	158	22	4	184	6	94	10	2	112	57	5	4	362
06:30 AM	252	30	12	294	11	127	8	10	156	100	7	6	563
06:45 AM	299	50	19	368	8	149	11	10	178	123	11	6	686
Total	808	124	42	974	32	466	33	23	554	362	27	17	1934
07:00 AM	350	32	8	390	16	215	18	4	253	126	16	10	795
07:15 AM	413	56	11	480	22	220	13	3	258	142	13	14	907
07:30 AM	401	67	15	483	15	231	9	20	275	196	13	18	985
07:45 AM	360	78	18	456	12	164	8	11	195	169	16	12	848
Total	1524	233	52	1809	65	830	48	38	981	633	58	54	3535
08:00 AM	350	73	17	440	5	200	14	11	230	190	17	17	894
08:15 AM	293	50	9	352	7	197	22	25	251	155	10	18	786
08:30 AM	199	40	18	257	15	214	20	18	267	199	16	16	755
08:45 AM	162	79	24	265	12	203	14	15	244	216	25	19	769
Total	1004	242	68	1314	39	814	70	69	992	760	68	70	3204
Grand Total	3336	599	162	4097	136	2110	151	130	2527	1755	153	141	8673
Apprch %	81.4	14.6	4		5.4	83.5	6	5.1		85.7	7.5	6.9	
Total %	38.5	6.9	1.9	47.2	1.6	24.3	1.7	1.5	29.1	20.2	1.8	1.6	23.6

Groups Printed- Unshifted													
Kapiolani Boulevard Westbound							Piikoi Street Northbound						
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Thru	Right	Peds	Int. Total
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													
07:15 AM	413	56		469	22	220	13		255	142	13		879
07:30 AM	401	67		468	15	231	9		255	196	13		932
07:45 AM	360	78		438	12	164	8		184	169	16		807
08:00 AM	350	73		423	5	200	14		219	190	17		849
Total Volume	1524	274		1798	54	815	44		913	697	59		3467
% App. Total	84.8	15.2			5.9	89.3	4.8			92.2	7.8		
PHF	.923	.878		.958	.614	.882	.786		.895	.889	.868		.930

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

Counted By: DY, BE
Counters: D4-5673, D4-3890
Weather: CLEAR

File Name : KAP PII PM
Site Code : 00000004
Start Date : 3/15/2018
Page No : 1

Groups Printed- Unshifted									
Kapiolani Boulevard Westbound					Piikoi Street Northbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total
03:00 PM	156	48	29	233	31	312	49	34	426
03:15 PM	155	78	14	247	21	273	44	13	351
03:30 PM	152	77	13	242	21	337	57	9	424
03:45 PM	191	87	21	299	19	265	39	26	349
Total	654	290	77	1021	92	1187	189	82	1550
Kapiolani Boulevard Eastbound					Kapiolani Boulevard Eastbound				
Start Time	Thru	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	173	47	38	258	29	272	51	17	389
04:15 PM	174	68	36	278	25	257	35	34	351
04:30 PM	153	55	9	217	22	271	62	21	376
04:45 PM	154	89	28	271	16	252	51	31	350
Total	654	259	111	1024	92	1052	199	103	1446
Kapiolani Boulevard Westbound					Kapiolani Boulevard Eastbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total
05:00 PM	143	61	37	241	28	319	51	29	427
05:15 PM	151	79	37	267	24	274	59	27	384
05:30 PM	141	47	15	203	29	302	50	23	404
05:45 PM	161	54	17	232	21	246	55	35	357
Total	596	241	106	943	102	1141	215	114	1572
Grand Total					Grand Total				
Approch %	63.7	26.4	9.8		286	3380	603	299	4568
Total %	14.7	6.1	2.3	23	6.3	74	13.2	6.5	35.2
Kapiolani Boulevard Westbound					Kapiolani Boulevard Eastbound				
Start Time	Thru	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	173	47	38	258	29	272	51	17	389
04:15 PM	174	68	36	278	25	257	35	34	351
04:30 PM	153	55	9	217	22	271	62	21	376
04:45 PM	154	89	28	271	16	252	51	31	350
Total	654	259	111	1024	92	1052	199	103	1446
Kapiolani Boulevard Westbound					Kapiolani Boulevard Eastbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total
05:00 PM	143	61	37	241	28	319	51	29	427
05:15 PM	151	79	37	267	24	274	59	27	384
05:30 PM	141	47	15	203	29	302	50	23	404
05:45 PM	161	54	17	232	21	246	55	35	357
Total	596	241	106	943	102	1141	215	114	1572
Grand Total					Grand Total				
Approch %	63.7	26.4	9.8		286	3380	603	299	4568
Total %	14.7	6.1	2.3	23	6.3	74	13.2	6.5	35.2
Kapiolani Boulevard Westbound					Kapiolani Boulevard Eastbound				
Start Time	Thru	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	173	47	38	258	29	272	51	17	389
04:15 PM	174	68	36	278	25	257	35	34	351
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Total	654	259	111	1024	92	1052	199	103	1446
Kapiolani Boulevard Westbound					Kapiolani Boulevard Eastbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total
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05:15 PM	151	79	37	267	24	274	59	27	384
05:30 PM	141	47	15	203	29	302	50	23	404
05:45 PM	161	54	17	232	21	246	55	35	357
Total	596	241	106	943	102	1141	215	114	1572
Grand Total					Grand Total				
Approch %	63.7	26.4	9.8		286	3380	603	299	4568
Total %	14.7	6.1	2.3	23	6.3	74	13.2	6.5	35.2
Kapiolani Boulevard Westbound					Kapiolani Boulevard Eastbound				
Start Time	Thru	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. Total
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04:15 PM	174	68	36	278	25	257	35	34	351
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Total	654	259	111	1024	92	1052	199	103	1446
Kapiolani Boulevard Westbound					Kapiolani Boulevard Eastbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total
05:00 PM	143	61	37	241	28	319	51	29	427
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05:30 PM	141	47	15	203	29	302	50	23	404
05:45 PM	161	54	17	232	21	246	55	35	357
Total	596	241	106	943	102	1141	215	114	1572
Grand Total					Grand Total				
Approch %	63.7	26.4	9.8		286	3380	603	299	4568
Total %	14.7	6.1	2.3	23	6.3	74	13.2	6.5	35.2
Kapiolani Boulevard Westbound					Kapiolani Boulevard Eastbound				
Start Time	Thru	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	173	47	38	258	29	272	51	17	389
04:15 PM	174	68	36	278	25	257	35	34	351
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Total	654	259	111	1024	92	1052	199	103	1446
Kapiolani Boulevard Westbound					Kapiolani Boulevard Eastbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total
05:00 PM	143	61	37	241	28	319	51	29	427
05:15 PM	151	79	37	267	24	274	59	27	384
05:30 PM	141	47	15	203	29	302	50	23	404
05:45 PM	161	54	17	232	21	246	55	35	357
Total	596	241	106	943	102	1141	215	114	1572
Grand Total					Grand Total				
Approch %	63.7	26.4	9.8		286	3380	603	299	4568
Total %	14.7	6.1	2.3	23	6.3	74	13.2	6.5	35.2
Kapiolani Boulevard Westbound					Kapiolani Boulevard Eastbound				
Start Time	Thru	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	173	47	38	258	29	272	51	17	389
04:15 PM	174	68	36	278	25	257	35	34	351
04:30 PM	153	55	9	217	22	271	62	21	376
04:45 PM	154	89	28	271	16	252	51	31	350
Total	654	259	111	1024	92	1052	199	103	1446
Kapiolani Boulevard Westbound					Kapiolani Boulevard Eastbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total
05:00 PM	143	61	37	241	28	319	51	29	427
05:15 PM	151	79	37	267	24	274	59	27	384
05:30 PM	141	47	15	203	29	302	50	23	404
05:45 PM	161	54	17	232	21	246	55	35	357
Total	596	241	106	943	102	1141	215	114	1572
Grand Total					Grand Total				
Approch %	63.7	26.4	9.8		286	3380	603	299	4568
Total %	14.7	6.1	2.3	23	6.3	74	13.2	6.5	35.2
Kapiolani Boulevard Westbound					Kapiolani Boulevard Eastbound				
Start Time	Thru	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	173	47	38	258	29	272	51	17	389
04:15 PM	174	68	36	278	25	257	35	34	351
04:30 PM	153	55	9	217	22	271	62	21	376
04:45 PM	154	89	28	271	16	252	51	31	350
Total	654	259	111	1024	92	1052	199	103	1446
Kapiolani Boulevard Westbound					Kapiolani Boulevard Eastbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total
05:00 PM	143	61	37	241	28	319	51	29	427
05:15 PM	151	79	37	267	24	274	59	27	384
05:30 PM	141	47	15	203	29	302	50	23	404
05:45 PM	161	54	17	232	21	246	55	35	357
Total	596	241	106	943	102	1141	215	114	1572
Grand Total					Grand Total				
Approch %	63.7	26.4	9.8		286	3380	603	299	4568
Total %	14.7	6.1	2.3	23	6.3	74	13.2	6.5	35.2
Kapiolani Boulevard Westbound					Kapiolani Boulevard Eastbound				
Start Time	Thru	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	173	47	38	258	29	272	51	17	389
04:15 PM	174	68	36	278	25	257	35	34	351
04:30 PM	153	55	9	217	22	271	62	21	376
04:45 PM	154	89	28	271	16	252	51	31	350
Total	654	259	111	1024	92	1052	199	103	1446
Kapiolani Boulevard Westbound					Kapiolani Boulevard Eastbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total
05:00 PM	143	61	37	241	28	319	51	29	427
05:15 PM	151	79	37	267	24	274	59	27	384
05:30 PM	141	47	15	203	29	302	50	23	404
05:45 PM	161	54	17	232	21	246	55	35	357
Total	596	241	106	943	102	1141	215	114	1572
Grand Total					Grand Total				
Approch %	63.7	26.4	9.8		286	3380	603	299	4568
Total %	14.7	6.1	2.3	23	6.3	74	13.2	6.5	35.2
Kapiolani Boulevard Westbound					Kapiolani Boulevard Eastbound				
Start Time	Thru	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	173	47	38	258	29	272	51	17	389
04:15 PM	174	68	36	278	25	257	35	34	351
04:30 PM	153	55	9	217	22	271	62	21	376
04:45 PM	154	89	28	271	16	252	51	31	350
Total	654	259	111	1024	92	1052	199	103	1446
Kapiolani Boulevard Westbound					Kapiolani Boulevard Eastbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total
05:00 PM	143	61	37	241	28	319	51	29	427
05:15 PM	151	79	37	267	24	274	59	27	384
05:30 PM	141	47	15	203	29	302	50	23	404
05:45 PM	161	54	17	232	21	246	55	35	357
Total	596	241	106	943	102	1141	215	114	1572
Grand Total					Grand Total				
Approch %	63.7	26.4	9.8		286	3380	603	299	4568
Total %	14.7	6.1	2.3	23	6.3	74	13.2	6.5	35.2
Kapiolani Boulevard Westbound					Kapiolani Boulevard Eastbound				
Start Time	Thru	Right	Peds	App. Total	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	173	47	38	258	29	272	51	17	389
04:15 PM	174	68	36	278	25	257	35	34	351
04:30 PM	153	55	9	217	22	271	62	21	376
04:45 PM	154	89	28	271	16	252	51	31	350
Total	654	259	111	1024	92	1052	199		

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

Counted By: FS
Counters: D4-5673
Weather: CLEAR

File Name : QUE COO PM
Site Code : 00000001
Start Date : 4/3/2018
Page No : 1

Groups Printed- Unshifted											
Cooke Street Southbound						Queen Street Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
03:00 PM	9	55	17	0	81	24	85	12	5	126	
03:15 PM	7	60	16	4	87	13	78	16	8	115	
03:30 PM	4	54	28	4	90	14	81	11	17	123	
03:45 PM	6	54	27	4	91	15	80	9	3	107	
Total	26	223	88	12	349	66	324	48	33	471	
04:00 PM	7	48	28	3	86	18	71	17	6	112	
04:15 PM	2	67	23	3	95	14	67	6	3	90	
04:30 PM	3	51	32	7	93	20	81	17	9	127	
04:45 PM	4	73	24	6	107	14	88	20	10	132	
Total	16	239	107	19	381	66	307	60	28	461	
05:00 PM	5	73	17	9	104	8	78	20	7	113	
05:15 PM	5	63	31	4	103	7	64	13	6	90	
05:30 PM	8	35	16	18	77	20	65	12	16	113	
05:45 PM	3	46	12	6	67	16	83	13	13	125	
Total	21	217	76	37	351	51	290	58	42	441	
Grand Total	63	679	271	68	1081	183	921	166	103	1373	
Apprch %	5.8	62.8	25.1	6.3		13.3	67.1	12.1	7.5		
Total %	1.2	13	5.2	1.3	20.7	3.5	17.6	3.2	2	26.3	

Cooke Street Southbound						Queen Street Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
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											
04:30 PM	3	51	32		86	20	81	17		118	
04:45 PM	4	73	24		101	14	88	20		122	
05:00 PM	5	73	17		95	8	78	20		106	
05:15 PM	5	63	31		99	7	64	13		84	
Total Volume	17	260	104		381	49	311	70		430	
% App. Total	4.5	68.2	27.3			11.4	72.3	16.3			
PHF	.850	.890	.813		.943	.613	.884	.875		.881	
Grand Total	63	679	271	68	1081	183	921	166	103	1373	
Apprch %	5.8	62.8	25.1	6.3		13.3	67.1	12.1	7.5		
Total %	1.2	13	5.2	1.3	20.7	3.5	17.6	3.2	2	26.3	

Cooke Street Northbound						Queen Street Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
04:30 PM	7	76	11		94	24	110	16		150	
04:45 PM	9	86	11		106	35	100	13		148	
05:00 PM	11	81	14		106	16	113	11		140	
05:15 PM	6	79	10		95	32	132	13		177	
Total Volume	33	322	46		401	107	455	53		615	
% App. Total	8.2	80.3	11.5			17.4	74	8.6			
PHF	.750	.936	.821		.946	.764	.862	.828		.869	
Grand Total	94	841	168	41	1144	253	1108	164	96	1621	
Apprch %	8.2	73.5	14.7	3.6		15.6	68.4	10.1	5.9		
Total %	1.8	16.1	3.2	0.8	21.9	4.8	21.2	3.1	1.8	31.1	

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

Counted By: EV
Counters: D4-3889
Weather: CLEAR

File Name : COO HAL AM
Site Code : 00000002
Start Date : 4/3/2018
Page No : 1

Groups Printed- Unshifted											
Cooke Street Southbound						Halekauwila Street Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
06:00 AM	8	19	4	2	33	2	2	2	4	10	
06:15 AM	7	29	4	3	43	1	8	3	6	18	
06:30 AM	7	30	6	2	45	7	7	9	4	27	
06:45 AM	11	38	12	3	64	3	14	6	6	29	
Total	33	116	26	10	185	13	31	20	20	84	
07:00 AM	7	45	15	2	69	9	16	3	5	33	
07:15 AM	14	48	13	5	80	4	17	6	4	31	
07:30 AM	4	50	21	3	78	5	14	13	6	38	
07:45 AM	10	56	14	4	84	9	21	8	3	41	
Total	35	199	63	14	311	27	68	30	18	143	
08:00 AM	4	54	13	3	74	9	12	7	2	30	
08:15 AM	5	64	15	2	86	6	16	9	2	33	
08:30 AM	7	55	12	5	79	2	17	8	7	34	
08:45 AM	7	49	13	4	73	8	6	7	2	23	
Total	23	222	53	14	312	25	51	31	13	120	
Grand Total	91	537	142	38	808	65	150	81	51	347	
Apprch %	11.3	66.5	17.6	4.7		18.7	43.2	23.3	14.7		
Total %	4.1	24	6.3	1.7	36	2.9	6.7	3.6	2.3	15.5	

Cooke Street Northbound						Halekauwila Street Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
06:00 AM	4	20	5	2	28	4	6	1	5	16	
06:15 AM	2	19	9	1	31	5	8	5	2	20	
06:30 AM	3	21	16	1	41	5	16	1	1	23	
06:45 AM	2	37	11	3	53	10	14	4	2	30	
Total	8	97	41	7	153	24	44	11	10	89	
07:00 AM	5	51	7	5	68	8	14	6	8	36	
07:15 AM	4	39	8	2	53	17	16	2	2	37	
07:30 AM	7	50	7	5	69	11	15	6	8	40	
07:45 AM	6	47	10	3	66	13	22	6	4	45	
Total	22	187	32	15	256	49	67	20	22	158	
08:00 AM	5	49	9	4	67	14	14	3	2	33	
08:15 AM	4	40	3	1	48	18	16	15	2	51	
08:30 AM	4	68	9	4	85	16	10	9	1	36	
08:45 AM	1	57	9	4	71	11	12	10	7	40	
Total	14	214	30	13	271	59	52	37	12	160	
Grand Total	44	498	103	35	680	132	163	68	44	407	
Apprch %	6.5	73.2	15.1	5.1		32.4	40	16.7	10.8		
Total %	2	22.2	4.6	1.6	30.3	5.9	7.3	3	2	18.2	

Cooke Street Southbound						Halekauwila Street Westbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
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											
07:45 AM	10	56	14		80	9	21	8		38	
08:00 AM	4	54	13		71	9	12	7		28	
08:15 AM	5	64	15		84	6	16	9		31	
08:30 AM	7	55	12		74	2	17	8		27	
Total Volume	26	229	54		309	26	66	32		124	
% App. Total	8.4	74.1	17.5			21	53.2	25.8			
PHF	.650	.895	.900		.920	.722	.786	.889		.816	
Grand Total	91	537	142	38	808	65	150	81	51	347	
Apprch %	11.3	66.5	17.6	4.7		18.7	43.2	23.3	14.7		
Total %	4.1	24	6.3	1.7	36	2.9	6.7	3.6	2.3	15.5	

Cooke Street Northbound						Halekauwila Street Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
07:45 AM	6	47	10		63	13	22	6		41	
08:00 AM	5	49	9		63	14	14	3		31	
08:15 AM	4	40	3		47	18	16	15		49	
08:30 AM	4	68	9		81	16	10	9		35	
Total Volume	19	204	31		254	61	62	33		156	
% App. Total	7.5	80.3	12.2			39.1	39.7	21.2			
PHF	.792	.750	.775		.784	.847	.705	.550		.796	
Grand Total	44	498	103	35	680	132	163	68	44	407	
Apprch %	6.5	73.2	15.1	5.1		32.4	40	16.7	10.8		
Total %	2	22.2	4.6	1.6	30.3	5.9	7.3	3	2	18.2	

Wilson Okamoto Corporation

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

Counted By: EV
Counters: D4-3889
Weather: CLEAR

File Name : COO HAL PM
Site Code : 00000002
Start Date : 4/3/2018
Page No : 1

Start Time	Cooke Street Southbound					Halekauwila Street Westbound					Cooke Street Northbound					Halekauwila 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					Int. Total					Int. Total					Int. Total				
03:00 PM	17	65	11	3	96	15	26	14	7	62	7	62	6	0	75	11	13	6	4	34
03:15 PM	12	68	9	12	101	6	24	10	23	63	3	70	1	1	75	18	17	7	7	49
03:30 PM	9	62	14	1	86	16	27	16	12	71	4	48	2	6	60	10	22	14	2	48
03:45 PM	11	69	9	4	93	11	15	11	3	40	1	64	7	0	72	18	32	6	2	58
Total	49	264	43	20	376	48	92	51	45	236	15	244	16	7	282	57	84	33	15	189
04:00 PM	5	66	11	7	89	13	17	10	4	44	5	63	14	4	86	14	27	10	1	52
04:15 PM	3	86	8	4	101	11	21	5	2	39	7	63	11	2	83	18	32	17	12	79
04:30 PM	6	67	14	0	87	11	14	11	5	41	5	60	13	5	83	22	59	10	1	92
04:45 PM	14	76	10	3	103	12	18	18	4	52	1	66	8	6	81	24	56	9	9	98
Total	28	295	43	14	380	47	70	44	15	176	18	252	46	17	333	78	174	46	23	321
05:00 PM	10	75	9	5	99	13	17	15	5	50	7	72	11	5	95	25	31	18	7	81
05:15 PM	11	67	13	1	92	15	19	12	5	51	4	67	13	5	89	24	39	8	14	85
05:30 PM	11	50	11	5	77	15	18	16	5	54	4	61	12	7	84	16	34	10	9	69
05:45 PM	8	51	11	5	75	6	18	10	4	38	7	48	6	3	64	17	37	11	12	77
Total	40	243	44	16	343	49	72	53	19	193	22	248	42	20	332	82	141	47	42	312
Grand Total	117	802	130	50	1099	144	234	148	79	605	55	744	104	44	947	217	399	126	80	822
Approch %	10.6	73	11.8	4.5		23.8	38.7	24.5	13.1		5.8	78.6	11	4.6		26.4	48.5	15.3	9.7	
Total %	3.4	23.1	3.7	1.4	31.6	4.1	6.7	4.3	2.3	17.4	1.6	21.4	3	1.3	27.3	6.2	11.5	3.6	2.3	23.7

Start Time	Cooke Street Southbound					Halekauwila Street Westbound					Cooke Street Northbound					Halekauwila Street Eastbound				
	Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		Left	Thru	Right	App. Total	
	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																				
04:30 PM	6	67	14	87		11	14	11	36		5	60	13	78		22	59	10	91	
04:45 PM	14	76	10	100		12	18	18	48		1	66	8	75		24	56	9	89	
05:00 PM	10	75	9	94		13	17	15	45		7	72	11	90		25	31	18	74	
05:15 PM	11	67	13	91		15	19	12	46		4	67	13	84		24	39	8	71	
Total Volume	41	285	46	372		51	68	56	175		17	265	45	327		95	185	45	325	
% App. Total	11	76.6	12.4			29.1	38.9	32			5.2	81	13.8			29.2	56.9	13.8		
PHF	.732	.938	.821	.930		.850	.895	.778	.911		.607	.920	.865	.908		.950	.784	.625	.893	

Counted By: WL
Counters: D4-5677
Weather: CLEAR

Wilson Okamoto Corporation

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

File Name : COO POH AM
Site Code : 00000003
Start Date : 4/3/2018
Page No : 1

Start Time	Cooke Street Southbound					Pohukaina Street Westbound					Cooke Street Northbound					Pohukaina 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					Int. Total					Int. Total					Int. Total				
06:00 AM	3	14	6	2	25	5	3	2	4	14	4	21	6	3	34	3	5	2	2	12
06:15 AM	8	20	6	3	37	3	7	4	5	19	0	25	6	4	35	3	5	2	3	13
06:30 AM	6	21	12	1	40	4	10	4	3	21	1	31	10	4	46	6	9	2	2	19
06:45 AM	10	21	10	3	44	5	10	9	4	28	4	34	9	4	51	6	8	2	5	21
Total	27	76	34	9	146	17	30	19	16	82	9	111	31	15	166	18	27	8	12	65
07:00 AM	10	24	24	2	60	4	23	13	4	44	4	39	6	9	58	8	7	4	3	22
07:15 AM	9	28	17	3	57	5	41	7	2	55	3	39	9	1	52	9	12	3	0	24
07:30 AM	5	33	26	2	66	9	27	11	5	52	5	36	8	5	54	16	10	3	6	35
07:45 AM	6	38	22	6	72	8	25	7	3	43	5	39	6	2	52	15	17	2	3	37
Total	30	123	89	13	255	26	116	38	14	194	17	153	29	17	216	48	46	12	12	118
08:00 AM	2	38	24	2	66	7	29	12	4	52	8	39	5	5	57	14	16	3	0	33
08:15 AM	9	38	34	2	83	6	29	4	3	42	4	32	7	0	43	7	24	5	1	37
08:30 AM	5	42	23	2	72	8	22	16	1	47	7	38	10	3	58	25	16	4	1	46
08:45 AM	8	34	21	12	75	7	15	10	5	37	0	43	8	3	54	15	22	3	5	45
Total	24	152	102	18	296	28	95	42	13	178	19	152	30	11	212	61	78	15	7	161
Grand Total	81	351	225	40	697	71	241	99	43	454	45	416	90	43	594	127	151	35	31	344
Approch %	11.6	50.4	32.3	5.7		15.6	53.1	21.8	9.5		7.6	70	15.2	7.2		36.9	43.9	10.2	9	
Total %	3.9	16.8	10.8	1.9	33.4	3.4	11.5	4.7	2.1	21.7	2.2	19.9	4.3	2.1	28.4	6.1	7.2	1.7	1.5	16.5

	Cooke Street Southbound					Pohukaina Street Westbound					Cooke Street Northbound					Pohukaina Street Eastbound				
Start Time	Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		Left	Thru	Right	App. Total	
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																				
07:45 AM	6	38	22	66		8	25	7	40		5	39	6	50		15	17	2	34	
08:00 AM	2	38	24	64		7	29	12	48		8	39	5	52		14	16	3	33	
08:15 AM	9	38	34	81		6	29	4	39		4	32	7	43		7	24	5	36	
08:30 AM	5	42	23	70		8	22	16	46		7	38	10	55		25	16	4	45	
Total Volume	22	156	103	281		29	105	39	173		24	148	28	200		61	73	14	148	
% App. Total	7.8	55.5	36.7			16.8	60.7	22.5			12	74	14			41.2	49.3	9.5		
PHF	.611	.929	.757	.867		.906	.905	.609	.901		.750	.949	.700	.909		.610	.760	.700	.822	

Beretania Street, Suite 400
Honolulu, HI 96826

File Name : COO AUA PM
Site Code : 00000004
Start Date : 4/3/2018
Page No : 1

	Cooke Street Southbound				Auahi Street Westbound				Cooke Street Northbound				Auahi Street Eastbound			
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. 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	11	56	26	93	1	4	12	17	7	22	3	32	20	5	5	30
04:30 PM	15	52	13	80	4	4	12	20	8	16	3	27	13	12	7	32
04:45 PM	13	52	18	83	3	13	18	34	7	28	10	45	26	11	6	43
05:00 PM	14	53	12	79	0	5	19	24	9	24	2	35	16	4	7	27
Total Volume	53	213	69	335	8	26	61	95	31	90	18	139	75	32	25	132
% App. Total	15.8	63.6	20.6		8.4	27.4	64.2		22.3	64.7	12.9		56.8	24.2	18.9	
PHF	.883	.951	.863	.901	.500	.500	.803	.699	.861	.804	.450	.772	.721	.667	.393	.767

Beretania Street, Suite 400
Honolulu, HI 96826

File Name : ALA COO AM
Site Code : 00000005
Start Date : 4/3/2018
Page No : 1

	Start Time	Cooke Street Southbound				Ala Moana Boulevard Westbound				Cooke Street Northbound				Ala Moana Boulevard Eastbound			
		Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total
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																	
	07:30 AM	13	0	21	34	2	448	10	460	2	3	1	6	15	426	6	447
	07:45 AM	6	10	17	33	4	416	12	432	5	4	3	12	23	458	7	488
	08:00 AM	11	4	10	25	3	455	21	479	0	6	1	7	17	453	7	477
	08:15 AM	12	7	13	32	4	325	17	346	5	6	2	13	9	450	9	468
	Total Volume	42	21	61	124	13	1644	60	1717	12	19	7	38	64	1787	29	1880
	% App. Total	33.9	16.9	49.2		0.8	95.7	3.5		31.6	50	18.4		3.4	95.1	1.5	
	PHF	.308	.525	.726	.912	.813	.903	.714	.896	.600	.792	.583	.731	.696	.975	.806	.951

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

Counted By: GH, DY
Counters: D4-5675, D4-5674
Weather: CLEAR

File Name : ALA COO PM
Site Code : 00000005
Start Date : 4/3/2018
Page No : 1

Groups Printed- Unshifted														
Cooke Street Southbound					Ala Moana Boulevard Westbound					Cooke Street Northbound				
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds
03:00 PM	3	4	34	3	44	3	417	15	0	435	5	7	7	3
03:15 PM	5	6	34	5	50	1	394	15	7	417	7	10	1	7
03:30 PM	9	1	40	5	55	1	340	12	5	358	13	7	2	9
03:45 PM	8	7	34	7	56	2	358	18	2	380	10	5	6	6
Total	25	18	142	20	205	7	1509	60	14	1590	35	29	16	25
04:00 PM	17	2	22	3	44	0	319	8	3	330	5	9	2	5
04:15 PM	13	12	39	2	66	0	431	12	3	446	8	9	5	2
04:30 PM	14	3	44	9	70	1	358	11	2	372	6	7	4	8
04:45 PM	13	6	39	3	61	2	381	19	3	405	2	9	4	8
Total	57	23	144	17	241	3	1489	50	11	1553	21	34	15	23
05:00 PM	12	7	40	14	73	0	315	20	2	337	5	9	1	8
05:15 PM	15	6	34	7	62	2	379	12	1	394	5	15	4	13
05:30 PM	11	3	26	10	50	0	334	17	5	356	6	9	3	11
05:45 PM	12	6	24	8	50	1	273	17	2	293	4	7	2	9
Total	50	22	124	39	235	3	1301	66	10	1380	20	40	10	41
Grand Total	132	63	410	76	681	13	4299	176	35	4523	76	103	41	89
Apprch %	19.4	9.3	60.2	11.2		0.3	95	3.9	0.8		24.6	33.3	13.3	28.8
Total %	1.1	0.5	3.5	0.7	5.9	0.1	37	1.5	0.3	38.9	0.7	0.9	0.4	0.8

Groups Printed- Unshifted														
Cooke Street Southbound					Ala Moana Boulevard Westbound					Cooke Street Northbound				
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds
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														
04:00 PM	17	2	22	22	41	0	319	8	327	5	9	2	16	3
04:15 PM	13	12	39	39	64	0	431	12	443	8	9	5	22	3
04:30 PM	14	3	44	44	61	1	358	11	370	6	7	4	17	2
04:45 PM	13	6	39	39	58	2	381	19	402	2	9	4	15	2
Total Volume	57	23	144	144	224	3	1489	50	1542	21	34	15	70	10
% App. Total	25.4	10.3	64.3	64.3		0.2	96.6	3.2		30	48.6	21.4		0.5
PHF	.838	.479	.818		.875	.375	.864	.658	.870	.656	.944	.750	.795	.833
													.946	.907

Wilson Okamoto Corporation

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

Counted By: SH
Counters: D4-5675
Weather: CLEAR

File Name : KAM HAL AM
Site Code : 00000001
Start Date : 8/14/2018
Page No : 1

Groups Printed- Unshifted														
Kamakee St Southbound					Kamakee St Northbound					Halekauwila St Eastbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total	
07:30 AM	55	11	2	68	4	28	1	33	3	4	10	17	118	
07:45 AM	50	15	5	70	12	35	2	49	5	17	15	37	156	
Total	105	26	7	138	16	63	3	82	8	21	25	54	274	
08:00 AM	52	16	3	71	7	35	4	46	6	7	6	19	136	
08:15 AM	49	9	7	65	4	36	3	43	9	17	5	31	139	
Grand Total	206	51	17	274	27	134	10	171	23	45	36	104	549	
Apprch %	75.2	18.6	6.2		15.8	78.4	5.8		22.1	43.3	34.6			
Total %	37.5	9.3	3.1	49.9	4.9	24.4	1.8	31.1	4.2	8.2	6.6	18.9		

Groups Printed- Unshifted														
Kamakee St Southbound					Kamakee St Northbound					Halekauwila St Eastbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total	
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 07:30 AM														
07:30 AM	55	11	11	66	4	28	4	32	3	4	7	7	105	
07:45 AM	50	15	15	65	12	35	3	47	5	17	5	22	134	
08:00 AM	52	16	16	68	7	35	3	42	6	7	13	26	123	
08:15 AM	49	9	9	58	4	36	3	40	9	17	26	124		
Total Volume	206	51	51	257	27	134	134	161	23	45	68	68	486	
% App. Total	80.2	19.8	19.8		16.8	83.2	83.2		33.8	66.2				
PHF	.936		.797	.945	.563	.931	.856	.856	.639	.662	.654		.907	

Counted by:CA
Counters:D4-5675
Weather:CLEAR

File Name : KAM HAL PM
Site Code : 00000001
Start Date : 8/14/2018
Page No : 1

Groups Printed- Unshifted													
Kamakee St Southbound				Kamakee St Northbound				Halekauwila St Eastbound					
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
04:30 PM	89	19	20	128	18	50	8	76	17	12	45	74	278
04:45 PM	75	18	5	98	6	52	4	62	10	16	80	106	266
Total	164	37	25	226	24	102	12	138	27	28	125	180	544
05:00 PM	87	20	20	127	16	49	7	72	15	13	60	88	287
05:15 PM	81	17	11	109	11	55	22	88	19	17	45	81	278
Grand Total	332	74	56	462	51	206	41	298	61	58	230	349	1109
Apprch %	71.9	16	12.1		17.1	69.1	13.8		17.5	16.6	65.9		
Total %	29.9	6.7	5	41.7	4.6	18.6	3.7	26.9	5.5	5.2	20.7	31.5	

Kamakee St Southbound				Kamakee St Northbound				Halekauwila St Eastbound					
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:30 PM													
04:30 PM	89	19	19	108	18	50		68	17	12		29	205
04:45 PM	75	18	18	93	6	52		58	10	16		26	177
05:00 PM	87	20	20	107	16	49		65	15	13		28	200
05:15 PM	81	17	17	98	11	55		66	19	17		36	200
Total Volume	332	74	74	406	51	206		257	61	58		119	782
% App. Total	81.8	18.2			19.8	80.2			51.3	48.7			
PHF	.933	.925		.940	.708	.936		.945	.803	.853		.826	.954

APPENDIX B

LEVEL OF SERVICE DEFINITIONS

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

APPENDIX C

CAPACITY ANALYSIS CALCULATIONS
BASELINE PEAK PERIOD TRAFFIC ANALYSIS

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

04/01/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	183	65	88	372	90	58	456	84	70	716	247
Future Volume (vph)	54	183	65	88	372	90	58	456	84	70	716	247
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	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.98	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.97		1.00	0.98		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)	1761	1769		1731	1800		1770	3420		1770	3354	
Flt Permitted	0.23	1.00		0.52	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	434	1769		948	1800		1770	3420		1770	3354	
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)	57	193	68	93	392	95	61	480	88	74	754	260
RTOR Reduction (vph)	0	14	0	0	10	0	0	16	0	0	38	0
Lane Group Flow (vph)	57	247	0	93	477	0	61	552	0	74	976	0
Confl. Peds. (#/hr)	15		42	42		15		40				30
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	25.3	25.3		25.3	25.3		4.3	27.7		6.1	29.5	
Effective Green, g (s)	25.3	25.3		25.3	25.3		4.3	27.7		6.1	29.5	
Actuated g/C Ratio	0.34	0.34		0.34	0.34		0.06	0.37		0.08	0.40	
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)	148	603		323	614		102	1278		145	1335	
v/s Ratio Prot		0.14			c0.27		0.03	0.16		c0.04	c0.29	
v/s Ratio Perm	0.13			0.10								
v/c Ratio	0.39	0.41		0.29	0.78		0.60	0.43		0.51	0.73	
Uniform Delay, d1	18.5	18.7		17.8	21.9		34.1	17.3		32.6	18.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.7	0.5		0.5	6.1		9.1	0.2		3.0	2.1	
Delay (s)	20.2	19.1		18.3	28.0		43.2	17.6		35.6	21.0	
Level of Service	C	B		B	C		D	B		D	C	
Approach Delay (s)		19.3			26.5			20.0			22.0	
Approach LOS		B			C			C			C	
Intersection Summary												
HCM 2000 Control Delay		22.2			HCM 2000 Level of Service			C				
HCM 2000 Volume to Capacity ratio		0.75										
Actuated Cycle Length (s)		74.1			Sum of lost time (s)			15.0				
Intersection Capacity Utilization		77.1%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

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

04/01/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	483	113	92	453	86	79	691	149	142	700	139
Future Volume (vph)	107	483	113	92	453	86	79	691	149	142	700	139
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	0.99		1.00	1.00		1.00	0.98		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.98		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)	1761	1799		1761	1810		1770	3380		1770	3399	
Flt Permitted	0.20	1.00		0.14	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	364	1799		255	1810		1770	3380		1770	3399	
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)	113	508	119	97	477	91	83	727	157	149	737	146
RTOR Reduction (vph)	0	10	0	0	8	0	0	21	0	0	18	0
Lane Group Flow (vph)	113	617	0	97	560	0	83	863	0	149	865	0
Confl. Peds. (#/hr)	18		21	21		18			55			52
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	33.6	33.6		33.6	33.6		5.3	28.9		8.1	31.7	
Effective Green, g (s)	33.6	33.6		33.6	33.6		5.3	28.9		8.1	31.7	
Actuated g/C Ratio	0.39	0.39		0.39	0.39		0.06	0.34		0.09	0.37	
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	706		100	710		109	1141		167	1258	
v/s Ratio Prot		0.34			0.31		0.05	c0.26		c0.08	c0.25	
v/s Ratio Perm	0.31			c0.38								
v/c Ratio	0.80	0.87		0.97	0.79		0.76	0.76		0.89	0.69	
Uniform Delay, d1	23.0	24.0		25.5	22.9		39.5	25.2		38.3	22.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	25.7	11.6		79.3	5.8		26.4	2.9		40.2	1.6	
Delay (s)	48.7	35.7		104.8	28.7		65.9	28.1		78.5	24.4	
Level of Service	D	D		F	C		E	C		E	C	
Approach Delay (s)		37.7			39.8			31.4			32.2	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay		34.6			HCM 2000 Level of Service			C				
HCM 2000 Volume to Capacity ratio		0.87										
Actuated Cycle Length (s)		85.6			Sum of lost time (s)			15.0				
Intersection Capacity Utilization		86.9%			ICU Level of Service			E				
Analysis Period (min)		15										
c Critical Lane Group												

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

04/01/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	235	38	133	331	25	19	98	66	22	163	78
Future Volume (vph)	43	235	38	133	331	25	19	98	66	22	163	78
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		0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes		0.99		1.00	1.00			0.99			0.98	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		0.98		1.00	0.99			0.95			0.96	
Flt Protected		0.99		0.95	1.00			0.99			1.00	
Satd. Flow (prot)		3425		1770	3497			3300			3307	
Flt Permitted		0.85		0.95	1.00			0.91			0.92	
Satd. Flow (perm)		2948		1770	3497			3013			3061	
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)	45	245	40	139	345	26	20	102	69	23	170	81
RTOR Reduction (vph)	0	10	0	0	6	0	0	47	0	0	37	0
Lane Group Flow (vph)	0	320	0	139	365	0	0	144	0	0	237	0
Confl. Peds. (#/hr)	12		64			12	73		5	5		73
Turn Type	Perm	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2						8			4		
Actuated Green, G (s)		14.0		8.2	27.2			17.1			17.1	
Effective Green, g (s)		14.0		8.2	27.2			17.1			17.1	
Actuated g/C Ratio		0.26		0.15	0.50			0.31			0.31	
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)		760		267	1751			948			963	
v/s Ratio Prot				c0.08	0.10							
v/s Ratio Perm		c0.11						0.05			c0.08	
v/c Ratio		0.42		0.52	0.21			0.15			0.25	
Uniform Delay, d1		16.8		21.2	7.6			13.4			13.8	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.4		1.8	0.1			0.1			0.1	
Delay (s)		17.2		23.1	7.6			13.5			13.9	
Level of Service		B		C	A			B			B	
Approach Delay (s)		17.2			11.8			13.5			13.9	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			13.9			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.37									
Actuated Cycle Length (s)			54.3			Sum of lost time (s)			15.0			
Intersection Capacity Utilization			69.5%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

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

04/01/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	500	68	216	515	39	23	115	72	65	121	37
Future Volume (vph)	65	500	68	216	515	39	23	115	72	65	121	37
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		0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes		0.98		1.00	1.00			0.99			0.95	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		0.98		1.00	0.99			0.95			0.97	
Flt Protected		0.99		0.95	1.00			0.99			0.99	
Satd. Flow (prot)		3401		1770	3494			3241			3227	
Flt Permitted		0.83		0.95	1.00			0.90			0.79	
Satd. Flow (perm)		2839		1770	3494			2934			2601	
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)	68	521	71	225	536	41	24	120	75	68	126	39
RTOR Reduction (vph)	0	9	0	0	6	0	0	54	0	0	13	0
Lane Group Flow (vph)	0	651	0	225	571	0	0	165	0	0	220	0
Confl. Peds. (#/hr)	15		117			15	127		8	8		127
Turn Type	Perm	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2						8			4		
Actuated Green, G (s)		25.0		15.1	45.1			14.8			14.8	
Effective Green, g (s)		25.0		15.1	45.1			14.8			14.8	
Actuated g/C Ratio		0.36		0.22	0.65			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)		1015		382	2254			621			550	
v/s Ratio Prot				c0.13	0.16							
v/s Ratio Perm		c0.23						0.06			c0.08	
v/c Ratio		0.64		0.59	0.25			0.27			0.40	
Uniform Delay, d1		18.7		24.6	5.3			23.0			23.7	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		1.4		2.3	0.1			0.2			0.5	
Delay (s)		20.1		26.9	5.3			23.2			24.2	
Level of Service		C		C	A			C			C	
Approach Delay (s)		20.1			11.4			23.2			24.2	
Approach LOS		C			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			17.3			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			69.9			Sum of lost time (s)			15.0			
Intersection Capacity Utilization			72.1%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

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

04/01/2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↘		↙	↑↑	↘↙	
Traffic Volume (veh/h)	313	16	99	405	32	101
Future Volume (Veh/h)	313	16	99	405	32	101
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)	348	18	110	450	36	112
Pedestrians					8	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					1	
Right turn flare (veh)						
Median type	TW	LT		None		
Median storage veh)	2					
Upstream signal (ft)	564			680		
pX, platoon unblocked						
vC, conflicting volume			374		810	191
vC1, stage 1 conf vol					365	
vC2, stage 2 conf vol					445	
vCu, unblocked vol			374		810	191
tC, single (s)			*3.1		*5.8	*5.9
tC, 2 stage (s)					4.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			92		94	87
cM capacity (veh/h)			1307		561	859
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	232	134	110	225	225	148
Volume Left	0	0	110	0	0	36
Volume Right	0	18	0	0	0	112
cSH	1700	1700	1307	1700	1700	761
Volume to Capacity	0.14	0.08	0.08	0.13	0.13	0.19
Queue Length 95th (ft)	0	0	7	0	0	18
Control Delay (s)	0.0	0.0	8.0	0.0	0.0	10.9
Lane LOS			A			B
Approach Delay (s)	0.0		1.6			10.9
Approach LOS						B
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			33.6%		ICU Level of Service	A
Analysis Period (min)			15			
* User Entered Value						

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

04/01/2020

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↱		↱	↑↑	↱↱	
Traffic Volume (veh/h)	701	52	123	748	47	236
Future Volume (Veh/h)	701	52	123	748	47	236
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)	738	55	129	787	49	248
Pedestrians					27	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					2	
Right turn flare (veh)						
Median type	TW	LT		None		
Median storage veh)	2					
Upstream signal (ft)	564			687		
pX, platoon unblocked			0.92		0.92	0.92
vC, conflicting volume			820		1444	424
vC1, stage 1 conf vol					792	
vC2, stage 2 conf vol					652	
vCu, unblocked vol			621		1302	189
tC, single (s)			*3.1		*5.8	*5.9
tC, 2 stage (s)					4.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			87		88	68
cM capacity (veh/h)			1024		399	777
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	492	301	129	394	394	297
Volume Left	0	0	129	0	0	49
Volume Right	0	55	0	0	0	248
cSH	1700	1700	1024	1700	1700	672
Volume to Capacity	0.29	0.18	0.13	0.23	0.23	0.44
Queue Length 95th (ft)	0	0	11	0	0	57
Control Delay (s)	0.0	0.0	9.0	0.0	0.0	14.5
Lane LOS			A			B
Approach Delay (s)	0.0		1.3			14.5
Approach LOS						B
Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization			55.2%		ICU Level of Service	B
Analysis Period (min)			15			
* User Entered Value						

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

04/01/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	131	4	21	0	0	0	39	440	3	6	589	233
Future Volume (vph)	131	4	21	0	0	0	39	440	3	6	589	233
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	0.95		1.00	0.95	
Frpb, ped/bikes		0.99					1.00	1.00		1.00	0.96	
Flpb, ped/bikes		1.00					0.97	1.00		1.00	1.00	
Frt		0.98					1.00	1.00		1.00	0.96	
Flt Protected		0.96					0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1741					1714	3536		1770	3263	
Flt Permitted		0.96					0.28	1.00		0.49	1.00	
Satd. Flow (perm)		1741					508	3536		910	3263	
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)	135	4	22	0	0	0	40	454	3	6	607	240
RTOR Reduction (vph)	0	7	0	0	0	0	0	1	0	0	51	0
Lane Group Flow (vph)	0	154	0	0	0	0	40	456	0	6	796	0
Confl. Peds. (#/hr)			78					85				85
Turn Type	Perm	NA					Perm	NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4						2			6		
Actuated Green, G (s)		17.4					25.9	25.9		25.9	25.9	
Effective Green, g (s)		17.4					25.9	25.9		25.9	25.9	
Actuated g/C Ratio		0.33					0.49	0.49		0.49	0.49	
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)		568					246	1718		442	1585	
v/s Ratio Prot								0.13			c0.24	
v/s Ratio Perm		0.09					0.08			0.01		
v/c Ratio		0.27					0.16	0.27		0.01	0.50	
Uniform Delay, d1		13.3					7.6	8.1		7.1	9.3	
Progression Factor		1.00					1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3					0.3	0.1		0.0	0.3	
Delay (s)		13.5					8.0	8.2		7.1	9.6	
Level of Service		B					A	A		A	A	
Approach Delay (s)		13.5			0.0			8.2			9.5	
Approach LOS		B			A			A			A	
Intersection Summary												
HCM 2000 Control Delay		9.5										
HCM 2000 Volume to Capacity ratio		0.41										
Actuated Cycle Length (s)		53.3								10.0		
Intersection Capacity Utilization		61.5%										
Analysis Period (min)		15										
c Critical Lane Group												

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

04/01/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	298	14	95	0	0	0	39	560	3	18	683	129
Future Volume (vph)	298	14	95	0	0	0	39	560	3	18	683	129
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	0.95		1.00	0.95	
Frpb, ped/bikes		0.97					1.00	1.00		1.00	0.88	
Flpb, ped/bikes		1.00					0.98	1.00		1.00	1.00	
Frt		0.97					1.00	1.00		1.00	0.98	
Flt Protected		0.96					0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1694					1730	3536		1770	3024	
Flt Permitted		0.96					0.25	1.00		0.39	1.00	
Satd. Flow (perm)		1694					449	3536		731	3024	
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)	310	15	99	0	0	0	41	583	3	19	711	134
RTOR Reduction (vph)	0	0	0	0	0	0	0	1	0	0	19	0
Lane Group Flow (vph)	0	424	0	0	0	0	41	585	0	19	826	0
Confl. Peds. (#/hr)			155					59				1300
Turn Type	Perm	NA					Perm	NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4						2			6		
Actuated Green, G (s)		24.6					24.2	24.2		24.2	24.2	
Effective Green, g (s)		24.6					24.2	24.2		24.2	24.2	
Actuated g/C Ratio		0.42					0.41	0.41		0.41	0.41	
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)		708					184	1455		300	1244	
v/s Ratio Prot								0.17			c0.27	
v/s Ratio Perm		0.25					0.09			0.03		
v/c Ratio		0.60					0.22	0.40		0.06	0.66	
Uniform Delay, d1		13.3					11.2	12.2		10.5	14.0	
Progression Factor		1.00					1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.4					0.6	0.2		0.1	1.3	
Delay (s)		14.6					11.8	12.4		10.5	15.4	
Level of Service		B					B	B		B	B	
Approach Delay (s)		14.6			0.0			12.3			15.3	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM 2000 Control Delay		14.2										
HCM 2000 Volume to Capacity ratio		0.63										
Actuated Cycle Length (s)		58.8								10.0		
Intersection Capacity Utilization		65.5%										
Analysis Period (min)		15										
c Critical Lane Group												

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

04/01/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	39	39	83	90	104	64	313	43	65	424	47
Future Volume (vph)	18	39	39	83	90	104	64	313	43	65	424	47
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		0.95	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.98	1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00		0.99	1.00	
Frt		1.00	0.85	1.00	0.92		1.00	0.98		1.00	0.99	
Flt Protected		0.98	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3478	1559	1764	1696		1762	3465		1757	3476	
Flt Permitted		0.86	1.00	0.72	1.00		0.47	1.00		0.53	1.00	
Satd. Flow (perm)		3044	1559	1329	1696		877	3465		982	3476	
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)	19	41	41	86	94	108	67	326	45	68	442	49
RTOR Reduction (vph)	0	0	28	0	56	0	0	12	0	0	9	0
Lane Group Flow (vph)	0	60	13	86	146	0	67	359	0	68	482	0
Confl. Peds. (#/hr)	14		7	7		14	10		23	23		10
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		14.9	14.9	14.9	14.9		22.7	22.7		22.7	22.7	
Effective Green, g (s)		14.9	14.9	14.9	14.9		22.7	22.7		22.7	22.7	
Actuated g/C Ratio		0.31	0.31	0.31	0.31		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)		952	488	416	530		418	1652		468	1657	
v/s Ratio Prot					c0.09			0.10			c0.14	
v/s Ratio Perm		0.02	0.01	0.06			0.08			0.07		
v/c Ratio		0.06	0.03	0.21	0.28		0.16	0.22		0.15	0.29	
Uniform Delay, d1		11.5	11.3	12.0	12.3		7.1	7.3		7.0	7.6	
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.0	0.0	0.2	0.3		0.2	0.1		0.1	0.1	
Delay (s)		11.5	11.3	12.3	12.6		7.2	7.3		7.1	7.7	
Level of Service		B	B	B	B		A	A		A	A	
Approach Delay (s)		11.4			12.5			7.3			7.6	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			8.8			HCM 2000 Level of Service				A		
HCM 2000 Volume to Capacity ratio			0.28									
Actuated Cycle Length (s)			47.6			Sum of lost time (s)				10.0		
Intersection Capacity Utilization			53.3%			ICU Level of Service				A		
Analysis Period (min)			15									
c Critical Lane Group												

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

04/01/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	96	58	209	75	237	60	339	75	137	398	65
Future Volume (vph)	34	96	58	209	75	237	60	339	75	137	398	65
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		0.95	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.98	1.00	0.92		1.00	0.98		1.00	0.99	
Flpb, ped/bikes		0.98	1.00	0.99	1.00		0.99	1.00		0.96	1.00	
Frt		1.00	0.85	1.00	0.89		1.00	0.97		1.00	0.98	
Flt Protected		0.99	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3441	1545	1752	1514		1749	3385		1692	3444	
Flt Permitted		0.84	1.00	0.66	1.00		0.44	1.00		0.48	1.00	
Satd. Flow (perm)		2922	1545	1221	1514		818	3385		860	3444	
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)	37	105	64	230	82	260	66	373	82	151	437	71
RTOR Reduction (vph)	0	0	37	0	104	0	0	23	0	0	16	0
Lane Group Flow (vph)	0	142	27	230	238	0	66	432	0	151	492	0
Confl. Peds. (#/hr)	170		21	21		170	23		134	134		23
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		24.6	24.6	24.6	24.6		23.4	23.4		23.4	23.4	
Effective Green, g (s)		24.6	24.6	24.6	24.6		23.4	23.4		23.4	23.4	
Actuated g/C Ratio		0.42	0.42	0.42	0.42		0.40	0.40		0.40	0.40	
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)		1239	655	517	642		330	1365		346	1389	
v/s Ratio Prot					0.16			0.13			0.14	
v/s Ratio Perm		0.05	0.02	c0.19			0.08			c0.18		
v/c Ratio		0.11	0.04	0.44	0.37		0.20	0.32		0.44	0.35	
Uniform Delay, d1		10.1	9.8	11.9	11.4		11.2	11.8		12.5	12.0	
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.0	0.0	0.6	0.4		0.3	0.1		0.9	0.2	
Delay (s)		10.1	9.8	12.5	11.8		11.5	12.0		13.4	12.2	
Level of Service		B	A	B	B		B	B		B	B	
Approach Delay (s)		10.0			12.1			11.9			12.5	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			11.9			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			58.0			Sum of lost time (s)				10.0		
Intersection Capacity Utilization			71.9%			ICU Level of Service				C		
Analysis Period (min)			15									
c Critical Lane Group												

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

04/01/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	98	51	12	65	42	32	134	30	23	218	105
Future Volume (vph)	34	98	51	12	65	42	32	134	30	23	218	105
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	0.95		1.00	0.95		1.00	0.95		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	1.00		1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.97	1.00		0.99	1.00	1.00
Frt	1.00	0.95		1.00	0.94		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3302		1770	3294		1723	3427		1750	1863	1509
Flt Permitted	0.95	1.00		0.95	1.00		0.62	1.00		0.64	1.00	1.00
Satd. Flow (perm)	1770	3302		1770	3294		1119	3427		1186	1863	1509
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)	35	102	53	12	68	44	33	140	31	24	227	109
RTOR Reduction (vph)	0	38	0	0	33	0	0	18	0	0	0	64
Lane Group Flow (vph)	35	117	0	13	79	0	33	153	0	24	227	45
Confl. Peds. (#/hr)			51			36	63		25	25		63
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		4
Actuated Green, G (s)	1.9	14.6		0.6	13.3		21.1	21.1		21.1	21.1	21.1
Effective Green, g (s)	1.9	14.6		0.6	13.3		21.1	21.1		21.1	21.1	21.1
Actuated g/C Ratio	0.04	0.28		0.01	0.26		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	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)	65	939		20	854		460	1409		487	766	620
v/s Ratio Prot	c0.02	c0.04		0.01	0.02			0.04			c0.12	
v/s Ratio Perm							0.03			0.02		0.03
v/c Ratio	0.54	0.12		0.65	0.09		0.07	0.11		0.05	0.30	0.07
Uniform Delay, d1	24.3	13.6		25.2	14.4		9.2	9.3		9.1	10.1	9.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	8.3	0.1		56.6	0.0		0.1	0.0		0.0	0.2	0.0
Delay (s)	32.6	13.7		81.8	14.5		9.2	9.3		9.1	10.3	9.2
Level of Service	C	B		F	B		A	A		A	B	A
Approach Delay (s)		17.2			21.5			9.3			9.9	
Approach LOS		B			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		13.0			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.25										
Actuated Cycle Length (s)		51.3			Sum of lost time (s)			15.0				
Intersection Capacity Utilization		58.1%			ICU Level of Service			B				
Analysis Period (min)		15										
c Critical Lane Group												

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

04/01/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	228	62	34	147	36	67	149	44	54	210	95
Future Volume (vph)	66	228	62	34	147	36	67	149	44	54	210	95
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	0.95		1.00	0.95		1.00	0.95		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97		1.00	0.97		1.00	0.98		1.00	1.00	0.86
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.92	1.00		0.92	1.00	1.00
Frt	1.00	0.97		1.00	0.97		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3309		1770	3337		1631	3333		1636	1863	1363
Flt Permitted	0.95	1.00		0.95	1.00		0.57	1.00		0.63	1.00	1.00
Satd. Flow (perm)	1770	3309		1770	3337		986	3333		1081	1863	1363
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)	67	233	63	35	150	37	68	152	45	55	214	97
RTOR Reduction (vph)	0	28	0	0	22	0	0	31	0	0	0	69
Lane Group Flow (vph)	67	268	0	35	165	0	68	166	0	55	214	28
Confl. Peds. (#/hr)			153			218	120		114	114		143
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		4
Actuated Green, G (s)	6.2	30.3		3.9	28.0		20.4	20.4		20.4	20.4	20.4
Effective Green, g (s)	6.2	30.3		3.9	28.0		20.4	20.4		20.4	20.4	20.4
Actuated g/C Ratio	0.09	0.44		0.06	0.40		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
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)	157	1440		99	1342		289	976		316	546	399
v/s Ratio Prot	c0.04	c0.08		0.02	0.05			0.05			c0.11	
v/s Ratio Perm							0.07			0.05		0.02
v/c Ratio	0.43	0.19		0.35	0.12		0.24	0.17		0.17	0.39	0.07
Uniform Delay, d1	30.0	12.1		31.6	13.1		18.7	18.3		18.3	19.6	17.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.9	0.1		2.2	0.0		0.4	0.1		0.3	0.5	0.1
Delay (s)	31.9	12.1		33.8	13.1		19.1	18.4		18.6	20.1	17.8
Level of Service	C	B		C	B		B	B		B	C	B
Approach Delay (s)		15.8			16.4			18.6			19.3	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay		17.6			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.30										
Actuated Cycle Length (s)		69.6			Sum of lost time (s)			15.0				
Intersection Capacity Utilization		71.7%			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

04/01/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	4	24	0	0	0	79	75	8	5	40	59
Future Volume (vph)	52	4	24	0	0	0	79	75	8	5	40	59
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	
Frpb, ped/bikes		1.00	0.98				1.00	1.00			0.97	
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)		1726	1546				1770	1829			1654	
Flt Permitted		0.96	1.00				0.95	1.00			0.99	
Satd. Flow (perm)		1726	1546				1770	1829			1643	
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)	55	4	25	0	0	0	83	79	8	5	42	62
RTOR Reduction (vph)	0	0	21	0	0	0	0	3	0	0	37	0
Lane Group Flow (vph)	0	59	4	0	0	0	83	84	0	0	72	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)		8.5	8.5				6.3	31.9			20.6	
Effective Green, g (s)		8.5	8.5				6.3	31.9			20.6	
Actuated g/C Ratio		0.17	0.17				0.12	0.63			0.41	
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)		291	260				221	1157			671	
v/s Ratio Prot							c0.05	0.05				
v/s Ratio Perm		0.03	0.00								c0.04	
v/c Ratio		0.20	0.02				0.38	0.07			0.11	
Uniform Delay, d1		18.0	17.5				20.2	3.6			9.2	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		0.3	0.0				1.1	0.0			0.1	
Delay (s)		18.4	17.5				21.3	3.6			9.3	
Level of Service		B	B				C	A			A	
Approach Delay (s)		18.1			0.0			12.2			9.3	
Approach LOS		B			A			B			A	
Intersection Summary												
HCM 2000 Control Delay		12.7					HCM 2000 Level of Service		B			
HCM 2000 Volume to Capacity ratio		0.18										
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

04/01/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	143	6	128	0	0	0	106	112	11	3	93	87
Future Volume (vph)	143	6	128	0	0	0	106	112	11	3	93	87
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	
Frpb, ped/bikes		1.00	0.95				1.00	0.99			0.94	
Flpb, ped/bikes		0.88	1.00				1.00	1.00			1.00	
Frt		1.00	0.85				1.00	0.99			0.94	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1570	1496				1770	1816			1640	
Flt Permitted		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (perm)		1570	1496				1770	1816			1636	
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)	144	6	129	0	0	0	107	113	11	3	94	88
RTOR Reduction (vph)	0	0	97	0	0	0	0	4	0	0	35	0
Lane Group Flow (vph)	0	150	32	0	0	0	107	120	0	0	150	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)		13.5	13.5				7.1	31.2			19.1	
Effective Green, g (s)		13.5	13.5				7.1	31.2			19.1	
Actuated g/C Ratio		0.25	0.25				0.13	0.57			0.35	
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)		387	369				229	1035			571	
v/s Ratio Prot							c0.06	0.07				
v/s Ratio Perm		0.10	0.02								c0.09	
v/c Ratio		0.39	0.09				0.47	0.12			0.26	
Uniform Delay, d1		17.2	15.9				22.0	5.4			12.8	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		0.6	0.1				1.5	0.1			0.2	
Delay (s)		17.8	16.0				23.6	5.5			13.0	
Level of Service		B	B				C	A			B	
Approach Delay (s)		16.9			0.0			13.8			13.0	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM 2000 Control Delay		14.9					HCM 2000 Level of Service		B			
HCM 2000 Volume to Capacity ratio		0.34										
Actuated Cycle Length (s)		54.7					Sum of lost time (s)		15.0			
Intersection Capacity Utilization		56.8%					ICU Level of Service		B			
Analysis Period (min)		15										
c Critical Lane Group												

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

04/01/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	245	1622	12	96	1721	181	2	40	43	178	114	194
Future Volume (vph)	245	1622	12	96	1721	181	2	40	43	178	114	194
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	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97		1.00	0.98	1.00	0.98	
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	1.00	
Satd. Flow (prot)	1770	5078		1770	5085	1530		3531	1544	1610	3025	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	5078		1770	5085	1530		3531	1544	1610	3025	
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)	258	1707	13	101	1812	191	2	42	45	187	120	204
RTOR Reduction (vph)	0	1	0	0	0	81	0	0	0	0	167	0
Lane Group Flow (vph)	258	1719	0	101	1812	110	0	44	45	168	176	0
Confl. Peds. (#/hr)			13			14			11			13
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)	18.8	58.4		9.4	49.0	49.0		25.8	25.8	25.2	25.2	
Effective Green, g (s)	18.8	58.4		9.4	49.0	49.0		25.8	25.8	25.2	25.2	
Actuated g/C Ratio	0.14	0.42		0.07	0.35	0.35		0.19	0.19	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)	239	2136		119	1795	540		656	286	292	549	
v/s Ratio Prot	c0.15	0.34		0.06	c0.36			0.01		c0.10	0.06	
v/s Ratio Perm					0.07				c0.03			
v/c Ratio	1.08	0.80		0.85	1.01	0.20		0.07	0.16	0.58	0.32	
Uniform Delay, d1	60.0	35.2		64.0	44.9	31.3		46.6	47.4	51.9	49.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	81.0	2.3		39.8	23.6	0.2		0.0	0.3	2.7	0.3	
Delay (s)	141.0	37.5		103.8	68.5	31.5		46.6	47.6	54.6	49.7	
Level of Service	F	D		F	E	C		D	D	D	D	
Approach Delay (s)		51.0			66.8			47.1			51.3	
Approach LOS		D			E			D			D	
Intersection Summary												
HCM 2000 Control Delay		58.1			HCM 2000 Level of Service			E				
HCM 2000 Volume to Capacity ratio		0.74										
Actuated Cycle Length (s)		138.8			Sum of lost time (s)			20.0				
Intersection Capacity Utilization		77.7%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

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

04/01/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	208	1975	2	51	1390	227	6	107	158	276	68	264
Future Volume (vph)	208	1975	2	51	1390	227	6	107	158	276	68	264
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	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.93		1.00	0.94	1.00	0.97	
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	5084		1770	5085	1466		3530	1493	1610	2943	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	0.99	
Satd. Flow (perm)	1770	5084		1770	5085	1466		3530	1493	1610	2943	
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)	219	2079	2	54	1463	239	6	113	166	291	72	278
RTOR Reduction (vph)	0	0	0	0	0	122	0	0	0	0	230	0
Lane Group Flow (vph)	219	2081	0	54	1463	117	0	119	166	224	187	0
Confl. Peds. (#/hr)			41			35			34			19
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)	22.3	69.1		6.0	52.8	52.8		35.0	35.0	27.4	27.4	
Effective Green, g (s)	22.3	69.1		6.0	52.8	52.8		35.0	35.0	27.4	27.4	
Actuated g/C Ratio	0.14	0.44		0.04	0.34	0.34		0.22	0.22	0.17	0.17	
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)	250	2230		67	1704	491		784	331	280	511	
v/s Ratio Prot	c0.12	c0.41		0.03	0.29			0.03		c0.14	0.06	
v/s Ratio Perm					0.08				c0.11			
v/c Ratio	0.88	0.93		0.81	0.86	0.24		0.15	0.50	0.80	0.37	
Uniform Delay, d1	66.2	42.0		75.2	48.9	37.8		49.3	53.6	62.4	57.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	27.1	7.9		48.7	4.5	0.3		0.1	1.2	15.0	0.4	
Delay (s)	93.4	49.9		123.9	53.4	38.1		49.4	54.8	77.4	57.8	
Level of Service	F	D		F	D	D		D	D	E	E	
Approach Delay (s)		54.1			53.5			52.5			64.7	
Approach LOS		D			D			D			E	
Intersection Summary												
HCM 2000 Control Delay		55.1			HCM 2000 Level of Service			E				
HCM 2000 Volume to Capacity ratio		0.81										
Actuated Cycle Length (s)		157.5			Sum of lost time (s)			20.0				
Intersection Capacity Utilization		93.3%			ICU Level of Service			F				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

43: Ala Moana Park Dr/Kamakee St & Ala Moana Blvd

04/01/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	1558	90	13	1849	103	88	22	14	121	29	109
Future Volume (vph)	84	1558	90	13	1849	103	88	22	14	121	29	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	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	0.97			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	0.99		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	5028		1770	5029		1770	1707			1702	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.55	1.00			0.74	1.00
Satd. Flow (perm)	1770	5028		1770	5029		1026	1707			1314	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)	87	1606	93	13	1906	106	91	23	14	125	30	112
RTOR Reduction (vph)	0	4	0	0	4	0	0	11	0	0	0	88
Lane Group Flow (vph)	87	1695	0	13	2008	0	91	26	0	0	155	24
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)	11.9	84.5		1.8	74.4		27.7	27.7			27.7	27.7
Effective Green, g (s)	11.9	84.5		1.8	74.4		27.7	27.7			27.7	27.7
Actuated g/C Ratio	0.09	0.66		0.01	0.58		0.21	0.21			0.21	0.21
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)	163	3293		24	2900		220	366			282	339
v/s Ratio Prot	c0.05	0.34		0.01	c0.40			0.02				
v/s Ratio Perm							0.09			c0.12		0.02
v/c Ratio	0.53	0.51		0.54	0.69		0.41	0.07			0.55	0.07
Uniform Delay, d1	55.9	11.6		63.2	19.2		43.7	40.4			45.1	40.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	3.3	0.1		22.7	0.7		1.3	0.1			2.2	0.1
Delay (s)	59.2	11.7		85.9	20.0		44.9	40.5			47.3	40.5
Level of Service	E	B		F	B		D	D			D	D
Approach Delay (s)		14.0			20.4			43.6			44.4	
Approach LOS		B			C			D			D	
Intersection Summary												
HCM 2000 Control Delay		19.9			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.64										
Actuated Cycle Length (s)		129.0			Sum of lost time (s)			15.0				
Intersection Capacity Utilization		81.3%			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

04/01/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	2251	195	36	1567	164	60	20	45	114	55	147
Future Volume (vph)	61	2251	195	36	1567	164	60	20	45	114	55	147
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	0.99		1.00	0.93			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	0.99		1.00	0.90			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	4984		1770	4972		1770	1557			1704	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.50	1.00			0.76	1.00
Satd. Flow (perm)	1770	4984		1770	4972		937	1557			1332	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)	63	2321	201	37	1615	169	62	21	46	118	57	152
RTOR Reduction (vph)	0	6	0	0	7	0	0	36	0	0	0	90
Lane Group Flow (vph)	63	2516	0	37	1777	0	62	31	0	0	175	62
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)	8.4	94.7		6.5	92.8		33.8	33.8			33.8	33.8
Effective Green, g (s)	8.4	94.7		6.5	92.8		33.8	33.8			33.8	33.8
Actuated g/C Ratio	0.06	0.63		0.04	0.62		0.23	0.23			0.23	0.23
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)	99	3146		76	3076		211	350			300	356
v/s Ratio Prot	c0.04	c0.50		0.02	0.36			0.02				
v/s Ratio Perm							0.07				c0.13	0.04
v/c Ratio	0.64	0.80		0.49	0.58		0.29	0.09			0.58	0.17
Uniform Delay, d1	69.3	20.6		70.1	17.0		48.2	45.9			51.8	46.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	12.6	1.5		4.8	0.3		0.8	0.1			2.9	0.2
Delay (s)	81.9	22.1		75.0	17.2		49.0	46.0			54.7	47.1
Level of Service	F	C		E	B		D	D			D	D
Approach Delay (s)		23.5			18.4			47.5			51.2	
Approach LOS		C			B			D			D	
Intersection Summary												
HCM 2000 Control Delay		24.1			HCM 2000 Level of Service			C				
HCM 2000 Volume to Capacity ratio		0.75										
Actuated Cycle Length (s)		150.0			Sum of lost time (s)			15.0				
Intersection Capacity Utilization		84.5%			ICU Level of Service			E				
Analysis Period (min)		15										
c Critical Lane Group												

APPENDIX D

TRIP GENERATIONS CALCULATIONS

Trip Generation				9th Edition																																				
Number of Units	Units	Land Use Number	Land Use No./Type	Weekday		AM PEAK			PM PEAK			Trip Rate per Unit	Number of Trips	In %	In	Rate	In	Trips	Out %	Out	Trips																			
				Trip Rate per Unit	Total Trips	Trip Rate	In %	Out %	Trip Rate	In %	Out %											Trip Rate	In %	Out %																
Block H - Phase 3																																								
Existing																																								
44,225	ksf	820	Shopping Center	37.75	1670	0.94	42	62	0.58	26	38	0.36	16	3.81	168	48	1.83	81	52	1.98	87																			
3,879	ksf	932	High-Turnover (Sit-Down) Restaurant (formerly #8)	112.18	435	9.94	39	55	5.47	21	45	4.47	18	9.77	38	62	6.06	23	38	3.71	15																			
Existing Subtotal				2105			81	47		34					206			104			102																			
Internal Capture				-1141			-29	-18		-11								-54			-56																			
Existing Total				964			52	29		23					96			50			46																			
Proposed																																								
600	units	222	High-Rise Apartment	4.45	2670	0.31	186	24	0.07	45	76	0.24	141	0.36	216	61	0.22	132	39	0.14	84																			
30	ksf	820	Shopping Center	37.75	1133	0.94	28	62	0.58	17	38	0.36	11	3.81	114	48	1.83	55	52	1.98	59																			
15	ksf	932	High-Turnover (Sit-Down) Restaurant (formerly #8)	112.18	1683	9.94	149	55	5.47	82	45	4.47	67	9.77	147	62	6.06	91	38	3.71	56																			
Block H - Residential/Alt Mode Trip Reduction				-408			-40	-9		-31					-33			-21			-12																			
				-483			-48	-11		-37					-39			-25			-14																			
Block H Residential																																								
P1-4		P1-5		2262	146	36	110	72						183	111																									
P1-4		P1-5		2187	138	34	104	70						177	107																									
Retail SubTotal (no reductions)																																								
Block H - Trip Reduction		P1-4		2816	177	99	78	115						261	146																									
P1-5		P1-5		-1526	-128	-54	-74	-63						-139	-76																									
Block H - Retail Trip Reduction		P1-4		-1626	-144	-60	-84	-117						-272	-155																									
P1-5		P1-5		-1118	-88	-45	-55	-103						-106	-55																									
				-1143	-96	-49	-47	-103						-233	-130																									
Block H Retail																																								
P1-4		P1-5		734	37	25	12	18						59	41																									
P1-5		P1-5		709	29	21	8	-34						-68	-34																									

APPENDIX E

CAPACITY ANALYSIS CALCULATIONS

PROJECTED YEAR 2024 PEAK PERIOD TRAFFIC

ANALYSIS WITHOUT PROJECT

HCM Signalized Intersection Capacity Analysis

15: Ward Ave & Queen St

08/24/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	165	67	77	351	73	54	519	60	69	778	254
Future Volume (vph)	55	165	67	77	351	73	54	519	60	69	778	254
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	0.96		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		0.92	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.97		1.00	0.98		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)	1761	1718		1633	1807		1770	3415		1770	3362	
Flt Permitted	0.26	1.00		0.53	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	476	1718		915	1807		1770	3415		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)	58	174	71	81	369	77	57	546	63	73	819	267
RTOR Reduction (vph)	0	17	0	0	9	0	0	10	0	0	35	0
Lane Group Flow (vph)	58	228	0	81	437	0	57	599	0	73	1051	0
Confl. Peds. (#/hr)	15		146	146		15			144			30
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	23.3	23.3		23.3	23.3		3.6	28.8		6.1	31.3	
Effective Green, g (s)	23.3	23.3		23.3	23.3		3.6	28.8		6.1	31.3	
Actuated g/C Ratio	0.32	0.32		0.32	0.32		0.05	0.39		0.08	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)	151	546		291	575		87	1343		147	1437	
v/s Ratio Prot		0.13			c0.24		0.03	0.18		c0.04	c0.31	
v/s Ratio Perm	0.12			0.09								
v/c Ratio	0.38	0.42		0.28	0.76		0.66	0.45		0.50	0.73	
Uniform Delay, d1	19.4	19.6		18.7	22.4		34.2	16.3		32.1	17.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	0.5		0.5	5.9		16.4	0.2		2.6	2.0	
Delay (s)	21.0	20.1		19.2	28.3		50.5	16.6		34.7	19.4	
Level of Service	C	C		B	C		D	B		C	B	
Approach Delay (s)		20.3			26.9			19.5			20.4	
Approach LOS		C			C			B			C	
Intersection Summary												
HCM 2000 Control Delay			21.4		HCM 2000 Level of Service					C		
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			73.2		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
15: Ward Ave & Queen St

08/24/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	456	110	101	441	78	78	733	116	135	774	143
Future Volume (vph)	110	456	110	101	441	78	78	733	116	135	774	143
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	0.98		1.00	0.94		1.00	0.99	
Flpb, ped/bikes	0.96	1.00		0.96	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.98		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)	1700	1759		1707	1784		1770	3264		1770	3406	
Flt Permitted	0.20	1.00		0.15	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	365	1759		273	1784		1770	3264		1770	3406	
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)	116	480	116	106	464	82	82	772	122	142	815	151
RTOR Reduction (vph)	0	10	0	0	7	0	0	14	0	0	16	0
Lane Group Flow (vph)	116	586	0	106	539	0	82	880	0	142	950	0
Confl. Peds. (#/hr)	136		142	142		136			294			52
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	32.3	32.3		32.3	32.3		5.3	29.6		8.2	32.5	
Effective Green, g (s)	32.3	32.3		32.3	32.3		5.3	29.6		8.2	32.5	
Actuated g/C Ratio	0.38	0.38		0.38	0.38		0.06	0.35		0.10	0.38	
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)	138	667		103	677		110	1135		170	1300	
v/s Ratio Prot		0.33			0.30		0.05	0.27		c0.08	c0.28	
v/s Ratio Perm	0.32			c0.39								
v/c Ratio	0.84	0.88		1.03	0.80		0.75	0.78		0.84	0.73	
Uniform Delay, d1	24.1	24.6		26.4	23.5		39.2	24.8		37.8	22.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	34.5	12.6		96.8	6.4		23.7	3.4		28.3	2.1	
Delay (s)	58.6	37.2		123.2	29.9		62.9	28.2		66.1	24.7	
Level of Service	E	D		F	C		E	C		E	C	
Approach Delay (s)		40.6			45.1			31.1			30.0	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay		35.4			HCM 2000 Level of Service			D				
HCM 2000 Volume to Capacity ratio		0.90										
Actuated Cycle Length (s)		85.1			Sum of lost time (s)			15.0				
Intersection Capacity Utilization		86.9%			ICU Level of Service			E				
Analysis Period (min)		15										
c Critical Lane Group												

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

08/24/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	240	34	137	342	26	20	100	67	22	165	74
Future Volume (vph)	43	240	34	137	342	26	20	100	67	22	165	74
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		0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes		0.99		1.00	1.00			0.99			0.98	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		0.98		1.00	0.99			0.95			0.96	
Flt Protected		0.99		0.95	1.00			0.99			1.00	
Satd. Flow (prot)		3436		1770	3497			3301			3317	
Flt Permitted		0.85		0.95	1.00			0.91			0.92	
Satd. Flow (perm)		2948		1770	3497			3008			3067	
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)	45	250	35	143	356	27	21	104	70	23	172	77
RTOR Reduction (vph)	0	11	0	0	7	0	0	48	0	0	47	0
Lane Group Flow (vph)	0	319	0	143	376	0	0	147	0	0	225	0
Confl. Peds. (#/hr)	12		64			12	73		5	5		73
Turn Type	Perm	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2						8			4		
Actuated Green, G (s)		13.7		8.3	27.0			16.8			16.8	
Effective Green, g (s)		13.7		8.3	27.0			16.8			16.8	
Actuated g/C Ratio		0.25		0.15	0.50			0.31			0.31	
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)		750		273	1755			939			957	
v/s Ratio Prot				c0.08	0.11							
v/s Ratio Perm		c0.11						0.05			c0.07	
v/c Ratio		0.43		0.52	0.21			0.16			0.24	
Uniform Delay, d1		16.8		20.9	7.5			13.4			13.7	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.4		1.8	0.1			0.1			0.1	
Delay (s)		17.1		22.7	7.5			13.5			13.9	
Level of Service		B		C	A			B			B	
Approach Delay (s)		17.1			11.7			13.5			13.9	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay		13.8			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.36										
Actuated Cycle Length (s)		53.8			Sum of lost time (s)			15.0				
Intersection Capacity Utilization		69.6%			ICU Level of Service			C				
Analysis Period (min)		15										
c Critical Lane Group												

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

08/24/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	512	67	221	550	40	23	118	74	67	124	31
Future Volume (vph)	64	512	67	221	550	40	23	118	74	67	124	31
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		0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes		0.98		1.00	1.00			0.99			0.96	
Flpb, ped/bikes		1.00		1.00	1.00			0.98			1.00	
Frt		0.98		1.00	0.99			0.95			0.98	
Flt Protected		1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)		3408		1770	3496			3246			3275	
Flt Permitted		0.83		0.95	1.00			0.90			0.79	
Satd. Flow (perm)		2835		1770	3496			2942			2623	
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)	67	533	70	230	573	42	24	123	77	70	129	32
RTOR Reduction (vph)	0	11	0	0	7	0	0	61	0	0	14	0
Lane Group Flow (vph)	0	659	0	230	608	0	0	163	0	0	217	0
Confl. Peds. (#/hr)	15		117			15	127		8	8		127
Turn Type	Perm	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2						8			4		
Actuated Green, G (s)		23.1		14.1	42.2			14.2			14.2	
Effective Green, g (s)		23.1		14.1	42.2			14.2			14.2	
Actuated g/C Ratio		0.35		0.21	0.64			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)		986		375	2221			629			560	
v/s Ratio Prot				c0.13	0.17							
v/s Ratio Perm		c0.23						0.06			c0.08	
v/c Ratio		0.67		0.61	0.27			0.26			0.39	
Uniform Delay, d1		18.4		23.7	5.3			21.7			22.4	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		1.7		3.0	0.1			0.2			0.4	
Delay (s)		20.1		26.6	5.4			21.9			22.8	
Level of Service		C		C	A			C			C	
Approach Delay (s)		20.1			11.2			21.9			22.8	
Approach LOS		C			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			16.8		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			66.4		Sum of lost time (s)					15.0		
Intersection Capacity Utilization			73.5%		ICU Level of Service					D		
Analysis Period (min)			15									
c Critical Lane Group												

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

08/24/2020

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	319	17	102	417	33	104
Future Volume (Veh/h)	319	17	102	417	33	104
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)	354	19	113	463	37	116
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			381		829	194
vC1, stage 1 conf vol					372	
vC2, stage 2 conf vol					458	
vCu, unblocked vol			381		829	194
tC, single (s)			*3.1		*5.8	*5.9
tC, 2 stage (s)					4.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			91		93	86
cM capacity (veh/h)			1302		553	855
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	236	137	113	232	232	153
Volume Left	0	0	113	0	0	37
Volume Right	0	19	0	0	0	116
cSH	1700	1700	1302	1700	1700	756
Volume to Capacity	0.14	0.08	0.09	0.14	0.14	0.20
Queue Length 95th (ft)	0	0	7	0	0	19
Control Delay (s)	0.0	0.0	8.0	0.0	0.0	11.0
Lane LOS			A			B
Approach Delay (s)	0.0		1.6			11.0
Approach LOS						B
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			34.2%		ICU Level of Service	A
Analysis Period (min)			15			
* User Entered Value						

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

08/24/2020

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↱		↱	↑↑	↱↲	
Traffic Volume (veh/h)	718	53	127	788	49	243
Future Volume (Veh/h)	718	53	127	788	49	243
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)	756	56	134	829	52	256
Pedestrians					27	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					2	
Right turn flare (veh)						
Median type	TW	LT		None		
Median storage veh)	2					
Upstream signal (ft)	564			687		
pX, platoon unblocked			0.91		0.91	0.91
vC, conflicting volume			839		1494	433
vC1, stage 1 conf vol					811	
vC2, stage 2 conf vol					682	
vCu, unblocked vol			632		1349	187
tC, single (s)			*3.1		*5.8	*5.9
tC, 2 stage (s)					4.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			87		87	67
cM capacity (veh/h)			1014		387	775
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	504	308	134	414	414	308
Volume Left	0	0	134	0	0	52
Volume Right	0	56	0	0	0	256
cSH	1700	1700	1014	1700	1700	663
Volume to Capacity	0.30	0.18	0.13	0.24	0.24	0.46
Queue Length 95th (ft)	0	0	11	0	0	62
Control Delay (s)	0.0	0.0	9.1	0.0	0.0	15.1
Lane LOS			A			C
Approach Delay (s)	0.0		1.3			15.1
Approach LOS						C
Intersection Summary						
Average Delay			2.8			
Intersection Capacity Utilization			56.5%		ICU Level of Service	B
Analysis Period (min)			15			
* User Entered Value						

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

08/24/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	134	4	22	0	0	0	40	478	3	7	626	239
Future Volume (vph)	134	4	22	0	0	0	40	478	3	7	626	239
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	0.95		1.00	0.95	
Frpb, ped/bikes		0.99					1.00	1.00		1.00	0.96	
Flpb, ped/bikes		1.00					0.97	1.00		1.00	1.00	
Frt		0.98					1.00	1.00		1.00	0.96	
Flt Protected		0.96					0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1740					1717	3535		1770	3267	
Flt Permitted		0.96					0.26	1.00		0.47	1.00	
Satd. Flow (perm)		1740					478	3535		876	3267	
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)	138	4	23	0	0	0	41	493	3	7	645	246
RTOR Reduction (vph)	0	7	0	0	0	0	0	1	0	0	48	0
Lane Group Flow (vph)	0	158	0	0	0	0	41	495	0	7	843	0
Confl. Peds. (#/hr)			78				47	85	47			85
Turn Type	Perm	NA					Perm	NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4						2			6		
Actuated Green, G (s)		17.5					27.4	27.4		27.4	27.4	
Effective Green, g (s)		17.5					27.4	27.4		27.4	27.4	
Actuated g/C Ratio		0.32					0.50	0.50		0.50	0.50	
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)		554					238	1764		437	1630	
v/s Ratio Prot								0.14			c0.26	
v/s Ratio Perm		0.09					0.09			0.01		
v/c Ratio		0.29					0.17	0.28		0.02	0.52	
Uniform Delay, d1		14.0					7.5	8.0		6.9	9.3	
Progression Factor		1.00					1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3					0.3	0.1		0.0	0.3	
Delay (s)		14.3					7.9	8.1		7.0	9.6	
Level of Service		B					A	A		A	A	
Approach Delay (s)		14.3			0.0			8.1			9.5	
Approach LOS		B			A			A			A	
Intersection Summary												
HCM 2000 Control Delay			9.5		HCM 2000 Level of Service					A		
HCM 2000 Volume to Capacity ratio			0.43									
Actuated Cycle Length (s)			54.9		Sum of lost time (s)					10.0		
Intersection Capacity Utilization			62.8%		ICU Level of Service					B		
Analysis Period (min)			15									
c Critical Lane Group												

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

08/24/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	306	14	98	0	0	0	40	586	3	19	759	132
Future Volume (vph)	306	14	98	0	0	0	40	586	3	19	759	132
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	0.95		1.00	0.95	
Frpb, ped/bikes		0.97					1.00	1.00		1.00	0.96	
Flpb, ped/bikes		0.94					0.95	1.00		0.93	1.00	
Frt		0.97					1.00	1.00		1.00	0.98	
Flt Protected		0.96					0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1578					1675	3534		1639	3326	
Flt Permitted		0.96					0.20	1.00		0.37	1.00	
Satd. Flow (perm)		1578					361	3534		642	3326	
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)	319	15	102	0	0	0	42	610	3	20	791	138
RTOR Reduction (vph)	0	13	0	0	0	0	0	1	0	0	16	0
Lane Group Flow (vph)	0	423	0	0	0	0	42	612	0	20	913	0
Confl. Peds. (#/hr)	121		185	185		121	160		121	121		160
Turn Type	Perm	NA					Perm	NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4						2			6		
Actuated Green, G (s)		26.1					25.3	25.3		25.3	25.3	
Effective Green, g (s)		26.1					25.3	25.3		25.3	25.3	
Actuated g/C Ratio		0.43					0.41	0.41		0.41	0.41	
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)		670					148	1456		264	1370	
v/s Ratio Prot								0.17			c0.27	
v/s Ratio Perm		0.27					0.12			0.03		
v/c Ratio		0.63					0.28	0.42		0.08	0.67	
Uniform Delay, d1		13.9					12.0	12.8		11.0	14.6	
Progression Factor		1.00					1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.9					1.1	0.2		0.1	1.2	
Delay (s)		15.8					13.1	13.0		11.1	15.9	
Level of Service		B					B	B		B	B	
Approach Delay (s)		15.8			0.0			13.0			15.8	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM 2000 Control Delay		14.9										
HCM 2000 Volume to Capacity ratio		0.65										
Actuated Cycle Length (s)		61.4								10.0		
Intersection Capacity Utilization		73.7%										
Analysis Period (min)		15										
c Critical Lane Group												

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

08/24/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	41	76	79	96	76	68	333	42	61	453	70
Future Volume (vph)	40	41	76	79	96	76	68	333	42	61	453	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	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	0.99	1.00		0.97	1.00		0.97	1.00		0.98	1.00	
Frt	1.00	0.90		1.00	0.93		1.00	0.98		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)	1758	1627		1711	1724		1709	3461		1731	3425	
Flt Permitted	0.64	1.00		0.68	1.00		0.45	1.00		0.52	1.00	
Satd. Flow (perm)	1193	1627		1222	1724		807	3461		949	3425	
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)	42	43	79	82	100	79	71	347	44	64	472	73
RTOR Reduction (vph)	0	59	0	0	37	0	0	13	0	0	17	0
Lane Group Flow (vph)	42	63	0	82	142	0	71	378	0	64	528	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)	8.1	8.1		8.1	8.1		13.3	13.3		13.3	13.3	
Effective Green, g (s)	8.1	8.1		8.1	8.1		13.3	13.3		13.3	13.3	
Actuated g/C Ratio	0.26	0.26		0.26	0.26		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)	307	419		315	444		341	1465		401	1450	
v/s Ratio Prot		0.04			c0.08			0.11			c0.15	
v/s Ratio Perm	0.04			0.07			0.09			0.07		
v/c Ratio	0.14	0.15		0.26	0.32		0.21	0.26		0.16	0.36	
Uniform Delay, d1	9.0	9.0		9.3	9.4		5.7	5.9		5.6	6.2	
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		0.4	0.4		0.3	0.1		0.2	0.2	
Delay (s)	9.2	9.2		9.7	9.8		6.0	6.0		5.8	6.3	
Level of Service	A	A		A	A		A	A		A	A	
Approach Delay (s)		9.2			9.8			6.0			6.3	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM 2000 Control Delay		7.1										
HCM 2000 Volume to Capacity ratio		0.35										
Actuated Cycle Length (s)		31.4								10.0		
Intersection Capacity Utilization		53.2%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

34: Ward Ave & Pohukaina St/Auahi St

08/24/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	105	74	211	80	225	71	355	75	126	421	124
Future Volume (vph)	47	105	74	211	80	225	71	355	75	126	421	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	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.91		1.00	0.98		1.00	0.97	
Flpb, ped/bikes	0.93	1.00		0.94	1.00		0.97	1.00		0.94	1.00	
Frt	1.00	0.94		1.00	0.89		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)	1644	1687		1672	1500		1718	3367		1658	3326	
Flt Permitted	0.50	1.00		0.63	1.00		0.38	1.00		0.47	1.00	
Satd. Flow (perm)	860	1687		1117	1500		691	3367		818	3326	
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)	52	115	81	232	88	247	78	390	82	138	463	136
RTOR Reduction (vph)	0	30	0	0	58	0	0	21	0	0	32	0
Lane Group Flow (vph)	52	166	0	232	277	0	78	451	0	138	567	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)	25.2	25.2		25.2	25.2		24.1	24.1		24.1	24.1	
Effective Green, g (s)	25.2	25.2		25.2	25.2		24.1	24.1		24.1	24.1	
Actuated g/C Ratio	0.42	0.42		0.42	0.42		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)	365	716		474	637		280	1368		332	1351	
v/s Ratio Prot		0.10			0.18			0.13			c0.17	
v/s Ratio Perm	0.06			c0.21			0.11			0.17		
v/c Ratio	0.14	0.23		0.49	0.43		0.28	0.33		0.42	0.42	
Uniform Delay, d1	10.4	10.9		12.4	12.0		11.8	12.1		12.6	12.6	
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		0.8	0.5		0.5	0.1		0.8	0.2	
Delay (s)	10.6	11.0		13.2	12.5		12.3	12.2		13.4	12.8	
Level of Service	B	B		B	B		B	B		B	B	
Approach Delay (s)		11.0			12.8			12.2			12.9	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay		12.5			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.45										
Actuated Cycle Length (s)		59.3			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		83.4%			ICU Level of Service			E				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

35: Kamakee St & Auahi St

08/24/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	101	47	12	67	43	31	134	31	23	226	102
Future Volume (vph)	32	101	47	12	67	43	31	134	31	23	226	102
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	0.98		1.00	1.00	0.95	1.00	1.00	0.96	1.00	0.98	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.96	1.00	1.00	0.98	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	1746		1770	1863	1509	1692	1863	1514	1734	1863	1457
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.61	1.00	1.00	0.67	1.00	1.00
Satd. Flow (perm)	1770	1746		1770	1863	1509	1091	1863	1514	1219	1863	1457
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)	33	105	49	12	70	45	32	140	32	24	235	106
RTOR Reduction (vph)	0	24	0	0	0	33	0	0	19	0	0	62
Lane Group Flow (vph)	33	130	0	13	70	12	32	140	13	24	235	44
Confl. Peds. (#/hr)			51			36	63		25	25		63
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)	1.7	15.1		0.5	13.9	13.9	21.5	21.5	21.5	21.5	21.5	21.5
Effective Green, g (s)	1.7	15.1		0.5	13.9	13.9	21.5	21.5	21.5	21.5	21.5	21.5
Actuated g/C Ratio	0.03	0.29		0.01	0.27	0.27	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	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)	57	506		16	497	402	450	768	624	503	768	601
v/s Ratio Prot	c0.02	c0.07		0.01	0.04			0.08			c0.13	
v/s Ratio Perm						0.01	0.03		0.01	0.02		0.03
v/c Ratio	0.58	0.26		0.81	0.14	0.03	0.07	0.18	0.02	0.05	0.31	0.07
Uniform Delay, d1	24.8	14.2		25.8	14.6	14.1	9.3	9.7	9.1	9.2	10.3	9.3
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	13.5	0.3		132.2	0.1	0.0	0.1	0.1	0.0	0.0	0.2	0.1
Delay (s)	38.3	14.5		157.9	14.7	14.1	9.3	9.8	9.1	9.2	10.5	9.3
Level of Service	D	B		F	B	B	A	A	A	A	B	A
Approach Delay (s)		18.7			29.0			9.6			10.1	
Approach LOS		B			C			A			B	
Intersection Summary												
HCM 2000 Control Delay		14.5			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.31										
Actuated Cycle Length (s)		52.1			Sum of lost time (s)			15.0				
Intersection Capacity Utilization		57.8%			ICU Level of Service			B				
Analysis Period (min)		15										
c Critical Lane Group												

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

08/24/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	235	56	36	151	37	67	148	46	55	214	93
Future Volume (vph)	66	235	56	36	151	37	67	148	46	55	214	93
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	0.76	1.00	1.00	0.82	1.00	1.00	0.77
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.87	1.00	1.00	0.86	1.00	1.00
Frt	1.00	0.97		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	1753		1770	1863	1201	1539	1863	1292	1530	1863	1212
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.57	1.00	1.00	0.66	1.00	1.00
Satd. Flow (perm)	1770	1753		1770	1863	1201	917	1863	1292	1064	1863	1212
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)	67	240	57	37	154	38	68	151	47	56	218	95
RTOR Reduction (vph)	0	10	0	0	0	23	0	0	33	0	0	67
Lane Group Flow (vph)	67	287	0	37	154	15	68	151	14	56	218	28
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)	6.2	31.7		3.1	28.6	28.6	20.6	20.6	20.6	20.6	20.6	20.6
Effective Green, g (s)	6.2	31.7		3.1	28.6	28.6	20.6	20.6	20.6	20.6	20.6	20.6
Actuated g/C Ratio	0.09	0.45		0.04	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)	155	789		77	756	487	268	545	378	311	545	354
v/s Ratio Prot	c0.04	c0.16		0.02	0.08			0.08			c0.12	
v/s Ratio Perm						0.01	0.07		0.01	0.05		0.02
v/c Ratio	0.43	0.36		0.48	0.20	0.03	0.25	0.28	0.04	0.18	0.40	0.08
Uniform Delay, d1	30.4	12.7		32.9	13.5	12.6	19.0	19.2	17.8	18.6	19.9	18.0
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	1.9	0.3		4.7	0.1	0.0	0.5	0.3	0.0	0.3	0.5	0.1
Delay (s)	32.4	13.0		37.5	13.7	12.6	19.5	19.4	17.8	18.9	20.4	18.1
Level of Service	C	B		D	B	B	B	B	B	B	C	B
Approach Delay (s)		16.6			17.3			19.2			19.6	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay		18.2			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.40										
Actuated Cycle Length (s)		70.4			Sum of lost time (s)			15.0				
Intersection Capacity Utilization		71.7%			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

08/24/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	4	24	0	0	0	81	78	8	6	41	61
Future Volume (vph)	53	4	24	0	0	0	81	78	8	6	41	61
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
Frpb, 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)		1726	1546				1770	1830				1614
Flt Permitted		0.96	1.00				0.95	1.00				0.99
Satd. Flow (perm)		1726	1546				1770	1830				1601
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)	56	4	25	0	0	0	85	82	8	6	43	64
RTOR Reduction (vph)	0	0	21	0	0	0	0	3	0	0	38	0
Lane Group Flow (vph)	0	60	4	0	0	0	85	87	0	0	75	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)		8.5	8.5				6.3	31.8			20.5	
Effective Green, g (s)		8.5	8.5				6.3	31.8			20.5	
Actuated g/C Ratio		0.17	0.17				0.13	0.63			0.41	
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)		291	261				221	1156			652	
v/s Ratio Prot							c0.05	0.05				
v/s Ratio Perm		0.03	0.00								c0.05	
v/c Ratio		0.21	0.02				0.38	0.08			0.12	
Uniform Delay, d1		18.0	17.4				20.2	3.6			9.3	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		0.4	0.0				1.1	0.0			0.1	
Delay (s)		18.3	17.4				21.3	3.6			9.3	
Level of Service		B	B				C	A			A	
Approach Delay (s)		18.1			0.0			12.2			9.3	
Approach LOS		B			A			B			A	
Intersection Summary												
HCM 2000 Control Delay		12.7					HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio		0.18										
Actuated Cycle Length (s)		50.3					Sum of lost time (s)				15.0	
Intersection Capacity Utilization		34.9%					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

08/24/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	7	132	0	0	0	109	115	11	3	95	90
Future Volume (vph)	148	7	132	0	0	0	109	115	11	3	95	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	
Lane Util. Factor		1.00	1.00				1.00	1.00			1.00	
Frpb, ped/bikes		1.00	0.95				1.00	0.99			0.90	
Flpb, ped/bikes		0.88	1.00				1.00	1.00			1.00	
Frt		1.00	0.85				1.00	0.99			0.94	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1572	1497				1770	1817			1573	
Flt Permitted		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (perm)		1572	1497				1770	1817			1569	
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)	149	7	133	0	0	0	110	116	11	3	96	91
RTOR Reduction (vph)	0	0	100	0	0	0	0	4	0	0	36	0
Lane Group Flow (vph)	0	156	33	0	0	0	110	123	0	0	154	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)		13.6	13.6				7.2	31.0			18.8	
Effective Green, g (s)		13.6	13.6				7.2	31.0			18.8	
Actuated g/C Ratio		0.25	0.25				0.13	0.57			0.34	
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)		391	372				233	1031			540	
v/s Ratio Prot							c0.06	0.07				
v/s Ratio Perm		0.10	0.02								c0.10	
v/c Ratio		0.40	0.09				0.47	0.12			0.29	
Uniform Delay, d1		17.1	15.7				21.9	5.5			13.0	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		0.7	0.1				1.5	0.1			0.3	
Delay (s)		17.8	15.8				23.5	5.5			13.3	
Level of Service		B	B				C	A			B	
Approach Delay (s)		16.9			0.0			13.8			13.3	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM 2000 Control Delay		14.9					HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio		0.36										
Actuated Cycle Length (s)		54.6					Sum of lost time (s)			15.0		
Intersection Capacity Utilization		57.1%					ICU Level of Service			B		
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

41: Ala Moana Blvd & Ward Ave

08/24/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	258	1682	12	99	1776	190	2	41	44	242	118	206
Future Volume (vph)	258	1682	12	99	1776	190	2	41	44	242	118	206
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	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.84		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		1.00	1.00	0.95	0.99	
Satd. Flow (prot)	1770	5078		1770	5085	1330		3531	1470	1610	2895	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	0.99	
Satd. Flow (perm)	1770	5078		1770	5085	1330		3531	1470	1610	2895	
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)	272	1771	13	104	1869	200	2	43	46	255	124	217
RTOR Reduction (vph)	0	1	0	0	0	82	0	0	0	0	156	0
Lane Group Flow (vph)	272	1783	0	104	1869	118	0	45	46	207	233	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)	18.7	58.2		9.4	48.9	48.9		25.8	25.8	25.7	25.7	
Effective Green, g (s)	18.7	58.2		9.4	48.9	48.9		25.8	25.8	25.7	25.7	
Actuated g/C Ratio	0.13	0.42		0.07	0.35	0.35		0.19	0.19	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)	237	2124		119	1787	467		654	272	297	534	
v/s Ratio Prot	c0.15	0.35		0.06	c0.37			0.01		c0.13	0.08	
v/s Ratio Perm						0.09			c0.03			
v/c Ratio	1.15	0.84		0.87	1.05	0.25		0.07	0.17	0.70	0.44	
Uniform Delay, d1	60.2	36.3		64.3	45.1	32.1		46.7	47.6	53.1	50.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	104.1	3.1		45.9	34.4	0.3		0.0	0.3	7.0	0.6	
Delay (s)	164.3	39.4		110.2	79.5	32.4		46.8	47.9	60.0	50.9	
Level of Service	F	D		F	E	C		D	D	E	D	
Approach Delay (s)		55.9			76.6			47.4			54.0	
Approach LOS		E			E			D			D	
Intersection Summary												
HCM 2000 Control Delay		64.7					HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio		0.80										
Actuated Cycle Length (s)		139.1					Sum of lost time (s)			20.0		
Intersection Capacity Utilization		94.3%					ICU Level of Service			F		
Analysis Period (min)		15										
c Critical Lane Group												

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

08/24/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	222	2037	2	52	1442	247	7	110	163	310	70	276
Future Volume (vph)	222	2037	2	52	1442	247	7	110	163	310	70	276
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	
Frpb, 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	5084		1770	5085	1262		3529	1367	1610	2915	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	0.99	
Satd. Flow (perm)	1770	5084		1770	5085	1262		3529	1367	1610	2915	
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)	234	2144	2	55	1518	260	7	116	172	326	74	291
RTOR Reduction (vph)	0	0	0	0	0	129	0	0	0	0	214	0
Lane Group Flow (vph)	234	2146	0	55	1518	131	0	123	172	241	236	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)	22.4	69.0		6.0	52.6	52.6		35.0	35.0	27.8	27.8	
Effective Green, g (s)	22.4	69.0		6.0	52.6	52.6		35.0	35.0	27.8	27.8	
Actuated g/C Ratio	0.14	0.44		0.04	0.33	0.33		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)	251	2223		67	1695	420		782	303	283	513	
v/s Ratio Prot	c0.13	c0.42		0.03	0.30			0.03		c0.15	0.08	
v/s Ratio Perm						0.10			c0.13			
v/c Ratio	0.93	0.97		0.82	0.90	0.31		0.16	0.57	0.85	0.46	
Uniform Delay, d1	66.9	43.2		75.4	50.0	39.1		49.5	54.7	63.0	58.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	38.6	12.0		52.9	6.6	0.4		0.1	2.4	21.1	0.7	
Delay (s)	105.6	55.2		128.3	56.6	39.6		49.6	57.1	84.1	58.9	
Level of Service	F	E		F	E	D		D	E	F	E	
Approach Delay (s)		60.1			56.3			54.0			67.7	
Approach LOS		E			E			D			E	
Intersection Summary												
HCM 2000 Control Delay		59.4			HCM 2000 Level of Service			E				
HCM 2000 Volume to Capacity ratio		0.86										
Actuated Cycle Length (s)		157.8			Sum of lost time (s)			20.0				
Intersection Capacity Utilization		101.7%			ICU Level of Service			G				
Analysis Period (min)		15										
c Critical Lane Group												

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

08/24/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	1679	93	13	1913	105	91	22	14	121	30	111
Future Volume (vph)	82	1679	93	13	1913	105	91	22	14	121	30	111
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	0.97			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	0.99		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	5030		1770	5029		1770	1706			1701	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.54	1.00			0.74	1.00
Satd. Flow (perm)	1770	5030		1770	5029		1011	1706			1315	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)	85	1731	96	13	1972	108	94	23	14	125	31	114
RTOR Reduction (vph)	0	3	0	0	3	0	0	11	0	0	0	90
Lane Group Flow (vph)	85	1824	0	13	2077	0	94	26	0	0	156	24
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)	11.7	87.3		1.8	77.4		27.8	27.8			27.8	27.8
Effective Green, g (s)	11.7	87.3		1.8	77.4		27.8	27.8			27.8	27.8
Actuated g/C Ratio	0.09	0.66		0.01	0.59		0.21	0.21			0.21	0.21
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	3329		24	2951		213	359			277	333
v/s Ratio Prot	c0.05	c0.36		0.01	c0.41			0.02				
v/s Ratio Perm							0.09				c0.12	0.02
v/c Ratio	0.54	0.55		0.54	0.70		0.44	0.07			0.56	0.07
Uniform Delay, d1	57.5	11.8		64.6	19.2		45.3	41.7			46.6	41.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	3.8	0.2		22.7	0.8		1.5	0.1			2.6	0.1
Delay (s)	61.3	12.0		87.3	20.0		46.8	41.8			49.2	41.8
Level of Service	E	B		F	B		D	D			D	D
Approach Delay (s)		14.2			20.4			45.4			46.1	
Approach LOS		B			C			D			D	
Intersection Summary												
HCM 2000 Control Delay		20.0			HCM 2000 Level of Service			C				
HCM 2000 Volume to Capacity ratio		0.65										
Actuated Cycle Length (s)		131.9			Sum of lost time (s)			15.0				
Intersection Capacity Utilization		82.7%			ICU Level of Service			E				
Analysis Period (min)		15										
c Critical Lane Group												

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	2350	201	37	1638	166	62	21	47	108	57	150
Future Volume (vph)	58	2350	201	37	1638	166	62	21	47	108	57	150
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	0.99		1.00	0.93			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	0.99		1.00	0.90			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	4985		1770	4975		1770	1556			1708	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.51	1.00			0.76	1.00
Satd. Flow (perm)	1770	4985		1770	4975		942	1556			1341	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)	60	2423	207	38	1689	171	64	22	48	111	59	155
RTOR Reduction (vph)	0	6	0	0	7	0	0	37	0	0	0	87
Lane Group Flow (vph)	60	2624	0	38	1853	0	64	33	0	0	170	68
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)	8.5	97.4		6.6	95.5		33.5	33.5			33.5	33.5
Effective Green, g (s)	8.5	97.4		6.6	95.5		33.5	33.5			33.5	33.5
Actuated g/C Ratio	0.06	0.64		0.04	0.63		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)	98	3183		76	3115		206	341			294	347
v/s Ratio Prot	c0.03	c0.53		0.02	0.37			0.02				
v/s Ratio Perm							0.07				c0.13	0.04
v/c Ratio	0.61	0.82		0.50	0.59		0.31	0.10			0.58	0.19
Uniform Delay, d1	70.4	21.0		71.3	17.0		49.8	47.4			53.2	48.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	10.8	1.8		5.1	0.3		0.9	0.1			2.7	0.3
Delay (s)	81.2	22.9		76.4	17.3		50.7	47.5			55.9	48.8
Level of Service	F	C		E	B		D	D			E	D
Approach Delay (s)		24.2			18.5			49.0			52.5	
Approach LOS		C			B			D			D	
Intersection Summary												
HCM 2000 Control Delay		24.5			HCM 2000 Level of Service			C				
HCM 2000 Volume to Capacity ratio		0.76										
Actuated Cycle Length (s)		152.5			Sum of lost time (s)			15.0				
Intersection Capacity Utilization		83.9%			ICU Level of Service			E				
Analysis Period (min)		15										
c Critical Lane Group												

APPENDIX F

CAPACITY ANALYSIS CALCULATIONS

PROJECTED YEAR 2024 PEAK PERIOD TRAFFIC

ANALYSIS WITH PROJECT

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

06/16/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	167	67	77	351	73	56	560	81	73	788	254
Future Volume (vph)	55	167	67	77	351	73	56	560	81	73	788	254
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	0.96		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		0.92	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.97		1.00	0.98		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)	1761	1718		1633	1807		1770	3388		1770	3363	
Flt Permitted	0.25	1.00		0.53	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	470	1718		906	1807		1770	3388		1770	3363	
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)	58	176	71	81	369	77	59	589	85	77	829	267
RTOR Reduction (vph)	0	17	0	0	9	0	0	13	0	0	35	0
Lane Group Flow (vph)	58	230	0	81	437	0	59	661	0	77	1061	0
Confl. Peds. (#/hr)	15		146	146		15			144			30
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	23.3	23.3		23.3	23.3		3.6	29.2		6.2	31.8	
Effective Green, g (s)	23.3	23.3		23.3	23.3		3.6	29.2		6.2	31.8	
Actuated g/C Ratio	0.32	0.32		0.32	0.32		0.05	0.40		0.08	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)	148	543		286	571		86	1342		148	1451	
v/s Ratio Prot		0.13			c0.24		0.03	0.20		c0.04	c0.32	
v/s Ratio Perm	0.12			0.09								
v/c Ratio	0.39	0.42		0.28	0.77		0.69	0.49		0.52	0.73	
Uniform Delay, d1	19.7	19.9		18.9	22.7		34.5	16.7		32.3	17.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.7	0.5		0.5	6.1		20.3	0.3		3.3	1.9	
Delay (s)	21.4	20.4		19.5	28.8		54.8	17.0		35.6	19.3	
Level of Service	C	C		B	C		D	B		D	B	
Approach Delay (s)		20.6			27.4			20.0			20.4	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay		21.7			HCM 2000 Level of Service			C				
HCM 2000 Volume to Capacity ratio		0.75										
Actuated Cycle Length (s)		73.7			Sum of lost time (s)			15.0				
Intersection Capacity Utilization		78.1%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

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

06/16/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	461	111	101	441	78	79	764	129	148	788	143
Future Volume (vph)	110	461	111	101	441	78	79	764	129	148	788	143
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	0.98		1.00	0.93		1.00	0.99	
Flpb, ped/bikes	0.96	1.00		0.96	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.98		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)	1698	1757		1707	1783		1770	3237		1770	3406	
Flt Permitted	0.21	1.00		0.16	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	381	1757		282	1783		1770	3237		1770	3406	
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)	116	485	117	106	464	82	83	804	136	156	829	151
RTOR Reduction (vph)	0	10	0	0	7	0	0	15	0	0	16	0
Lane Group Flow (vph)	116	592	0	106	539	0	83	925	0	156	964	0
Confl. Peds. (#/hr)	136		142	142		136			294			52
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	35.0	35.0		35.0	35.0		5.5	30.6		9.0	34.1	
Effective Green, g (s)	35.0	35.0		35.0	35.0		5.5	30.6		9.0	34.1	
Actuated g/C Ratio	0.39	0.39		0.39	0.39		0.06	0.34		0.10	0.38	
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)	148	686		110	696		108	1105		177	1296	
v/s Ratio Prot		0.34			0.30		0.05	c0.29		c0.09	c0.28	
v/s Ratio Perm	0.30			c0.38								
v/c Ratio	0.78	0.86		0.96	0.77		0.77	0.84		0.88	0.74	
Uniform Delay, d1	24.0	25.1		26.7	23.8		41.4	27.2		39.8	24.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	23.2	10.9		73.7	5.4		27.3	5.7		36.3	2.4	
Delay (s)	47.2	36.0		100.4	29.2		68.8	32.9		76.1	26.3	
Level of Service	D	D		F	C		E	C		E	C	
Approach Delay (s)		37.8			40.8			35.8			33.2	
Approach LOS		D			D			D			C	
Intersection Summary												
HCM 2000 Control Delay		36.3			HCM 2000 Level of Service			D				
HCM 2000 Volume to Capacity ratio		0.90										
Actuated Cycle Length (s)		89.6			Sum of lost time (s)			15.0				
Intersection Capacity Utilization		89.3%			ICU Level of Service			E				
Analysis Period (min)		15										
c Critical Lane Group												

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

06/16/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	261	40	143	342	26	20	100	69	22	177	74
Future Volume (vph)	43	261	40	143	342	26	20	100	69	22	177	74
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		0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes		0.99		1.00	1.00			0.99			0.98	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		0.98		1.00	0.99			0.95			0.96	
Flt Protected		0.99		0.95	1.00			0.99			1.00	
Satd. Flow (prot)		3430		1770	3497			3297			3324	
Flt Permitted		0.86		0.95	1.00			0.91			0.92	
Satd. Flow (perm)		2967		1770	3497			3002			3078	
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)	45	272	42	149	356	27	21	104	72	23	184	77
RTOR Reduction (vph)	0	10	0	0	6	0	0	50	0	0	31	0
Lane Group Flow (vph)	0	349	0	149	377	0	0	147	0	0	253	0
Confl. Peds. (#/hr)	12		64			12	73		5	5		73
Turn Type	Perm	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2						8			4		
Actuated Green, G (s)		14.6		8.6	28.2			17.3			17.3	
Effective Green, g (s)		14.6		8.6	28.2			17.3			17.3	
Actuated g/C Ratio		0.26		0.15	0.51			0.31			0.31	
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)		780		274	1776			935			959	
v/s Ratio Prot				c0.08	0.11							
v/s Ratio Perm		c0.12						0.05			c0.08	
v/c Ratio		0.45		0.54	0.21			0.16			0.26	
Uniform Delay, d1		17.1		21.6	7.5			13.8			14.3	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.4		2.2	0.1			0.1			0.1	
Delay (s)		17.5		23.8	7.6			13.9			14.5	
Level of Service		B		C	A			B			B	
Approach Delay (s)		17.5			12.1			13.9			14.5	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay		14.3										
HCM 2000 Volume to Capacity ratio		0.39										
Actuated Cycle Length (s)		55.5						15.0				
Intersection Capacity Utilization		69.8%										
Analysis Period (min)		15										
c Critical Lane Group												

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

06/16/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	526	86	250	550	40	23	118	77	67	152	31
Future Volume (vph)	64	526	86	250	550	40	23	118	77	67	152	31
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		0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes		0.98		1.00	1.00			0.99			0.96	
Flpb, ped/bikes		1.00		1.00	1.00			0.98			1.00	
Frt		0.98		1.00	0.99			0.95			0.98	
Flt Protected		1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)		3375		1770	3495			3234			3287	
Flt Permitted		0.83		0.95	1.00			0.90			0.80	
Satd. Flow (perm)		2814		1770	3495			2920			2662	
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)	67	548	90	260	573	42	24	123	80	70	158	32
RTOR Reduction (vph)	0	11	0	0	6	0	0	60	0	0	9	0
Lane Group Flow (vph)	0	694	0	260	609	0	0	167	0	0	251	0
Confl. Peds. (#/hr)	15		117			15	127		8	8		127
Turn Type	Perm	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2						8			4		
Actuated Green, G (s)		27.9		17.5	50.4			15.5			15.5	
Effective Green, g (s)		27.9		17.5	50.4			15.5			15.5	
Actuated g/C Ratio		0.37		0.23	0.66			0.20			0.20	
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)		1034		408	2320			596			543	
v/s Ratio Prot				c0.15	0.17							
v/s Ratio Perm		c0.25						0.06			c0.09	
v/c Ratio		0.67		0.64	0.26			0.28			0.46	
Uniform Delay, d1		20.2		26.3	5.2			25.5			26.5	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		1.7		3.3	0.1			0.3			0.6	
Delay (s)		21.9		29.6	5.2			25.8			27.2	
Level of Service		C		C	A			C			C	
Approach Delay (s)		21.9			12.5			25.8			27.2	
Approach LOS		C			B			C			C	
Intersection Summary												
HCM 2000 Control Delay		19.0										
HCM 2000 Volume to Capacity ratio		0.61										
Actuated Cycle Length (s)		75.9						15.0				
Intersection Capacity Utilization		74.7%										
Analysis Period (min)		15										
c Critical Lane Group												

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↱		↱	↑↑	↱↱	
Traffic Volume (veh/h)	342	17	102	423	33	104
Future Volume (Veh/h)	342	17	102	423	33	104
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)	380	19	113	470	37	116
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				407	858	208
vC1, stage 1 conf vol					398	
vC2, stage 2 conf vol					461	
vCu, unblocked vol				407	858	208
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 %				90	93	86
cM capacity (veh/h)				1141	540	842
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	253	146	113	235	235	153
Volume Left	0	0	113	0	0	37
Volume Right	0	19	0	0	0	116
cSH	1700	1700	1141	1700	1700	742
Volume to Capacity	0.15	0.09	0.10	0.14	0.14	0.21
Queue Length 95th (ft)	0	0	8	0	0	19
Control Delay (s)	0.0	0.0	8.5	0.0	0.0	11.1
Lane LOS				A	B	
Approach Delay (s)	0.0		1.6	11.1		
Approach LOS				B		
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			34.7%		ICU Level of Service	
Analysis Period (min)			15		A	
* User Entered Value						

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↘		↘	↑↑	↘	
Traffic Volume (veh/h)	735	53	127	817	49	243
Future Volume (Veh/h)	735	53	127	817	49	243
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)	774	56	134	860	52	256
Pedestrians					27	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					2	
Right turn flare (veh)						
Median type	TW	LT		None		
Median storage veh)	2					
Upstream signal (ft)	564			687		
pX, platoon unblocked			0.90		0.90	0.90
vC, conflicting volume			857		1527	442
vC1, stage 1 conf vol					829	
vC2, stage 2 conf vol					698	
vCu, unblocked vol			623		1366	163
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 %			84		86	68
cM capacity (veh/h)			841		374	788
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	516	314	134	430	430	308
Volume Left	0	0	134	0	0	52
Volume Right	0	56	0	0	0	256
cSH	1700	1700	841	1700	1700	664
Volume to Capacity	0.30	0.18	0.16	0.25	0.25	0.46
Queue Length 95th (ft)	0	0	14	0	0	62
Control Delay (s)	0.0	0.0	10.1	0.0	0.0	15.0
Lane LOS			B			C
Approach Delay (s)	0.0		1.4			15.0
Approach LOS						C
Intersection Summary						
Average Delay			2.8			
Intersection Capacity Utilization			56.9%		ICU Level of Service	B
Analysis Period (min)			15			
* User Entered Value						

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

06/16/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	112	50	19	22	59	35	31	522	17	42	621	226
Future Volume (vph)	112	50	19	22	59	35	31	522	17	42	621	226
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	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98			0.98		1.00	1.00		1.00	0.97	
Flpb, ped/bikes	1.00	1.00			1.00		0.97	1.00		1.00	1.00	
Frt	1.00	0.96			0.96		1.00	1.00		1.00	0.96	
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1757			1741		1718	3515		1770	3284	
Flt Permitted	0.80	1.00			0.94		0.28	1.00		0.44	1.00	
Satd. Flow (perm)	1488	1757			1656		508	3515		827	3284	
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)	115	52	20	23	61	36	32	538	18	43	640	233
RTOR Reduction (vph)	0	14	0	0	19	0	0	3	0	0	43	0
Lane Group Flow (vph)	115	58	0	0	101	0	32	553	0	43	830	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)	14.8	14.8			14.8		25.6	25.6		25.6	25.6	
Effective Green, g (s)	14.8	14.8			14.8		25.6	25.6		25.6	25.6	
Actuated g/C Ratio	0.29	0.29			0.29		0.51	0.51		0.51	0.51	
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)	436	515			486		258	1785		420	1668	
v/s Ratio Prot		0.03						0.16			c0.25	
v/s Ratio Perm	c0.08				0.06		0.06			0.05		
v/c Ratio	0.26	0.11			0.21		0.12	0.31		0.10	0.50	
Uniform Delay, d1	13.6	13.0			13.4		6.5	7.2		6.4	8.2	
Progression Factor	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	0.1		0.1	0.2	
Delay (s)	14.0	13.1			13.6		6.7	7.3		6.5	8.4	
Level of Service	B	B			B		A	A		A	A	
Approach Delay (s)		13.6			13.6			7.3			8.3	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay		8.9			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.41										
Actuated Cycle Length (s)		50.4			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		62.7%			ICU Level of Service			B				
Analysis Period (min)		15										
c Critical Lane Group												

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

06/16/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	277	91	91	17	42	22	38	611	26	58	749	118
Future Volume (vph)	277	91	91	17	42	22	38	611	26	58	749	118
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	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.93			0.96		1.00	0.99		1.00	0.96	
Flpb, ped/bikes	0.88	1.00			0.98		0.94	1.00		0.93	1.00	
Frt	1.00	0.93			0.96		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1552	1603			1669		1671	3494		1652	3345	
Flt Permitted	0.70	1.00			0.93		0.22	1.00		0.34	1.00	
Satd. Flow (perm)	1147	1603			1575		379	3494		593	3345	
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)	289	95	95	18	44	23	40	636	27	60	780	123
RTOR Reduction (vph)	0	18	0	0	13	0	0	4	0	0	14	0
Lane Group Flow (vph)	289	172	0	0	72	0	40	659	0	60	889	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)	26.0	26.0			26.0		24.9	24.9		24.9	24.9	
Effective Green, g (s)	26.0	26.0			26.0		24.9	24.9		24.9	24.9	
Actuated g/C Ratio	0.43	0.43			0.43		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	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	489	684			672		154	1428		242	1367	
v/s Ratio Prot		0.11						0.19			c0.27	
v/s Ratio Perm	c0.25				0.05		0.11			0.10		
v/c Ratio	0.59	0.25			0.11		0.26	0.46		0.25	0.65	
Uniform Delay, d1	13.4	11.2			10.5		11.9	13.1		11.8	14.5	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.9	0.2			0.1		0.9	0.2		0.5	1.1	
Delay (s)	15.3	11.4			10.5		12.8	13.4		12.4	15.6	
Level of Service	B	B			B		B	B		B	B	
Approach Delay (s)		13.7			10.5			13.3			15.4	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay		14.2			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.62										
Actuated Cycle Length (s)		60.9			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		63.3%			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

06/16/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	41	76	100	117	143	68	338	42	61	455	70
Future Volume (vph)	42	41	76	100	117	143	68	338	42	61	455	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	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	0.99	1.00		0.97	1.00		0.97	1.00		0.98	1.00	
Frt	1.00	0.90		1.00	0.92		1.00	0.98		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)	1759	1626		1710	1690		1708	3461		1731	3425	
Flt Permitted	0.59	1.00		0.68	1.00		0.45	1.00		0.52	1.00	
Satd. Flow (perm)	1097	1626		1222	1690		805	3461		945	3425	
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)	44	43	79	104	122	149	71	352	44	64	474	73
RTOR Reduction (vph)	0	55	0	0	60	0	0	12	0	0	15	0
Lane Group Flow (vph)	44	67	0	104	211	0	71	384	0	64	532	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)	9.7	9.7		9.7	9.7		12.1	12.1		12.1	12.1	
Effective Green, g (s)	9.7	9.7		9.7	9.7		12.1	12.1		12.1	12.1	
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.38	0.38		0.38	0.38	
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)	334	495		372	515		306	1316		359	1303	
v/s Ratio Prot		0.04			c0.12			0.11			c0.16	
v/s Ratio Perm	0.04			0.09			0.09			0.07		
v/c Ratio	0.13	0.14		0.28	0.41		0.23	0.29		0.18	0.41	
Uniform Delay, d1	8.0	8.0		8.4	8.8		6.7	6.9		6.5	7.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.1		0.4	0.5		0.4	0.1		0.2	0.2	
Delay (s)	8.2	8.1		8.8	9.3		7.1	7.0		6.8	7.4	
Level of Service	A	A		A	A		A	A		A	A	
Approach Delay (s)		8.1			9.2			7.0			7.4	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM 2000 Control Delay		7.8			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.41										
Actuated Cycle Length (s)		31.8			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		54.9%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

34: Ward Ave & Pohukaina St/Auahi St

06/16/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	105	74	225	91	272	71	362	75	126	424	125
Future Volume (vph)	49	105	74	225	91	272	71	362	75	126	424	125
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	0.90		1.00	0.98		1.00	0.97	
Flpb, ped/bikes	0.94	1.00		0.94	1.00		0.97	1.00		0.94	1.00	
Frt	1.00	0.94		1.00	0.89		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)	1657	1687		1670	1492		1718	3369		1657	3324	
Flt Permitted	0.43	1.00		0.63	1.00		0.38	1.00		0.46	1.00	
Satd. Flow (perm)	749	1687		1116	1492		682	3369		804	3324	
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)	54	115	81	247	100	299	78	398	82	138	466	137
RTOR Reduction (vph)	0	30	0	0	56	0	0	20	0	0	32	0
Lane Group Flow (vph)	54	166	0	247	343	0	78	460	0	138	571	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)	25.9	25.9		25.9	25.9		24.4	24.4		24.4	24.4	
Effective Green, g (s)	25.9	25.9		25.9	25.9		24.4	24.4		24.4	24.4	
Actuated g/C Ratio	0.43	0.43		0.43	0.43		0.40	0.40		0.40	0.40	
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)	321	724		479	640		275	1363		325	1345	
v/s Ratio Prot		0.10			c0.23			0.14			c0.17	
v/s Ratio Perm	0.07			0.22			0.11			0.17		
v/c Ratio	0.17	0.23		0.52	0.54		0.28	0.34		0.42	0.42	
Uniform Delay, d1	10.6	10.9		12.6	12.7		12.1	12.4		12.9	12.9	
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		0.9	0.9		0.6	0.1		0.9	0.2	
Delay (s)	10.8	11.0		13.5	13.6		12.6	12.5		13.8	13.1	
Level of Service	B	B		B	B		B	B		B	B	
Approach Delay (s)		11.0			13.6			12.5			13.2	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay		12.9			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.48										
Actuated Cycle Length (s)		60.3			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		84.2%			ICU Level of Service			E				
Analysis Period (min)		15										
c Critical Lane Group												

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

06/16/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	101	47	12	67	43	40	135	31	23	227	128
Future Volume (vph)	32	101	47	12	67	43	40	135	31	23	227	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	0.98		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	0.96	1.00	1.00	0.98	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	1746		1770	1863	1509	1692	1863	1514	1735	1863	1457
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.61	1.00	1.00	0.67	1.00	1.00
Satd. Flow (perm)	1770	1746		1770	1863	1509	1090	1863	1514	1218	1863	1457
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)	33	105	49	12	70	45	42	141	32	24	236	133
RTOR Reduction (vph)	0	24	0	0	0	33	0	0	19	0	0	78
Lane Group Flow (vph)	33	130	0	13	70	12	42	141	13	24	236	55
Confl. Peds. (#/hr)			51			36	63		25	25		63
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)	1.7	15.1		0.5	13.9	13.9	21.5	21.5	21.5	21.5	21.5	21.5
Effective Green, g (s)	1.7	15.1		0.5	13.9	13.9	21.5	21.5	21.5	21.5	21.5	21.5
Actuated g/C Ratio	0.03	0.29		0.01	0.27	0.27	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	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)	57	506		16	497	402	449	768	624	502	768	601
v/s Ratio Prot	c0.02	c0.07		0.01	0.04			0.08			c0.13	
v/s Ratio Perm						0.01	0.04		0.01	0.02		0.04
v/c Ratio	0.58	0.26		0.81	0.14	0.03	0.09	0.18	0.02	0.05	0.31	0.09
Uniform Delay, d1	24.8	14.2		25.8	14.6	14.1	9.3	9.7	9.1	9.2	10.3	9.3
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	13.5	0.3		132.2	0.1	0.0	0.1	0.1	0.0	0.0	0.2	0.1
Delay (s)	38.3	14.5		157.9	14.7	14.1	9.4	9.8	9.1	9.2	10.5	9.4
Level of Service	D	B		F	B	B	A	A	A	A	B	A
Approach Delay (s)		18.7			29.0			9.6			10.1	
Approach LOS		B			C			A			B	
Intersection Summary												
HCM 2000 Control Delay		14.3			HCM 2000 Level of Service				B			
HCM 2000 Volume to Capacity ratio		0.31										
Actuated Cycle Length (s)		52.1			Sum of lost time (s)				15.0			
Intersection Capacity Utilization		59.8%			ICU Level of Service				B			
Analysis Period (min)		15										
c Critical Lane Group												

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

06/16/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	235	56	36	151	37	96	150	46	55	215	176
Future Volume (vph)	66	235	56	36	151	37	96	150	46	55	215	176
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	0.76	1.00	1.00	0.82	1.00	1.00	0.77
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.87	1.00	1.00	0.86	1.00	1.00
Frt	1.00	0.97		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	1753		1770	1863	1201	1540	1863	1292	1530	1863	1212
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.56	1.00	1.00	0.66	1.00	1.00
Satd. Flow (perm)	1770	1753		1770	1863	1201	914	1863	1292	1063	1863	1212
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)	67	240	57	37	154	38	98	153	47	56	219	180
RTOR Reduction (vph)	0	10	0	0	0	23	0	0	33	0	0	127
Lane Group Flow (vph)	67	287	0	37	154	15	98	153	14	56	219	53
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)	6.2	31.7		3.1	28.6	28.6	20.6	20.6	20.6	20.6	20.6	20.6
Effective Green, g (s)	6.2	31.7		3.1	28.6	28.6	20.6	20.6	20.6	20.6	20.6	20.6
Actuated g/C Ratio	0.09	0.45		0.04	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)	155	789		77	756	487	267	545	378	311	545	354
v/s Ratio Prot	c0.04	c0.16		0.02	0.08			0.08			c0.12	
v/s Ratio Perm						0.01	0.11		0.01	0.05		0.04
v/c Ratio	0.43	0.36		0.48	0.20	0.03	0.37	0.28	0.04	0.18	0.40	0.15
Uniform Delay, d1	30.4	12.7		32.9	13.5	12.6	19.7	19.2	17.8	18.6	20.0	18.4
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	1.9	0.3		4.7	0.1	0.0	0.9	0.3	0.0	0.3	0.5	0.2
Delay (s)	32.4	13.0		37.5	13.7	12.6	20.6	19.5	17.8	18.9	20.4	18.6
Level of Service	C	B		D	B	B	C	B	B	B	C	B
Approach Delay (s)		16.6			17.3			19.6			19.5	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay		18.4			HCM 2000 Level of Service				B			
HCM 2000 Volume to Capacity ratio		0.40										
Actuated Cycle Length (s)		70.4			Sum of lost time (s)				15.0			
Intersection Capacity Utilization		73.1%			ICU Level of Service				D			
Analysis Period (min)		15										
c Critical Lane Group												

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

06/16/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	4	24	0	0	0	81	78	8	6	41	61
Future Volume (vph)	53	4	24	0	0	0	81	78	8	6	41	61
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	
Frpb, 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)		1726	1546				1770	1830			1614	
Flt Permitted		0.96	1.00				0.95	1.00			0.99	
Satd. Flow (perm)		1726	1546				1770	1830			1601	
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)	56	4	25	0	0	0	85	82	8	6	43	64
RTOR Reduction (vph)	0	0	21	0	0	0	0	3	0	0	38	0
Lane Group Flow (vph)	0	60	4	0	0	0	85	87	0	0	75	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)		8.5	8.5				6.3	31.8			20.5	
Effective Green, g (s)		8.5	8.5				6.3	31.8			20.5	
Actuated g/C Ratio		0.17	0.17				0.13	0.63			0.41	
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)		291	261				221	1156			652	
v/s Ratio Prot							c0.05	0.05				
v/s Ratio Perm		0.03	0.00								c0.05	
v/c Ratio		0.21	0.02				0.38	0.08			0.12	
Uniform Delay, d1		18.0	17.4				20.2	3.6			9.3	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		0.4	0.0				1.1	0.0			0.1	
Delay (s)		18.3	17.4				21.3	3.6			9.3	
Level of Service		B	B				C	A			A	
Approach Delay (s)		18.1			0.0			12.2			9.3	
Approach LOS		B			A			B			A	
Intersection Summary												
HCM 2000 Control Delay		12.7					HCM 2000 Level of Service		B			
HCM 2000 Volume to Capacity ratio		0.18										
Actuated Cycle Length (s)		50.3					Sum of lost time (s)		15.0			
Intersection Capacity Utilization		34.9%					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

06/16/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	7	132	0	0	0	109	115	11	3	95	90
Future Volume (vph)	148	7	132	0	0	0	109	115	11	3	95	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	
Lane Util. Factor		1.00	1.00				1.00	1.00			1.00	
Frpb, ped/bikes		1.00	0.95				1.00	0.99			0.90	
Flpb, ped/bikes		0.88	1.00				1.00	1.00			1.00	
Frt		1.00	0.85				1.00	0.99			0.94	
Flt Protected		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)		1572	1497				1770	1817			1573	
Flt Permitted		0.95	1.00				0.95	1.00			1.00	
Satd. Flow (perm)		1572	1497				1770	1817			1569	
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)	149	7	133	0	0	0	110	116	11	3	96	91
RTOR Reduction (vph)	0	0	100	0	0	0	0	4	0	0	36	0
Lane Group Flow (vph)	0	156	33	0	0	0	110	123	0	0	154	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)		13.6	13.6				7.2	31.0			18.8	
Effective Green, g (s)		13.6	13.6				7.2	31.0			18.8	
Actuated g/C Ratio		0.25	0.25				0.13	0.57			0.34	
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)		391	372				233	1031			540	
v/s Ratio Prot							c0.06	0.07				
v/s Ratio Perm		0.10	0.02								c0.10	
v/c Ratio		0.40	0.09				0.47	0.12			0.29	
Uniform Delay, d1		17.1	15.7				21.9	5.5			13.0	
Progression Factor		1.00	1.00				1.00	1.00			1.00	
Incremental Delay, d2		0.7	0.1				1.5	0.1			0.3	
Delay (s)		17.8	15.8				23.5	5.5			13.3	
Level of Service		B	B				C	A			B	
Approach Delay (s)		16.9			0.0			13.8			13.3	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM 2000 Control Delay		14.9					HCM 2000 Level of Service		B			
HCM 2000 Volume to Capacity ratio		0.36										
Actuated Cycle Length (s)		54.6					Sum of lost time (s)		15.0			
Intersection Capacity Utilization		57.1%					ICU Level of Service		B			
Analysis Period (min)		15										
c Critical Lane Group												

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

06/16/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	259	1685	12	99	1776	194	2	41	44	265	118	207
Future Volume (vph)	259	1685	12	99	1776	194	2	41	44	265	118	207
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	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.84		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		1.00	1.00	0.95	0.99	
Satd. Flow (prot)	1770	5078		1770	5085	1330		3531	1470	1610	2908	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	0.99	
Satd. Flow (perm)	1770	5078		1770	5085	1330		3531	1470	1610	2908	
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)	273	1774	13	104	1869	204	2	43	46	279	124	218
RTOR Reduction (vph)	0	1	0	0	0	84	0	0	0	0	144	0
Lane Group Flow (vph)	273	1786	0	104	1869	120	0	45	46	215	262	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)	18.7	58.2		9.3	48.8	48.8		25.8	25.8	25.8	25.8	
Effective Green, g (s)	18.7	58.2		9.3	48.8	48.8		25.8	25.8	25.8	25.8	
Actuated g/C Ratio	0.13	0.42		0.07	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)	237	2124		118	1783	466		654	272	298	539	
v/s Ratio Prot	c0.15	0.35		0.06	c0.37			0.01		c0.13	0.09	
v/s Ratio Perm					0.09				c0.03			
v/c Ratio	1.15	0.84		0.88	1.05	0.26		0.07	0.17	0.72	0.49	
Uniform Delay, d1	60.2	36.3		64.4	45.1	32.2		46.7	47.6	53.3	50.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	105.6	3.2		48.1	35.2	0.3		0.0	0.3	8.3	0.7	
Delay (s)	165.8	39.5		112.5	80.4	32.5		46.8	47.9	61.6	51.4	
Level of Service	F	D		F	F	C		D	D	E	D	
Approach Delay (s)		56.2			77.4			47.4			54.9	
Approach LOS		E			E			D			D	
Intersection Summary												
HCM 2000 Control Delay		65.2			HCM 2000 Level of Service			E				
HCM 2000 Volume to Capacity ratio		0.80										
Actuated Cycle Length (s)		139.1			Sum of lost time (s)			20.0				
Intersection Capacity Utilization		94.4%			ICU Level of Service			F				
Analysis Period (min)		15										
c Critical Lane Group												

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

06/16/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	2045	2	52	1442	253	7	110	163	326	70	276
Future Volume (vph)	223	2045	2	52	1442	253	7	110	163	326	70	276
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	
Frpb, 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	5084		1770	5085	1261		3529	1367	1610	2922	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	0.99	
Satd. Flow (perm)	1770	5084		1770	5085	1261		3529	1367	1610	2922	
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)	235	2153	2	55	1518	266	7	116	172	343	74	291
RTOR Reduction (vph)	0	0	0	0	0	133	0	0	0	0	195	0
Lane Group Flow (vph)	235	2155	0	55	1518	133	0	123	172	247	266	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	69.0		6.0	53.0	53.0		35.0	35.0	28.2	28.2	
Effective Green, g (s)	22.0	69.0		6.0	53.0	53.0		35.0	35.0	28.2	28.2	
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	2217		67	1703	422		780	302	286	520	
v/s Ratio Prot	c0.13	c0.42		0.03	0.30			0.03		c0.15	0.09	
v/s Ratio Perm					0.11				c0.13			
v/c Ratio	0.96	0.97		0.82	0.89	0.32		0.16	0.57	0.86	0.51	
Uniform Delay, d1	67.6	43.7		75.6	49.9	39.1		49.7	54.9	63.1	58.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	44.7	13.1		52.9	6.3	0.4		0.1	2.5	22.6	0.9	
Delay (s)	112.3	56.8		128.5	56.2	39.5		49.8	57.3	85.7	59.6	
Level of Service	F	E		F	E	D		D	E	F	E	
Approach Delay (s)		62.3			56.0			54.2			68.7	
Approach LOS		E			E			D			E	
Intersection Summary												
HCM 2000 Control Delay		60.5			HCM 2000 Level of Service			E				
HCM 2000 Volume to Capacity ratio		0.86										
Actuated Cycle Length (s)		158.2			Sum of lost time (s)			20.0				
Intersection Capacity Utilization		102.0%			ICU Level of Service			G				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

43: Ala Moana Park Dr/Kamakee St & Ala Moana Blvd

06/16/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	1702	93	13	1917	113	91	22	14	121	30	111
Future Volume (vph)	84	1702	93	13	1917	113	91	22	14	121	30	111
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	0.97			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	0.99		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	5030		1770	5026		1770	1706			1700	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.54	1.00			0.74	1.00
Satd. Flow (perm)	1770	5030		1770	5026		1006	1706			1315	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)	87	1755	96	13	1976	116	94	23	14	125	31	114
RTOR Reduction (vph)	0	3	0	0	4	0	0	11	0	0	0	90
Lane Group Flow (vph)	87	1848	0	13	2088	0	94	26	0	0	156	24
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)	12.0	88.4		1.8	78.2		27.8	27.8			27.8	27.8
Effective Green, g (s)	12.0	88.4		1.8	78.2		27.8	27.8			27.8	27.8
Actuated g/C Ratio	0.09	0.66		0.01	0.59		0.21	0.21			0.21	0.21
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)	159	3343		23	2955		210	356			274	330
v/s Ratio Prot	c0.05	c0.37		0.01	c0.42			0.02				
v/s Ratio Perm							0.09				c0.12	0.02
v/c Ratio	0.55	0.55		0.57	0.71		0.45	0.07			0.57	0.07
Uniform Delay, d1	57.9	11.8		65.2	19.3		45.9	42.2			47.2	42.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	3.8	0.2		28.1	0.8		1.5	0.1			2.7	0.1
Delay (s)	61.7	12.0		93.3	20.1		47.4	42.3			49.9	42.3
Level of Service	E	B		F	C		D	D			D	D
Approach Delay (s)		14.3			20.6			46.0			46.7	
Approach LOS		B			C			D			D	
Intersection Summary												
HCM 2000 Control Delay		20.1			HCM 2000 Level of Service			C				
HCM 2000 Volume to Capacity ratio		0.66										
Actuated Cycle Length (s)		133.0			Sum of lost time (s)			15.0				
Intersection Capacity Utilization		83.0%			ICU Level of Service			E				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

43: Ala Moana Park Dr/Kamakee St & Ala Moana Blvd

06/16/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	2367	201	37	1644	189	62	21	47	109	57	150
Future Volume (vph)	66	2367	201	37	1644	189	62	21	47	109	57	150
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	0.99		1.00	0.93			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	0.98		1.00	0.90			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	4985		1770	4962		1770	1556			1707	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.50	1.00			0.76	1.00
Satd. Flow (perm)	1770	4985		1770	4962		939	1556			1340	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)	68	2440	207	38	1695	195	64	22	48	112	59	155
RTOR Reduction (vph)	0	6	0	0	8	0	0	37	0	0	0	87
Lane Group Flow (vph)	68	2641	0	38	1882	0	64	33	0	0	171	68
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)	8.7	97.6		6.6	95.5		33.6	33.6			33.6	33.6
Effective Green, g (s)	8.7	97.6		6.6	95.5		33.6	33.6			33.6	33.6
Actuated g/C Ratio	0.06	0.64		0.04	0.62		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)	100	3184		76	3101		206	342			294	348
v/s Ratio Prot	c0.04	c0.53		0.02	0.38			0.02				
v/s Ratio Perm							0.07				c0.13	0.04
v/c Ratio	0.68	0.83		0.50	0.61		0.31	0.10			0.58	0.19
Uniform Delay, d1	70.7	21.2		71.5	17.3		49.9	47.5			53.3	48.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	17.3	1.9		5.1	0.3		0.9	0.1			2.9	0.3
Delay (s)	88.0	23.1		76.6	17.6		50.8	47.6			56.2	48.8
Level of Service	F	C		E	B		D	D			E	D
Approach Delay (s)		24.7			18.8			49.1			52.7	
Approach LOS		C			B			D			D	
Intersection Summary												
HCM 2000 Control Delay		24.9			HCM 2000 Level of Service			C				
HCM 2000 Volume to Capacity ratio		0.77										
Actuated Cycle Length (s)		152.8			Sum of lost time (s)			15.0				
Intersection Capacity Utilization		88.7%			ICU Level of Service			E				
Analysis Period (min)		15										
c Critical Lane Group												

APPENDIX G

TRANSIT CAPACITY ANALYSIS CALCULATIONS

Multimodal Transit LOS Calculation																							
		Ala Moana Blvd 1 peak	Ala Moana Blvd 1	Ala Moana Blvd 2 peak	Ala Moana Blvd 2	Kapiolani Blvd 1 peak	Kapiolani Blvd 1	Kapiolani Blvd 2 peak	Kapiolani Blvd 2	Auahi St 1 peak	Ward Ave peak	Ward Ave	Queen St 1 peak	Queen St 1	Queen St 2 peak	Queen St 2							
From		Queen St	Queen St	Ward Ave	Ward Ave	Ward Ave	Ward Ave	Kamakee St	Kamakee St	Ward Ave	Halekauwila St	Halekauwila St	Cooke St	Cooke St	Kamani St	Kamani St							
To		Ward Ave	Ward Ave	Queen St	Queen St	Kamakee St	Kamakee St	Pikoii St	Pikoii St	Kamakee St	Kapiolani Blvd	Kapiolani Blvd	Kamani St	Kamani St	Cooke St	Cooke St							
Inputs		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	14	15	16	17	18	19	20
TRANSIT OPERATIONS INFORMATION																							
t _{ex}	Number of local buses on street segment per hour (bus/h)	14	9	14	9	17	8	22	12	3	3	2	3	2	3	2							
	Number of express buses stopping in segment per hour (bus/h)	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0							
	Average excess wait time (min)	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8							
	Average passenger load factor (p/seat)	1.1	1.1	1.1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5							
	Average transit travel speed (mi/h)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0							
I _{pt}	Average passenger trip length (mi)	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8							
Is the segment in the CBD of a metro area of 5 million or more?		No	No	No	No	No	No	No	No	No	No	No	No	No	No	No							
TRANSIT AMENITY DATA																							
p _{sh}	Percent stops in segment with a shelter	75%	75%	100%	100%	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%	0%							
p _{be}	Percent stops in segment with a bench	75%	75%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%							
PEDESTRIAN ENVIRONMENT DATA																							
W _A	Sidewalk width (ft) (Enter 0 if no sidewalk)	8.0	8.0	6.0	6.0	8.0	8.0	6.0	6.0	8.0	10.0	10.0	0.0	0.0	0.0	0.0							
W _{buf}	Buffer width from sidewalk to street (ft)	0.0	0.0	0.0	0.0	9.0	9.0	11.0	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0							
Does a continuous barrier exist between the street and sidewalk?		No	No	No	No	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No							
Is the street divided?		Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes							
Are parking spaces striped?		No	No	No	No	No	No	No	No	Yes	Yes	Yes	No	No	No	No							
p _{pk}	Proportion of on-street parking occupied	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%							
W _{bl}	Bicycle lane width (ft)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0							
W _{os}	Shoulder/parking lane width (ft)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0	10.0	10.0	0.0	0.0	0.0	0.0							
W _{ol}	Outside travel lane (closest to sidewalk) width (ft)	10.0	10.0	10.0	10.0	12.0	10.0	10.0	12.0	11.0	11.0	11.0	12.0	12.0	12.0	12.0							
V _m	Outside lane demand flow rate at midsegment (veh/h)	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400							
S _R	Average vehicle running speed, including intersection delay (mi/h)	10.0	15.0	18.0	18.0	12.0	12.0	9.0	18.0	6.0	4.0	6.0	6.0	12.0	12.0	12.0							
Calculations																							
f	Transit frequency (bus/h)	15	10	15	10	17	8	23	13	3	3	2	3	2	3	2							
f _h	Headway factor	3.64	3.47	3.64	3.47	3.68	3.34	3.76	3.58	2.48	2.48	1.95	2.48	1.95	2.48	1.95							
f _{pl}	Passenger load weighting factor	1.41	1.41	1.41	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00							
T _{at}	Perceived amenity time rate (min/mi)	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.1	0.1	0.1	0.1	0.1	0.1							
T _{ex}	Excess wait time rate due to late arrivals (min/mi)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7							
T _{ptt}	Perceived travel time rate (min/mi)	8.2	8.2	8.1	6.1	6.1	6.1	6.1	6.1	6.1	6.4	6.4	6.4	6.4	6.4	6.4							
T _{ttt}	Base travel time rate (min/mi)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0							
f _{tt}	Perceived travel time factor	0.76	0.76	0.76	0.85	0.85	0.85	0.85	0.85	0.85	0.83	0.83	0.83	0.83	0.83	0.83							
S _{w-r}	Transit wait-ride score	2.75	2.62	2.76	2.94	3.12	2.83	3.19	3.04	2.10	2.06	1.62	2.06	1.62	2.06	1.62							
f _s	Motorized vehicle speed adjustment factor	0.04	0.09	0.13	0.13	0.06	0.06	0.03	0.13	0.01	0.01	0.01	0.01	0.01	0.06	0.06							
f _v	Motorized vehicle volume adjustment factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91							
W _{ak}	Adjusted available sidewalk width (ft)	8.0	8.0	6.0	6.0	8.0	8.0	6.0	6.0	8.0	10.0	10.0	0.0	0.0	0.0	0.0							
f _{sw}	Sidewalk width coefficient	3.60	3.60	4.20	4.20	3.60	3.60	4.20	4.20	3.60	3.00	3.00	6.00	6.00	6.00	6.00							
f _b	Buffer area coefficient	1.00	1.00	1.00	1.00	5.37	5.37	5.37	5.37	1.00	1.00	1.00	1.00	1.00	1.00	1.00							
W _t	Total width of outside lane, bike lane, and parking lane/shoulder (ft)	10.0	10.0	10.0	10.0	12.0	10.0	12.0	12.0	19.0	21.0	21.0	12.0	12.0	12.0	12.0							
W _v	Effective total width as a function of traffic volume (ft)	10.0	10.0	10.0	10.0	12.0	10.0	12.0	12.0	19.0	21.0	21.0	12.0	12.0	12.0	12.0							
W ₁	Effective width of combined bike lane and shoulder (ft)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0	10.0	10.0	0.0	0.0	0.0	0.0							
f _w	Cross-section adjustment factor	-4.49	-4.49	-4.37	-4.37	-5.51	-5.48	-5.61	-5.61	-4.85	-4.94	-4.94	-3.05	-3.05	-3.05	-3.05							
I _p	Pedestrian environment score	2.51	2.56	2.71	2.71	1.50	1.53	1.38	1.48	2.13	2.02	2.03	3.92	3.96	3.96	3.96							
I _t	Pedestrian LOS	B	B	B	B	A	A	A	A	B	B	B	D	D	D	D							
	Transit LOS score	2.25	2.45	2.26	2.00	1.55	1.98	1.43	1.67	3.17	3.22	3.87	3.50	4.16	3.51	4.16							
Output																							
Transit LOS		B	B	B	B	A	A	A	A	C	C	D	D	D	D	D							