Traffic Impact Report

Victoria Ward Development

Phase 2

Prepared for:
Victoria Ward, Limited

Prepared by:
Wilson Okamoto Corporation

June 2014

TRAFFIC IMPACT REPORT

FOR THE

VICTORIA WARD DEVELOPMENT

Phase 2

Prepared for:

Victoria Ward, Limited

Prepared by:

Wilson Okamoto Corporation
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June 2014

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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 Phase 2 of the Victoria Ward Development in Kakaako on the island of Oahu. Phase 2 of the proposed project entails the replacement of existing commercial uses and parking areas with new residential and commercial/retail uses.

B. Scope of Study

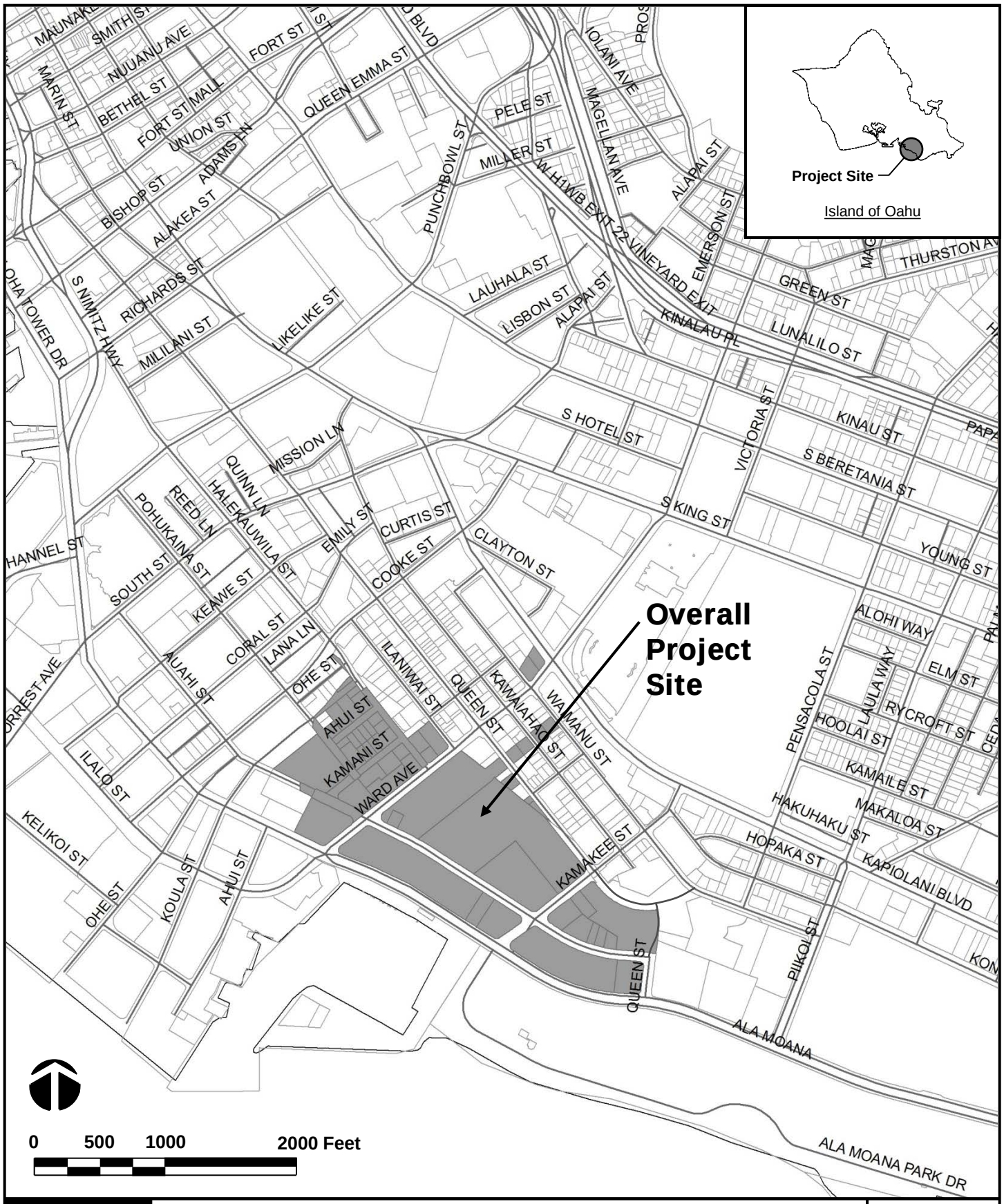
This report presents the findings and conclusions of the traffic study, the scope of which includes:

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 overall Victoria Ward development currently encompasses Ward Warehouse and Ward Centre, Ward Entertainment Center, Ward Village Shops, and other surrounding commercial and office buildings. The proposed master plan area is bounded by Ala Moana Boulevard to the south, Koula Street to the west, Queen Street to the north, and Queen Lane to the east. Phase 2 entails the development of six smaller parcels within the project area (see Figure 1). The first three parcels (referred to as “Block B West”, “Block B East”, and “Block C West”) currently houses Ward Warehouse adjacent to Auahi Street. The fourth parcel (referred to as “Block G East”) is located adjacent to Ward Avenue between



VICTORIA WARD DEVELOPMENT – PHASE 2

LOCATION AND VICINITY MAP

FIGURE 1

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Halekauwila Street and Pohukaina Street while the fifth parcel (referred to as "Block M") is located on the northwest corner of the Queen Street and Kamakee Street intersection. The last parcel is located along Auahi Street adjacent to the existing theater complex across from Ward Warehouse (see Figure 2 on following page).

B. Project Characteristics

The project site for the Victoria Ward development currently houses a variety of commercial and office uses. The overall development is expected to be implemented in phases over the next 10-15 years with the second phase (referred to as "Phase 2") expected to be completed by the Year 2017 with the exception of Block B West and Block G East which are expected to be completed by the Year 2018. In conjunction with Phase 2, a new section of Halekauwila Street is expected to be constructed between Kamakee Street and Block I. The following is a summary of the uses and accesses for each of the parcels:

- Block B West: Approximately 15,000 square feet (sf) of commercial/retail space with 180 multi-family residential units. Access will be provided via a right-turn-in and right-turn-out driveway off Ward Avenue.
- Block B East: Approximately 12,000 sf of commercial/retail space with 130 multi-family residential units. Access will be provided via a driveway off Auahi Street.
- Block C West: Approximately 12,000 sf of commercial/retail space with 130 multi-family residential units. Access will be provided via a driveway off Auahi Street.
- Block I: Approximately 60,000 to 70,000 sf of commercial/retail space with 200 multi-family residential units. Access will be provided via Halekauwila Street off Kamakee Street.
- Block M: Approximately 75,000 sf of commercial/retail space with 350 multi-family residential units. Primary access will be provided via Halekauwila Street off Kamakee Street with secondary access provided via a driveway off Queen Street.
- Block G East: Approximately 225,700 sf of commercial/retail space with 400 multi-family residential units. Access will be provided via a driveway off Halekauwila Street.

Figure 2 shows the proposed site plan.

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VICTORIA WARD DEVELOPMENT – PHASE 2

PROPOSED PHASE 2 SITE PLAN

FIGURE 2

III. BASELINE TRAFFIC CONDITIONS

A. Area Roadway System

East-west traffic through the Kakaako area is served by a number of existing roadways which include Ala Moana Boulevard, Auahi Street, Pohukaina Street, Halekauwila Street, and Queen Street while north-south traffic is served by a number of existing roadways including Cooke Street, Ward Avenue, Kamakee Street, and Queen Street.

Cooke Street is a four-lane, two-way roadway generally oriented in the north-south direction that serves as a connector roadway between the major east-west roadways in the vicinity. Near the west edge of the study area, Cooke Street intersects Halekauwila Street. Halekauwila Street is generally a two-lane, two-way roadway generally oriented in the east-west direction that serves as an alternate east-west route through Kakaako between Ward Avenue and Punchbowl Street. At the all-way stop-controlled intersection with Cooke Street, the eastbound and westbound approaches of Halekauwila Street have one lane that serves all traffic movements while the northbound and southbound approaches of Cooke Street have two lanes that serve all traffic movements.

South of the intersection with Halekauwila Street, Cooke Street intersects Pohukaina Street. Pohukaina Street is generally a two-lane, two-way roadway generally oriented in the east-west direction that also serves as an alternate east-west route through Kakaako. At the all-way stop-controlled intersection with Cooke Street, the eastbound and westbound approaches of Pohukaina Street have one lane that serves all traffic movements while the northbound and southbound approaches of Cooke Street have two lanes that serve all traffic movements.

East of the intersection with Cooke Street, Halekauwila Street intersects Ward Avenue. At this signalized intersection, the eastbound approach of Halekauwila Street has one lane that serves all turning movements. Ward Avenue is a predominantly four-lane, two-way roadway oriented in the north-south direction with exclusive turning lane provided at major intersections. At the intersection with Halekauwila Street, both approaches of Ward Avenue have an exclusive left-turn

lane, one through lane, and a shared through and right-turn lane. The east leg of the intersection is comprised of an entrance driveway for the adjacent Ward Gateway Center.

North of the intersection with Halekauwila Street, Ward Avenue intersects Queen Street. At this signalized intersection, both approaches of Ward Avenue have an exclusive left-turn lane, one through lane, and a shared through and right-turn lane. Near Ward Avenue, Queen Street is a predominantly two-lane, two-way roadway generally oriented in the east-west direction that transitions to a four-lane, two-way roadway east of Kamakee Street. At the intersection with Ward Avenue, both approaches of Queen Street have one lane that serves all traffic movements. It should be noted that there is also a remnant section of Queen Street located between Auahi Street and Ala Moana Boulevard near the east edge of the study area.

South of the intersection with Halekauwila Street, Ward Avenue intersects Auahi Street. At this signalized intersection, both approaches of Ward Avenue have an exclusive left-turn lane, one through lane, and a shared through and right-turn lane. Auahi Street is a predominantly four-lane, two-way roadway generally oriented in the east-west direction. The eastbound approach of Auahi Street has two lane that serve all traffic movements while the westbound approach has an exclusive left-turn lane and a shared through and right-turn lane.

Further south, Ward Avenue intersects Ala Moana Boulevard. At this signalized intersection, the northbound approach of Ward Avenue has a shared left-turn and through lane, one through lane, and an exclusive right-turn lane while the southbound approach has an exclusive left-turn lane, a shared left-turn and through lane, and a shared through and right-turn lane. In the vicinity of the project site, Ala Moana Boulevard is a predominantly six-lane, two-way roadway generally oriented in the east-west direction with exclusive turning lanes at major intersections. At the intersection with Ward Avenue, the eastbound approach has an exclusive left-turn lane, two through lanes, and a shared through and right-turn lane while the westbound approach of Ala Moana Boulevard has exclusive turning lanes and three through lanes.

East of Ward Avenue, Queen Street intersects Kamakee Street. At this signalized intersection, the eastbound approach of Queen Street has two lanes that serve all traffic movements while the westbound approach has an exclusive left-turn lane, one through lane, and a shared through and right-turn lane. Kamakee Street is a predominantly four-lane, two-way roadway generally oriented in the north-south direction that serves as a connector roadway between the major east-west roadways in the vicinity. At the intersection with Queen Street, both approaches of Kamakee Street have two lanes that serve all traffic movements.

South of the intersection with Queen Street, Kamakee Street intersects Auahi Street. At this signalized intersection, the northbound approach of Kamakee Street has an exclusive left-turn lane, one through lane, and a shared through and right-turn lane while the southbound approach has exclusive turning lanes and one through lane. The Auahi Street approaches of the intersection have an exclusive left-turn lane, one through lane, and a shared through and right-turn lane.

Further south, Kamakee Street intersects Ala Moana Boulevard and Ala Moana Park Drive. At this signalized intersection, the Kamakee Street and Ala Moana Park Drive approaches have an exclusive right-turn lane and a shared left-turn and through lane while both approaches of Ala Moana Boulevard have an exclusive left-turn lane, two through lanes, and a shared through and right-turn lane. It should be noted that in conjunction with a previous phase of the Victoria Ward Development (Phase 1A), the lane use on the northbound approach of Ala Moana Park Drive is expected to be modified to provide an exclusive left-turn lane and a shared through and right-turn lane.

On the east edge of the study area, Queen Street intersects Queen Lane. At this unsignalized T-intersection, the eastbound approach of Queen Street has a through lane and a shared through and right-turn lane while the westbound approach has an exclusive left-turn lane and two through lanes. Queen Lane is a two-lane, two-way connector roadway oriented in the north-south direction between Queen Street and Auahi Street. At the intersection with Queen Street, the Queens Lane approach has one stop-controlled lane that serves left-turn and right-turn traffic movements.

South of the intersection with Queen Street, Queen Lane intersects Ala Moana Boulevard and a remnant portion of Queen Street. At this signalized intersection, the southbound approach of Queen Lane has one lane that serves all traffic movements while the eastbound approach of Auahi Street has an exclusive right-turn lane and a shared left-turn and through lane. The remnant portion of Queen Street was, at one time, connected to the remainder of the roadway. However, over time, the roadways in the vicinity were realigned leaving a small portion of the original roadway between Auahi Street and Ala Moana Boulevard. At the intersection with Auahi Street and Queen Lane, the Queen Street approach has an exclusive left-turn lane and a shared through and right-turn lane. The westbound approach of the intersection is comprised of a driveway from the adjacent Hokua development that has one lane that serves all traffic movements.

South of the intersection with Auahi Street, Queen Street intersects Ala Moana Boulevard. At this signalized T-intersection, the eastbound approach of Ala Moana Boulevard has an exclusive left-turn lane and three through lanes while the westbound approach has two through lanes and a shared through and right-turn lane. The southbound approach of Queen Street has an exclusive left-turn lane and a shared left-turn and right-turn lane.

B. Traffic Volumes and Conditions

1. General

a. Field Investigation

Field investigations were conducted during April and May 2011, and supplemented during February 2014 between the weekday morning peak hours of 6:00 and 9:00 AM and afternoon peak hours of 3:00 PM and 6:00 PM at the following intersections:

- Cooke Street and Halekauwila Street
- Cooke Street and Pohukaina Street
- Ward Avenue and Queen Street
- Ward Avenue and Halekauwila Street
- Ward Avenue and Auahi Street
- Ward Avenue and Ala Moana Boulevard
- Kamakee Street and Queen Street

- Kamakee Street and Auahi Street
- Kamakee Street, Ala Moana Boulevard, and Ala Moana Park Drive
- Queen Street and Queen Lane
- Queen Street, Queen Lane, and Auahi Street
- Queen Street and Ala Moana Boulevard

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", developed by Trafficware. The analysis is based on the concept of Level of Service (LOS).

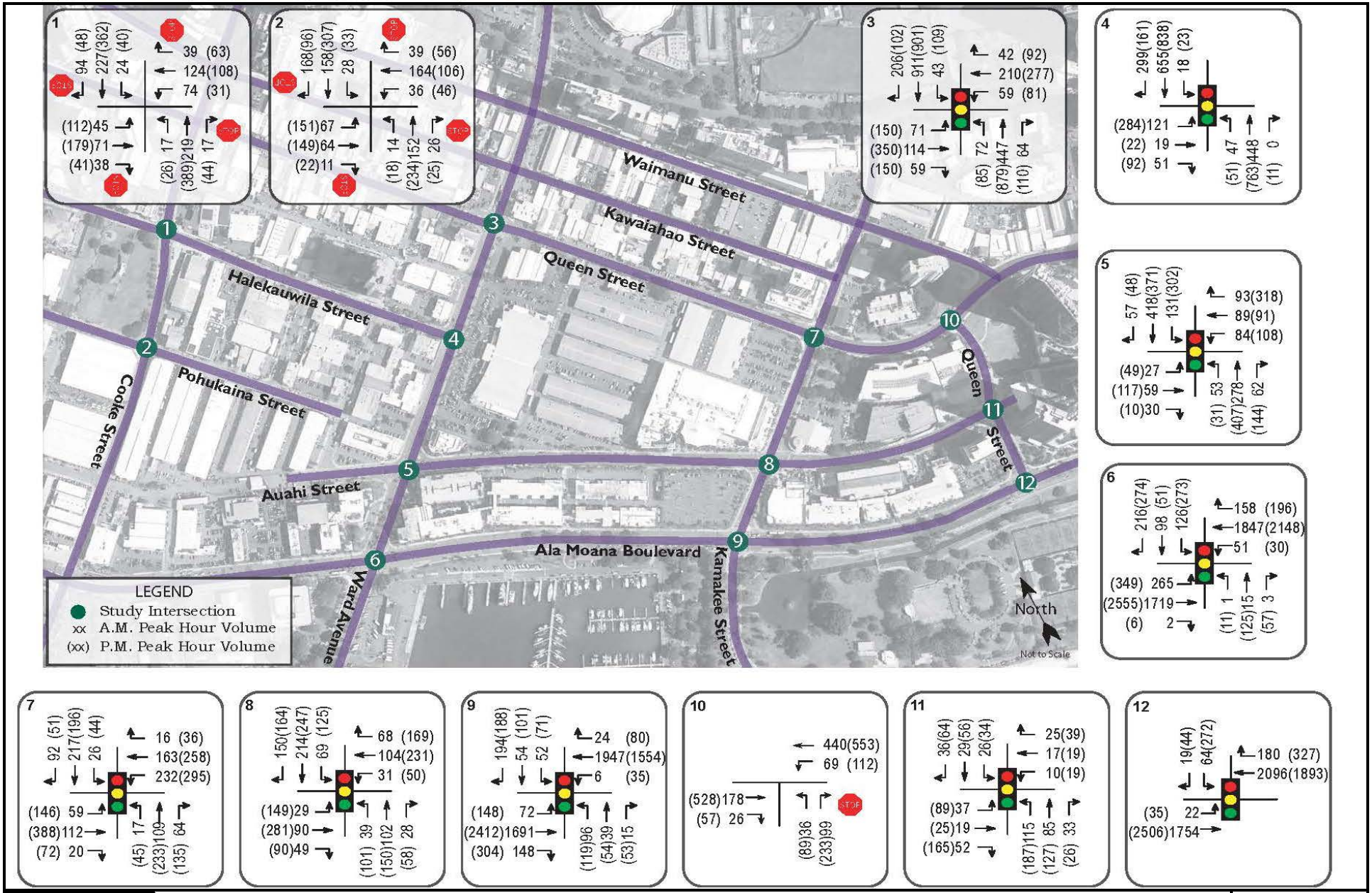
LOS is a quantitative and qualitative assessment of traffic operations. Levels of Service are defined by LOS "A" through "F"; LOS "A" representing ideal or free-flow traffic operating conditions and LOS "F" representing unacceptable or potentially congested traffic operating conditions.

"Volume-to-Capacity" (v/c) ratio is another measure indicating the relative traffic demand to the roadway 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 generally indicates that the traffic demand exceeds the road's carrying capacity. The LOS definitions are included in Appendix B.

2. Existing Peak Hour Traffic

a. General

Figure 3 shows the baseline Year 2016 AM and PM peak hour traffic volumes. These traffic conditions are based on the projected conditions included in the "Traffic Impact Report for the Victoria Ward Development Phase 1A" dated October 2012. The project



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VICTORIA WARD DEVELOPMENT - PHASE 2

BASELINE YEAR 2016 PEAK HOUR OF TRAFFIC

FIGURE 3

conditions from the study were adjusted to accommodate changes in the project development plan and access points since the completion of that study. The AM peak hour of traffic generally occurs between the hours of 7:00 AM and 8:00 AM while the PM peak hour of traffic generally occurs between the hours of 4:30 PM and 5:30 PM. The analysis is based on these peak hour time periods for each intersection. LOS calculations are included in Appendix C.

b. Cooke Street and Halekauwila Street

At the intersection with Halekauwila Street, Cooke Street carries 263 vehicles northbound and 350 vehicles southbound during the AM peak hour of traffic. During the PM peak period, traffic volumes are higher with 455 vehicles traveling eastbound and 436 vehicles traveling westbound. Both approaches of Cooke Street operate at LOS "B" and LOS "C" during the AM and PM peak periods, respectively.

The Halekauwila Street approaches of the intersection carry 154 vehicles eastbound and 232 vehicles westbound during the AM peak hour of traffic. During the PM peak period, the overall traffic volume is higher with 316 vehicles traveling eastbound and 181 vehicles traveling westbound. Both approaches of Halekauwila Street operate at LOS "B" and LOS "C" during the AM and PM peak periods, respectively.

c. Cooke Street and Pohukaina Street

At the intersection with Pohukaina Street, Cooke Street carries 203 vehicles northbound and 364 vehicles southbound during the AM peak hour of traffic. During the PM peak period, traffic volumes are higher with 279 vehicles traveling eastbound and 426 vehicles traveling westbound. The northbound approach of Cooke Street operates at LOS "A" and LOS "B" during the AM and PM peak

periods, respectively, while the southbound approach operates at LOS "B" during both peak periods.

The Halekauwila Street approaches of the intersection carry 142 vehicles eastbound and 235 vehicles westbound during the AM peak hour of traffic. During the PM peak period, the overall traffic volume is higher with 297 vehicles traveling eastbound and 183 vehicles traveling westbound. The eastbound approach of Pohukaina Street 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.

d. Ward Avenue and Queen Street

At the intersection with Queen Street, Ward Avenue carries 579 vehicles northbound and 1,158 vehicles southbound during the AM peak hour of traffic. During the PM peak period, the overall traffic volume is higher with 996 vehicles traveling northbound and 1,041 vehicles traveling southbound. Both approaches of Ward Avenue operate at LOS "B" and LOS "D" during the AM and PM peak periods, respectively.

The Queen Street approaches of the intersection carry 241 vehicles eastbound and 311 vehicles westbound during AM peak hour of traffic. During the PM peak period, traffic volumes are higher with 601 vehicles traveling eastbound and 423 vehicles traveling westbound. The eastbound approach of Queen Street operates at LOS "C" and LOS "D" during the AM and PM peak periods, respectively, while the westbound approach operates at LOS "C" during both peak periods.

e. Ward Avenue and Halekauwila Street

At the intersection with Halekauwila Street, Ward Avenue carries 485 vehicles northbound and 967 vehicles southbound during the AM peak hour of traffic. During the PM peak period, the traffic

volumes are higher with 779 vehicles traveling northbound and 978 vehicles traveling southbound. The northbound approach of Ward Avenue operates at LOS "A" during both peak periods, while the southbound approach operates at LOS "A" and LOS "B" during the AM and PM peak periods, respectively.

The Halekauwila Street approach of the intersection carries 186 vehicles eastbound during the AM peak period and 373 vehicles during the PM peak period. During both peak periods, the eastbound approach of Halekauwila Street operates at LOS "B".

f. Ward Avenue and Auahi Street

At the intersection with Auahi Street, Ward Avenue carries 393 vehicles northbound and 595 vehicles southbound during the AM peak period. During the PM peak period, traffic volumes are higher with 559 vehicles traveling northbound and 669 vehicles traveling southbound. Both approaches of Ward Avenue operate at LOS "A" during both peak periods.

The Auahi Street approaches of the intersection carry 126 vehicles eastbound and 267 vehicles westbound. During the PM peak period, traffic volumes are higher with 195 vehicles traveling eastbound and 497 vehicles traveling westbound. Both approaches of Auahi Street operate at LOS "A" and LOS "B" during the AM and PM peak hours, respectively.

g. Ward Avenue and Ala Moana Boulevard

At the intersection with Ala Moana Boulevard, Ward Avenue carries 19 vehicles northbound and 440 vehicles southbound during the AM peak period. During the PM peak period, traffic volumes are higher with 176 vehicles traveling northbound and 546 vehicles traveling southbound. Both approaches of Ward Avenue operate at LOS "D" during both peak periods.

The Ala Moana Boulevard approaches of the intersection carry 1,986 vehicles eastbound and 2,056 vehicles westbound during the AM peak period. During the PM peak period, traffic volumes are higher with 2,657 vehicles traveling eastbound and 2,167 vehicles traveling westbound. The eastbound approach of Ala Moana Boulevard operates at LOS "C" and LOS "D" during the AM and PM peak periods, respectively, while the westbound approach operates at LOS "C" and LOS "E" during the AM and PM peak periods, respectively.

h. Kamakee Street and Queen Street

At the intersection with Queen Street, Kamakee Street carries 190 vehicles northbound and 335 vehicles southbound during the AM peak hour of traffic. During the PM peak period, the overall traffic volume is higher with 335 vehicles traveling northbound and 273 vehicles traveling southbound. Both approaches of Kamakee Street operate at LOS "B" and LOS "C" during the AM and PM peak periods, respectively.

The Queen Street approaches of the intersection carry 191 vehicles eastbound and 411 vehicles westbound during the AM peak hour of traffic. During the PM peak period, traffic volumes are higher with 570 vehicles traveling eastbound and 555 vehicles traveling westbound. The eastbound approach of Queen Street operates at LOS "B" and LOS "C" during the AM and PM peak hours, respectively, while the westbound approach operates at LOS "B" during both peak periods.

i. Kamakee Street and Auahi Street

At the intersection with Auahi Street, Kamakee Street carries 169 vehicles northbound and 433 vehicles southbound during the AM peak period. During the PM peak period, traffic volumes are higher with 305 vehicles traveling northbound and 529 vehicles traveling

southbound. Both approaches of Kamakee Street operate at LOS "A" and LOS "B" during the AM and PM peak periods, respectively.

Auahi Street carries 168 vehicles eastbound and 203 vehicles westbound during the AM peak period. During the PM peak period, traffic volumes are higher with 513 vehicles traveling eastbound and 444 vehicles traveling westbound. The eastbound approach of Auahi Street operates at LOS "C" and LOS "B" during the AM and PM peak periods, respectively, while the westbound approach operates at LOS "C" during both peak periods.

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

At the intersection with Ala Moana Boulevard, Ala Moana Park Drive carries 150 vehicles northbound while Kamakee Street carries 300 vehicles southbound during the AM peak period. During the PM peak period, traffic volumes are higher with 221 vehicles traveling northbound and 350 vehicles traveling southbound. The northbound approach of Ala Moana Park Drive operates at LOS "E" during both peak periods, while the southbound approach of Kamakee Street operates at LOS "D" during both peak periods.

During the AM peak period, Ala Moana Boulevard carries 1,911 vehicles eastbound and 1,977 vehicles westbound. The overall traffic volume for the PM peak period is higher with 2,790 vehicles eastbound and 1,627 vehicles traveling westbound. Both approaches of Ala Moana Boulevard operate at LOS "B" during both peak periods.

k. Queen Street and Queen Lane

At the intersection with Queen Lane, Queen Street carries 204 vehicles eastbound and 509 vehicles westbound during the AM peak period. During the PM peak period, traffic volumes are higher with 550 vehicles traveling eastbound and 625 vehicles traveling westbound. The critical movement on the Queen Street approaches of

the intersection is the westbound left-turn traffic movement which operates at LOS "A" during both peak periods.

The Queen Lane approach carries 135 vehicles traveling northbound during the AM peak period and 302 vehicles traveling northbound in the PM peak period. The Queen Lane approach operates at LOS "B" and LOS "C" during the AM and PM peak periods, respectively.

l. Queen Lane, Queen Street, and Auahi Street

At the intersection with Queen Street and Auahi Street, Queen Lane carries 91 vehicles southbound during the AM peak period. During the PM peak period, traffic volumes are higher with 149 vehicles traveling southbound. The Queen Lane approach operates at operates at LOS "B" during both peak periods.

The Queen Street approach carries 233 vehicles northbound during the AM peak period. During the PM peak period, traffic volumes are higher with 331 vehicles traveling northbound. The Queen Street approach operates at LOS "A" and LOS "B" during the AM and PM peak periods, respectively.

The Auahi Street approach carries 108 vehicles and 272 vehicles eastbound during the AM and PM peak period, respectively. The westbound approach is comprised of a driveway for the adjacent Hokua development which carries 52 vehicles and 76 vehicles westbound during the AM and PM peak periods, respectively. The eastbound and westbound approaches operate at LOS "B" during both peak periods.

m. Queen Street and Ala Moana Boulevard

At the intersection with Ala Moana Boulevard, the Queen Street approach carries 83 vehicles southbound during the AM peak period and 296 vehicles during the PM peak period. The southbound

approach of Queen Street operates at LOS "D" during both peak periods.

The Ala Moana Boulevard approaches of the intersection carry 1,776 vehicles eastbound and 2,276 vehicles westbound during the AM peak period. During the PM peak period, the overall traffic volume is higher with 2,384 vehicles traveling eastbound and 2,082 vehicles traveling westbound. Both approaches of Ala Moana Boulevard operate at LOS "A" during both peak periods.

IV. PROJECTED TRAFFIC CONDITIONS

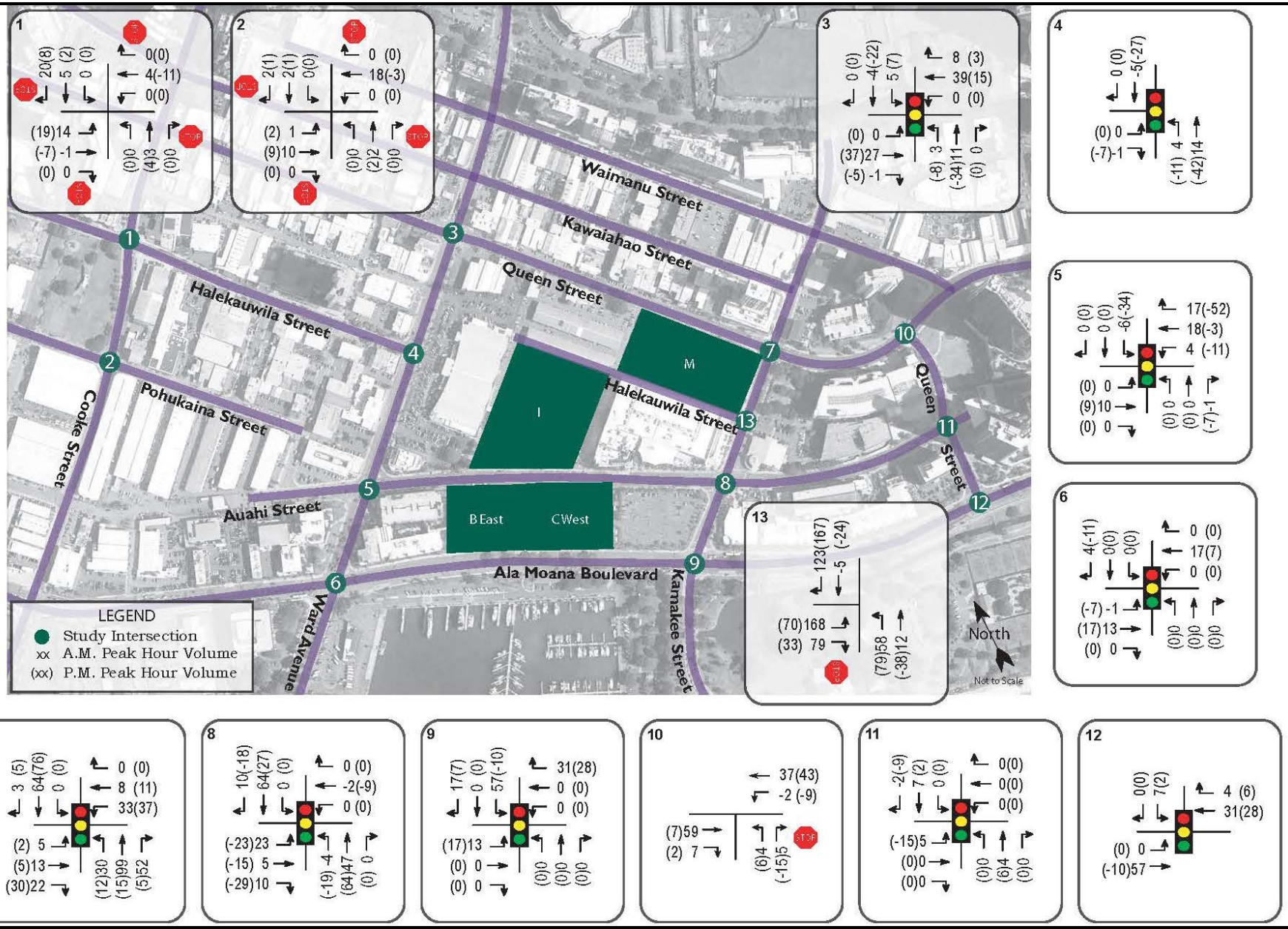
A. Site-Generated Traffic

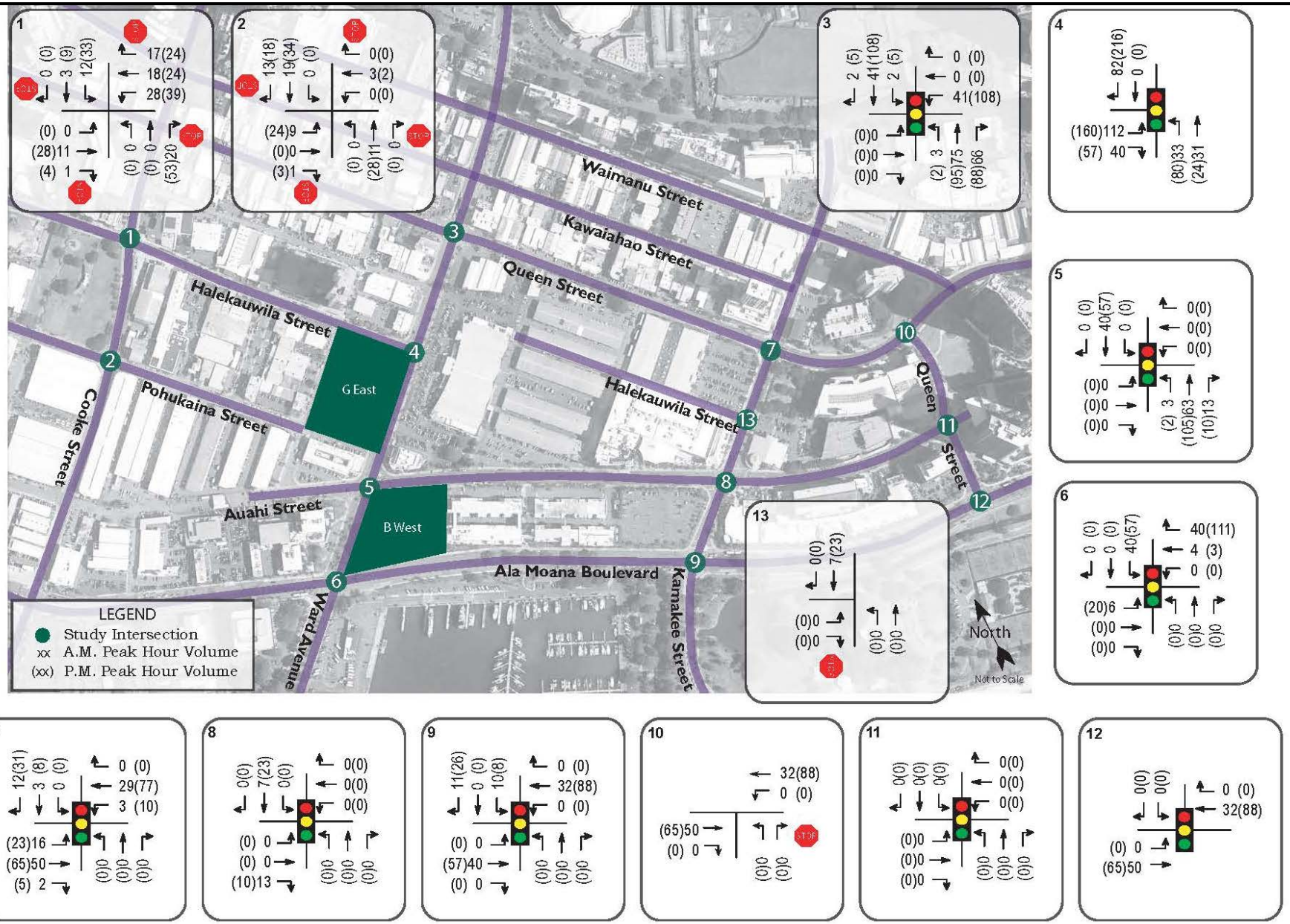
The trip generation methodology used in this study is based upon generally accepted techniques developed by the Institute of Transportation Engineers (ITE) and published in "Trip Generation, 9th Edition," 2012. The ITE trip generation rates are developed empirically by correlating the vehicle trip generation data with various land use characteristics such as the number of vehicle trips generated per dwelling unit or 1,000 square feet of development. The trip generation methodology developed by ITE also includes provisions for pass-by trips and internal capture of trips. Pass-by trips are generated when vehicles that would be traveling through the area whether or not the project was developed make an intermediate stop at the project site between their origin and primary destination. 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. In addition, the project site is currently served by established, convenient transit routes that may reduce the number of vehicular trips added to the surrounding major roadways. As such, the trip generation characteristics for the proposed project were adjusted to account for the influence of these factors utilizing the current Oahu Metropolitan Planning Organization (OMPO) regional travel forecasting model. The OMPO model contains estimated land usage for the island of Oahu by the Year 2035 and utilizes this data to forecast individual vehicle trips between destinations within the model. It should be noted that the City and County of Honolulu is planning to develop 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. These future plans are expected to include the development of a transit station within the project site. However, the schedule for this station and the guideway section serving the project site is targeted for Year 2019. As such, the influence of the resulting increased transit service in the project vicinity was not incorporated into the analyses included in this study. The analyses contained herein represent the worst-case scenario during the period between project completion and when the guideway is expected to become operational. At such time, traffic demands in the vicinity are expected to reduce with increased transit service. Table 1 summarizes the adjusted trip generation characteristics of the existing uses that will be replaced during Phase 2 of the development and Table 2 summarizes the adjusted project site trip generation characteristics for Phase 2 applied to the AM and PM peak periods of traffic. In addition, the OMPO model was also utilized to develop trip distribution percentages for the proposed development (see Figures 4 and 5).

Table 1: Adjusted Existing Peak Hour Trip Generation

Block B East, Block C West, Block B West		
Retail (Shopping Center) INDEPENDENT VARIABLE**:** Exist 1,000 sf of development = 115.83		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	51
	EXIT	31
	TOTAL	82
PM PEAK	ENTER	152
	EXIT	166
	TOTAL	318


Waimanu Street
Kawaiahao Street
Queen Street
Halekauwila Street
Pohukaina Street
Cooke Street
Auahi Street
Ala Moana Boulevard
Ward Avenue
Kamakee Street
Queen Street
M
I
B East
C West
LEGEND
Study Intersection
xx A.M. Peak Hour Volume
(xx) P.M. Peak Hour Volume
North
Not to Scale



VICTORIA WARD DEVELOPMENT - PHASE 2

YEAR 2018 DISTRIBUTION OF SITE-GENERATED VEHICLES

FIGURE 5

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Table 1: Adjusted Existing Peak Hour Trip Generation (Cont'd)

Block I		
Retail (Specialty Retail Center) INDEPENDENT VARIABLE: Exist 1,000 sf of development = 29.728		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	0
	EXIT	0
	TOTAL	0
PM PEAK	ENTER	26
	EXIT	34
	TOTAL	60
Industrial (Warehousing) INDEPENDENT VARIABLE: Exist 1,000 sf of development = 74.719		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	13
	EXIT	3
	TOTAL	16
PM PEAK	ENTER	4
	EXIT	13
	TOTAL	17
Block G		
Retail (Specialty Retail Center) INDEPENDENT VARIABLE: Exist 1,000 sf of development = 23.904		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	0
	EXIT	0
	TOTAL	0
PM PEAK	ENTER	21
	EXIT	27
	TOTAL	48

Table 1: Adjusted Existing Peak Hour Trip Generation (Cont'd)

Block G (Cont'd)		
Industrial (General Light Industrial) INDEPENDENT VARIABLE: Exist 1,000 sf of development = 63.963		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	38
	EXIT	5
	TOTAL	43
PM PEAK	ENTER	5
	EXIT	41
	TOTAL	46
Block M		
Retail (Shopping center) INDEPENDENT VARIABLE**:** Exist 1,000 sf of development = 61.461		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	27
	EXIT	16
	TOTAL	43
PM PEAK	ENTER	81
	EXIT	88
	TOTAL	169
EXISTING TOTALS		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	129
	EXIT	55
	TOTAL	184
PM PEAK	ENTER	289
	EXIT	369
	TOTAL	658

Table 2: Adjusted Phase 2 Peak Hour Trip Generation

YEAR 2017		
Block B East and Block C West		
Retail (Shopping Center) INDEPENDENT VARIABLE**:** 1,000 sf of development = 16		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	7
	EXIT	4
	TOTAL	11
PM PEAK	ENTER	21
	EXIT	23
	TOTAL	44
Residential (High Rise Residential Condo/Townhouse) INDEPENDENT VARIABLE: # of Units = 270		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	13
	EXIT	56
	TOTAL	69
PM PEAK	ENTER	47
	EXIT	29
	TOTAL	76
Restaurant (High Turnover Sit-Down Restaurant) INDEPENDENT VARIABLE: 1,000 sf of development = 8		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	36
	EXIT	28
	TOTAL	64
PM PEAK	ENTER	35
	EXIT	24
	TOTAL	59

Table 2: Adjusted Phase 2 Peak Hour Trip Generation (Cont'd)

Block I		
Retail (Shopping Center) INDEPENDENT VARIABLE**:** 1,000 sf of development = 30		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	13
	EXIT	8
	TOTAL	21
PM PEAK	ENTER	39
	EXIT	43
	TOTAL	82
Residential (High Rise Residential Condo/Townhouse) INDEPENDENT VARIABLE: # of Units = 230		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	11
	EXIT	47
	TOTAL	58
PM PEAK	ENTER	40
	EXIT	24
	TOTAL	64
Restaurant (High Turnover Sit-Down Restaurant) INDEPENDENT VARIABLE: 1,000 sf of development = 25		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	110
	EXIT	90
	TOTAL	200
PM PEAK	ENTER	110
	EXIT	73
	TOTAL	183

Table 2: Adjusted Phase 2 Peak Hour Trip Generation (Cont'd)

Block M		
Retail (Shopping Center) INDEPENDENT VARIABLE: 1,000 sf of development = 55		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	24
	EXIT	15
	TOTAL	39
PM PEAK	ENTER	73
	EXIT	78
	TOTAL	151
Residential (High Rise Residential Condo/Townhouse) INDEPENDENT VARIABLE: # of Units = 350		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	17
	EXIT	71
	TOTAL	88
PM PEAK	ENTER	61
	EXIT	38
	TOTAL	99
Restaurant (High Turnover Sit-Down Restaurant) INDEPENDENT VARIABLE: 1,000 sf of development = 20		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	88
	EXIT	72
	TOTAL	160
PM PEAK	ENTER	87
	EXIT	59
	TOTAL	146
YEAR 2017 TOTALS		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	319
	EXIT	391
	TOTAL	710
PM PEAK	ENTER	513
	EXIT	391
	TOTAL	904

Table 2: Adjusted Phase 2 Peak Hour Trip Generation (Cont'd)

YEAR 2018		
Block B West		
Retail (Shopping Center) INDEPENDENT VARIABLE**:** 1,000 sf of development = 15		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	7
	EXIT	4
	TOTAL	11
PM PEAK	ENTER	20
	EXIT	21
	TOTAL	41
Residential (High Rise Residential Condo/Townhouse) INDEPENDENT VARIABLE: # of Units = 180		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	9
	EXIT	36
	TOTAL	45
PM PEAK	ENTER	31
	EXIT	19
	TOTAL	50
Block G East		
Retail (Shopping Center) INDEPENDENT VARIABLE**:** 1,000 sf of development = 203.15		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	90
	EXIT	55
	TOTAL	145
PM PEAK	ENTER	268
	EXIT	290
	TOTAL	558

Table 2: Adjusted Phase 2 Peak Hour Trip Generation (Cont'd)

YEAR 2018 (CONT'D)		
Block G East (Cont'd)		
Residential (High Rise Residential Condo/Townhouse) INDEPENDENT VARIABLE: # of Units = 400		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	19
	EXIT	81
	TOTAL	100
PM PEAK	ENTER	70
	EXIT	43
	TOTAL	113
Restaurant (High Turnover Sit-Down Restaurant) INDEPENDENT VARIABLE: 1,000 sf of development = 22.57		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	99
	EXIT	81
	TOTAL	180
PM PEAK	ENTER	98
	EXIT	66
	TOTAL	164
YEAR 2018 TOTALS		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	224
	EXIT	257
	TOTAL	481
PM PEAK	ENTER	487
	EXIT	439
	TOTAL	926

B. Through Traffic Forecasting Methodology

The travel forecast utilized for this study is based on the OMPO regional forecasting model which includes the development of other projects such as the adjacent Kamehameha Schools/Bishop Estate (KSBE) lands to the west. The use of the OMPO model more accurately reflects the anticipated impacts of traffic growth on the island more than the use of historical traffic count data. The travel forecast utilized for the OMPO model is based on Societal Economic Data (SED) which

represents the population distribution within a multitude of traffic analysis zones. As such, since population estimates for the island of Oahu indicate that population growth is expected to be relatively linear to the Year 2035, a linear growth in traffic was also assumed over that period. Consequently, the traffic forecast from the OMPO model was scaled appropriately to determine Year 2017 and Year 2018 traffic volumes.

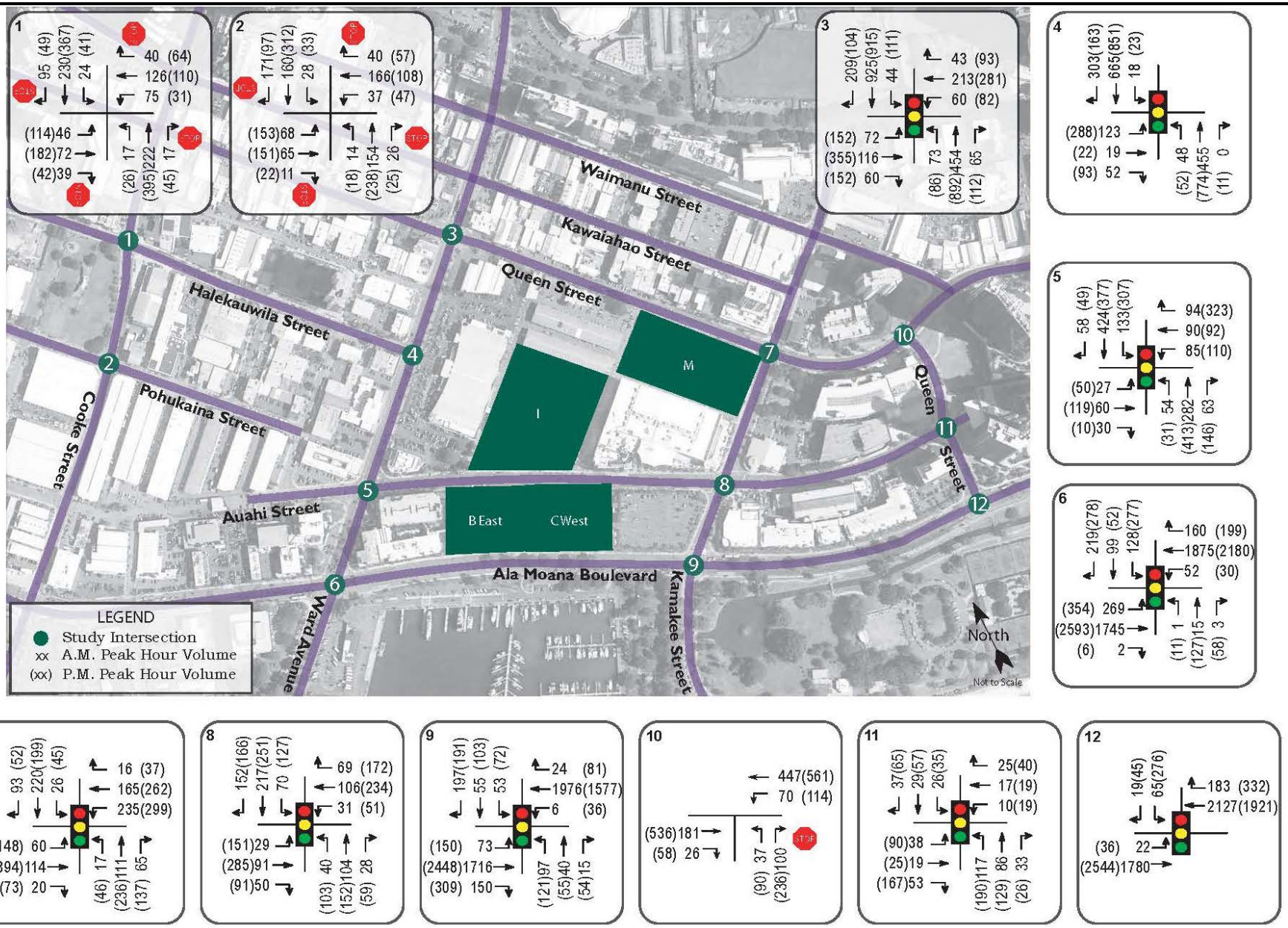
C. Year 2017 Traffic Conditions

1. Total Traffic Volumes Without Project

The projected year 2017 AM and PM peak period traffic volumes without Phase 2 of the Victoria Ward development are shown in Figure 6 and the resulting traffic conditions are summarized in Table 3. The baseline levels of service are included for comparison purposes. LOS calculations are included in Appendix D.

Table 3: Baseline and Projected Year 2017 (Without Project) LOS Traffic Operating Conditions

Intersection	Approach	AM		PM	
		Baseline	Year 2017 w/out Proj	Baseline	Year 2017 w/out Proj
Cooke St/ Halekauwila St	Eastbound	B	B	C	D
	Westbound	B	B	C	C
	Northbound	B	B	C	C
	Southbound	B	B	C	C
Cooke St/ Pohukaina St	Eastbound	B	B	C	C
	Westbound	B	B	B	C
	Northbound	A	A	B	B
	Southbound	B	B	B	C
Ward Ave/ Queen St	Eastbound	C	C	D	E
	Westbound	C	C	C	C
	Northbound	B	B	D	E
	Southbound	B	B	D	E
Ward Ave/ Halekauwila St	Eastbound	B	B	B	B
	Northbound	A	A	A	B
	Southbound	A	A	B	B



VICTORIA WARD DEVELOPMENT - PHASE 2

YEAR 2017 PEAK HOUR OF TRAFFIC WITHOUT PROJECT

FIGURE 6

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Table 3: Baseline and Projected Year 2017 (Without Project) LOS Traffic Operating Conditions (Cont'd)

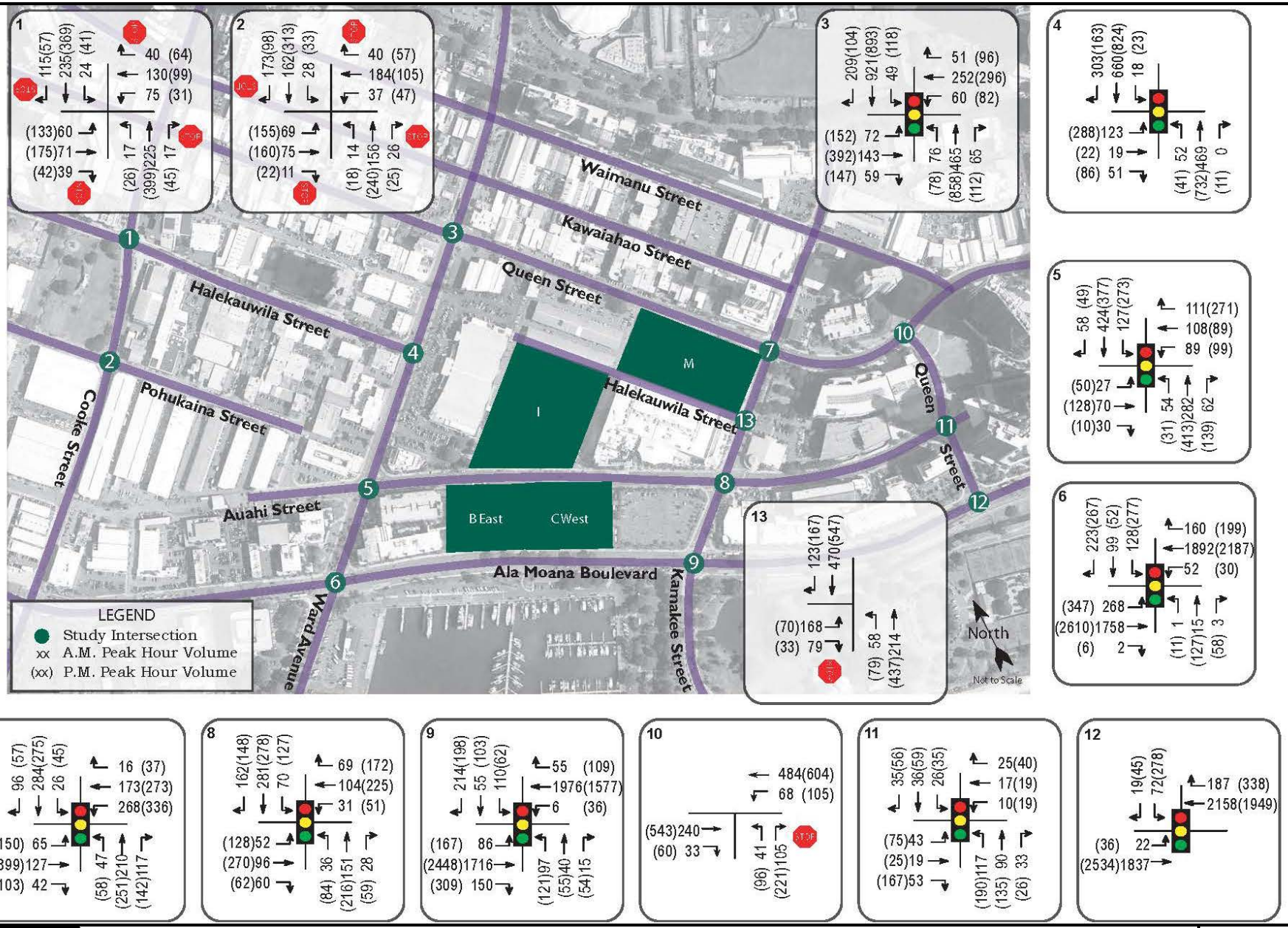
Intersection	Approach	AM		PM	
		Baseline	Year 2017 w/out Proj	Baseline	Year 2017 w/out Proj
Ward Ave/ Auahi St	Eastbound	A	A	B	B
	Westbound	A	A	B	C
	Northbound	A	A	A	A
	Southbound	A	A	A	B
Ward Ave/ Ala Moana Blvd	Eastbound	C	C	D	D
	Westbound	C	C	D	E
	Northbound	D	D	E	E
	Southbound	D	D	E	E
Kamakee St/ Queen St	Eastbound	B	B	C	C
	Westbound	B	B	B	B
	Northbound	B	B	C	C
	Southbound	B	B	C	C
Kamakee St/ Auahi St	Eastbound	C	C	B	B
	Westbound	C	C	C	B
	Northbound	A	A	B	B
	Southbound	A	A	B	B
Kamakee St/ Ala Moana Blvd/ Ala Moana Park Dr	Eastbound	A	B	B	C
	Westbound	B	B	B	B
	Northbound	D	D	E	E
	Southbound	D	D	D	E
Queen St/ Queens Ln	Westbound	A	A	A	A
	Northbound	B	B	C	C
Queens Ln/ Queen St/ Auahi St	Eastbound	B	B	B	B
	Westbound	B	B	B	B
	Northbound	A	A	B	B
	Southbound	B	B	B	B
Queen St/ Ala Moana Blvd	Eastbound	A	A	A	A
	Westbound	A	A	A	B
	Southbound	D	D	D	D

Under Year 2017 without project conditions, traffic operations are expected to deteriorate from existing conditions due ambient growth in traffic throughout the region. Along Cooke Street, the eastbound approach of the intersection with the intersection with Halekauwila Street is expected to

deteriorate to LOS "D" during the PM peak period while the westbound and southbound approaches of the intersection with Pohukaina Street are expected to deteriorate to LOS "C" during the PM peak period. Along Ward Avenue, the eastbound, northbound, and southbound approaches of the intersection with Queen Street and the westbound approach of the intersection with Ala Moana Boulevard are expected to deteriorate to LOS "E" during the PM peak period while the northbound approach of the intersection with Halekauwila Street is expected to deteriorate to LOS "B" during the PM peak period. At the intersection with Auahi Street, the westbound and southbound approaches are expected to deteriorate to LOS "C" and LOS "B," respectively, during the PM peak period. Along Kamakee Street, the eastbound approach of the intersection with Auahi Street is expected to deteriorate to LOS "B" and LOS "C" during the AM and PM peak periods, respectively, while the southbound approach of the intersection with Ala Moana Boulevard is expected to deteriorate to LOS "E" during the PM peak period. Along Queens Lane/Queen Street, the westbound approach of the intersection with Ala Moana Boulevard is expected to deteriorate to LOS "B" during the PM peak period. The other approaches of these intersection and those at the remaining study intersections are expected to continue operating at levels of service similar to existing conditions.

2. Total Traffic Volumes With Project

The projected year 2017 AM and PM peak period traffic volumes with the development of Block B East, Block C West, Block M, and Block I of the Victoria Ward development are shown in Figure 7 and the resulting traffic conditions are summarized in Table 4. The cumulative volumes consist of site- generated traffic superimposed over Year 2017 projected traffic demands. The lane usage on the eastbound and westbound approaches of the Queen Street and Ward Avenue intersection are assumed to be modified under with project conditions to alleviate the anticipated levels of service operations. In addition, the traffic signals along Ala Moana Boulevard and Ward Avenue



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VICTORIA WARD DEVELOPMENT - PHASE 2

YEAR 2017 PEAK HOUR OF TRAFFIC WITH PROJECT

FIGURE 7

are assumed to be modified to accommodate the anticipated shifts in traffic distribution as a result of the proposed project. The without project levels of service are included for comparison purposes. LOS calculations are included in Appendix E.

Table 4: Projected Year 2017 (Without and With Project) LOS Traffic Operating Conditions

Intersection	Approach	AM		PM	
		Year 2017 w/out Proj	Year 2017 w/ Proj	Year 2017 w/out Proj	Year 2017 w/ Proj
Cooke St/ Halekauwila St	Eastbound	B	B	D	D
	Westbound	B	B	C	C
	Northbound	B	B	C	C
	Southbound	B	B	C	C
Cooke St/ Pohukaina St	Eastbound	B	B	C	C
	Westbound	B	B	C	C
	Northbound	A	A	B	B
	Southbound	B	B	C	C
Ward Ave/ Queen St*	Eastbound	C	C	E	D
	Westbound	C	C	C	C
	Northbound	B	B	E	C
	Southbound	B	B	E	C
Ward Ave/ Halekauwila St	Eastbound	B	B	B	B
	Northbound	A	A	B	B
	Southbound	A	A	B	B
Ward Ave/ Auahi St	Eastbound	A	A	B	B
	Westbound	A	A	C	B
	Northbound	A	A	A	A
	Southbound	A	A	B	A
Ward Ave/ Ala Moana Blvd	Eastbound	C	C	D	D
	Westbound	C	C	E	E
	Northbound	D	D	E	E
	Southbound	D	D	E	E
Kamakee St/ Queen St	Eastbound	B	C	C	C
	Westbound	B	B	B	C
	Northbound	B	B	C	C
	Southbound	B	B	C	C

*Intersection improvement implemented.

Table 4: Projected Year 2017 (Without and With Project) LOS Traffic Operating Conditions (Cont'd)

Intersection	Approach	AM		PM	
		Year 2017 w/out Proj	Year 2017 w/ Proj	Year 2017 w/out Proj	Year 2017 w/ Proj
Kamakee St/ Halekauwila St**	Eastbound	-	C	-	C
	Northbound	-	A	-	A
Kamakee St/ Auahi St	Eastbound	C	B	B	B
	Westbound	C	C	B	B
	Northbound	A	A	B	B
	Southbound	A	A	B	B
Kamakee St/ Ala Moana Blvd/ Ala Moana Park Dr	Eastbound	B	B	C	C
	Westbound	B	B	B	B
	Northbound	D	D	E	E
	Southbound	D	D	E	E
Queen St/ Queens Ln	Westbound	A	A	A	A
	Northbound	B	B	C	C
Queens Ln/ Queen St/ Auahi St	Eastbound	B	B	B	B
	Westbound	B	B	B	B
	Northbound	A	A	B	B
	Southbound	B	B	B	B
Queen St/ Ala Moana Blvd	Eastbound	A	A	A	A
	Westbound	A	A	B	B
	Southbound	D	D	D	D

** New intersection.

Traffic operations under Year 2017 with project conditions are expected, in general, to remain similar to Year 2017 without project conditions during both peak periods due to lane use modifications at the intersection of Ward Avenue with Queen Street, and the modifications to the signal timing along Ala Moana Boulevard and Ward Avenue. Along Cooke Street, the approaches of the intersection with Halekauwila Street are expected to continue operating at LOS "B" during the AM peak period and LOS "D" or better during the PM peak period while those at the intersection with Pohukaina 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.

Along Ward Avenue, the approaches of the intersection with Queen Street are expected to operate at LOS "C" or better during the AM peak period and LOS "D" or better during the PM peak period while those at the intersections with Halekauwila Street and Auahi Street are expected to operate at LOS "B' or better during both peak periods. At the intersection with Ala Moana Boulevard, the approaches of the intersection are expected to continue operating at LOS "D" or better during the AM peak period and LOS "E" or better during the PM peak period. Along Kamakee Street, the approaches of the intersection with Queen Street and Auahi Street are expected to continue operating at LOS "C" or better during both peak periods while those at the intersection with Ala Moana Boulevard are expected to continue operating at LOS "D" or better during the AM peak period and LOS "E" or better during the PM peak period. At the intersection of Kamakee Street with the new Halekauwila Street (extension), the critical movement is the eastbound approach which is expected to operate at LOS "C" during both peak periods. Along Queens Lane/Queen Street, the approaches of the intersections 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 with the exception of the intersection with Ala Moana Boulevard which is expected to continue operating at LOS "D" or better during both peak periods.

D. Year 2018 Traffic Conditions

1. Other Considerations

The anticipated increases in traffic volumes along the surrounding roadways as a result of the proposed development may warrant the installation of traffic signal systems at key unsignalized intersections. Those intersections within the study area that were anticipated to operate at low levels of service with the completion of Phase 2 were reviewed to determine if a traffic signal warrant assessment should be conducted. As such, a preliminary traffic signal warrant assessment was conducted for the intersection of Cooke Street and Halekauwila Street.

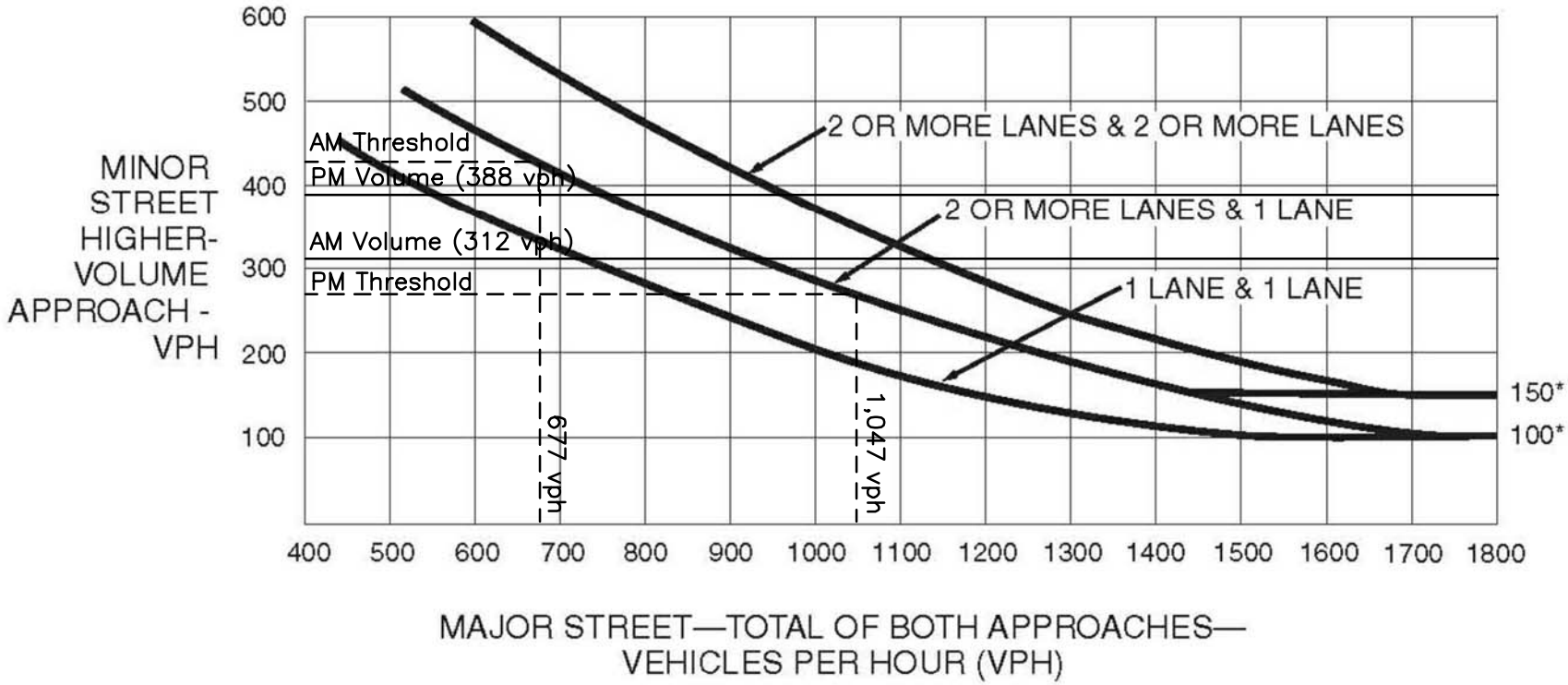
The installation of a traffic signal at an intersection may be justified by one or more of the nine warrants outlined in the "Manual on Uniform Traffic Control Devices for Streets and Highways," 2009 Edition (MUTCD). These warrants take into account factors such as eight-hour vehicular volumes (Warrant 1), four-hour vehicular volumes (Warrant 2), peak hour volumes (Warrant 3), pedestrian volumes (Warrant 4), the presence of a school crossing or coordinated signal system (Warrants 5 and 6), crash experience (Warrant 7), other characteristics of the roadway network (Warrant 8), and the presence of railroad crossings (Warrant 9). The traffic data used in this study was collected during the morning and afternoon peak hours and, as such, a cursory assessment of the "Peak Hour Warrant" (Warrant 3) was conducted to determine if a traffic signal system may be warranted at the intersection of Cooke Street and Halekauwila Street.

Warrant 3, the "Peak Hour Warrant," consists of several conditions that may justify the installation of a traffic signal at an intersection where vehicles experience high traffic delay due to large volumes of intersecting traffic during the peak hour periods. One of the conditions is based upon the relationship between the traffic volumes along the major and minor streets. If the traffic volumes along the minor street exceed the thresholds shown in Figure 4C-3 of the MUTCD, a traffic signal system may be warranted. Under Year 2018 with project conditions, the traffic volumes entering the intersection of Cooke Street and Halekauwila Street meet the thresholds during the PM peak hour of traffic and, as such, satisfy Warrant 3 for minor street approaches with one lane for high traffic volumes on the major street (see Figure 8). As such, this intersection is assumed to be signalized prior to the completion of Phase 2 of the Victoria Ward Development.

2. Total Traffic Volumes With Project

The projected year 2018 AM and PM peak period traffic volumes with the completion of Phase 2 of the Victoria Ward development are shown in Figure 9 and the resulting traffic conditions are summarized in Table 5. The

Figure 4C-3. Warrant 3, Peak Hour



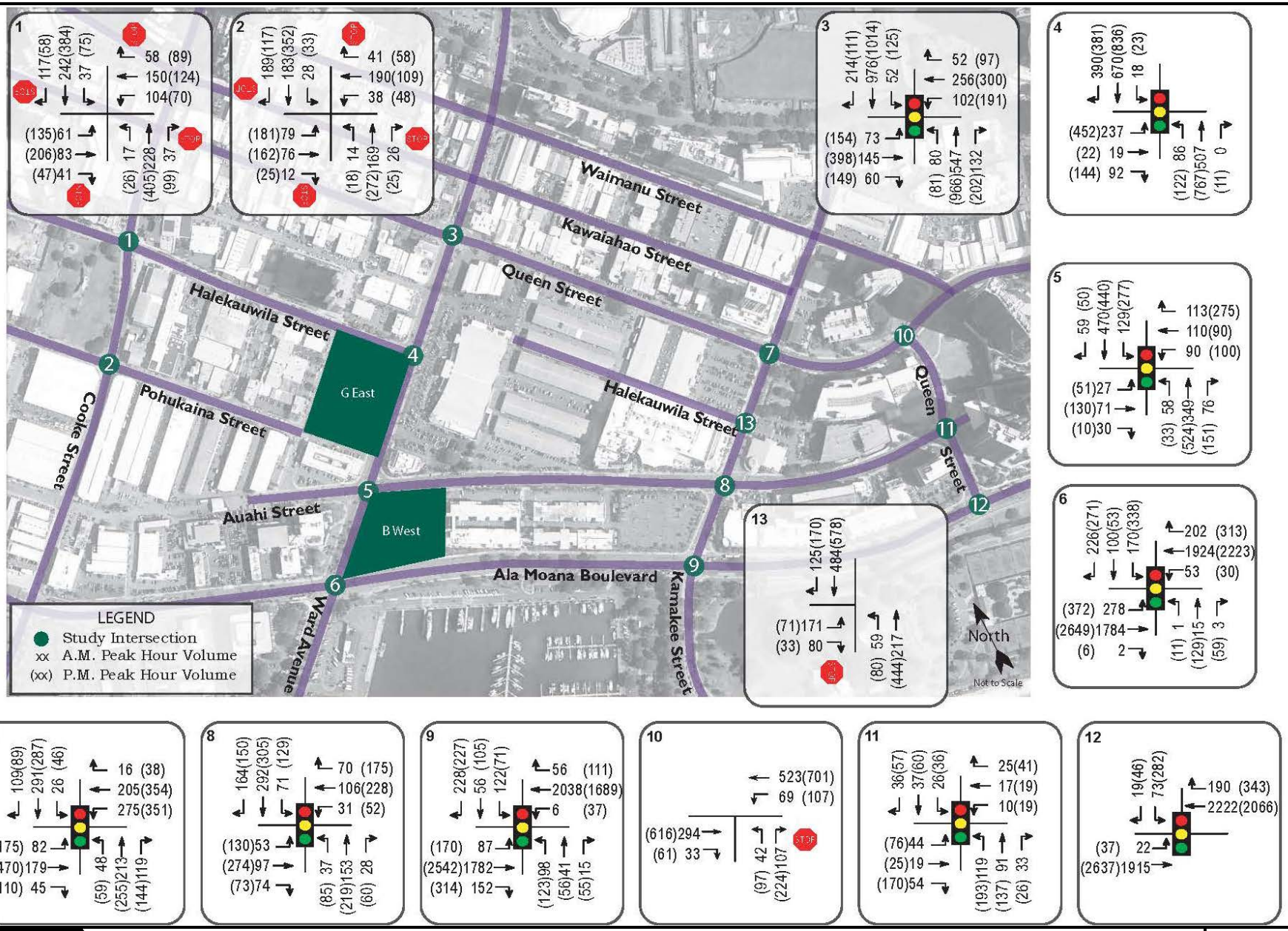
*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: MUTCD

VICTORIA WARD DEVELOPMENT - PHASE 2

TRAFFIC SIGNAL WARRANT NO. 3 -
COOKE STREET AND HALEKAUWILA STREET

FIGURE
8



VICTORIA WARD DEVELOPMENT - PHASE 2

YEAR 2018 PEAK HOUR OF TRAFFIC WITH PROJECT

FIGURE 9

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cumulative volumes consist of site- generated traffic superimposed over Year 2018 projected traffic demands. The northbound approach of the Queen Street and Ward Avenue intersection is assumed to be modified to alleviate the anticipated levels of service under with project conditions to provide an exclusive right-turn lane and a traffic signal system is assumed to be installed at the intersection of Cooke Street and Halekauwila Street. In addition, the traffic signal phasing and timing at the intersection of Ward Avenue and Halekauwila Street is assumed to be modified to provide a protected left-turn phase for the Ward Avenue approaches of the intersection and at the intersection of Kamakee Street and Queen Street to provide split phasing for the Queen Street approaches of the intersection. Finally, the traffic signals along Ala Moana Boulevard and Ward Avenue are assumed to be modified to accommodate the anticipated shifts in traffic distribution as a result of the proposed project. The Year 2017 with project levels of service are included for comparison purposes. LOS calculations are included in Appendix F.

Table 5: Projected Year 2017 With Project and Year 2018 With Project LOS Traffic Operating Conditions

Intersection	Approach	AM		PM	
		Year 2017 w/ Proj	Year 2018 w/ Proj	Year 2017 w/ Proj	Year 2018 w/ Proj
Cooke St/ Halekauwila St*	Eastbound	B	A	D	B
	Westbound	B	A	C	A
	Northbound	B	A	C	A
	Southbound	B	A	C	B
Cooke St/ Pohukaina St	Eastbound	B	B	C	D
	Westbound	B	B	C	C
	Northbound	A	B	B	B
	Southbound	B	B	C	C
Ward Ave/ Queen St**	Eastbound	C	C	D	C
	Westbound	C	C	C	D
	Northbound	B	B	C	D
	Southbound	B	B	C	D

*Traffic signal system installed.
**Intersection improvement implemented.

Table 5: Projected Year 2017 With Project and Year 2018 With Project LOS Traffic Operating Conditions (Cont'd)

Intersection	Approach	AM		PM	
		Year 2017 w/ Proj	Year 2018 w/ Proj	Year 2017 w/ Proj	Year 2018 w/ Proj
Ward Ave/ Halekauwila St***	Eastbound	B	C	B	D
	Northbound	A	B	B	C
	Southbound	A	A	B	D
Ward Ave/ Auahi St	Eastbound	A	A	B	B
	Westbound	A	B	B	C
	Northbound	A	A	A	A
	Southbound	A	A	A	B
Ward Ave/ Ala Moana Blvd	Eastbound	C	C	D	E
	Westbound	C	C	E	E
	Northbound	D	D	E	E
	Southbound	D	D	E	E
Kamakee St/ Queen St***	Eastbound	C	C	C	C
	Westbound	B	B	C	C
	Northbound	B	B	C	C
	Southbound	B	C	C	C
Kamakee St/ Halekauwila St	Eastbound	C	D	C	C
	Northbound	A	A	A	A
Kamakee St/ Auahi St	Eastbound	B	B	B	B
	Westbound	C	C	B	B
	Northbound	A	A	B	B
	Southbound	A	A	B	B
Kamakee St/ Ala Moana Blvd/ Ala Moana Park Dr	Eastbound	B	B	C	C
	Westbound	B	B	B	B
	Northbound	D	D	E	E
	Southbound	D	D	E	E
Queen St/ Queens Ln	Westbound	A	A	A	A
	Northbound	B	B	C	C
Queens Ln/ Queen St/ Auahi St	Eastbound	B	B	B	B
	Westbound	B	B	B	B
	Northbound	A	A	B	B
	Southbound	B	B	B	B

***Traffic signal improvements implemented.

Table 5: Projected Year 2017 With Project and Year 2018 With Project LOS Traffic Operating Conditions (Cont'd)

Intersection	Approach	AM		PM	
		Year 2017 w/ Proj	Year 2018 w/ Proj	Year 2017 w/ Proj	Year 2018 w/ Proj
Queen St/ Ala Moana Blvd	Eastbound	A	A	A	A
	Westbound	A	A	B	B
	Southbound	D	D	D	D

Traffic operations under Year 2018 with project conditions are generally expected to remain similar to Year 2017 with project conditions due to the provision of an exclusive northbound right-turn lane at the intersection of Ward Avenue with Queen Street, traffic signal phasing and timing modifications at the Ward Avenue/Halekauwila Street and Kamakee Street/Queen Street intersections, installation of a traffic signal system at the intersection of Cooke Street with Halekauwila Street, and the modifications to the signal timing along Ala Moana Boulevard and Ward Avenue. These improvements are in to addition to those required for Year 2017. Along Cooke Street, the approaches of the intersection with Halekauwila Street are expected to operate at LOS "A" during the AM peak period and LOS "B" or better during the PM peak period. At the intersection with Pohukaina Street, the approaches of the intersection are expected to operate at LOS "B" during the AM peak period and LOS "D" or better during the PM peak period. Along Ward Avenue, the approaches of the intersections with Queen Street and Halekauwila Street are expected to operate at LOS "C" or better during the AM peak period and LOS "D" or better during the PM peak period while those at the intersection with Auahi Street are expected to operate at LOS "B" or better during the AM peak period and LOS "C" or better during the PM peak period. At the intersection with Ala Moana Boulevard, the approaches of the intersection are expected to operate at LOS "D" or better during the AM peak period and LOS "E" during the PM peak period. Along Kamakee Street,

the approaches of the intersection with Queen Street are expected to operate at LOS "C" or better during both peak periods while those at the intersection with Auahi Street are expected to operate at LOS "D" or better during the AM peak period and LOS "B" during the PM peak period. At the intersection with Halekauwila Street, the critical movement is the eastbound approach which is expected to operate at LOS "D" and LOS "C" during the AM and PM peak periods, respectively. At the intersection with Ala Moana Boulevard, the approaches of the intersection are expected to operate at LOS "D" or better during the AM peak period and LOS "E" or better during the PM peak period. Along Queens Lane/Queen Street, the approaches of the intersections are expected to operate at LOS "B" or better during the AM peak period and LOS "C" or better during the PM peak period with the exception of the intersection with Ala Moana Boulevard which is expected to operate at LOS "D" or better during both peak periods

It should be noted that traffic operations along Ala Moana Boulevard in the vicinity of the project site are currently congested and are expected to deteriorate slowly over time with or without the completion of Phase 2 of the Victoria Ward Development due to ambient growth in traffic along this regional roadway. However, in conjunction with future phases of the proposed project, significant improvements to the area roadway network are anticipated to be implemented to improve circulation in the immediate vicinity and provide additional east-west routes through the region. The two segments of Halekauwila Street are eventually expected to be connected at Ward Avenue providing an alternate east-west route that should help to alleviate the traffic demands along Ala Moana Boulevard. In addition, Auahi Street is expected to be realigned near Ward Avenue to intersect Pohukaina Street to the west. The newly realigned roadway, with Pohukaina Street, will provide another east-west route through the region thereby further alleviating traffic demands along Ala Moana Boulevard.

V. RECOMMENDATIONS

A. Year 2017

Based on the analysis of the traffic data, the following are the recommendations associated with the completion of Block B East, Block C West, Block M, and Block I of the Victoria Ward development:

1. Provide sufficient sight distance for motorists to safely enter and exit all project driveways.

2. Provide adequate on-site loading and off-loading service areas.

3. Provide adequate turn-around area for service, delivery, and refuse collection vehicles to maneuver on the project site to avoid vehicle-reversing maneuvers onto adjacent public roadways.

4. Provide sufficient turning radii at all driveways to avoid or minimize vehicle encroachments to oncoming traffic lanes.

5. Provide bicycle racks and provisions for alternate energy vehicles to encourage the use of alternate or environmentally friendly modes of transportation.

6. Provide pedestrian facilities throughout the project site to encourage pedestrian activity. Ensure adequate internal pedestrian circulation and connections to sidewalk facilities within the public right-of-way to facilitate pedestrian movement.

7. Construct the new segment of Halekauwila Street between Block I and Kamakee Street. Provide two lanes of traffic (one lane in each direction) with sidewalks and bicycle lanes. The layout and dimensions of this roadway should be determined during the design of the project.

8. Modify the lane use on the eastbound and westbound approaches of Queen Street at the intersection with Ward Avenue to provide an exclusive left-turn lane and a shared through and right-turn lane. The layout and dimensions of these lanes should be determined during the design of the projects as listed above.

9. Monitor and modify (if necessary) the traffic signal timing along Ala Moana Boulevard and Ward Avenue fronting the project to ensure traffic is adequately serviced at those intersections.

B. Year 2018

Based on the analysis of the traffic data, the following are the additional recommendations associated with the completion of Phase 2 of the Victoria Ward development:

1. Install or contribute to the installation of a traffic signal system at the intersection of Cooke Street with Halekauwila Street if warranted. A Traffic Signal Warrant Study should be prepared to verify that a traffic signal system is warranted at that intersection. The installation of the traffic signal system should be coordinated with the Honolulu Authority for Rapid Transportation (HART) since this intersection is located along the proposed rail alignment.

2. Prepare a full Traffic Signal Warrant Study for the intersection of Kamakee Street with Halekauwila Street to verify if a traffic signal system should be installed at that intersection. This new section of Halekauwila Street is expected to serve as the primary access for several parcels and, as such, is anticipated to be signalized in the future. In addition, pedestrian interaction with adjacent parcels is expected to increase as development progresses. When warranted, a traffic signal system should be installed at this intersection.

3. Monitor traffic conditions at the intersection of Cooke Street with Pohukaina Street and install or contribute to the installation of a traffic signal system at that intersection if warranted. A Traffic Signal Warrant Study should be prepared to verify that a traffic signal system is warranted at that intersection.

4. Install a right-turn lane/bay on the northbound approach of Ward Avenue at the intersection with Queen Street, if warranted, upon the completion of the final component of the Phase 2 project. The layout and dimensions of this roadway should be determined during the design of the project.

5. Modify the traffic signal phasing and timing at the intersection of Ward Avenue with Halekauwila Street to provide a protected left-turn movement for the northbound approach of Ward Avenue.

6. Modify the traffic signal phasing and timing at the intersection of Kamakee Street with Queen Street to provide split phasing for the eastbound and westbound approaches of Queen Street.

7. Continue coordinating with the Hawaii Community Development Authority (HCDA) and other government agencies regarding the completion of the final segment of Halekauwila Street between Block I and Ward Avenue. Ultimately, Halekauwila Street is expected to be a continuous two-way, east-west roadway through Kakaako providing alternate access through the region.

8. Continue coordinating with the Hawaii Community Development Authority (HCDA) and other government agencies regarding the realignment of Auahi Street near Ward Avenue and connection to Pohukaina Street to the west. Ultimately, Pohukaina Street and Auahi Street are expected to form a continuous two-way, east-west route through Kakaako providing alternate access through the region.

9. Consider the incorporation of other Traffic Management Plan (TMP) and Complete Streets strategies in future phases of the project to reduce the overall impact of the development on the surrounding roadways.

VI. CONCLUSION

The project site for the Victoria Ward development currently encompasses Ward Warehouse, Ward Centre, Ward Entertainment Center, Ward Village Shops, and other surrounding commercial and office buildings. The proposed development is expected to be implemented in phases over the next 10-15 years and entail the redevelopment of most of the existing commercial, office, and industrial spaces. The second phase of the project (referred to as "Phase 2") includes the new commercial/retail space and residential units on six of the parcels within the project site. With the implementation of the aforementioned recommendations, traffic operations at the study intersections with the development of Phase 2 are generally expected to operate at levels of service similar to without project conditions. However, it should be noted that extensive redevelopment is anticipated to follow this initial phase and subsequent traffic studies are expected to be prepared as the overall development progresses to ensure that appropriate measures are undertaken to mitigate the cumulative impact of these future phases.

APPENDIX A

EXISTING TRAFFIC COUNT DATA

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counter:0525,0769
Counted By:RF,EG
Weather:Clear

File Name : CooHalAM
Site Code : 00000000
Start Date : 4/25/2011
Page No : 1

Groups Printed- Unshifted

	Cooke Street Southbound					Halekauwila Street Westbound					Cooke Street Northbound					Halekauwila 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	1	19	2	8	30	0	7	1	7	15	0	19	1	4	24	3	6	1	3	13	82
06:15 AM	7	22	11	3	43	2	5	7	1	15	4	21	6	1	32	3	2	1	4	10	100
06:30 AM	10	28	14	0	52	10	11	6	8	35	2	28	3	2	35	4	15	8	8	35	157
06:45 AM	9	44	12	3	68	12	21	3	12	48	4	32	7	1	44	11	18	6	7	42	202
Total	27	113	39	14	193	24	44	17	28	113	10	100	17	8	135	21	41	16	22	100	541
07:00 AM	6	57	22	3	88	13	28	8	9	58	3	21	5	1	30	7	8	7	10	32	208
07:15 AM	9	37	16	8	70	14	38	4	11	67	3	41	4	3	51	6	24	4	7	41	229
07:30 AM	6	47	21	12	86	18	33	7	5	63	3	41	4	0	48	4	13	6	9	32	229
07:45 AM	5	57	15	5	82	19	34	9	7	69	3	60	3	2	68	13	15	8	7	43	262
Total	26	198	74	28	326	64	133	28	32	257	12	163	16	6	197	30	60	25	33	148	928
08:00 AM	8	43	21	9	81	18	21	11	7	57	4	39	3	2	48	10	16	11	2	39	225
08:15 AM	3	51	27	3	84	12	18	8	2	40	2	50	7	4	63	14	12	10	1	37	224
08:30 AM	8	43	14	1	66	4	24	7	3	38	3	36	3	2	44	9	13	3	2	27	175
08:45 AM	10	43	15	2	70	5	15	5	3	28	4	52	7	1	64	5	16	9	6	36	198
Total	29	180	77	15	301	39	78	31	15	163	13	177	20	9	219	38	57	33	11	139	822
Grand Total	82	491	190	57	820	127	255	76	75	533	35	440	53	23	551	89	158	74	66	387	2291
Apprch %	10	59.9	23.2	7		23.8	47.8	14.3	14.1		6.4	79.9	9.6	4.2		23	40.8	19.1	17.1		
Total %	3.6	21.4	8.3	2.5	35.8	5.5	11.1	3.3	3.3	23.3	1.5	19.2	2.3	1	24.1	3.9	6.9	3.2	2.9	16.9	

	Cooke Street Southbound				Halekauwila Street Westbound				Cooke Street Northbound				Halekauwila 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 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	6	47	21	74	18	33	7	58	3	41	4	48	4	13	6	23	203
07:45 AM	5	57	15	77	19	34	9	62	3	60	3	66	13	15	8	36	241
08:00 AM	8	43	21	72	18	21	11	50	4	39	3	46	10	16	11	37	205
08:15 AM	3	51	27	81	12	18	8	38	2	50	7	59	14	12	10	36	214
Total Volume	22	198	84	304	67	106	35	208	12	190	17	219	41	56	35	132	863
% App. Total	7.2	65.1	27.6		32.2	51	16.8		5.5	86.8	7.8		31.1	42.4	26.5		
PHF	.688	.868	.778	.938	.882	.779	.795	.839	.750	.792	.607	.830	.732	.875	.795	.892	.895

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counter:0525,0769
Counted By:RF,EG
Weather:Clear

File Name : CooHalPM
Site Code : 00000000
Start Date : 4/25/2011
Page No : 1

Groups Printed- Unshifted

	Cooke Street Southbound					Halekauwila Street Westbound					Cooke Street Northbound					Halekauwila 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	9	79	17	3	108	8	17	9	8	42	6	74	6	4	90	18	18	18	4	58	298
03:15 PM	10	55	11	2	78	3	13	11	1	28	6	74	7	8	95	13	30	12	6	61	262
03:30 PM	8	80	10	2	100	11	15	18	5	49	3	54	3	2	62	6	27	7	3	43	254
03:45 PM	7	60	11	2	80	8	20	12	4	44	4	77	9	11	101	15	25	11	15	66	291
Total	34	274	49	9	366	30	65	50	18	163	19	279	25	25	348	52	100	48	28	228	1105
04:00 PM	4	89	13	4	110	7	21	17	7	52	8	77	13	2	100	17	25	10	4	56	318
04:15 PM	7	61	8	2	78	5	19	15	2	41	4	72	3	3	82	23	29	7	7	66	267
04:30 PM	11	80	5	5	101	3	20	6	3	32	5	83	7	1	96	32	39	10	3	84	313
04:45 PM	10	70	14	8	102	11	17	16	1	45	2	85	11	2	100	23	39	9	9	80	327
Total	32	300	40	19	391	26	77	54	13	170	19	317	34	8	378	95	132	36	23	286	1225
05:00 PM	10	58	11	0	79	10	17	11	0	38	4	70	7	2	83	25	32	16	4	77	277
05:15 PM	15	70	11	4	100	8	9	13	3	33	0	48	3	2	53	24	33	7	12	76	262
05:30 PM	9	56	6	2	73	7	12	9	3	31	2	61	4	1	68	10	26	4	0	40	212
05:45 PM	6	44	3	4	57	1	11	13	1	26	6	47	6	0	59	12	21	6	2	41	183
Total	40	228	31	10	309	26	49	46	7	128	12	226	20	5	263	71	112	33	18	234	934
Grand Total	106	802	120	38	1066	82	191	150	38	461	50	822	79	38	989	218	344	117	69	748	3264
Apprch %	9.9	75.2	11.3	3.6		17.8	41.4	32.5	8.2		5.1	83.1	8	3.8		29.1	46	15.6	9.2		
Total %	3.2	24.6	3.7	1.2	32.7	2.5	5.9	4.6	1.2	14.1	1.5	25.2	2.4	1.2	30.3	6.7	10.5	3.6	2.1	22.9	

	Cooke Street Southbound				Halekauwila Street Westbound				Cooke Street Northbound				Halekauwila 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 04:00 PM																	
04:00 PM	4	89	13	106	7	21	17	45	8	77	13	98	17	25	10	52	301
04:15 PM	7	61	8	76	5	19	15	39	4	72	3	79	23	29	7	59	253
04:30 PM	11	80	5	96	3	20	6	29	5	83	7	95	32	39	10	81	301
04:45 PM	10	70	14	94	11	17	16	44	2	85	11	98	23	39	9	71	307
Total Volume	32	300	40	372	26	77	54	157	19	317	34	370	95	132	36	263	1162
% App. Total	8.6	80.6	10.8		16.6	49	34.4		5.1	85.7	9.2		36.1	50.2	13.7		
PHF	.727	.843	.714	.877	.591	.917	.794	.872	.594	.932	.654	.944	.742	.846	.900	.812	.946

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counter:3890,5676
Counted By:AE,JL
Weather:Clear

File Name : CooPohAM
Site Code : 00000008
Start Date : 4/25/2011
Page No : 1

Groups Printed- Unshifted

	Cooke Street Southbound					Pohukaina Street Westbound					Cooke Street Northbound					Pohukaina 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	3	8	9	1	21	1	6	3	4	14	2	13	3	2	20	3	7	0	4	14	69
06:15 AM	2	13	10	2	27	1	4	5	1	11	0	19	5	2	26	7	5	1	4	17	81
06:30 AM	11	20	15	2	48	5	4	4	6	19	1	26	3	1	31	6	6	0	1	13	111
06:45 AM	10	30	22	3	65	5	23	10	3	41	5	28	4	4	41	3	11	2	4	20	167
Total	26	71	56	8	161	12	37	22	14	85	8	86	15	9	118	19	29	3	13	64	428
07:00 AM	14	34	30	4	82	6	31	9	5	51	0	24	5	0	29	3	9	2	2	16	178
07:15 AM	6	21	31	2	60	4	28	5	3	40	2	32	8	1	43	11	10	2	2	25	168
07:30 AM	4	37	37	3	81	4	47	6	1	58	3	34	3	3	43	12	18	2	3	35	217
07:45 AM	7	33	44	1	85	16	39	11	4	70	2	37	6	4	49	12	13	3	2	30	234
Total	31	125	142	10	308	30	145	31	13	219	7	127	22	8	164	38	50	9	9	106	797
08:00 AM	7	31	33	3	74	9	30	7	5	51	4	26	9	1	40	19	10	1	2	32	197
08:15 AM	8	39	33	1	81	4	32	12	0	48	0	32	3	3	38	14	12	4	1	31	198
08:30 AM	16	33	8	0	57	4	21	6	6	37	2	24	5	3	34	8	20	5	0	33	161
08:45 AM	7	42	11	2	62	13	21	8	0	42	4	33	4	0	41	18	20	6	2	46	191
Total	38	145	85	6	274	30	104	33	11	178	10	115	21	7	153	59	62	16	5	142	747
Grand Total	95	341	283	24	743	72	286	86	38	482	25	328	58	24	435	116	141	28	27	312	1972
Apprch %	12.8	45.9	38.1	3.2		14.9	59.3	17.8	7.9		5.7	75.4	13.3	5.5		37.2	45.2	9	8.7		
Total %	4.8	17.3	14.4	1.2	37.7	3.7	14.5	4.4	1.9	24.4	1.3	16.6	2.9	1.2	22.1	5.9	7.2	1.4	1.4	15.8	

	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	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	4	37	37	78	4	47	6	57	3	34	3	40	12	18	2	32	207
07:45 AM	7	33	44	84	16	39	11	66	2	37	6	45	12	13	3	28	223
08:00 AM	7	31	33	71	9	30	7	46	4	26	9	39	19	10	1	30	186
08:15 AM	8	39	33	80	4	32	12	48	0	32	3	35	14	12	4	30	193
Total Volume	26	140	147	313	33	148	36	217	9	129	21	159	57	53	10	120	809
% App. Total	8.3	44.7	47		15.2	68.2	16.6		5.7	81.1	13.2		47.5	44.2	8.3		
PHF	.813	.897	.835	.932	.516	.787	.750	.822	.563	.872	.583	.883	.750	.736	.625	.938	.907

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counter:3890,5676
Counted By:AE,JL
Weather:Clear

File Name : CooPohPM
Site Code : 00000008
Start Date : 4/25/2011
Page No : 1

Groups Printed- Unshifted

	Cooke Street Southbound					Pohukaina Street Westbound					Cooke Street Northbound					Pohukaina 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	9	61	31	4	105	8	22	12	0	42	1	38	5	0	44	23	21	10	0	54	245
03:15 PM	9	48	9	2	68	2	16	12	2	32	2	36	8	0	46	27	23	3	1	54	200
03:30 PM	8	66	20	5	99	14	18	2	1	35	0	32	3	2	37	27	18	4	1	50	221
03:45 PM	5	54	19	1	79	7	16	21	2	46	0	38	6	2	46	32	26	9	2	69	240
Total	31	229	79	12	351	31	72	47	5	155	3	144	22	4	173	109	88	26	4	227	906
04:00 PM	6	77	16	6	105	13	22	11	4	50	6	43	4	6	59	37	27	4	2	70	284
04:15 PM	6	49	16	4	75	9	24	12	1	46	1	39	3	1	44	23	24	8	1	56	221
04:30 PM	8	63	19	2	92	11	18	9	2	40	2	51	6	3	62	25	29	3	1	58	252
04:45 PM	8	67	20	1	96	6	18	16	5	45	3	49	3	5	60	30	33	4	2	69	270
Total	28	256	71	13	368	39	82	48	12	181	12	182	16	15	225	115	113	19	6	253	1027
05:00 PM	18	53	11	0	82	4	33	17	1	55	7	30	8	2	47	35	38	7	2	82	266
05:15 PM	17	57	13	5	92	7	21	7	5	40	1	15	3	8	27	33	31	1	6	71	230
05:30 PM	15	31	19	2	67	6	25	12	2	45	0	31	4	2	37	29	36	1	0	66	215
05:45 PM	10	29	12	3	54	1	20	8	5	34	1	34	0	2	37	15	18	4	10	47	172
Total	60	170	55	10	295	18	99	44	13	174	9	110	15	14	148	112	123	13	18	266	883
Grand Total	119	655	205	35	1014	88	253	139	30	510	24	436	53	33	546	336	324	58	28	746	2816
Apprch %	11.7	64.6	20.2	3.5		17.3	49.6	27.3	5.9		4.4	79.9	9.7	6		45	43.4	7.8	3.8		
Total %	4.2	23.3	7.3	1.2	36	3.1	9	4.9	1.1	18.1	0.9	15.5	1.9	1.2	19.4	11.9	11.5	2.1	1	26.5	

	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	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	6	77	16	99	13	22	11	46	6	43	4	53	37	27	4	68	266
04:15 PM	6	49	16	71	9	24	12	45	1	39	3	43	23	24	8	55	214
04:30 PM	8	63	19	90	11	18	9	38	2	51	6	59	25	29	3	57	244
04:45 PM	8	67	20	95	6	18	16	40	3	49	3	55	30	33	4	67	257
Total Volume	28	256	71	355	39	82	48	169	12	182	16	210	115	113	19	247	981
% App. Total	7.9	72.1	20		23.1	48.5	28.4		5.7	86.7	7.6		46.6	45.7	7.7		
PHF	.875	.831	.888	.896	.750	.854	.750	.918	.500	.892	.667	.890	.777	.856	.594	.908	.922

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counter:1841,5672
Counted By:GC,CA
Weather:Clear

File Name : WarQueAM
Site Code : 00000003
Start Date : 4/26/2011
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	8	99	16	0	123	1	9	4	12	26	2	41	6	0	49	5	6	4	2	17	215
06:15 AM	6	107	14	0	127	4	8	5	6	23	2	42	5	0	49	3	6	7	4	20	219
06:30 AM	1	141	28	2	172	2	13	0	5	20	6	62	8	0	76	5	8	6	4	23	291
06:45 AM	6	146	39	3	194	4	25	6	6	41	6	69	9	0	84	2	11	11	11	35	354
Total	21	493	97	5	616	11	55	15	29	110	16	214	28	0	258	15	31	28	21	95	1079
07:00 AM	7	187	49	4	247	3	42	8	2	55	17	84	4	0	105	4	24	6	12	46	453
07:15 AM	3	167	68	3	241	12	51	7	8	78	13	116	8	3	140	11	21	18	8	58	517
07:30 AM	4	184	50	0	238	17	54	8	8	87	17	106	11	1	135	20	22	9	3	54	514
07:45 AM	12	203	65	1	281	7	56	8	10	81	24	85	5	3	117	10	22	9	10	51	530
Total	26	741	232	8	1007	39	203	31	28	301	71	391	28	7	497	45	89	42	33	209	2014
08:00 AM	4	217	39	1	261	17	35	5	6	63	10	89	5	1	105	21	19	18	5	63	492
08:15 AM	10	220	37	3	270	6	40	7	8	61	13	94	10	1	118	15	31	16	2	64	513
08:30 AM	8	194	37	1	240	14	38	10	13	75	8	94	7	6	115	19	38	8	7	72	502
08:45 AM	10	191	31	4	236	9	27	8	14	58	19	100	8	5	132	21	33	19	2	75	501
Total	32	822	144	9	1007	46	140	30	41	257	50	377	30	13	470	76	121	61	16	274	2008
Grand Total	79	2056	473	22	2630	96	398	76	98	668	137	982	86	20	1225	136	241	131	70	578	5101
Apprch %	3	78.2	18	0.8		14.4	59.6	11.4	14.7		11.2	80.2	7	1.6		23.5	41.7	22.7	12.1		
Total %	1.5	40.3	9.3	0.4	51.6	1.9	7.8	1.5	1.9	13.1	2.7	19.3	1.7	0.4	24	2.7	4.7	2.6	1.4	11.3	

	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	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	4	184	50	238	17	54	8	79	17	106	11	134	20	22	9	51	502
07:45 AM	12	203	65	280	7	56	8	71	24	85	5	114	10	22	9	41	506
08:00 AM	4	217	39	260	17	35	5	57	10	89	5	104	21	19	18	58	479
08:15 AM	10	220	37	267	6	40	7	53	13	94	10	117	15	31	16	62	499
Total Volume	30	824	191	1045	47	185	28	260	64	374	31	469	66	94	52	212	1986
% App. Total	2.9	78.9	18.3		18.1	71.2	10.8		13.6	79.7	6.6		31.1	44.3	24.5		
PHF	.625	.936	.735	.933	.691	.826	.875	.823	.667	.882	.705	.875	.766	.758	.722	.855	.981

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counter:1841,5672
Counted By:GC,CA
Weather:Clear

File Name : WarQuePM
Site Code : 00000003
Start Date : 4/26/2011
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
03:00 PM	9	188	24	4	225	10	43	16	11	80	18	146	8	8	180	17	36	22	4	79	564
03:15 PM	16	181	26	4	227	11	38	21	12	82	12	166	9	6	193	19	41	21	4	85	587
03:30 PM	12	169	25	2	208	11	41	10	22	84	23	177	5	9	214	25	49	27	9	110	616
03:45 PM	14	173	22	3	212	11	38	27	15	91	16	186	9	4	215	26	39	22	12	99	617
Total	51	711	97	13	872	43	160	74	60	337	69	675	31	27	802	87	165	92	29	373	2384
04:00 PM	12	140	16	2	170	2	46	18	7	73	25	177	13	0	215	31	40	28	4	103	561
04:15 PM	12	150	23	7	192	7	37	17	11	72	13	159	19	5	196	20	46	21	6	93	553
04:30 PM	11	168	17	6	202	16	46	5	9	76	17	189	29	3	238	33	63	21	5	122	638
04:45 PM	16	180	18	1	215	13	45	19	9	86	14	156	20	0	190	41	68	33	7	149	640
Total	51	638	74	16	779	38	174	59	36	307	69	681	81	8	839	125	217	103	22	467	2392
05:00 PM	20	202	21	3	246	12	60	13	14	99	15	205	15	2	237	34	67	26	3	130	712
05:15 PM	16	168	17	4	205	12	72	14	11	109	14	163	14	6	197	33	67	36	14	150	661
05:30 PM	18	178	33	7	236	6	44	11	15	76	24	193	19	3	239	22	77	28	7	134	685
05:45 PM	17	195	26	1	239	11	45	8	9	73	17	139	16	2	174	26	50	17	2	95	581
Total	71	743	97	15	926	41	221	46	49	357	70	700	64	13	847	115	261	107	26	509	2639
Grand Total	173	2092	268	44	2577	122	555	179	145	1001	208	2056	176	48	2488	327	643	302	77	1349	7415
Apprch %	6.7	81.2	10.4	1.7		12.2	55.4	17.9	14.5		8.4	82.6	7.1	1.9		24.2	47.7	22.4	5.7		
Total %	2.3	28.2	3.6	0.6	34.8	1.6	7.5	2.4	2	13.5	2.8	27.7	2.4	0.6	33.6	4.4	8.7	4.1	1	18.2	

	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	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	16	180	18	214	13	45	19	77	14	156	20	190	41	68	33	142	623
05:00 PM	20	202	21	243	12	60	13	85	15	205	15	235	34	67	26	127	690
05:15 PM	16	168	17	201	12	72	14	98	14	163	14	191	33	67	36	136	626
05:30 PM	18	178	33	229	6	44	11	61	24	193	19	236	22	77	28	127	653
Total Volume	70	728	89	887	43	221	57	321	67	717	68	852	130	279	123	532	2592
% App. Total	7.9	82.1	10		13.4	68.8	17.8		7.9	84.2	8		24.4	52.4	23.1		
PHF	.875	.901	.674	.913	.827	.767	.750	.819	.698	.874	.850	.903	.793	.906	.854	.937	.939

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counter:5674,5673
Counted By:DY,MH
Weather:Clear

File Name : WarHalAM
Site Code : 00000001
Start Date : 4/25/2011
Page No : 1

Groups Printed- Unshifted

	Ward Avenue Southbound					Westbound	Ward Avenue Northbound					Halekauwila Street Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 AM	0	79	17	0	96	0	3	27	0	1	31	5	2	3	3	13	140
06:15 AM	0	81	24	0	105	0	6	38	0	1	45	5	1	4	2	12	162
06:30 AM	1	98	32	0	131	0	8	77	0	0	85	4	3	8	2	17	233
06:45 AM	4	122	46	0	172	0	14	65	0	0	79	11	2	6	11	30	281
Total	5	380	119	0	504	0	31	207	0	2	240	25	8	21	18	72	816
07:00 AM	4	111	40	0	155	0	13	93	0	0	106	10	2	7	8	27	288
07:15 AM	6	131	68	0	205	0	9	100	0	0	109	27	7	12	5	51	365
07:30 AM	5	149	68	0	222	0	8	90	0	0	98	28	3	10	3	44	364
07:45 AM	2	145	75	0	222	0	14	97	0	1	112	14	5	6	8	33	367
Total	17	536	251	0	804	0	44	380	0	1	425	79	17	35	24	155	1384
08:00 AM	4	154	64	0	222	0	9	89	0	0	98	31	3	10	6	50	370
08:15 AM	2	143	55	0	200	0	4	87	0	0	91	19	6	7	8	40	331
08:30 AM	2	155	30	0	187	0	1	95	1	0	97	32	1	7	12	52	336
08:45 AM	3	168	45	0	216	0	4	70	1	0	75	25	4	11	6	46	337
Total	11	620	194	0	825	0	18	341	2	0	361	107	14	35	32	188	1374
Grand Total	33	1536	564	0	2133	0	93	928	2	3	1026	211	39	91	74	415	3574
Apprch %	1.5	72	26.4	0			9.1	90.4	0.2	0.3		50.8	9.4	21.9	17.8		
Total %	0.9	43	15.8	0	59.7	0	2.6	26	0.1	0.1	28.7	5.9	1.1	2.5	2.1	11.6	

	Ward Avenue Southbound				Westbound	Ward Avenue Northbound				Halekauwila Street Eastbound				
Start Time	Left	Thru	Right	App. Total	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	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	6	131	68	205	0	9	100	0	109	27	7	12	46	360
07:30 AM	5	149	68	222	0	8	90	0	98	28	3	10	41	361
07:45 AM	2	145	75	222	0	14	97	0	111	14	5	6	25	358
08:00 AM	4	154	64	222	0	9	89	0	98	31	3	10	44	364
Total Volume	17	579	275	871	0	40	376	0	416	100	18	38	156	1443
% App. Total	2	66.5	31.6			9.6	90.4	0		64.1	11.5	24.4		
PHF	.708	.940	.917	.981	.000	.714	.940	.000	.937	.806	.643	.792	.848	.991

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counter:5674,5673
Counted By:DY,MH
Weather:Clear

File Name : WarHalPM
Site Code : 00000001
Start Date : 4/25/2011
Page No : 1

Groups Printed- Unshifted

	Ward Avenue Southbound					Westbound	Ward Avenue Northbound					Halekauwila Street Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
03:00 PM	8	160	29	0	197	0	5	141	2	4	152	37	7	20	3	67	416
03:15 PM	7	150	21	0	178	0	11	122	5	1	139	38	4	12	3	57	374
03:30 PM	10	177	23	0	210	0	7	141	3	3	154	48	8	5	7	68	432
03:45 PM	8	149	26	0	183	0	6	149	4	6	165	45	1	15	10	71	419
Total	33	636	99	0	768	0	29	553	14	14	610	168	20	52	23	263	1641
04:00 PM	11	150	18	0	179	0	10	144	2	0	156	69	5	9	17	100	435
04:15 PM	9	158	33	0	200	0	13	158	3	0	174	50	3	12	13	78	452
04:30 PM	6	154	20	0	180	0	6	161	1	0	168	62	4	13	12	91	439
04:45 PM	7	168	37	0	212	0	13	143	6	0	162	61	8	18	7	94	468
Total	33	630	108	0	771	0	42	606	12	0	660	242	20	52	49	363	1794
05:00 PM	4	173	26	0	203	0	10	167	1	1	179	70	6	17	15	108	490
05:15 PM	5	181	29	0	215	0	5	155	2	6	168	53	3	21	29	106	489
05:30 PM	5	180	27	0	212	0	4	157	1	0	162	56	3	11	10	80	454
05:45 PM	3	153	13	0	169	0	4	116	3	0	123	41	4	11	18	74	366
Total	17	687	95	0	799	0	23	595	7	7	632	220	16	60	72	368	1799
Grand Total	83	1953	302	0	2338	0	94	1754	33	21	1902	630	56	164	144	994	5234
Apprch %	3.6	83.5	12.9	0			4.9	92.2	1.7	1.1		63.4	5.6	16.5	14.5		
Total %	1.6	37.3	5.8	0	44.7	0	1.8	33.5	0.6	0.4	36.3	12	1.1	3.1	2.8	19	

	Ward Avenue Southbound				Westbound	Ward Avenue Northbound				Halekauwila Street Eastbound				
Start Time	Left	Thru	Right	App. Total	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	7	168	37	212	0	13	143	6	162	61	8	18	87	461
05:00 PM	4	173	26	203	0	10	167	1	178	70	6	17	93	474
05:15 PM	5	181	29	215	0	5	155	2	162	53	3	21	77	454
05:30 PM	5	180	27	212	0	4	157	1	162	56	3	11	70	444
Total Volume	21	702	119	842	0	32	622	10	664	240	20	67	327	1833
% App. Total	2.5	83.4	14.1			4.8	93.7	1.5		73.4	6.1	20.5		
PHF	.750	.970	.804	.979	.000	.615	.931	.417	.933	.857	.625	.798	.879	.967

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counter:3880,5677
Counted By:MM,MK
Weather:Clear

File Name : WarAuaAM
Site Code : 00000005
Start Date : 4/25/2011
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
06:00 AM	3	49	7	1	60	9	2	6	4	21	3	25	11	2	41	1	0	3	3	7	129
06:15 AM	2	56	4	1	63	4	4	6	6	20	6	42	12	3	63	2	4	1	0	7	153
06:30 AM	3	70	4	2	79	7	2	9	7	25	8	62	10	1	81	2	4	3	0	9	194
06:45 AM	5	78	13	0	96	13	12	13	5	43	7	66	10	3	86	2	1	0	0	3	228
Total	13	253	28	4	298	33	20	34	22	109	24	195	43	9	271	7	9	7	3	26	704
07:00 AM	4	82	9	4	99	10	21	11	4	46	8	77	11	3	99	2	10	3	5	20	264
07:15 AM	8	72	10	1	91	12	34	12	6	64	7	57	6	3	73	4	6	3	0	13	241
07:30 AM	16	86	7	7	116	30	32	14	8	84	15	63	11	5	94	1	6	3	4	14	308
07:45 AM	10	82	23	8	123	17	24	15	3	59	18	73	9	5	105	1	6	3	1	11	298
Total	38	322	49	20	429	69	111	52	21	253	48	270	37	16	371	8	28	12	10	58	1111
08:00 AM	18	91	15	8	132	14	23	11	2	50	7	62	10	0	79	4	10	6	1	21	282
08:15 AM	16	101	13	5	135	17	25	18	8	68	10	70	15	6	101	1	5	2	2	10	314
08:30 AM	25	104	10	8	147	27	15	23	10	75	20	53	18	1	92	11	16	8	8	43	357
08:45 AM	36	80	15	15	146	20	16	15	2	53	12	49	14	4	79	9	13	12	8	42	320
Total	95	376	53	36	560	78	79	67	22	246	49	234	57	11	351	25	44	28	19	116	1273
Grand Total	146	951	130	60	1287	180	210	153	65	608	121	699	137	36	993	40	81	47	32	200	3088
Apprch %	11.3	73.9	10.1	4.7		29.6	34.5	25.2	10.7		12.2	70.4	13.8	3.6		20	40.5	23.5	16		
Total %	4.7	30.8	4.2	1.9	41.7	5.8	6.8	5	2.1	19.7	3.9	22.6	4.4	1.2	32.2	1.3	2.6	1.5	1	6.5	

	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	Int. 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	18	91	15	124	14	23	11	48	7	62	10	79	4	10	6	20	271
08:15 AM	16	101	13	130	17	25	18	60	10	70	15	95	1	5	2	8	293
08:30 AM	25	104	10	139	27	15	23	65	20	53	18	91	11	16	8	35	330
08:45 AM	36	80	15	131	20	16	15	51	12	49	14	75	9	13	12	34	291
Total Volume	95	376	53	524	78	79	67	224	49	234	57	340	25	44	28	97	1185
% App. Total	18.1	71.8	10.1		34.8	35.3	29.9		14.4	68.8	16.8		25.8	45.4	28.9		
PHF	.660	.904	.883	.942	.722	.790	.728	.862	.613	.836	.792	.895	.568	.688	.583	.693	.898

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counter:3880,5677
Counted By:MM,MK
Weather:Clear

File Name : WarAuaPM
Site Code : 00000005
Start Date : 4/25/2011
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	36	104	2	0	142	31	21	52	27	131	13	68	16	3	100	1	16	4	0	21	394
03:15 PM	37	72	13	1	123	18	40	34	11	103	7	51	29	6	93	8	28	7	0	43	362
03:30 PM	29	100	20	7	156	32	19	53	8	112	4	58	19	1	82	8	14	0	0	22	372
03:45 PM	28	75	13	0	116	19	28	67	25	139	11	72	21	4	108	4	15	1	0	20	383
Total	130	351	48	8	537	100	108	206	71	485	35	249	85	14	383	21	73	12	0	106	1511
04:00 PM	33	94	6	14	147	26	26	51	9	112	5	63	23	0	91	12	13	2	5	32	382
04:15 PM	35	61	10	5	111	14	16	54	12	96	0	89	26	0	115	4	19	0	2	25	347
04:30 PM	42	75	11	4	132	32	16	69	20	137	6	68	38	3	115	14	20	0	2	36	420
04:45 PM	51	70	13	5	139	30	21	67	7	125	12	80	36	4	132	17	22	0	2	41	437
Total	161	300	40	28	529	102	79	241	48	470	23	300	123	7	453	47	74	2	11	134	1586
05:00 PM	48	89	7	7	151	18	22	63	11	114	3	92	21	5	121	11	27	2	10	50	436
05:15 PM	51	84	14	11	160	26	21	60	7	114	5	70	30	4	109	7	19	4	4	34	417
05:30 PM	61	80	9	10	160	22	9	51	7	89	8	87	41	6	142	9	17	3	13	42	433
05:45 PM	46	80	12	17	155	19	31	48	6	104	6	45	23	7	81	9	13	3	1	26	366
Total	206	333	42	45	626	85	83	222	31	421	22	294	115	22	453	36	76	12	28	152	1652
Grand Total	497	984	130	81	1692	287	270	669	150	1376	80	843	323	43	1289	104	223	26	39	392	4749
Apprch %	29.4	58.2	7.7	4.8		20.9	19.6	48.6	10.9		6.2	65.4	25.1	3.3		26.5	56.9	6.6	9.9		
Total %	10.5	20.7	2.7	1.7	35.6	6	5.7	14.1	3.2	29	1.7	17.8	6.8	0.9	27.1	2.2	4.7	0.5	0.8	8.3	

	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	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	51	70	13	134	30	21	67	118	12	80	36	128	17	22	0	39	419
05:00 PM	48	89	7	144	18	22	63	103	3	92	21	116	11	27	2	40	403
05:15 PM	51	84	14	149	26	21	60	107	5	70	30	105	7	19	4	30	391
05:30 PM	61	80	9	150	22	9	51	82	8	87	41	136	9	17	3	29	397
Total Volume	211	323	43	577	96	73	241	410	28	329	128	485	44	85	9	138	1610
% App. Total	36.6	56	7.5		23.4	17.8	58.8		5.8	67.8	26.4		31.9	61.6	6.5		
PHF	.865	.907	.768	.962	.800	.830	.899	.869	.583	.894	.780	.892	.647	.787	.563	.863	.961

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counter:TU-0654, TU-0652
Counted By:MM, VL
Weather:Clear

File Name : AlaWar AM
Site Code : 00000014
Start Date : 5/2/2011
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	Int. Total
06:00 AM	30	24	18	1	73	3	180	5	0	188	0	2	4	5	11	29	205	0	7	241	513
06:15 AM	32	23	17	0	72	12	244	7	2	265	0	7	5	3	15	39	225	0	6	270	622
06:30 AM	30	17	29	1	77	8	319	14	1	342	2	4	1	8	15	64	357	1	8	430	864
06:45 AM	37	25	43	4	109	10	324	20	6	360	1	2	2	9	14	60	349	0	2	411	894
Total	129	89	107	6	331	33	1067	46	9	1155	3	15	12	25	55	192	1136	1	23	1352	2893
07:00 AM	27	20	31	3	81	8	377	20	0	405	0	2	0	10	12	57	414	1	5	477	975
07:15 AM	29	18	50	1	98	5	455	27	4	491	1	2	1	14	18	56	390	0	4	450	1057
07:30 AM	28	19	56	3	106	21	387	41	2	451	0	6	0	15	21	80	387	1	9	477	1055
07:45 AM	22	34	63	4	123	13	468	35	4	520	0	4	2	9	15	52	375	0	2	429	1087
Total	106	91	200	11	408	47	1687	123	10	1867	1	14	3	48	66	245	1566	2	20	1833	4174
08:00 AM	36	70	48	2	156	12	285	19	6	322	3	6	2	3	14	58	326	2	2	388	880
08:15 AM	34	25	58	5	122	13	343	30	5	391	1	6	5	4	16	49	364	2	2	417	946
08:30 AM	42	22	51	3	118	5	296	28	11	340	1	5	5	8	19	54	296	5	5	360	837
08:45 AM	40	24	44	3	111	16	318	29	4	367	4	9	5	5	23	78	412	0	3	493	994
Total	152	141	201	13	507	46	1242	106	26	1420	9	26	17	20	72	239	1398	9	12	1658	3657
Grand Total	387	321	508	30	1246	126	3996	275	45	4442	13	55	32	93	193	676	4100	12	55	4843	10724
Apprch %	31.1	25.8	40.8	2.4		2.8	90	6.2	1		6.7	28.5	16.6	48.2		14	84.7	0.2	1.1		
Total %	3.6	3	4.7	0.3	11.6	1.2	37.3	2.6	0.4	41.4	0.1	0.5	0.3	0.9	1.8	6.3	38.2	0.1	0.5	45.2	

	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 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	27	20	31	78	8	377	20	405	0	2	0	2	57	414	1	472	957
07:15 AM	29	18	50	97	5	455	27	487	1	2	1	4	56	390	0	446	1034
07:30 AM	28	19	56	103	21	387	41	449	0	6	0	6	80	387	1	468	1026
07:45 AM	22	34	63	119	13	468	35	516	0	4	2	6	52	375	0	427	1068
Total Volume	106	91	200	397	47	1687	123	1857	1	14	3	18	245	1566	2	1813	4085
% App. Total	26.7	22.9	50.4		2.5	90.8	6.6		5.6	77.8	16.7		13.5	86.4	0.1		
PHF	.914	.669	.794	.834	.560	.901	.750	.900	.250	.583	.375	.750	.766	.946	.500	.960	.956

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counter:TU-0654, TU-0652
Counted By:MM, VL
Weather:Clear

File Name : AlaWar PM
Site Code : 00000014
Start Date : 5/2/2011
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	Int. Total
03:00 PM	55	17	77	2	151	0	415	44	0	459	3	10	9	9	31	72	381	2	1	456	1097
03:15 PM	45	2	86	2	135	4	430	50	4	488	1	13	5	16	35	63	466	0	7	536	1194
03:30 PM	51	8	55	1	115	15	355	46	6	422	3	25	12	12	52	76	466	2	11	555	1144
03:45 PM	51	5	54	4	114	5	372	52	3	432	1	19	6	7	33	62	520	0	4	586	1165
Total	202	32	272	9	515	24	1572	192	13	1801	8	67	32	44	151	273	1833	4	23	2133	4600
04:00 PM	52	7	51	2	112	8	355	27	3	393	0	24	8	14	46	54	521	1	11	587	1138
04:15 PM	40	13	56	4	113	6	459	33	2	500	1	18	16	11	46	71	560	0	3	634	1293
04:30 PM	57	20	57	3	137	9	416	16	11	452	3	37	13	13	66	66	537	2	10	615	1270
04:45 PM	48	7	39	4	98	7	464	32	6	509	2	21	9	8	40	81	526	2	4	613	1260
Total	197	47	203	13	460	30	1694	108	22	1854	6	100	46	46	198	272	2144	5	28	2449	4961
05:00 PM	60	9	60	13	142	3	367	33	1	404	0	23	15	19	57	68	558	1	3	630	1233
05:15 PM	58	7	76	1	142	6	540	51	1	598	4	25	11	6	46	81	525	0	5	611	1397
05:30 PM	46	7	49	6	108	1	291	30	13	335	4	22	12	7	45	56	501	1	2	560	1048
05:45 PM	69	17	60	3	149	2	338	24	1	365	3	34	34	3	74	46	353	0	2	401	989
Total	233	40	245	23	541	12	1536	138	16	1702	11	104	72	35	222	251	1937	2	12	2202	4667
Grand Total	632	119	720	45	1516	66	4802	438	51	5357	25	271	150	125	571	796	5914	11	63	6784	14228
Apprch %	41.7	7.8	47.5	3		1.2	89.6	8.2	1		4.4	47.5	26.3	21.9		11.7	87.2	0.2	0.9		
Total %	4.4	0.8	5.1	0.3	10.7	0.5	33.8	3.1	0.4	37.7	0.2	1.9	1.1	0.9	4	5.6	41.6	0.1	0.4	47.7	

	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 04:30 PM																	
04:30 PM	57	20	57	134	9	416	16	441	3	37	13	53	66	537	2	605	1233
04:45 PM	48	7	39	94	7	464	32	503	2	21	9	32	81	526	2	609	1238
05:00 PM	60	9	60	129	3	367	33	403	0	23	15	38	68	558	1	627	1197
05:15 PM	58	7	76	141	6	540	51	597	4	25	11	40	81	525	0	606	1384
Total Volume	223	43	232	498	25	1787	132	1944	9	106	48	163	296	2146	5	2447	5052
% App. Total	44.8	8.6	46.6		1.3	91.9	6.8		5.5	65	29.4		12.1	87.7	0.2		
PHF	.929	.538	.763	.883	.694	.827	.647	.814	.563	.716	.800	.769	.914	.961	.625	.976	.913

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counter:5677,5676
Counted By:PA,BO
Weather:Clear

File Name : KamQueAM
Site Code : 00000002
Start Date : 4/20/2011
Page No : 1

Groups Printed- Unshifted

	Kamakee Street Southbound					Queen Street Westbound					Kamakee Street 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	1	15	3	1	20	18	4	0	2	24	0	11	2	3	16	1	6	1	7	15	75
06:15 AM	2	20	7	0	29	23	11	0	5	39	3	11	6	2	22	1	5	5	6	17	107
06:30 AM	1	22	10	1	34	28	12	1	6	47	3	6	8	1	18	5	8	2	6	21	120
06:45 AM	3	28	10	0	41	33	20	3	6	62	1	20	3	4	28	2	9	1	5	17	148
Total	7	85	30	2	124	102	47	4	19	172	7	48	19	10	84	9	28	9	24	70	450
07:00 AM	3	39	18	3	63	29	20	3	4	56	3	21	10	2	36	7	11	1	3	22	177
07:15 AM	8	35	20	6	69	54	28	3	12	97	2	15	6	0	23	4	8	2	5	19	208
07:30 AM	2	36	14	1	53	55	34	2	3	94	5	19	16	2	42	17	13	2	4	36	225
07:45 AM	5	50	23	4	82	56	42	2	9	109	3	28	12	2	45	8	20	4	5	37	273
Total	18	160	75	14	267	194	124	10	28	356	13	83	44	6	146	36	52	9	17	114	883
08:00 AM	4	50	17	1	72	51	34	0	6	91	4	18	15	0	37	8	24	3	6	41	241
08:15 AM	4	45	10	4	63	46	15	1	1	63	4	28	14	0	46	8	12	7	3	30	202
08:30 AM	5	28	23	1	57	39	24	4	7	74	4	19	13	5	41	9	20	4	4	37	209
08:45 AM	4	37	16	3	60	30	27	4	5	66	8	38	20	0	66	12	29	1	6	48	240
Total	17	160	66	9	252	166	100	9	19	294	20	103	62	5	190	37	85	15	19	156	892
Grand Total	42	405	171	25	643	462	271	23	66	822	40	234	125	21	420	82	165	33	60	340	2225
Apprch %	6.5	63	26.6	3.9		56.2	33	2.8	8		9.5	55.7	29.8	5		24.1	48.5	9.7	17.6		
Total %	1.9	18.2	7.7	1.1	28.9	20.8	12.2	1	3	36.9	1.8	10.5	5.6	0.9	18.9	3.7	7.4	1.5	2.7	15.3	

	Kamakee Street Southbound				Queen Street Westbound				Kamakee Street 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	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	2	36	14	52	55	34	2	91	5	19	16	40	17	13	2	32	215
07:45 AM	5	50	23	78	56	42	2	100	3	28	12	43	8	20	4	32	253
08:00 AM	4	50	17	71	51	34	0	85	4	18	15	37	8	24	3	35	228
08:15 AM	4	45	10	59	46	15	1	62	4	28	14	46	8	12	7	27	194
Total Volume	15	181	64	260	208	125	5	338	16	93	57	166	41	69	16	126	890
% App. Total	5.8	69.6	24.6		61.5	37	1.5		9.6	56	34.3		32.5	54.8	12.7		
PHF	.750	.905	.696	.833	.929	.744	.625	.845	.800	.830	.891	.902	.603	.719	.571	.900	.879

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counter:5677,5676
Counted By:PA,BO
Weather:Clear

File Name : KamQuePM
Site Code : 00000002
Start Date : 4/20/2011
Page No : 1

Groups Printed- Unshifted

	Kamakee Street Southbound					Queen Street Westbound					Kamakee Street 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
03:00 PM	7	41	18	1	67	41	28	3	1	73	9	43	29	1	82	10	46	19	6	81	303
03:15 PM	3	32	10	1	46	52	44	5	2	103	8	57	27	4	96	22	49	5	7	83	328
03:30 PM	1	42	10	0	53	57	32	6	3	98	5	47	24	2	78	12	41	6	15	74	303
03:45 PM	3	28	6	0	37	63	46	2	5	116	5	45	30	1	81	18	43	8	5	74	308
Total	14	143	44	2	203	213	150	16	11	390	27	192	110	8	337	62	179	38	33	312	1242
04:00 PM	9	33	4	5	51	68	40	4	6	118	1	53	21	3	78	20	44	10	7	81	328
04:15 PM	4	31	10	1	46	62	33	1	4	100	6	39	29	1	75	36	47	5	9	97	318
04:30 PM	4	21	5	1	31	42	39	3	5	89	10	51	20	2	83	20	62	11	9	102	305
04:45 PM	3	27	9	5	44	52	43	1	9	105	13	56	20	1	90	23	64	22	16	125	364
Total	20	112	28	12	172	224	155	9	24	412	30	199	90	7	326	99	217	48	41	405	1315
05:00 PM	3	31	5	4	43	63	39	1	7	110	5	45	42	4	96	31	68	14	7	120	369
05:15 PM	5	33	9	4	51	71	36	4	3	114	8	51	29	4	92	29	82	11	6	128	385
05:30 PM	4	39	16	4	63	60	42	4	11	117	13	33	22	5	73	33	62	11	13	119	372
05:45 PM	5	55	11	6	77	0	0	0	0	0	0	0	0	0	0	19	61	10	16	106	183
Total	17	158	41	18	234	194	117	9	21	341	26	129	93	13	261	112	273	46	42	473	1309
Grand Total	51	413	113	32	609	631	422	34	56	1143	83	520	293	28	924	273	669	132	116	1190	3866
Apprch %	8.4	67.8	18.6	5.3		55.2	36.9	3	4.9		9	56.3	31.7	3		22.9	56.2	11.1	9.7		
Total %	1.3	10.7	2.9	0.8	15.8	16.3	10.9	0.9	1.4	29.6	2.1	13.5	7.6	0.7	23.9	7.1	17.3	3.4	3	30.8	

	Kamakee Street Southbound				Queen Street Westbound				Kamakee Street 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	Int. Total
Peak Hour Analysis From 03:00 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	3	27	9	39	52	43	1	96	13	56	20	89	23	64	22	109	333
05:00 PM	3	31	5	39	63	39	1	103	5	45	42	92	31	68	14	113	347
05:15 PM	5	33	9	47	71	36	4	111	8	51	29	88	29	82	11	122	368
05:30 PM	4	39	16	59	60	42	4	106	13	33	22	66	33	62	11	106	339
Total Volume	15	130	39	184	246	160	10	416	39	185	113	337	116	276	58	450	1387
% App. Total	8.2	70.7	21.2		59.1	38.5	2.4		11.6	54.9	33.5		25.8	61.3	12.9		
PHF	.750	.833	.609	.780	.866	.930	.625	.937	.750	.826	.673	.916	.879	.841	.659	.922	.942

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counter:3890,3891
Counted By:EM,SM
Weather:Clear

File Name : KamAuaAM
Site Code : 00000004
Start Date : 4/20/2011
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
06:00 AM	1	26	9	2	38	0	6	6	5	17	2	10	0	3	15	3	7	5	2	17	87
06:15 AM	1	28	8	2	39	0	4	5	7	16	5	10	2	10	27	3	3	4	8	18	100
06:30 AM	1	29	19	4	53	0	10	7	7	24	6	14	0	8	28	7	7	4	2	20	125
06:45 AM	3	25	24	3	55	1	10	7	11	29	7	11	1	5	24	8	5	2	5	20	128
Total	6	108	60	11	185	1	30	25	30	86	20	45	3	26	94	21	22	15	17	75	440
07:00 AM	2	45	13	8	68	0	16	11	3	30	2	19	1	0	22	5	11	2	3	21	141
07:15 AM	11	37	40	5	93	0	10	9	8	27	8	23	0	4	35	4	2	4	10	20	175
07:30 AM	12	42	36	4	94	0	23	16	5	44	11	17	5	5	38	5	19	13	0	37	213
07:45 AM	21	45	34	1	101	4	18	12	9	43	9	26	4	5	44	7	14	5	5	31	219
Total	46	169	123	18	356	4	67	48	25	144	30	85	10	14	139	21	46	24	18	109	748
08:00 AM	11	53	29	7	100	3	12	12	7	34	11	17	7	3	38	8	15	8	8	39	211
08:15 AM	12	38	40	5	95	5	20	15	3	43	5	33	6	4	48	7	13	6	7	33	219
08:30 AM	12	24	25	7	68	1	24	10	10	45	16	22	5	7	50	14	14	6	4	38	201
08:45 AM	15	27	23	8	73	1	23	18	7	49	19	36	10	10	75	12	26	5	5	48	245
Total	50	142	117	27	336	10	79	55	27	171	51	108	28	24	211	41	68	25	24	158	876
Grand Total	102	419	300	56	877	15	176	128	82	401	101	238	41	64	444	83	136	64	59	342	2064
Apprch %	11.6	47.8	34.2	6.4		3.7	43.9	31.9	20.4		22.7	53.6	9.2	14.4		24.3	39.8	18.7	17.3		
Total %	4.9	20.3	14.5	2.7	42.5	0.7	8.5	6.2	4	19.4	4.9	11.5	2	3.1	21.5	4	6.6	3.1	2.9	16.6	

	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	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	12	42	36	90	0	23	16	39	11	17	5	33	5	19	13	37	199
07:45 AM	21	45	34	100	4	18	12	34	9	26	4	39	7	14	5	26	199
08:00 AM	11	53	29	93	3	12	12	27	11	17	7	35	8	15	8	31	186
08:15 AM	12	38	40	90	5	20	15	40	5	33	6	44	7	13	6	26	200
Total Volume	56	178	139	373	12	73	55	140	36	93	22	151	27	61	32	120	784
% App. Total	15	47.7	37.3		8.6	52.1	39.3		23.8	61.6	14.6		22.5	50.8	26.7		
PHF	.667	.840	.869	.933	.600	.793	.859	.875	.818	.705	.786	.858	.844	.803	.615	.811	.980

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counter:3890,3891
Counted By:EM,SM
Weather:Clear

File Name : KamAuaPM
Site Code : 00000004
Start Date : 4/20/2011
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	18	46	34	12	110	2	36	27	23	88	19	25	9	35	88	29	34	10	19	92	378
03:15 PM	18	41	36	23	118	5	25	31	26	87	16	34	9	43	102	25	26	20	22	93	400
03:30 PM	28	35	46	22	131	5	47	22	22	96	16	40	6	52	114	29	46	12	19	106	447
03:45 PM	20	35	32	31	118	4	44	30	31	109	15	36	10	38	99	32	62	21	18	133	459
Total	84	157	148	88	477	16	152	110	102	380	66	135	34	168	403	115	168	63	78	424	1684
04:00 PM	15	53	35	15	118	2	40	25	15	82	12	44	4	54	114	29	32	15	18	94	408
04:15 PM	17	58	27	15	117	8	48	39	16	111	16	28	10	36	90	28	49	12	15	104	422
04:30 PM	16	32	32	17	97	0	36	29	9	74	7	28	6	47	88	48	44	18	27	137	396
04:45 PM	20	40	37	22	119	6	28	26	31	91	20	48	12	23	103	31	54	12	6	103	416
Total	68	183	131	69	451	16	152	119	71	358	55	148	32	160	395	136	179	57	66	438	1642
05:00 PM	16	46	38	34	134	4	43	32	26	105	11	32	10	28	81	45	53	15	14	127	447
05:15 PM	28	48	36	27	139	4	50	25	23	102	27	39	11	35	112	25	45	20	15	105	458
05:30 PM	30	46	26	17	119	4	36	43	23	106	22	29	10	61	122	37	60	10	26	133	480
05:45 PM	21	48	50	40	159	3	32	36	31	102	32	32	13	49	126	29	45	14	37	125	512
Total	95	188	150	118	551	15	161	136	103	415	92	132	44	173	441	136	203	59	92	490	1897
Grand Total	247	528	429	275	1479	47	465	365	276	1153	213	415	110	501	1239	387	550	179	236	1352	5223
Apprch %	16.7	35.7	29	18.6		4.1	40.3	31.7	23.9		17.2	33.5	8.9	40.4		28.6	40.7	13.2	17.5		
Total %	4.7	10.1	8.2	5.3	28.3	0.9	8.9	7	5.3	22.1	4.1	7.9	2.1	9.6	23.7	7.4	10.5	3.4	4.5	25.9	

	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 05:00 PM																	
05:00 PM	16	46	38	100	4	43	32	79	11	32	10	53	45	53	15	113	345
05:15 PM	28	48	36	112	4	50	25	79	27	39	11	77	25	45	20	90	358
05:30 PM	30	46	26	102	4	36	43	83	22	29	10	61	37	60	10	107	353
05:45 PM	21	48	50	119	3	32	36	71	32	32	13	77	29	45	14	88	355
Total Volume	95	188	150	433	15	161	136	312	92	132	44	268	136	203	59	398	1411
% App. Total	21.9	43.4	34.6		4.8	51.6	43.6		34.3	49.3	16.4		34.2	51	14.8		
PHF	.792	.979	.750	.910	.938	.805	.791	.940	.719	.846	.846	.870	.756	.846	.738	.881	.985

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counter:1839,3888
Counted By:GC,CA
Weather:Clear

File Name : AlaKamAM
Site Code : 00000003
Start Date : 4/20/2011
Page No : 1

Groups Printed- Unshifted

	Kamakee Street Southbound					Ala Moana Blvd. Westbound					Ala Moana Park Drive Northbound					Ala Moana Blvd. 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	1	14	16	8	39	2	200	2	10	214	6	3	1	5	15	5	183	34	0	222	490
06:15 AM	0	14	16	17	47	1	236	4	20	261	4	5	1	3	13	4	243	22	0	269	590
06:30 AM	2	8	23	8	41	2	292	7	13	314	18	5	4	6	33	7	309	44	0	360	748
06:45 AM	1	6	20	4	31	2	356	5	6	369	15	2	1	6	24	8	344	28	0	380	804
Total	4	42	75	37	158	7	1084	18	49	1158	43	15	7	20	85	24	1079	128	0	1231	2632
07:00 AM	5	8	35	6	54	3	418	4	5	430	16	4	8	5	33	17	357	34	0	408	925
07:15 AM	4	11	22	3	40	1	446	6	11	464	33	8	3	3	47	14	430	24	0	468	1019
07:30 AM	6	14	33	2	55	1	579	4	5	589	16	11	3	0	30	12	373	43	0	428	1102
07:45 AM	6	15	37	9	67	0	380	7	19	406	19	9	2	8	38	21	357	34	0	412	923
Total	21	48	127	20	216	5	1823	21	40	1889	84	32	16	16	148	64	1517	135	0	1716	3969
08:00 AM	9	10	44	1	64	4	395	5	12	416	21	8	6	10	45	14	395	36	0	445	970
08:15 AM	9	13	28	2	52	6	425	7	6	444	16	9	6	5	36	23	342	36	0	401	933
08:30 AM	3	8	21	2	34	0	344	3	11	358	19	20	7	5	51	12	364	33	0	409	852
08:45 AM	2	6	25	0	33	2	320	3	0	325	21	16	1	4	42	32	347	40	0	419	819
Total	23	37	118	5	183	12	1484	18	29	1543	77	53	20	24	174	81	1448	145	0	1674	3574
Grand Total	48	127	320	62	557	24	4391	57	118	4590	204	100	43	60	407	169	4044	408	0	4621	10175
Apprch %	8.6	22.8	57.5	11.1		0.5	95.7	1.2	2.6		50.1	24.6	10.6	14.7		3.7	87.5	8.8	0		
Total %	0.5	1.2	3.1	0.6	5.5	0.2	43.2	0.6	1.2	45.1	2	1	0.4	0.6	4	1.7	39.7	4	0	45.4	

	Kamakee Street Southbound				Ala Moana Blvd. Westbound				Ala Moana Park Drive Northbound				Ala Moana Blvd. 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 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	4	11	22	37	1	446	6	453	33	8	3	44	14	430	24	468	1002
07:30 AM	6	14	33	53	1	579	4	584	16	11	3	30	12	373	43	428	1095
07:45 AM	6	15	37	58	0	380	7	387	19	9	2	30	21	357	34	412	887
08:00 AM	9	10	44	63	4	395	5	404	21	8	6	35	14	395	36	445	947
Total Volume	25	50	136	211	6	1800	22	1828	89	36	14	139	61	1555	137	1753	3931
% App. Total	11.8	23.7	64.5		0.3	98.5	1.2		64	25.9	10.1		3.5	88.7	7.8		
PHF	.694	.833	.773	.837	.375	.777	.786	.783	.674	.818	.583	.790	.726	.904	.797	.936	.897

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counter:1839,3888
Counted By:GC,CA
Weather:Clear

File Name : AlaKamPM
Site Code : 00000003
Start Date : 4/20/2011
Page No : 1

Groups Printed- Unshifted

	Kamakee Street Southbound					Ala Moana Blvd. Westbound					Ala Moana Park Drive Northbound					Ala Moana Blvd. 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	15	10	39	7	71	3	364	17	5	389	31	10	12	7	60	17	443	56	0	516	1036
03:15 PM	14	11	26	7	58	5	375	6	13	399	16	16	1	9	42	31	507	44	0	582	1081
03:30 PM	16	8	36	3	63	5	322	15	14	356	15	13	11	4	43	31	516	40	0	587	1049
03:45 PM	16	7	32	10	65	3	334	15	13	365	24	11	4	7	46	29	512	59	0	600	1076
Total	61	36	133	27	257	16	1395	53	45	1509	86	50	28	27	191	108	1978	199	0	2285	4242
04:00 PM	16	15	42	17	90	6	354	10	7	377	29	16	7	9	61	31	478	52	0	561	1089
04:15 PM	23	17	34	13	87	1	411	11	15	438	17	12	6	3	38	20	559	67	0	646	1209
04:30 PM	11	18	24	6	59	8	330	13	12	363	30	17	10	6	63	23	517	57	0	597	1082
04:45 PM	7	21	30	12	70	11	373	10	14	408	18	18	4	8	48	34	563	54	0	651	1177
Total	57	71	130	48	306	26	1468	44	48	1586	94	63	27	26	210	108	2117	230	0	2455	4557
05:00 PM	11	20	33	20	84	8	348	21	30	407	25	8	14	12	59	27	503	81	0	611	1161
05:15 PM	13	25	28	22	88	5	347	19	21	392	31	16	15	16	78	33	551	75	0	659	1217
05:30 PM	12	25	30	16	83	8	320	22	20	370	33	7	15	18	73	26	551	64	0	641	1167
05:45 PM	8	21	42	23	94	7	292	22	22	343	33	19	17	10	79	43	524	51	0	618	1134
Total	44	91	133	81	349	28	1307	84	93	1512	122	50	61	56	289	129	2129	271	0	2529	4679
Grand Total	162	198	396	156	912	70	4170	181	186	4607	302	163	116	109	690	345	6224	700	0	7269	13478
Apprch %	17.8	21.7	43.4	17.1		1.5	90.5	3.9	4		43.8	23.6	16.8	15.8		4.7	85.6	9.6	0		
Total %	1.2	1.5	2.9	1.2	6.8	0.5	30.9	1.3	1.4	34.2	2.2	1.2	0.9	0.8	5.1	2.6	46.2	5.2	0	53.9	

	Kamakee Street Southbound				Ala Moana Blvd. Westbound				Ala Moana Park Drive Northbound				Ala Moana Blvd. 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	7	21	30	58	11	373	10	394	18	18	4	40	34	563	54	651	1143
05:00 PM	11	20	33	64	8	348	21	377	25	8	14	47	27	503	81	611	1099
05:15 PM	13	25	28	66	5	347	19	371	31	16	15	62	33	551	75	659	1158
05:30 PM	12	25	30	67	8	320	22	350	33	7	15	55	26	551	64	641	1113
Total Volume	43	91	121	255	32	1388	72	1492	107	49	48	204	120	2168	274	2562	4513
% App. Total	16.9	35.7	47.5		2.1	93	4.8		52.5	24	23.5		4.7	84.6	10.7		
PHF	.827	.910	.917	.951	.727	.930	.818	.947	.811	.681	.800	.823	.882	.963	.846	.972	.974

Wilson Okamoto Corporation

1907 S. Beretania Street
Honolulu, Hi 96826

Counted By:GC
Counter:D4-5676
Weather:Clear

File Name : QueQue AM
Site Code : 00000001
Start Date : 2/5/2014
Page No : 1

Groups Printed- Unshifted

	Southbound	Queen Street Westbound					Queen's Lane Northbound					Queen Street Eastbound					
Start Time	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	0	1	26	0	0	27	0	0	5	2	7	0	21	1	0	22	56
06:15 AM	0	3	28	0	0	31	2	0	3	0	5	0	15	1	0	16	52
06:30 AM	0	6	33	0	0	39	2	0	4	3	9	0	24	0	0	24	72
06:45 AM	0	5	54	0	0	59	4	0	12	3	19	0	22	1	0	23	101
Total	0	15	141	0	0	156	8	0	24	8	40	0	82	3	0	85	281
07:00 AM	0	7	62	0	0	69	4	0	11	3	18	0	29	1	0	30	117
07:15 AM	0	11	73	0	0	84	6	0	18	3	27	0	18	3	0	21	132
07:30 AM	0	7	91	0	0	98	9	0	15	4	28	0	28	1	0	29	155
07:45 AM	0	13	118	0	0	131	6	0	18	4	28	0	39	3	0	42	201
Total	0	38	344	0	0	382	25	0	62	14	101	0	114	8	0	122	605
08:00 AM	0	9	105	0	0	114	3	0	14	5	22	0	29	6	0	35	171
08:15 AM	0	13	97	0	0	110	9	0	22	2	33	0	32	2	0	34	177
08:30 AM	0	16	84	0	0	100	6	0	18	4	28	0	47	2	0	49	177
08:45 AM	0	12	71	0	0	83	9	0	23	4	36	0	51	1	0	52	171
Total	0	50	357	0	0	407	27	0	77	15	119	0	159	11	0	170	696
Grand Total	0	103	842	0	0	945	60	0	163	37	260	0	355	22	0	377	1582
Apprch %		10.9	89.1	0	0		23.1	0	62.7	14.2		0	94.2	5.8	0		
Total %	0	6.5	53.2	0	0	59.7	3.8	0	10.3	2.3	16.4	0	22.4	1.4	0	23.8	

	Southbound	Queen Street Westbound				Queen's Lane Northbound				Queen Street Eastbound				
Start Time	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 07:45 AM														
07:45 AM	0	13	**118**	0	**131**	6	0	18	24	0	39	3	42	**197**
08:00 AM	0	9	105	0	114	3	0	14	17	0	29	**6**	35	166
08:15 AM	0	13	97	0	110	**9**	0	**22**	**31**	0	32	2	34	175
08:30 AM	0	**16**	84	0	100	6	0	18	24	0	**47**	2	**49**	173
Total Volume	0	51	404	0	455	24	0	72	96	0	147	13	160	711
% App. Total		11.2	88.8	0		25	0	75		0	91.9	8.1		
PHF	.000	.797	.856	.000	.868	.667	.000	.818	.774	.000	.782	.542	.816	.902

Wilson Okamoto Corporation

1907 S. Beretania Street
Honolulu, Hi 96826

Counted By:GC
Counter:D4-5676
Weather:Clear

File Name : QueQue PM
Site Code : 00000001
Start Date : 2/5/2014
Page No : 1

Groups Printed- Unshifted

	Southbound	Queen Street Westbound					Queen's Lane Northbound					Queen Street Eastbound					
Start Time	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	0	12	115	0	0	127	8	0	35	5	48	0	80	8	0	88	263
03:15 PM	0	12	106	0	0	118	9	0	38	11	58	0	77	6	0	83	259
03:30 PM	0	21	101	0	0	122	8	0	31	9	48	0	84	5	0	89	259
03:45 PM	0	14	115	0	0	129	14	0	34	13	61	0	68	8	0	76	266
Total	0	59	437	0	0	496	39	0	138	38	215	0	309	27	0	336	1047
04:00 PM	0	15	101	0	0	116	3	0	33	13	49	0	80	8	0	88	253
04:15 PM	0	17	99	0	0	116	7	0	51	6	64	0	81	4	0	85	265
04:30 PM	0	11	119	0	0	130	8	0	34	9	51	0	103	10	0	113	294
04:45 PM	0	17	105	0	0	122	9	0	28	11	48	0	93	10	0	103	273
Total	0	60	424	0	0	484	27	0	146	39	212	0	357	32	0	389	1085
05:00 PM	0	13	111	0	0	124	14	0	54	8	76	0	107	9	0	116	316
05:15 PM	0	15	113	0	0	128	10	0	43	6	59	0	98	8	0	106	293
05:30 PM	0	16	120	0	0	136	12	0	41	18	71	0	128	6	0	134	341
05:45 PM	0	23	106	0	0	129	18	0	36	10	64	0	111	4	0	115	308
Total	0	67	450	0	0	517	54	0	174	42	270	0	444	27	0	471	1258
Grand Total	0	186	1311	0	0	1497	120	0	458	119	697	0	1110	86	0	1196	3390
Apprch %		12.4	87.6	0	0		17.2	0	65.7	17.1		0	92.8	7.2	0		
Total %	0	5.5	38.7	0	0	44.2	3.5	0	13.5	3.5	20.6	0	32.7	2.5	0	35.3	

	Southbound	Queen Street Westbound				Queen's Lane Northbound				Queen Street Eastbound				
Start Time	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 05:00 PM														
05:00 PM	0	13	111	0	124	14	0	**54**	**68**	0	107	**9**	116	308
05:15 PM	0	15	113	0	128	10	0	43	53	0	98	8	106	287
05:30 PM	0	16	**120**	0	**136**	12	0	41	53	0	**128**	6	**134**	**323**
05:45 PM	0	**23**	106	0	129	**18**	0	36	54	0	111	4	115	298
Total Volume	0	67	450	0	517	54	0	174	228	0	444	27	471	1216
% App. Total		13	87	0		23.7	0	76.3		0	94.3	5.7		
PHF	.000	.728	.938	.000	.950	.750	.000	.806	.838	.000	.867	.750	.879	.941

Wilson Okamoto Corporation

1907 S. Beretania Street Suite 400
Honolulu, Hi 96826

Counted By:TO
Counter:D4-3888
Weather:Clear

File Name : QueAua AM
Site Code : 00000002
Start Date : 2/5/2014
Page No : 1

Groups Printed- Unshifted

	Queen's Lane Southbound					Hokua Condominium Westbound					Queen's Lane Northbound					Auahi Street Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:00 AM	2	2	0	3	7	1	0	3	1	5	0	2	2	0	4	1	0	2	2	5	21
06:15 AM	3	1	2	1	7	0	0	2	0	2	0	2	7	1	10	1	1	2	0	4	23
06:30 AM	3	2	1	1	7	0	0	1	0	1	4	8	14	0	26	3	1	1	0	5	39
06:45 AM	0	3	3	3	9	10	2	1	2	15	1	8	10	2	21	2	2	3	3	10	55
Total	8	8	6	8	30	11	2	7	3	23	5	20	33	3	61	7	4	8	5	24	138
07:00 AM	3	2	2	1	8	5	0	0	6	11	1	6	18	3	28	7	6	4	10	27	74
07:15 AM	4	1	7	3	15	9	5	1	1	16	5	13	14	0	32	8	2	4	5	19	82
07:30 AM	3	3	2	5	13	9	5	7	2	23	7	11	12	2	32	7	1	4	7	19	87
07:45 AM	6	3	7	2	18	9	0	3	4	16	8	12	29	4	53	10	4	3	8	25	112
Total	16	9	18	11	54	32	10	11	13	66	21	42	73	9	145	32	13	15	30	90	355
08:00 AM	2	5	7	4	18	5	1	2	6	14	6	9	14	8	37	7	1	4	4	16	85
08:15 AM	7	5	5	2	19	6	4	1	2	13	10	18	24	2	54	9	5	7	8	29	115
08:30 AM	5	4	8	3	20	4	7	4	3	18	5	12	23	1	41	14	7	6	8	35	114
08:45 AM	5	2	5	6	18	9	4	3	1	17	11	19	30	2	62	8	5	2	11	26	123
Total	19	16	25	15	75	24	16	10	12	62	32	58	91	13	194	38	18	19	31	106	437
Grand Total	43	33	49	34	159	67	28	28	28	151	58	120	197	25	400	77	35	42	66	220	930
Apprch %	27	20.8	30.8	21.4		44.4	18.5	18.5	18.5		14.5	30	49.2	6.2		35	15.9	19.1	30		
Total %	4.6	3.5	5.3	3.7	17.1	7.2	3	3	3	16.2	6.2	12.9	21.2	2.7	43	8.3	3.8	4.5	7.1	23.7	

	Queen's Lane Southbound				Hokua Condominium Westbound				Queen's Lane Northbound				Auahi Street Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. 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	2	**5**	7	14	5	1	2	8	6	9	14	29	7	1	4	12	63
08:15 AM	**7**	5	5	**17**	6	4	1	11	10	18	24	52	9	5	**7**	21	101
08:30 AM	5	4	**8**	17	4	**7**	**4**	15	5	12	23	40	**14**	**7**	6	**27**	99
08:45 AM	5	2	5	12	**9**	4	3	**16**	**11**	**19**	**30**	**60**	8	5	2	15	**103**
Total Volume	19	16	25	60	24	16	10	50	32	58	91	181	38	18	19	75	366
% App. Total	31.7	26.7	41.7		48	32	20		17.7	32	50.3		50.7	24	25.3		
PHF	.679	.800	.781	.882	.667	.571	.625	.781	.727	.763	.758	.754	.679	.643	.679	.694	.888

Wilson Okamoto Corporation

1907 S. Beretania Street Suite 400
Honolulu, Hi 96826

Counted By:TO
Counter:D4-3888
Weather:Clear

File Name : QueAua PM
Site Code : 00000002
Start Date : 2/5/2014
Page No : 1

Groups Printed- Unshifted

	Queen's Lane Southbound					Hokua Condominium Westbound					Queen Street Northbound					Auahi Street Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:00 PM	5	4	10	19	38	6	5	7	7	25	4	14	29	17	64	30	5	13	22	70	197
03:15 PM	3	5	9	15	32	8	3	4	9	24	5	23	33	26	87	31	6	15	18	70	213
03:30 PM	12	10	5	13	40	12	3	4	8	27	8	16	39	15	78	29	3	13	27	72	217
03:45 PM	6	9	8	15	38	7	7	3	11	28	7	28	32	8	75	40	9	15	10	74	215
Total	26	28	32	62	148	33	18	18	35	104	24	81	133	66	304	130	23	56	77	286	842
04:00 PM	4	7	9	8	28	5	5	3	1	14	9	14	32	8	63	30	4	15	23	72	177
04:15 PM	6	7	10	14	37	7	3	6	9	25	10	28	39	9	86	23	3	22	20	68	216
04:30 PM	3	9	8	12	32	4	0	2	6	12	3	25	29	5	62	35	6	14	11	66	172
04:45 PM	9	10	8	12	39	8	5	2	5	20	5	15	50	24	94	27	6	13	16	62	215
Total	22	33	35	46	136	24	13	13	21	71	27	82	150	46	305	115	19	64	70	268	780
05:00 PM	7	8	7	13	35	14	2	3	9	28	4	31	39	4	78	37	3	18	9	67	208
05:15 PM	5	5	9	13	32	11	4	5	1	21	3	21	35	6	65	36	5	26	16	83	201
05:30 PM	5	12	7	13	37	9	1	4	7	21	5	24	29	6	64	30	6	17	14	67	189
05:45 PM	5	13	7	3	28	7	2	6	11	26	6	28	24	1	59	31	3	15	21	70	183
Total	22	38	30	42	132	41	9	18	28	96	18	104	127	17	266	134	17	76	60	287	781
Grand Total	70	99	97	150	416	98	40	49	84	271	69	267	410	129	875	379	59	196	207	841	2403
Apprch %	16.8	23.8	23.3	36.1		36.2	14.8	18.1	31		7.9	30.5	46.9	14.7		45.1	7	23.3	24.6		
Total %	2.9	4.1	4	6.2	17.3	4.1	1.7	2	3.5	11.3	2.9	11.1	17.1	5.4	36.4	15.8	2.5	8.2	8.6	35	

	Queen's Lane Southbound				Hokua Condominium Westbound				Queen Street Northbound				Auahi Street Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	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	**9**	10	8	**27**	8	**5**	2	15	**5**	15	**50**	70	27	**6**	13	46	158
05:00 PM	7	8	7	22	**14**	2	3	19	4	**31**	39	**74**	**37**	3	18	58	**173**
05:15 PM	5	5	**9**	19	11	4	**5**	**20**	3	21	35	59	36	5	**26**	**67**	165
05:30 PM	5	**12**	7	24	9	1	4	14	5	24	29	58	30	6	17	53	149
Total Volume	26	35	31	92	42	12	14	68	17	91	153	261	130	20	74	224	645
% App. Total	28.3	38	33.7		61.8	17.6	20.6		6.5	34.9	58.6		58	8.9	33		
PHF	.722	.729	.861	.852	.750	.600	.700	.850	.850	.734	.765	.882	.878	.833	.712	.836	.932

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counter:5672,5674
Counted By:RJ,SF
Weather:Clear

File Name : AlaQueAM
Site Code : 00000006
Start Date : 4/20/2011
Page No : 1

Groups Printed- Unshifted

	Queen Street Southbound					Ala Moana Blvd. Westbound					Northbound	Ala Moana Blvd. Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 AM	2	0	2	7	11	0	222	13	0	235	0	0	190	0	3	193	439
06:15 AM	3	0	2	13	18	0	235	8	0	243	0	0	242	0	4	246	507
06:30 AM	4	0	2	7	13	0	311	16	0	327	0	1	307	0	17	325	665
06:45 AM	4	0	3	8	15	0	389	19	0	408	0	0	338	0	12	350	773
Total	13	0	9	35	57	0	1157	56	0	1213	0	1	1077	0	36	1114	2384
07:00 AM	8	0	2	17	27	0	424	19	0	443	0	2	373	0	16	391	861
07:15 AM	6	0	4	17	27	0	493	26	0	519	0	4	435	0	9	448	994
07:30 AM	12	0	5	9	26	0	562	41	0	603	0	1	395	0	9	405	1034
07:45 AM	9	0	4	23	36	0	438	30	0	468	0	2	365	0	21	388	892
Total	35	0	15	66	116	0	1917	116	0	2033	0	9	1568	0	55	1632	3781
08:00 AM	10	0	5	14	29	0	445	40	0	485	0	2	406	0	6	414	928
08:15 AM	11	0	7	18	36	0	401	38	0	439	0	4	351	0	17	372	847
08:30 AM	13	0	6	8	27	0	366	39	0	405	0	0	371	0	7	378	810
08:45 AM	26	0	9	8	43	0	325	33	0	358	0	3	351	0	11	365	766
Total	60	0	27	48	135	0	1537	150	0	1687	0	9	1479	0	41	1529	3351
Grand Total	108	0	51	149	308	0	4611	322	0	4933	0	19	4124	0	132	4275	9516
Apprch %	35.1	0	16.6	48.4		0	93.5	6.5	0			0.4	96.5	0	3.1		
Total %	1.1	0	0.5	1.6	3.2	0	48.5	3.4	0	51.8	0	0.2	43.3	0	1.4	44.9	

	Queen Street Southbound				Ala Moana Blvd. Westbound				Northbound	Ala Moana Blvd. Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	App. Total	Left	Thru	Right	App. Total	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	6	0	4	10	0	493	26	519	0	4	435	0	439	968
07:30 AM	12	0	5	17	0	562	41	603	0	1	395	0	396	1016
07:45 AM	9	0	4	13	0	438	30	468	0	2	365	0	367	848
08:00 AM	10	0	5	15	0	445	40	485	0	2	406	0	408	908
Total Volume	37	0	18	55	0	1938	137	2075	0	9	1601	0	1610	3740
% App. Total	67.3	0	32.7		0	93.4	6.6			0.6	99.4	0		
PHF	.771	.000	.900	.809	.000	.862	.835	.860	.000	.563	.920	.000	.917	.920

Wilson Okamoto Corporation

1907 S. Beretania Street, Suite 400
Honolulu, Hawaii

Counter:5672,5674
Counted By:RJ,SF
Weather:Clear

File Name : AlaQuePM
Site Code : 00000006
Start Date : 4/20/2011
Page No : 1

Groups Printed- Unshifted

	Queen Street Southbound					Ala Moana Blvd. Westbound					Northbound	Ala Moana Blvd. Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
03:00 PM	37	0	14	16	67	0	413	40	0	453	0	9	460	0	11	480	1000
03:15 PM	37	0	10	33	80	0	391	40	0	431	0	6	515	0	8	529	1040
03:30 PM	48	0	7	8	63	0	373	46	0	419	0	8	523	0	5	536	1018
03:45 PM	49	0	7	10	66	0	348	54	0	402	0	4	525	0	9	538	1006
Total	171	0	38	67	276	0	1525	180	0	1705	0	27	2023	0	33	2083	4064
04:00 PM	42	0	5	32	79	0	400	46	0	446	0	5	514	0	8	527	1052
04:15 PM	51	0	10	11	72	0	444	64	0	508	0	4	561	0	7	572	1152
04:30 PM	45	0	12	17	74	0	368	55	0	423	0	6	540	0	11	557	1054
04:45 PM	52	0	9	20	81	0	418	54	0	472	0	4	544	0	5	553	1106
Total	190	0	36	80	306	0	1630	219	0	1849	0	19	2159	0	31	2209	4364
05:00 PM	57	0	6	20	83	0	361	48	0	409	0	2	525	0	13	540	1032
05:15 PM	44	0	12	14	70	0	394	67	0	461	0	4	579	0	7	590	1121
05:30 PM	61	0	10	22	93	0	319	68	0	387	0	4	533	0	14	551	1031
05:45 PM	45	0	8	33	86	0	326	51	0	377	0	3	593	0	22	618	1081
Total	207	0	36	89	332	0	1400	234	0	1634	0	13	2230	0	56	2299	4265
Grand Total	568	0	110	236	914	0	4555	633	0	5188	0	59	6412	0	120	6591	12693
Apprch %	62.1	0	12	25.8		0	87.8	12.2	0			0.9	97.3	0	1.8		
Total %	4.5	0	0.9	1.9	7.2	0	35.9	5	0	40.9	0	0.5	50.5	0	0.9	51.9	

	Queen Street Southbound				Ala Moana Blvd. Westbound				Northbound	Ala Moana Blvd. Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	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 04:00 PM														
04:00 PM	42	0	5	47	0	400	46	446	0	5	514	0	519	1012
04:15 PM	51	0	10	61	0	444	64	508	0	4	561	0	565	1134
04:30 PM	45	0	12	57	0	368	55	423	0	6	540	0	546	1026
04:45 PM	52	0	9	61	0	418	54	472	0	4	544	0	548	1081
Total Volume	190	0	36	226	0	1630	219	1849	0	19	2159	0	2178	4253
% App. Total	84.1	0	15.9		0	88.2	11.8			0.9	99.1	0		
PHF	.913	.000	.750	.926	.000	.918	.855	.910	.000	.792	.962	.000	.964	.938

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.

"Highway Capacity Manual," Transportation Research Board, 2000.

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.

"Highway Capacity Manual," Transportation Research Board, 2000.

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

"Highway Capacity Manual," Transportation Research Board, 2000.

APPENDIX C

CAPACITY ANALYSIS CALCULATIONS
BASELINE PEAK HOUR TRAFFIC ANALYSIS

HCM Unsignalized Intersection Capacity Analysis
1: Cooke St & Halekauwila St

4/24/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	45	65	44	74	119	39	22	224	17	24	232	94
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	50	72	49	82	132	43	24	249	19	27	258	104

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	171	258	149	143	156	233
Volume Left (vph)	50	82	24	0	27	0
Volume Right (vph)	49	43	0	19	0	104
Hadj (s)	-0.08	0.00	0.12	-0.06	0.12	-0.28
Departure Headway (s)	6.2	6.0	6.6	6.4	6.5	6.1
Degree Utilization, x	0.29	0.43	0.27	0.26	0.28	0.39
Capacity (veh/h)	526	554	499	522	523	560
Control Delay (s)	11.7	13.5	10.9	10.4	10.8	11.8
Approach Delay (s)	11.7	13.5	10.7		11.4	
Approach LOS	B	B	B		B	

Intersection Summary			
Delay	11.7		
Level of Service	B		
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
1: Cooke St & Halekauwila St

4/24/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	106	158	52	29	93	59	34	379	42	38	353	45
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	112	166	55	31	98	62	36	399	44	40	372	47

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	333	191	235	244	226	233
Volume Left (vph)	112	31	36	0	40	0
Volume Right (vph)	55	62	0	44	0	47
Hadj (s)	0.00	-0.13	0.11	-0.09	0.12	-0.11
Departure Headway (s)	7.0	7.4	7.5	7.3	7.6	7.3
Degree Utilization, x	0.65	0.39	0.49	0.49	0.47	0.47
Capacity (veh/h)	481	432	452	462	453	459
Control Delay (s)	22.0	15.0	16.4	16.0	16.0	15.6
Approach Delay (s)	22.0	15.0	16.2		15.8	
Approach LOS	C	C	C		C	

Intersection Summary			
Delay	17.2		
Level of Service	C		
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	67	57	18	36	160	39	19	161	23	28	168	168
Peak Hour 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
Hourly flow rate (vph)	74	63	20	40	176	43	21	177	25	31	185	185

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	156	258	109	114	123	277
Volume Left (vph)	74	40	21	0	31	0
Volume Right (vph)	20	43	0	25	0	185
Hadj (s)	0.05	-0.03	0.13	-0.12	0.16	-0.43
Departure Headway (s)	6.1	5.8	6.5	6.3	6.3	5.7
Degree Utilization, x	0.26	0.41	0.20	0.20	0.22	0.44
Capacity (veh/h)	535	579	512	531	539	599
Control Delay (s)	11.2	12.8	9.9	9.6	9.8	11.9
Approach Delay (s)	11.2	12.8	9.7		11.2	
Approach LOS	B	B	A		B	

Intersection Summary			
Delay	11.3		
Level of Service	B		
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	139	122	36	42	89	52	26	236	17	30	307	89
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	151	133	39	46	97	57	28	257	18	33	334	97

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	323	199	157	147	199	264
Volume Left (vph)	151	46	28	0	33	0
Volume Right (vph)	39	57	0	18	0	97
Hadj (s)	0.05	-0.09	0.12	-0.05	0.12	-0.22
Departure Headway (s)	6.6	6.8	7.3	7.1	7.0	6.7
Degree Utilization, x	0.59	0.37	0.32	0.29	0.39	0.49
Capacity (veh/h)	512	472	450	467	486	504
Control Delay (s)	18.5	13.8	12.5	11.8	13.3	14.8
Approach Delay (s)	18.5	13.8	12.2		14.1	
Approach LOS	C	B	B		B	

Intersection Summary			
Delay	14.7		
Level of Service	B		
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	71	114	56	59	210	42	69	446	64	43	909	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	
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	0.96	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	0.98		1.00	0.97	
Flt Protected		0.98	1.00		0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1815	1537		1837	1520	1770	3465		1770	3427	
Flt Permitted		0.61	1.00		0.88	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1134	1537		1641	1520	1770	3465		1770	3427	
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)	72	116	57	60	214	43	70	455	65	44	928	210
RTOR Reduction (vph)	0	0	43	0	0	32	0	12	0	0	22	0
Lane Group Flow (vph)	0	188	14	0	274	11	70	508	0	44	1116	0
Confl. Peds. (#/hr)	32		20	20		32			6			2
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)		17.5	17.5		17.5	17.5	6.0	35.7		3.0	32.7	
Effective Green, g (s)		17.5	17.5		17.5	17.5	6.0	35.7		3.0	32.7	
Actuated g/C Ratio		0.25	0.25		0.25	0.25	0.08	0.50		0.04	0.46	
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)		278	377		403	373	149	1737		74	1573	
v/s Ratio Prot							c0.04	c0.15		0.02	c0.33	
v/s Ratio Perm		0.17	0.01		c0.17	0.01						
v/c Ratio		0.68	0.04		0.68	0.03	0.47	0.29		0.59	0.71	
Uniform Delay, d1		24.3	20.4		24.3	20.4	31.1	10.4		33.5	15.4	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		6.4	0.0		4.5	0.0	2.3	0.1		12.2	1.5	
Delay (s)		30.7	20.5		28.8	20.4	33.4	10.5		45.7	16.9	
Level of Service		C	C		C	C	C	B		D	B	
Approach Delay (s)		28.3			27.7			13.2			18.0	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	71.2	Sum of lost time (s)	15.0
Intersection Capacity Utilization	85.1%	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												
Volume (vph)	140	328	133	76	260	87	72	821	103	103	842	96
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	0.95		1.00	0.93	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected		0.99	1.00		0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1820	1511		1837	1480	1770	3470		1770	3468	
Flt Permitted		0.63	1.00		0.62	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1167	1511		1152	1480	1770	3470		1770	3468	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	149	349	141	81	277	93	77	873	110	110	896	102
RTOR Reduction (vph)	0	0	58	0	0	53	0	11	0	0	9	0
Lane Group Flow (vph)	0	498	83	0	358	40	77	972	0	110	989	0
Confl. Peds. (#/hr)	49		31	31		49			11			15
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)		38.4	38.4		38.4	38.4	5.5	28.4		7.0	29.9	
Effective Green, g (s)		38.4	38.4		38.4	38.4	5.5	28.4		7.0	29.9	
Actuated g/C Ratio		0.43	0.43		0.43	0.43	0.06	0.32		0.08	0.34	
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)		504	653		498	640	109	1109		139	1167	
v/s Ratio Prot							0.04	0.28		c0.06	c0.29	
v/s Ratio Perm		c0.43	0.06		0.31	0.03						
v/c Ratio		0.99	0.13		0.72	0.06	0.71	0.88		0.79	0.85	
Uniform Delay, d1		25.0	15.1		20.8	14.7	40.9	28.5		40.2	27.3	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		36.6	0.1		4.9	0.0	18.8	8.0		25.7	5.9	
Delay (s)		61.6	15.2		25.7	14.7	59.6	36.5		65.9	33.2	
Level of Service		E	B		C	B	E	D		E	C	
Approach Delay (s)		51.4			23.4			38.2			36.4	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	38.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	88.8	Sum of lost time (s)	15.0
Intersection Capacity Utilization	93.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	121	19	46	0	0	0	42	443	0	18	650	299
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	1.00	
Flpb, ped/bikes		1.00					1.00	1.00		1.00	1.00	
Frt		0.97					1.00	1.00		1.00	0.95	
Flt Protected		0.97					0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1733					1770	3539		1768	3372	
Flt Permitted		0.97					0.26	1.00		0.49	1.00	
Satd. Flow (perm)		1733					482	3539		918	3372	
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)	122	19	46	0	0	0	42	447	0	18	657	302
RTOR Reduction (vph)	0	14	0	0	0	0	0	0	0	0	64	0
Lane Group Flow (vph)	0	173	0	0	0	0	42	447	0	18	895	0
Confl. Peds. (#/hr)			22						1	1		
Turn Type	Split	NA					Perm	NA		Perm	NA	
Protected Phases	4	4						2			6	
Permitted Phases							2			6		
Actuated Green, G (s)		11.1					24.1	24.1		24.1	24.1	
Effective Green, g (s)		11.1					24.1	24.1		24.1	24.1	
Actuated g/C Ratio		0.25					0.53	0.53		0.53	0.53	
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)		425					256	1886		489	1797	
v/s Ratio Prot		c0.10						0.13			c0.27	
v/s Ratio Perm							0.09			0.02		
v/c Ratio		0.41					0.16	0.24		0.04	0.50	
Uniform Delay, d1		14.3					5.4	5.6		5.0	6.7	
Progression Factor		1.00					1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.6					0.3	0.1		0.0	0.2	
Delay (s)		14.9					5.7	5.7		5.1	6.9	
Level of Service		B					A	A		A	A	
Approach Delay (s)		14.9			0.0			5.7			6.9	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	45.2	Sum of lost time (s)	10.0
Intersection Capacity Utilization	57.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	274	22	77	0	0	0	41	727	11	23	799	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0					5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00					1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99					1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00					1.00	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)		1727					1770	3530		1770	3452	
Flt Permitted		0.96					0.21	1.00		0.32	1.00	
Satd. Flow (perm)		1727					400	3530		594	3452	
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)	282	23	79	0	0	0	42	749	11	24	824	161
RTOR Reduction (vph)	0	11	0	0	0	0	0	1	0	0	19	0
Lane Group Flow (vph)	0	373	0	0	0	0	42	759	0	24	966	0
Confl. Peds. (#/hr)			61						7			
Turn Type	Split	NA					Perm	NA		Perm	NA	
Protected Phases	4	4						2			6	
Permitted Phases							2			6		
Actuated Green, G (s)		17.8					23.9	23.9		23.9	23.9	
Effective Green, g (s)		17.8					23.9	23.9		23.9	23.9	
Actuated g/C Ratio		0.34					0.46	0.46		0.46	0.46	
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)		594					184	1631		274	1595	
v/s Ratio Prot		c0.22						0.21			c0.28	
v/s Ratio Perm							0.10			0.04		
v/c Ratio		0.63					0.23	0.47		0.09	0.61	
Uniform Delay, d1		14.2					8.4	9.5		7.8	10.4	
Progression Factor		1.00					1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.1					0.6	0.2		0.1	0.7	
Delay (s)		16.3					9.0	9.7		7.9	11.0	
Level of Service		B					A	A		A	B	
Approach Delay (s)		16.3			0.0			9.7			11.0	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	11.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	51.7	Sum of lost time (s)	10.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	69	30	84	99	84	53	278	62	120	418	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes		1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt		0.96		1.00	0.93		1.00	0.97		1.00	0.98	
Flt Protected		0.99		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3357		1758	1718		1746	3431		1764	3456	
Flt Permitted		0.87		0.66	1.00		0.46	1.00		0.53	1.00	
Satd. Flow (perm)		2940		1227	1718		839	3431		979	3456	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	30	77	33	93	110	93	59	309	69	133	464	63
RTOR Reduction (vph)	0	23	0	0	40	0	0	24	0	0	14	0
Lane Group Flow (vph)	0	117	0	93	163	0	59	354	0	133	513	0
Confl. Peds. (#/hr)	22		19	19		22	36		11	11		36
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)		10.3		10.3	10.3		14.0	14.0		14.0	14.0	
Effective Green, g (s)		10.3		10.3	10.3		14.0	14.0		14.0	14.0	
Actuated g/C Ratio		0.30		0.30	0.30		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)		882		368	515		342	1400		399	1410	
v/s Ratio Prot					c0.09			0.10			c0.15	
v/s Ratio Perm		0.04		0.08			0.07			0.14		
v/c Ratio		0.13		0.25	0.32		0.17	0.25		0.33	0.36	
Uniform Delay, d1		8.7		9.1	9.3		6.5	6.7		7.0	7.1	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1		0.4	0.4		0.2	0.1		0.5	0.2	
Delay (s)		8.8		9.4	9.6		6.7	6.8		7.4	7.2	
Level of Service		A		A	A		A	A		A	A	
Approach Delay (s)		8.8			9.6			6.8			7.3	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	34.3	Sum of lost time (s)	10.0
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	48	137	10	104	108	285	30	391	138	266	357	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	0.98		1.00	0.99		1.00	0.99	
Flpb, ped/bikes		1.00		0.99	1.00		0.98	1.00		0.99	1.00	
Frt		0.99		1.00	0.89		1.00	0.96		1.00	0.98	
Flt Protected		0.99		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3456		1744	1620		1732	3377		1757	3456	
Flt Permitted		0.75		0.62	1.00		0.51	1.00		0.45	1.00	
Satd. Flow (perm)		2607		1146	1620		923	3377		824	3456	
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)	50	143	10	108	112	297	31	407	144	277	372	48
RTOR Reduction (vph)	0	4	0	0	108	0	0	45	0	0	13	0
Lane Group Flow (vph)	0	199	0	108	301	0	31	506	0	277	407	0
Confl. Peds. (#/hr)	32		29	29		32	32		19	19		32
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)		16.2		16.2	16.2		26.6	26.6		26.6	26.6	
Effective Green, g (s)		16.2		16.2	16.2		26.6	26.6		26.6	26.6	
Actuated g/C Ratio		0.31		0.31	0.31		0.50	0.50		0.50	0.50	
Clearance Time (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		799		351	497		464	1701		415	1741	
v/s Ratio Prot					c0.19			0.15			0.12	
v/s Ratio Perm		0.08		0.09			0.03			c0.34		
v/c Ratio		0.25		0.31	0.61		0.07	0.30		0.67	0.23	
Uniform Delay, d1		13.7		14.0	15.6		6.7	7.6		9.8	7.4	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2		0.5	2.1		0.1	0.1		4.0	0.1	
Delay (s)		13.9		14.5	17.7		6.8	7.7		13.8	7.4	
Level of Service		B		B	B		A	A		B	A	
Approach Delay (s)		13.9			17.0			7.7			10.0	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	52.8	Sum of lost time (s)	10.0
Intersection Capacity Utilization	87.4%	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												
Volume (vph)	265	1719	2	51	1847	158	1	15	3	126	98	216
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	0.93	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	0.90	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	5084		1770	5085	1539		3529	1471	1610	2993	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	5084		1770	5085	1539		3529	1471	1610	2993	
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)	276	1791	2	53	1924	165	1	16	3	131	102	225
RTOR Reduction (vph)	0	0	0	0	0	72	0	0	0	0	197	0
Lane Group Flow (vph)	276	1793	0	53	1924	93	0	17	3	118	143	0
Confl. Peds. (#/hr)			20			10			48			11
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8			2			
Actuated Green, G (s)	20.5	65.2		6.6	51.3	51.3		6.7	6.7	14.0	14.0	
Effective Green, g (s)	20.5	65.2		6.6	51.3	51.3		6.7	6.7	14.0	14.0	
Actuated g/C Ratio	0.18	0.58		0.06	0.46	0.46		0.06	0.06	0.12	0.12	
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)	322	2946		103	2318	701		210	87	200	372	
v/s Ratio Prot	c0.16	0.35		0.03	c0.38			c0.00		c0.07	0.05	
v/s Ratio Perm						0.06			0.00			
v/c Ratio	0.86	0.61		0.51	0.83	0.13		0.08	0.03	0.59	0.38	
Uniform Delay, d1	44.6	15.4		51.4	26.8	17.7		50.0	49.9	46.5	45.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	19.5	0.4		4.3	2.7	0.1		0.2	0.2	4.4	0.7	
Delay (s)	64.1	15.7		55.7	29.5	17.8		50.2	50.0	50.9	46.0	
Level of Service	E	B		E	C	B		D	D	D	D	
Approach Delay (s)		22.2			29.2			50.1			47.2	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	28.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	112.5	Sum of lost time (s)	20.0
Intersection Capacity Utilization	81.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

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

4/29/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	319	2333	5	27	1961	179	10	114	52	249	46	251
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	0.95		1.00	1.00	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	0.89	
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	1507		3524	1583	1610	2905	
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	1507		3524	1583	1610	2905	
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)	336	2456	5	28	2064	188	11	120	55	262	48	264
RTOR Reduction (vph)	0	0	0	0	0	72	0	0	0	0	223	0
Lane Group Flow (vph)	336	2461	0	28	2064	116	0	131	55	202	149	0
Confl. Peds. (#/hr)			5			19			46			21
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	Prot	Split	NA	
Protected Phases	7	4		3	8		2	2	2	6	6	
Permitted Phases						8						
Actuated Green, G (s)	25.1	77.5		4.0	56.4	56.4		12.7	12.7	21.1	21.1	
Effective Green, g (s)	25.1	77.5		4.0	56.4	56.4		12.7	12.7	21.1	21.1	
Actuated g/C Ratio	0.19	0.57		0.03	0.42	0.42		0.09	0.09	0.16	0.16	
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)	328	2912		52	2119	628		330	148	251	453	
v/s Ratio Prot	c0.19	0.48		0.02	c0.41			c0.04	0.03	c0.13	0.05	
v/s Ratio Perm						0.08						
v/c Ratio	1.02	0.85		0.54	0.97	0.18		0.40	0.37	0.80	0.33	
Uniform Delay, d1	55.1	23.9		64.7	38.7	24.9		57.7	57.6	55.1	50.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	56.1	2.4		10.3	13.9	0.1		0.8	1.6	16.9	0.4	
Delay (s)	111.2	26.4		75.1	52.6	25.1		58.5	59.1	72.0	51.2	
Level of Service	F	C		E	D	C		E	E	E	D	
Approach Delay (s)		36.5			50.6			58.7			58.5	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	44.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	135.3	Sum of lost time (s)	20.0
Intersection Capacity Utilization	92.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	59	112	20	232	163	16	17	109	64	26	217	92
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		1.00		1.00	1.00			0.99			0.99	
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		0.98		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		3407		1770	3484			3326			3349	
Flt Permitted		0.80		0.95	1.00			0.90			0.91	
Satd. Flow (perm)		2767		1770	3484			2999			3070	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	67	127	23	264	185	18	19	124	73	30	247	105
RTOR Reduction (vph)	0	10	0	0	8	0	0	56	0	0	46	0
Lane Group Flow (vph)	0	207	0	264	195	0	0	160	0	0	336	0
Confl. Peds. (#/hr)	19		18			19	10		4	4		10
Turn Type	Perm	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4						2			6		
Actuated Green, G (s)		10.6		13.5	29.1			11.9			11.9	
Effective Green, g (s)		10.6		13.5	29.1			11.9			11.9	
Actuated g/C Ratio		0.21		0.26	0.57			0.23			0.23	
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)		575		468	1987			699			716	
v/s Ratio Prot				c0.15	0.06							
v/s Ratio Perm		c0.07						0.05			c0.11	
v/c Ratio		0.36		0.56	0.10			0.23			0.47	
Uniform Delay, d1		17.3		16.2	5.0			15.8			16.8	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.4		1.6	0.0			0.2			0.5	
Delay (s)		17.7		17.8	5.0			16.0			17.3	
Level of Service		B		B	A			B			B	
Approach Delay (s)		17.7			12.2			16.0			17.3	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	51.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	137	365	68	278	243	34	42	220	127	41	184	48
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	0.99			0.99			0.99	
Flpb, ped/bikes		0.99		1.00	1.00			1.00			1.00	
Frt		0.98		1.00	0.98			0.95			0.97	
Flt Protected		0.99		0.95	1.00			0.99			0.99	
Satd. Flow (prot)		3393		1770	3455			3313			3387	
Flt Permitted		0.78		0.95	1.00			0.88			0.81	
Satd. Flow (perm)		2695		1770	3455			2924			2758	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	146	388	72	296	259	36	45	234	135	44	196	51
RTOR Reduction (vph)	0	12	0	0	12	0	0	69	0	0	21	0
Lane Group Flow (vph)	0	594	0	296	283	0	0	345	0	0	270	0
Confl. Peds. (#/hr)	30		42			30	17		14	14		17
Turn Type	Perm	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4						2			6		
Actuated Green, G (s)		21.1		16.8	42.9			13.9			13.9	
Effective Green, g (s)		21.1		16.8	42.9			13.9			13.9	
Actuated g/C Ratio		0.32		0.25	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)		851		445	2218			608			573	
v/s Ratio Prot				c0.17	0.08							
v/s Ratio Perm		c0.22						c0.12			0.10	
v/c Ratio		0.70		0.67	0.13			0.57			0.47	
Uniform Delay, d1		20.1		22.5	4.7			23.8			23.2	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		2.5		3.7	0.0			1.2			0.6	
Delay (s)		22.6		26.2	4.7			25.0			23.8	
Level of Service		C		C	A			C			C	
Approach Delay (s)		22.6			15.5			25.0			23.8	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	21.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	66.8	Sum of lost time (s)	15.0
Intersection Capacity Utilization	74.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	90	49	31	104	68	39	102	28	69	214	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	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	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	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	3324		1770	3302		1758	3408		1757	1863	1551
Flt Permitted	0.95	1.00		0.95	1.00		0.62	1.00		0.67	1.00	1.00
Satd. Flow (perm)	1770	3324		1770	3302		1151	3408		1235	1863	1551
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)	30	92	50	32	106	69	40	104	29	70	218	153
RTOR Reduction (vph)	0	39	0	0	54	0	0	19	0	0	0	100
Lane Group Flow (vph)	30	103	0	32	121	0	40	114	0	70	218	53
Confl. Peds. (#/hr)			20			24	17		17	17		17
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)	0.8	7.6		0.8	7.6		12.3	12.3		12.3	12.3	12.3
Effective Green, g (s)	0.8	7.6		0.8	7.6		12.3	12.3		12.3	12.3	12.3
Actuated g/C Ratio	0.02	0.21		0.02	0.21		0.34	0.34		0.34	0.34	0.34
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)	39	707		39	702		396	1174		425	641	534
v/s Ratio Prot	0.02	0.03		c0.02	c0.04			0.03			c0.12	
v/s Ratio Perm							0.03			0.06		0.03
v/c Ratio	0.77	0.15		0.82	0.17		0.10	0.10		0.16	0.34	0.10
Uniform Delay, d1	17.4	11.4		17.4	11.5		7.9	7.9		8.1	8.7	7.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	60.6	0.1		76.9	0.1		0.1	0.0		0.2	0.3	0.1
Delay (s)	78.0	11.5		94.3	11.6		8.1	8.0		8.3	9.0	8.0
Level of Service	E	B		F	B		A	A		A	A	A
Approach Delay (s)		23.1			24.4			8.0			8.6	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	14.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	35.7	Sum of lost time (s)	15.0
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	147	277	89	49	228	167	99	148	58	124	243	162
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	0.97		1.00	0.96		1.00	1.00	0.90
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.94	1.00		0.91	1.00	1.00
Frt	1.00	0.96		1.00	0.94		1.00	0.96		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	3332		1770	3219		1662	3262		1607	1863	1429
Flt Permitted	0.95	1.00		0.95	1.00		0.57	1.00		0.62	1.00	1.00
Satd. Flow (perm)	1770	3332		1770	3219		994	3262		1051	1863	1429
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)	148	280	90	49	230	169	100	149	59	125	245	164
RTOR Reduction (vph)	0	38	0	0	122	0	0	43	0	0	0	118
Lane Group Flow (vph)	148	332	0	49	277	0	100	165	0	125	245	46
Confl. Peds. (#/hr)			92			103	118		173	173		118
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)	8.1	20.7		1.8	14.4		14.4	14.4		14.4	14.4	14.4
Effective Green, g (s)	8.1	20.7		1.8	14.4		14.4	14.4		14.4	14.4	14.4
Actuated g/C Ratio	0.16	0.40		0.03	0.28		0.28	0.28		0.28	0.28	0.28
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)	276	1328		61	893		275	905		291	516	396
v/s Ratio Prot	c0.08	0.10		0.03	c0.09			0.05			c0.13	
v/s Ratio Perm							0.10			0.12		0.03
v/c Ratio	0.54	0.25		0.80	0.31		0.36	0.18		0.43	0.47	0.11
Uniform Delay, d1	20.2	10.4		24.9	14.8		15.1	14.3		15.4	15.6	14.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.0	0.1		51.7	0.2		0.8	0.1		1.0	0.7	0.1
Delay (s)	22.2	10.5		76.6	15.0		15.9	14.4		16.4	16.3	14.1
Level of Service	C	B		E	B		B	B		B	B	B
Approach Delay (s)		13.8			21.8			14.9			15.7	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	51.9	Sum of lost time (s)	15.0
Intersection Capacity Utilization	73.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	72	1691	148	6	1947	24	96	39	15	52	54	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
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	0.94		1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		0.98	1.00
Frt	1.00	0.99		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97	1.00		0.98	1.00
Satd. Flow (prot)	1770	5003		1770	5069			1799	1493		1789	1583
Flt Permitted	0.95	1.00		0.95	1.00			0.65	1.00		0.65	1.00
Satd. Flow (perm)	1770	5003		1770	5069			1212	1493		1187	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	80	1879	164	7	2163	27	107	43	17	58	60	216
RTOR Reduction (vph)	0	6	0	0	1	0	0	0	14	0	0	88
Lane Group Flow (vph)	80	2037	0	7	2189	0	0	150	3	0	118	128
Confl. Peds. (#/hr)			15			47			21	21		
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2		2	6		6
Actuated Green, G (s)	8.3	80.7		1.0	73.4			19.8	19.8		19.8	19.8
Effective Green, g (s)	8.3	80.7		1.0	73.4			19.8	19.8		19.8	19.8
Actuated g/C Ratio	0.07	0.69		0.01	0.63			0.17	0.17		0.17	0.17
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)	126	3465		15	3193			205	253		201	269
v/s Ratio Prot	c0.05	0.41		0.00	c0.43							
v/s Ratio Perm								c0.12	0.00		0.10	0.08
v/c Ratio	0.63	0.59		0.47	0.69			0.73	0.01		0.59	0.48
Uniform Delay, d1	52.6	9.3		57.5	14.0			45.8	40.2		44.6	43.7
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	10.0	0.3		21.2	0.6			12.6	0.0		4.3	1.3
Delay (s)	62.6	9.5		78.7	14.7			58.5	40.2		48.9	45.0
Level of Service	E	A		E	B			E	D		D	D
Approach Delay (s)		11.5			14.9			56.6			46.4	
Approach LOS		B			B			E			D	

Intersection Summary			
HCM 2000 Control Delay	17.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	116.5	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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	2349	296	35	1514	78	116	53	52	69	98	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	0.98		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			0.96	1.00
Frt	1.00	0.98		1.00	0.99		1.00	0.93			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	1.00
Satd. Flow (prot)	1770	4896		1770	4997		1770	1608			1747	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.46	1.00			0.75	1.00
Satd. Flow (perm)	1770	4896		1770	4997		861	1608			1336	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)	149	2422	305	36	1561	80	120	55	54	71	101	189
RTOR Reduction (vph)	0	9	0	0	3	0	0	27	0	0	0	157
Lane Group Flow (vph)	149	2718	0	36	1638	0	120	82	0	0	172	32
Confl. Peds. (#/hr)			70			85			54	54		
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)	15.3	85.1		4.4	74.2		21.0	21.0			21.0	21.0
Effective Green, g (s)	15.3	85.1		4.4	74.2		21.0	21.0			21.0	21.0
Actuated g/C Ratio	0.12	0.68		0.04	0.59		0.17	0.17			0.17	0.17
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)	215	3319		62	2954		144	269			223	264
v/s Ratio Prot	c0.08	c0.56		0.02	0.33			0.05				
v/s Ratio Perm							c0.14				0.13	0.02
v/c Ratio	0.69	0.82		0.58	0.55		0.83	0.30			0.77	0.12
Uniform Delay, d1	52.8	14.6		59.6	15.6		50.6	45.8			50.0	44.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	9.3	1.7		13.1	0.2		31.9	0.6			15.1	0.2
Delay (s)	62.1	16.3		72.7	15.8		82.5	46.5			65.1	44.6
Level of Service	E	B		E	B		F	D			E	D
Approach Delay (s)		18.7			17.0			65.3			54.4	
Approach LOS		B			B			E			D	

Intersection Summary			
HCM 2000 Control Delay	22.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	125.5	Sum of lost time (s)	15.0
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	178	26	69	440	36	99
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)	198	29	77	489	40	110
Pedestrians	15				15	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	1				1	
Right turn flare (veh)						
Median type	TWLTL			None		
Median storage veh)	2					
Upstream signal (ft)	452					
pX, platoon unblocked						
vC, conflicting volume			242		640	128
vC1, stage 1 conf vol					227	
vC2, stage 2 conf vol					413	
vCu, unblocked vol			242		640	128
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 %			94		93	88
cM capacity (veh/h)			1305		615	920

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	132	95	77	244	244	150
Volume Left	0	0	77	0	0	40
Volume Right	0	29	0	0	0	110
cSH	1700	1700	1305	1700	1700	812
Volume to Capacity	0.08	0.06	0.06	0.14	0.14	0.18
Queue Length 95th (ft)	0	0	5	0	0	17
Control Delay (s)	0.0	0.0	7.9	0.0	0.0	10.4
Lane LOS			A			B
Approach Delay (s)	0.0		1.1			10.4
Approach LOS						B

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	30.8%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	497	53	105	520	83	219
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	529	56	112	553	88	233
Pedestrians	42				42	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	4				4	
Right turn flare (veh)						
Median type	TWLTL			None		
Median storage veh)	2					
Upstream signal (ft)	452					
pX, platoon unblocked			0.97		0.97	0.97
vC, conflicting volume			627		1141	335
vC1, stage 1 conf vol					599	
vC2, stage 2 conf vol					542	
vCu, unblocked vol			546		1077	243
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 %			88		80	69
cM capacity (veh/h)			951		449	758

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	352	233	112	277	277	321
Volume Left	0	0	112	0	0	88
Volume Right	0	56	0	0	0	233
cSH	1700	1700	951	1700	1700	637
Volume to Capacity	0.21	0.14	0.12	0.16	0.16	0.50
Queue Length 95th (ft)	0	0	10	0	0	71
Control Delay (s)	0.0	0.0	9.3	0.0	0.0	16.3
Lane LOS			A			C
Approach Delay (s)	0.0		1.6			16.3
Approach LOS						C

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	49.7%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	37	19	52	10	17	25	115	85	33	26	29	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0		5.0	5.0			5.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Frpb, ped/bikes		1.00	0.97		0.99		1.00	0.99			0.99	
Flpb, ped/bikes		0.99	1.00		1.00		1.00	1.00			1.00	
Frt		1.00	0.85		0.93		1.00	0.96			0.95	
Flt Protected		0.97	1.00		0.99		0.95	1.00			0.99	
Satd. Flow (prot)		1792	1539		1695		1770	1769			1720	
Flt Permitted		0.77	1.00		0.92		0.95	1.00			0.86	
Satd. Flow (perm)		1426	1539		1570		1770	1769			1492	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	42	22	59	11	19	28	131	97	38	30	33	41
RTOR Reduction (vph)	0	0	50	0	24	0	0	20	0	0	35	0
Lane Group Flow (vph)	0	64	9	0	34	0	131	115	0	0	69	0
Confl. Peds. (#/hr)	12		31	31		12			13	13		15
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8						6		
Actuated Green, G (s)		4.3	4.3		4.3		4.0	13.3			4.3	
Effective Green, g (s)		4.3	4.3		4.3		4.0	13.3			4.3	
Actuated g/C Ratio		0.16	0.16		0.16		0.14	0.48			0.16	
Clearance Time (s)		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	
Lane Grp Cap (vph)		222	239		244		256	852			232	
v/s Ratio Prot							c0.07	0.07				
v/s Ratio Perm		c0.04	0.01		0.02						c0.05	
v/c Ratio		0.29	0.04		0.14		0.51	0.14			0.30	
Uniform Delay, d1		10.3	9.9		10.1		10.9	4.0			10.3	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		0.7	0.1		0.3		1.7	0.1			0.7	
Delay (s)		11.0	10.0		10.3		12.6	4.0			11.0	
Level of Service		B	A		B		B	A			B	
Approach Delay (s)		10.5			10.3			8.3			11.0	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM 2000 Control Delay	9.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	27.6	Sum of lost time (s)	15.0
Intersection Capacity Utilization	38.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	87	24	161	19	19	38	182	124	25	33	54	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0		5.0	5.0			5.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Frpb, ped/bikes		1.00	0.94		0.97		1.00	0.98			0.98	
Flpb, ped/bikes		0.97	1.00		0.99		1.00	1.00			0.99	
Frt		1.00	0.85		0.93		1.00	0.97			0.94	
Flt Protected		0.96	1.00		0.99		0.95	1.00			0.99	
Satd. Flow (prot)		1742	1482		1648		1770	1787			1677	
Flt Permitted		0.72	1.00		0.88		0.95	1.00			0.88	
Satd. Flow (perm)		1304	1482		1476		1770	1787			1492	
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)	90	25	166	20	20	39	188	128	26	34	56	64
RTOR Reduction (vph)	0	0	132	0	31	0	0	12	0	0	49	0
Lane Group Flow (vph)	0	115	34	0	48	0	188	142	0	0	105	0
Confl. Peds. (#/hr)	35		77	77		35			66	66		62
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8						6		
Actuated Green, G (s)		7.5	7.5		7.5		7.3	19.2			6.9	
Effective Green, g (s)		7.5	7.5		7.5		7.3	19.2			6.9	
Actuated g/C Ratio		0.20	0.20		0.20		0.20	0.52			0.19	
Clearance Time (s)		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	
Lane Grp Cap (vph)		266	302		301		352	934			280	
v/s Ratio Prot							c0.11	0.08				
v/s Ratio Perm		c0.09	0.02		0.03						c0.07	
v/c Ratio		0.43	0.11		0.16		0.53	0.15			0.38	
Uniform Delay, d1		12.7	11.9		12.0		13.2	4.5			13.0	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		1.1	0.2		0.2		1.6	0.1			0.8	
Delay (s)		13.9	12.1		12.3		14.7	4.6			13.9	
Level of Service		B	B		B		B	A			B	
Approach Delay (s)		12.8			12.3			10.2			13.9	
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	0.45		
Actuated Cycle Length (s)	36.7	Sum of lost time (s)	15.0
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	22	1754	2096	180	64	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.91	0.91		0.97	1.00
Frpb, ped/bikes	1.00	1.00	0.99		1.00	0.85
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	5085	4998		3433	1353
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	5085	4998		3433	1353
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	1907	2278	196	70	21
RTOR Reduction (vph)	0	0	5	0	0	20
Lane Group Flow (vph)	24	1907	2469	0	70	1
Confl. Peds. (#/hr)				45		63
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	4.0	98.1	89.1		7.1	7.1
Effective Green, g (s)	4.0	98.1	89.1		7.1	7.1
Actuated g/C Ratio	0.03	0.85	0.77		0.06	0.06
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)	61	4330	3865		211	83
v/s Ratio Prot	0.01	c0.38	c0.49		c0.02	
v/s Ratio Perm						0.00
v/c Ratio	0.39	0.44	0.64		0.33	0.02
Uniform Delay, d1	54.4	2.0	5.8		51.8	50.8
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.1	0.1	0.4		0.9	0.1
Delay (s)	58.6	2.1	6.2		52.7	50.8
Level of Service	E	A	A		D	D
Approach Delay (s)		2.8	6.2		52.3	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay	5.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	115.2	Sum of lost time (s)	15.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	33	2351	1775	307	255	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.91	0.91		0.97	1.00
Frpb, ped/bikes	1.00	1.00	0.99		1.00	0.82
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	5085	4935		3433	1293
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	5085	4935		3433	1293
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	35	2501	1888	327	271	44
RTOR Reduction (vph)	0	0	15	0	0	38
Lane Group Flow (vph)	35	2501	2200	0	271	6
Confl. Peds. (#/hr)				31		80
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	4.6	91.6	82.0		14.8	14.8
Effective Green, g (s)	4.6	91.6	82.0		14.8	14.8
Actuated g/C Ratio	0.04	0.79	0.70		0.13	0.13
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)	69	4001	3476		436	164
v/s Ratio Prot	0.02	c0.49	0.45		c0.08	
v/s Ratio Perm						0.00
v/c Ratio	0.51	0.63	0.63		0.62	0.03
Uniform Delay, d1	54.8	5.2	9.2		48.1	44.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	5.8	0.3	0.4		2.7	0.1
Delay (s)	60.5	5.5	9.6		50.9	44.6
Level of Service	E	A	A		D	D
Approach Delay (s)		6.3	9.6		50.0	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	116.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX D

CAPACITY ANALYSIS CALCULATIONS
PROJECTED YEAR 2017 PEAK HOUR TRAFFIC
ANALYSIS WITHOUT PROJECT

HCM Unsignalized Intersection Capacity Analysis
1: Cooke St & Halekauwila St

4/25/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	46	72	39	75	126	40	17	222	17	24	230	95
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	51	80	43	83	140	44	19	247	19	27	256	106

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	174	268	142	142	154	233
Volume Left (vph)	51	83	19	0	27	0
Volume Right (vph)	43	44	0	19	0	106
Hadj (s)	-0.06	0.00	0.10	-0.06	0.12	-0.28
Departure Headway (s)	6.2	6.0	6.6	6.5	6.5	6.1
Degree Utilization, x	0.30	0.45	0.26	0.26	0.28	0.40
Capacity (veh/h)	524	555	495	516	520	557
Control Delay (s)	11.8	13.8	10.8	10.5	10.8	11.8
Approach Delay (s)	11.8	13.8	10.6		11.4	
Approach LOS	B	B	B		B	

Intersection Summary			
Delay	11.9		
Level of Service	B		
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
1: Cooke St & Halekauwila St

4/25/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	114	182	42	31	110	64	26	395	45	41	367	49
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	120	192	44	33	116	67	27	416	47	43	386	52

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	356	216	235	255	236	245
Volume Left (vph)	120	33	27	0	43	0
Volume Right (vph)	44	67	0	47	0	52
Hadj (s)	0.03	-0.12	0.09	-0.10	0.13	-0.11
Departure Headway (s)	7.4	7.8	7.9	7.7	8.0	7.7
Degree Utilization, x	0.73	0.47	0.52	0.55	0.52	0.53
Capacity (veh/h)	465	417	431	441	424	440
Control Delay (s)	27.7	17.3	17.9	18.5	18.2	17.8
Approach Delay (s)	27.7	17.3	18.2		18.0	
Approach LOS	D	C	C		C	

Intersection Summary			
Delay	20.2		
Level of Service	C		
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	68	65	11	37	166	40	14	154	26	28	160	171
Peak Hour 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
Hourly flow rate (vph)	75	71	12	41	182	44	15	169	29	31	176	188

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	158	267	100	113	119	276
Volume Left (vph)	75	41	15	0	31	0
Volume Right (vph)	12	44	0	29	0	188
Hadj (s)	0.08	-0.03	0.11	-0.14	0.16	-0.44
Departure Headway (s)	6.1	5.7	6.5	6.3	6.3	5.7
Degree Utilization, x	0.27	0.43	0.18	0.20	0.21	0.44
Capacity (veh/h)	535	583	510	529	537	598
Control Delay (s)	11.3	12.9	9.8	9.6	9.8	11.9
Approach Delay (s)	11.3	12.9	9.7		11.2	
Approach LOS	B	B	A		B	

Intersection Summary			
Delay	11.4		
Level of Service	B		
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
2: Pohukaina St & Cooke St

4/25/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	153	151	22	47	108	57	18	238	25	33	312	97
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	166	164	24	51	117	62	20	259	27	36	339	105

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	354	230	149	157	205	275
Volume Left (vph)	166	51	20	0	36	0
Volume Right (vph)	24	62	0	27	0	105
Hadj (s)	0.09	-0.08	0.10	-0.09	0.12	-0.23
Departure Headway (s)	6.9	7.1	7.7	7.5	7.4	7.0
Degree Utilization, x	0.67	0.45	0.32	0.33	0.42	0.54
Capacity (veh/h)	494	459	426	433	461	479
Control Delay (s)	22.9	15.8	13.1	12.9	14.5	16.8
Approach Delay (s)	22.9	15.8	13.0		15.8	
Approach LOS	C	C	B		C	

Intersection Summary			
Delay	17.0		
Level of Service	C		
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	72	116	60	60	213	43	73	454	65	44	925	209
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	0.96	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	0.98		1.00	0.97	
Flt Protected		0.98	1.00		0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1816	1536		1837	1520	1770	3465		1770	3427	
Flt Permitted		0.60	1.00		0.88	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1117	1536		1639	1520	1770	3465		1770	3427	
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)	73	118	61	61	217	44	74	463	66	45	944	213
RTOR Reduction (vph)	0	0	46	0	0	33	0	12	0	0	22	0
Lane Group Flow (vph)	0	191	15	0	278	11	74	517	0	45	1135	0
Confl. Peds. (#/hr)	32		20	20		32			6			2
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)		17.8	17.8		17.8	17.8	6.1	36.2		3.0	33.1	
Effective Green, g (s)		17.8	17.8		17.8	17.8	6.1	36.2		3.0	33.1	
Actuated g/C Ratio		0.25	0.25		0.25	0.25	0.08	0.50		0.04	0.46	
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)		276	379		405	375	149	1742		73	1575	
v/s Ratio Prot							c0.04	c0.15		0.03	c0.33	
v/s Ratio Perm		c0.17	0.01		0.17	0.01						
v/c Ratio		0.69	0.04		0.69	0.03	0.50	0.30		0.62	0.72	
Uniform Delay, d1		24.6	20.6		24.6	20.5	31.5	10.5		33.9	15.7	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		7.3	0.0		4.8	0.0	2.6	0.1		14.5	1.7	
Delay (s)		31.9	20.6		29.3	20.6	34.1	10.6		48.4	17.4	
Level of Service		C	C		C	C	C	B		D	B	
Approach Delay (s)		29.2			28.2			13.4			18.5	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	72.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	86.0%	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												
Volume (vph)	152	355	152	82	281	93	86	892	112	111	915	104
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	0.95		1.00	0.93	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected		0.99	1.00		0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1821	1510		1837	1479	1770	3471		1770	3468	
Flt Permitted		0.61	1.00		0.59	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1125	1510		1093	1479	1770	3471		1770	3468	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	162	378	162	87	299	99	91	949	119	118	973	111
RTOR Reduction (vph)	0	0	60	0	0	51	0	11	0	0	10	0
Lane Group Flow (vph)	0	540	102	0	386	48	91	1058	0	118	1074	0
Confl. Peds. (#/hr)	49		31	31		49			11			15
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)		41.0	41.0		41.0	41.0	6.0	27.0		7.0	28.0	
Effective Green, g (s)		41.0	41.0		41.0	41.0	6.0	27.0		7.0	28.0	
Actuated g/C Ratio		0.46	0.46		0.46	0.46	0.07	0.30		0.08	0.31	
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)		512	687		497	673	118	1041		137	1078	
v/s Ratio Prot							0.05	0.30		c0.07	c0.31	
v/s Ratio Perm		c0.48	0.07		0.35	0.03						
v/c Ratio		1.05	0.15		0.78	0.07	0.77	1.02		0.86	1.00	
Uniform Delay, d1		24.5	14.3		20.6	13.8	41.3	31.5		41.0	31.0	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		55.0	0.1		7.5	0.0	26.2	31.9		39.0	26.4	
Delay (s)		79.5	14.4		28.1	13.8	67.5	63.4		80.0	57.3	
Level of Service		E	B		C	B	E	E		E	E	
Approach Delay (s)		64.5			25.2			63.7			59.6	
Approach LOS		E			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	57.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	98.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	123	19	52	0	0	0	48	455	0	18	665	303
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	1.00	
Flpb, ped/bikes		1.00					1.00	1.00		1.00	1.00	
Frt		0.96					1.00	1.00		1.00	0.95	
Flt Protected		0.97					0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1727					1770	3539		1768	3373	
Flt Permitted		0.97					0.25	1.00		0.49	1.00	
Satd. Flow (perm)		1727					466	3539		907	3373	
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)	124	19	53	0	0	0	48	460	0	18	672	306
RTOR Reduction (vph)	0	17	0	0	0	0	0	0	0	0	63	0
Lane Group Flow (vph)	0	179	0	0	0	0	48	460	0	18	915	0
Confl. Peds. (#/hr)			22						1	1		
Turn Type	Split	NA					Perm	NA		Perm	NA	
Protected Phases	4	4						2			6	
Permitted Phases							2			6		
Actuated Green, G (s)		11.3					24.2	24.2		24.2	24.2	
Effective Green, g (s)		11.3					24.2	24.2		24.2	24.2	
Actuated g/C Ratio		0.25					0.53	0.53		0.53	0.53	
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)		428					247	1882		482	1793	
v/s Ratio Prot		c0.10						0.13			c0.27	
v/s Ratio Perm							0.10			0.02		
v/c Ratio		0.42					0.19	0.24		0.04	0.51	
Uniform Delay, d1		14.3					5.6	5.7		5.1	6.8	
Progression Factor		1.00					1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.7					0.4	0.1		0.0	0.2	
Delay (s)		15.0					5.9	5.8		5.1	7.1	
Level of Service		B					A	A		A	A	
Approach Delay (s)		15.0			0.0			5.8			7.1	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	45.5	Sum of lost time (s)	10.0
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	288	22	93	0	0	0	52	774	11	23	851	163
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	1.00	
Flpb, ped/bikes		1.00					1.00	1.00		1.00	1.00	
Frt		0.97					1.00	1.00		1.00	0.98	
Flt Protected		0.97					0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1718					1770	3530		1770	3454	
Flt Permitted		0.97					0.19	1.00		0.29	1.00	
Satd. Flow (perm)		1718					355	3530		542	3454	
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)	297	23	96	0	0	0	54	798	11	24	877	168
RTOR Reduction (vph)	0	13	0	0	0	0	0	1	0	0	18	0
Lane Group Flow (vph)	0	403	0	0	0	0	54	808	0	24	1027	0
Confl. Peds. (#/hr)			61						7			
Turn Type	Split	NA					Perm	NA		Perm	NA	
Protected Phases	4	4						2			6	
Permitted Phases							2			6		
Actuated Green, G (s)		20.2					27.2	27.2		27.2	27.2	
Effective Green, g (s)		20.2					27.2	27.2		27.2	27.2	
Actuated g/C Ratio		0.35					0.47	0.47		0.47	0.47	
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)		604					168	1672		256	1636	
v/s Ratio Prot		c0.23						0.23			c0.30	
v/s Ratio Perm							0.15			0.04		
v/c Ratio		0.67					0.32	0.48		0.09	0.63	
Uniform Delay, d1		15.8					9.4	10.3		8.3	11.3	
Progression Factor		1.00					1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.8					1.1	0.2		0.2	0.8	
Delay (s)		18.5					10.5	10.5		8.5	12.1	
Level of Service		B					B	B		A	B	
Approach Delay (s)		18.5			0.0			10.5			12.0	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	57.4	Sum of lost time (s)	10.0
Intersection Capacity Utilization	68.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	60	30	85	90	94	54	282	63	133	424	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes		1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt		0.96		1.00	0.92		1.00	0.97		1.00	0.98	
Flt Protected		0.99		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3343		1757	1702		1746	3431		1764	3456	
Flt Permitted		0.86		0.67	1.00		0.45	1.00		0.52	1.00	
Satd. Flow (perm)		2910		1239	1702		832	3431		975	3456	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	30	67	33	94	100	104	60	313	70	148	471	64
RTOR Reduction (vph)	0	23	0	0	48	0	0	25	0	0	13	0
Lane Group Flow (vph)	0	107	0	94	156	0	60	358	0	148	522	0
Confl. Peds. (#/hr)	22		19	19		22	36		11	11		36
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)		10.2		10.2	10.2		14.4	14.4		14.4	14.4	
Effective Green, g (s)		10.2		10.2	10.2		14.4	14.4		14.4	14.4	
Actuated g/C Ratio		0.29		0.29	0.29		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	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		857		365	501		346	1427		405	1438	
v/s Ratio Prot					c0.09			0.10			0.15	
v/s Ratio Perm		0.04		0.08			0.07			c0.15		
v/c Ratio		0.12		0.26	0.31		0.17	0.25		0.37	0.36	
Uniform Delay, d1		8.9		9.3	9.5		6.4	6.6		7.0	6.9	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1		0.4	0.4		0.2	0.1		0.6	0.2	
Delay (s)		9.0		9.7	9.8		6.6	6.7		7.5	7.1	
Level of Service		A		A	A		A	A		A	A	
Approach Delay (s)		9.0			9.8			6.7			7.2	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	34.6	Sum of lost time (s)	10.0
Intersection Capacity Utilization	56.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	119	10	110	92	323	31	413	146	307	377	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	0.97		1.00	0.99		1.00	0.99	
Flpb, ped/bikes		1.00		0.98	1.00		0.98	1.00		0.99	1.00	
Frt		0.99		1.00	0.88		1.00	0.96		1.00	0.98	
Flt Protected		0.99		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3446		1741	1601		1729	3376		1757	3454	
Flt Permitted		0.67		0.63	1.00		0.49	1.00		0.43	1.00	
Satd. Flow (perm)		2354		1163	1601		901	3376		789	3454	
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)	52	124	10	115	96	336	32	430	152	320	393	51
RTOR Reduction (vph)	0	4	0	0	139	0	0	47	0	0	13	0
Lane Group Flow (vph)	0	182	0	115	293	0	32	535	0	320	431	0
Confl. Peds. (#/hr)	32		29	29		32	32		19	19		32
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)		16.5		16.5	16.5		31.5	31.5		31.5	31.5	
Effective Green, g (s)		16.5		16.5	16.5		31.5	31.5		31.5	31.5	
Actuated g/C Ratio		0.28		0.28	0.28		0.54	0.54		0.54	0.54	
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)		669		330	455		489	1833		428	1875	
v/s Ratio Prot					c0.18			0.16			0.12	
v/s Ratio Perm		0.08		0.10			0.04			c0.41		
v/c Ratio		0.27		0.35	0.64		0.07	0.29		0.75	0.23	
Uniform Delay, d1		16.1		16.5	18.2		6.3	7.2		10.2	6.9	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2		0.6	3.1		0.1	0.1		7.0	0.1	
Delay (s)		16.3		17.1	21.3		6.3	7.3		17.2	7.0	
Level of Service		B		B	C		A	A		B	A	
Approach Delay (s)		16.3			20.4			7.2			11.3	
Approach LOS		B			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	58.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	91.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

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

4/25/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	269	1745	2	52	1875	160	1	15	3	128	99	219
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	0.93	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	0.90	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	5084		1770	5085	1539		3529	1471	1610	2993	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	5084		1770	5085	1539		3529	1471	1610	2993	
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)	280	1818	2	54	1953	167	1	16	3	133	103	228
RTOR Reduction (vph)	0	0	0	0	0	72	0	0	0	0	200	0
Lane Group Flow (vph)	280	1820	0	54	1953	95	0	17	3	120	144	0
Confl. Peds. (#/hr)			20			10			48			11
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8			2			
Actuated Green, G (s)	20.4	65.1		6.6	51.3	51.3		6.7	6.7	14.0	14.0	
Effective Green, g (s)	20.4	65.1		6.6	51.3	51.3		6.7	6.7	14.0	14.0	
Actuated g/C Ratio	0.18	0.58		0.06	0.46	0.46		0.06	0.06	0.12	0.12	
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)	321	2944		103	2320	702		210	87	200	372	
v/s Ratio Prot	c0.16	0.36		0.03	c0.38			c0.00		c0.07	0.05	
v/s Ratio Perm						0.06			0.00			
v/c Ratio	0.87	0.62		0.52	0.84	0.14		0.08	0.03	0.60	0.39	
Uniform Delay, d1	44.7	15.5		51.4	27.0	17.7		49.9	49.8	46.6	45.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	21.9	0.4		4.7	2.9	0.1		0.2	0.2	4.8	0.7	
Delay (s)	66.7	15.9		56.1	29.9	17.8		50.1	50.0	51.3	45.9	
Level of Service	E	B		E	C	B		D	D	D	D	
Approach Delay (s)		22.7			29.6			50.1			47.3	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	28.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	112.4	Sum of lost time (s)	20.0
Intersection Capacity Utilization	82.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

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

4/29/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	354	2593	6	30	2180	199	11	127	58	277	52	278
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	0.95		1.00	0.92	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	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	0.99	
Satd. Flow (prot)	1770	5083		1770	5085	1508		3525	1459	1610	2960	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	0.99	
Satd. Flow (perm)	1770	5083		1770	5085	1508		3525	1459	1610	2960	
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)	373	2729	6	32	2295	209	12	134	61	292	55	293
RTOR Reduction (vph)	0	0	0	0	0	71	0	0	0	0	179	0
Lane Group Flow (vph)	373	2735	0	32	2295	138	0	146	61	146	315	0
Confl. Peds. (#/hr)			5			19			46			21
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8			2			
Actuated Green, G (s)	24.2	76.1		4.5	56.4	56.4		13.1	13.1	19.0	19.0	
Effective Green, g (s)	24.2	76.1		4.5	56.4	56.4		13.1	13.1	19.0	19.0	
Actuated g/C Ratio	0.18	0.57		0.03	0.43	0.43		0.10	0.10	0.14	0.14	
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)	322	2914		60	2161	640		347	144	230	423	
v/s Ratio Prot	c0.21	0.54		0.02	c0.45			0.04		0.09	c0.11	
v/s Ratio Perm						0.09			c0.04			
v/c Ratio	1.16	0.94		0.53	1.06	0.22		0.42	0.42	0.63	0.74	
Uniform Delay, d1	54.2	26.1		63.1	38.1	24.1		56.2	56.2	53.6	54.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	100.3	6.7		8.8	38.3	0.2		0.8	2.0	5.6	7.0	
Delay (s)	154.6	32.9		71.9	76.4	24.3		57.1	58.3	59.2	61.5	
Level of Service	F	C		E	E	C		E	E	E	E	
Approach Delay (s)		47.5			72.1			57.4			61.0	
Approach LOS		D			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	58.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	132.7	Sum of lost time (s)	20.0
Intersection Capacity Utilization	113.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

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

4/25/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	114	20	235	165	16	17	111	65	26	220	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	
Lane Util. Factor		0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes		1.00		1.00	1.00			0.99			0.99	
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		0.98		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		3409		1770	3484			3326			3349	
Flt Permitted		0.80		0.95	1.00			0.90			0.91	
Satd. Flow (perm)		2766		1770	3484			3000			3071	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	68	130	23	267	188	18	19	126	74	30	250	106
RTOR Reduction (vph)	0	10	0	0	8	0	0	57	0	0	46	0
Lane Group Flow (vph)	0	211	0	267	198	0	0	162	0	0	340	0
Confl. Peds. (#/hr)	19		18			19	10		4	4		10
Turn Type	Perm	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4						2			6		
Actuated Green, G (s)		10.6		13.7	29.3			12.0			12.0	
Effective Green, g (s)		10.6		13.7	29.3			12.0			12.0	
Actuated g/C Ratio		0.21		0.27	0.57			0.23			0.23	
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)		571		472	1989			701			718	
v/s Ratio Prot				c0.15	0.06							
v/s Ratio Perm		c0.08						0.05			c0.11	
v/c Ratio		0.37		0.57	0.10			0.23			0.47	
Uniform Delay, d1		17.5		16.2	5.0			15.9			16.9	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.4		1.6	0.0			0.2			0.5	
Delay (s)		17.9		17.8	5.0			16.1			17.4	
Level of Service		B		B	A			B			B	
Approach Delay (s)		17.9			12.2			16.1			17.4	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	51.3	Sum of lost time (s)	15.0
Intersection Capacity Utilization	59.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	148	394	73	299	262	37	46	236	137	45	199	52
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	0.99			0.99			0.99	
Flpb, ped/bikes		0.99		1.00	1.00			1.00			1.00	
Frt		0.98		1.00	0.98			0.95			0.97	
Flt Protected		0.99		0.95	1.00			0.99			0.99	
Satd. Flow (prot)		3391		1770	3454			3311			3386	
Flt Permitted		0.78		0.95	1.00			0.87			0.77	
Satd. Flow (perm)		2666		1770	3454			2901			2641	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	157	419	78	318	279	39	49	251	146	48	212	55
RTOR Reduction (vph)	0	12	0	0	12	0	0	69	0	0	21	0
Lane Group Flow (vph)	0	642	0	318	306	0	0	377	0	0	294	0
Confl. Peds. (#/hr)	30		42			30	17		14	14		17
Turn Type	Perm	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4						2			6		
Actuated Green, G (s)		22.9		17.9	45.8			15.2			15.2	
Effective Green, g (s)		22.9		17.9	45.8			15.2			15.2	
Actuated g/C Ratio		0.32		0.25	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)		859		446	2228			621			565	
v/s Ratio Prot				c0.18	0.09							
v/s Ratio Perm		c0.24						c0.13			0.11	
v/c Ratio		0.75		0.71	0.14			0.61			0.52	
Uniform Delay, d1		21.5		24.2	4.9			25.2			24.7	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		3.6		5.3	0.0			1.7			0.8	
Delay (s)		25.1		29.5	4.9			26.9			25.5	
Level of Service		C		C	A			C			C	
Approach Delay (s)		25.1			17.2			26.9			25.5	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	23.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	71.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	77.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	91	50	31	106	69	40	104	28	70	217	152
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	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	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	3322		1770	3303		1758	3410		1757	1863	1551
Flt Permitted	0.95	1.00		0.95	1.00		0.62	1.00		0.67	1.00	1.00
Satd. Flow (perm)	1770	3322		1770	3303		1148	3410		1233	1863	1551
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)	30	93	51	32	108	70	41	106	29	71	221	155
RTOR Reduction (vph)	0	40	0	0	55	0	0	19	0	0	0	101
Lane Group Flow (vph)	30	104	0	32	123	0	41	116	0	71	221	54
Confl. Peds. (#/hr)			20			24	17		17	17		17
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)	0.8	7.6		0.8	7.6		12.4	12.4		12.4	12.4	12.4
Effective Green, g (s)	0.8	7.6		0.8	7.6		12.4	12.4		12.4	12.4	12.4
Actuated g/C Ratio	0.02	0.21		0.02	0.21		0.35	0.35		0.35	0.35	0.35
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)	39	705		39	701		397	1181		427	645	537
v/s Ratio Prot	0.02	0.03		c0.02	c0.04			0.03			c0.12	
v/s Ratio Perm							0.04			0.06		0.03
v/c Ratio	0.77	0.15		0.82	0.18		0.10	0.10		0.17	0.34	0.10
Uniform Delay, d1	17.4	11.5		17.4	11.5		7.9	7.9		8.1	8.7	7.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	60.6	0.1		76.9	0.1		0.1	0.0		0.2	0.3	0.1
Delay (s)	78.0	11.6		94.4	11.7		8.0	8.0		8.3	9.0	8.0
Level of Service	E	B		F	B		A	A		A	A	A
Approach Delay (s)		23.0			24.3			8.0			8.5	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	14.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	35.8	Sum of lost time (s)	15.0
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	151	285	91	51	234	172	103	152	59	127	251	166
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	0.97		1.00	0.96		1.00	1.00	0.90
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.94	1.00		0.91	1.00	1.00
Frt	1.00	0.96		1.00	0.94		1.00	0.96		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	3333		1770	3218		1664	3265		1609	1863	1429
Flt Permitted	0.95	1.00		0.95	1.00		0.56	1.00		0.62	1.00	1.00
Satd. Flow (perm)	1770	3333		1770	3218		978	3265		1047	1863	1429
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)	153	288	92	52	236	174	104	154	60	128	254	168
RTOR Reduction (vph)	0	39	0	0	128	0	0	43	0	0	0	120
Lane Group Flow (vph)	153	341	0	52	282	0	104	171	0	128	254	48
Confl. Peds. (#/hr)			92			103	118		173	173		118
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)	8.3	18.3		3.6	13.6		14.8	14.8		14.8	14.8	14.8
Effective Green, g (s)	8.3	18.3		3.6	13.6		14.8	14.8		14.8	14.8	14.8
Actuated g/C Ratio	0.16	0.35		0.07	0.26		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)	284	1179		123	846		279	934		299	533	409
v/s Ratio Prot	c0.09	c0.10		0.03	0.09			0.05			c0.14	
v/s Ratio Perm							0.11			0.12		0.03
v/c Ratio	0.54	0.29		0.42	0.33		0.37	0.18		0.43	0.48	0.12
Uniform Delay, d1	19.9	12.0		23.1	15.4		14.7	13.9		15.0	15.2	13.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.0	0.1		2.3	0.2		0.8	0.1		1.0	0.7	0.1
Delay (s)	21.9	12.2		25.4	15.6		15.6	14.0		16.0	15.9	13.8
Level of Service	C	B		C	B		B	B		B	B	B
Approach Delay (s)		15.0			16.7			14.5			15.3	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	51.7	Sum of lost time (s)	15.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	73	1716	150	6	1976	24	97	40	15	53	55	197
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			0.98	1.00
Frt	1.00	0.99		1.00	1.00		1.00	0.96			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	1.00
Satd. Flow (prot)	1770	5002		1770	5069		1770	1757			1780	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.59	1.00			0.81	1.00
Satd. Flow (perm)	1770	5002		1770	5069		1107	1757			1483	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	81	1907	167	7	2196	27	108	44	17	59	61	219
RTOR Reduction (vph)	0	6	0	0	1	0	0	11	0	0	0	106
Lane Group Flow (vph)	81	2068	0	7	2222	0	108	50	0	0	120	113
Confl. Peds. (#/hr)			15			47			21	21		
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	83.7		1.0	76.0		16.8	16.8			16.8	16.8
Effective Green, g (s)	8.7	83.7		1.0	76.0		16.8	16.8			16.8	16.8
Actuated g/C Ratio	0.07	0.72		0.01	0.65		0.14	0.14			0.14	0.14
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)	132	3593		15	3306		159	253			213	228
v/s Ratio Prot	c0.05	0.41		0.00	c0.44			0.03				
v/s Ratio Perm							c0.10				0.08	0.07
v/c Ratio	0.61	0.58		0.47	0.67		0.68	0.20			0.56	0.50
Uniform Delay, d1	52.3	7.9		57.5	12.5		47.3	43.9			46.4	45.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	8.2	0.2		21.2	0.5		11.0	0.4			3.4	1.7
Delay (s)	60.5	8.1		78.7	13.1		58.3	44.3			49.8	47.6
Level of Service	E	A		E	B		E	D			D	D
Approach Delay (s)		10.1			13.3			53.2			48.4	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	116.5	Sum of lost time (s)	15.0
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	150	2448	309	36	1577	81	121	55	54	72	103	191
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	0.98		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			0.96	1.00
Frt	1.00	0.98		1.00	0.99		1.00	0.93			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	1.00
Satd. Flow (prot)	1770	4892		1770	4994		1770	1603			1746	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.44	1.00			0.73	1.00
Satd. Flow (perm)	1770	4892		1770	4994		820	1603			1306	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)	155	2524	319	37	1626	84	125	57	56	74	106	197
RTOR Reduction (vph)	0	10	0	0	3	0	0	27	0	0	0	163
Lane Group Flow (vph)	155	2833	0	37	1707	0	125	86	0	0	180	34
Confl. Peds. (#/hr)			70			85			54	54		
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)	16.1	88.6		4.6	77.1		22.2	22.2			22.2	22.2
Effective Green, g (s)	16.1	88.6		4.6	77.1		22.2	22.2			22.2	22.2
Actuated g/C Ratio	0.12	0.68		0.04	0.59		0.17	0.17			0.17	0.17
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)	218	3323		62	2952		139	272			222	269
v/s Ratio Prot	c0.09	c0.58		0.02	0.34			0.05				
v/s Ratio Perm							c0.15				0.14	0.02
v/c Ratio	0.71	0.85		0.60	0.58		0.90	0.32			0.81	0.12
Uniform Delay, d1	54.9	15.9		62.0	16.6		53.0	47.5			52.1	45.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	10.4	2.3		14.5	0.3		46.8	0.7			19.6	0.2
Delay (s)	65.3	18.2		76.5	16.8		99.9	48.1			71.7	46.1
Level of Service	E	B		E	B		F	D			E	D
Approach Delay (s)		20.7			18.1			75.3			58.3	
Approach LOS		C			B			E			E	

Intersection Summary			
HCM 2000 Control Delay	24.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	130.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	86.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	181	26	70	447	37	100
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)	201	29	78	497	41	111
Pedestrians	15				15	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	1				1	
Right turn flare (veh)						
Median type	TWLTL			None		
Median storage veh)	2					
Upstream signal (ft)	452					
pX, platoon unblocked						
vC, conflicting volume			245		649	130
vC1, stage 1 conf vol					231	
vC2, stage 2 conf vol					419	
vCu, unblocked vol			245		649	130
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 %			94		93	88
cM capacity (veh/h)			1302		610	918

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	134	96	78	248	248	152
Volume Left	0	0	78	0	0	41
Volume Right	0	29	0	0	0	111
cSH	1700	1700	1302	1700	1700	808
Volume to Capacity	0.08	0.06	0.06	0.15	0.15	0.19
Queue Length 95th (ft)	0	0	5	0	0	17
Control Delay (s)	0.0	0.0	7.9	0.0	0.0	10.5
Lane LOS			A			B
Approach Delay (s)	0.0		1.1			10.5
Approach LOS						B

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	31.0%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	536	58	114	561	90	236
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	570	62	121	597	96	251
Pedestrians	42				42	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	4				4	
Right turn flare (veh)						
Median type	TWLTL			None		
Median storage veh)	2					
Upstream signal (ft)	452					
pX, platoon unblocked			0.95		0.95	0.95
vC, conflicting volume			674		1226	358
vC1, stage 1 conf vol					643	
vC2, stage 2 conf vol					583	
vCu, unblocked vol			541		1124	207
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 %			87		78	68
cM capacity (veh/h)			935		429	775

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	380	252	121	298	298	347
Volume Left	0	0	121	0	0	96
Volume Right	0	62	0	0	0	251
cSH	1700	1700	935	1700	1700	634
Volume to Capacity	0.22	0.15	0.13	0.18	0.18	0.55
Queue Length 95th (ft)	0	0	11	0	0	83
Control Delay (s)	0.0	0.0	9.4	0.0	0.0	17.3
Lane LOS			A			C
Approach Delay (s)	0.0		1.6			17.3
Approach LOS						C

Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	38	19	53	10	17	25	117	86	33	26	29	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			5.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Frpb, ped/bikes		1.00	0.97		0.99		1.00	0.99			0.99	
Flpb, ped/bikes		0.99	1.00		1.00		1.00	1.00			1.00	
Frt		1.00	0.85		0.93		1.00	0.96			0.95	
Flt Protected		0.97	1.00		0.99		0.95	1.00			0.99	
Satd. Flow (prot)		1792	1539		1695		1770	1769			1719	
Flt Permitted		0.77	1.00		0.92		0.95	1.00			0.86	
Satd. Flow (perm)		1430	1539		1570		1770	1769			1493	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	43	22	60	11	19	28	133	98	38	30	33	42
RTOR Reduction (vph)	0	0	51	0	24	0	0	20	0	0	35	0
Lane Group Flow (vph)	0	65	9	0	34	0	133	116	0	0	70	0
Confl. Peds. (#/hr)	12		31	31		12			13	13		15
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8						6		
Actuated Green, G (s)		4.3	4.3		4.3		4.1	13.5			4.4	
Effective Green, g (s)		4.3	4.3		4.3		4.1	13.5			4.4	
Actuated g/C Ratio		0.15	0.15		0.15		0.15	0.49			0.16	
Clearance Time (s)		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	
Lane Grp Cap (vph)		221	238		242		261	859			236	
v/s Ratio Prot							c0.08	0.07				
v/s Ratio Perm		c0.05	0.01		0.02						c0.05	
v/c Ratio		0.29	0.04		0.14		0.51	0.14			0.30	
Uniform Delay, d1		10.4	10.0		10.2		10.9	3.9			10.3	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		0.7	0.1		0.3		1.6	0.1			0.7	
Delay (s)		11.2	10.1		10.4		12.5	4.0			11.0	
Level of Service		B	B		B		B	A			B	
Approach Delay (s)		10.6			10.4			8.2			11.0	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM 2000 Control Delay	9.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	27.8	Sum of lost time (s)	15.0
Intersection Capacity Utilization	38.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	25	167	19	19	40	190	129	26	35	57	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	
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Frpb, ped/bikes		1.00	0.94		0.97		1.00	0.98			0.98	
Flpb, ped/bikes		0.97	1.00		0.99		1.00	1.00			0.99	
Frt		1.00	0.85		0.93		1.00	0.97			0.94	
Flt Protected		0.96	1.00		0.99		0.95	1.00			0.99	
Satd. Flow (prot)		1742	1481		1644		1770	1786			1677	
Flt Permitted		0.72	1.00		0.89		0.95	1.00			0.88	
Satd. Flow (perm)		1302	1481		1476		1770	1786			1488	
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)	93	26	172	20	20	41	196	133	27	36	59	67
RTOR Reduction (vph)	0	0	137	0	33	0	0	13	0	0	47	0
Lane Group Flow (vph)	0	119	35	0	48	0	196	147	0	0	115	0
Confl. Peds. (#/hr)	35		77	77		35			66	66		62
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8						6		
Actuated Green, G (s)		7.6	7.6		7.6		7.5	19.6			7.1	
Effective Green, g (s)		7.6	7.6		7.6		7.5	19.6			7.1	
Actuated g/C Ratio		0.20	0.20		0.20		0.20	0.53			0.19	
Clearance Time (s)		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	
Lane Grp Cap (vph)		266	302		301		356	941			284	
v/s Ratio Prot							c0.11	0.08				
v/s Ratio Perm		c0.09	0.02		0.03						c0.08	
v/c Ratio		0.45	0.12		0.16		0.55	0.16			0.41	
Uniform Delay, d1		13.0	12.1		12.2		13.3	4.5			13.2	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		1.2	0.2		0.3		1.8	0.1			0.9	
Delay (s)		14.2	12.2		12.4		15.2	4.6			14.1	
Level of Service		B	B		B		B	A			B	
Approach Delay (s)		13.0			12.4			10.4			14.1	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	37.2	Sum of lost time (s)	15.0
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	22	1780	2127	183	65	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.91	0.91		0.97	1.00
Frpb, ped/bikes	1.00	1.00	0.99		1.00	0.85
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	5085	4997		3433	1350
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	5085	4997		3433	1350
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	1935	2312	199	71	21
RTOR Reduction (vph)	0	0	5	0	0	20
Lane Group Flow (vph)	24	1935	2506	0	71	1
Confl. Peds. (#/hr)				45		63
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	4.0	99.5	90.5		7.2	7.2
Effective Green, g (s)	4.0	99.5	90.5		7.2	7.2
Actuated g/C Ratio	0.03	0.85	0.78		0.06	0.06
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)	60	4335	3875		211	83
v/s Ratio Prot	0.01	c0.38	c0.50		c0.02	
v/s Ratio Perm						0.00
v/c Ratio	0.40	0.45	0.65		0.34	0.02
Uniform Delay, d1	55.2	2.0	5.9		52.5	51.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.3	0.1	0.4		0.9	0.1
Delay (s)	59.5	2.1	6.3		53.4	51.5
Level of Service	E	A	A		D	D
Approach Delay (s)		2.8	6.3		53.0	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay	5.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	116.7	Sum of lost time (s)	15.0
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

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

4/29/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	36	2544	1921	332	276	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.91	0.91		0.97	1.00
Frpb, ped/bikes	1.00	1.00	0.99		1.00	0.80
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	5085	4933		3433	1272
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	5085	4933		3433	1272
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	38	2678	2022	349	291	47
RTOR Reduction (vph)	0	0	15	0	0	41
Lane Group Flow (vph)	38	2678	2356	0	291	6
Confl. Peds. (#/hr)				31		80
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	6.3	99.4	88.1		16.1	16.1
Effective Green, g (s)	6.3	99.4	88.1		16.1	16.1
Actuated g/C Ratio	0.05	0.79	0.70		0.13	0.13
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)	88	4027	3462		440	163
v/s Ratio Prot	0.02	c0.53	0.48		c0.08	
v/s Ratio Perm						0.00
v/c Ratio	0.43	0.67	0.68		0.66	0.04
Uniform Delay, d1	57.9	5.7	10.7		52.1	47.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.4	0.4	0.6		3.7	0.1
Delay (s)	61.2	6.2	11.2		55.8	48.0
Level of Service	E	A	B		E	D
Approach Delay (s)		6.9	11.2		54.7	
Approach LOS		A	B		D	

Intersection Summary			
HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	125.5	Sum of lost time (s)	15.0
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX E

CAPACITY ANALYSIS CALCULATIONS
PROJECTED YEAR 2017 PEAK HOUR TRAFFIC
ANALYSIS WITH PROJECT

HCM Unsignalized Intersection Capacity Analysis
1: Cooke St & Halekauwila St

4/29/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	60	71	39	75	130	40	17	225	17	24	235	115
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	67	79	43	83	144	44	19	250	19	27	261	128

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	189	272	144	144	157	258
Volume Left (vph)	67	83	19	0	27	0
Volume Right (vph)	43	44	0	19	0	128
Hadj (s)	-0.03	0.00	0.10	-0.06	0.12	-0.31
Departure Headway (s)	6.3	6.2	6.8	6.6	6.6	6.2
Degree Utilization, x	0.33	0.47	0.27	0.27	0.29	0.44
Capacity (veh/h)	512	540	483	503	511	550
Control Delay (s)	12.5	14.5	11.1	10.8	11.1	12.8
Approach Delay (s)	12.5	14.5	11.0		12.2	
Approach LOS	B	B	B		B	

Intersection Summary			
Delay	12.5		
Level of Service	B		
Intersection Capacity Utilization	51.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
1: Cooke St & Halekauwila St

4/29/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	133	175	42	31	99	64	26	399	45	41	369	57
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	140	184	44	33	104	67	27	420	47	43	388	60

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	368	204	237	257	237	254
Volume Left (vph)	140	33	27	0	43	0
Volume Right (vph)	44	67	0	47	0	60
Hadj (s)	0.04	-0.13	0.09	-0.09	0.12	-0.13
Departure Headway (s)	7.4	7.8	8.0	7.8	8.0	7.7
Degree Utilization, x	0.75	0.45	0.52	0.56	0.53	0.55
Capacity (veh/h)	467	411	430	439	423	441
Control Delay (s)	29.7	17.0	18.2	18.8	18.4	18.5
Approach Delay (s)	29.7	17.0	18.5		18.4	
Approach LOS	D	C	C		C	

Intersection Summary			
Delay	20.9		
Level of Service	C		
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	69	75	11	37	184	40	14	156	26	28	162	173
Peak Hour 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
Hourly flow rate (vph)	76	82	12	41	202	44	15	171	29	31	178	190

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	170	287	101	114	120	279
Volume Left (vph)	76	41	15	0	31	0
Volume Right (vph)	12	44	0	29	0	190
Hadj (s)	0.08	-0.03	0.11	-0.14	0.16	-0.44
Departure Headway (s)	6.2	5.8	6.7	6.4	6.5	5.8
Degree Utilization, x	0.29	0.46	0.19	0.20	0.21	0.45
Capacity (veh/h)	526	576	487	512	524	583
Control Delay (s)	11.7	13.8	10.0	9.8	10.0	12.4
Approach Delay (s)	11.7	13.8	9.9		11.7	
Approach LOS	B	B	A		B	

Intersection Summary				
Delay	11.9			
Level of Service	B			
Intersection Capacity Utilization	52.3%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
2: Pohukaina St & Cooke St

4/29/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	155	160	22	47	105	57	18	240	25	33	313	98
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	168	174	24	51	114	62	20	261	27	36	340	107

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	366	227	150	158	206	277
Volume Left (vph)	168	51	20	0	36	0
Volume Right (vph)	24	62	0	27	0	107
Hadj (s)	0.09	-0.08	0.10	-0.09	0.12	-0.24
Departure Headway (s)	6.9	7.1	7.8	7.6	7.5	7.1
Degree Utilization, x	0.70	0.45	0.32	0.33	0.43	0.55
Capacity (veh/h)	495	454	423	429	458	476
Control Delay (s)	24.3	15.8	13.2	13.1	14.7	17.1
Approach Delay (s)	24.3	15.8	13.1		16.1	
Approach LOS	C	C	B		C	

Intersection Summary			
Delay	17.6		
Level of Service	C		
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		

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

4/29/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	72	143	59	60	252	51	76	465	65	49	921	209
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	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.98	1.00		0.99	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	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1741	1766		1747	1803		1770	3467		1770	3427	
Flt Permitted	0.37	1.00		0.56	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	679	1766		1025	1803		1770	3467		1770	3427	
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)	73	146	60	61	257	52	78	474	66	50	940	213
RTOR Reduction (vph)	0	17	0	0	8	0	0	12	0	0	22	0
Lane Group Flow (vph)	73	189	0	61	301	0	78	528	0	50	1131	0
Confl. Peds. (#/hr)	32		20	20		32			6			2
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)	17.6	17.6		17.6	17.6		6.1	36.1		3.0	33.0	
Effective Green, g (s)	17.6	17.6		17.6	17.6		6.1	36.1		3.0	33.0	
Actuated g/C Ratio	0.25	0.25		0.25	0.25		0.09	0.50		0.04	0.46	
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)	166	433		251	442		150	1745		74	1577	
v/s Ratio Prot		0.11			c0.17		c0.04	c0.15		0.03	c0.33	
v/s Ratio Perm	0.11			0.06								
v/c Ratio	0.44	0.44		0.24	0.68		0.52	0.30		0.68	0.72	
Uniform Delay, d1	22.9	22.9		21.7	24.5		31.4	10.4		33.9	15.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.9	0.7		0.5	4.3		3.2	0.1		21.7	1.6	
Delay (s)	24.7	23.6		22.2	28.8		34.6	10.5		55.6	17.2	
Level of Service	C	C		C	C		C	B		E	B	
Approach Delay (s)		23.9			27.7			13.6			18.8	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	71.7	Sum of lost time (s)	15.0
Intersection Capacity Utilization	75.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	152	392	147	82	296	96	78	858	112	118	893	104
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	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.98	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.96		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)	1730	1765		1754	1767		1770	3469		1770	3467	
Flt Permitted	0.33	1.00		0.15	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	595	1765		279	1767		1770	3469		1770	3467	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	162	417	156	87	315	102	83	913	119	126	950	111
RTOR Reduction (vph)	0	15	0	0	13	0	0	11	0	0	10	0
Lane Group Flow (vph)	162	558	0	87	404	0	83	1021	0	126	1051	0
Confl. Peds. (#/hr)	49		31	31		49			11			15
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)	30.4	30.4		30.4	30.4		5.3	30.2		8.7	33.6	
Effective Green, g (s)	30.4	30.4		30.4	30.4		5.3	30.2		8.7	33.6	
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.06	0.36		0.10	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)	214	636		100	637		111	1242		182	1381	
v/s Ratio Prot		c0.32			0.23		0.05	0.29		c0.07	c0.30	
v/s Ratio Perm	0.27			0.31								
v/c Ratio	0.76	0.88		0.87	0.63		0.75	0.82		0.69	0.76	
Uniform Delay, d1	23.7	25.2		25.1	22.3		38.8	24.6		36.5	21.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	14.2	12.9		50.3	2.1		23.7	4.5		10.8	2.5	
Delay (s)	37.9	38.1		75.4	24.4		62.5	29.1		47.3	24.4	
Level of Service	D	D		E	C		E	C		D	C	
Approach Delay (s)		38.1			33.2			31.6			26.9	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	31.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	84.3	Sum of lost time (s)	15.0
Intersection Capacity Utilization	85.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

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

4/29/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	123	19	51	0	0	0	52	469	0	18	660	303
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	1.00	
Flpb, ped/bikes		1.00					1.00	1.00		1.00	1.00	
Frt		0.96					1.00	1.00		1.00	0.95	
Flt Protected		0.97					0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1728					1770	3539		1768	3372	
Flt Permitted		0.97					0.25	1.00		0.48	1.00	
Satd. Flow (perm)		1728					470	3539		895	3372	
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)	124	19	52	0	0	0	53	474	0	18	667	306
RTOR Reduction (vph)	0	16	0	0	0	0	0	0	0	0	64	0
Lane Group Flow (vph)	0	179	0	0	0	0	53	474	0	18	909	0
Confl. Peds. (#/hr)			22						1	1		
Turn Type	Split	NA					Perm	NA		Perm	NA	
Protected Phases	4	4						2			6	
Permitted Phases							2			6		
Actuated Green, G (s)		11.2					24.1	24.1		24.1	24.1	
Effective Green, g (s)		11.2					24.1	24.1		24.1	24.1	
Actuated g/C Ratio		0.25					0.53	0.53		0.53	0.53	
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)		427					250	1882		476	1793	
v/s Ratio Prot		c0.10						0.13			c0.27	
v/s Ratio Perm							0.11			0.02		
v/c Ratio		0.42					0.21	0.25		0.04	0.51	
Uniform Delay, d1		14.3					5.6	5.7		5.1	6.8	
Progression Factor		1.00					1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.7					0.4	0.1		0.0	0.2	
Delay (s)		15.0					6.0	5.8		5.1	7.0	
Level of Service		B					A	A		A	A	
Approach Delay (s)		15.0			0.0			5.8			7.0	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	45.3	Sum of lost time (s)	10.0
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	288	22	86	0	0	0	41	732	11	23	824	163
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	1.00	
Flpb, ped/bikes		1.00					1.00	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)		1722					1770	3530		1770	3452	
Flt Permitted		0.96					0.20	1.00		0.31	1.00	
Satd. Flow (perm)		1722					371	3530		580	3452	
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)	297	23	89	0	0	0	42	755	11	24	849	168
RTOR Reduction (vph)	0	12	0	0	0	0	0	1	0	0	19	0
Lane Group Flow (vph)	0	397	0	0	0	0	42	765	0	24	998	0
Confl. Peds. (#/hr)			61						7			
Turn Type	Split	NA					Perm	NA		Perm	NA	
Protected Phases	4	4						2			6	
Permitted Phases							2			6		
Actuated Green, G (s)		19.6					25.6	25.6		25.6	25.6	
Effective Green, g (s)		19.6					25.6	25.6		25.6	25.6	
Actuated g/C Ratio		0.36					0.46	0.46		0.46	0.46	
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)		611					172	1637		268	1600	
v/s Ratio Prot		c0.23						0.22			c0.29	
v/s Ratio Perm							0.11			0.04		
v/c Ratio		0.65					0.24	0.47		0.09	0.62	
Uniform Delay, d1		14.9					8.9	10.1		8.3	11.2	
Progression Factor		1.00					1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.4					0.7	0.2		0.1	0.8	
Delay (s)		17.3					9.7	10.3		8.4	11.9	
Level of Service		B					A	B		A	B	
Approach Delay (s)		17.3			0.0			10.3			11.9	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	55.2	Sum of lost time (s)	10.0
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

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

4/29/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	70	30	89	108	111	54	282	62	127	424	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes		1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt		0.96		1.00	0.92		1.00	0.97		1.00	0.98	
Flt Protected		0.99		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3358		1758	1703		1746	3432		1764	3456	
Flt Permitted		0.86		0.66	1.00		0.45	1.00		0.53	1.00	
Satd. Flow (perm)		2926		1226	1703		832	3432		976	3456	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	30	78	33	99	120	123	60	313	69	141	471	64
RTOR Reduction (vph)	0	23	0	0	47	0	0	25	0	0	14	0
Lane Group Flow (vph)	0	118	0	99	196	0	60	357	0	141	521	0
Confl. Peds. (#/hr)	22		19	19		22	36		11	11		36
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)		10.8		10.8	10.8		13.6	13.6		13.6	13.6	
Effective Green, g (s)		10.8		10.8	10.8		13.6	13.6		13.6	13.6	
Actuated g/C Ratio		0.31		0.31	0.31		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	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		918		384	534		328	1356		385	1366	
v/s Ratio Prot					c0.12			0.10			c0.15	
v/s Ratio Perm		0.04		0.08			0.07			0.14		
v/c Ratio		0.13		0.26	0.37		0.18	0.26		0.37	0.38	
Uniform Delay, d1		8.4		8.8	9.2		6.8	7.0		7.4	7.4	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1		0.4	0.4		0.3	0.1		0.6	0.2	
Delay (s)		8.5		9.2	9.6		7.0	7.1		7.9	7.6	
Level of Service		A		A	A		A	A		A	A	
Approach Delay (s)		8.5			9.5			7.1			7.7	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	34.4	Sum of lost time (s)	10.0
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

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

4/29/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	128	10	99	89	271	31	413	139	273	377	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	0.98		1.00	0.99		1.00	0.99	
Flpb, ped/bikes		1.00		0.99	1.00		0.98	1.00		0.99	1.00	
Frt		0.99		1.00	0.89		1.00	0.96		1.00	0.98	
Flt Protected		0.99		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3450		1745	1613		1734	3383		1758	3456	
Flt Permitted		0.74		0.63	1.00		0.49	1.00		0.44	1.00	
Satd. Flow (perm)		2575		1155	1613		903	3383		806	3456	
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)	52	133	10	103	93	282	32	430	145	284	393	51
RTOR Reduction (vph)	0	4	0	0	124	0	0	43	0	0	13	0
Lane Group Flow (vph)	0	191	0	103	251	0	32	532	0	284	431	0
Confl. Peds. (#/hr)	32		29	29		32	32		19	19		32
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)		14.5		14.5	14.5		26.7	26.7		26.7	26.7	
Effective Green, g (s)		14.5		14.5	14.5		26.7	26.7		26.7	26.7	
Actuated g/C Ratio		0.28		0.28	0.28		0.52	0.52		0.52	0.52	
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)		729		327	456		470	1764		420	1802	
v/s Ratio Prot					c0.16			0.16			0.12	
v/s Ratio Perm		0.07		0.09			0.04			c0.35		
v/c Ratio		0.26		0.31	0.55		0.07	0.30		0.68	0.24	
Uniform Delay, d1		14.2		14.4	15.6		6.1	7.0		9.1	6.7	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2		0.6	1.4		0.1	0.1		4.3	0.1	
Delay (s)		14.4		15.0	17.0		6.1	7.1		13.3	6.8	
Level of Service		B		B	B		A	A		B	A	
Approach Delay (s)		14.4			16.6			7.0			9.3	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	51.2	Sum of lost time (s)	10.0
Intersection Capacity Utilization	86.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

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

4/29/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	268	1758	2	52	1892	160	1	15	3	128	99	223
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	0.93	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	0.90	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	5084		1770	5085	1539		3529	1471	1610	2990	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	5084		1770	5085	1539		3529	1471	1610	2990	
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)	279	1831	2	54	1971	167	1	16	3	133	103	232
RTOR Reduction (vph)	0	0	0	0	0	72	0	0	0	0	203	0
Lane Group Flow (vph)	279	1833	0	54	1971	95	0	17	3	120	145	0
Confl. Peds. (#/hr)			20			10			48			11
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8			2			
Actuated Green, G (s)	20.4	66.2		5.5	51.3	51.3		6.7	6.7	14.0	14.0	
Effective Green, g (s)	20.4	66.2		5.5	51.3	51.3		6.7	6.7	14.0	14.0	
Actuated g/C Ratio	0.18	0.59		0.05	0.46	0.46		0.06	0.06	0.12	0.12	
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)	321	2994		86	2320	702		210	87	200	372	
v/s Ratio Prot	c0.16	0.36		0.03	c0.39			c0.00		c0.07	0.05	
v/s Ratio Perm						0.06			0.00			
v/c Ratio	0.87	0.61		0.63	0.85	0.14		0.08	0.03	0.60	0.39	
Uniform Delay, d1	44.7	14.8		52.4	27.1	17.7		49.9	49.8	46.6	45.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	21.2	0.4		13.5	3.1	0.1		0.2	0.2	4.8	0.7	
Delay (s)	65.9	15.2		65.9	30.2	17.8		50.1	50.0	51.3	45.9	
Level of Service	E	B		E	C	B		D	D	D	D	
Approach Delay (s)		21.9			30.2			50.1			47.3	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	28.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	112.4	Sum of lost time (s)	20.0
Intersection Capacity Utilization	82.5%	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												
Volume (vph)	347	2610	6	30	2187	199	11	127	58	277	52	267
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	0.95		1.00	0.92	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	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	0.99	
Satd. Flow (prot)	1770	5083		1770	5085	1509		3525	1459	1610	2966	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	0.99	
Satd. Flow (perm)	1770	5083		1770	5085	1509		3525	1459	1610	2966	
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)	365	2747	6	32	2302	209	12	134	61	292	55	281
RTOR Reduction (vph)	0	0	0	0	0	70	0	0	0	0	173	0
Lane Group Flow (vph)	365	2753	0	32	2302	139	0	146	61	146	309	0
Confl. Peds. (#/hr)			5			19			46			21
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8			2			
Actuated Green, G (s)	23.2	76.2		4.5	57.5	57.5		13.1	13.1	18.6	18.6	
Effective Green, g (s)	23.2	76.2		4.5	57.5	57.5		13.1	13.1	18.6	18.6	
Actuated g/C Ratio	0.18	0.58		0.03	0.43	0.43		0.10	0.10	0.14	0.14	
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)	310	2925		60	2208	655		348	144	226	416	
v/s Ratio Prot	c0.21	0.54		0.02	c0.45			0.04		0.09	c0.10	
v/s Ratio Perm						0.09			c0.04			
v/c Ratio	1.18	0.94		0.53	1.04	0.21		0.42	0.42	0.65	0.74	
Uniform Delay, d1	54.6	26.0		62.9	37.5	23.3		56.1	56.1	53.8	54.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	108.3	7.0		8.8	31.4	0.2		0.8	2.0	6.2	7.0	
Delay (s)	162.9	33.1		71.7	68.8	23.5		56.9	58.1	60.0	61.6	
Level of Service	F	C		E	E	C		E	E	E	E	
Approach Delay (s)		48.3			65.1			57.3			61.3	
Approach LOS		D			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	56.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	132.4	Sum of lost time (s)	20.0
Intersection Capacity Utilization	113.1%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	127	42	268	173	16	47	210	117	26	284	96
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			1.00			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		0.97		1.00	0.99			0.95			0.96	
Flt Protected		0.99		0.95	1.00			0.99			1.00	
Satd. Flow (prot)		3366		1770	3486			3334			3386	
Flt Permitted		0.81		0.95	1.00			0.84			0.90	
Satd. Flow (perm)		2748		1770	3486			2807			3065	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	74	144	48	305	197	18	53	239	133	30	323	109
RTOR Reduction (vph)	0	21	0	0	8	0	0	61	0	0	34	0
Lane Group Flow (vph)	0	245	0	305	207	0	0	364	0	0	428	0
Confl. Peds. (#/hr)	19		18			19	10		4	4		10
Turn Type	Perm	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4						2			6		
Actuated Green, G (s)		11.6		15.7	32.3			14.2			14.2	
Effective Green, g (s)		11.6		15.7	32.3			14.2			14.2	
Actuated g/C Ratio		0.21		0.28	0.57			0.25			0.25	
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)		564		491	1992			705			770	
v/s Ratio Prot				c0.17	0.06							
v/s Ratio Perm		c0.09						0.13			c0.14	
v/c Ratio		0.43		0.62	0.10			0.52			0.56	
Uniform Delay, d1		19.6		17.8	5.5			18.2			18.4	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.5		2.4	0.0			0.6			0.9	
Delay (s)		20.1		20.2	5.5			18.8			19.3	
Level of Service		C		C	A			B			B	
Approach Delay (s)		20.1			14.2			18.8			19.3	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	17.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	56.5	Sum of lost time (s)	15.0
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	150	399	103	336	273	37	58	251	142	45	275	57
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	0.99			0.99			1.00	
Flpb, ped/bikes		0.99		1.00	1.00			1.00			1.00	
Frt		0.98		1.00	0.98			0.95			0.98	
Flt Protected		0.99		0.95	1.00			0.99			0.99	
Satd. Flow (prot)		3361		1770	3456			3317			3418	
Flt Permitted		0.78		0.95	1.00			0.79			0.78	
Satd. Flow (perm)		2641		1770	3456			2622			2667	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	160	424	110	357	290	39	62	267	151	48	293	61
RTOR Reduction (vph)	0	17	0	0	12	0	0	60	0	0	16	0
Lane Group Flow (vph)	0	677	0	357	317	0	0	420	0	0	386	0
Confl. Peds. (#/hr)	30		42			30	17		14	14		17
Turn Type	Perm	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4						2			6		
Actuated Green, G (s)		24.8		20.1	49.9			17.4			17.4	
Effective Green, g (s)		24.8		20.1	49.9			17.4			17.4	
Actuated g/C Ratio		0.32		0.26	0.65			0.23			0.23	
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)		847		460	2230			590			600	
v/s Ratio Prot				c0.20	0.09							
v/s Ratio Perm		c0.26						c0.16			0.14	
v/c Ratio		0.80		0.78	0.14			0.71			0.64	
Uniform Delay, d1		24.0		26.5	5.3			27.6			27.1	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		5.3		8.0	0.0			4.0			2.4	
Delay (s)		29.3		34.5	5.4			31.7			29.5	
Level of Service		C		C	A			C			C	
Approach Delay (s)		29.3			20.5			31.7			29.5	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	77.3	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

HCM Unsignalized Intersection Capacity Analysis
14: Kamakee St & Halekauwila St

4/29/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	168	79	58	214	475	123
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	183	86	63	233	516	134
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				316	242	
pX, platoon unblocked						
vC, conflicting volume	826	239	650			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	826	239	650			
tC, single (s)	*5.8	*5.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	50	89	93			
cM capacity (veh/h)	368	817	932			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	268	141	155	207	207	237
Volume Left	183	63	0	0	0	0
Volume Right	86	0	0	0	0	134
cSH	446	932	1700	1700	1700	1700
Volume to Capacity	0.60	0.07	0.09	0.12	0.12	0.14
Queue Length 95th (ft)	97	5	0	0	0	0
Control Delay (s)	24.5	4.5	0.0	0.0	0.0	0.0
Lane LOS	C	A				
Approach Delay (s)	24.5	2.1		0.0		
Approach LOS	C					

Intersection Summary				
Average Delay		5.9		
Intersection Capacity Utilization		43.7%	ICU Level of Service	A
Analysis Period (min)		15		

* User Entered Value

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	70	33	79	475	571	167
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	36	86	516	621	182
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				256	301	
pX, platoon unblocked	0.99					
vC, conflicting volume	1141	298	802			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1125	298	802			
tC, single (s)	*5.8	*5.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	69	95	89			
cM capacity (veh/h)	244	761	817			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	112	258	344	248	248	306
Volume Left	76	86	0	0	0	0
Volume Right	36	0	0	0	0	182
cSH	312	817	1700	1700	1700	1700
Volume to Capacity	0.36	0.11	0.20	0.15	0.15	0.18
Queue Length 95th (ft)	39	9	0	0	0	0
Control Delay (s)	22.8	4.1	0.0	0.0	0.0	0.0
Lane LOS	C	A				
Approach Delay (s)	22.8	1.7		0.0		
Approach LOS	C					

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	46.1%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

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

4/29/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	52	96	60	31	104	69	36	151	28	70	281	162
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	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		0.99	1.00	1.00
Frt	1.00	0.94		1.00	0.94		1.00	0.98		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	3299		1758	3443		1757	1863	1549
Flt Permitted	0.95	1.00		0.95	1.00		0.58	1.00		0.64	1.00	1.00
Satd. Flow (perm)	1770	3302		1770	3299		1080	3443		1177	1863	1549
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)	53	98	61	32	106	70	37	154	29	71	287	165
RTOR Reduction (vph)	0	46	0	0	55	0	0	18	0	0	0	104
Lane Group Flow (vph)	53	113	0	32	121	0	37	165	0	71	287	61
Confl. Peds. (#/hr)			20			24	17		17	17		17
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)	2.3	9.9		0.9	8.5		15.1	15.1		15.1	15.1	15.1
Effective Green, g (s)	2.3	9.9		0.9	8.5		15.1	15.1		15.1	15.1	15.1
Actuated g/C Ratio	0.06	0.24		0.02	0.21		0.37	0.37		0.37	0.37	0.37
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)	99	799		38	685		398	1271		434	687	571
v/s Ratio Prot	c0.03	0.03		0.02	c0.04			0.05			c0.15	
v/s Ratio Perm							0.03			0.06		0.04
v/c Ratio	0.54	0.14		0.84	0.18		0.09	0.13		0.16	0.42	0.11
Uniform Delay, d1	18.8	12.2		19.9	13.3		8.4	8.5		8.7	9.6	8.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.5	0.1		85.4	0.1		0.1	0.0		0.2	0.4	0.1
Delay (s)	24.3	12.2		105.3	13.4		8.5	8.6		8.8	10.0	8.6
Level of Service	C	B		F	B		A	A		A	B	A
Approach Delay (s)		15.2			27.6			8.6			9.4	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	13.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	40.9	Sum of lost time (s)	15.0
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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

4/29/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	128	270	62	51	225	172	84	216	59	127	278	148
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	0.97		1.00	0.97		1.00	1.00	0.90
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.94	1.00		0.92	1.00	1.00
Frt	1.00	0.97		1.00	0.93		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	3380		1770	3212		1671	3329		1625	1863	1431
Flt Permitted	0.95	1.00		0.95	1.00		0.52	1.00		0.58	1.00	1.00
Satd. Flow (perm)	1770	3380		1770	3212		922	3329		994	1863	1431
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)	129	273	63	52	227	174	85	218	60	128	281	149
RTOR Reduction (vph)	0	25	0	0	129	0	0	29	0	0	0	105
Lane Group Flow (vph)	129	311	0	52	272	0	85	249	0	128	281	44
Confl. Peds. (#/hr)			92			103	118		173	173		118
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)	7.6	17.2		3.6	13.2		15.2	15.2		15.2	15.2	15.2
Effective Green, g (s)	7.6	17.2		3.6	13.2		15.2	15.2		15.2	15.2	15.2
Actuated g/C Ratio	0.15	0.34		0.07	0.26		0.30	0.30		0.30	0.30	0.30
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)	263	1139		124	831		274	992		296	555	426
v/s Ratio Prot	c0.07	c0.09		0.03	c0.08			0.07			c0.15	
v/s Ratio Perm							0.09			0.13		0.03
v/c Ratio	0.49	0.27		0.42	0.33		0.31	0.25		0.43	0.51	0.10
Uniform Delay, d1	19.9	12.3		22.7	15.3		13.8	13.6		14.4	14.8	13.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.4	0.1		2.3	0.2		0.6	0.1		1.0	0.7	0.1
Delay (s)	21.4	12.5		25.0	15.5		14.5	13.7		15.4	15.5	13.1
Level of Service	C	B		C	B		B	B		B	B	B
Approach Delay (s)		14.9			16.6			13.9			14.9	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	51.0	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 Signalized Intersection Capacity Analysis
9: Kamakee St & Ala Moana Blvd

4/30/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	86	1716	150	6	1976	55	97	40	15	110	55	214
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			0.97	1.00
Frt	1.00	0.99		1.00	1.00		1.00	0.96			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	5002		1770	5048		1770	1758			1750	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.46	1.00			0.76	1.00
Satd. Flow (perm)	1770	5002		1770	5048		857	1758			1380	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	93	1865	163	7	2148	60	105	43	16	120	60	233
RTOR Reduction (vph)	0	5	0	0	2	0	0	11	0	0	0	99
Lane Group Flow (vph)	93	2023	0	7	2206	0	105	48	0	0	180	134
Confl. Peds. (#/hr)			15			47			21	21		
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)	11.2	83.8		1.2	73.8		21.4	21.4			21.4	21.4
Effective Green, g (s)	11.2	83.8		1.2	73.8		21.4	21.4			21.4	21.4
Actuated g/C Ratio	0.09	0.69		0.01	0.61		0.18	0.18			0.18	0.18
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	3452		17	3068		151	309			243	279
v/s Ratio Prot	c0.05	c0.40		0.00	c0.44			0.03				
v/s Ratio Perm							0.12				c0.13	0.08
v/c Ratio	0.57	0.59		0.41	0.72		0.70	0.16			0.74	0.48
Uniform Delay, d1	52.8	9.8		59.7	16.6		46.9	42.4			47.4	45.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	4.8	0.3		15.4	0.8		13.0	0.2			11.5	1.3
Delay (s)	57.5	10.0		75.2	17.4		60.0	42.6			58.9	46.3
Level of Service	E	B		E	B		E	D			E	D
Approach Delay (s)		12.1			17.6			53.7			51.8	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	19.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	121.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	74.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	167	2448	309	36	1577	109	121	55	54	62	103	198
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	0.98		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			0.96	1.00
Frt	1.00	0.98		1.00	0.99		1.00	0.93			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	1.00
Satd. Flow (prot)	1770	4893		1770	4967		1770	1604			1757	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.46	1.00			0.74	1.00
Satd. Flow (perm)	1770	4893		1770	4967		855	1604			1327	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)	172	2524	319	37	1626	112	125	57	56	64	106	204
RTOR Reduction (vph)	0	10	0	0	5	0	0	27	0	0	0	170
Lane Group Flow (vph)	172	2833	0	37	1733	0	125	86	0	0	170	34
Confl. Peds. (#/hr)			70			85			54	54		
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)	17.3	88.6		4.6	75.9		21.4	21.4			21.4	21.4
Effective Green, g (s)	17.3	88.6		4.6	75.9		21.4	21.4			21.4	21.4
Actuated g/C Ratio	0.13	0.68		0.04	0.59		0.17	0.17			0.17	0.17
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)	236	3345		62	2908		141	264			219	261
v/s Ratio Prot	c0.10	c0.58		0.02	0.35			0.05				
v/s Ratio Perm							c0.15				0.13	0.02
v/c Ratio	0.73	0.85		0.60	0.60		0.89	0.33			0.78	0.13
Uniform Delay, d1	53.9	15.4		61.6	17.1		52.9	47.7			51.8	46.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	10.7	2.1		14.5	0.3		43.5	0.7			15.7	0.2
Delay (s)	64.6	17.6		76.1	17.4		96.4	48.5			67.5	46.4
Level of Service	E	B		E	B		F	D			E	D
Approach Delay (s)		20.2			18.6			73.7			56.0	
Approach LOS		C			B			E			E	

Intersection Summary			
HCM 2000 Control Delay	24.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	129.6	Sum of lost time (s)	15.0
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	240	33	68	484	41	105
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)	267	37	76	538	46	117
Pedestrians	15				15	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	1				1	
Right turn flare (veh)						
Median type	TWLTL			None		
Median storage veh)	2					
Upstream signal (ft)	452					
pX, platoon unblocked						
vC, conflicting volume			318		735	167
vC1, stage 1 conf vol					300	
vC2, stage 2 conf vol					435	
vCu, unblocked vol			318		735	167
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 %			94		92	87
cM capacity (veh/h)			1223		585	879

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	178	126	76	269	269	162
Volume Left	0	0	76	0	0	46
Volume Right	0	37	0	0	0	117
cSH	1700	1700	1223	1700	1700	770
Volume to Capacity	0.10	0.07	0.06	0.16	0.16	0.21
Queue Length 95th (ft)	0	0	5	0	0	20
Control Delay (s)	0.0	0.0	8.1	0.0	0.0	10.9
Lane LOS			A			B
Approach Delay (s)	0.0		1.0			10.9
Approach LOS						B

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	32.5%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	543	60	105	604	96	221
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	578	64	112	643	102	235
Pedestrians	42				42	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	4				4	
Right turn flare (veh)						
Median type	TWLTL			None		
Median storage veh)	2					
Upstream signal (ft)	452					
pX, platoon unblocked			0.97		0.97	0.97
vC, conflicting volume			683		1238	363
vC1, stage 1 conf vol					652	
vC2, stage 2 conf vol					587	
vCu, unblocked vol			601		1175	269
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 %			88		76	68
cM capacity (veh/h)			906		423	734

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	385	256	112	321	321	337
Volume Left	0	0	112	0	0	102
Volume Right	0	64	0	0	0	235
cSH	1700	1700	906	1700	1700	600
Volume to Capacity	0.23	0.15	0.12	0.19	0.19	0.56
Queue Length 95th (ft)	0	0	11	0	0	87
Control Delay (s)	0.0	0.0	9.5	0.0	0.0	18.4
Lane LOS			A			C
Approach Delay (s)	0.0		1.4			18.4
Approach LOS						C

Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	52.0%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	43	19	53	10	17	25	117	90	33	26	36	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0		5.0	5.0			5.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Frpb, ped/bikes		1.00	0.97		0.99		1.00	0.99			0.99	
Flpb, ped/bikes		0.99	1.00		1.00		1.00	1.00			1.00	
Frt		1.00	0.85		0.93		1.00	0.96			0.95	
Flt Protected		0.97	1.00		0.99		0.95	1.00			0.99	
Satd. Flow (prot)		1789	1539		1695		1770	1772			1732	
Flt Permitted		0.77	1.00		0.92		0.95	1.00			0.86	
Satd. Flow (perm)		1422	1539		1567		1770	1772			1512	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	49	22	60	11	19	28	133	102	38	30	41	40
RTOR Reduction (vph)	0	0	51	0	24	0	0	20	0	0	34	0
Lane Group Flow (vph)	0	71	9	0	34	0	133	120	0	0	77	0
Confl. Peds. (#/hr)	12		31	31		12			13	13		15
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8						6		
Actuated Green, G (s)		4.4	4.4		4.4		4.1	13.5			4.4	
Effective Green, g (s)		4.4	4.4		4.4		4.1	13.5			4.4	
Actuated g/C Ratio		0.16	0.16		0.16		0.15	0.48			0.16	
Clearance Time (s)		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	
Lane Grp Cap (vph)		224	242		247		260	857			238	
v/s Ratio Prot							c0.08	0.07				
v/s Ratio Perm		c0.05	0.01		0.02						c0.05	
v/c Ratio		0.32	0.04		0.14		0.51	0.14			0.32	
Uniform Delay, d1		10.4	10.0		10.1		11.0	4.0			10.4	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		0.8	0.1		0.3		1.7	0.1			0.8	
Delay (s)		11.2	10.0		10.4		12.7	4.1			11.2	
Level of Service		B	B		B		B	A			B	
Approach Delay (s)		10.7			10.4			8.3			11.2	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM 2000 Control Delay	9.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	27.9	Sum of lost time (s)	15.0
Intersection Capacity Utilization	42.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Queens Lane & Auahi St

4/29/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	25	167	19	19	40	190	135	26	35	59	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0		5.0	5.0			5.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Frpb, ped/bikes		1.00	0.94		0.97		1.00	0.98			0.98	
Flpb, ped/bikes		0.97	1.00		0.99		1.00	1.00			0.99	
Frt		1.00	0.85		0.93		1.00	0.98			0.95	
Flt Protected		0.96	1.00		0.99		0.95	1.00			0.99	
Satd. Flow (prot)		1747	1482		1644		1770	1789			1689	
Flt Permitted		0.73	1.00		0.89		0.95	1.00			0.87	
Satd. Flow (perm)		1320	1482		1477		1770	1789			1488	
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)	77	26	172	20	20	41	196	139	27	36	61	58
RTOR Reduction (vph)	0	0	138	0	33	0	0	13	0	0	40	0
Lane Group Flow (vph)	0	103	34	0	48	0	196	153	0	0	115	0
Confl. Peds. (#/hr)	35		77	77		35			66	66		62
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8						6		
Actuated Green, G (s)		7.2	7.2		7.2		7.5	19.6			7.1	
Effective Green, g (s)		7.2	7.2		7.2		7.5	19.6			7.1	
Actuated g/C Ratio		0.20	0.20		0.20		0.20	0.53			0.19	
Clearance Time (s)		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	
Lane Grp Cap (vph)		258	289		288		360	952			287	
v/s Ratio Prot							c0.11	0.09				
v/s Ratio Perm		c0.08	0.02		0.03						c0.08	
v/c Ratio		0.40	0.12		0.17		0.54	0.16			0.40	
Uniform Delay, d1		12.9	12.2		12.3		13.1	4.4			13.0	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		1.0	0.2		0.3		1.7	0.1			0.9	
Delay (s)		13.9	12.4		12.6		14.8	4.5			13.9	
Level of Service		B	B		B		B	A			B	
Approach Delay (s)		12.9			12.6			10.1			13.9	
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	0.45		
Actuated Cycle Length (s)	36.8	Sum of lost time (s)	15.0
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	22	1837	2158	187	72	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.91	0.91		0.97	1.00
Frpb, ped/bikes	1.00	1.00	0.99		1.00	0.85
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	5085	4996		3433	1345
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	5085	4996		3433	1345
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	1997	2346	203	78	21
RTOR Reduction (vph)	0	0	5	0	0	20
Lane Group Flow (vph)	24	1997	2544	0	78	1
Confl. Peds. (#/hr)				45		63
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	3.7	102.1	93.4		7.5	7.5
Effective Green, g (s)	3.7	102.1	93.4		7.5	7.5
Actuated g/C Ratio	0.03	0.85	0.78		0.06	0.06
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)	54	4340	3901		215	84
v/s Ratio Prot	0.01	c0.39	c0.51		c0.02	
v/s Ratio Perm						0.00
v/c Ratio	0.44	0.46	0.65		0.36	0.02
Uniform Delay, d1	56.9	2.1	5.8		53.8	52.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	5.7	0.1	0.4		1.0	0.1
Delay (s)	62.7	2.2	6.2		54.8	52.7
Level of Service	E	A	A		D	D
Approach Delay (s)		2.9	6.2		54.3	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay	5.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	119.6	Sum of lost time (s)	15.0
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	36	2534	1949	338	278	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.91	0.91		0.97	1.00
Frpb, ped/bikes	1.00	1.00	0.99		1.00	0.80
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	5085	4932		3433	1271
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	5085	4932		3433	1271
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	38	2667	2052	356	293	47
RTOR Reduction (vph)	0	0	15	0	0	41
Lane Group Flow (vph)	38	2667	2393	0	293	6
Confl. Peds. (#/hr)				31		80
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	6.3	99.7	88.4		16.2	16.2
Effective Green, g (s)	6.3	99.7	88.4		16.2	16.2
Actuated g/C Ratio	0.05	0.79	0.70		0.13	0.13
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)	88	4026	3462		441	163
v/s Ratio Prot	0.02	c0.52	c0.49		c0.09	
v/s Ratio Perm						0.00
v/c Ratio	0.43	0.66	0.69		0.66	0.04
Uniform Delay, d1	58.1	5.7	10.8		52.3	48.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.4	0.4	0.6		3.8	0.1
Delay (s)	61.4	6.2	11.5		56.0	48.1
Level of Service	E	A	B		E	D
Approach Delay (s)		6.9	11.5		54.9	
Approach LOS		A	B		D	

Intersection Summary			
HCM 2000 Control Delay	11.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	125.9	Sum of lost time (s)	15.0
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX F

CAPACITY ANALYSIS CALCULATIONS
PROJECTED YEAR 2018 PEAK HOUR TRAFFIC
ANALYSIS WITH PROJECT

HCM Signalized Intersection Capacity Analysis
1: Cooke St & Halekauwila St

5/2/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	61	83	41	104	150	58	17	228	37	36	242	117
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	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.99			0.99			0.99			0.98	
Flpb, ped/bikes		0.99			1.00			1.00			1.00	
Frt		0.97			0.98			0.98			0.96	
Flt Protected		0.98			0.98			1.00			1.00	
Satd. Flow (prot)		1749			1769			3431			3287	
Flt Permitted		0.80			0.82			0.91			0.89	
Satd. Flow (perm)		1416			1468			3134			2955	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	68	92	46	116	167	64	19	253	41	40	269	130
RTOR Reduction (vph)	0	15	0	0	11	0	0	15	0	0	55	0
Lane Group Flow (vph)	0	191	0	0	336	0	0	298	0	0	384	0
Confl. Peds. (#/hr)	50		48	27		29	48		27	29		50
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)		14.1			14.1			10.8			10.8	
Effective Green, g (s)		14.1			14.1			10.8			10.8	
Actuated g/C Ratio		0.40			0.40			0.31			0.31	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		572			593			969			914	
v/s Ratio Prot												
v/s Ratio Perm		0.13			c0.23			0.10			c0.13	
v/c Ratio		0.33			0.57			0.31			0.42	
Uniform Delay, d1		7.2			8.0			9.2			9.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.3			1.2			0.2			0.3	
Delay (s)		7.5			9.3			9.4			9.9	
Level of Service		A			A			A			A	
Approach Delay (s)		7.5			9.3			9.4			9.9	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	34.9	Sum of lost time (s)	10.0
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1: Cooke St & Halekauwila St

5/2/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	135	206	47	70	124	89	26	405	99	75	384	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		1.00			0.99			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			0.96			0.97			0.98	
Flt Protected		0.98			0.99			1.00			0.99	
Satd. Flow (prot)		1784			1743			3394			3428	
Flt Permitted		0.80			0.84			0.91			0.80	
Satd. Flow (perm)		1454			1490			3095			2763	
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)	142	217	49	74	131	94	27	426	104	79	404	61
RTOR Reduction (vph)	0	12	0	0	39	0	0	50	0	0	25	0
Lane Group Flow (vph)	0	396	0	0	260	0	0	507	0	0	519	0
Confl. Peds. (#/hr)	32		42	31		21	42		31	21		32
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		13.6			13.6			12.2			12.2	
Effective Green, g (s)		13.6			13.6			12.2			12.2	
Actuated g/C Ratio		0.38			0.38			0.34			0.34	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		552			566			1054			941	
v/s Ratio Prot												
v/s Ratio Perm		c0.27			0.17			0.16			c0.19	
v/c Ratio		0.72			0.46			0.48			0.55	
Uniform Delay, d1		9.5			8.3			9.3			9.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		4.4			0.6			0.3			0.7	
Delay (s)		13.9			8.9			9.7			10.3	
Level of Service		B			A			A			B	
Approach Delay (s)		13.9			8.9			9.7			10.3	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	35.8	Sum of lost time (s)	10.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: Pohukaina St & Cooke St

4/30/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	79	76	12	38	190	41	14	169	26	28	183	189
Peak Hour 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
Hourly flow rate (vph)	87	84	13	42	209	45	15	186	29	31	201	208

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	184	296	108	121	131	308
Volume Left (vph)	87	42	15	0	31	0
Volume Right (vph)	13	45	0	29	0	208
Hadj (s)	0.09	-0.03	0.11	-0.13	0.15	-0.44
Departure Headway (s)	6.4	6.0	6.9	6.6	6.6	6.0
Degree Utilization, x	0.33	0.50	0.21	0.22	0.24	0.51
Capacity (veh/h)	507	556	470	494	514	560
Control Delay (s)	12.5	14.8	10.5	10.3	10.5	14.0
Approach Delay (s)	12.5	14.8	10.4		12.9	
Approach LOS	B	B	B		B	

Intersection Summary			
Delay	12.9		
Level of Service	B		
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	181	162	25	48	109	58	18	272	25	33	352	117
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	191	171	26	51	115	61	19	286	26	35	371	123

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	387	226	162	169	220	308
Volume Left (vph)	191	51	19	0	35	0
Volume Right (vph)	26	61	0	26	0	123
Hadj (s)	0.09	-0.08	0.09	-0.07	0.11	-0.25
Departure Headway (s)	7.2	7.6	8.1	7.9	7.8	7.4
Degree Utilization, x	0.77	0.47	0.36	0.37	0.47	0.63
Capacity (veh/h)	482	430	410	415	446	465
Control Delay (s)	30.4	17.2	14.5	14.4	16.4	21.1
Approach Delay (s)	30.4	17.2	14.4		19.1	
Approach LOS	D	C	B		C	

Intersection Summary			
Delay	20.7		
Level of Service	C		
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	15		

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

5/2/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	73	145	60	102	256	52	80	547	132	52	976	214
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	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	0.98	1.00		0.99	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	0.97		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1741	1766		1746	1803		1770	3539	1556	1770	3430	
Flt Permitted	0.36	1.00		0.55	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	653	1766		1004	1803		1770	3539	1556	1770	3430	
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)	74	148	61	104	261	53	82	558	135	53	996	218
RTOR Reduction (vph)	0	17	0	0	8	0	0	0	67	0	20	0
Lane Group Flow (vph)	74	192	0	104	306	0	82	558	68	53	1194	0
Confl. Peds. (#/hr)	32		20	20		32			6			2
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			
Actuated Green, G (s)	18.2	18.2		18.2	18.2		6.2	37.3	37.3	3.6	34.7	
Effective Green, g (s)	18.2	18.2		18.2	18.2		6.2	37.3	37.3	3.6	34.7	
Actuated g/C Ratio	0.25	0.25		0.25	0.25		0.08	0.50	0.50	0.05	0.47	
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)	160	433		246	442		148	1781	783	85	1606	
v/s Ratio Prot		0.11			c0.17		c0.05	c0.16		0.03	c0.35	
v/s Ratio Perm	0.11			0.10					0.04			
v/c Ratio	0.46	0.44		0.42	0.69		0.55	0.31	0.09	0.62	0.74	
Uniform Delay, d1	23.8	23.7		23.5	25.4		32.6	10.8	9.6	34.6	16.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.1	0.7		1.2	4.6		4.4	0.1	0.0	13.4	1.9	
Delay (s)	25.9	24.4		24.7	30.0		37.1	11.0	9.6	48.0	18.0	
Level of Service	C	C		C	C		D	B	A	D	B	
Approach Delay (s)		24.8			28.7			13.5			19.2	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	74.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	78.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

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

5/2/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	154	398	149	191	300	97	81	966	202	125	1014	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	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.98		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	0.98	1.00		0.99	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	0.96		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1726	1764		1752	1765		1770	3539	1545	1770	3471	
Flt Permitted	0.39	1.00		0.24	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	700	1764		436	1765		1770	3539	1545	1770	3471	
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)	159	410	154	197	309	100	84	996	208	129	1045	114
RTOR Reduction (vph)	0	15	0	0	13	0	0	0	142	0	9	0
Lane Group Flow (vph)	159	549	0	197	396	0	84	996	66	129	1150	0
Confl. Peds. (#/hr)	49		31	31		49			11			15
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			
Actuated Green, G (s)	39.0	39.0		39.0	39.0		5.6	28.8	28.8	8.0	31.2	
Effective Green, g (s)	39.0	39.0		39.0	39.0		5.6	28.8	28.8	8.0	31.2	
Actuated g/C Ratio	0.43	0.43		0.43	0.43		0.06	0.32	0.32	0.09	0.34	
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)	300	757		187	758		109	1122	490	155	1192	
v/s Ratio Prot		0.31			0.22		0.05	0.28		c0.07	c0.33	
v/s Ratio Perm	0.23			c0.45					0.04			
v/c Ratio	0.53	0.72		1.05	0.52		0.77	0.89	0.13	0.83	0.96	
Uniform Delay, d1	19.1	21.5		25.9	19.0		42.0	29.5	22.1	40.7	29.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.8	3.5		80.6	0.7		27.9	8.7	0.1	30.0	18.1	
Delay (s)	20.9	24.9		106.5	19.7		69.8	38.2	22.2	70.8	47.3	
Level of Service	C	C		F	B		E	D	C	E	D	
Approach Delay (s)		24.0			47.9			37.7			49.7	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	40.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	90.8	Sum of lost time (s)	15.0
Intersection Capacity Utilization	94.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

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

5/2/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	237	19	92	0	0	0	86	507	0	18	670	390
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	1.00	
Flpb, ped/bikes		1.00					1.00	1.00		1.00	1.00	
Frt		0.96					1.00	1.00		1.00	0.94	
Flt Protected		0.97					0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1721					1770	3539		1770	3344	
Flt Permitted		0.97					0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1721					1770	3539		1770	3344	
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)	239	19	93	0	0	0	87	512	0	18	677	394
RTOR Reduction (vph)	0	15	0	0	0	0	0	0	0	0	90	0
Lane Group Flow (vph)	0	336	0	0	0	0	87	512	0	18	981	0
Confl. Peds. (#/hr)			22						1	1		
Turn Type	Split	NA					Prot	NA		Prot	NA	
Protected Phases	4	4					5	2		1	6	
Permitted Phases												
Actuated Green, G (s)		19.4					6.6	36.2		1.3	30.9	
Effective Green, g (s)		19.4					6.6	36.2		1.3	30.9	
Actuated g/C Ratio		0.27					0.09	0.50		0.02	0.43	
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)		464					162	1781		32	1437	
v/s Ratio Prot		c0.20					c0.05	0.14		0.01	c0.29	
v/s Ratio Perm												
v/c Ratio		0.72					0.54	0.29		0.56	0.68	
Uniform Delay, d1		23.8					31.2	10.4		35.0	16.5	
Progression Factor		1.00					1.00	1.00		1.00	1.00	
Incremental Delay, d2		5.5					3.4	0.1		20.7	1.4	
Delay (s)		29.3					34.6	10.5		55.7	17.9	
Level of Service		C					C	B		E	B	
Approach Delay (s)		29.3			0.0			14.0			18.5	
Approach LOS		C			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	71.9	Sum of lost time (s)	15.0
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	452	22	144	0	0	0	122	767	11	23	836	381
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		0.98					1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00					1.00	1.00		1.00	1.00	
Frt		0.97					1.00	1.00		1.00	0.95	
Flt Protected		0.96					0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1705					1770	3530		1770	3373	
Flt Permitted		0.96					0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1705					1770	3530		1770	3373	
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)	466	23	148	0	0	0	126	791	11	24	862	393
RTOR Reduction (vph)	0	13	0	0	0	0	0	1	0	0	56	0
Lane Group Flow (vph)	0	624	0	0	0	0	126	801	0	24	1199	0
Confl. Peds. (#/hr)			61						7			
Turn Type	Split	NA					Prot	NA		Prot	NA	
Protected Phases	4	4					5	2		1	6	
Permitted Phases												
Actuated Green, G (s)		34.5					8.0	39.2		1.9	33.1	
Effective Green, g (s)		34.5					8.0	39.2		1.9	33.1	
Actuated g/C Ratio		0.38					0.09	0.43		0.02	0.37	
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)		649					156	1527		37	1232	
v/s Ratio Prot		c0.37					c0.07	0.23		0.01	c0.36	
v/s Ratio Perm												
v/c Ratio		0.96					0.81	0.52		0.65	0.97	
Uniform Delay, d1		27.4					40.5	18.9		44.0	28.3	
Progression Factor		1.00					1.00	1.00		1.00	1.00	
Incremental Delay, d2		25.9					25.5	0.3		33.0	19.4	
Delay (s)		53.3					66.0	19.2		77.0	47.7	
Level of Service		D					E	B		E	D	
Approach Delay (s)		53.3			0.0			25.5			48.3	
Approach LOS		D			A			C			D	

Intersection Summary			
HCM 2000 Control Delay	42.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	90.6	Sum of lost time (s)	15.0
Intersection Capacity Utilization	90.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

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

4/30/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	71	30	90	110	113	58	349	76	129	470	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		5.0	5.0	
Lane Util. Factor		0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes		1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt		0.97		1.00	0.92		1.00	0.97		1.00	0.98	
Flt Protected		0.99		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3359		1757	1702		1747	3434		1764	3461	
Flt Permitted		0.86		0.66	1.00		0.43	1.00		0.48	1.00	
Satd. Flow (perm)		2912		1224	1702		791	3434		894	3461	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	30	79	33	100	122	126	64	388	84	143	522	66
RTOR Reduction (vph)	0	24	0	0	76	0	0	30	0	0	16	0
Lane Group Flow (vph)	0	118	0	100	172	0	64	442	0	143	572	0
Confl. Peds. (#/hr)	22		19	19		22	36		11	11		36
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)		10.2		10.2	10.2		15.6	15.6		15.6	15.6	
Effective Green, g (s)		10.2		10.2	10.2		15.6	15.6		15.6	15.6	
Actuated g/C Ratio		0.28		0.28	0.28		0.44	0.44		0.44	0.44	
Clearance Time (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		829		348	484		344	1496		389	1508	
v/s Ratio Prot					c0.10			0.13			c0.17	
v/s Ratio Perm		0.04		0.08			0.08			0.16		
v/c Ratio		0.14		0.29	0.36		0.19	0.30		0.37	0.38	
Uniform Delay, d1		9.5		10.0	10.2		6.2	6.5		6.8	6.8	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1		0.5	0.5		0.3	0.1		0.6	0.2	
Delay (s)		9.6		10.4	10.6		6.5	6.7		7.4	7.0	
Level of Service		A		B	B		A	A		A	A	
Approach Delay (s)		9.6			10.6			6.6			7.1	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	35.8	Sum of lost time (s)	10.0
Intersection Capacity Utilization	57.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

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

5/2/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	51	130	10	100	90	275	33	524	151	277	440	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor		0.95		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	0.97		1.00	0.99		1.00	0.99	
Flpb, ped/bikes		1.00		0.98	1.00		0.98	1.00		0.99	1.00	
Frt		0.99		1.00	0.89		1.00	0.97		1.00	0.98	
Flt Protected		0.99		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3449		1741	1609		1732	3399		1759	3463	
Flt Permitted		0.68		0.63	1.00		0.46	1.00		0.37	1.00	
Satd. Flow (perm)		2388		1150	1609		846	3399		679	3463	
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)	53	135	10	104	94	286	34	546	157	289	458	52
RTOR Reduction (vph)	0	4	0	0	123	0	0	33	0	0	11	0
Lane Group Flow (vph)	0	194	0	104	257	0	34	670	0	289	499	0
Confl. Peds. (#/hr)	32		29	29		32	32		19	19		32
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)		15.2		15.2	15.2		33.5	33.5		33.5	33.5	
Effective Green, g (s)		15.2		15.2	15.2		33.5	33.5		33.5	33.5	
Actuated g/C Ratio		0.26		0.26	0.26		0.57	0.57		0.57	0.57	
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)		618		297	416		482	1939		387	1976	
v/s Ratio Prot					c0.16			0.20			0.14	
v/s Ratio Perm		0.08		0.09			0.04			c0.43		
v/c Ratio		0.31		0.35	0.62		0.07	0.35		0.75	0.25	
Uniform Delay, d1		17.5		17.7	19.2		5.6	6.7		9.4	6.3	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3		0.7	2.7		0.1	0.1		7.7	0.1	
Delay (s)		17.8		18.4	21.9		5.7	6.8		17.1	6.4	
Level of Service		B		B	C		A	A		B	A	
Approach Delay (s)		17.8			21.2			6.8			10.3	
Approach LOS		B			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	12.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	58.7	Sum of lost time (s)	10.0
Intersection Capacity Utilization	90.0%	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												
Volume (vph)	278	1784	2	53	1924	202	1	15	3	170	100	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	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	0.93	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	0.90	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	5084		1770	5085	1539		3529	1469	1610	2993	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	5084		1770	5085	1539		3529	1469	1610	2993	
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)	290	1858	2	55	2004	210	1	16	3	177	104	235
RTOR Reduction (vph)	0	0	0	0	0	73	0	0	0	0	202	0
Lane Group Flow (vph)	290	1860	0	55	2004	137	0	17	3	159	155	0
Confl. Peds. (#/hr)			20			10			48			11
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8			2			
Actuated Green, G (s)	20.4	66.1		5.5	51.2	51.2		6.7	6.7	16.3	16.3	
Effective Green, g (s)	20.4	66.1		5.5	51.2	51.2		6.7	6.7	16.3	16.3	
Actuated g/C Ratio	0.18	0.58		0.05	0.45	0.45		0.06	0.06	0.14	0.14	
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)	315	2932		84	2271	687		206	85	228	425	
v/s Ratio Prot	c0.16	0.37		0.03	c0.39			c0.00		c0.10	0.05	
v/s Ratio Perm						0.09			0.00			
v/c Ratio	0.92	0.63		0.65	0.88	0.20		0.08	0.04	0.70	0.37	
Uniform Delay, d1	46.3	16.2		53.6	29.0	19.3		51.0	50.9	46.8	44.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	31.0	0.5		16.9	4.4	0.1		0.2	0.2	8.9	0.5	
Delay (s)	77.3	16.6		70.5	33.4	19.4		51.2	51.1	55.7	45.0	
Level of Service	E	B		E	C	B		D	D	E	D	
Approach Delay (s)		24.8			33.0			51.2			48.3	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	31.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	114.6	Sum of lost time (s)	20.0
Intersection Capacity Utilization	83.7%	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												
Volume (vph)	372	2649	6	30	2223	313	11	129	59	338	53	271
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	0.95		1.00	0.92	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	0.92	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	0.98	
Satd. Flow (prot)	1770	5083		1770	5085	1507		3526	1457	1610	2979	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		1.00	1.00	0.95	0.98	
Satd. Flow (perm)	1770	5083		1770	5085	1507		3526	1457	1610	2979	
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)	388	2759	6	31	2316	326	11	134	61	352	55	282
RTOR Reduction (vph)	0	0	0	0	0	97	0	0	0	0	148	0
Lane Group Flow (vph)	388	2765	0	31	2316	229	0	145	61	176	365	0
Confl. Peds. (#/hr)			5			19			46			21
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	Perm	Split	NA	
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8			2			
Actuated Green, G (s)	23.1	77.0		4.5	58.4	58.4		13.3	13.3	20.9	20.9	
Effective Green, g (s)	23.1	77.0		4.5	58.4	58.4		13.3	13.3	20.9	20.9	
Actuated g/C Ratio	0.17	0.57		0.03	0.43	0.43		0.10	0.10	0.15	0.15	
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)	301	2884		58	2188	648		345	142	247	458	
v/s Ratio Prot	c0.22	0.54		0.02	c0.46			0.04		0.11	c0.12	
v/s Ratio Perm						0.15			c0.04			
v/c Ratio	1.29	0.96		0.53	1.06	0.35		0.42	0.43	0.71	0.80	
Uniform Delay, d1	56.3	27.8		64.6	38.6	26.0		57.6	57.6	54.5	55.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	152.8	9.0		9.1	36.9	0.3		0.8	2.1	9.3	9.3	
Delay (s)	209.1	36.8		73.7	75.6	26.3		58.4	59.7	63.9	64.7	
Level of Service	F	D		E	E	C		E	E	E	E	
Approach Delay (s)		58.0			69.6			58.8			64.5	
Approach LOS		E			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	63.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	135.7	Sum of lost time (s)	20.0
Intersection Capacity Utilization	115.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

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

5/2/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	82	179	45	275	205	16	48	213	119	26	291	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	
Lane Util. Factor		0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes		1.00		1.00	1.00			1.00			0.99	
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)		3401		1770	3493			3334			3374	
Flt Permitted		0.99		0.95	1.00			0.81			0.90	
Satd. Flow (perm)		3401		1770	3493			2732			3060	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	93	203	51	312	233	18	55	242	135	30	331	124
RTOR Reduction (vph)	0	16	0	0	6	0	0	62	0	0	39	0
Lane Group Flow (vph)	0	331	0	312	245	0	0	370	0	0	446	0
Confl. Peds. (#/hr)	19		18			19	10		4	4		10
Turn Type	Split	NA		Split	NA		Perm	NA		Perm	NA	
Protected Phases	4	4		8	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)		11.9		17.4	17.4			15.2			15.2	
Effective Green, g (s)		11.9		17.4	17.4			15.2			15.2	
Actuated g/C Ratio		0.20		0.29	0.29			0.26			0.26	
Clearance Time (s)		5.0		5.0	5.0			5.0			5.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		680		517	1021			697			781	
v/s Ratio Prot		c0.10		c0.18	0.07							
v/s Ratio Perm								0.14			c0.15	
v/c Ratio		0.49		0.60	0.24			0.53			0.57	
Uniform Delay, d1		21.1		18.1	16.0			19.1			19.3	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.6		2.0	0.1			0.8			1.0	
Delay (s)		21.6		20.1	16.1			19.9			20.3	
Level of Service		C		C	B			B			C	
Approach Delay (s)		21.6			18.3			19.9			20.3	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	19.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	59.5	Sum of lost time (s)	15.0
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

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

5/2/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	470	110	351	354	38	59	255	144	46	287	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor		0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes		0.99		1.00	1.00			0.99			0.99	
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)		3390		1770	3471			3317			3383	
Flt Permitted		0.99		0.95	1.00			0.77			0.79	
Satd. Flow (perm)		3390		1770	3471			2558			2693	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	184	495	116	369	373	40	62	268	152	48	302	94
RTOR Reduction (vph)	0	15	0	0	9	0	0	62	0	0	28	0
Lane Group Flow (vph)	0	780	0	369	404	0	0	420	0	0	416	0
Confl. Peds. (#/hr)	30		42			30	17		14	14		17
Turn Type	Split	NA		Split	NA		Perm	NA		Perm	NA	
Protected Phases	4	4		8	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)		22.6		21.5	21.5			17.9			17.9	
Effective Green, g (s)		22.6		21.5	21.5			17.9			17.9	
Actuated g/C Ratio		0.29		0.28	0.28			0.23			0.23	
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)		994		494	969			594			626	
v/s Ratio Prot		c0.23		c0.21	0.12							
v/s Ratio Perm								c0.16			0.15	
v/c Ratio		0.78		0.75	0.42			0.71			0.66	
Uniform Delay, d1		25.0		25.3	22.6			27.1			26.8	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		4.1		6.1	0.3			3.8			2.7	
Delay (s)		29.1		31.4	22.9			31.0			29.5	
Level of Service		C		C	C			C			C	
Approach Delay (s)		29.1			26.9			31.0			29.5	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	28.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	87.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	171	80	59	217	489	125
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	186	87	64	236	532	136
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				316	242	
pX, platoon unblocked						
vC, conflicting volume	846	245	667			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	846	245	667			
tC, single (s)	*5.8	*5.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	48	89	93			
cM capacity (veh/h)	358	811	918			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	273	143	157	213	213	242
Volume Left	186	64	0	0	0	0
Volume Right	87	0	0	0	0	136
cSH	435	918	1700	1700	1700	1700
Volume to Capacity	0.63	0.07	0.09	0.13	0.13	0.14
Queue Length 95th (ft)	104	6	0	0	0	0
Control Delay (s)	26.1	4.5	0.0	0.0	0.0	0.0
Lane LOS	D	A				
Approach Delay (s)	26.1	2.1		0.0		
Approach LOS	D					

Intersection Summary			
Average Delay	6.3		
Intersection Capacity Utilization	44.3%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	71	33	80	482	603	170
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	77	36	87	524	655	185
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				256	301	
pX, platoon unblocked	0.99					
vC, conflicting volume	1184	311	840			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1164	311	840			
tC, single (s)	*5.8	*5.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	67	95	89			
cM capacity (veh/h)	231	749	791			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	113	262	349	262	262	316
Volume Left	77	87	0	0	0	0
Volume Right	36	0	0	0	0	185
cSH	296	791	1700	1700	1700	1700
Volume to Capacity	0.38	0.11	0.21	0.15	0.15	0.19
Queue Length 95th (ft)	43	9	0	0	0	0
Control Delay (s)	24.5	4.2	0.0	0.0	0.0	0.0
Lane LOS	C	A				
Approach Delay (s)	24.5	1.8		0.0		
Approach LOS	C					

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	53	97	74	31	106	70	37	153	28	71	292	164
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	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		0.99	1.00	1.00
Frt	1.00	0.93		1.00	0.94		1.00	0.98		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	3271		1770	3299		1758	3444		1757	1863	1549
Flt Permitted	0.95	1.00		0.95	1.00		0.57	1.00		0.64	1.00	1.00
Satd. Flow (perm)	1770	3271		1770	3299		1062	3444		1174	1863	1549
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)	54	99	76	32	108	71	38	156	29	72	298	167
RTOR Reduction (vph)	0	58	0	0	56	0	0	17	0	0	0	104
Lane Group Flow (vph)	54	117	0	32	123	0	38	168	0	72	298	63
Confl. Peds. (#/hr)			20			24	17		17	17		17
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)	2.3	9.9		0.9	8.5		15.5	15.5		15.5	15.5	15.5
Effective Green, g (s)	2.3	9.9		0.9	8.5		15.5	15.5		15.5	15.5	15.5
Actuated g/C Ratio	0.06	0.24		0.02	0.21		0.38	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	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)	98	784		38	678		398	1292		440	699	581
v/s Ratio Prot	c0.03	0.04		0.02	c0.04			0.05			c0.16	
v/s Ratio Perm							0.04			0.06		0.04
v/c Ratio	0.55	0.15		0.84	0.18		0.10	0.13		0.16	0.43	0.11
Uniform Delay, d1	19.0	12.4		20.1	13.5		8.4	8.5		8.6	9.6	8.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.6	0.1		85.4	0.1		0.1	0.0		0.2	0.4	0.1
Delay (s)	25.5	12.5		105.5	13.7		8.5	8.5		8.8	10.0	8.5
Level of Service	C	B		F	B		A	A		A	B	A
Approach Delay (s)		15.6			27.6			8.5			9.4	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	13.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	41.3	Sum of lost time (s)	15.0
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

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

5/2/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	130	274	73	52	228	175	85	219	60	129	305	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	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	0.97		1.00	0.97		1.00	1.00	0.90
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.95	1.00		0.92	1.00	1.00
Frt	1.00	0.97		1.00	0.93		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	3358		1770	3210		1674	3326		1622	1863	1428
Flt Permitted	0.95	1.00		0.95	1.00		0.48	1.00		0.58	1.00	1.00
Satd. Flow (perm)	1770	3358		1770	3210		854	3326		988	1863	1428
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)	131	277	74	53	230	177	86	221	61	130	308	152
RTOR Reduction (vph)	0	29	0	0	131	0	0	30	0	0	0	105
Lane Group Flow (vph)	131	322	0	53	276	0	86	252	0	130	308	47
Confl. Peds. (#/hr)			92			103	118		173	173		118
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)	7.7	17.3		3.9	13.5		16.1	16.1		16.1	16.1	16.1
Effective Green, g (s)	7.7	17.3		3.9	13.5		16.1	16.1		16.1	16.1	16.1
Actuated g/C Ratio	0.15	0.33		0.07	0.26		0.31	0.31		0.31	0.31	0.31
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)	260	1110		131	828		262	1023		304	573	439
v/s Ratio Prot	c0.07	c0.10		0.03	0.09			0.08			c0.17	
v/s Ratio Perm							0.10			0.13		0.03
v/c Ratio	0.50	0.29		0.40	0.33		0.33	0.25		0.43	0.54	0.11
Uniform Delay, d1	20.5	13.0		23.1	15.7		13.9	13.6		14.4	15.0	13.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.5	0.1		2.0	0.2		0.7	0.1		1.0	1.0	0.1
Delay (s)	22.1	13.1		25.1	16.0		14.7	13.7		15.4	16.0	13.1
Level of Service	C	B		C	B		B	B		B	B	B
Approach Delay (s)		15.5			17.0			13.9			15.1	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	52.3	Sum of lost time (s)	15.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	87	1782	152	6	2038	56	98	41	15	122	56	228
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0			5.0	5.0
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			0.97	1.00
Frt	1.00	0.99		1.00	1.00		1.00	0.96			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	5004		1770	5049		1770	1761			1745	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.44	1.00			0.76	1.00
Satd. Flow (perm)	1770	5004		1770	5049		814	1761			1367	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	95	1937	165	7	2215	61	107	45	16	133	61	248
RTOR Reduction (vph)	0	5	0	0	2	0	0	10	0	0	0	107
Lane Group Flow (vph)	95	2097	0	7	2274	0	107	51	0	0	194	141
Confl. Peds. (#/hr)			15			47			21	21		
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)	11.5	85.5		1.2	75.2		23.3	23.3			23.3	23.3
Effective Green, g (s)	11.5	85.5		1.2	75.2		23.3	23.3			23.3	23.3
Actuated g/C Ratio	0.09	0.68		0.01	0.60		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
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	162	3422		16	3037		151	328			254	295
v/s Ratio Prot	c0.05	c0.42		0.00	c0.45			0.03				
v/s Ratio Perm							0.13				c0.14	0.09
v/c Ratio	0.59	0.61		0.44	0.75		0.71	0.16			0.76	0.48
Uniform Delay, d1	54.5	10.7		61.6	18.1		47.7	42.6			48.2	45.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	5.3	0.3		18.0	1.0		14.1	0.2			12.8	1.2
Delay (s)	59.8	11.1		79.5	19.1		61.8	42.8			61.0	46.6
Level of Service	E	B		E	B		E	D			E	D
Approach Delay (s)		13.2			19.3			54.9			52.9	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	20.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	76.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	170	2542	314	37	1689	111	123	56	55	71	105	227
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	0.98		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			0.96	1.00
Frt	1.00	0.98		1.00	0.99		1.00	0.93			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	1.00
Satd. Flow (prot)	1770	4895		1770	4971		1770	1602			1749	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.44	1.00			0.73	1.00
Satd. Flow (perm)	1770	4895		1770	4971		819	1602			1301	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)	175	2621	324	38	1741	114	127	58	57	73	108	234
RTOR Reduction (vph)	0	10	0	0	5	0	0	26	0	0	0	185
Lane Group Flow (vph)	175	2935	0	38	1850	0	127	89	0	0	181	49
Confl. Peds. (#/hr)			70			85			54	54		
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)	17.6	88.6		5.4	76.4		22.7	22.7			22.7	22.7
Effective Green, g (s)	17.6	88.6		5.4	76.4		22.7	22.7			22.7	22.7
Actuated g/C Ratio	0.13	0.67		0.04	0.58		0.17	0.17			0.17	0.17
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)	236	3293		72	2883		141	276			224	272
v/s Ratio Prot	c0.10	c0.60		0.02	0.37			0.06				
v/s Ratio Perm							c0.16				0.14	0.03
v/c Ratio	0.74	0.89		0.53	0.64		0.90	0.32			0.81	0.18
Uniform Delay, d1	54.9	17.6		61.9	18.5		53.4	47.7			52.4	46.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	11.8	3.5		6.8	0.5		47.3	0.7			18.9	0.3
Delay (s)	66.7	21.1		68.7	19.0		100.7	48.4			71.3	46.9
Level of Service	E	C		E	B		F	D			E	D
Approach Delay (s)		23.6			20.0			75.8			57.5	
Approach LOS		C			B			E			E	

Intersection Summary			
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	131.7	Sum of lost time (s)	15.0
Intersection Capacity Utilization	88.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	294	33	69	523	42	107
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)	327	37	77	581	47	119
Pedestrians	15				15	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	1				1	
Right turn flare (veh)						
Median type	TWLTL			None		
Median storage veh)	2					
Upstream signal (ft)	452					
pX, platoon unblocked						
vC, conflicting volume			378		819	197
vC1, stage 1 conf vol					360	
vC2, stage 2 conf vol					459	
vCu, unblocked vol			378		819	197
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 %			93		92	86
cM capacity (veh/h)			1162		558	848

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	218	146	77	291	291	166
Volume Left	0	0	77	0	0	47
Volume Right	0	37	0	0	0	119
cSH	1700	1700	1162	1700	1700	740
Volume to Capacity	0.13	0.09	0.07	0.17	0.17	0.22
Queue Length 95th (ft)	0	0	5	0	0	21
Control Delay (s)	0.0	0.0	8.3	0.0	0.0	11.3
Lane LOS			A			B
Approach Delay (s)	0.0		1.0			11.3
Approach LOS						B

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	33.6%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	616	61	107	701	97	224
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	655	65	114	746	103	238
Pedestrians	42				42	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	4				4	
Right turn flare (veh)						
Median type	TWLTL			None		
Median storage veh)	2					
Upstream signal (ft)	452					
pX, platoon unblocked			0.91		0.91	0.91
vC, conflicting volume			762		1372	402
vC1, stage 1 conf vol					730	
vC2, stage 2 conf vol					643	
vCu, unblocked vol			545		1214	150
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 %			87		74	70
cM capacity (veh/h)			897		404	799

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	437	283	114	373	373	341
Volume Left	0	0	114	0	0	103
Volume Right	0	65	0	0	0	238
cSH	1700	1700	897	1700	1700	617
Volume to Capacity	0.26	0.17	0.13	0.22	0.22	0.55
Queue Length 95th (ft)	0	0	11	0	0	85
Control Delay (s)	0.0	0.0	9.6	0.0	0.0	17.8
Lane LOS			A			C
Approach Delay (s)	0.0		1.3			17.8
Approach LOS						C

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		

* User Entered Value

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	44	19	54	10	17	25	119	91	33	26	37	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0		5.0	5.0			5.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Frpb, ped/bikes		1.00	0.97		0.98		1.00	0.99			0.99	
Flpb, ped/bikes		0.99	1.00		1.00		1.00	1.00			1.00	
Frt		1.00	0.85		0.93		1.00	0.96			0.95	
Flt Protected		0.97	1.00		0.99		0.95	1.00			0.99	
Satd. Flow (prot)		1787	1536		1693		1770	1772			1730	
Flt Permitted		0.76	1.00		0.92		0.95	1.00			0.86	
Satd. Flow (perm)		1399	1536		1565		1770	1772			1513	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	50	22	61	11	19	28	135	103	38	30	42	41
RTOR Reduction (vph)	0	0	52	0	24	0	0	18	0	0	35	0
Lane Group Flow (vph)	0	72	9	0	34	0	135	123	0	0	78	0
Confl. Peds. (#/hr)	12		31	31		12			13	13		15
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8						6		
Actuated Green, G (s)		4.6	4.6		4.6		7.4	17.0			4.6	
Effective Green, g (s)		4.6	4.6		4.6		7.4	17.0			4.6	
Actuated g/C Ratio		0.15	0.15		0.15		0.23	0.54			0.15	
Clearance Time (s)		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	
Lane Grp Cap (vph)		203	223		227		414	953			220	
v/s Ratio Prot							c0.08	0.07				
v/s Ratio Perm		c0.05	0.01		0.02						c0.05	
v/c Ratio		0.35	0.04		0.15		0.33	0.13			0.35	
Uniform Delay, d1		12.2	11.6		11.8		10.0	3.6			12.2	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		1.1	0.1		0.3		0.5	0.1			1.0	
Delay (s)		13.2	11.7		12.1		10.5	3.7			13.1	
Level of Service		B	B		B		B	A			B	
Approach Delay (s)		12.5			12.1			7.0			13.1	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	31.6	Sum of lost time (s)	15.0
Intersection Capacity Utilization	42.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	76	25	170	19	19	41	193	137	26	36	60	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0		5.0	5.0			5.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Frpb, ped/bikes		1.00	0.94		0.97		1.00	0.98			0.98	
Flpb, ped/bikes		0.97	1.00		0.99		1.00	1.00			0.99	
Frt		1.00	0.85		0.93		1.00	0.98			0.95	
Flt Protected		0.96	1.00		0.99		0.95	1.00			0.99	
Satd. Flow (prot)		1747	1482		1642		1770	1790			1689	
Flt Permitted		0.73	1.00		0.89		0.95	1.00			0.87	
Satd. Flow (perm)		1317	1482		1476		1770	1790			1485	
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)	78	26	175	20	20	42	199	141	27	37	62	59
RTOR Reduction (vph)	0	0	141	0	34	0	0	13	0	0	40	0
Lane Group Flow (vph)	0	104	34	0	48	0	199	155	0	0	118	0
Confl. Peds. (#/hr)	35		77	77		35			66	66		62
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8						6		
Actuated Green, G (s)		7.2	7.2		7.2		7.6	19.7			7.1	
Effective Green, g (s)		7.2	7.2		7.2		7.6	19.7			7.1	
Actuated g/C Ratio		0.20	0.20		0.20		0.21	0.53			0.19	
Clearance Time (s)		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	
Lane Grp Cap (vph)		256	289		288		364	955			285	
v/s Ratio Prot							c0.11	0.09				
v/s Ratio Perm		c0.08	0.02		0.03						c0.08	
v/c Ratio		0.41	0.12		0.17		0.55	0.16			0.42	
Uniform Delay, d1		13.0	12.2		12.4		13.1	4.4			13.1	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		1.1	0.2		0.3		1.7	0.1			1.0	
Delay (s)		14.0	12.4		12.6		14.8	4.5			14.1	
Level of Service		B	B		B		B	A			B	
Approach Delay (s)		13.0			12.6			10.1			14.1	
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	0.46		
Actuated Cycle Length (s)	36.9	Sum of lost time (s)	15.0
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	22	1915	2222	190	73	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.91	0.91		0.97	1.00
Frpb, ped/bikes	1.00	1.00	0.99		1.00	0.85
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	5085	4997		3433	1347
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	5085	4997		3433	1347
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	2082	2415	207	79	21
RTOR Reduction (vph)	0	0	5	0	0	20
Lane Group Flow (vph)	24	2082	2617	0	79	1
Confl. Peds. (#/hr)				45		63
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	3.8	101.3	92.5		7.4	7.4
Effective Green, g (s)	3.8	101.3	92.5		7.4	7.4
Actuated g/C Ratio	0.03	0.85	0.78		0.06	0.06
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)	56	4339	3894		214	83
v/s Ratio Prot	0.01	c0.41	c0.52		c0.02	
v/s Ratio Perm						0.00
v/c Ratio	0.43	0.48	0.67		0.37	0.02
Uniform Delay, d1	56.4	2.2	6.1		53.4	52.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	5.2	0.1	0.5		1.1	0.1
Delay (s)	61.6	2.2	6.5		54.5	52.3
Level of Service	E	A	A		D	D
Approach Delay (s)		2.9	6.5		54.0	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay	5.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	118.7	Sum of lost time (s)	15.0
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	37	2637	2066	343	282	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	5.0
Lane Util. Factor	1.00	0.91	0.91		0.97	1.00
Frpb, ped/bikes	1.00	1.00	0.99		1.00	0.80
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	5085	4938		3433	1274
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	5085	4938		3433	1274
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	39	2805	2198	365	300	49
RTOR Reduction (vph)	0	0	13	0	0	43
Lane Group Flow (vph)	39	2805	2550	0	300	6
Confl. Peds. (#/hr)				31		80
Turn Type	Prot	NA	NA		Prot	Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	6.0	98.7	87.7		16.2	16.2
Effective Green, g (s)	6.0	98.7	87.7		16.2	16.2
Actuated g/C Ratio	0.05	0.79	0.70		0.13	0.13
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	85	4018	3467		445	165
v/s Ratio Prot	0.02	c0.55	c0.52		c0.09	
v/s Ratio Perm						0.00
v/c Ratio	0.46	0.70	0.74		0.67	0.04
Uniform Delay, d1	57.9	6.1	11.5		51.8	47.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.9	0.5	0.8		4.0	0.1
Delay (s)	61.8	6.7	12.3		55.8	47.6
Level of Service	E	A	B		E	D
Approach Delay (s)		7.4	12.3		54.7	
Approach LOS		A	B		D	

Intersection Summary			
HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	124.9	Sum of lost time (s)	15.0
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group