955 Alton (Coco Bamboo) Miami Beach, Florida



prepared for: CBMIA Restaurant, LLC



October 2014



October 22, 2014

CBMIA Restaurant, LLC c/o Monika Entin, Esq. Bercow Radell & Fernandez, P.A. 200 S. Biscayne Boulevard, Suite 850 Miami, Florida 33131

Re: 955 Alton (Coco Bamboo) – Traffic Study

Dear Monika:

Traf Tech Engineering, Inc. is pleased to provide you with the results of the traffic study undertaken for the proposed 955 Alton (Coco Bamboo) project planned to be located at 955 Alton Road in Miami Beach, Florida. The study addresses the traffic impacts created by the proposed project to the surrounding street system.

It has been a pleasure working with you on this project.

Sincerely,

TRAF TECH ENGINEERING, INC.

Joaquin E. Vargas, P.E. Senior Transportation Engineer

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INTRODUCTION

955 Alton (Coco Bamboo) is a proposed restaurant development planned to be located at the southeast corner of Alton Road and 10th Street in the City of Miami Beach in Miami-Dade County, Florida. The location of the project site is illustrated in Figure 1 on the following page.

Traf Tech Engineering, Inc. was retained by CBMIA Restaurant, LLC to conduct a traffic study¹ in connection with the proposed 955 Alton (Coco Bamboo) development. The study addresses trip generation and the traffic impacts created by the proposed project on the nearby transportation network. This study is divided into seven (7) sections, as listed below:

- 1. Inventory
- 2. Existing Conditions
- 3. Traffic Counts
- 4. Trip Generation
- 5. Trip Distribution and Traffic Assignment
- 6. Traffic Impact Analysis
- 7. Conclusions and Recommendations

¹ The traffic methodology was discussed and agreed with the City of Miami Beach staff.



TrafTech Engineering, INC.

PROJECT LOCATION MAP

FIGURE 1 955 Alton Miami Beach, Florida

Existing Land Use

The current use at the site consists of an existing vacant building with a small parking lot located on the south side of the building.

Proposed Land Uses and Access

The 955 Alton project consists of the following land use and intensity:

• Restaurant with 450 seats

The access to the project's proposed parking lot will consist of the following:

• Right in/ right-out driveway off of Alton Road

Valet parking will be provided for future restaurant patrons. The valet drop-off/pick-up operation is anticipated at the existing parking lot located immediately south of the existing building. Valet vehicles will be parked at a parking located near Alton Road and 6^{th} Street. Appendix A contains a copy of the proposed site plan for the project site.

This section addresses the existing roadway system located in the vicinity of the project site and nearby intersections.

Roadway System

The roadway system located near the project site includes Alton Road, West Avenue, 10th Street, and 9th Street. Near the project site, Alton Road is a four-lane facility and West Avenue, 10th Street, and 9th Street are two-lane facilities.

Nearby Intersections

With the assistance of City of Miami Beach staff, four intersections (plus the future access driveway) were identified as the locations that will be impacted the most by the proposed project. These intersections include Alton Road and 10th Street, Alton Road and 9th Street, West Avenue and 10th Street, and West Avenue and 9th Street. The two intersections along 10th Street are signalized and the remaining intersections are controlled with stop signs.

Figure 2 shows the existing lane geometry of the four intersections selected for analysis purposes. The number of lanes on the street system surrounding the project site is also depicted in the figure.



FIGURE 2 955 Alton Miami Beach, Florida

EXISTING LANE GEOMETRY

Traffic counts were obtained from previous traffic studies conducted by others since traffic patterns are currently altered due to the construction of Alton Road.

The obtained traffic counts were performed on a typical Friday and collected during the PM peak period (4:00 PM to 6:00 PM). The traffic counts were collected on August 9, 2013 and September 4, 2008 at the following intersections located near the project site:

- 1. Alton Road and 10th Street (signalized intersection)
- 2. Alton Road and 9th Street (stop controlled)
- 3. West Avenue and 10th Street (signalized intersection)

The traffic counts for the intersection of West Avenue and 9th Street were derived from the adjacent intersection traffic counts.

Figure 3 summarizes the results of the intersection turning movement counts undertaken during the weekday peak hour. Appendix B contains the intersection turning movement counts, as collected in the field. The signal timing plan for the signalized intersections of Alton Road/10th Street and West Avenue/10th Street were obtained from the Miami-Dade County's web site.



EXISTING TRAFFIC COUNTS – Peak Hour (Projected to 2014)

Traf Tech ENGINEERING, INC. FIGURE 3 955 Alton Miami Beach, Florida

TRIP GENERATION

The trip generation for the project was based on information contained in the Institute of Transportation Engineer's (ITE) *Trip Generation Manual* (9th Edition). According to the subject ITE manual, the most appropriate "land use" category for the proposed land use includes Land Use 931 – Quality Restaurant. Table 1 summarizes the external trips associated with the proposed 955 Alton development.

	Trip 955 Al	TABLI Generation Iton (Propos	E 1 n Summary sed Land Use)											
		Daily	Weekd	ay Peak Hour	Trips									
Land Use	d Use Size Trips Inbound Outbound Total													
		PROPOSEI) USES											
Quality Restaurant	450 seats	1,287	80	55	135									

Source: ITE Trip Generation Manual (9th Edition)

As indicated in Table 1, the external trips anticipated to be generated by the proposed 955 Alton development consist of approximately 1,287 daily trips and approximately 135 trips during the weekday peak hour (80 inbound and 55 outbound).

The trip generation rates used to determine the trips associated with the proposed use are presented below:

ITE Land Use 931 – Quality Restaurant

 $\frac{\text{Weekday Daily Trip Generation}}{T = 2.86 (X)}$ Where T = number of weekday daily trips and X = number of seats

<u>Weekday Peak Hour of Generator</u> T = 0.30 (X) (59% inbound and 41% outbound)Where T = number of weekday peak hour trips and X = number of seats

TRIP DISTRUBUTION AND TRAFFIC ASSIGNMENT

The trip distribution and traffic assignment for the project were based on Miami-Dade County's Cardinal Distribution information for the study area. Table 2 summarizes the County's cardinal distribution data for Traffic Analysis Zone 636, which is applicable to the project site from the latest SERPM data published by Miami-Dade County.

	TABLE 2 Project Trip Distr 955 Alton	ibution
	Direction	% of Total Trips
North:	Northwest	21.59
	Northeast	
South:	Southwest	1.08
	Southeast	5.87
East:	Northeast	4.79
	Southeast	20.02
West:	Northwest	23.27
	Southwest	23.38
	Total	100.00%

Source: Miami-Dade County (2035 SERPM)

Based on the above, the following traffic assignment was assumed for the proposed hotel development:

- o 30% to and from the north via Alton Road
- o 20% to and from the north via West Avenue
- o 30% to and from the south via Alton Road
- o 10% to and from the south via West Avenue
- \circ 5% to and from the east via 10th Street
- \circ 5% to and from the east via 9th Street

The new peak hour traffic generated by the project was assigned to the nearby transportation network using the traffic assignment documented above. The new project traffic assignment is summarized in Figure 4.



This section of the study is divided into four parts. The first part consists of developing the future conditions traffic volumes for the study area. The second part includes levelof-service analyses for existing and future conditions. The third section addresses the projected operating conditions of the project's access driveways. The final section focusses on valet parking.

Future Conditions Traffic Volumes

Two sets of future traffic volumes were developed. The first set includes project buildout conditions without the proposed project and the second set adds the new trips anticipated to be generated by the project.

In order to develop year 2016 traffic volumes (project anticipated to be built and occupied by the year 2016), without the proposed project, two separate analyses were undertaken. The first analysis converts the existing peak hour traffic counts collected in the field during the months of August and September to average peak season conditions. Based on the FDOT's Peak Season Factor Category report, a factor of 1.05 is required to convert traffic counts collected in August of 2013 and September 2008 to average peak season conditions (refer to Appendix C). Moreover, a growth factor of 1% was applied to project 2013 and 2008 peak season traffic volumes to current year 2014. The second analysis includes a growth factor to project 2014 peak season traffic volumes to the buildout year 2016. Based on traffic growth data published by the FDOT for a nearby traffic count station, minimal traffic growth has occurred during the past five years (refer to Appendix C). However, in order to assess impacts with a conservative approach, and to account for unforeseen approved projects (committed trips) that may impact the study intersections, a one percent (1%) growth rate was used for purposes of this study.

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The new trips generated by the 955 Alton development (refer to Figure 4) were added to the 2016 background traffic in order to develop total traffic conditions. The future traffic projections for the study intersections (peak season adjustments, growth rates and project traffic) are presented in tabular format in Appendix D. Figures 5 and 6 present the year 2016 future traffic volumes for the study area.

Figure 5 includes background traffic only (without the proposed project) and Figure 6 includes the additional traffic anticipated to be generated by the 955 Alton development.

Level of Service Analyses

Intersection capacity/level of service analyses were conducted for the four study intersections and the access driveway. The analyses were undertaken following the capacity/level of service procedures outlined in the Highway Capacity Manual (HCS) using the SYNCHRO software. The results of the capacity analyses are summarized in Tables 3 and 4. As indicated in Tables 3 and 4, the study intersections are currently operating at an acceptable level of service, except for the eastbound and westbound approaches of the intersection of Alton Road and 9th Street. Due to the amount of traffic traveling north and south along Alton Road, undesired delay is experienced by traffic wishing to turn left onto Alton Road from 9th Street. In the year 2016 with the proposed project in place, the study intersections are expected to operate at an acceptable level of service, except for the eastbound and westbound approaches of the intersection of Alton Road and 9th Street. In the year 2016 with the proposed project in place, the study intersections are expected to operate at an acceptable level of service, except for the eastbound and westbound approaches of the intersection of Alton Road and 9th Street.

Access Driveway

The proposed access driveway is projected to operate at level of service "C" (refer to Table 4).

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BACKGROUND TRAFFIC – Year 2016 (Weekdays Peak Hour Trips) FIGURE 5 955 Alton Miami Beach, Florida



TOTAL TRAFFIC with PROJECT – Year 2016 (Weekdays Peak Hour Trips)

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FIGURE 6 955 Alton Miami Beach, Florida

Intersection L	TABI evel of Service 955 A	LE 3 – (Signalized Inters Alton	sections)
		Future Tra	ffic Conditions
	2014	2016	2016
Intersection	Existing	w/o Project	With Project
Alton Rd & 10 th St	А	А	А
West Ave & 10 th St	А	А	А

Source: Highway Capacity Manual

Intersection Le	TABI vel of Service 955 A	LE 4 (Stop-Control Inter Ilton	sections)												
Future Traffic Conditions 2014 2016															
	201420162016Existing														
itersection/Movement Existing w/o Project With Project															
Alton Rd & 9 th St															
- EB	F	F	F												
- WB	F	F	F												
West Av & 9 th St															
- WB	С	С	D												
Alton Rd & Project	-	-	C												
Driveway															

Source: Highway Capacity Manual

The computer printouts of the intersection capacity analyses are contained in Appendix E.

Valet Operation

The 955 Alton project will provide valet parking to the restaurant patrons. All vehicles will access the valet station and a valet attendant will park vehicles at or retrieve vehicles from a parking garage located near the intersection of Alton Road and 6th Street.

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In order to determine the stacking requirements associated with the valet operation, a queuing analysis was undertaken. As indicated in Table 1, the maximum number of inbound vehicles associated with this project, during a one-hour period, is approximately 80 vehicles or one vehicle every 45 seconds.

A queuing analysis was conducted in order to ensure that the on-street stacking is sufficient to accommodate the maximum inbound vehicular demand anticipated at this facility. The length of queue anticipated on Alton Road was determined using information contained in ITE's *Transportation and Land Development*, Chapter 8 – Drive-In Facilities¹. For this analysis, the following input variables were used:

- <u>Service Rate</u>: It was assumed that the average time to park/unpark a vehicle by a valet runner is approximately two minutes, or 30 vehicles per hour per valet runner. Assuming up to five (5) valet runners, the maximum service rate of the facility is 150 vehicles in a one-hour period.
- <u>Demand Rate</u>: As indicated above, a maximum of 80 vehicles will arrive during the highest hour.

Using equation 8-9b and Table 8-11 of ITE's *Transportation and Land Development*, the maximum length of queue anticipated on Park Avenue, at the 90% confidence level, is two vehicles. Therefore, the valet station on Alton Road should provide parking for at least two (2) vehicles. The results of the ITE queuing procedure is contained in Appendix F.

¹ By Vergil G. Stover and Frank J. Koepke.

Valet Route

The parking lot for the valet operation will likely be located near the intersection of Alton Road and 6th Street. The valet parking route will include right-turns onto the northbound lanes of Alton Road, left-turns at 11th Street towards West Avenue, left-turns (heading south) on West Avenue towards 10th Street, left-turn on 10th Street in order to head east towards Alton Road followed by a right-turn (heading south) on Alton Road.

The valet retrieval route will travel north on Alton Road towards the parking lot located on the south side of the building. The valet parking and retrieval routes are depicted in Figures 7a and 7b.

Sight Distance at Access Driveway

Due to the current construction on Alton Road, field measurements of sight distance were not feasible. However, when vehicles are exiting in order to turn right on Alton Road, drivers of exiting vehicles are required to execute a right-turn maneuver and therefore, adequate sight distance should be provided. According to Florida Department of Transportation (FDOT) 2014 Design Standards (Index 17346, Page 12 of 14 – *Special Marking Areas*), on-street parking should be off-set at least 20 feet from an exit driveway in order to provide adequate visibility. Therefore, future on-street parking allowed on the east side of Alton Road, if any, should be located at least 20 feet from the project access driveway.

Moreover, a "Right-Turn Only" sign should be provided at the exit driveway in order to prohibit left-turns from the project's parking lot.

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Valet Parking Route

FIGURE 7a 955 Alton Miami Beach, Florida



TrafTech Engineering, INC.

Valet Retrieval Route

FIGURE 7b 955 Alton Miami Beach, Florida 955 Alton (Coco Bamboo) is a proposed restaurant development planned to be located at the southeast corner of Alton Road and 10th Street in the City of Miami Beach in Miami-Dade County, Florida. The current use at the site consists of an existing vacant building with a small parking lot located on the south side of the building. The 955 Alton project consists of the following land use and intensity:

o Restaurant with 450 seats

Access to the site will consist of the following:

• Right-turn in/ right-turn out driveway off of Alton Road serving the small parking lot located on the south side of the building

Valet parking will be provided for future restaurant patrons. The valet drop-off/pick-up operation is anticipated at the parking lot located immediately south of the existing building. Valet vehicles will be parked at a parking located near Alton Road and 6^{th} Street.

Traf Tech Engineering, Inc. was retained by CBMIA Restaurant, LLC to conduct a traffic study in connection with the proposed 955 Alton (Coco Bamboo) development. The study addresses trip generation and the traffic impacts created by the proposed project on the nearby transportation network. The conclusions and recommendations of the traffic study are presented below:

 The external trips anticipated to be generated by the proposed 955 Alton development consist of approximately 1,287 daily trips and approximately 135 trips during the weekday peak hour (80 inbound and 55 outbound).

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- The studied intersections are currently operating at an acceptable level of service, except for the eastbound and westbound approaches of the intersection of Alton Road and 9th Street. Due to the amount of traffic traveling north and south along Alton Road, undesired delay is experienced by traffic wishing to turn left onto Alton Road from 9th Street.
- In the year 2016 with the proposed project in place, the studied intersections are expected to operate at an acceptable level of service, except for the eastbound and westbound approaches of the intersection of Alton Road and 9th Street.
- The proposed access driveway on Alton Road is projected to operate at level of service "C".
- The valet station on Alton Road should provide parking for at least two (2) vehicles.
- Up to Five (5) valet runners should be assigned to this facility during the anticipated peak periods.
- A "Right-Turn Only" sign should be provided at the exit driveway in order to prohibit left-turns from the project's parking lot.
- Future on-street parking allowed on the east side of Alton Road, if any, should be located at least 20 feet from the project access driveway.

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APPENDIX A

Site Plan – 955 Alton (Coco Bamboo)



APPENDIX B

Traffic Counts and Signal Timing Data

Print Date: 11/15/2013

TOD Schedule Report for 3374: West Av&10 St

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630	[01] EARLY MORNING (1)	130
645	[02] PRE-AM PEAK (2)	120
815	[03] AM PEAK (3)	130
905	[04] HEAVY AM PEAK (4)	80
1000	[05] POST-AM PEAK (5)	60
1130	[08] EARLY AFTERNOON (8)	0
1500	[10] PRE-PM PEAK (10)	0
1520	[12] HEAVY PM PEAK (12)	0
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929 Alton Road-Revised

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Crossroads Engineering 13284 SW 120th Street Miami, FI 33186 Tel: 305-233-3997 Fax: 305-233-7720

CLIENT : TRAFTECH Tel: 30 JOB NO.: 2008-087 PROJECT: MONDRIAN SOUTH BEACH COUNTY : MIAMI-DADE

File Name	: WEST@10
Site Code	: 00000000
Start Date	: 9/4/2008
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	Groups Printed AUTOS - HEAVY VEHICLES																
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04:30 PM	0	124	20	6	26	1	8	3	16	74	0	5	1	1	1	5	291
04:45 PM	3	95	15	2	21	2	10	2	19	89	1	10	2	0	8	8	287
Total	11	465	73	19	96	6	39	5	58	334	5	27	8	4	21	34	1205
05:00 PM	2	109	14	5	27	1	14	1	15	94	2	4	2	0	4	10	304
05:15 PM	3	101	16	5	27	0	9	0	9	104	0	8	1	0	4	9	296
05:30 PM	2	117	12	6	23	3	10	0	9	87	1	7	3	0	6	13	299
05:45 PM	3	123	24	8	21	0	12	1	15	98	1	12	1	1	2	12	334
Total	10	450	66	24	98	4	45	2	48	383	4	31	7	1	16	44	1233
Grand Total	21	915	139	43	194	10	84	7	106	717	9	58	15	5	37	78	2438
Apprch %	1.9	81.8	12.4	3.8	65.8	3.4	28.5	2.4	11.9	80.6	1	6.5	11.1	3.7	27.4	57.8	
Total %	0.9	37.5	5.7	1.8	8	0.4	3.4	0.3	4.3	29.4	0.4	2.4	0.6	0.2	1.5	3.2	
AUTOS	21	889	139	43	192	10	84	7	106	702	8	58	15	5	36	78	2393
<u>% AUTOS</u>	100	97.2	100	100	99	100	100	100	100	97.9	88.9	100	100	100	97.3	100	98.2
HEAVY VEHICLES	0	26	0	0	2	0	0	0	0	15	1	0	0	0	1	0	45
% HEAVY VEHICLES	0	2.8	0	0	1	0	0	0	0	2.1	11.1	0	0	0	2.7	0	1.8

Crossroads Engineering 13284 SW 120th Street Miami, FI 33186 Tel: 305-233-3997 Fax: 305-233-7720

CLIENT : TRAFTECH Tel: 30 JOB NO.: 2008-087 PROJECT: MONDRIAN SOUTH BEACH COUNTY : MIAMI-DADE

File Name	: WEST@10
Site Code	: 00000000
Start Date	: 9/4/2008
Page No	: 1

	Groups Printed HEAVY VEHICLES																
		WEST AV	ENUE			10TH ST	REET			WEST AV	/ENUE			10TH ST	FREET		
		From N	orth			From E	last			From S	outh			From	West		
Start Time	Rght	Thru	Left	Peds	Rght	Thru	Left	Peds	Rght	Thru	Left	Peds	Rght	Thru	Left	Peds	Int. Total
04:00 PM	0	4	0	0	0	0	0	0	0	2	0	0	0	0	0	0	6
04:15 PM	0	4	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5
04:30 PM	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	4
04:45 PM	0	5	0	0	0	0	0	0	0	2	1	0	0	0	1	0	9
Total	0	15	0	0	0	0	0	0	0	7	1	0	0	0	1	0	24
									1								
05:00 PM	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
05:15 PM	0	4	0	0	1	0	0	0	0	3	0	0	0	0	0	0	8
05:30 PM	0	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	4
05:45 PM	0	3	0	0	1	0	0	0	0	3	0	0	0	0	0	0	7
Total	0	11	0	0	2	0	0	0	0	8	0	0	0	0	0	0	21
Grand Total	0	26	0	0	2	0	0	0	0	15	1	0	0	0	1	0	45
Apprch %	0	100	0	0	100	0	0	0	0	93.8	6.2	0	0	0	100	0	
Total %	0	57.8	0	0	4.4	0	0	0	0	33.3	2.2	0	0	0	2.2	a	

Crossroads Engineering 13284 SW 120th Street Miami, FI 33186 Tel: 305-233-3997 Fax: 305-233-7720

CLIENT : TRAFTECH Tel: 30 JOB NO.: 2008-087 PROJECT: MONDRIAN SOUTH BEACH COUNTY : MIAMI-DADE

File Name	: WEST@10
Site Code	: 00000000
Start Date	: 9/4/2008
Page No	: 2

		WE F	ST AVEN From Nort	UE h			10 TH STREET From East					WEST AVENUE From South					10TH STREET From West				
Start Time	Rght	Thru	Left	Peds	App. Total	Rght	Thru	Left	Peds	App. Total	Rght	Thru	Left	Peds	App. Total	Rght	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis	sFrom 04:	00 PM to	03:43 PM	-Peak 1	of 1	-					-					-					
Peak Hour fo	r Entire	e Inters	section	Begir	is at 05;	00 PM															
05:00 PM	2	109	14	5	130	27	1	14	1	43	15	94	2	4	115	2	0	4	10	16	304
05:15 PM	3	101	16	5	125	27	0	9	0	36	9	104	0	8	121	1	0	4	9	14	296
05:30 PM	2	117	12	6	137	23	3	10	0	36	9	87	1	7	104	3	0	6	13	22	299
05:45 PM	3	123	24	8	158	21	0	12	1	34	15	98	1	12	126	1	1	2	12	16	334
Total ∨olume	10	450	66	24	550	98	4	45	2	149	48	383	4	31	466	7	1	16	44	68	1233
% App. Total	1.8	81.8	12	4.4		65.8	2.7	30.2	1.3		10.3	82.2	0.9	6.7		10.3	1.5	23.5	64.7		
PHF	.833	.915	.688	.750	.870	.907	.333	.804	.500	.866	.800	.921	.500	.646	.925	.583	.250	.667	.846	.773	.923



APPENDIX C

Historical Traffic Counts and Peak Season Conversion Factors 2013 PEAK SEASON FACTOR CATEGORY REPORT - REPORT TYPE: ALL CATEGORY: 8700 MIAMI-DADE NORTH

WEEK	DATES	SF	MOCF: 0.97 PSCF
* * * * * * * * * * * * * * * * * * *	Diffie 01/01/2013 - 01/05/2013 01/06/2013 - 01/12/2013 01/13/2013 - 01/19/2013 01/20/2013 - 02/02/2013 02/03/2013 - 02/09/2013 02/10/2013 - 02/16/2013 02/17/2013 - 02/23/2013 02/24/2013 - 03/02/2013 03/03/2013 - 03/09/2013 03/10/2013 - 03/23/2013 03/10/2013 - 03/23/2013 03/10/2013 - 03/23/2013 03/10/2013 - 04/06/2013 03/11/2013 - 04/06/2013 03/12/2013 - 04/20/2013 03/12/2013 - 04/20/2013 04/14/2013 - 04/20/2013 04/21/2013 - 05/18/2013 04/21/2013 - 05/18/2013 05/12/2013 - 05/18/2013 05/12/2013 - 05/18/2013 05/12/2013 - 05/25/2013 05/26/2013 - 06/08/2013 06/09/2013 - 06/22/2013 06/23/2013 - 06/22/2013 06/23/2013 - 06/22/2013 06/23/2013 - 07/27/2013 07/14/2013 - 07/27/2013 07/21/2013 - 07/27/2013 07/21/2013 - 08/13/2013 08/11/2013 - 08/24/2013 08/11/2013 - 08/24/2013 08/11/2013 - 09/21/2013	1.03 1.03 1.03 1.01 1.00 0.99 0.97 0.96 0.96 0.96 0.97 0.97 0.97 0.97 0.97 0.97 0.97 0.97 0.98 0.98 0.98 0.98 0.99 1.00 1.00 1.00 1.00 1.00 1.02	1.06 1.06 1.06 1.04 1.03 1.02 1.00 0.99 0.99 0.99 0.99 1.00 1.00 1.00 1.00 1.00 1.01 1.01 1.01 1.02 1.02 1.03 1.03 1.03 1.03 1.03 1.04 1.04 1.05 1.05 1.05 1.06 1.05
49 50 51 52 53	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	1.02 1.02 1.03 1.03 1.03	1.05 1.05 1.06 1.06 1.06

* PEAK SEASON

18-FEB-2014 08:46:31

830UPD

6_8700_PKSEASON.TXT



APPENDIX D

Projected Turning Movement Volumes

Alton Road Alton Road 10th Street 10th Street Westbound Northbound Southbound Eastbound Description Through Right Through Right Through Right Through Right Left Left Left Left Existing Traffic (8/9/2013) 652 16 36 967 44 38 68 42 48 58 72 15 Season Adjustment Factor 1.05 1.05 1.05 1.05 1.05 1.05 1.05 1.05 1.05 1.05 1.05 1.05 Annual Growth Rate 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 2014 Peak Season Traffic 62 40 72 691 38 1,026 51 76 16 17 47 45 Annual Growth Rate 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 2016 Background Traffic 63 705 17 39 1.046 48 41 74 45 52 78 16 955 Alton 17 97 21 24 80 2016 Total Traffic 80 1,046 41 125 52 802 63 48 74 78 38 16

Alton Road and 10th Street PM Peak Hour

Alton Road Alton Road 9th Street 9th Street Southbound Westbound Northbound Eastbound Description Through Right Through Right Through Right Through Right Left Left Left Left Existing Traffic (8/9/2013) 47 681 6 35 964 28 8 19 47 27 17 53 Season Adjustment Factor 1.05 1.05 1.05 1.05 1.05 1.05 1.05 1.05 1.05 1.05 1.05 1.05 Annual Growth Rate 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 2014 Peak Season Traffic 50 722 37 1,022 8 20 29 18 56 6 30 50 Annual Growth Rate 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 2016 Background Traffic 51 737 6 38 1.043 30 9 21 51 29 18 57 955 Alton 79 80 24 32 2016 Total Traffic 51 1,123 33 29 816 38 21 51 18 6 30 89

Alton Road and 9th Street PM Peak Hour

West Avenue and 10th Street PM Peak Hour

v	lest Avenu	le	v	Vest Avenu	e		10th Street	t	10th Street			
Ν	orthboun	d	5	Southboun	d		Eastbound	I	1	Westbound	d	
Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
4	383	48	66	450	10	16	1	7	45	4	98	
1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	
1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	
4	427	54	74	502	11	18	1	8	50	4	109	
1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	
5	435	55	75	512	11	18	1	8	51	5	111	
			80	16					6		11	
5	435	55	155	528	11	18	1	8	57	5	122	
	Left 4 1.05 1.0% 4 1.0% 5	West Avenue Northbound Left Through 4 383 1.05 1.05 1.0% 1.0% 4 427 1.0% 1.0% 5 435	Northbound Left Through Right 4 383 48 1.05 1.05 1.05 1.0% 1.0% 1.0% 4 427 54 1.0% 1.0% 1.0% 5 435 55 5 435 55	Northbound S Left Through Right Left 4 383 48 66 1.05 1.05 1.05 1.05 1.0% 1.0% 1.0% 1.0% 4 427 54 74 1.0% 1.0% 1.0% 1.0% 5 435 55 75 80 80 155 155	Northbound Southbound Left Through Right Left Through 4 383 48 66 450 1.05 1.05 1.05 1.05 1.05 1.0% 1.0% 1.0% 1.0% 1.0% 4 427 54 74 502 1.0% 1.0% 1.0% 1.0% 1.0% 5 435 55 75 512 80 16 16 16 16	West Avenue Northbound Right Southbound Left Through Right Left Through Right 4 383 48 66 450 10 1.05 1.05 1.05 1.05 1.05 1.05 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 4 427 54 74 502 11 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 5 435 55 75 512 11 80 16 10 11 11	Northbound Right Left Through Right Left Through Right Left 4 383 48 66 450 10 16 1.05 1.05 1.05 1.05 1.05 1.05 1.05 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 4 427 54 74 502 11 18 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 1.0% 5 435 55 75 512 11 18 80 16 10 18 10% 10% 10%	Northbound Right Left Through Left Through Right Left Through Left Through Left Through Left Through 4 383 48 66 450 10 16 1 1.05 1.0	Northbound Right Left Through Right Left Through Right Left Through Right Left Through Right Right Left Through Right Right Right Left Through Right Rist Right Right	Northbound Right Left Through Right Left Left Through Right Left Left Through Right Left Left 4 383 48 66 450 10 16 1 7 45 1.05	West Avenue Southbound Southbound Eastbound West Avenue	

West Avenue and 9th Street PM Peak Hour

	V	Vest Avenu	ie	V	Vest Avenu	Ie		9th Street		9th Street			
	1	Northboun	d	5	Southboun	d		Eastbound	ł		Westbound	b	
Description	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Existing Traffic*		382	39	39	520					52		53	
Season Adjustment Factor	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	
Annual Growth Rate	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	
2014 Peak Season Traffic	0	405	41	41	552	0	0	0	0	55	0	56	
Annual Growth Rate	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	
2016 Background Traffic	0	413	42	42	564	0	0	0	0	56	0	57	
955 Alton			8	16	6								
2016 Total Traffic	0	413	50	58	570	0	0	0	0	56	0	57	

* Traffic Volumes were derived from the adjacent intersections.

APPENDIX E

Intersection Capacity Analyses

	≯	-	\rightarrow	4	-	•	1	1	1	1	Ļ	-
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		\$			\$		٦	≜ ⊅		۲	∱ ⊅	
Volume (veh/h)	40	72	45	51	76	16	62	691	17	38	1026	47
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	190.0	186.3	190.0	190.0	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0
Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Cap, veh/h	174	166	90	212	195	36	403	2204	55	550	2152	99
Arrive On Green	0.06	0.06	0.06	0.19	0.19	0.17	0.61	0.61	0.61	0.61	0.61	0.61
Sat Flow, veh/h	314	884	481	466	1041	194	502	3619	90	717	3535	162
Grp Volume(v), veh/h	164	0	0	149	0	0	65	370	368	40	563	555
Grp Sat Flow(s),veh/h/ln	1678	0	0	1701	0	0	502	1863	1847	717	1863	1834
Q Serve(g_s), s	0.7	0.0	0.0	0.0	0.0	0.0	3.3	3.8	3.8	1.1	6.7	6.7
Cycle Q Clear(g_c), s	3.5	0.0	0.0	2.8	0.0	0.0	10.0	3.8	3.8	5.0	6.7	6.7
Prop In Lane	0.26		0.29	0.36		0.11	1.00		0.05	1.00		0.09
Lane Grp Cap(c), veh/h	430	0	0	444	0	0	403	1134	1124	550	1134	1117
V/C Ratio(X)	0.38	0.00	0.00	0.34	0.00	0.00	0.16	0.33	0.33	0.07	0.50	0.50
Avail Cap(c_a), veh/h	1587	0	0	1576	0	0	1195	4073	4038	1682	4073	4010
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.99	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.7	0.0	0.0	14.2	0.0	0.0	7.1	3.8	3.8	5.0	4.3	4.3
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.4	0.0	0.0	0.9	0.8	0.8	0.3	1.6	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
% ile Back of Q (50%), veh/in	1.5	0.0	0.0	1.2	0.0	0.0	0.4	1.1	1.1	0.2	2.1	2.0
Lane Grp Delay (d), s/veh	17.2	0.0	0.0	14.6	0.0	0.0	8.0	4.5	4.5	5.2	5.9	5.9
Lane Grp LOS	В	101		В	4.40		A	<u>A</u>	A	A	<u>A</u>	<u> </u>
Approach Vol, veh/h		164			149			803			1158	
Approach Delay, s/veh		17.2			14.6			4.8			5.9	
Approach LOS		В			В			A			A	
Timer												
Assigned Phs		4			8			2			6	
Phs Duration (G+Y+Rc), s		11.4			11.4			27.9			27.9	
Change Period (Y+Rc), s		4.8			4.8			4.0			4.0	
Max Green Setting (Gmax), s		35.0			35.0			86.0			86.0	
Max Q Clear Time (g_c+l1), s		5.5			4.8			12.0			8.7	
Green Ext Time (p_c), s		1.3			1.3			12.0			12.0	
Intersection Summary												
HCM 2010 Ctrl Delay			6.9									
HCM 2010 LOS			А									
Notes												

8/25/2014

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			\$		ሻ	đβ		5	≜1 }	
Volume (veh/h)	18	1	8	50	4	109	4	427	54	74	502	11
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	190.0	186.3	190.0	190.0	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0
Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Cap, veh/h	405	54	97	266	19	209	616	1580	200	630	1770	39
Arrive On Green	0.20	0.20	0.16	0.20	0.20	0.16	0.49	0.49	0.45	0.49	0.49	0.45
Sat Flow, veh/h	853	267	480	413	96	1035	848	3243	410	8/6	3632	80
Grp Volume(v), veh/h	30	0	0	176	0	0	4	266	257	80	280	278
Grp Sat Flow(s),veh/h/ln	1600	0	0	1543	0	0	848	1863	1790	876	1863	1849
Q Serve(g_s), s	0.0	0.0	0.0	2.0	0.0	0.0	0.1	2.2	2.2	1.6	2.3	2.3
Cycle Q Clear(g_c), s	0.4	0.0	0.0	2.7	0.0	0.0	2.4	2.2	2.2	3.8	2.3	2.3
Prop In Lane	0.67	0	0.30	0.31	0	0.67	1.00	000	0.23	1.00	000	0.04
Lane Grp Cap(c), ven/n	556	0	0	494	0	0	616	908	8/2	630	908	901
V/C Ratio(X)	0.05	0.00	0.00	0.30	0.00	0.00	0.01	0.29	0.30	0.13	0.31	0.31
Avail Cap(c_a), ven/n	1/09	1 00	1 00	1/00	1 00	1 00	3331	1 00	1.00	3435	1 00	1 00
HCM Platoon Ratio	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.72	0.00	0.00	1.00	1.00	1.00	1.00 5.1	1.00	1.00
Incr Delay (d2) s/veh	0.0	0.0	0.0	9.0	0.0	0.0	4.7	0.8	4.0	0.4	4.0	4.0
Initial Ω Delay(d3) s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.4	0.9	0.9
%ile Back of O (50%) veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Grn Delay (d) s/veh	8.5	0.0	0.0	9.9	0.0	0.0	4 7	4.8	4.9	5.5	49	49
Lane Grp LOS	0.0 A	0.0	0.0	0.0 A	0.0	0.0	A	A	A	A O	A	A
Approach Vol. veh/h	71	30			176			527			638	
Approach Delay, s/veh		8.5			9.9			4.8			5.0	
Approach LOS		A			A			A			A	
Timer												
Assigned Phs		4			8			2			6	
Phs Duration (G+Y+Rc), s		9.2			9.2			16.5			16.5	
Change Period (Y+Rc), s		5.0			5.0			5.0			5.0	
Max Green Setting (Gmax), s		26.0			26.0			94.0			94.0	
Max Q Clear Time (q c+11), s		2.4			4.7			4.4			5.8	
Green Ext Time (p_c), s		0.8			0.8			5.7			5.7	
Intersection Summary												
HCM 2010 Ctrl Delay			5.6									
HCM 2010 LOS			А									
Notes												

8/25/2014

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			\$		ሻ	đβ		5	≜1 }	
Volume (veh/h)	18	1	8	50	4	109	4	427	54	74	502	11
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	190.0	186.3	190.0	190.0	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0
Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Cap, veh/h	405	54	97	266	19	209	616	1580	200	630	1770	39
Arrive On Green	0.20	0.20	0.16	0.20	0.20	0.16	0.49	0.49	0.45	0.49	0.49	0.45
Sat Flow, veh/h	853	267	480	413	96	1035	848	3243	410	8/6	3632	80
Grp Volume(v), veh/h	30	0	0	176	0	0	4	266	257	80	280	278
Grp Sat Flow(s),veh/h/ln	1600	0	0	1543	0	0	848	1863	1790	876	1863	1849
Q Serve(g_s), s	0.0	0.0	0.0	2.0	0.0	0.0	0.1	2.2	2.2	1.6	2.3	2.3
Cycle Q Clear(g_c), s	0.4	0.0	0.0	2.7	0.0	0.0	2.4	2.2	2.2	3.8	2.3	2.3
Prop In Lane	0.67	0	0.30	0.31	0	0.67	1.00	000	0.23	1.00	000	0.04
Lane Grp Cap(c), ven/n	556	0	0	494	0	0	010	908	8/2	630	908	901
V/C Ratio(X)	0.05	0.00	0.00	0.30	0.00	0.00	0.01	0.29	0.30	0.13	0.31	0.31
Avail Cap(c_a), ven/n	1/09	1 00	1 00	1/00	1 00	1 00	3331	1 00	1.00	3435	1 00	1 00
HCM Platoon Ratio	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.72	0.00	0.00	1.00	1.00	1.00	1.00 5.1	1.00	1.00
Incr Delay (d2) s/veh	0.0	0.0	0.0	9.0	0.0	0.0	4.7	0.8	4.0	0.4	4.0	4.0
Initial O Delay (d2), siven	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.4	0.9	0.9
%ile Back of O (50%) veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Grn Delay (d) s/veh	8.5	0.0	0.0	9.9	0.0	0.0	4 7	4.8	4.9	5.5	49	49
Lane Grp LOS	0.0 A	0.0	0.0	0.0 A	0.0	0.0	A	A	A	A O	A	A
Approach Vol. veh/h	71	30			176			527			638	
Approach Delay, s/veh		8.5			9.9			4.8			5.0	
Approach LOS		A			A			A			A	
Timer												
Assigned Phs		4			8			2			6	
Phs Duration (G+Y+Rc), s		9.2			9.2			16.5			16.5	
Change Period (Y+Rc), s		5.0			5.0			5.0			5.0	
Max Green Setting (Gmax), s		26.0			26.0			94.0			94.0	
Max Q Clear Time (q c+11), s		2.4			4.7			4.4			5.8	
Green Ext Time (p_c), s		0.8			0.8			5.7			5.7	
Intersection Summary												
HCM 2010 Ctrl Delay			5.6									
HCM 2010 LOS			А									
Notes												

12.9

Intersection

Intersection Delay, s/veh

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	8	20	50	29	18	56	50	722	6	37	1022	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	0	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	21	52	30	19	58	52	744	6	38	1054	31

Major/Minor	Minor2			Minor1			Major1		ľ	Major2		
Conflicting Flow All	1630	1999	542	1464	2012	375	1085	0	0	751	0	0
Stage 1	1145	1145	-	851	851	-	-	-	-	-	-	-
Stage 2	485	854	-	613	1161	-	-	-	-	-	-	-
Follow-up Headway	4	4	3	4	4	3	2	-	-	2	-	-
Pot Capacity-1 Maneuver	67	59	485	90	58	623	639	-	-	854	-	-
Stage 1	212	272	-	321	375	-	-	-	-	-	-	-
Stage 2	532	373	-	446	268	-	-	-	-	-	-	-
Time blocked-Platoon, %								-	-		-	-
Mov Capacity-1 Maneuver	40	52	485	51	51	623	639	-	-	854	-	-
Mov Capacity-2 Maneuver	40	52	-	51	51	-	-	-	-	-	-	-
Stage 1	195	260	-	295	344	-	-	-	-	-	-	-
Stage 2	420	343	-	351	256	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	92			178			1			0		

Minor Lane / Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR	
Capacity (veh/h)	639	-	-	113	102	854	-	-	
HCM Lane V/C Ratio	0.081	-	-	0.712	1.041	0.045	-	-	
HCM Control Delay (s)	11.128	-	-	92	178.4	9.412	-	-	
HCM Lane LOS	В			F	F	А			
HCM 95th % tile Q(veh)	0.262	-	-	3.82	6.577	0.14	-	-	

Notes

8/24/	2014
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			\$		۲	≜ ⊅		۲	≜ †⊅	
Volume (veh/h)	41	74	45	52	78	16	63	705	17	39	1046	48
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	190.0	186.3	190.0	190.0	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0
Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Cap, veh/h	164	168	89	200	194	34	378	2275	53	529	2219	101
Arrive On Green	0.06	0.06	0.06	0.19	0.19	0.17	0.63	0.63	0.63	0.63	0.63	0.63
Sat Flow, veh/h	319	893	475	462	1035	179	469	3625	85	687	3535	162
Grp Volume(v), veh/h	174	0	0	159	0	0	68	394	390	42	599	590
Grp Sat Flow(s),veh/h/ln	1687	0	0	1676	0	0	469	1863	1848	687	1863	1834
Q Serve(g_s), s	0.7	0.0	0.0	0.0	0.0	0.0	4.0	4.3	4.3	1.3	7.6	7.7
Cycle Q Clear(g_c), s	4.1	0.0	0.0	3.4	0.0	0.0	11.7	4.3	4.3	5.7	7.6	7.7
Prop In Lane	0.26		0.28	0.36		0.11	1.00		0.05	1.00		0.09
Lane Grp Cap(c), veh/h	421	0	0	428	0	0	378	1169	1160	529	1169	1151
V/C Ratio(X)	0.41	0.00	0.00	0.37	0.00	0.00	0.18	0.34	0.34	0.08	0.51	0.51
Avail Cap(c_a), veh/h	1442	0	0	1426	0	0	1015	3698	3668	1462	3698	3641
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.98	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.5	0.0	0.0	15.7	0.0	0.0	7.6	3.8	3.8	5.1	4.4	4.4
Incr Delay (d2), s/veh	0.6	0.0	0.0	0.5	0.0	0.0	1.0	0.8	0.8	0.3	1.6	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
% Ile Back of Q (50%), veh/In	1.9	0.0	0.0	1.4	0.0	0.0	0.4	1.3	1.3	0.2	2.4	2.3
Lane Grp Delay (d), s/veh	19.1	0.0	0.0	16.2	0.0	0.0	8./	4.6	4.6	5.4	6.0	6.1
Lane Grp LOS	В	474		В	450		A	A	A	A	A	A
Approach Vol, ven/h		1/4			159			852			1231	
Approach Delay, s/veh		19.1			16.2			4.9			6.0	
Approach LOS		В			В			A			A	
Timer		<u> </u>										
Assigned Phs		4			8			2			6	
Phs Duration (G+Y+Rc), s		12.1			12.1			31.2			31.2	
Change Period (Y+Rc), s		4.8			4.8			4.0			4.0	
Max Green Setting (Gmax), s		35.0			35.0			86.0			86.0	
Max Q Clear Time (g_c+l1), s		6.1			5.4			13.7			9.7	
Green Ext Time (p_c), s		1.3			1.3			13.5			13.5	
Intersection Summary												
HCM 2010 Ctrl Delay			7.2									
HCM 2010 LOS			A									
Notes												

8/25/2014

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		\$			\$		7	tβ		۲	A1⊅	
Volume (veh/h)	18	1	8	51	5	111	5	435	55	75	512	11
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	190.0	186.3	190.0	190.0	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0
Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Cap, veh/h	405	54	99	262	22	212	608	1590	201	622	1781	38
Arrive On Green	0.21	0.21	0.17	0.21	0.21	0.17	0.49	0.49	0.45	0.49	0.49	0.45
Sat Flow, veh/h	860	261	480	404	109	1034	839	3244	410	868	3633	78
Grp Volume(v), veh/h	30	0	0	181	0	0	5	271	262	82	285	284
Grp Sat Flow(s),veh/h/ln	1601	0	0	1547	0	0	839	1863	1790	868	1863	1849
Q Serve(g_s), s	0.0	0.0	0.0	2.1	0.0	0.0	0.1	2.3	2.3	1.6	2.4	2.4
Cycle Q Clear(g_c), s	0.4	0.0	0.0	2.8	0.0	0.0	2.5	2.3	2.3	4.0	2.4	2.4
Prop In Lane	0.67		0.30	0.30		0.67	1.00		0.23	1.00		0.04
Lane Grp Cap(c), veh/h	557	0	0	496	0	0	608	913	878	622	913	906
V/C Ratio(X)	0.05	0.00	0.00	0.36	0.00	0.00	0.01	0.30	0.30	0.13	0.31	0.31
Avail Cap(c_a), veh/h	1674	0	0	1754	0	0	3232	6738	6476	3335	6738	6688
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.69	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.6	0.0	0.0	9.7	0.0	0.0	4.8	4.0	4.1	5.2	4.0	4.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.8	0.9	0.4	0.9	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	0.1	0.0	0.0	0.8	0.0	0.0	0.0	0.8	0.8	0.3	0.9	0.9
Lane Grp Delay (d), s/veh	8.6	0.0	0.0	10.0	0.0	0.0	4.8	4.8	4.9	5.6	4.9	4.9
Lane Grp LOS	A			A			A	A	A	A	A	<u> </u>
Approach Vol, veh/h		30			181			538			651	
Approach Delay, s/veh		8.6			10.0			4.9			5.0	
Approach LOS		A			A			A			A	
Timer												
Assigned Phs		4			8			2			6	
Phs Duration (G+Y+Rc), s		9.4			9.4			16.9			16.9	
Change Period (Y+Rc), s		5.0			5.0			5.0			5.0	
Max Green Setting (Gmax), s		26.0			26.0			94.0			94.0	
Max Q Clear Time (g_c+I1), s		2.4			4.8			4.5			6.0	
Green Ext Time (p_c), s		0.8			0.8			5.9			5.9	
Intersection Summary												
HCM 2010 Ctrl Delay			5.7									
HCM 2010 LOS			А									
Notes												

2.7

Intersection

Intersection Delay, s/veh

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	56	57	413	42	42	564
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	61	62	449	46	46	613

Major/Minor	Minor1		Major1		Major2		
Conflicting Flow All	1176	472	0	0	495	0	
Stage 1	472	-	-	-	-	-	
Stage 2	704	-	-	-	-	-	
Follow-up Headway	3.518	3.318	-	-	2.218	-	
Pot Capacity-1 Maneuver	211	592	-	-	1069	-	
Stage 1	628	-	-	-	-	-	
Stage 2	490	-	-	-	-	-	
Time blocked-Platoon, %			-	-		-	
Mov Capacity-1 Maneuver	202	592	-	-	1069	-	
Mov Capacity-2 Maneuver	202	-	-	-	-	-	
Stage 1	628	-	-	-	-	-	
Stage 2	469	-	-	-	-	-	
Approach	WB		NB		SB		
HCM Control Delay, s	24.7		0		0.6		
HCM LOS	С						

Minor Lane / Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	303	1069	-
HCM Lane V/C Ratio	-	-	0.405	0.043	-
HCM Control Delay (s)	-	-	24.7	8.518	-
HCM Lane LOS			С	А	
HCM 95th %tile Q(veh)	-	-	1.887	0.134	-
NT. C.					

Notes

27.5

Intersection

Intersection Delay, s/veh

EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
9	21	51	29	18	57	51	737	6	38	1043	30
0	0	0	0	0	0	0	0	0	0	0	0
Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
-	-	None	-	-	None	-	-	None	-	-	None
-	-	-	-	-	-	0	-	-	0	-	-
-	0	-	-	0	-	-	0	-	-	0	-
-	0	-	-	0	-	-	0	-	-	0	-
92	92	92	92	92	92	92	92	92	92	92	92
2	2	2	2	2	2	2	2	2	2	2	2
10	23	55	32	20	62	55	801	7	41	1134	33
	EBL 9 0 Stop - - - 92 2 2 10	EBL EBT 9 21 0 0 Stop Stop - - - - - 0 - 0 - 0 9 92 92 92 10 23	EBL EBT EBR 9 21 51 0 0 0 Stop Stop Stop - - None - - - - 0 - - 0 - - 0 - - 0 - 92 92 92 2 2 2 10 23 55	EBL EBT EBR WBL 9 21 51 29 0 0 0 0 Stop Stop Stop Stop - - None - - 0 - - - 0 - - - 0 - - 92 92 92 92 92 2 2 2 10 23 55 32	EBL EBT EBR WBL WBT 9 21 51 29 18 0 0 0 0 0 Stop Stop Stop Stop Stop - None - - - 0 - - - - 0 - - 0 - 0 - - 0 - 0 - - 0 - 0 - - 0 0 92 92 92 92 92 92 2 2 2 2 2 2 10 23 55 32 20	EBL EBT EBR WBL WBT WBR 9 21 51 29 18 57 0 0 0 0 0 0 Stop Stop Stop Stop Stop Stop - - None - - None - 0 - - None - - - 0 - - 0 - - - - 0 - - 0 - </td <td>EBL EBT EBR WBL WBT WBR NBL 9 21 51 29 18 57 51 0 0 0 0 0 0 0 Stop Stop Stop Stop Stop Stop Free - - None - - None - - - None - - 0 - - - - - 0 - - 0 - 0 - - 0 - - 0 - - 0 - - 0 - <</td> <td>EBL EBT EBR WBL WBT WBR NBL NBT 9 21 51 29 18 57 51 737 0 0 0 0 0 0 0 0 Stop Stop Stop Stop Stop Stop Free Free - - None - - None - - - - None - - None - - - - - - 0 - - 0 - - 0 - - 0 - - 0 - - 0 - - 0 - - 0 - - 0 - - 0 - - 0 - - 0 - - 0 - - 0 - -</td> <td>EBL EBT EBR WBL WBT WBR NBL NBT NBR 9 21 51 29 18 57 51 737 6 0 0 0 0 0 0 0 0 0 Stop Stop Stop Stop Stop Free Free Free - None - None - None - None - None - - None - 0 - - - 0 - - 0 - - 0 - - - 0 - - 0 - - 0 - - - 0 - - - 0 - - - - - - - - - - - - - - - - - - <t< td=""><td>EBL EBT EBR WBL WBT WBR NBL NBT NBR SBL 9 21 51 29 18 57 51 737 6 38 0 0 0 0 0 0 0 0 0 Stop Stop Stop Stop Stop Stop Free Free Free Free - - None - None - None - - - None - - 0 - - 0 - - - - - 0 - - 0 - - - - 0 - - 0 - - - 0 - - 0 - - 0 - - - 0 - - 0 - - 0 -</td><td>EBL EBR WBL WBT WBR NBL NBT NBR SBL SBL 9 21 51 29 18 57 51 737 6 38 1043 0 0 0 0 0 0 0 0 0 Stop Stop Stop Stop Stop Free Free</td></t<></td>	EBL EBT EBR WBL WBT WBR NBL 9 21 51 29 18 57 51 0 0 0 0 0 0 0 Stop Stop Stop Stop Stop Stop Free - - None - - None - - - None - - 0 - - - - - 0 - - 0 - 0 - - 0 - - 0 - - 0 - - 0 - <	EBL EBT EBR WBL WBT WBR NBL NBT 9 21 51 29 18 57 51 737 0 0 0 0 0 0 0 0 Stop Stop Stop Stop Stop Stop Free Free - - None - - None - - - - None - - None - - - - - - 0 - - 0 - - 0 - - 0 - - 0 - - 0 - - 0 - - 0 - - 0 - - 0 - - 0 - - 0 - - 0 - - 0 - -	EBL EBT EBR WBL WBT WBR NBL NBT NBR 9 21 51 29 18 57 51 737 6 0 0 0 0 0 0 0 0 0 Stop Stop Stop Stop Stop Free Free Free - None - None - None - None - None - - None - 0 - - - 0 - - 0 - - 0 - - - 0 - - 0 - - 0 - - - 0 - - - 0 - - - - - - - - - - - - - - - - - - <t< td=""><td>EBL EBT EBR WBL WBT WBR NBL NBT NBR SBL 9 21 51 29 18 57 51 737 6 38 0 0 0 0 0 0 0 0 0 Stop Stop Stop Stop Stop Stop Free Free Free Free - - None - None - None - - - None - - 0 - - 0 - - - - - 0 - - 0 - - - - 0 - - 0 - - - 0 - - 0 - - 0 - - - 0 - - 0 - - 0 -</td><td>EBL EBR WBL WBT WBR NBL NBT NBR SBL SBL 9 21 51 29 18 57 51 737 6 38 1043 0 0 0 0 0 0 0 0 0 Stop Stop Stop Stop Stop Free Free</td></t<>	EBL EBT EBR WBL WBT WBR NBL NBT NBR SBL 9 21 51 29 18 57 51 737 6 38 0 0 0 0 0 0 0 0 0 Stop Stop Stop Stop Stop Stop Free Free Free Free - - None - None - None - - - None - - 0 - - 0 - - - - - 0 - - 0 - - - - 0 - - 0 - - - 0 - - 0 - - 0 - - - 0 - - 0 - - 0 -	EBL EBR WBL WBT WBR NBL NBT NBR SBL SBL 9 21 51 29 18 57 51 737 6 38 1043 0 0 0 0 0 0 0 0 0 Stop Stop Stop Stop Stop Free

Major/Minor	Minor2			Minor1			Major1		ľ	Major2		
Conflicting Flow All	1754	2151	583	1576	2164	404	1166	0	0	808	0	0
Stage 1	1233	1233	-	915	915	-	-	-	-	-	-	-
Stage 2	521	918	-	661	1249	-	-	-	-	-	-	-
Follow-up Headway	4	4	3	4	4	3	2	-	-	2	-	-
Pot Capacity-1 Maneuver	54	48	456	74	47	596	595	-	-	813	-	-
Stage 1	187	247	-	294	350	-	-	-	-	-	-	-
Stage 2	507	349	-	418	243	-	-	-	-	-	-	-
Time blocked-Platoon, %								-	-		-	-
Mov Capacity-1 Maneuver	27	41	456	33	41	596	595	-	-	813	-	-
Mov Capacity-2 Maneuver	27	41	-	33	41	-	-	-	-	-	-	-
Stage 1	170	235	-	267	318	-	-	-	-	-	-	-
Stage 2	387	317	-	315	231	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	196			\$ 390			1			0		

Minor Lane / Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR	
Capacity (veh/h)	595	-	-	85	74	813	-	-	
HCM Lane V/C Ratio	0.093	-	-	1.036	1.528	0.051	-	-	
HCM Control Delay (s)	11.671	-	-	196.1	\$ 390.4	9.665	-	-	
HCM Lane LOS	В			F	F	А			
HCM 95th % tile Q(veh)	0.307	-	-	5.939	9.393	0.16	-	-	

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		\$			\$		۲	A		۲	≜ †⊅	
Volume (veh/h)	41	74	125	52	78	16	80	802	38	63	1046	48
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	190.0	186.3	190.0	190.0	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0
Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Cap, veh/h	120	140	200	174	228	38	337	2195	103	432	2199	101
Arrive On Green	0.08	0.08	0.07	0.23	0.23	0.22	0.62	0.62	0.62	0.62	0.62	0.62
Sat Flow, veh/h	187	595	851	369	972	161	469	3530	166	609	3535	162
Grp Volume(v), veh/h	261	0	0	159	0	0	87	460	453	68	599	590
Grp Sat Flow(s),veh/h/ln	1634	0	0	1503	0	0	469	1863	1833	609	1863	1834
Q Serve(g_s), s	4.2	0.0	0.0	0.0	0.0	0.0	7.1	6.9	6.9	3.5	10.0	10.0
Cycle Q Clear(g_c), s	8.6	0.0	0.0	4.4	0.0	0.0	17.1	6.9	6.9	10.4	10.0	10.0
Prop In Lane	0.17	<u>,</u>	0.52	0.36	<u>,</u>	0.11	1.00	4450	0.09	1.00	4450	0.09
Lane Grp Cap(c), veh/h	459	0	0	440	0	0	337	1158	1140	432	1158	1141
	0.57	0.00	0.00	0.36	0.00	0.00	0.26	0.40	0.40	0.16	0.52	0.52
Avail Cap(c_a), veh/h	1107	0	0	1053	0	0	/68	2870	2825	992	2870	2826
	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.00	0.00	10.00	0.00	0.00	10.0	1.00	1.00	1.00	1.00	1.00
Iner Delay (d2), s/veh	23.0	0.0	0.0	10.0	0.0	0.0	10.0	5.5	0.0 1.0	7.9	0.9 1 7	0.9 1 7
lifting O Delay(d2), s/ven	0.0	0.0	0.0	0.5	0.0	0.0	1.9	1.0	1.0	0.0	1.7	0.0
% ile Back of O (50%), yeh/lp	0.0 3.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.5	0.0	0.0	0.0
Lane Grn Delay (d) s/veh	24.7	0.0	0.0	18.5	0.0	0.0	12.5	63	63	8.7	7.5	7.6
Lane Grp LOS	24.1 C	0.0	0.0	10.5 R	0.0	0.0	12.5 R	Δ	Δ	Δ	Δ	Δ
Approach Vol. veh/h		261			159			1000			1257	
Approach Delay, s/yeh		201			18.5			69			7.6	
Approach LOS		<u>с</u>			10.0 B			Δ			7.0 A	
		Ū			5						7.	
Limer		4			0			0			<u> </u>	
Assigned Phs		4			0 17 1			207			0	
Change Deried (V Be)		1/.1			1/.1			30.7			30.7	
Max Groop Sotting (Cmax)		4.0 25.0			4.0			4.0			4.0 96.0	
Max O Closer Time (g. a. 11) a		10.6			55.0 6.4			10.1			10.0	
(y_{t+1}) , s Green Ext Time (n, c) s		10.0			0.4			19.1			12.4	
Green Ext Time (p_0), s		1.0			1.0			15.0			13.7	
Intersection Summary			0.0									
HCM 2010 Ctrl Delay			9.6									
HUM 2010 LUS			A									
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		\$			\$		۲	∱ ⊅		۲	∱ ⊅	
Volume (veh/h)	18	1	8	57	5	122	5	435	55	155	528	11
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	190.0	186.3	190.0	190.0	186.3	190.0	186.3	186.3	190.0	186.3	186.3	190.0
Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Cap, veh/h	373	48	97	237	27	220	596	1710	216	620	1917	40
Arrive On Green	0.21	0.21	0.18	0.21	0.21	0.18	0.53	0.53	0.49	0.53	0.53	0.49
Sat Flow, veh/h	834	225	454	392	127	1031	826	3244	410	868	3636	76
Grp Volume(v), veh/h	30	0	0	200	0	0	5	271	262	168	294	292
Grp Sat Flow(s),veh/h/ln	1513	0	0	1551	0	0	826	1863	1790	868	1863	1849
Q Serve(g_s), s	0.0	0.0	0.0	2.5	0.0	0.0	0.1	2.5	2.5	4.1	2.7	2.7
Cycle Q Clear(g_c), s	0.4	0.0	0.0	3.6	0.0	0.0	2.8	2.5	2.5	6.6	2.7	2.7
Prop In Lane	0.67		0.30	0.31		0.66	1.00		0.23	1.00		0.04
Lane Grp Cap(c), veh/h	517	0	0	484	0	0	596	982	944	620	982	975
V/C Ratio(X)	0.06	0.00	0.00	0.41	0.00	0.00	0.01	0.28	0.28	0.27	0.30	0.30
Avail Cap(c_a), veh/h	1411	0	0	1496	0	0	2708	5744	5521	2838	5744	5703
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.75	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.8	0.0	0.0	11.2	0.0	0.0	4.9	4.0	4.1	5.9	4.1	4.1
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.7	0.7	1.1	0.8	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
% ile Back of Q (50%), veh/In	0.2	0.0	0.0	1.2	0.0	0.0	0.0	0.9	0.9	0.8	0.9	0.9
Lane Grp Delay (d), s/veh	9.9	0.0	0.0	11.6	0.0	0.0	4.9	4.7	4.8	7.0	4.9	4.9
Lane Grp LOS	<u>A</u>			B			<u>A</u>	<u>A</u>	A	A	Α	<u> </u>
Approach Vol, veh/h		30			200			538			754	
Approach Delay, s/veh		9.9			11.6			4.8			5.3	
Approach LOS		A			В			A			А	
Timer												
Assigned Phs		4			8			2			6	
Phs Duration (G+Y+Rc), s		10.6			10.6			20.2			20.2	
Change Period (Y+Rc), s		5.0			5.0			5.0			5.0	
Max Green Setting (Gmax), s		26.0			26.0			94.0			94.0	
Max Q Clear Time (g_c+l1), s		2.4			5.6			4.8			8.6	
Green Ext Time (p_c), s		0.9			0.9			6.6			6.6	
Intersection Summary												
HCM 2010 Ctrl Delay			6.1									
HCM 2010 LOS			A									
Notes												

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Intersection

Intersection Delay, s/veh

Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Vol, veh/h	56	57	413	50	58	570	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	0	-	-	-	0	-	
Veh in Median Storage, #	0	-	0	-	-	0	
Grade, %	0	-	0	-	-	0	
Peak Hour Factor	92	92	92	92	92	92	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	61	62	449	54	63	620	

Major/Minor	Minor1		Major1	Ν	Major2		
Conflicting Flow All	1222	476	0	0	503	0	
Stage 1	476	-	-	-	-	-	
Stage 2	746	-	-	-	-	-	
Follow-up Headway	4	3	-	-	2	-	
Pot Capacity-1 Maneuver	198	589	-	-	1061	-	
Stage 1	625	-	-	-	-	-	
Stage 2	469	-	-	-	-	-	
Time blocked-Platoon, %			-	-		-	
Mov Capacity-1 Maneuver	186	589	-	-	1061	-	
Mov Capacity-2 Maneuver	186	-	-	-	-	-	
Stage 1	625	-	-	-	-	-	
Stage 2	441	-	-	-	-	-	
Approach	WB		NB		SB		
HCM Control Delay, s	27		0		1		

Minor Lane / Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	284	1061	-
HCM Lane V/C Ratio	-	-	0.432	0.059	-
HCM Control Delay (s)	-	-	27	8.607	-
HCM Lane LOS			D	А	
HCM 95th % tile Q(veh)	-	-	2.073	0.189	-

Notes

Intersection

Intersection Delay, s/veh 88.3

N /		FDT						NDT		001	ODT	000
Movement	EBL	ERI	EBK	VVBL	WRI	WBR	NBL	NRI	NRK	SBL	SBT	SBR
Vol, veh/h	33	45	51	29	18	89	51	816	6	38	1123	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	0	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	36	49	55	32	20	97	55	887	7	41	1221	33

Major/Minor	Minor2			Minor1			Major1		1	Major2		
Conflicting Flow All	1884	2324	627	1718	2337	447	1253	0	0	893	0	0
Stage 1	1320	1320	-	1001	1001	-	-	-	-	-	-	-
Stage 2	564	1004	-	717	1336	-	-	-	-	-	-	-
Follow-up Headway	4	4	3	4	4	3	2	-	-	2	-	-
Pot Capacity-1 Maneuver	43	# 37	426	58	36	559	551	-	-	755	-	-
Stage 1	166	225	-	260	319	-	-	-	-	-	-	-
Stage 2	478	318	-	387	221	-	-	-	-	-	-	-
Time blocked-Platoon, %								-	-		-	-
Mov Capacity-1 Maneuver	# 16	# 31	426	-	31	559	551	-	-	755	-	-
Mov Capacity-2 Maneuver	# 16	# 31	-	-	31	-	-	-	-	-	-	-
Stage 1	149	213	-	234	287	-	-	-	-	-	-	-
Stage 2	332	286	-	245	209	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	\$ 1586			Error			1			0		

Minor Lane / Major Mvmt	NBL	NBT	NBR EBLn1	WBLn1	SBL	SBT	SBR	
Capacity (veh/h)	551	-	- 35	Error	755	-	-	
HCM Lane V/C Ratio	0.101	-	- 4.006	Error	0.055	-	-	
HCM Control Delay (s)	12.263	-	-\$ 1586.1	Error	10.044	-	-	
HCM Lane LOS	В		F	Error	В			
HCM 95th % tile Q(veh)	0.334	-	- 16.365	Error	0.173	-	-	

Notes

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Intersection

Intersection Delay, s/veh

1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	0	135	938	135	0	1143
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	_	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	147	1020	147	0	1242

Major/Minor	Minor1		Major1	Ν	1ajor2		
Conflicting Flow All	1714	583	0	0	1166	0	
Stage 1	1093	-	-	-	-	-	
Stage 2	621	-	-	-	-	-	
Follow-up Headway	4	3	-	-	2	-	
Pot Capacity-1 Maneuver	81	456	-	-	595	-	
Stage 1	283	-	-	-	-	-	
Stage 2	498	-	-	-	-	-	
Time blocked-Platoon, %			-	-		-	
Mov Capacity-1 Maneuver	81	456	-	-	595	-	
Mov Capacity-2 Maneuver	81	-	-	-	-	-	
Stage 1	283	-	-	-	-	-	
Stage 2	498	-	-	-	-	-	
Approach	WB		NB		SB		
HCM Control Delay, s	17		0		0		

Minor Lane / Major Mvmt	NBT	NBR	WBLn1	SBL	SBT	
Capacity (veh/h)	-	-	456	595	-	
HCM Lane V/C Ratio	-	-	0.322	-	-	
HCM Control Delay (s)	-	-	16.6	0	-	
HCM Lane LOS			С	А		
HCM 95th % tile Q(veh)	-	-	1.375	0	-	

Notes

APPENDIX F

Valet Queuing Analysis

Queuing Analysis based on ITE Procedures

q = 80 veh/hr (demand rate)
Q = 30 veh/hr (service rate)
$$p = \frac{q}{NQ} = 0.5333$$
 (N = 5 valet runners)

Q_M = 0.5333

Using Acceptable Probability of 10% (90% Confidence Level)

$$M = \left(\frac{\text{Ln } (x > M) - \text{Ln } (Q_M)}{\text{Ln } (p)}\right) - 1$$
$$M = \left(\frac{\text{Ln}(0.10) - \text{Ln}(0.5333)}{\text{Ln}(0.5333)}\right) - 1$$
$$M = \left(\frac{-2.3026 - (-0.6287)}{-0.6287}\right) - 1$$

M = 2.66 - 1 = 1.66, say 2 vehicles

