March 23, 2018



5757 Collins Avenue

c/o Mr. Matthew A. Barnes, AICP Consultant Akerman, LLP 98 Southeast Seventh Street, Suite 1100 Miami, Florida 33131

Review Report – Traffic Study 5775 Collins - Response to Review Comments Re: (March 20, 2018)

Dear Matt:

We received traffic-related comments in connection with the 5775 Collins Development project. The responses to the traffic-related comments are provided below:

- 1. Please clarify the land use code and the ITE trip generation edition used. There are conflicting references within the document. The land use code is LUC 222 and the ITE trip generation edition is the 10th. The text in the report was revised accordingly.
- 2. It seems that the study used the average rate to determine the trip generation for land use code 222. The best fit formula should be used. The best fit formula was used for the trip generation calculations. The trip generation was revised accordingly.
- 3. The project is located in TAZ 627 not 527. Please review Table 2 and the proposed traffic assignment.

Table 2 was revised and the project traffic assignment was updated.

- 4. Figure 3 should identify the trips assigned to the intersection of 63rd street at Indian Creek and Collins Avenue. Trips assigned to the intersection of 63rd street at Indian Creek and Collins Avenue were added to Figure 3.
- 5. Intersection Analysis
- a. The synchro models should include all the intersections to be analyzed. Please model the intersection of Collins Avenue at 5875 Block. The updated SYNCHRO files include the intersections analyzed.
- b. The synchro file models are showing the intersection at 65th street. However, there was no reference to them on the study. The 65th Street intersection was deleted from the SYNCHRO file.
- c. The signal timings or existing volumes for the intersections of 63rd street at Indian Creek and Collins Avenue were not provided within the appendix. Timings and volumes were added to Appendix B.



6. Valet Operations

a. Please indicate how the service rate was determined. The study assumes various times for different parts of the service, but it doesn't indicate how those times were determined.

The service rate includes four components (ticket processing time, driving time, parking time and walking period). Since the parking garage is on site, the driving time to a parking space was assumed to be 2 minutes and the walking time through the building at 1 minute. Based on discussions with mechanical lifts manufacturers and as used in other projects in Miami Beach, 2 minutes appears to be the average time to park or unpark a vehicle from a mechanical parking system. For purposes of this evaluation, we used 3 minutes.

- **b.** Please indicate the type of mechanical parking system and its operational characteristics.
- c. The type of mechanical parking system has not been selected yet. It will likely between Klaus or ParkPlus.
- 7. Figures 1-3 should include the complete study area. Figure 3 has a typo in the legend.

Figures 1-3 were revised accordingly.

8. Please provide figures summarizing the intersections existing background and expected volumes.

Figures 4, 5, and 6 were added to Appendix E

9. Appendix E – shows that a growth rate of 1.5% was used in the analysis. Please provide supportive documentation.

Documentation supporting the 1.5% growth rate was added to Appendix B.

- 10. Loading and Trash Pickup Please indicate the type of loading vehicles that will be serving the project and provide a loading zone maneuverability analysis. In addition, please discuss the garbage pickup operations and provide maneuverability analysis diagrams for this operation as well. The attached diagram depicts the trash pickup route.
- **11.** This project requires the installation of bike racks. Please show their location on the proposed site plan.

The attached plan shows the bike racks within the site.

12. The trip distribution and circulation section has a typo indicating a restaurant use.

The text in the report was revised.

Please call me if you have any questions.

TRAF TECH ENGINEERING, INC.

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



5775 COLLINS AVE	GARAGE - EL3.6' NGVD		2018.03.23	A-1-01
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5775 Collins Avenue March/2018 Vehicle Maneuvering Study Loading Area



March 22, 2018

5757 Collins Avenue

c/o Mr. Matthew A. Barnes, AICP Consultant Akerman, LLP 98 Southeast Seventh Street, Suite 1100 Miami, Florida 33131

Re: 5775 Collins Avenue – Traffic Study

Dear Matt:

Traf Tech Engineering, Inc. is pleased to provide you with the results of the traffic study conducted for the proposed re-development of the existing residential development located at 5775 Collins Avenue in the City of Miami Beach in Miami-Dade County, Florida. Figure 1 depicts the location of the project site and the nearby transportation network. The existing residential development will be replaced with a less-intense residential building consisting of 89 high-rise residential units. Even though the existing residential development currently has 10 residential units currently occupied, the new project impacts associated with all 89 high-rise units will be assessed herein. It is important to note that the current residential development is more intense (more residential units) than the proposed building and the current building can be fully occupied without the need for a traffic study. However, as discussed with the City of Miami Beach, the future traffic impacts with the 89 high-rise units are documented herein.

This following section addresses the existing roadway system located in the vicinity of the project site, nearby U-turn locations, traffic counts, trip generation and trip distribution.

Existing Roadway Conditions

The roadway system located near the project site includes Collins Avenue. Collins Avenue is a six-lane divided arterial roadway with a one-lane frontage road on the east side of the roadway. The driveway to the future high-rise development will remain unchanged (right-turns only).

Nearby U-Turn Locations

For ingress and egress purposes, U-turns are expected at the signalized U-turn location at the 5800 block (north of the project site) and at a directional median opening located south of the 5775 Collins project.

Figure 2 shows the existing lane geometry of the two U-turn locations.

8400 North University Drive, Suite 309, Tamarac, Florida 33321 Tel: (954) 582-0988 Fax: (954) 582-0989



Traffic Counts

Traf Tech Engineering, Inc., in association with Video Data Solutions, Inc., collected traffic data at the two U-turn locations. These traffic counts were collected for information purposes.

The intersection turning movement counts were collected on Friday, March 10, 2017 during the PM peak period (4:00 PM to 7:00 PM). As indicated in the traffic counts, the amount of U-turn currently occurring at the two U-turn locations is minimal (less than one vehicle per minute). The existing PM peak hour traffic counts are contained in Appendix B.

Trip Generation Estimation

The trip generation for the project was based on information contained in the Institute of Transportation Engineer's (ITE) *Trip Generation Manual (10th Edition)*. According to the subject ITE manual, the most appropriate "land use" category for the proposed land use is: Land Use 222 – High Rise Apartment. Table 1 below summarizes the external trips associated with the proposed 5775 Collins residential development.

		TAB Trip Generat 5775 (LE 1 ion Summary Collins		
		Daily	AM	l (PM) Peak H	our
Land Use	Size	Trips	Ins	Out	Total
High-Rise	89	562	9 (24)	29 (15)	38 (39)

SOURCE: ITE Trip Generation Manual (10th Edition)

As indicated in Table 1, the proposed development is anticipated to generate approximately 562 new daily trips and approximately 38/39 new trips (9/24 inbound and 29/15 outbound) during the typical AM/PM peak hour. Hence, the new trips generated by the 5775 Collins development are considered minimal from a traffic engineering standpoint (one new peak hour trip every two minutes).

ITE Land Use 222 – High Rise Residential Condominium

<u>Weekday Trip Generation</u> T = 3.94 (X) + 211.81Where T = number of weekday trips and X = number of units

<u>Weekday AM Peak Hour of Adjacent Street</u> T = 0.28 (X) + 12.86 (24% inbound and 76% outbound)Where T = number of weekday PM peak hour trips and X = number of units



<u>Weekday PM Peak Hour of Adjacent Street</u> T = 0.34 (X) + 8.56 (61% inbound and 39% outbound)Where T = number of weekday PM peak hour trips and X = number of units

Trip Distribution and Traffic Circulation

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 627, which is applicable to the project site from the latest SERPM data published by Miami-Dade County.

	TABLE 2 Project Trip Distri 5775 Collins	ibution
	Direction	% of Total Trips
North:	Northwest	24.7
	Northeast	4.7
South:	Southwest	31.7
	Southeast	0.0
East:	Northeast	0.0
	Southeast	0.0
West:	Northwest	12.9
	Southwest	26.0
	Total	100.00%

Source: Miami-Dade County (2040 SERPM)

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

- 42% to/from the north via Collins Avenue
- 58% to/from the south via Collins Avenue

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 3. As depicted in Figure 3, the projected U-turns at the north and south median openings are minimal (less than one new vehicle trip every six minutes).

The traffic circulation within the site consists of the following:

• All inbound vehicles will enter via the south driveway from the Collins Avenue frontage road and drop-off at the porte-cochere area near the center of the site. The south driveway is restricted to right-turns-in only. Vehicles will be parked by entering via the north ramp that leads to the parking garage. Vehicles are



retrieved from the parking garage and returned to the porte-cochere via the south ramp. From the porte-cochere all exiting vehicles exit onto the Collins Avenue frontage road via the north driveway which is restricted to right-turns-out only.

Pedestrian Circulation

A 9-foot four-inch sidewalk is located in front of the 5775 Collins Avenue site (east side of Collins Avenue/frontage road). The wide-sidewalk provides north-south pedestrian mobility within the immediate area of the project. From the sidewalk, access to the subject residential development is provided via a pedestrian access path/stairs located between the sidewalk and the porte-cochere. Moreover, a signalized pedestrian crossing is provided at the 5800 block approximately 625 feet north of the site.

Pedestrian Facilities Analysis (Sidewalks and Crosswalks)

Based on the traffic counts contained in Appendix B, approximately 22 pedestrians used the signalized pedestrian crosswalk located at the 5800-block during the peak pedestrian hour. As shown in the signal timing plans contained in Appendix C for the signalized located at the 5800 block (timing plan refers to the location as the 5875 block, but the street sign indicates 5800 block), the subject pedestrian crossing operates with a signal cycle of 140 seconds, which results in approximately 25 pedestrian crossing opportunities per hour. Hence, the signalized pedestrian crossing at the 5800 block has 25 opportunities per hour to accommodate 22 pedestrians per hour (sufficient pedestrian capacity is available at the subject signalized pedestrian crossing).

The traffic counts contained in Appendix B show a maximum of 27 pedestrians during the peak 15-minute period using the sidewalk located on the east side of Collins Avenue/frontage road (west of the site, refer to ped column on westbound approach at Collins Ave at 5701 Block). With a sidewalk width of 9.33 feet (9 feet, 4 inches), the resulting pedestrian flow rate is approximately 0.193 pedestrians/minute/foot of sidewalk width (27 pedestrians per peak 15-minute period divided by 15 divided by 9.33). According the 2010 Highway Capacity Manual (refer to Appendix D), the resulting level of service of the sidewalk adjacent to the site is "A".

Transit Service

Miami-Dade County transit service has three (3) bus routes that travel north and south along Collins Avenue. These bus routes include S, L and 120. There is a bus stop (with a bus bench) in front of the 5775 Collins Avenue site for northbound traveling passengers. Similarly, there is another bus stop (with a bus shelter) for southbound traffic on the west side of Collins Avenue approximately 100 feet north of the 5775 Collins Avenue site.



DecoBike

DecoBike is the Official City of Miami Beach Bike Sharing & Rental program. It provides new alternative mode of transportation for both residents and visitors of the City of Miami Beach. The DecoBike Program features a network of 100 solar-powered bike rental & sharing stations. Station 302 is located within walking distance (at the 5300 block) from the 5775 Collins Site.

Transportation Demand Management

Travel Demand Management plans (TDM) establish policies and mechanisms to reduce automobile trips to and from designated facilities. TDM plans usually use several approaches to address all modes of transportation likely to be used to provide access to a facility such as single occupant driving, carpooling, transit, bicycling and walking. The goal of TDM plans is to increase the use of alternatives modes to single occupant driving, i.e., to reduce the number of automobile trips to and from the facility and consequently, minimizing automobile traffic impacts on the street system.

Successful TDM plans not only address all modes of transportation, but also use policies such as inducements for alternative modes, physical enhancements (bike lockers, preferential parking for carpools) and disincentives for automobile use..

Potential measures for each mode are addressed below.

Pedestrian Access

Walking not only reduces automobile trips and their contribution to congestion and emissions, it also provides health benefits to the residents who use this mode of transportation. In addition, the area near the subject mixed-use project is a high pedestrian traffic area and densely populated residential area and therefore, many future residents of the 5775 Collins development are expected to regularly choose walking over alternative transportation methods. Sidewalks exist on the east and south sides of Collins Avenue as well as safe pedestrian crosswalks (with ramps and pedestrian signals) at the signalized intersection of Collins Avenue and the 5800 Block.

Bicycling

The site of the 5775 Collins offers a potential approach to encourage cycling vi the use of the DecoBike program.



Use of DecoBikes will be encouraged by facilitating the acquisition of monthly passes on site. Monthly passes are \$15.00 for unlimited 30 minute rides and \$25.00 for unlimited 60 minute rides. Within the immediate area of the project, there is one convenient DecoBike rental stations (Station 302: Collins Avenue at the 5300 Block). Residents will be informed of DecoBike Stations 302. (Goal: 4 Residents).

Mass Transit

There are transit options for the 5775 Collins development. These transit routes include 120, L and S. The nearest bus stop for these services is located adjacent to the project (on both sides of Collins Avenue). These transit routes provide frequent service and access to all of Miami-Dade County as well as connections to other destinations outside of the County. Residents will be informed of the transit routes available.

Carpooling

Carpooling is historically the least effective alternative transportation mode, even when implemented on a regional basis. It is unlikely that carpooling will provide a significant amount of trip reduction. However, preferential parking could be made available to residents that carpool. (Goal: 2 Residents).

TDM Program Management

An employee of the future 5775 Collins building will be designated as the "TDM Manager" and will have assigned duties that include establishment and management of the TDM program. Said employee will need to be able to explain the bicycling, mass transit and carpooling options to residents. In addition, said employee will advise residents of the benefits relative to each mode of transportation. Materials describing the TDM program will be made available to all residents. The TDM Manager will coordinate with the City of Miami Beach, and potentially with MDT and DECOBIKES LLC for monthly transit passes and DecoBike passes respectively. The TDM Manager will need to set up a method and a schedule to monitor participation of residents for each mode of transportation. The person assigned to manage the TDM plan will be identified at the time of permitting.

Level of Service

Level of service analyses were undertaken for the AM and PM peak hours for the intersections of 63rd Street at both Indian Creek Drive and Collins Avenue. The analyses conducted for the 6372 Collins project were used as background conditions and the projected trips associated with this project were added to the above-referenced intersection system. As indicated in the SYNCHRO analyses contained in Appendix E, the impacts created by the 5775 Collins project are minimal.

TA Intersection 577:	ABLE 3 Level of Serv 5 Collins	ice	
		Future Traf	fic Conditions
Intersection	Existing	Future w/o Project	Future With Project
Indian Creek Drive & W 63 rd Street (signalized)	F (F)	F (F)	F (F)
Collins Avenue & W 63 rd Street (signalized)	B (C)	C (C)	C (C)
Collins and 5875 Block (signalized)	_	_	(A)

Source: Highway Capacity Manual Legend: AM (PM)

The projected impact to the northbound U-turn at the 5800 block is projected to be minimal. Based on the project trips depicted in Figure 3, a maximum of nine (9) vehicles will impact the subject northbound U-turn during the AM peak hour, which is one new vehicle trip every six minutes and 40 seconds (approximately one vehicle trip every 3 signal cycles).

Valet Service and Queuing

In order to determine the potential on-site vehicle stacking at the valet station as a result of the proposed mechanical parking, a queuing analysis was undertaken. The length of queue anticipated at the valet station using information contained in ITE's *Transportation and Land Development*, Chapter 8¹. For this analysis, the following input variables were used:

- <u>Service Rate</u>: For purposes of this evaluation, it was assumed that each valet runner would take approximately seven (7) minutes to park/unpark a valet vehicle. This assumption is based on the following: (1 minute for ticket processing time, 2 minutes of driving time, 3 minutes to park/unpark a vehicle within the mechanical parking system, and 1 minute of walking time back to the valet station).
- <u>Demand Rate</u>: As indicated in Table 1, a maximum of 39 inbound/outbound vehicles will arrive/depart during the highest hour.

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



Using equation 8-9b and Table 8-11 of ITE's *Transportation and Land Development*, the maximum length of queue anticipated at the 95% confidence level is eight (8) vehicle. Therefore, the on-site queueing at the valet station is not anticipated to be a problem with up to six (6) valet runners. The results of the ITE queuing procedure are contained in Appendix F.

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

Sincerely,

TRAF TECH ENGINEERING, INC.

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





PROJECT LOCATION MAP

5775 Collins Miami Beach, Florida



FIGURE 2

5775 Collins Miami Beach, Florida

EXISTING LANE GEOMETRY

Traf Tech ENGINEERING, INC.





Traf Tech ENGINEERING, INC. EXISTING TRAFFIC COUNTS AM & (PM) Peak Hour **FIGURE 4** 5775 Collins Miami Beach, Florida



Traf Tech ENGINEERING, INC. BACKGROUND TRAFFIC AM & (PM) Peak Hour **FIGURE 5** 5775 Collins Miami Beach, Florida





TOTAL TRAFFIC AM & (PM) Peak Hour **FIGURE 6** 5775 Collins Miami Beach, Florida

APPENDIX A Site Plan – 5775 Collins



5775 COLLINS AVE

SITE PLAN

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APPENDIX B

Traffic Counts and Growth Rate Information

CLIENT : TRAF TECH Engineering JOB NO : 2017-26 PROJECT: Collins Ave COUNTY : Miami-Dade

							(Groups	s Printe	ed- Auto	<u>) - Hea</u>	vy Veh	icles								
		Co	ollins A	ve			58	300 Blo	ock			C	ollins A	Ave			58	300 Blo	ock		
		So	uthbou	und			W	estbou	und			No	orthbo	und			E	astbou	ind		
Start Time	Right	Thru	Left	U-Turns	App. Total	Right	Thru	Left	U-Turns	App. Total	Right	Thru	Left	U-Turns	App. Total	Right	Thru	Left	U-Turns	App. Total	Int. Total
16:30	0	230	0	1	231	0	0	0	0	0	0	279	0	15	294	0	0	0	0	0	525
16:45	0	235	0	3	238	0	0	0	0	0	0	295	0	9	304	0	0	0	0	0	542
Total	0	465	0	4	469	0	0	0	0	0	0	574	0	24	598	0	0	0	0	0	1067
	-					-					-					-				-	
17:00	0	234	0	6	240	0	0	0	0	0	0	300	0	7	307	0	0	0	0	0	547
17:15	0	246	0	3	249	0	0	0	0	0	0	325	0	8	333	0	0	0	0	0	582
17:30	0	255	0	4	259	0	0	0	0	0	0	339	0	6	345	0	0	0	0	0	604
17:45	0	242	0	2	244	0	0	0	0	0	0	340	0	9	349	0	0	0	0	0	593
Total	0	977	0	15	992	0	0	0	0	0	0	1304	0	30	1334	0	0	0	0	0	2326
18:00	0	215	0	2	217	0	0	0	0	0	0	329	0	8	337	0	0	0	0	0	554
18:15	0	221	0	3	224	0	0	0	0	0	0	314	0	7	321	0	0	0	0	0	545
18:30	0	205	0	0	205	0	0	0	0	0	0	305	0	0	305	0	0	0	0	0	510
18:45	0	195	0	0	195	0	0	0	0	0	0	289	0	0	289	0	0	0	0	0	484
Iotal	0	836	0	5	841	0	0	0	0	0	0	1237	0	15	1252	0	0	0	0	0	2093
Grand Total	0	2278										3115	0	69	3184	0	0	0	0	0	5486
Apprch %	0	99	0	1		0	0	0	0		0	97.8	0	2.2		0	0	0	0	-	
Total %	0	41.5	0	0.4	42	0	0	0	0	0	0	56.8	0	1.3	58	0	0	0	0	0	
Auto	0	2246	0	24	2270	0	0	0	0	0	0	3078	0	69	3147	0	0	0	0	0	5417
% Auto	0	98.6	0	100	98.6	0	0	0	0	0	0	98.8	0	100	98.8	0	0	0	0	0	98.7
Heavy Vehicles																					
% Heavy Vehicles	0	1.4	0	0	1.4	0	0	0	0	0	0	1.2	0	0	1.2	0	0	0	0	0	1.3

CLIENT : TRAF TECH Engineering JOB NO : 2017-26 PROJECT: Collins Ave COUNTY : Miami-Dade



CLIENT : TRAF TECH Engineering JOB NO : 2017-26 PROJECT: Collins Ave COUNTY : Miami-Dade

		С	ollins A	Ave			58	300 BI	ock			С	ollins /	Ave			58	300 BI	ock		[
		Sc	outhbo	und			W	estbo	und			N	orthbo	und			E	astbou	ind		
Start Time	Right	Thru	Left	U-Turns	App. Total	Right	Thru	Left	U-Turns	App. Total	Right	Thru	Left	U-Turns	App. Total	Right	Thru	Left	U-Turns	App. Total	Int. Total
Peak Hour A	nalysis	From 1	16:30 t	o 18:45	5 - Peak	1 of 1															
Peak Hour fo	r Entire	Inters	ection	Begins	at 17:1	5															
17:15	0	246	0	3	249	0	0	0	0	0	0	325	0	8	333	0	0	0	0	0	582
17:30	0	255	0	4	259	0	0	0	0	0	0	339	0	6	345	0	0	0	0	0	604
17:45	0	242	0	2	244	0	0	0	0	0	0	340	0	9	349	0	0	0	0	0	593
18:00	0	215	0	2	217	0	0	0	0	0	0	329	0	8	337	0	0	0	0	0	554
Total Volume	0	958	0	11	969	0	0	0	0	0	0	1333	0	31	1364	0	0	0	0	0	2333
% App. Total																					
PHF	.000	.939	.000	.688	.935	.000	.000	.000	.000	.000	.000	.980	.000	.861	.977	.000	.000	.000	.000	.000	.966



CLIENT : TRAF TECH Engineering JOB NO : 2017-26 PROJECT: Collins Ave COUNTY : Miami-Dade

							Grou	os Printe	d- Peds								
		Collins	Ave			5800 E	Block			Collins	Ave			5800 E	Block		
		Southb	ound			Westb	ound			Northb	ound			Eastbo	ound		
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
16:30	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
16:45	Ő	Õ	Õ	Õ	0	Õ	Õ	Õ	Õ	Õ	Õ	3	0	0	Õ	0	3
Total	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4
17:00	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	9
17:15	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	5
17:30	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4
17:45	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4
Total	0	0	0	0	0	0	0	0	0	0	0	22	0	0	0	0	22
	1												1				1
18:00	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	5
18:15	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	5
18:30	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	6
18:45	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
Total	0	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0	18
A 1 - 1																	
Grand I otal	0	0	0	0	0	0	0	0	0	0	0	44	0	0	0	0	44
Apprch %	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	
Total %	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	

CLIENT : TRAF TECH Engineering JOB NO : 2017-26 PROJECT: Collins Ave COUNTY : Miami-Dade

		С	ollins A	Ave			58	300 Bl	ock			С	ollins /	Ave			58	300 Bl	ock		
		Sc	outhbo	und			W	estbo	und			N	orthbo	und			E	astbou	ind		
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
Peak Hour A	nalysis	From 1	6:30 t	o 18:45	5 - Peak	1 of 1															
Peak Hour fo	r Entire	Inters	ection	Begins	at 17:00)															
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	9	9	0	0	0	0	0	9
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	0	0	0	0	5
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	0	0	0	0	0	4
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	0	0	0	0	0	4
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	22	22	0	0	0	0	0	22
% App. Total	0	0	0	0		0	0	0	0		0	0	0	100		0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.611	.611	.000	.000	.000	.000	.000	.611



CLIENT : TRAF TECH Engineering JOB NO : 2017-26 PROJECT: Collins Ave COUNTY : Miami-Dade

							(Groups	<u>s Printe</u>	ed- Auto	<u>- Hea</u>	<u>vy Veh</u>	icles								
		Co	ollins A	ve			57	'01 Blo	ock			Co	ollins A	Ave			57	701 Blo	ock		
		So	uthbou	und			W	estbou	und			No	orthbo	und			E	astbou	ind		
Start Time	Thru	Left	U-Turn A	U-Turn B	App. Total	Right	Thru	Left	U-Turns	App. Total	Right	Thru	Left	U-Turns	App. Total	Right	Thru	Left	U-Turns	App. Total	Int. Total
16:30	221	6	4	7	238	1	0	1	0	2	3	309	0	7	319	0	0	0	0	0	559
16:45	226	5	3	11	245	1	0	0	0	1	2	313	0	7	322	0	0	0	0	0	568
Total	447	11	7	18	483	2	0	1	0	3	5	622	0	14	641	0	0	0	0	0	1127
17:00	231	3	1	5	240	2	0	1	0	3	5	325	0	2	332	0	0	0	0	0	575
17:15	233	2	0	5	240	1	0	1	0	2	4	347	0	5	356	0	0	0	0	0	598
17:30	232	0	2	2	236	2	0	0	0	2	5	372	0	3	380	0	0	0	0	0	618
17:45	219	1	11	15	246	0	0	0	0	0	1	360	0	11	372	0	0	0	0	0	618
Total	915	6	14	27	962	5	0	2	0	7	15	1404	0	21	1440	0	0	0	0	0	2409
18:00	207	2	8	8	225	1	0	0	0	1	2	350	0	8	360	0	0	0	0	0	586
18:15	201	3	3	5	212	1	0	0	0	1	3	342	0	7	352	0	0	0	0	0	565
18:30	194	1	4	4	203	2	0	0	0	2	3	336	0	7	346	0	0	0	0	0	551
18:45	197	2	3	5	207	1	0	0	0	1	2	327	0	5	334	0	0	0	0	0	542
Total	799	8	18	22	847	5	0	0	0	5	10	1355	0	27	1392	0	0	0	0	0	2244
Grand Total	2161	25	30	67	2202	12	0	з	0	15	30	2201	0	62	3/73	0	0	0	0	0	5780
	0/ 3	11	17	20	2232	80	0	20	0	15	00	07 /	0	1.8	5475	0	0	0	0	0	5700
Total %	37.4	0.4	0.7	1.3	39.7	0.2	0	0.1	0	03	0.5	58.5	0	1.0	60.1	0	0	0	0	0	
	2135	25	30	67	2266	12	0	3	0	15	30	3353	0	62	3445	0	0	0	0	0	5726
% Auto	98.8	100	100	100	98.9	100	0	100	0	100	100	99.2	0	100	QQ 2	0	0	0	0	0	99.1
Home Vohider	00.0			.00						100		00.2		.00	55.Z					0	
% Heavy Vehicles	1.2	0	0	0	1.1	0	0	0	0	0	0	0.8	0	0	0.8	0	0	0	0	0	0.9

CLIENT : TRAF TECH Engineering JOB NO : 2017-26 PROJECT: Collins Ave COUNTY : Miami-Dade



CLIENT : TRAF TECH Engineering JOB NO : 2017-26 PROJECT: Collins Ave COUNTY : Miami-Dade

		С	ollins A	Ave			5	701 Bl	ock			С	ollins /	Ave			57	701 Blo	ock		
		Sc	outhbo	und			W	estbo	und			N	orthbo	und			E	astbou	ind		
Start Time	Thru	Left	U-Turn A	U-Turn B	App. Total	Right	Thru	Left	U-Turns	App. Total	Right	Thru	Left	U-Turns	App. Total	Right	Thru	Left	U-Turns	App. Total	Int. Total
Peak Hour A	nalysis	From 2	16:30 t	o 18:45	5 - Peak	1 of 1															
Peak Hour fo	r Entire	Iysis From 16:30 to 18:45 - Peak 1 of 1 Entire Intersection Begins at 17:15 233 2 0 5 240 1 0 1 0 2 4 347 0 5 356 0 0 0 0 5 233 2 0 5 240 1 0 1 0 2 4 347 0 5 356 0 0 0 0 0 6 232 0 2 2 5 372 0 3 380 0 0 0 0 6																			
17:15	233	2	0	5	240	1	0	1	0	2	4	347	0	5	356	0	0	0	0	0	598
17:30	232	0	2	2	236	2	0	0	0	2	5	372	0	3	380	0	0	0	0	0	618
17:45	219	1	11	15	246	0	0	0	0	0	1	360	0	11	372	0	0	0	0	0	618
18:00	207	2	8	8	225	1	0	0	0	1	2	350	0	8	360	0	0	0	0	0	586
Total Volume	891	5	21	30	947	4	0	1	0	5	12	1429	0	27	1468	0	0	0	0	0	2420
% App. Total																					
PHF	.956	.625	.477	.500	.962	.500	.000	.250	.000	.625	.600	.960	.000	.614	.966	.000	.000	.000	.000	.000	.979



CLIENT : TRAF TECH Engineering JOB NO : 2017-26 PROJECT: Collins Ave COUNTY : Miami-Dade

							Group	os Printe	ed- Peds								
		Collin	s Ave			5701 E	Block			Collins	s Ave			5701 E	Block		
		South	bound			Westb	ound			Northb	ound			Eastb	ound		
Start Time	Thru	Left	U-Turn A	U-Turn B	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
16:30	0	0	0	0	0	0	0	5	0	0	0	4	0	0	0	2	11
16:45	0	0	0	0	0	0	0	6	0	0	0	1	0	0	0	7	14
Total	0	0	0	0	0	0	0	11	0	0	0	5	0	0	0	9	25
17:00	0	0	0	0	0	0	0	11	0	0	0	3	0	0	0	4	18
17:15	0	0	0	0	0	0	0	16	0	0	0	1	0	0	0	2	19
17:30	0	0	0	0	0	0	0	16	0	0	0	1	0	0	0	9	26
17:45	0	0	0	0	0	0	0	13	0	0	0	2	0	0	0	3	18
Total	0	0	0	0	0	0	0	56	0	0	0	7	0	0	0	18	81
1					I												I
18:00	0	0	0	0	0	0	0	27	0	0	0	2	0	0	0	10	39
18:15	0	0	0	0	0	0	0	23	0	0	0	1	0	0	0	7	31
18:30	0	0	0	0	0	0	0	15	0	0	0	3	0	0	0	5	23
18:45	0	0	0	0	0	0	0	13	0	0	0	1	0	0	0	3	17
Total	0	0	0	0	0	0	0	78	0	0	0	7	0	0	0	25	110
Grand Total	0	0	0	0	0	0	0	145	0	0	0	10	0	0	0	52	216
Appreh %	0	0	0	0	0	0	0	100	0	0	0	100	0	0	0	100	210
Total %	0	0	0	0	0	0	0	67.4	0	0	0	001	0	0	0	24.4	
Total %	0	0	0	0	0	0	0	07.1	0	0	0	8.8	0	0	0	24.1	

TRAFFIC SURVEY SPECIALISTS, INC. 85 SE 4TH AVENUE, UNIT 109 DELRAY BEACH, FLORIDA PHONE (561)272-3255

Site Code : 00170131 Start Date: 08/04/17 File I.D. : 63STCOLL Page : 1

ALL VEHICLES

	COLLINS	AVENUE			DRIVEWA	Y			COLLINS	AVENUE			63RD ST	REET			
	From No	rth			From Eas	st			From So	uth			From We	st			
	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	 UTurn	Left	Thru	Right	Total
Date 08,	/04/17 -									•							
07:00	0	0	0	0	0	0	0	0	0	29	110	0	0	87	2	0	228
07:15	0	0	0	0	0	0	0	0	0	14	106	1	0	91	1	0	213
07:30	0	0	0	0	0	0	0	0	0	25	124	0	1	97	2	0	249
07:45	0	0	0	0	0	0	0	0	0	29	120	1	1	110	5	0 1	266
Hr Total	L O	0	0	0	0	0	0	0	0	97	460	2	2	385	10	0	956
08:00	0	0	0	0	0	0	0	0	0	40	135	0	1 0	105	5	0	285
08:15	0	0	0	0	0	0	0	0	0	37	124	0	1	100	2	0 1	264
08:30	0	0	0	0	0	0	0	0	0	51	128	1	1	109	4	0	294
08:45	0	0	0	0	L0	0	0	0	0	48	154	1	2	114	5	0 1	324
Hr Total	0	0	0	0	0	0	0	0	0	176	541	2	4	428	16	0	1167
	* BRI	EAK *															
16:00	0	0	0	0	0	0	0	0	0	57	230	1	1	158	1	0	448
16:15	0	0	0	0	0	0	0	0	0	61	260	0	1	191	2	0 1	515
16:30	0	0	0	0	0	0	0	0	0	89	337	0	1	198	1	0	626
16:45	0	0	0	0	0	0	0	0	0	59	279	1		195	5	0	539
Hr Total	0	0	0	0	0	0	0	0	0	266	1106	2	3	742	9	0	2128
17:00	0	0	0	0	O	0	0	0	0	71	287	1	0	209	1	0	569
17:15	0	0	0	0	0	0	0	0	0	67	327	0	3	203	2	0	602
17:30	0	0	0	0	0	0	0	0	0	79	286	0	0	191	2	0	558
17:45	0	0	0	0	0	0	0	0	0	61	219	0	2	192	0	0	474
Hr Total	0	0	0	0	0	0	0	0	0	278	1119	1	5	795	5	0	2203
TOTAL	0	0	0	 0	0			0	0	817	3226	7	14	2350	40	o I	6454

TRAFFIC SURVEY SPECIALISTS, INC. 85 SE 4TH AVENUE, UNIT 109 DELRAY BEACH, FLORIDA PHONE (561)272-3255

Site Code : 00170131 Start Date: 08/04/17 File I.D. : 63STCOLL Page : 2

ALL VEHICLES COLLINS AVENUE DRIVEWAY COLLINS AVENUE 63RD STREET From North From East From South From West Т 1 1 UTurn Left Thru Right | Total Date 08/04/17 -----Peak Hour Analysis By Entire Intersection for the Period: 07:00 to 09:00 on 08/04/17 Peak start 08:00 08:00 08:00 08:00 1 Volume 0 0 0 0 0 0 0 0 0 176 541 2 4 428 16 0 | 08 Percent 08 08 0% 0% 0% 0% 0% 0% 24% 75€ 0% 1% 96% 48 0% 0 Pk total 0 719 448 Highest 07:00 ł 07:00 08:45 1 08:45 0 0 Volume 0 0 0 0 0 0 0 2 114 48 154 1 | 5 0 | Hi total 0 121 1 0 203 PHF . 0 1 . 0 .89 1 1 . 93 COLLINS AVENUE 0 0 0 . 0 432 541 0 _ _ _ _ - - -- -- --0 0 0 0 0 973 0 0 973 0 63RD STREET 0 176 · ALL VEHICLES 0 176 0 0 0 0 432 432 0 624 18 0 16 16 448 Intersection Total 0 1,167 18 16 2 0 0 DRIVEWAY 719 719 0 0 0 176 541 2 0 0 0 - - -0 176 2 541 0 COLLINS AVENUE

TRAFFIC SURVEY SPECIALISTS, INC. 85 SE 4TH AVENUE, UNIT 109 DELRAY BEACH, FLORIDA PHONE (561)272-3255

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ALL VEHICLES



TRAFFIC SURVEY SPECIALISTS, INC. 85 SE 4TH AVENUE, UNIT 109 DELRAY BEACH, FLORIDA PHONE (561)272-3255

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PEDESTRIANS & BIKES

	COLLINS AVENUE From North					Y			COLLINS	G AVENUE	5		63RD ST				
	1101111	/1 Cm				100				ucn			FLOM WE	sc			
	Left	BIKES	Right	Peds	Left	BIKES	Right	Peds	Left	BIKES	Right	Peds	Left	BIKES	Right	Peds	Total
Date 08/	/04/17 -									•							
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	2	0	0	0	0	0	3	0	0	0	0	5
07:30	0	0	0	0	0	0	0	2	0	1	0	1	0	0	0	5	9
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	12
Hr Total	0	0	0	0	0	2	0	2	0	1	0	4	0	0	0	17	26
08:00	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	8
08:15	0	0	0	0	0	0	0	0	0	1	0	3	0	0	0	7	11
08:30	0	0	0	0	0	0	0	0	0	0	0	5	0	1	0	0	6
08:45	. 0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	5	11
Hr Total	. 0	0	0	0	0	0	0	0	0	1	0	22	0	1	0	12	36
	* BR	EAK * -								•	~~						
16:00	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	13	17
16:15	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	1	5
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	8
16:45	0	0	0	0	0	0	0	0	0	0	0	10	0	1	0	6	17
Hr Total	0	0	0	0	0	0	0	0	0	0	0	18	0	1	0	28	47
17:00	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	4	13
17:15	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	13	26
17:30	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	14	17
17:45	0	0	0	0	0	0	0	0	0	3	0	8	0	1	0	3	15
Hr Total	0	0	0	0	0	0	0	0	0	3	0	33	0	1	0	34	71
TOTAL	0	0	0	0	0	2	0	2	0	5	0	77	0	3	0	91	180

Lambordy C3ST 2 La Gorce Palace ins Alc ~ Miami Beach, FLorida June 20, 2014 drawn by: Luis Palomino signalized RD 8-4-17

63RD STREET & INDIAN CREEK DRIVE MIAMI BEACH, FLORIDA COUNTED BY: S. SALVO & W. DE LUNA VARGAS SIGNALIZED

TRAFFIC SURVEY SPECIALISTS, INC. 85 SE 4TH AVENUE, UNIT 109 DELRAY BEACH, FLORIDA PHONE (561)272-3255

Site Code : 00170131 Start Date: 08/04/17 File I.D. : 63STINDI Page : 1

ALL VEHICLES

	INDIAN From No	CREEK E rth	RIVE		63RD STREET From East				INDIAN CREEK DRIVE From South				63RD ST From We				
	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	 UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	Total
Date 08/	/04/17 -													• • • • • • •			
07:00	0	13	213	261	0	9	0	21		0	0	0		10	0.5	10	
07:15	2	12	216	369		4	0	11		0	0	0		40	00	12	655
07:30	1	9	251	463	1 0	4	õ	18	0	0	0	0		54	90	10	770
07:45	0	16	303	454	1	13	0	19	0	0	0	0		76	00	22	1004
Hr Total	L 3	50	983	1547	1 1	30	0	69	0	0	0	0	0	226	362	57	3328
08.00	2	21	200	533								540					
00.15	2	21	200	531		11	0	29	0	0	0	0	0	69	93	13	1057
09.30	1	17	330	532		10	0	23	0	0	0	0	0	69	112	13	1093
08.45	1	22	357	556		19	0	33	0	0	0	0	0	108	105	20	1215
Hr Total	4	62	1260	2152		16	0	30	0	0	0	0	0	111	99	22	1124
		00	1200	2131	1 0	50	0	112	0	0	0	0	0	357	409	68	4489
	* BRI	EAK * -									.						
16:00	1	21	207	329	0	7	0	44	0	0	0	0	0	230	152	27	1018
16:15	2	21	193	333	0	8	0	40	0	0	0	0	0	285	189	35	1106
16:30	1	27	237	328	0	11	0	68	0	0	0	0	0	232	167	37	1108
16:45	4	17	194	309	1	7	0	50	0	0	0	0	0	252	177	33	1044
Hr Total	. 8	86	831	1299	1	33	0	202	0	0	0	0	0	999	685	132	4276
17:00	0	23	188	370	1	4	0	69	0	0	0	0	0	288	182	28	1153
17:15	4	17	211	338	0	9	0	56	0	0	0	0	0	305	192	23	1155
17:30	2	14	198	308	0	11	0	66	0	0	0	0		271	169	23	1063
17:45	0	26	184	339	0	14	0	43	1 0	0	0	0	0	278	170	27	1003
Hr Total	6	80	781	1355	1	38	0	234	0	0	0	0	0	1142	713	100	4450
TOTAL	21	279	3855	6358	3	157	0	620	0	0	0	0	0	2724	2169	357	16543




TRAFFIC SURVEY SPECIALISTS, INC.

63RD STREET & INDIAN CREEK DRIVE MIAMI BEACH, FLORIDA COUNTED BY: S. SALVO & W. DE LUNA VARGAS SIGNALIZED

TRAFFIC SURVEY SPECIALISTS, INC. 85 SE 4TH AVENUE, UNIT 109 DELRAY BEACH, FLORIDA PHONE (561)272-3255

Site Code : 00170131 Start Date: 08/04/17 File I.D. : 63STINDI Page : 1

PEDESTRIANS & BIKES

	INDIAN CREEK DRIVE From North				63RD STREET From East					INDIAN CREEK DRIVE From South 				63RD STREET From West			
	Left	BIKES	Right	Peds	Left	BIKES	Right	Peds	 Left	BIKES	Right	Peds	 Left	BIKES	Right	Peds	Total
Date 08/	/04/17	·								•							
07:00	0	1	0	2	0	0	0	1	0	0	0	5	0	1	0	0	10
07:15	0	0	0	1	0	0	0	2	I 0	0	0	3	0	0	0	0	6
07:30	0	0	0	1	0	1	0	0	0	1	0	5	0	1	0	1	10
07:45	0	0	0	1	0	0	0	2	0	0	0	7	0	0	0	0	10
Hr Total	0	1	0	5	0	1	0	5	0	1	0	20	0	2	0	1	36
08:00	0	1	0	0	0	0	0	0	0	3	0	5	0	1	0	0	10
08:15	0	0	0	2	0	0	0	1	0	1	0	6	0	1	0	2	13
08:30	0	0	0	0	0	0	0	1	0	0	0	5	0	1	0	0	7
08:45	0	1	0	0	0	0	0	0) o	0	0	1	0	0	0	0	2
Hr Total	0	2	0	2	0	0	0	2	0	4	0	17	0	3	0	2	32
	* BI	REAK *								.							
16:00	0	0	0	0	0	0	0	1	0	1	0	3	1 0	2	0	2	9
16:15	0	0	0	0	0	0	0	0	0	0	0	2	0	7	0	0	9
16:30	0	1	0	0	0	0	0	2	0	0	0	2	0	0	0	0	5
16:45	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	2	7
Hr Total	. 0	1	0	0	0	0	0	3	0	1	0	12	0	9	0	4	30
17:00	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	4	9
17:15	0	0	0	0	0	0	0	1	0	1	0	7	0	1	0	7	17
17:30	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	3	6
17:45	0	2	0	0	0	0	0	0	0	3	0	5	0	2	0	1	13
Hr Total	0	2	0	1	0	0	0	1	0	4	0	19	0	3	0	15	45
TOTAL	0	6	0	8	0	1	0	11	0	10	0	68	0	17	0	22	143





FLORIDA DEPARTMENT OF TRANSPORTATION TRANSPORTATION STATISTICS OFFICE 2016 HISTORICAL AADT REPORT

COUNTY: 87 - MIAMI-DADE

SITE: 2541 - SR A1A/COLLINS AVE, 500' S OF 63 ST (MIAMI BEACH)

YEAR	AADT	DI	RECTION 1	DIRECTION 2	*K FACTOR	D FACTOR	T FACTOR
2016	21000 C	 N	21000	0	9.00	99.90	7.80
2015	20000 C	N	20000	0	9.00	99.90	4.60
2014	21500 C	Ν	21500		9.00	99.90	5.10
2013	21000 C	Ν	21000	0	9.00	99.90	6.10
2012	19000 C	Ν	19000	0	9.00	99.90	8.40
2011	17000 C	Ν	17000	0	9.00	99.90	7.50
2010	15000 C	Ν	15000	0	8.98	99.99	8.80
2009	21000 C	Ν	21000	0	8.99	99.99	8.40
2008	18000 C	Ν	18000	0	9.09	99.99	5.30
2007	16000 S		0	0	8.01	99.99	4.90
2006	16000 F				7.97	99.99	2.20
2005	16000 C	Ν	16000		8.80	99.90	5.50
2004	17000 C	Ν	17000		9.00	99.90	8.20
2003	18000 C	Ν	18000		8.80	99.90	4.90
2002	18500 C	Ν	18500		9.80	99.90	2.60
2001	18500 C	Ν	18500		8.20	99.90	3.00

AADT FLAGS: C = COMPUTED; E = MANUAL ESTIMATE; F = FIRST YEAR ESTIMATE S = SECOND YEAR ESTIMATE; T = THIRD YEAR ESTIMATE; R = FOURTH YEAR ESTIMATE V = FIFTH YEAR ESTIMATE; 6 = SIXTH YEAR ESTIMATE; X = UNKNOWN *K FACTOR: STARTING WITH YEAR 2011 IS STANDARDK, PRIOR YEARS ARE K30 VALUES



*Axle-Adjusted

APPENDIX C

Signal Timing Plan (Collins Avenue and 5800/5875 Block)

TOD Schedule Report for 3923: Collins Av@5875 Blk

Print Time

3/21/2017 10:43 AM TOD TOD <u>Active</u> Active **Intersection** Schedule **Op Mode** <u>Plan #</u> **Offset** Setting PhaseBank Maximum Asset Cycle 3923 Collins Av@5875 Blk DOW-3 TOD [02] PRE-AM PEAK 100 35 Max 2 N/A 1 <u>Splits</u> <u>PH 1</u> <u>PH 2</u> <u>PH 5</u> <u>PH 3</u> <u>PH 4</u> <u>PH 6</u> <u>PH 7</u> <u>PH 8</u> SBL NBT NWT PED SBT ---0 37 33 0 37 0 0 11 N/A

Active Phase Bank: Phase Bank 1

Print Date:

Phase	<u>Walk</u>	<u>Don't Walk</u>	<u>Min Initial</u>	<u>Veh Ext</u>	<u>Max Limit</u>	<u>Max 2</u>	Yellow	Red	Last In Service Date: unknown
	Phase Bank								Last in Gervice Date. Unknown
	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3			Permitted Phases
1 SBL	0 - 0 - 0	0 - 0 - 0	5 - 5 - 5	2 - 2 - 2	15 - 15 - 15	30 - 28 - 28	3.7	2.3	
2 NBT	0 - 0 - 0	0 - 0 - 0	16 - 16 - 16	1 - 1 - 1	30 - 30 - 30	0 - 0 - 0	4	2.3	<u>12345678</u>
3 NWT	0 - 0 - 0	0 - 0 - 0	5 - 5 - 5	2 - 2 - 2	9 - 9 - 9	12 - 12 - 12	4	3.3	Default 1234-6
4 PED	5 - 5 - 5	27 - 27 - 27	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	3.7	2.3	External Permit 0
5 -	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0	0	External Permit 1
6 SBT	0 - 0 - 0	0 - 0 - 0	16 - 16 - 16	1 - 1 - 1	30 - 30 - 30	0 - 0 - 0	4	2.3	External Permit 2
7 -	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0	0	
8 -	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0	0	L

TOD Schedule Report for 3923: Collins Av@5875 Blk

Print Date: 3/21/2017

Print Time 10:43 AM

					G	Green 1	Time					
Current	<u>t</u> dule Plan	Cycle	1 SBI	2 NBT	3 NWT	4 PED	5	6 SBT	7	8	Ring Offset	Offset
	2	100	**	37	11	33	0	37	0	0		35
0700	18	140	**	77	11	33	0	77	0	0	0	101
0930	2	100	**	37	11	33	0	37	0	0	0	35
1500	19	140	**	77	11	33	0	77	0	0	0	11
2200	2	100	**	37	11	33	0	37	0	0	0	35
	1	90	**	30	8	33	0	30	0	0	0	79
	3	100	**	37	11	33	0	37	0	0	0	49
	4	140	**	78	10	33	0	78	0	0	0	59
	5	100	**	37	11	33	0	37	0	0	0	44
	6	100	**	37	11	33	0	37	0	0	0	44
	8	105	**	42	11	33	0	42	0	0	0	6
	9	105	**	42	11	33	0	42	0	0	0	8
	10	120	**	58	10	33	0	58	0	0	0	62
	11	140	**	78	10	33	0	78	0	0	0	6
	12	120	**	57	11	33	0	57	0	0	0	84
	13	100	**	37	11	33	0	37	0	0	0	44
	14	105	**	42	11	33	0	42	0	0	0	59
	15	120	**	57	11	33	0	57	0	0	0	84
	16	100	**	37	11	33	0	37	0	0	0	45
	17	100	**	37	11	33	0	37	0	0	0	35
	20	120	**	58	10	33	0	58	0	0	0	62
	21	120	**	58	10	33	0	58	0	0	0	62
	22	90	**	28	10	33	0	28	0	0	0	55
	23	90	**	28	10	33	0	28	0	0	0	55

Local TOD Schedule									
Time	<u>Plan</u>	DOW							
0000	1	Su S							
0000	2	M T W Th F							
0700	18	M T W Th F							
0930	2	M T W Th F							
1000	2	Su S							
1500	19	M T W Th F							
2000	1	Su S							
2200	2	M T W Th F							

7 - X-PED OMIT

8 - TBA

Currei	Current Time of Day Function				Time of Day Function		* Settings		
<u>Time</u> 0000	Function TOD OUTPUTS	<u>Settings *</u> 	Day of Week SuM T W ThF S	<u>Time</u> 0000	Function TOD OUTPUTS	Settings	* <u>Day of Week</u> SuM T W ThF S	Blank - FREE - Phase Bank 1, Max 1 Blank - Plan - Phase Bank 1, Max 2 1 - Phase Bank 2, Max 1 2 - Phase Bank 2, Max 2 3 - Phase Bank 3, Max 1 4 - Phase Bank 3, Max 2 5 - EXTERNAL PERMIT 1 6 - EXTERNAL PERMIT 2	

TOD Schedule Report for 3923: Collins Av@5875 Blk

Print Date: 3/21/2017

Print Time 10:43 AM

No Calendar Defined/Enabled

						'	OD Schedule Report								
Print Date: 8/17/2013		for 2689: Collins Av&63 St													
Asset		TOD Intersection Schedu			<u>TOD</u> hedule	<u>Op Mode</u>	<u> Plan #</u>	<u>Cycle</u>	<u>Offset</u>	<u>TOD</u> <u>Setting</u>	<u>Active</u> <u>PhaseBank</u>	<u>Active</u> <u>Maximum</u>			
2689	2689 Collins Av&63 St			DOW-7			N/A	0	0	N/A	0	Max 0			
			<u>Sp</u>	<u>lits</u>											
<u>PH 1</u>	<u>PH 2</u>	<u>PH 3</u>	<u>PH 4</u>	<u>PH 5</u>	<u>PH 6</u>	<u>PH 7</u>	<u>PH 8</u>								
-	NBT	-	EBT	-	-	-	-								
0	0	0	0	0	0	0	0								
	↑		→												

~ .

Active Phase Bank: Phase Bank 1 Max Limit <u>Walk</u> Don't Walk Min Initial Veh Ext <u>Max 2</u> <u>Yellow</u> <u>Red</u> Phase Last In Service Date: unknown Phase Bank 1 2 3 2 3 2 3 2 3 2 3 2 3 1 1 1 1 1 **Permitted Phases** 0 - 0 - 0 0 - 0 - 0 0 - 0 - 0 0 - 0 - 0 0 - 0 - 0 0 - 0 - 0 -0 0 1 <u>12345678</u> 22 - 22 - 22 7 - 7 - 7 40 - 40 - 40 0 - 50 - 50 2 NBT 7 - 7 - 7 1 - 1 - 1 4 1 0 - 0 - 0 0 - 0 - 0 -2-4-----0 - 0 - 0 0 - 0 - 0 0 Default 3 0 - 0 - 0 0 - 0 - 0 0 **External Permit 0** 4 EBT 7 - 7 - 7 19 - 19 - 19 7 - 7 -7 1 - 1 - 1 26 - 26 - 26 47 - 47 - 47 1 -----4 - 0 - 0 **External Permit 1** 5 0 - 0 - 0 0 - 0 - 0 0 - 0 -0 0 - 0 -0 0 -0 - 0 0 0 0 ------**External Permit 2** - 0 - 0 0 - 0 - 0 0 - 0 -- 0 -0 0 -0 - 0 0 - 0 - 0 0 -----6 -0 0 0 0 - 0 0 -0 7 -0 - 0 - 0 0 - 0 0 - 0 -0 0 - 0 0 0 - 0 - 0 - 0 0 0 -8 0 - 0 - 0 0 - 0 - 0 0 - 0 -0 0 - 0 -0 0 - 0 -0 0 - 0 - 0 0 0 -

<u>Green Time</u>												
Current		- ·	1	2	3	4	5	6	7	8		
TOD Schedule	<u>Plan</u>	<u>Cycle</u>	-	NBT	-	EBT	-	-	-	-	Ring Offset	<u>Offset</u>
	1	90	0	53	0	27	0	0	0	0	0	20
	2	90	0	45	0	35	0	0	0	0	0	0
	3	90	0	53	0	27	0	0	0	0	0	80
	4	80	0	43	0	27	0	0	0	0	0	55
	5	120	0	70	0	40	0	0	0	0	0	84
	6	80	0	43	0	27	0	0	0	0	0	55
	7	90	0	40	0	40	0	0	0	0	0	9
	8	80	0	44	0	26	0	0	0	0	0	20
	9	90	0	53	0	27	0	0	0	0	0	1
	10	80	0	43	0	27	0	0	0	0	0	36
	11	80	0	43	0	27	0	0	0	0	0	55
	12	100	0	49	0	41	0	0	0	0	0	45
	13	80	0	43	0	27	0	0	0	0	0	35
	14	90	0	53	0	27	0	0	0	0	0	76
	15	90	0	45	0	35	0	0	0	0	0	36
	16	90	0	40	0	40	0	0	0	0	0	9
	17	90	0	40	0	40	0	0	0	0	0	27
	18	90	0	40	0	40	0	0	0	0	0	36
	19	120	0	73	0	37	0	0	0	0	0	32
	20	90	0	39	0	41	0	0	0	0	0	10
	21	120	0	73	0	37	0	0	0	0	0	0
	22	80	0	43	0	27	0	0	0	0	0	55
	23	80	0	43	0	27	0	0	0	0	0	55

Local TOD Schedule								
<u>Time</u>	<u>Plan</u>	DOW						
0000	13	Su	S					
0000	14	M T W Th F						
0600	1	M T W Th F						
0800	2	Su	S					
0930	17	M T W Th F						
1045	18	M T W Th F						
1300	15	M T W Th F						
1500	16	M T W Th F						
1615	7	M T W Th F						
1630	12	Su	S					
1745	20	M T W Th F						
1830	10	Su	S					
1845	19	M T W Th F						
2100	13	Su	S					
2100	3	M T W Th F						
2200	14	M T W Th F						

2 - Phase Bank 2, Max 2 3 - Phase Bank 3, Max 1 4 - Phase Bank 3, Max 2 5 - EXTERNAL PERMIT 1 6 - EXTERNAL PERMIT 2

7 - X-PED OMIT

8 - TBA

Current Time of Day Function				Local	Time of Day Function	* Settings		
Time	<u>Function</u>	<u>Settings *</u>	Day of Week	Time	Function	<u>Settings *</u>	Day of Week	Blank - FREE - Phase Bank 1, Max 1
0000	TOD OUTPUTS		SuM T W ThF S	0000	TOD OUTPUTS		SuM T W ThF S	Blank - Plan - Phase Bank 1, Max 2
								1 - Phase Bank 2, Max 1

	No C	Calenda	ar Defin	ed/Enal	bled	

TOD Schedule Report

Print Date: 1/13/2014	for 2721: Indian Creek Dr&63 St											:
Asset		Intersection	<u>1</u>	Sc	<u>TOD</u> hedule	<u>Op Mode</u>	<u>Plan #</u>	<u>Cycle</u>	<u>Offset</u>	<u>TOD</u> <u>Setting</u>	<u>Active Active</u> PhaseBank Maximum	
2721	India	n Creek Dr&	&63 St	DC	DW-2		N/A	0	0	N/A	0 Max 0	
			<u>Sp</u>	<u>lits</u>								
<u>PH 1</u>	<u>PH 2</u>	<u>PH 3</u>	<u>PH 4</u>	<u>PH 5</u>	<u>PH 6</u>	<u>PH 7</u>	<u>PH 8</u>					
-	SBT	-	-	-	-	WBL	EBT					
0	0	0	0	0	0	0	0					
	↓					F	\rightarrow					

-

Active Phase Bank: Phase Bank 1

<u>Phase</u>	<u>Walk</u>	Don't Walk	<u>Min Initial</u>	<u>Veh Ext</u>	<u>Max Limit</u>	<u>Max 2</u>	Yellow	Red	Last In Service Date	unknown
	Phase Bank								Last III Service Date.	UTIKITOWIT
	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3			Permitted Phases	
1 -	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0	0	r enninged r nases	
2 SBT	6 - 6 - 6	19 - 19 - 19	7 - 7 - 7	1 - 1 - 1	40 - 40 - 40	0 - 40 - 40	4	4		<u>12345678</u>
3 -	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0	0	Default	-278
4 -	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0	0	External Permit 0	
5 -	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0	0	External Permit 1	
6 -	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0 - 0 - 0	0	0	External Permit 2	
7 WBL	0 - 0 - 0	0 - 0 - 0	5 - 5 - 5	2 - 2 - 2	7 - 7 - 7	12 - 12 - 12	3.4	2.9		
<u>8 EBT</u>	6 - 6 - 6	16 - 16 - 16	7 - 7 - 7	5 - 5 - 5	24 - 24 - 24	125 - 125 - 12	4	2.9		

						Green	<u>Time</u>					
<u>Current</u>			1	2	3	4	5	6	7	8		
TOD Schedule	<u>Plan</u>	<u>Cycle</u>	-	SBT	-	-	-	-	WBL	EBT	Ring Offset	<u>Offset</u>
	1	180	0	92	0	0	0	0	8	59	0	0
	2	90	0	37	0	0	0	0	9	23	0	69
	4	180	0	130	0	0	0	0	6	23	0	47
	5	120	0	45	0	0	0	0	6	48	0	15
	8	80	0	27	0	0	0	0	6	26	0	39
	9	90	0	38	0	0	0	0	8	23	0	62
	10	80	0	27	0	0	0	0	7	25	0	17
	11	80	0	30	0	0	0	0	6	23	0	21
	12	100	0	32	0	0	0	0	8	39	0	27
	13	80	0	27	0	0	0	0	6	26	0	19
	14	90	0	35	0	0	0	0	7	27	0	63
	15	180	0	60	0	0	0	0	7	92	0	11
	16	180	0	50	0	0	0	0	7	102	0	86
	17	180	0	74	0	0	0	0	7	78	0	7
	18	180	0	64	0	0	0	0	7	88	0	15
	20	80	0	30	0	0	0	0	6	23	0	21
	22	80	0	30	0	0	0	0	6	23	0	55
	23	80	0	30	0	0	0	0	6	23	0	70

Local TOD	Local TOD Schedule												
<u>Time</u>	<u>Plan</u>	DOW											
0000	13	Su	S										
0000	14	M T W Th F	-										
0100	8	Su	S										
0600	10	Su	S										
0700	1	M T W Th F	-										
0800	14	Su	S										
0930	17	M T W Th F	-										
1000	2	Su	S										
1045	18	M T W Th F	-										
1300	15	M T W Th F	=										
1500	16	M T W Th F	=										
1630	12	Su	S										
1830	10	Su	S										
1845	5	M T W Th F	=										
2100	13	Su	S										
2100	14	M T W Th F	=										

Current Time of Day Function				Local	Time of Day Function	* Settings		
<u>Time</u>	Function	<u>Settings *</u>	Day of Week	<u>Time</u>	Function	<u>Settings *</u>	Day of Week	Blank - FREE - Phase Bank 1, Max 1
0000	TOD OUTPUTS		SuM T W ThF S	0000	TOD OUTPUTS		SuM T W ThF S	Blank - Plan - Phase Bank 1, Max 2
								1 - Phase Bank 2 Max 1

Blank - FREE - Phase Bank 1, Max 1 Blank - Plan - Phase Bank 1, Max 2
1 Dhank Than Thate Bank 1, Max 2
1 - Phase Bank 2, Max 1
2 - Phase Bank 2, Max 2
3 - Phase Bank 3, Max 1
4 - Phase Bank 3, Max 2
5 - EXTERNAL PERMIT 1
6 - EXTERNAL PERMIT 2
7 - X-PED OMIT
8 - TBA

 No C	alendar De	efined/Enab	led	

APPENDIX D

Pedestrian LOS (Source: 2010 HCM)

Highway Capacity Manual 2010

parts of the walkway. In cross-flow locations, the LOS E–F threshold is 13 ft²/p, as indicated in the notes for Exhibit 23-1 and Exhibit 23-2.

	Average	Re	lated Measure	<u>s</u>	
LOS	Space (ft ² /p)	Flow Rate (p/min/ft) ^a	Average Speed (ft/s)	v/c Ratio ^b	Comments
A	>60	≤5	>4.25	≤0.21	Ability to move in desired path, no need to alter movements
В	>40-60	>5-7	>4.17-4.25	>0.21-0.31	Occasional need to adjust path to avoid conflicts
С	>24-40	>7-10	>4.00-4.17	>0.31-0.44	Frequent need to adjust path to avoid conflicts
D	>15-24	>10-15	>3.75-4.00	>0.44-0.65	Speed and ability to pass slower pedestrians restricted
Е	>8–15 ^c	>15–23	>2.50-3.75	>0.65-1.00	Speed restricted, very limited ability to pass slower pedestrians
F	≤8 ^c	Variable	≤2.50	Variable	Speeds severely restricted, frequent contact with other users

Notes: Exhibit 23-1 does not apply to walkways with steep grades (>5%). See the Special Cases section for further discussion.

^a Pedestrians per minute per foot of walkway width.

 b v/c ratio = flow rate/23. LOS is based on average space per pedestrian.

^c In cross-flow situations, the LOS E–F threshold is 13 ft²/p.

LOS	Average Space (ft ² /p)	Related <u>Measure</u> Flow Rate ^a (p/min/ft) ^b	Comments
A	>530	≤0.5	Ability to move in desired path, no need to alter movements
B	>90-530	>0.5-3	Occasional need to adjust path to avoid conflicts
C	>40-90	>3-6	Frequent need to adjust path to avoid conflicts
D	>23-40	>6-11	Speed and ability to pass slower pedestrians restricted
Е	>11-23°	>11-18	Speed restricted, very limited ability to pass slower pedestrians
F	≤11 ^c	>18	Speeds severely restricted, frequent contact with other users

Notes: ^a Rates in the table represent average flow rates over a 5-min period. Flow rate is directly related to space; however, LOS is based on average space per pedestrian.

^b Pedestrians per minute per foot of walkway width. ^c In cross-flow situations, the LOS E–F threshold is 13 ft²/p.

Stairways

Exhibit 23-3 provides the LOS criteria for stairways.

LOS	Average Space (ft ² /p)	Related M Flow Rate (p/min/ft) ^a	<u>Measures</u> v/c Ratio ^b	Comments
А	>20	≤5	≤ 0.33	No need to alter movements
В	>17-20	>5-6	>0.33-0.41	Occasional need to adjust path to avoid conflicts
С	>12-17	>6-8	>0.41-0.53	Frequent need to adjust path to avoid conflicts
D	>8-12	>8-11	>0.53-0.73	Limited ability to pass slower pedestrians
E	>5-8	>11-15	>0.73-1.00	Very limited ability to pass slower pedestrians
F	≤5	Variable	Variable	Speeds severely restricted, frequent contact with other users

Notes: ^a Pedestrians per minute per foot of walkway width.

^b v/c ratio = flow rate/15. LOS is based on average space per pedestrian.

Chapter 23/Off-Street Pedestrian and Bicycle Facilities December 2010 Exhibit 23-1

Exhibit 23-2 Platoon-Adjusted LOS Criteria for Walkways

Average Flow LOS Criteria for Walkways

Exhibit 23-3 LOS Criteria for Stairways

APPENDIX E

SYNCHRO Analyses (Source 6372 Collins)

Collins Avenue and 63rd Street Weekday AM Peak Hour Analysis

	Co	ollins Aven	ue					63rd Stree	t				
	1	Northboun	d	5	Southboun	d		Eastbound	ł		Westbound		
Description	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Existing Traffic (8/4/2017)	176	541					432						
Season Adjustment Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	
2016 Peak Season Traffic	183	563	0	0	0	0	449	0	0	0	0	0	
Annual Growth Rate	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	
2018 Growth Traffic	186	571	0	0	0	0	456	0	0	0	0	0	
6372 Project Trips		11					21						
2018 Background Traffic	186	582	0	0	0	0	477	0	0	0	0	0	
5775 Collins		12											
2018 Total Traffic	186	594	0	0	0	0	477	0	0	0	0	0	



Collins Avenue and 63rd Street Weekday PM Peak Hour Analysis

	Co	ollins Aven	ue					63rd Stree	t			
	1	Northboun	d	5	Southbound			Eastbound	ł	Westbound		
Description	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Existing Traffic (8/4/2017)	286	1,230					809		0			
Season Adjustment Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
2016 Peak Season Traffic	297	1,279	0	0	0	0	841	0	0	0	0	0
Annual Growth Rate	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
2018 Growth Traffic	302	1,298	0	0	0	0	854	0	0	0	0	0
6372 Project Trips		14					20					
2018 Background Traffic	302	1,312	0	0	0	0	874	0	0	0	0	0
		0										
5775 Collins		6										
2018 Total Traffic	302	1,318	0	0	0	0	874	0	0	0	0	0



Indian Creek Drive and W 63th Street Weekday AM Peak Hour Analysis

				Indi	an Creek I)rive	V 1	V 63rd Stre	et			
	1	Northboun	d		Southboun	d		Eastbound	ł	Westbound		
Description	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Existing Traffic (8/4/2017)				67	1,260	2,157	357	409	68	56		115
Season Adjustment Factor	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
						0.040	0.74	105				100
2016 Peak Season Traffic	0	0	0	70	1,310	2,243	3/1	425	/1	58	0	120
Annual Growth Rate 2018 Growth Traffic 6372 Project Trips	1.5% 0	1.5% 0	1.5% 0	1.5% 71	1.5% 1,330	1.5% 2,277	1.5% 377	1.5% 432	1.5% 72	1.5% 59	1.5% 0	1.5% 121
0372 Project mps				15	0	0		0				
2018 Background Traffic	0	0	0	84	1,338	2,283	377	440	72	59	0	121
5775 Collins					4							
2018 Total Traffic	0	0	0	84	1,342	2,283	377	440	72	59	0	121



Indian Creek Drive and W 63th Street Weekday PM Peak Hour Analysis

				Indian Creek Drive			W	/ 63rd Stre	et			
	1	lorthboun	d	5	Southboun	d		Eastbound	ł	Westbound		
Description	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Existing Traffic (8/4/2017) Season Adjustment Factor	1.04	1.04	1.04	93 1.04	830 1.04	1,345 1.04	1,077 1.04	718 1.04	121 1.04	33 1.04	1.04	243 1.04
2016 Peak Season Traffic	0	0	0	97	863	1,399	1,120	747	126	34	0	253
Annual Growth Rate 2018 Growth Traffic 6372 Project Trips	1.5% 0	1.5% 0	1.5% 0	1.5% 98 10	1.5% 876 15	1.5% 1,420 10	1.5% 1,137	1.5% 758 10	1.5% 128	1.5% 35	1.5% 0	1.5% 257
2018 Background Traffic	0	0	0	108	891	1,430	1,137	768	128	35	0	257
5775 Collins					10							
2018 Total Traffic	0	0	0	108	901	1,430	1,137	768	128	35	0	257



Collins Avenue and 5875 Block Weekday PM Peak Hour Analysis

	Co	Collins Avenue			ollins Aven	ue						
	N	lorthboun	d	S	Southboun	d		Eastbound	ł		Westbound	b
Description	U-turn	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Existing Traffic (3/10/2017) Season Adjustment Factor	1.00	1,333 1.00	1.00	1.00	958 1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2016 Peak Season Traffic	0	1,333	0	0	958	0	0	0	0	0	0	0
Annual Growth Rate 2018 Growth Traffic	1.5% 0	1.5% 1,353	1.5% 0	1.5% 0	1.5% 972	1.5% 0						
2018 Background Traffic	0	1,353	0	0	972	0	0	0	0	0	0	0
Net New Project Trips	17											
2018 Total Traffic	17	1,353	0	0	972	0	0	0	0	0	0	0





Traf Tech ENGINEERING, INC. EXISTING TRAFFIC COUNTS AM & (PM) Peak Hour **FIGURE 4** 5775 Collins Miami Beach, Florida



Traf Tech ENGINEERING, INC. BACKGROUND TRAFFIC AM & (PM) Peak Hour **FIGURE 5** 5775 Collins Miami Beach, Florida





TOTAL TRAFFIC AM & (PM) Peak Hour **FIGURE 6** 5775 Collins Miami Beach, Florida

HCM Signalized Intersection Capacity Analysis 101: Indian Creek Drive & W 63 Street

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻሻ	ፋፑ		٦		1					4 ↑	11
Traffic Volume (vph)	371	425	71	58	0	120	0	0	0	70	1310	2243
Future Volume (vph)	371	425	71	58	0	120	0	0	0	70	1310	2243
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.9	6.9		6.6		6.6					8.0	8.0
Lane Util. Factor	0.86	0.86		1.00		1.00					0.95	0.88
Frpb, ped/bikes	1.00	0.99		1.00		0.97					1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00		1.00					1.00	1.00
Frt	1.00	0.98		1.00		0.85					1.00	0.85
Flt Protected	0.95	1.00		0.95		1.00					1.00	1.00
Satd. Flow (prot)	2739	2795		1593		1375					3177	2435
Flt Permitted	0.95	1.00		0.95		1.00					1.00	1.00
Satd. Flow (perm)	2739	2795		1593		1375					3177	2435
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)	403	462	77	63	0	130	0	0	0	76	1424	2438
RTOR Reduction (vph)	0	6	0	0	0	124	0	0	0	0	0	623
Lane Group Flow (vph)	363	573	0	63	0	6	0	0	0	0	1500	1815
Confl. Peds. (#/hr)	2		17	17		2						2
Confl. Bikes (#/hr)			4			2						3
Turn Type	Split	NA		Prot		Perm				Perm	NA	Perm
Protected Phases	8	8		7							2	
Permitted Phases						7				2		2
Actuated Green, G (s)	50.5	50.5		8.0		8.0					99.5	99.5
Effective Green, g (s)	50.5	50.5		8.0		8.0					99.5	99.5
Actuated g/C Ratio	0.28	0.28		0.04		0.04					0.55	0.55
Clearance Time (s)	6.9	6.9		6.6		6.6					8.0	8.0
Vehicle Extension (s)	5.0	5.0		2.0		2.0					1.0	1.0
Lane Grp Cap (vph)	770	786		70		61					1761	1349
v/s Ratio Prot	0.13	c0.20		c0.04								
v/s Ratio Perm						0.00					0.47	c0.75
v/c Ratio	0.47	0.73		0.90		0.09					0.85	1.35
Uniform Delay, d1	53.4	58.3		85.4		82.3					33.8	40.0
Progression Factor	1.00	1.00		1.00		1.00					1.00	1.00
Incremental Delay, d2	1.0	4.2		72.6		0.2					5.4	160.5
Delay (s)	54.4	62.5		158.0		82.5					39.2	200.5
Level of Service	D	E		F		F					D	F
Approach Delay (s)		59.4			107.1			0.0			139.0	
Approach LOS		E			F			A			F	
Intersection Summary												
HCM 2000 Control Delay	у		123.0	F	ICM 20	00 Leve	l of Serv	vice	F			
HCM 2000 Volume to Ca	apacity	ratio	1.12									
Actuated Cycle Length (s)		179.5	S	Sum of I	ost time	(s)		21.5			
Intersection Capacity Ut	ilization		94.1%	I	CU Leve	el of Ser	vice		F			
Analysis Period (min)			15									

c Critical Lane Group

Timings 101: Indian Creek Drive & W 63 Street

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Lane Group	EBL	EBT	WBL	WBR	SBT	SBR	
Lane Configurations	ሻሻ	ፋፑ	٦	1	4Þ	11	
Traffic Volume (vph)	371	425	58	120	1310	2243	
Future Volume (vph)	371	425	58	120	1310	2243	
Turn Type	Split	NA	Prot	Perm	NA	Perm	
Protected Phases	. 8	8	7		2		
Permitted Phases				7		2	
Detector Phase	8	8	7	7	2	2	
Switch Phase							
Minimum Initial (s)	7.0	7.0	5.0	5.0	7.0	7.0	
Minimum Split (s)	28.9	28.9	14.0	14.0	33.0	33.0	
Total Split (s)	64.9	64.9	14.6	14.6	100.0	100.0	
Total Split (%)	36.2%	36.2%	8.1%	8.1%	55.7%	55.7%	
Yellow Time (s)	4.0	4.0	3.7	3.7	4.0	4.0	
All-Red Time (s)	2.9	2.9	2.9	2.9	4.0	4.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.9	6.9	6.6	6.6	8.0	8.0	
Lead/Lag	Lag	Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			
Recall Mode	None	None	None	None	C-Min	C-Min	
Act Effct Green (s)	50.5	50.5	8.0	8.0	99.5	99.5	
Actuated g/C Ratio	0.28	0.28	0.04	0.04	0.55	0.55	
v/c Ratio	0.47	0.73	0.90	0.70	0.85	1.24	
Control Delay	54.7	62.6	163.1	31.7	40.7	127.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	54.7	62.6	163.1	31.7	40.7	127.8	
LOS	D	Е	F	С	D	F	
Approach Delay		59.6			94.6		
Approach LOS		E			F		
Intersection Summary							
Cycle Length: 179.5							
Actuated Cycle Length:	179.5						
Offset: 30 (17%), Refer	enced to	o phase	2:SBTL	and 6:	, Start o	f Yellow	
Natural Cycle: 130							
Control Type: Actuated	-Coordir	nated					
Maximum v/c Ratio: 1.2	24						
Intersection Signal Dela	ay: 87.3				ntersec	tion LOS	: F
Intersection Capacity U	tilization	94.1%			CU Lev	el of Serv	vice
Analysis Period (min) 1	5						
Splits and Phases: 1	01: India	an Creek	C Drive &	& W 63	Street		

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100 s	14.6 s	64.9 s

Queues 101: Indian Creek Drive & W 63 Street

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Lane Group	EBL	EBT	WBL	WBR	SBT	SBR
Lane Group Flow (vph)	363	579	63	130	1500	2438
v/c Ratio	0.47	0.73	0.90	0.70	0.85	1.24
Control Delay	54.7	62.6	163.1	31.7	40.7	127.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.7	62.6	163.1	31.7	40.7	127.8
Queue Length 50th (ft)	205	353	75	0	780	~1575
Queue Length 95th (ft)	252	413	#179	#90	969	#1684
Internal Link Dist (ft)		365			1320	
Turn Bay Length (ft)	250					
Base Capacity (vph)	885	909	70	185	1760	1972
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.64	0.90	0.70	0.85	1.24

Intersection Summary

Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis 102: Collins Avenue & W 63 Street

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Movement	EBL	EBR	NBL	NBT	SBT	SBR			
Lane Configurations	ሻሻ			4†₽					
Traffic Volume (vph)	449	0	183	563	0	0			
Future Volume (vph)	449	0	183	563	0	0			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900			
Total Lost time (s)	6.3			6.3					
Lane Util. Factor	0.97			0.91					
Frpb, ped/bikes	1.00			1.00					
Flpb, ped/bikes	1.00			1.00					
Frt	1.00			1.00					
Flt Protected	0.95			0.99					
Satd, Flow (prot)	3090			4508					
Flt Permitted	0.95			0.99					
Satd. Flow (perm)	3090			4508					
Peak-hour factor PHF	0.90	0.90	0.90	0.90	0.90	0.90			
Adi Flow (vph)	499	0.00	203	626	0.00	0			
RTOR Reduction (vph)	0	0	0	0_0	0	0			
Lane Group Flow (vph)	499	0	0	829	0	0			
Confl Peds (#/hr)	100	22	12	020	Ű	12			
Confl Bikes (#/hr)		1	•=			1			
	Prot	•	Perm	NΔ		•			
Protected Phases	4		i cim	2					
Permitted Phases	т		2	2					
Actuated Green G (s)	18 3		2	59.7					
Effective Green, g (s)	18.3			59.7					
Actuated q/C Ratio	0.20			0.66					
Clearance Time (s)	63			63					
Vehicle Extension (s)	1.0			1.0					
Lane Grp Cap (vpb)	624			2070					
v/s Ratio Prot	c0 16			2310					
v/s Ratio Perm	0.10			0.18					
v/s Ratio Ferm	0.80			0.10					
Uniform Delay, d1	34.4			6.5					
Progression Eactor	1 00			1.00					
Incremental Delay, d2	6.6			0.2					
Delay (s)	/1 1			6.7					
Level of Service	י.וד- ח			0.7					
Approach Delay (s)	/1 1			67	0.0				
Approach LOS	41.1 D			0.7	0.0				
Approach 203	U			A	A				
Intersection Summary									
HCM 2000 Control Dela	у		19.6	F	ICM 200	0 Level of S	Service	В	
HCM 2000 Volume to C	apacity	ratio	0.40						
Actuated Cycle Length (s)		90.6	S	Sum of Ic	ost time (s)		12.6	
Intersection Capacity Ut	ilization		46.1%	10	CU Leve	l of Service		A	
Analysis Period (min)			15						

Critical Lane Group С

Timings 102: Collins Avenue & W 63 Street

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Lane Group	EBL	NBT	
Lane Configurations	ሻሻ	4†î⊳	
Traffic Volume (vph)	449	563	
Future Volume (vph)	449	563	
Turn Type	Prot	NA	
Protected Phases	4	2	
Permitted Phases			
Detector Phase	4	2	
Switch Phase			
Minimum Initial (s)	5.0	5.0	
Minimum Split (s)	32.3	35.3	
Total Split (s)	32.3	58.3	
Total Split (%)	35.7%	64.3%	
Yellow Time (s)	4.0	4.0	
All-Red Time (s)	2.3	2.3	
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.3	6.3	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	C-Min	
Act Effct Green (s)	18.3	59.7	
Actuated g/C Ratio	0.20	0.66	
v/c Ratio	0.80	0.28	
Control Delay	44.3	7.2	
Queue Delay	0.9	0.0	
Total Delay	45.2	7.2	
LOS	D	A	
Approach Delay	45.2	7.2	
Approach LOS	D	A	
Intersection Summary			
Cycle Length: 90.6			
Actuated Cycle Length	: 90.6		
Offset: 43 (47%), Refe	renced to	o phase	2:NBTL and 6:, Start of Yellow
Natural Cycle: 70			
Control Type: Actuated	d-Coordir	nated	
Maximum v/c Ratio: 0.	80		
Intersection Signal Del	lay: 21.5		Intersection LOS: C
Intersection Capacity L	Jtilization	46.1%	ICU Level of Service A
Analysis Period (min) 1	15		
Splits and Phases: 1	102: Colli	ns Aver	nue & W 63 Street
1 Ø2 (R)			_ <i>▶</i> ¢i4
58.3 s			

∮Ø2 (R) 58.3 s

Queues 102: Collins Avenue & W 63 Street

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Lane Group	EBL	NBT
Lane Group Flow (vph)	499	829
v/c Ratio	0.80	0.28
Control Delay	44.3	7.2
Queue Delay	0.9	0.0
Total Delay	45.2	7.2
Queue Length 50th (ft)	141	64
Queue Length 95th (ft)	181	102
Internal Link Dist (ft)	170	216
Turn Bay Length (ft)		
Base Capacity (vph)	886	2970
Starvation Cap Reductn	168	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.69	0.28
Intersection Summarv		

	٨	¥	•	Ť	ţ	4	
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	ካካ			4 † ₽			
Traffic Volume (veh/h)	449	0	183	563	0	0	
Future Volume (veh/h)	449	0	183	563	0	0	
Number	7	14	5	2			
Initial Q (Qb), veh	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00				
Parking Bus, Adj	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1676	0	1710	1676			
Adj Flow Rate, veh/h	499	0	203	626			
Adj No. of Lanes	2	0	0	3			
Peak Hour Factor	0.90	0.90	0.90	0.90			
Percent Heavy Veh, %	2	0	2	2			
Cap, veh/h	0	0	959	2968			
Arrive On Green	0.00	0.00	0.93	0.93			
Sat Flow, veh/h	0		958	3326			
Grp Volume(v), veh/h	0.0		287	542			
Grp Sat Flow(s),veh/h/ln			1370	1388			
Q Serve(g_s), s			0.6	1.5			
Cycle Q Clear(g_c), s			1.4	1.5			
Prop In Lane			0.71				
Lane Grp Cap(c), veh/h			1343	2584			
V/C Ratio(X)			0.21	0.21			
Avail Cap(c_a), veh/h			1343	2584			
HCM Platoon Ratio			1.00	1.00			
Upstream Filter(I)			1.00	1.00			
Uniform Delay (d), s/veh			0.3	0.3			
Incr Delay (d2), s/veh			0.4	0.2			
Initial Q Delay(d3),s/veh			0.0	0.0			
%ile BackOfQ(50%),veh/	′ln		0.7	0.6			
LnGrp Delay(d),s/veh			0.6	0.5			
LnGrp LOS			А	А			
Approach Vol. veh/h				829			
Approach Delay, s/veh				0.5			
Approach LOS				А			
Timer	4	0	2	4	~	0	7 0
	1	2	3	4	5	0	1 8
Assigned Phs	-	2					
Phys Duration (G+Y+RC),	S	91.0					
Change Period (Y+RC), s		" 6.3 * 50					
Max Green Setting (Gma	IX), S	° 52					
Max Q Clear Time (g_c+	11), S	3.5					
Green Ext Time (p_c), s		2.1					
Intersection Summary							
HCM 2010 Ctrl Delay			0.5				
HCM 2010 LOS			A				
Notes							
* HCM 2010 computation	al engi	ne requ	ires equ	al clear	ance tin	nes for	the phases crossing the barrier.

Existing AM Peak

Synchro 10 Light Report

HCM Signalized Intersection Capacity Analysis 101: Indian Creek Drive & W 63 Street

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻሻ	ፋፑ		۲		1					4 ↑	11
Traffic Volume (vph)	1120	747	126	34	0	253	0	0	0	97	863	1399
Future Volume (vph)	1120	747	126	34	0	253	0	0	0	97	863	1399
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.9	6.9		6.6		6.6					8.0	8.0
Lane Util. Factor	0.86	0.86		1.00		1.00					0.95	0.88
Frpb, ped/bikes	1.00	0.99		1.00		1.00					1.00	0.93
Flpb, ped/bikes	1.00	1.00		1.00		1.00					1.00	1.00
Frt	1.00	0.98		1.00		0.85					1.00	0.85
Flt Protected	0.95	0.99		0.95		1.00					0.99	1.00
Satd. Flow (prot)	2739	2790		1593		1425					3169	2339
Flt Permitted	0.95	0.99		0.95		1.00					0.99	1.00
Satd. Flow (perm)	2739	2790		1593		1425					3169	2339
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)	1167	778	131	35	0	264	0	0	0	101	899	1457
RTOR Reduction (vph)	0	6	0	0	0	254	0	0	0	0	0	607
Lane Group Flow (vph)	1027	1043	0	35	0	10	0	0	0	0	1000	850
Confl. Peds. (#/hr)			19	19								13
Confl. Bikes (#/hr)			1									1
Turn Type	Split	NA		Prot		Perm				Perm	NA	Perm
Protected Phases	8	8		7							2	
Permitted Phases						7				2		2
Actuated Green, G (s)	102.2	102.2		6.9		6.9					50.0	50.0
Effective Green, g (s)	102.2	102.2		6.9		6.9					50.0	50.0
Actuated g/C Ratio	0.57	0.57		0.04		0.04					0.28	0.28
Clearance Time (s)	6.9	6.9		6.6		6.6					8.0	8.0
Vehicle Extension (s)	5.0	5.0		2.0		2.0					1.0	1.0
Lane Grp Cap (vph)	1549	1578		60		54					877	647
v/s Ratio Prot	c0.37	0.37		c0.02								
v/s Ratio Perm						0.01					0.32	c0.36
v/c Ratio	0.66	0.66		0.58		0.19					1.14	1.31
Uniform Delay, d1	27.2	27.2		85.4		84.1					65.3	65.3
Progression Factor	1.00	1.00		1.00		1.00					1.00	1.00
Incremental Delay, d2	1.4	1.4		9.0		0.6					76.8	151.7
Delay (s)	28.7	28.6		94.4		84.7					142.1	217.0
Level of Service	С	С		F		F					F	F
Approach Delay (s)		28.6			85.9			0.0			186.5	
Approach LOS		С			F			A			F	
Intersection Summary												
HCM 2000 Control Dela	У		112.5	F	ICM 20	00 Leve	l of Serv	vice	F			
HCM 2000 Volume to C	apacity	ratio	0.86									
Actuated Cycle Length (s)		180.6	S	Sum of l	ost time	(s)		21.5			
Intersection Capacity Ut	ilization		78.9%	10	CU Leve	el of Ser	vice		D			
Analysis Period (min)			15									

c Critical Lane Group

Timings 101: Indian Creek Drive & W 63 Street

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Lane Group	EBL	EBT	WBL	WBR	SBT	SBR					
Lane Configurations	ሻሻ	ፋፑ	۲	1	41⊳	11					
Traffic Volume (vph)	1120	747	34	253	863	1399					
Future Volume (vph)	1120	747	34	253	863	1399					
Turn Type	Split	NA	Prot	Perm	NA	Perm					
Protected Phases	. 8	8	7		2						
Permitted Phases				7		2					
Detector Phase	8	8	7	7	2	2					
Switch Phase											
Minimum Initial (s)	7.0	7.0	5.0	5.0	7.0	7.0					
Minimum Split (s)	28.9	28.9	13.0	13.0	33.0	33.0					
Total Split (s)	109.0	109.0	13.6	13.6	58.0	58.0					
Total Split (%)	60.4%	60.4%	7.5%	7.5%	32.1%	32.1%					
Yellow Time (s)	4.0	4.0	3.7	3.7	4.0	4.0					
All-Red Time (s)	2.9	2.9	2.9	2.9	4.0	4.0					
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0					
Total Lost Time (s)	6.9	6.9	6.6	6.6	8.0	8.0					
Lead/Lag	Lag	Lag	Lead	Lead							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes							
Recall Mode	None	None	None	None	C-Min	C-Min					
Act Effct Green (s)	102.2	102.2	6.9	6.9	50.0	50.0					
Actuated g/C Ratio	0.57	0.57	0.04	0.04	0.28	0.28					
v/c Ratio	0.66	0.66	0.58	0.86	1.14	1.16					
Control Delay	29.9	29.4	120.1	32.7	133.2	104.7					
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0					
Total Delay	29.9	29.4	120.1	32.7	133.2	104.7					
LOS	С	С	F	С	F	F					
Approach Delay		29.6			116.3						
Approach LOS		С			F						
Intersection Summary											
Cycle Length: 180.6											
Actuated Cycle Length:	180.6										
Offset: 14 (8%), Refere	enced to	phase 2	SBTL :	and 6:,	Start of	Yellow					
Natural Cycle: 90											
Control Type: Actuated	-Coordir	nated									
Maximum v/c Ratio: 1.1	16										
Intersection Signal Delay: 74.5 Intersection LOS: E											
Intersection Capacity U	Intersection Capacity Utilization 78.9% ICU Level of Service D										
Analysis Period (min) 15											
Splits and Phases: 1	01: India	an Creek	Drive 8	& W 63	Street						

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58 s	13.6 <mark>s</mark>	109 s	

Queues 101: Indian Creek Drive & W 63 Street

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Lane Group	EBL	EBT	WBL	WBR	SBT	SBR
Lane Group Flow (vph)	1027	1049	35	264	1000	1457
v/c Ratio	0.66	0.66	0.58	0.86	1.14	1.16
Control Delay	29.9	29.4	120.1	32.7	133.2	104.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.9	29.4	120.1	32.7	133.2	104.7
Queue Length 50th (ft)	480	485	42	0	~724	~726
Queue Length 95th (ft)	568	573	#96	#150	#865	#876
Internal Link Dist (ft)		365			1320	
Turn Bay Length (ft)	250					
Base Capacity (vph)	1550	1584	61	309	877	1255
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.66	0.57	0.85	1.14	1.16

Intersection Summary

Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis 102: Collins Avenue & W 63 Street

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Movement	EBL	EBR	NBL	NBT	SBT	SBR			
Lane Configurations	ሻሻ			4 † ħ					
Traffic Volume (vph)	841	0	297	1279	0	0			
Future Volume (vph)	841	0	297	1279	0	0			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900			
Total Lost time (s)	6.3			6.3					
Lane Util. Factor	0.97			0.91					
Frpb, ped/bikes	1.00			1.00					
Flpb, ped/bikes	1.00			0.99					
Frt	1.00			1.00					
Flt Protected	0.95			0.99					
Satd. Flow (prot)	3090			4507					
Flt Permitted	0.95			0.99					
Satd. Flow (perm)	3090			4507					
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97			
Adj. Flow (vph)	867	0	306	1319	0	0			
RTOR Reduction (vph)	0	0	0	0	0	0			
Lane Group Flow (vph)	867	0	0	1625	0	0			
Confl. Peds. (#/hr)		32	31			31			
Confl. Bikes (#/hr)						1			
Turn Type	Prot		Perm	NA					
Protected Phases	4			2					
Permitted Phases			2						
Actuated Green, G (s)	30.0			48.0					
Effective Green, g (s)	30.0			48.0					
Actuated g/C Ratio	0.33			0.53					
Clearance Time (s)	6.3			6.3					
Vehicle Extension (s)	1.0			1.0					
Lane Grp Cap (vph)	1023			2387					
v/s Ratio Prot	c0.28								
v/s Ratio Perm				0.36					
v/c Ratio	0.85			0.68					
Uniform Delay, d1	28.2			15.7					
Progression Factor	1.00			1.00					
Incremental Delay, d2	6.4			1.6					
Delay (s)	34.5			17.3					
Level of Service	С			В					
Approach Delay (s)	34.5			17.3	0.0				
Approach LOS	С			В	А				
Intersection Summary									
HCM 2000 Control Dela	y		23.3	ŀ	ICM 200	0 Level of	Service	С	
HCM 2000 Volume to C	apacity	ratio	0.74						
Actuated Cycle Length (s)			90.6	5	Sum of Io	ost time (s)		12.6	
Intersection Capacity Utilization			73.5%		CU Leve	el of Servic	e	D	
Analysis Period (min)			15						
a Oritical Lana Oracia									

c Critical Lane Group
Timings 102: Collins Avenue & W 63 Street

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Lane Group	EBL	NBT	
Lane Configurations	ሻሻ	ተተኩ	
Traffic Volume (vph)	841	1279	
Future Volume (vph)	841	1279	
Turn Type	Prot	NA	
Protected Phases	4	2	
Permitted Phases			
Detector Phase	4	2	
Switch Phase			
Minimum Initial (s)	5.0	5.0	
Minimum Split (s)	32.3	35.3	
Total Split (s)	45.3	45.3	
Total Split (%)	50.0%	50.0%	
Yellow Time (s)	4.0	4.0	
All-Red Time (s)	2.3	2.3	
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.3	6.3	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	C-Min	
Act Effct Green (s)	30.0	48.0	
Actuated g/C Ratio	0.33	0.53	
v/c Ratio	0.85	0.68	
Control Delay	36.5	18.4	
Queue Delay	9.0	0.0	
Total Delay	45.5	18.4	
LOS	D	В	
Approach Delay	45.5	18.4	
Approach LOS	D	В	
Intersection Summary			
Cycle Length: 90.6			
Actuated Cycle Length	: 90.6		
Offset: 9 (10%), Refere	enced to	phase 2	R:NBTL and 6:, Start of Yellow
Natural Cycle: 70			
Control Type: Actuated	d-Coordir	nated	
Maximum v/c Ratio: 0.	85		
Intersection Signal Del	ay: 27.8		Intersection LOS: C
Intersection Capacity L	Jtilization	73.5%	ICU Level of Service D
Analysis Period (min)	15		
,			
Splits and Phases: 1	102: Colli	ins Aver	ue & W 63 Street

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45.3 s	45.3 s

Queues 102: Collins Avenue & W 63 Street

	٨	Ť
Lane Group	EBL	NBT
Lane Group Flow (vph)	867	1625
v/c Ratio	0.85	0.68
Control Delay	36.5	18.4
Queue Delay	9.0	0.0
Total Delay	45.5	18.4
Queue Length 50th (ft)	234	238
Queue Length 95th (ft)	275	341
Internal Link Dist (ft)	170	216
Turn Bay Length (ft)		
Base Capacity (vph)	1330	2390
Starvation Cap Reductn	429	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.96	0.68
Intersection Summary		

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Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	ካካ			4 † ↑			
Traffic Volume (veh/h)	841	0	297	1279	0	0	
Future Volume (veh/h)	841	0	297	1279	0	0	
Number	7	14	5	2			
Initial Q (Qb), veh	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00				
Parking Bus, Adj	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1676	0	1710	1676			
Adj Flow Rate, veh/h	867	0	306	1319			
Adj No. of Lanes	2	0	0	3			
Peak Hour Factor	0.97	0.97	0.97	0.97			
Percent Heavy Veh, %	2	0	2	2			
Cap, veh/h	0	0	785	3189			
Arrive On Green	0.00	0.00	0.93	0.93			
Sat Flow, veh/h	0		778	3564			
Grp Volume(v), veh/h	0.0		562	1063			
Grp Sat Flow(s),veh/h/ln			1428	1388			
Q Serve(g_s), s			4.1	3.9			
Cycle Q Clear(g_c), s			4.1	3.9			
Prop In Lane			0.54				
Lane Grp Cap(c), veh/h			1390	2584			
V/C Ratio(X)			0.40	0.41			
Avail Cap(c_a), veh/h			1390	2584			
HCM Platoon Ratio			1.00	1.00			
Upstream Filter(I)			1.00	1.00			
Uniform Delay (d), s/veh			0.4	0.4			
Incr Delay (d2), s/veh			0.9	0.5			
Initial Q Delay(d3),s/veh			0.0	0.0			
%ile BackOfQ(50%),veh/	Ίn		1.7	1.5			
LnGrp Delay(d),s/veh			1.2	0.8			
LnGrp LOS			А	А			
Approach Vol, veh/h				1625			
Approach Delay, s/veh				1.0			
Approach LOS				А			
Timor	1	2	2	1	F	6	7 0
		2	3	4	5	0	/ 8
Assigned Phs	-	2					
Phys Duration (G+Y+RC),	S	91.0					
Change Period (Y+Rc), s		* 20					
Max Green Setting (Gma	IX), S						
Max Q Clear Time (g_c+	11), S	6.1					
Green Ext Time (p_c), s		5.1					
Intersection Summary							
HCM 2010 Ctrl Delay			1.0				
HCM 2010 LOS			A				
Notes							
* HCM 2010 computation	al engi	ne requ	ires equ	al clear	ance tin	nes for	the phases crossing the barrier.

Existing PM Peak

Synchro 10 Light Report

HCM Signalized Intersection Capacity Analysis 101: Indian Creek Drive & W 63 Street

NBL NBT NBR SBL SBT SBR									
A* ##	NBT	NBL	WBR	WBT	WBL	EBR	EBT	EBL	Movement
मा ।।			1		۲		ፋፑ	ሻሻ	Lane Configurations
0 0 0 84 1338 2283	0	0	121	0	59	72	440	377	Traffic Volume (vph)
0 0 0 84 1338 2283	0	0	121	0	59	72	440	377	Future Volume (vph)
1900 1900 1900 1900 1900 1900	1900	1900	1900	1900	1900	1900	1900	1900	Ideal Flow (vphpl)
8.0 8.0			6.6		6.6		6.9	6.9	Total Lost time (s)
0.95 0.88			1.00		1.00		0.86	0.86	Lane Util. Factor
1.00 0.97			0.97		1.00		0.99	1.00	Frpb, ped/bikes
1.00 1.00			1.00		1.00		1.00	1.00	Flpb, ped/bikes
1.00 0.85			0.85		1.00		0.98	1.00	Frt
1.00 1.00			1.00		0.95		1.00	0.95	Flt Protected
3176 2435			1375		1593		2797	2739	Satd. Flow (prot)
1.00 1.00			1.00		0.95		1.00	0.95	Flt Permitted
3176 2435			1375		1593		2797	2739	Satd. Flow (perm)
0.92 0.92 0.92 0.92 0.92 0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	Peak-hour factor, PHF
0 0 0 91 1454 2482	0	0	132	0	64	78	478	410	Adj. Flow (vph)
0 0 0 0 0 624	0	0	126	0	0	0	6	0	RTOR Reduction (vph)
0 0 0 0 1545 1858	0	0	6	0	64	0	591	369	Lane Group Flow (vph)
2			2		17	17		2	Confl. Peds. (#/hr)
3			2			4			Confl. Bikes (#/hr)
Perm NA Perm			Perm		Prot		NA	Split	Turn Type
2					7		8	8	Protected Phases
2 2			7						Permitted Phases
98.5 98.5			8.0		8.0		51.5	51.5	Actuated Green, G (s)
98.5 98.5			8.0		8.0		51.5	51.5	Effective Green, g (s)
0.55 0.55			0.04		0.04		0.29	0.29	Actuated g/C Ratio
8.0 8.0			6.6		6.6		6.9	6.9	Clearance Time (s)
1.0 1.0			2.0		2.0		5.0	5.0	Vehicle Extension (s)
1742 1336			61		70		802	785	Lane Grp Cap (vph)
					c0.04		c0.21	0.13	v/s Ratio Prot
0.49 c0.76			0.00						v/s Ratio Perm
0.89 1.39			0.10		0.91		0.74	0.47	v/c Ratio
35.6 40.5			82.3		85.4		57.9	52.8	Uniform Delay, d1
1.00 1.00			1.00		1.00		1.00	1.00	Progression Factor
7.1 180.6			0.3		76.8		4.3	0.9	Incremental Delay, d2
42.7 221.1			82.5		162.2		62.2	53.7	Delay (s)
D F			F		F		E	D	Level of Service
0.0 152.7	0.0			108.6			58.9		Approach Delay (s)
A F	А			F			E		Approach LOS
									Intersection Summary
el of Service F	vice	of Serv	00 Level	ICM 20	F	133.6		у	HCM 2000 Control Dela
						1.15	ratio	apacity	HCM 2000 Volume to C
e (s) 21.5		(s)	ost time	Sum of l	S	179.5		s)	Actuated Cycle Length (
rvice F		vice	el of Ser	CU Leve](95.6%		ilization	Intersection Capacity Ut
						15			Analysis Period (min)
1900 100 1.00 1.00 1.00 1.00 1 1742 13 135.6 40 1.00 1.	1900 0.92 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1900 0.92 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1900 6.6 1.00 0.97 1.00 0.85 1.00 1375 1.00 1375 0.92 132 126 6 2 2 Perm 7 8.0 8.0 0.04 6.6 2.0 61 0.00 0.10 82.3 1.00 0.3 82.5 F D0 Level ost time of Ser	1900 1900 0.92 0 0 0 0 0 0 0 0 0 0 0 0 0	1900 6.6 1.00 1.00 1.00 0.95 1593 0.95 1593 0.92 64 0 64 17 Prot 7 8.0 8.0 0.04 6.6 2.0 70 c0.04 0.91 85.4 1.00 76.8 162.2 F	1900 0.92 78 0 0 17 4 0 17 4 133.6 1.15 179.5 95.6% 15	1900 6.9 0.86 0.99 1.00 2797 1.00 2797 0.92 478 6 591 	1900 6.9 0.86 1.00 1.00 0.95 2739 0.95 2739 0.95 2739 0.92 410 0 369 2 Split 8 51.5 51.5 0.29 6.9 5.0 785 0.13 0.47 52.8 1.00 0.9 5.0 785 0.13 0.47 52.8 1.00 0.9 5.0 785 0.13 0.47 52.8 1.00 0.9 5.0 785 0.13 0.47 52.8 1.00 0.9 5.0 785 0.13 0.47 52.8 1.00 0.9 5.0 785 0.13 0.47 52.8 1.00 0.9 5.0 785 0.13 0.47 52.8 1.00 0.9 5.0 785 0.13 0.47 52.8 1.00 0.9 5.0 785 0.13 0.9 5.0 785 0.13 0.9 5.0 785 0.13 0.47 52.8 1.00 0.9 5.0 785 0.13 0.47 52.8 1.00 0.9 53.7 D	Ideal Flow (vphpl) Total Lost time (s) Lane Util. Factor Frpb, ped/bikes Flpb, ped/bikes Frt Flt Protected Satd. Flow (prot) Flt Permitted Satd. Flow (perm) Peak-hour factor, PHF Adj. Flow (vph) RTOR Reduction (vph) Lane Group Flow (vph) Confl. Peds. (#/hr) Confl. Bikes (#/hr) Turn Type Protected Phases Permitted Phases Actuated Green, G (s) Effective Green, g (s) Actuated g/C Ratio Clearance Time (s) Vehicle Extension (s) Lane Grp Cap (vph) v/s Ratio Perm v/c Ratio Uniform Delay, d1 Progression Factor Incremental Delay, d2 Delay (s) Level of Service Approach Delay (s) Approach LOS Intersection Summary HCM 2000 Volume to C Actuated Cycle Length (Intersection Capacity Ut Analysis Period (min)

Timings 101: Indian Creek Drive & W 63 Street

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Lane Group	EBL	EBT	WBL	WBR	SBT	SBR		
Lane Configurations	ሻሻ	ፋኩ	۲	1	4ħ	11		
Traffic Volume (vph)	377	440	59	121	1338	2283		
Future Volume (vph)	377	440	59	121	1338	2283		
Turn Type	Split	NA	Prot	Perm	NA	Perm		
Protected Phases	. 8	8	7		2			
Permitted Phases				7		2		
Detector Phase	8	8	7	7	2	2		
Switch Phase								
Minimum Initial (s)	7.0	7.0	5.0	5.0	7.0	7.0		
Minimum Split (s)	28.9	28.9	14.0	14.0	33.0	33.0		
Total Split (s)	64.9	64.9	14.6	14.6	100.0	100.0		
Total Split (%)	36.2%	36.2%	8.1%	8.1%	55.7%	55.7%		
Yellow Time (s)	4.0	4.0	3.7	3.7	4.0	4.0		
All-Red Time (s)	2.9	2.9	2.9	2.9	4.0	4.0		
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.9	6.9	6.6	6.6	8.0	8.0		
Lead/Lag	Lag	Lag	Lead	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	C-Min	C-Min		
Act Effct Green (s)	51.5	51.5	8.0	8.0	98.5	98.5		
Actuated g/C Ratio	0.29	0.29	0.04	0.04	0.55	0.55		
v/c Ratio	0.47	0.74	0.91	0.71	0.89	1.27		
Control Delay	54.0	62.4	166.4	31.6	43.9	141.7		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	54.0	62.4	166.4	31.6	43.9	141.7		
LOS	D	E	F	C	D	F		
Approach Delay		59.2			104.1			
Approach LOS		E			F			
Intersection Summary								
Cycle Length: 179.5								
Actuated Cycle Length:	179.5							
Offset: 30 (17%), Refer	enced to	o phase	2:SBTL	and 6:	, Start o	f Yellow		
Natural Cycle: 150								
Control Type: Actuated-	-Coordir	nated						
Maximum v/c Ratio: 1.2	27							
Intersection Signal Dela	ay: 94.7			I	ntersec	tion LOS:	: F	
Intersection Capacity U	tilization	95.6%		I	CU Lev	el of Serv	vice F	
Analysis Period (min) 1	5							
Splits and Phases: 10	01: India	an Creek	c Drive &	& W 63	Street			

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100 s	14.6 s 64.9 s

Queues 101: Indian Creek Drive & W 63 Street

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Lane Group	EBL	EBT	WBL	WBR	SBT	SBR
Lane Group Flow (vph)	369	597	64	132	1545	2482
v/c Ratio	0.47	0.74	0.91	0.71	0.89	1.27
Control Delay	54.0	62.4	166.4	31.6	43.9	141.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.0	62.4	166.4	31.6	43.9	141.7
Queue Length 50th (ft)	206	362	77	0	845	~1644
Queue Length 95th (ft)	258	428	#184	#90	#1075	#1753
Internal Link Dist (ft)		365			1320	
Turn Bay Length (ft)	250					
Base Capacity (vph)	885	909	70	187	1742	1959
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.66	0.91	0.71	0.89	1.27

Intersection Summary

Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis 102: Collins Avenue & W 63 Street

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Movement	EBL	EBR	NBL	NBT	SBT	SBR				
Lane Configurations	ሻሻ			-↑↑↑						
Traffic Volume (vph)	477	0	186	582	0	0				
Future Volume (vph)	477	0	186	582	0	0				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900				
Total Lost time (s)	6.3			6.3						
Lane Util. Factor	0.97			0.91						
Frpb, ped/bikes	1.00			1.00						
Flpb, ped/bikes	1.00			1.00						
Frt	1.00			1.00						
Flt Protected	0.95			0.99						
Satd. Flow (prot)	3090			4509						
Flt Permitted	0.95			0.99						
Satd. Flow (perm)	3090			4509						
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90				
Adj. Flow (vph)	530	0	207	647	0	0				
RTOR Reduction (vph)	0	0	0	0	0	0				
Lane Group Flow (vph)	530	0	0	854	0	0				
Confl. Peds. (#/hr)		22	12			12				
Confl. Bikes (#/hr)		1				1				
Turn Type	Prot		Perm	NA						
Protected Phases	4			2						
Permitted Phases			2							
Actuated Green, G (s)	19.0			59.0						
Effective Green, g (s)	19.0			59.0						
Actuated g/C Ratio	0.21			0.65						
Clearance Time (s)	6.3			6.3						
Vehicle Extension (s)	1.0			1.0						
Lane Grp Cap (vph)	648			2936						
v/s Ratio Prot	c0.17									
v/s Ratio Perm				0.19						
v/c Ratio	0.82			0.29						
Uniform Delay, d1	34.1			6.8						
Progression Factor	1.00			1.00						
Incremental Delay, d2	7.5			0.3						
Delay (s)	41.7			7.0						
Level of Service	D			А						
Approach Delay (s)	41.7			7.0	0.0					
Approach LOS	D			А	А					
Intersection Summary										
HCM 2000 Control Dela	у		20.3	F	ICM 200	0 Level of	Service	С		
HCM 2000 Volume to C	apacity	ratio	0.42							
Actuated Cycle Length (s)		90.6	S	Sum of Io	ost time (s)		12.6		
Intersection Capacity Ut	ilization		47.0%	10	CU Leve	el of Service	•	А		
Analysis Period (min)			15							
a Critical Lana Croup										

Timings 102: Collins Avenue & W 63 Street

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Lane Group	EBL	NBT	
Lane Configurations	ካካ	441>	
Traffic Volume (vph)	477	582	
Future Volume (vph)	477	582	
Turn Type	Prot	NA	
Protected Phases	4	2	
Permitted Phases			
Detector Phase	4	2	
Switch Phase			
Minimum Initial (s)	5.0	5.0	
Minimum Split (s)	32.3	35.3	
Total Split (s)	32.3	58.3	
Total Split (%)	35.7%	64.3%	
Yellow Time (s)	4.0	4.0	
All-Red Time (s)	2.3	2.3	
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.3	6.3	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	C-Min	
Act Effct Green (s)	19.0	59.0	
Actuated g/C Ratio	0.21	0.65	
v/c Ratio	0.82	0.29	
Control Delay	44.6	7.6	
Queue Delay	1.5	0.0	
Total Delay	46.0	7.6	
LOS	D	А	
Approach Delay	46.0	7.6	
Approach LOS	D	А	
Intersection Summary			
Cycle Length: 90.6			
Actuated Cycle Length:	90.6		
Offset: 43 (47%), Refer	renced to	o phase	2:NBTL and 6:, Start of Yellow
Natural Cycle: 70			
Control Type: Actuated	-Coordir	nated	
Maximum v/c Ratio: 0.8	32		
Intersection Signal Dela	ay: 22.3		Intersection LOS: C
Intersection Capacity U	Itilization	47.0%	ICU Level of Service A
Analysis Period (min) 1	5		
Splits and Phases: 1	02: Colli	ns Aven	ue & W 63 Street

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58.3 s	32.3 s	

Queues 102: Collins Avenue & W 63 Street

	٨	t
Lane Group	EBL	NBT
Lane Group Flow (vph)	530	854
v/c Ratio	0.82	0.29
Control Delay	44.6	7.6
Queue Delay	1.5	0.0
Total Delay	46.0	7.6
Queue Length 50th (ft)	150	68
Queue Length 95th (ft)	192	106
Internal Link Dist (ft)	170	216
Turn Bay Length (ft)		
Base Capacity (vph)	886	2934
Starvation Cap Reductn	186	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.76	0.29
Intersection Summary		

HCM Signalized Intersection Capacity Analysis 101: Indian Creek Drive & W 63 Street

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻሻ	ፋፑ		٦		1					4 ↑	11
Traffic Volume (vph)	1137	768	128	35	0	257	0	0	0	108	891	1430
Future Volume (vph)	1137	768	128	35	0	257	0	0	0	108	891	1430
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.9	6.9		6.3		6.3					8.0	8.0
Lane Util. Factor	0.86	0.86		1.00		1.00					0.95	0.88
Frpb, ped/bikes	1.00	0.99		1.00		1.00					1.00	0.93
Flpb, ped/bikes	1.00	1.00		1.00		1.00					1.00	1.00
Frt	1.00	0.98		1.00		0.85					1.00	0.85
Flt Protected	0.95	0.99		0.95		1.00					0.99	1.00
Satd. Flow (prot)	2739	2791		1593		1425					3168	2340
Flt Permitted	0.95	0.99		0.95		1.00					0.99	1.00
Satd. Flow (perm)	2739	2791		1593		1425					3168	2340
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)	1184	800	133	36	0	268	0	0	0	112	928	1490
RTOR Reduction (vph)	0	5	0	0	0	258	0	0	0	0	0	598
Lane Group Flow (vph)	1042	1070	0	36	0	10	0	0	0	0	1041	892
Confl. Peds. (#/hr)			19	19								13
Confl. Bikes (#/hr)			1									1
Turn Type	Split	NA		Prot		Perm				Perm	NA	Perm
Protected Phases	8	8		7							2	
Permitted Phases						7				2		2
Actuated Green, G (s)	102.1	102.1		6.7		6.7					50.0	50.0
Effective Green, g (s)	102.1	102.1		6.7		6.7					50.0	50.0
Actuated g/C Ratio	0.57	0.57		0.04		0.04					0.28	0.28
Clearance Time (s)	6.9	6.9		6.3		6.3					8.0	8.0
Vehicle Extension (s)	5.0	5.0		2.0		2.0					1.0	1.0
Lane Grp Cap (vph)	1553	1583		59		53					880	650
v/s Ratio Prot	0.38	c0.38		c0.02								
v/s Ratio Perm						0.01					0.33	c0.38
v/c Ratio	0.67	0.68		0.61		0.19					1.18	1.37
Uniform Delay, d1	27.2	27.3		85.4		84.0					65.0	65.0
Progression Factor	1.00	1.00		0.83		4.34					0.99	0.97
Incremental Delay, d2	1.5	1.5		9.2		0.5					91.1	174.7
Delay (s)	28.7	28.8		80.2		365.5					155.5	237.8
Level of Service	С	С		F		F					F	F
Approach Delay (s)		28.8			331.7			0.0			204.0	
Approach LOS		С			F			А			F	
Intersection Summary												
HCM 2000 Control Dela	у		136.9	F	ICM 20	00 Leve	l of Serv	vice	F			
HCM 2000 Volume to C	apacity	ratio	0.89									
Actuated Cycle Length (s)		180.0	S	Sum of l	ost time	(s)		21.2			
Intersection Capacity Ut	ilization		80.8%	10	CU Leve	el of Ser	vice		D			
Analysis Period (min)			15									

Timings 101: Indian Creek Drive & W 63 Street

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Lane Group	EBL	EBT	WBL	WBR	SBT	SBR					
Lane Configurations	ካካ	ፋቡ	٦	1	4₽	11					
Traffic Volume (vph)	1137	768	35	257	891	1430					
Future Volume (vph)	1137	768	35	257	891	1430					
Turn Type	Split	NA	Prot	Perm	NA	Perm					
Protected Phases	8	8	7		2						
Permitted Phases				7		2					
Detector Phase	8	8	7	7	2	2					
Switch Phase											
Minimum Initial (s)	7.0	7.0	5.0	5.0	7.0	7.0					
Minimum Split (s)	28.9	28.9	13.0	13.0	33.0	33.0					
Total Split (s)	109.0	109.0	13.0	13.0	58.0	58.0					
Total Split (%)	60.6%	60.6%	7.2%	7.2%	32.2%	32.2%					
Yellow Time (s)	4.0	4.0	3.4	3.4	4.0	4.0					
All-Red Time (s)	2.9	2.9	2.9	2.9	4.0	4.0					
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0					
Total Lost Time (s)	6.9	6.9	6.3	6.3	8.0	8.0					
Lead/Lag	Lag	Lag	Lead	Lead							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes							
Recall Mode	None	None	None	None	C-Min	C-Min					
Act Effct Green (s)	102.1	102.1	6.7	6.7	50.0	50.0					
Actuated g/C Ratio	0.57	0.57	0.04	0.04	0.28	0.28					
v/c Ratio	0.67	0.68	0.61	0.86	1.18	1.19					
Control Delay	29.9	29.7	100.5	44.9	144.8	116.4					
Queue Delay	0.0	50.7	0.0	56.2	0.0	0.0					
Total Delay	29.9	80.4	100.5	101.0	144.9	116.4					
LOS	С	F	F	F	F	F					
Approach Delay		55.6			128.1						
Approach LOS		E			F						
Intersection Summary											
Cycle Length: 180											
Actuated Cycle Length	: 180										
Offset: 86 (48%), Refe	renced to	o phase	2:SBTL	and 6:	, Start o	f Yellow					
Natural Cycle: 90											
Control Type: Actuated	d-Coordir	nated									
Maximum v/c Ratio: 1.1	19										
Intersection Signal Del	ay: 95.4			I	ntersec	tion LOS	3: F				
Intersection Capacity L	Jtilization	n 80.8%		I	CU Lev	el of Ser	vice D				
Analysis Period (min) 1	15										
Solits and Phases: 1	101 · India	an Creel	C Drive S	s W es	Street						
	Splits and Phases: 101: Indian Creek Drive & W 63 Street										

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58 s	13 s	109 s

Queues 101: Indian Creek Drive & W 63 Street

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Lane Group	EBL	EBT	WBL	WBR	SBT	SBR
Lane Group Flow (vph)	1042	1075	36	268	1041	1490
v/c Ratio	0.67	0.68	0.61	0.86	1.18	1.19
Control Delay	29.9	29.7	100.5	44.9	144.8	116.4
Queue Delay	0.0	50.7	0.0	56.2	0.0	0.0
Total Delay	29.9	80.4	100.5	101.0	144.9	116.4
Queue Length 50th (ft)	488	502	44	79	~762	~776
Queue Length 95th (ft)	576	590	m60	#260	#905	#1140
Internal Link Dist (ft)		365			1320	
Turn Bay Length (ft)	250					
Base Capacity (vph)	1553	1587	59	311	880	1248
Starvation Cap Reductn	0	0	0	113	0	0
Spillback Cap Reductn	0	769	0	0	6	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.67	1.31	0.61	1.35	1.19	1.19
Intersection Summary						

Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis 102: Collins Avenue & W 63 Street

Timings 102: Collins Avenue & W 63 Street

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Lane Group	EBL	NBT	
Lane Configurations	ኘሻ	ተተኩ	
Traffic Volume (vph)	874	1312	
Future Volume (vph)	874	1312	
Turn Type	Prot	NA	
Protected Phases	4	2	
Permitted Phases			
Detector Phase	4	2	
Switch Phase			
Minimum Initial (s)	7.0	7.0	
Minimum Split (s)	31.0	34.0	
Total Split (s)	45.0	45.0	
Total Split (%)	50.0%	50.0%	
Yellow Time (s)	4.0	4.0	
All-Red Time (s)	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	5.0	5.0	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	C-Min	
Act Effct Green (s)	31.0	49.0	
Actuated g/C Ratio	0.34	0.54	
v/c Ratio	0.85	0.68	
Control Delay	48.5	17.5	
Queue Delay	2.2	0.0	
Total Delay	50.7	17.5	
LOS	D	В	
Approach Delay	50.7	17.5	
Approach LOS	D	В	
Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length	: 90		
Offset: 9 (10%). Refere	enced to	phase 2	NBTL and 6:. Start of Yellow
Natural Cycle: 65		12.1200 2	
Control Type: Actuated	-Coordir	nated	
Maximum v/c Ratio: 0.8	85		
Intersection Signal Dela	av [.] 29.2		Intersection LOS: C
Intersection Canacity I	Jtilization	73.2%	ICU Level of Service D
Analysis Period (min) 1	5	. , 0.2 /0	
Splits and Phases: 1	02: Colli	ins Aver	ue & W 63 Street

[▲] ¶Ø2 (R)	<i>▶</i> ø4	
45 s	45 s	

Queues 102: Collins Avenue & W 63 Street

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Lane Group	EBL	NBT
Lane Group Flow (vph)	901	1664
v/c Ratio	0.85	0.68
Control Delay	48.5	17.5
Queue Delay	2.2	0.0
Total Delay	50.7	17.5
Queue Length 50th (ft)	427	235
Queue Length 95th (ft)	m362	341
Internal Link Dist (ft)	170	216
Turn Bay Length (ft)		
Base Capacity (vph)	1373	2456
Starvation Cap Reductn	324	0
Spillback Cap Reductn	0	41
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.86	0.69
Intersection Summary		

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis 103: Collins Avenue & 5875 Block

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Movement	EBL	EBR	NBU	NBL	NBT	SBT	SBR		
Lane Configurations			0		***	***	-		
Traffic Volume (vph)	0	0	17	0	1353	972	0		
Future Volume (vph)	0	0	17	0	1353	972	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900		
Total Lost time (s)			7.3		6.3	6.3			
Lane Util. Factor			1.00		0.91	0.91			
Frt			1.00		1.00	1.00			
Flt Protected			0.95		1.00	1.00			
Satd. Flow (prot)			1770		5085	5085			
Flt Permitted			0.95		1.00	1.00			
Satd. Flow (perm)			1770		5085	5085			
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96		
Adi, Flow (vph)	0	0	18	0	1409	1012	0		
RTOR Reduction (vph)	0	0	0	0	0	0	0		
Lane Group Flow (vph)	0	0	18	0	1409	1013	0		
Turn Type			Prot		NA	NA			
Protected Phases			5		2	6			
Permitted Phases									
Actuated Green, G (s)			3.0		140.6	124.0			
Effective Green, g (s)			3.0		140.6	124.0			
Actuated g/C Ratio			0.02		1.00	0.88			
Clearance Time (s)			7.3		6.3	6.3			
Vehicle Extension (s)			2.0		1.0	1.0			
Lane Grp Cap (vph)			37		5085	4484			
v/s Ratio Prot			0.01		c0.28	0.20			
v/s Ratio Perm									
v/c Ratio			0.49		0.28	0.23			
Uniform Delay, d1			68.0		0.0	1.2			
Progression Factor			1.00		1.00	1.00			
Incremental Delay, d2			3.6		0.1	0.0			
Delay (s)			71.7		0.1	1.2			
Level of Service			Е		А	А			
Approach Delay (s)	0.0				1.0	1.2			
Approach LOS	А				А	А			
Intersection Summary									
HCM 2000 Control Delay			1.1	Н	ICM 2000	Level of S	ervice	А	
HCM 2000 Volume to Capacity	ratio		0.32						
Actuated Cycle Length (s)			140.6	S	um of los	t time (s)		19.6	
Intersection Capacity Utilization	ı		31.4%	IC	CU Level	of Service		А	
Analysis Period (min)			15						

Timings 103: Collins Avenue & 5875 Block

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Lane Group	NBU	NBT	SBT	Ø4	
Lane Configurations	đ	^	^††		
Traffic Volume (vph)	17	1353	972		
Future Volume (vph)	17	1353	972		
Turn Type	Prot	NA	NA		
Protected Phases	5	2	6	4	
Permitted Phases					
Detector Phase	5	2	6		
Switch Phase					
Minimum Initial (s)	5.0	16.0	16.0	5.0	
Minimum Split (s)	12.3	24.3	24.3	24.0	
Total Split (s)	18.3	101.6	83.3	39.0	
Total Split (%)	13.0%	72.3%	59.2%	28%	
Yellow Time (s)	4.0	4.0	4.0	3.7	
All-Red Time (s)	3.3	2.3	2.3	2.3	
Lost Time Adjust (s)	0.0	0.0	0.0		
Total Lost Time (s)	7.3	6.3	6.3		
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	C-Min	Min	None	
Act Effct Green (s)	6.1	140.6	132.2		
Actuated g/C Ratio	0.04	1.00	0.94		
v/c Ratio	0.23	0.28	0.21		
Control Delay	71.6	0.1	1.0		
Queue Delay	0.0	0.0	0.0		
Total Delay	71.6	0.1	1.0		
LOS	E	Α	А		
Approach Delay		1.0	1.0		
Approach LOS		A	А		
Intersection Summary					
Cycle Length: 140.6					
Actuated Cycle Length: 140.	.6				
Offset: 11 (8%), Referenced	to phase 2	2:NBT, St	art of Yell	ow	
Natural Cycle: 65					
Control Type: Actuated-Coo	rdinated				
Maximum v/c Ratio: 0.28					
Intersection Signal Delay: 1.	0				ntersection LOS: A
Intersection Capacity Utilization	tion 31.4%				CU Level of Service A
Analysis Period (min) 15					

Splits and Phases: 103: Collins Avenue & 5875 Block



Queues 103: Collins Avenue & 5875 Block

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Lane Group	NBU	NBT	SBT
Lane Group Flow (vph)	18	1409	1013
v/c Ratio	0.23	0.28	0.21
Control Delay	71.6	0.1	1.0
Queue Delay	0.0	0.0	0.0
Total Delay	71.6	0.1	1.0
Queue Length 50th (ft)	16	0	0
Queue Length 95th (ft)	43	0	59
Internal Link Dist (ft)		590	631
Turn Bay Length (ft)			
Base Capacity (vph)	138	5085	4781
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.13	0.28	0.21
Intersection Summary			

APPENDIX F

Valet Queuing

Queuing Analysis based on ITE Procedures

q = 39 veh/hr (demand rate)
Q = 8.5 veh/hr (service rate at 7 minutes per veh)
$$p = \frac{q}{NQ} = 0.7647$$
 (N = 6 valet runners)

 $Q_{M} = 0.4536$

Using Acceptable Probability of 5% (95% Confidence Level)

$$M = \left(\frac{\text{Ln } (x > M) - \text{Ln } (Q_M)}{\text{Ln } (p)}\right) - 1$$
$$M = \left(\frac{\text{Ln}(0.05) - \text{Ln}(0.4536)}{\text{Ln}(0.7647)}\right) - 1$$
$$M = \left(\frac{-2.9957 - (-0.7905)}{-0.2683}\right) - 1$$

M = 8.1 - 1 = 7.2, say 8 vehicle



Applications of Queueing Analysis

location, a 5% probability of back-up onto the adjacent street is judged to be acceptable. Demand on the system for design is expected to be 110 vehicles in a 45-minute period. Average service time was expected to be 2.2 minutes. Is the queue storage adequate?

Such problems can be quickly solved using Equation (8-9b) given in Table 8-10 and repeated below for convenience.

$$M = \left[\frac{\ln P(x > M) - \ln Q_M}{\ln \rho}\right] - 1$$

where:

- M = queue length which is exceeded p percent of the time
- N = number of service channels (drive-in positions)
- Q = service rate per channel (vehicles per hour)
- $\rho = \frac{\text{demand rate}}{\text{service rate}} = \frac{q}{NQ} = \text{utilization factor}$
- q = demand rate on the system (vehicles per hour)
- Q_M = tabled values of the relationship between queue length, number of channels, and utilization factor (see Table 8.11)

TABLE 8-11

q

Table of Q_M Values

	N = 1	2	3	4	6	8	10
0.0 0.1 .2 .3 .4 .5 .6 .7 .8 .9 1.0	0.0000 .1000 .2000 .3000 .5000 .6000 .7000 .8000 .9000 1.0000	0.0000 .0182 .0666 .1385 .2286 .3333 .4501 .5766 .7111 .8526 1.0000	0.0000 .0037 .0247 .0700 .1411 .2368 .3548 .4923 .6472 .8172 1.0000	0.0000 .0008 .0096 .0370 .0907 .1739 .2870 .4286 .5964 .7878 1.0000	.0000 .0015 .0111 .0400 .0991 .1965 .3359 .5178 .7401 1.0000	0.0000 .0002 .0185 .0591 .1395 .2706 .4576 .7014 1.0000	0.0000 .0000 .0011 .0088 .0360 .1013 .2218 .4093 .6687 1.0000

arrival rate, total

NQ (number of channels) (service rate per channel)

N = number of channels (service positions)





Step 1:
$$Q = \frac{60 \text{ min/hr}}{2.2 \text{ min/service}} = 27.3 \text{ services per hour}$$

Step 2: $q = (110 \text{ veh}/45 \text{ min}) \times (60 \text{ min/hr}) = 146.7 \text{ vehicles per hour}$

Step 3:
$$\rho = \frac{q}{NO} = \frac{146.7}{(6)(27.3)} = 0.8956$$

- Step 4: $Q_M = 0.7303$ by interpolation between 0.8 and 0.9 for N = 6 from the table of Q_M values (see Table 8-11).
- Step 5: The acceptable probability of the queue, M, being longer than the storage, 18 spaces in this example, was stated to be 5%. P(x > M) = 0.05, and:

$$M = \left[\frac{\ln 0.05 - \ln 0.7303}{\ln 0.8956}\right] - 1 = \left[\frac{-2.996 - (-0.314)}{-0.110}\right] - 1$$

= 24.38 - 1 = 23.38, say 23 vehicles.