Nyx Capital Corp

Tannery Street Townhouse Residential Development

TRANSPORTATION IMPACT STUDY

18031 June 2018

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June 8, 2018 Our Ref.: 18031

Mr. Tim Jessop
NYX Capital Corp.
201-1131 Leslie Street
Toronto, Ontario
M3C 3L8

Dear Mr. Jessop

Re: **Transportation Impact Study for the Tannery Street Townhouse Development, Mississauga, Ontario**

LEA Consulting Ltd. is pleased to present the findings of our Transportation Impact Study for the proposed townhouse residential development at 51 and 57 Tannery Street in the City of Mississauga, Ontario.

Should you have any questions regarding this Transportation Impact Study, please feel free to contact Chris Sidlar at 416-572-1791 or Kelsey Waugh at 416-572-1793.

Yours very truly,

LEA Consulting Ltd.

Chris Sidlar, M.Sc.Pl., MCIP, RPP
Manager, Transportation Planning

Kelsey Waugh, B.A.Sc
Transportation Analyst

: cs/kw

Encl.: Tannery Street Townhouse Development Transportation Impact Study

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1.0 INTRODUCTION

LEA Consulting Limited (LEA) was retained by Nyx Capital Corp, to prepare a traffic impact study for the proposed residential development to be located at 51, 57 Tannery Street and 208 Emby Drive, in the City of Mississauga. **Figure 1** below illustrates the site location. For the purposes of this report Queen Street South will be referred to as north-south and Tannery Street and Thomas Street will be referred to as east-west roads. Subsequently all other intersecting roads will be referred to as north-south roads.

The study area for the proposed development is also illustrated in **Figure 1** and extends along Tannery Street or Thomas Street from Joymar Drive to Queen Street South. Details of the trip generation and distribution are provided in **Section 5.0**.

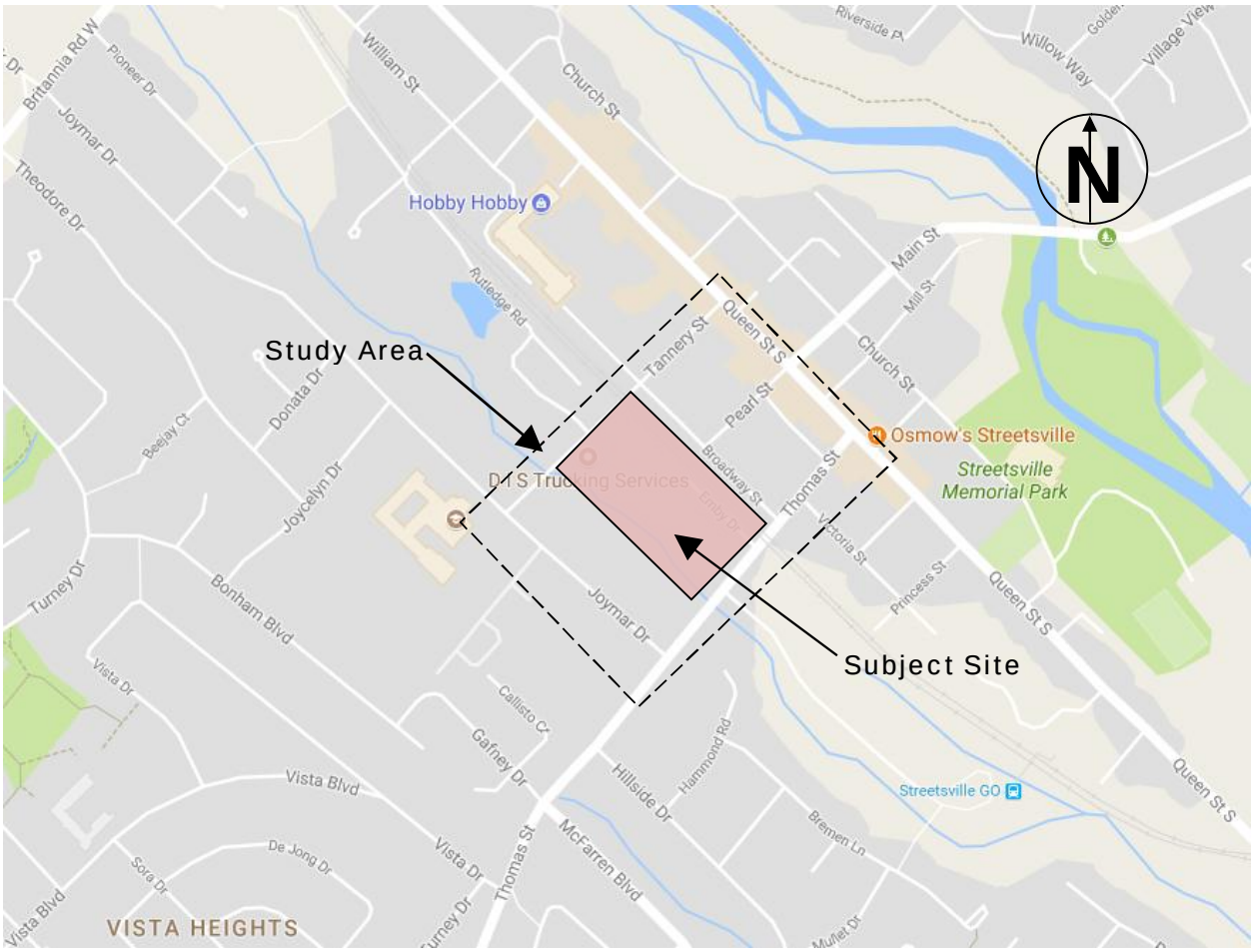


Figure 1: Site Location – 51, 57 Tannery Street & 208 Emby Drive.

The proposed development will replace the existing used auto parts stores on Tannery Street and Emby Drive, west of Broadway Street. The proposed residential development will consist of 155 stacked townhouse units. **Figure 2** illustrates the proposed site plan. The proposed development will provide a total of 233 parking spaces, consisting of 202 resident spaces and 31 visitor spaces through structure facilities.

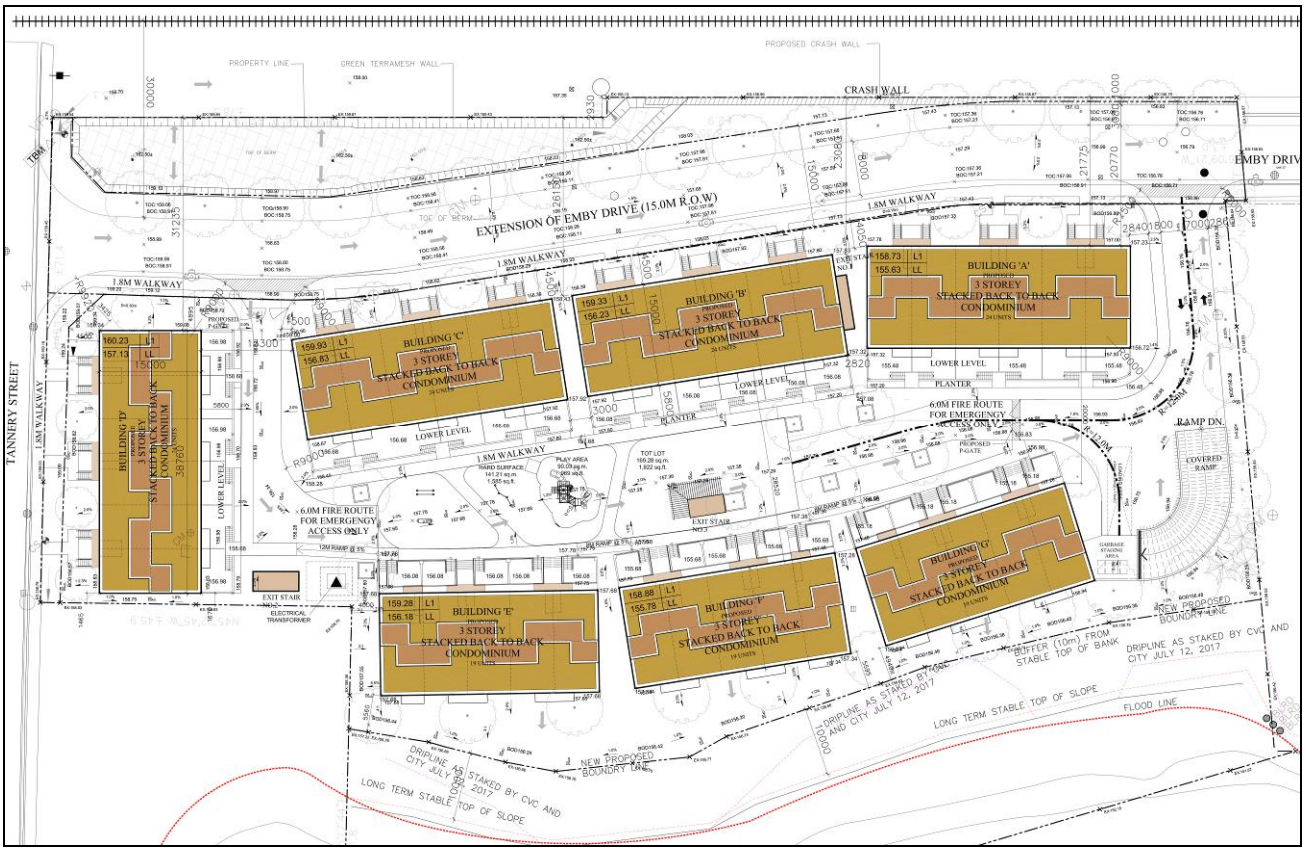


Figure 2: Proposed Site Plan

2.0 EXISTING ROAD NETWORK

The study area for this traffic impact is bounded by Joymar Drive to the west and Queen Street South to the east and the following existing intersections have been included in this study:

- Tannery Street & Crumbie Street/Broadway Street;
- Tannery Street & Rutledge Road;
- Tannery Street & Joymar Drive;
- Tannery Street & Queen Street;
- Thomas Street & Emby Drive;
- Thomas Street & Queen Street;
- Thomas Street & GO Station; and
- Thomas Street & Joymar Drive, where;

Tannery Street is a northeast-southwest two-lane minor collector road north of the subject lands, with an assumed speed limit of 50 km/h as there are no posted speed limit sign. It terminates at Queen Street South to the north-east. For the purposes of this report, Tannery Street will be referred to as an east-west road.

Thomas Street is northeast-southwest four-lane major collector road beginning at Ninth Line at the southwest to Queen Street South at the northeast. Within the study area, Thomas Street has a posted speed limit of 50 km/h. For the purposes of this report, Thomas Street will be referred to as an east-west road.

Crumbie Street/Broadway Street is a northwest-southeast two-lane local road east of the subject lands, with an assumed speed limit of 50 km/h as there are no posted speed limit sign. Crumbie Street begins north of Tannery Street and transitions to Broadway Street south of Tannery Street and terminates at Thomas Street.

Rutledge Road is a northwest-southeast two-lane local road that is currently in construction due to a development located on the southeast corner of Tannery Street and Rutledge Road. The speed limit is assumed to be 30 km/h in consideration of construction. It begins north of Tannery Street and transitions to Brookside Drive to the northwest, just south of Britannia Road West.

Joymar Drive is a northwest-southeast two-lane minor collector road that begins north of Thomas Street and terminates at Britannia Road West. Within the study area, Joymar Drive does not have a posted speed limit but it is assumed to be 40 km/h.

Queen Street South is a northwest-southeast two-lane major collector road that begins south of Britannia Road West and transitions to Mississauga Road to the southeast. Within the study area, Queen Street South has a posted speed limit of 40 km/h.

Emby Drive is a northwest-southeast two-lane local road that begins north of Thomas Street and extends into the subject area. Emby Drive does not have a posted speed limit, but it is assumed to have a speed limit of 30 km/h.

There is an unnamed road for the **GO Station** that is a northwest-southeast four-lane transit road that loops west of the Streetsville GO Station. The posted speed limit for the transit road is 25 km/h.

Figure 3 illustrates a diagram of the existing lane configurations within the study area.

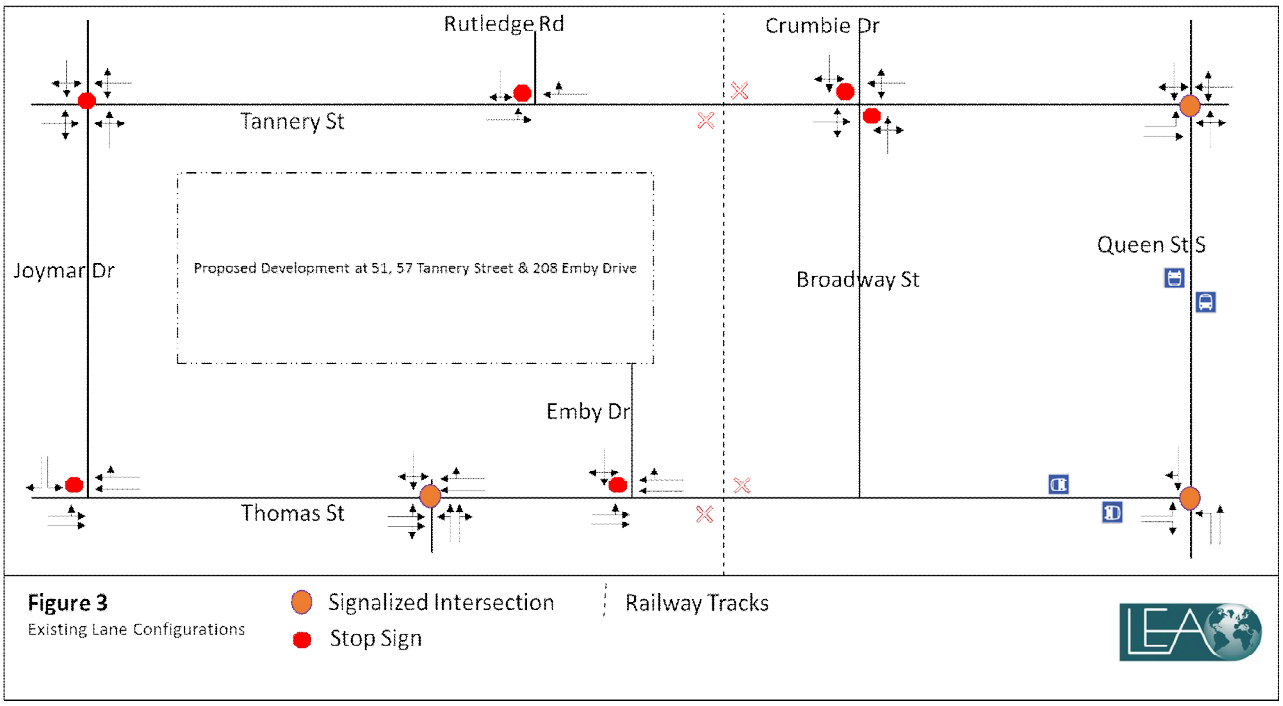


Figure 3: Existing Lane Configurations – Signalized Intersections

2.1 EXISTING TRANSIT NETWORK

The subject site currently has access to a variety of transit services that include MiWay transit service. The subject site is approximately 800 m from the Streetsville GO Station and is serviced by Route 9, 49A, and 67. **Figure 4** illustrates all existing transit services in the area.

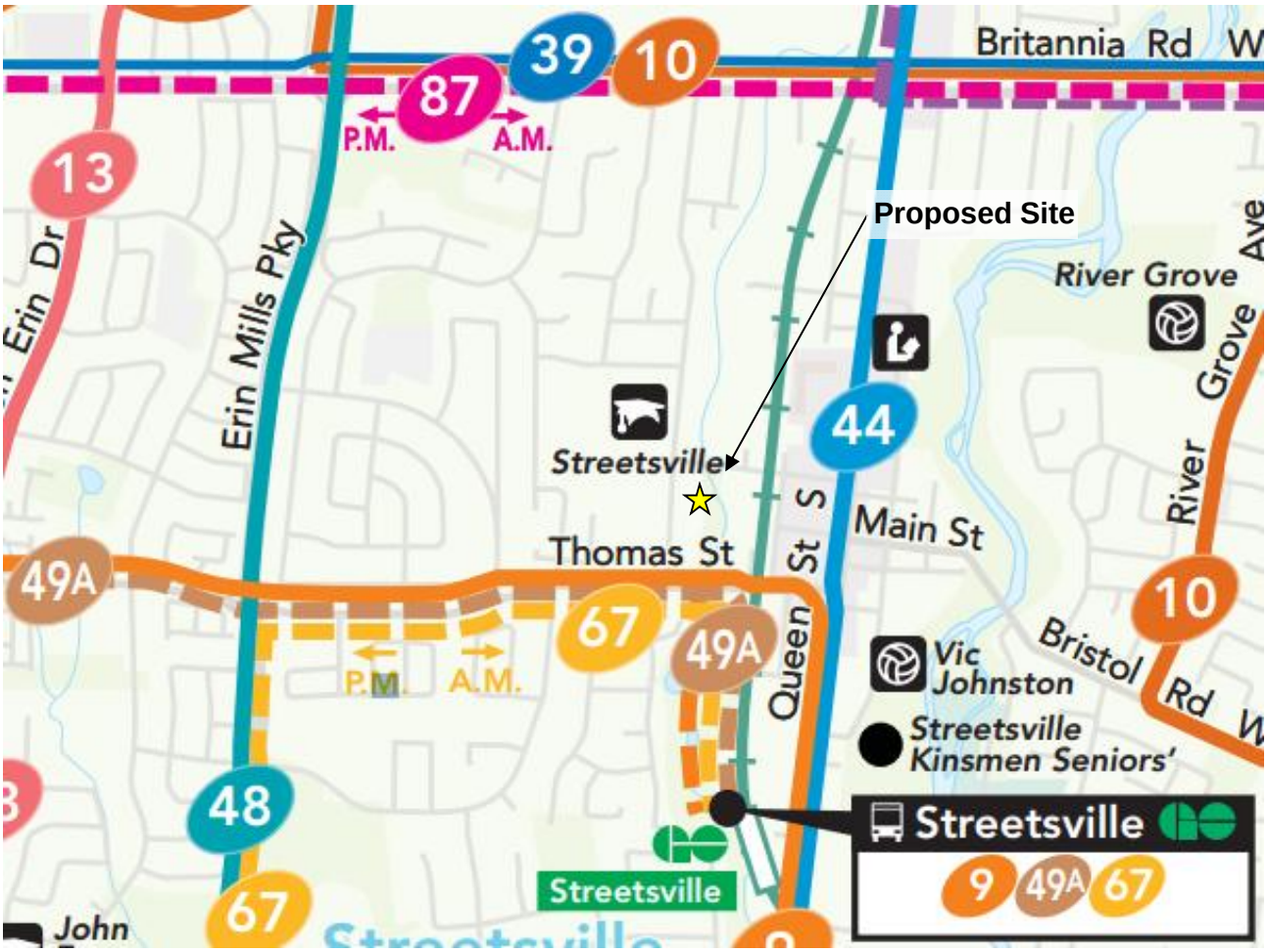


Figure 4: Existing Transit Network

Frequency of Transit Service	AM Peak Hour	PM Peak Hour
GO Transit	15 minutes	30 minutes
MiWay Buses	10 minutes	15 minutes

Table 1: Service Frequency of Existing Transit Service

Within the GO Transit network, the Streetsville GO Station is located south of Thomas Street. During weekdays, approximately twenty GO trains stop at the station, which is on the Milton line. During the peak periods, GO trains operate with headway of approximately 15 minutes, while headways during the off-peak period are approximately 30 minutes. The Milton line connects Union Station in the east and Milton GO Station in the west.

2.2 TRAFFIC DATA COLLECTION

LEA conducted existing traffic volumes for the peak periods within the study area (7:00 a.m. to 9:30 a.m. and 4:00 p.m. to 6:30 p.m). **Table 2** summarizes the sources and dates of the data utilized in this traffic study.

Intersection	Date of Survey	Source
Tannery Street & Crumbie Street/Broadway Street	May 31, 2017	LEA Consulting Ltd.
Tannery Street & Rutledge Road	May 31, 2017	LEA Consulting Ltd.
Tannery Street & Joymar Drive	June 26, 2017	LEA Consulting Ltd.
Tannery Street & Queen Street	June 7, 2017	LEA Consulting Ltd.
Thomas Street & Emby Drive	June 26, 2017	LEA Consulting Ltd.
Thomas Street & Queen Street	June 11, 2017	LEA Consulting Ltd.
Thomas Street & GO Station	June 26, 2017	LEA Consulting Ltd.
Thomas Street & Joymar Drive	June 26, 2017	LEA Consulting Ltd.

Table 2: Existing Traffic Volumes

2.3 PEAK HOUR FACTORS

According to the Region of Peel Guidelines for Using Synchro (version 7.73 Rev 8, December 2010), the peak hour factor (PHF) shall be 1.00 for all movements on all approaches. Therefore, the synchro analysis performed for this report assumes a PHF of 1.00 for all movements on all approaches.

3.0 EXISTING TRAFFIC CONDITIONS

The existing balanced traffic volumes are shown in **Figure 5**.

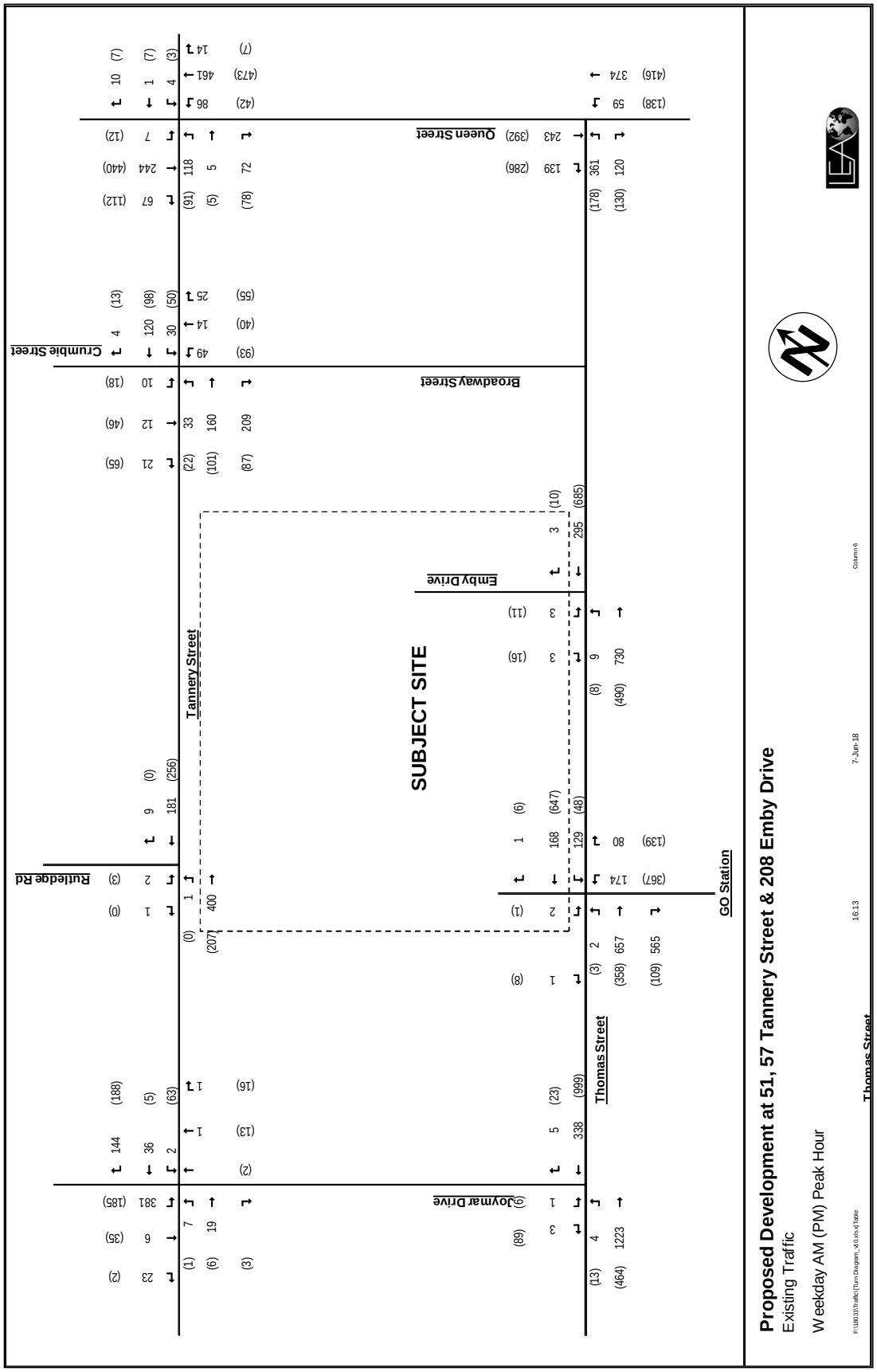


Figure 5: Existing Peak Hour Traffic Volumes

3.1 EXISTING INTERSECTION CAPACITY ANALYSIS

Intersection capacity analyses for this report were conducted using Synchro version 9.0, which incorporates the Highway Capacity Manual 2000 methodology. The analyses were undertaken in accordance with the Region of Peel's Synchro guidelines and incorporate signal timing plans obtained from the City. The signal timing plans can be found in **Appendix A**. **Table 3** and **Table 4** summarize the results of existing traffic analysis for the signalized and unsignalized intersections respectively. Detailed outputs can be found in **Appendix B**.

A.M. Peak Hour									
Intersection	**Overall**			**Movements of Interest**					
	V/C	**Delay (s)**	**LOS**	**Movement**	**V/C**	**Delay (s)**	**LOS**	**Queue (m)**	
								50th	**95th**
Queen St & Tannery St	0.49	18.4	B	EBL	0.25	20.8	C	14.2	27.0
				EBT	0.06	19.1	B	0.6	9.2
				WBT	0.02	18.8	B	0.6	4.5
				NBT	0.66	20.3	C	67.9	103.5
				SBT	0.34	14.0	B	28.6	46.2
Queen St & Thomas St	0.48	18.5	B	EBL	0.71	33.4	C	55.5	85.7
				EBR	0.08	23.5	C	0.0	11.9
				NBL	0.11	9.2	A	4.3	10.1
				NBT	0.35	11.2	B	31.6	49.8
				SBT	0.36	11.4	B	27.6	46.2
GO Station & Thomas St	0.61	16.2	B	EBT	0.58	12.2	B	55.7	80.1
				WBT	0.22	4.6	A	8.3	13.2
				NBL	0.78	56.8	E	32.3	#58.4
				NBR	0.05	32.2	C	0.0	10.1
P.M. Peak Hour									
Queen St & Tannery St	0.43	14.0	B	EBL	0.31	35.9	D	16.3	31.1
				EBT	0.07	33.4	C	0.8	13.0
				WBT	0.03	33.1	C	1.7	7.4
				NBT	0.45	10.2	B	48.8	70.3
				SBT	0.47	10.4	B	51.4	74.1
Queen St & Thomas St	0.54	16.6	B	EBL	0.42	36.3	D	32.6	53.3
				EBR	0.09	32.9	C	0.0	14.5
				NBL	0.37	11.8	B	12.7	25.8
				NBT	0.34	9.7	A	37.2	53.9
				SBT	0.59	13.5	B	68.9	101.4
GO Station & Thomas St	0.62	19.6	B	EBT	0.36	18.4	B	23.9	46.0
				WBT	0.42	12.2	B	31.6	60.1
				NBL	0.82	36.1	D	53.9	85.4
				NBR	0.10	15.3	B	0.7	8.5

Table 3: Signalized Levels of Service – Existing Balanced Traffic

The analysis indicates that all the signalized intersections in the study area are operating at good overall levels of service.

A.M. Peak Hour							
Intersection	**Movement of Interest**	**Flow Rate (vph)**	**Capacity (vph)**	**Control Delay (s)**	**95th Queue (m)**	**V/C**	**LOS**
Joymar Dr & Tannery St	EBLTR	29	619	8.5	-	-	A
	WBLTR	185	737	8.8	-	-	A
	NBLTR	2	715	7.6	-	-	A
	SBLTR	412	760	12.5	-	-	B
Thomas St & Joymar Dr	EBLT	4	1219	0.1	0.1	0.00	A
	SBL	1	251	19.4	0.1	0.00	C
	SBR	3	827	9.4	0.1	0.00	A
Thomas St & Emby Dr	EBLT	9	1285	0.3	0.2	0.01	A
	SBLR	6	541	11.7	0.3	0.01	B
Broadway St/Crumbie St & Tannery St	EBLTR	41	1475	0.9	0.7	0.03	A
	WBLTR	30	1111	1.8	0.6	0.03	A
	NBLTR	88	432	15.5	5.7	0.20	C
	SBLTR	43	499	12.9	2.1	0.09	B
Tannery St & Rutledge Rd	EBL	1	1396	0.0	0.0	0.00	A
	SBLR	3	558	11.5	0.1	0.01	B
P.M. Peak Hour							
Joymar Dr & Tannery St	EBLTR	11	701	7.8	-	-	A
	WBLTR	256	820	8.9	-	-	A
	NBLTR	31	742	7.7	-	-	A
	SBLTR	222	726	9.6	-	-	A
Thomas St & Joymar Dr	EBLT	13	727	1.0	0.4	0.02	A
	SBL	6	179	25.8	0.8	0.03	D
	SBR	89	630	11.7	3.7	0.14	B
Thomas St & Emby Dr	EBLT	8	925	0.5	0.2	0.01	A
	SBLR	27	461	13.3	1.4	0.06	B
Broadway St/Crumbie St & Tannery St	EBLTR	22	1492	0.9	0.3	0.01	A
	WBLTR	50	1398	2.6	0.8	0.04	A
	NBLTR	188	519	15.8	12.5	0.36	C
	SBLTR	129	634	12.1	5.8	0.20	B
Tannery St & Rutledge Rd	EBL	1	1396	0.0	0.0	0.00	A
	SBLR	3	561	11.5	0.1	0.01	B

Table 4: Unsignalized Levels of Service – Existing Balanced Traffic

During the weekday a.m. and p.m. peak hours, the analysis indicates all the unsignalized intersections are operating at good overall levels of service.

4.0 FUTURE BACKGROUND TRAFFIC

This traffic impact study considers a horizon year of 2022 (five years from the data collection date). Background developments were identified in the surrounding area to be included in the study and no infrastructure changes were assumed in the future background analyses. Background developments that were incorporated into the future background traffic volumes include office, residential, commercial and mixed-used buildings as shown in **Table 5** below.

The 2022 future background traffic volumes for the weekday a.m. peak and p.m. peak are shown in **Figure 6**.

Site Address	Application Type	Application Status	Description
170, 180 & 190 Rutledge Rd (Formerly 60 Tannery St)	Condominium	Application in process	62 apartment unit standard condominium
56 Tannery St	Rezoning	Application in process	67 Condominium Townhouse and 143 Condominium Apartment in 7 Storey Building
142-148 Queen Street South	Site Plan	Withheld	3-Storey Residential (108) and Commercial (1870m^2) Mixed-Use Building
38, 40, 44 Main St	Rezoning	Application in process	25 three-storey townhouses
215 Broadway St	Site Plan	Approved	3-Storey mixed use building (at grade office; 16 residential units on the 2 and 3 storeys) – max 440m^2 of non-residential
80 Thomas St	Rezoning	Withheld	203 residential units (14 semi-detached, 59 standard townhouses, 130 back to back townhouses)

Table 5: Future Background Developments

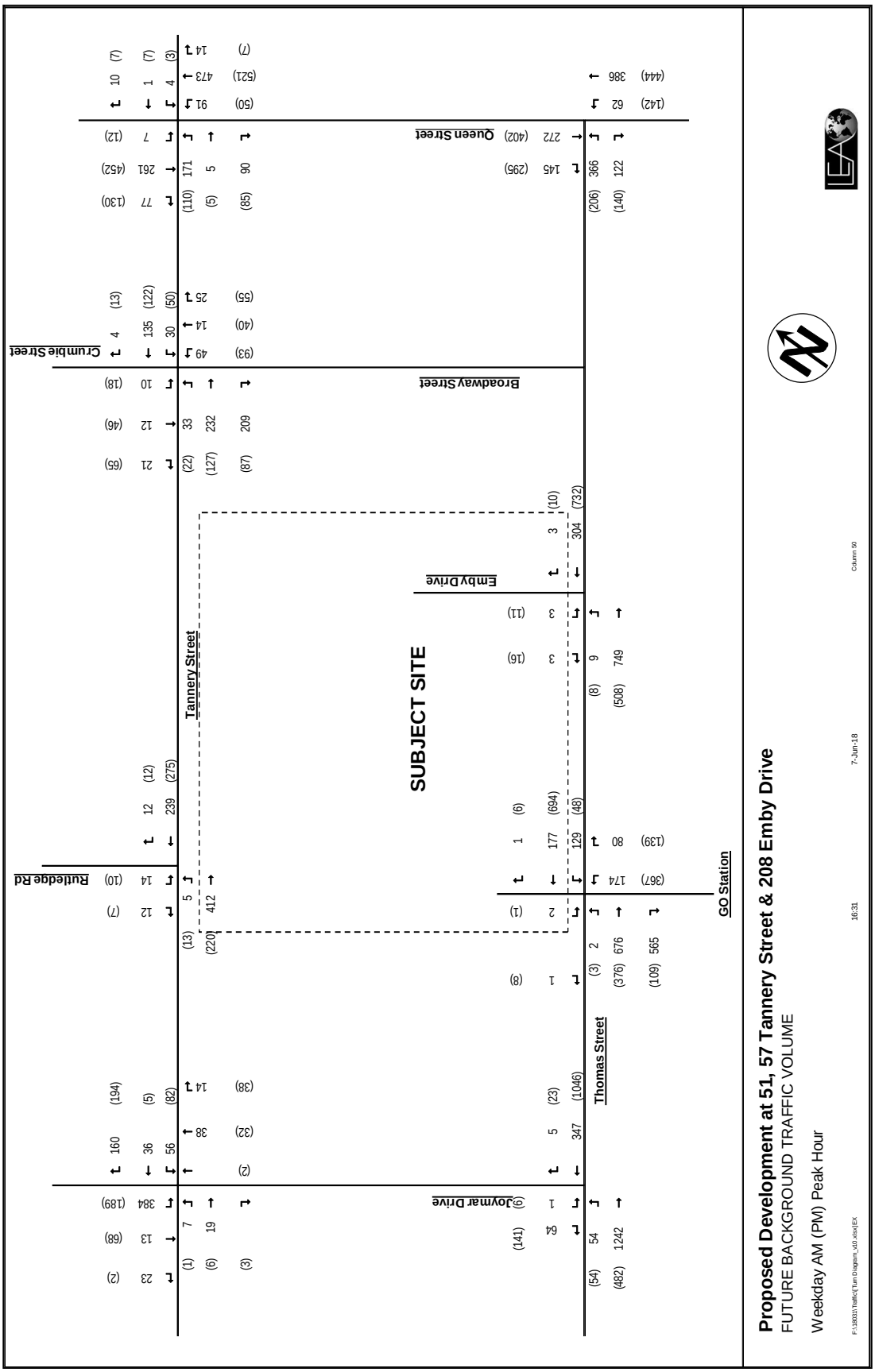


Figure 6: Future Background Peak Hour Traffic Volumes

4.1 FUTURE BACKGROUND INTERSECTION CAPACITY ANALYSIS

Intersection capacity analyses were performed for the future background volumes, with existing signal timing plans acquired from the City. **Table 6** and **Table 7** summarizes the analysis results for the future background traffic for the signalized and unsignalized respectively. Detailed outputs can be found in **Appendix C**.

A.M. Peak Hour									
Intersection	Overall			Movements of Interest					
	V/C	Delay (s)	LOS	Movement	V/C	Delay (s)	LOS	Queue (m)	
								50th	95th
Queen St & Tannery St	0.55	19.1	B	EBL	0.36	21.9	C	21.5	38.1
				EBT	0.07	19.2	B	0.6	10.0
				WBT	0.02	18.8	B	0.6	4.5
				NBT	0.69	21.1	C	71.2	108.7
				SBT	0.37	14.4	B	31.7	50.5
Queen St & Thomas St	0.50	18.6	B	EBL	0.72	33.9	C	56.5	87.2
				EBR	0.08	23.5	C	0.0	11.9
				NBL	0.13	9.4	A	4.5	10.7
				NBT	0.36	11.3	B	32.9	51.6
				SBT	0.39	11.8	B	31.9	52.3
GO Station & Thomas St	0.61	16.2	B	EBT	0.59	12.4	B	58.1	83.0
				WBT	0.24	4.7	A	9.0	14.2
				NBL	0.78	56.8	E	32.3	58.4
				NBR	0.05	32.2	C	0.0	10.1
P.M. Peak Hour									
Queen St & Tannery St	0.47	14.7	B	EBL	0.37	36.7	D	20.1	36.7
				EBT	0.07	33.5	C	0.8	13.4
				WBT	0.03	33.1	C	1.7	7.4
				NBT	0.51	11.1	B	57.2	82.4
				SBT	0.50	10.8	B	55.5	80.3
Queen St & Thomas St	0.57	17.2	B	EBL	0.49	37.2	D	38.3	61.1
				EBR	0.10	32.9	C	0.0	15.1
				NBL	0.39	12.4	B	13.4	27.4
				NBT	0.37	9.9	A	40.5	58.3
				SBT	0.61	13.8	B	72.2	106.4
GO Station & Thomas St	0.62	18.8	B	EBT	0.36	17.8	B	24.4	46.5
				WBT	0.44	11.7	B	32.8	62.0
				NBL	0.82	35.9	D	50.3	80.3
				NBR	0.10	15.6	B	1.2	9.1
				SBT	0.01	18.5	B	0.0	0.0

Table 6: Signalized Levels of Service – Future Background Traffic

Under the future background traffic conditions, the capacity analysis indicates all the signalized intersections in the study area will operate at good overall levels of service in the weekday a.m. peak and p.m. peak hours.

A.M. Peak Hour							
Intersection	**Movement of Interest**	**Flow Rate (vph)**	**Capacity (vph)**	**Control Delay (s)**	**95th Queue (m)**	**V/C**	**LOS**
Joymar Dr & Tannery St	EBLTR	29	568	8.8	-	-	A
	WBLTR	255	690	10.3	-	-	B
	NBLTR	52	650	8.4	-	-	A
	SBLTR	422	714	14.0	-	-	B
Thomas St & Joymar Dr	EBLT	54	1209	1.4	1.1	0.04	A
	SBL	1	201	23.0	0.1	0.00	C
	SBR	64	821	9.8	1.9	0.08	A
Thomas St & Emby Dr	EBLT	9	1276	0.3	0.2	0.01	A
	SBLR	6	530	11.9	0.3	0.01	B
Broadway St/Crumbie St & Tannery St	EBLTR	33	1457	0.7	0.5	0.02	A
	WBLTR	30	1130	1.7	0.6	0.03	A
	NBLTR	88	430	15.5	5.8	0.20	C
	SBLTR	43	503	12.8	2.1	0.09	B
Tannery St & Rutledge Rd	EBL	5	1326	0.1	0.1	0.00	A
	SBLR	26	542	12.0	1.1	0.05	B
P.M. Peak Hour							
Joymar Dr & Tannery St	EBLTR	11	649	8.0	-	-	A
	WBLTR	281	772	9.6	-	-	A
	NBLTR	72	717	8.1	-	-	A
	SBLTR	259	707	10.3	-	-	B
Thomas St & Joymar Dr	EBLT	54	704	3.3	1.9	0.08	A
	SBL	6	138	32.3	1.0	0.04	D
	SBR	141	634	12.3	6.4	0.22	B
Thomas St & Emby Dr	EBLT	8	890	0.5	0.2	0.01	A
	SBLR	27	439	13.7	1.5	0.06	B
Broadway St/Crumbie St & Tannery St	EBLTR	22	1462	0.8	0.3	0.02	A
	WBLTR	50	1368	2.3	0.9	0.04	A
	NBLTR	188	483	17.1	13.9	0.39	C
	SBLTR	129	599	12.7	6.2	0.22	B
Tannery St & Rutledge Rd	EBL	13	1287	0.5	0.2	0.01	A
	SBLR	17	590	11.3	0.7	0.03	B

Table 7: Unsignalized Levels of Service – Future Background Traffic

During the weekday a.m. and p.m. peak hours, the capacity analysis indicates the unsignalized intersections in the study area will operate at good overall levels of service.

5.0 TRIP GENERATION AND DISTRIBUTION

5.1 TRIP GENERATION

The proposed development consists of seven stacked back to back townhouse buildings, which combined have a total of 155 townhouse units. **Table 8** summarizes the trip generation volumes for the proposed development during weekday a.m. and p.m. peak hours for the development.

Weekday AM Peak Hour			**In**	**Out**	**Total**
Townhouse	155 units	Trip Rate / Unit	0.17	0.83	100%
		Trips Generated	12	61	73
		Total Trips	**12**	**61**	**73**
Weekday PM Peak Hour			**In**	**Out**	**Total**
Townhouse	155 units	Trip Rate / Unit	0.67	0.33	100%
		Trips Generated	58	28	86
		Total trips	**58**	**28**	**86**

Table 8: Trip Generation Summary

5.2 TRIP DISTRIBUTION AND TRIP ASSIGNMENT

The trip distribution for the proposed development was derived from TTS 2011 data for the weekday a.m. and p.m. peak periods. **Table 9** summarizes the traffic distribution used for the inbound and outbound trips in the weekday a.m. and p.m. peak hours. Detailed traffic distribution calculations and trip assignments are included in **Appendix D**. Traffic assignment for the proposed development is derived based on the shortest path routes and existing traffic patterns. The future peak hour site traffic volumes are shown in **Figure 7**. Existing site trips were removed from the area and the net traffic volumes are shown in **Figure 8.**

Weekday AM		
Direction To/From	**Outgoing**	**Incoming**
East	19%	18%
West	45%	36%
South	29%	33%
North	8%	13%
Weekday PM		
Direction To/From	**Trip Assignment**	**Incoming**
East	19%	12%
West	45%	48%
South	29%	22%
North	8%	18%

Table 9: Site Traffic Trip Distribution

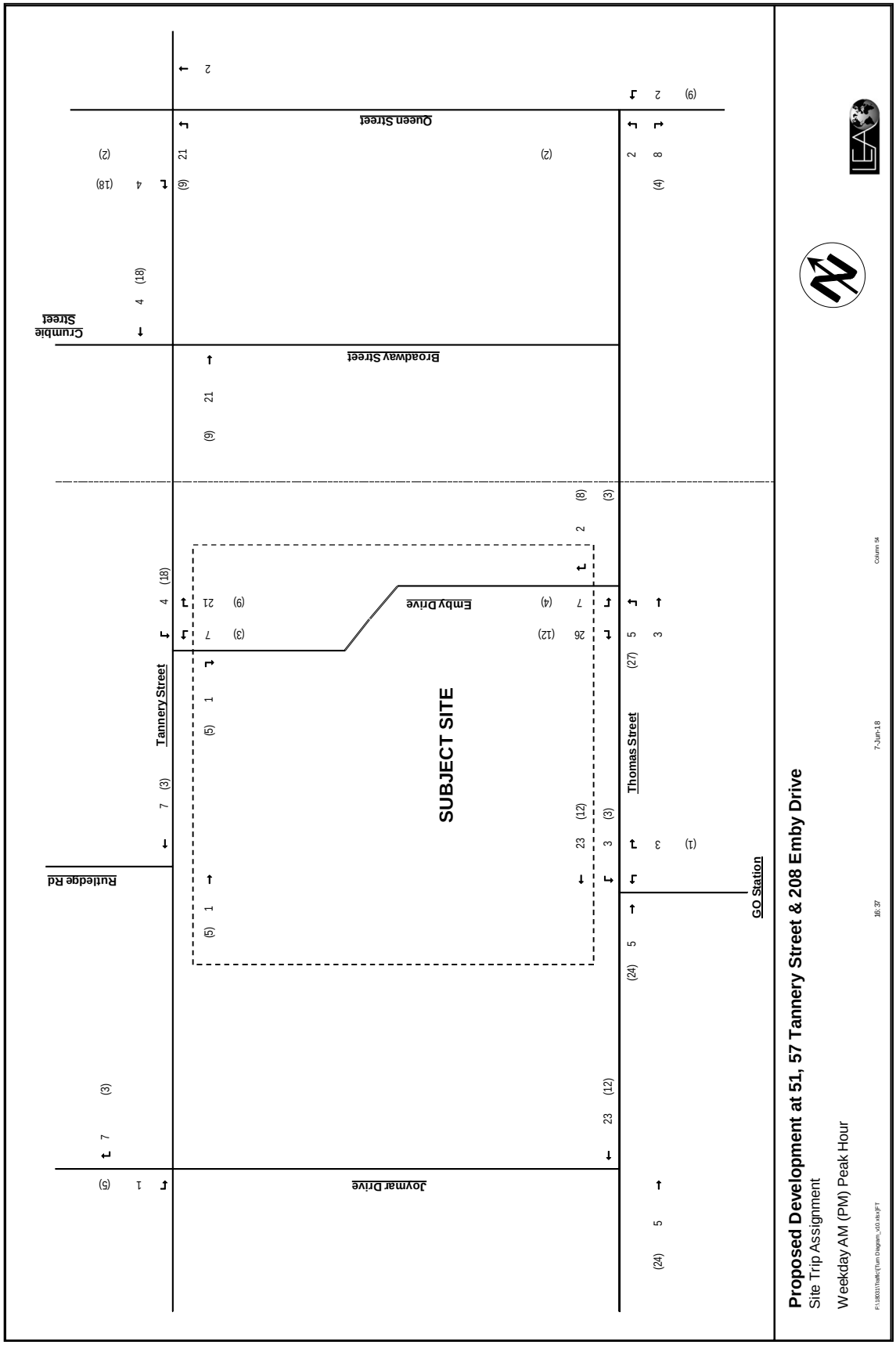


Figure 7: Peak Hour Site Trips

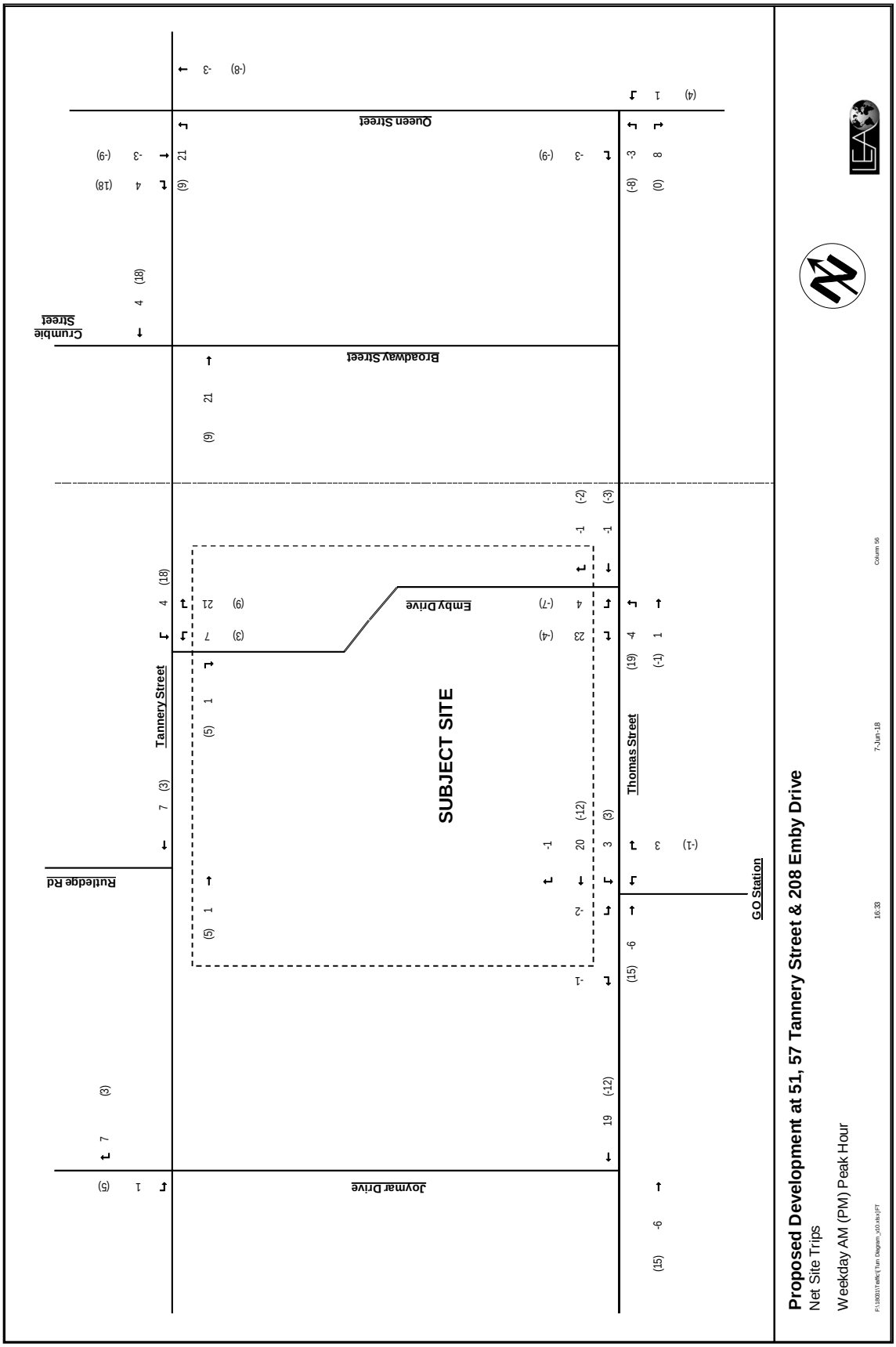


Figure 8: Net Site Trips

6.0 FUTURE TOTAL TRAFFIC CONDITIONS

A Future Total traffic analysis was performed for the 2022 planning horizon. The only change to the future background network is the extension of Emby Drive from Thomas Street to Tannery Street, which is futher discussed in **Section 6.2**. **Figure 9** illustrates the future total traffic volumes for the weekday A.M. and P.M. peak hours.

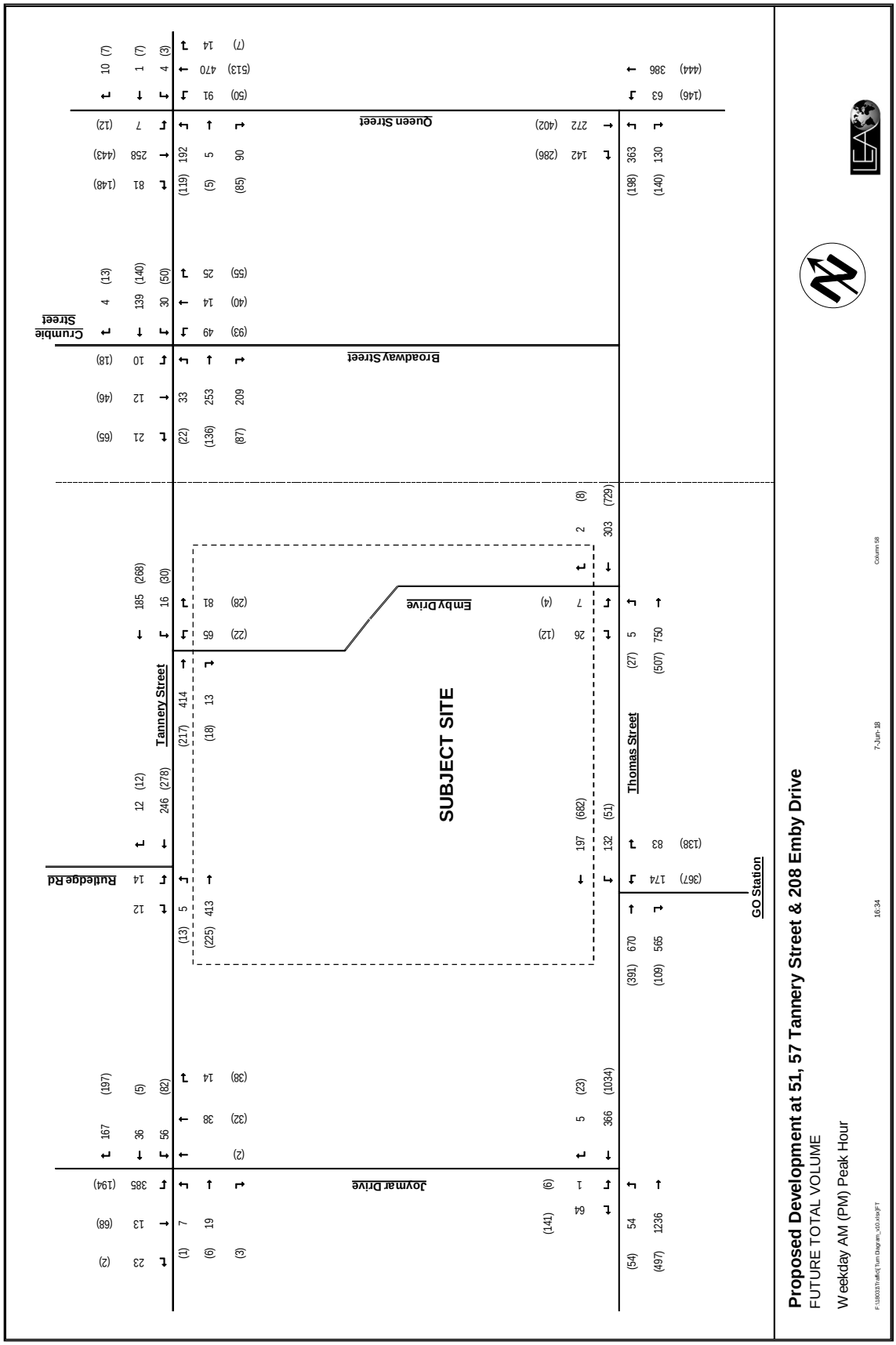


Figure 9: Future Total Traffic with Emby Extension

6.1 FUTURE TOTAL INTERSECTION CAPACITY ANALYSIS

The intersection capacity analysis was performed for the future total traffic conditions using future total traffic volumes, existing signal timings and existing lane configurations. **Table 10** and **Table 11** provide a summary of the results from the capacity analysis for the signalized and unsignalized intersections in the study area. **Appendix E** includes the detailed Synchro outputs.

A.M. Peak Hour									
Intersection	**Overall**			**Movements of Interest**					
	V/C	**Delay (s)**	**LOS**	**Movement**	**V/C**	**Delay (s)**	**LOS**	**Queue (m)**	
								50th	**95th**
Queen St & Tannery St	0.57	19.2	B	EBL	0.40	22.4	C	24.6	42.7
				EBT	0.07	19.2	B	0.6	10.0
				WBT	0.02	18.8	B	0.6	4.5
				NBT	0.68	20.9	C	70.6	108.1
				SBT	0.37	14.4	B	31.7	50.6
Queen St & Thomas St	0.50	18.5	B	EBL	0.72	33.5	C	55.8	86.3
				EBR	0.09	23.6	C	0.0	12.3
				NBL	0.13	9.4	A	4.6	10.7
				NBT	0.36	11.3	B	32.9	51.6
				SBT	0.39	11.8	B	31.6	51.9
GO Station & Thomas St	0.56	14.3	B	EBT	0.56	10.9	B	51.5	74.6
				WBT	0.23	4.2	A	8.3	13.4
				NBL	0.69	47.9	D	31.4	52.7
				NBR	0.05	32.8	C	0.0	10.6
P.M. Peak Hour									
Queen St & Tannery St	0.48	14.9	B	EBL	0.40	37.0	D	21.9	39.4
				EBT	0.07	33.5	C	0.8	13.4
				WBT	0.03	33.1	C	1.7	7.4
				NBT	0.51	11.0	B	56.1	80.9
				SBT	0.51	11.0	B	56.5	81.8
Queen St & Thomas St	0.56	17.0	B	EBL	0.47	36.9	D	36.7	58.7
				EBR	0.10	32.9	C	0.0	15.1
				NBL	0.39	12.4	B	13.8	28.1
				NBT	0.37	9.9	A	40.5	58.3
				SBT	0.60	13.6	B	70.9	104.2
GO Station & Thomas St	0.56	16.2	B	EBT	0.33	15.0	B	22.0	39.5
				WBT	0.40	9.2	A	26.8	47.6
				NBL	0.76	31.6	C	46.9	74.1
				NBR	0.12	16.6	B	1.9	10.3

Table 10: Signalized Levels of Service – Future Total Traffic

The capacity analysis indicates the signalized intersections within the study area will continue to operate at good overall levels of service.

A.M. Peak Hour							
Intersection	**Movement of Interest**	**Flow Rate (vph)**	**Capacity (vph)**	**Control Delay (s)**	**95th Queue (m)**	**V/C**	**LOS**
Joymar Dr & Tannery St	EBLTR	29	566	8.9	-	-	A
	WBLTR	262	690	10.4	-	-	B
	NBLTR	52	646	8.5	-	-	A
	SBLTR	423	711	14.2	-	-	B
Thomas St & Joymar Dr	EBLT	54	1190	1.4	1.1	0.05	A
	SBL	1	197	23.4	0.1	0.01	C
	SBR	64	810	9.8	2.0	0.08	A
Thomas St & Emby Dr	EBLT	5	1234	0.2	0.1	0.00	A
	SBLR	33	662	10.7	1.2	0.05	B
Broadway St/Crumbie St & Tannery St	EBLTR	33	1452	0.7	0.5	0.02	A
	WBLTR	30	1110	1.6	0.6	0.03	A
	NBLTR	88	415	16.0	6.0	0.21	C
	SBLTR	43	489	13.1	2.2	0.09	B
Emby Extension & Tannery St	WBLT	20	1587	6.2	0.2	0.01	A
	NBLR	159	1002	9.3	4.3	0.16	A
Tannery St & Rutledge Rd	EBL	5	1318	0.1	0.1	0.00	A
	SBLR	26	537	12.0	1.2	0.05	B
P.M. Peak Hour							
Joymar Dr & Tannery St	EBLTR	11	646	8.1	-	-	A
	WBLTR	284	769	9.7	-	-	A
	NBLTR	72	714	8.1	-	-	A
	SBLTR	264	706	10.4	-	-	B
Thomas St & Joymar Dr	EBLT	54	698	3.3	1.9	0.08	A
	SBL	6	133	33.3	1.1	0.04	D
	SBR	141	596	12.9	6.9	0.24	B
Thomas St & Emby Dr	EBLT	27	893	1.5	0.7	0.03	A
	SBLR	16	486	12.7	0.8	0.03	B
Broadway St/Crumbie St & Tannery St	EBLTR	22	1440	0.8	0.4	0.02	A
	WBLTR	50	1358	2.1	0.9	0.04	A
	NBLTR	188	465	17.9	14.7	0.40	C
	SBLTR	129	579	13.0	6.4	0.22	B
Emby Extension & Tannery St	WBLT	46	1585	5.3	0.5	0.02	A
	NBLR	54	974	8.9	1.3	0.06	A
Tannery St & Rutledge Rd	EBL	13	1283	0.5	0.2	0.01	A
	SBLR	17	585	11.3	0.7	0.03	B

Table 11: Unsignalized Levels of Service – Future Total Traffic

During the weekday a.m. peak hour and p.m. peak hour future total traffic conditions, the intersection capacity analysis indicates that the unsignalized intersections within the study area are expected to operate at good overall levels of service.

6.2 EMBY DRIVE EXTENSION

The site plan shows an extension of Emby Drive northwest through the subject site. This extension provides additional connectivity from Tannery Street to the Streetsville GO station, and will assist to mitigate impacts of increased traffic volumes on the intersection of Thomas and Joymar. It was provided

at the request of the City of Mississauga and is designed in accordance with the City's specifications and with CP Rail requirements. The alignment of the roadway was planned to minimize curvature of the roadway while complying with the Transport Canada Grade Crossing standards. The Transport Canada standards require a setback of 30m from the access location to the nearest railway track. The existing segment of Emby Drive at Thomas Street was constructed before the setback regulations were established, however the extension is expected to comply with them.

The roadway will have a cross-section of 15.0m, with a pavement of 8.0m and a 1.8m sidewalk. The connection of Emby Drive with Tannery Street is aligned to create a right-angle intersection that is set back 30m from the rail track. The Emby Drive intersection will be offset approximately 35m from the nearby intersection of Rutledge Road. The offset of the intersections is acceptable to provide appropriate sightlines for outbound left turn movements, and the inbound left turning movements do not overlap.

The extension as proposed is recommended to comply with federal and municipal design standards while minimizing impacts to the overall site layout.

7.0 PARKING AND LOADING REQUIREMENTS

7.1 VEHICULAR PARKING REQUIREMENTS

The City of Mississauga Zoning By-law (No. 0225-2007) parking requirements were considered for the proposed development. The zoning by-law has a rate of 2 residential spaces per unit and 0.25 visitor parking spaces. Table 12 outlines the development parking recommendations as indicated by Zoning By-law 0225-2007.

Type of Use	Total GFA (m2) or Number of Units	By-law 0225-2007 Parking Rates	Parking Supply
Townhouse	155 units	2 (Residential) spaces / unit	310
Townhouse		0.25 (Visitor) spaces / unit	39
Total Residential		Total	349

Table 12: Zoning By-Law Parking Standards

According to Zoning by-law 0225-2007, there are a total of 349 spaces considered to be adequate for the proposed development.

7.2 FUTURE PARKING DEMAND

The subject site is located proximate to the Streetsville GO Station, which is a higher order transit station and a significant commuter trip attractor. All townhouses are within a 10-15 minute walk to the platform. Given this location, a reduced demand for parking is considered reasonable for the subject site.

To verify demand for comparable sites within Mississauga, data from proxy surveys at 2929 Aquitaine Avenue was collected. 2929 Aquitaine Avenue has 175 residential units and provides 388 parking spaces (348 underground for residents and 40 surface spaces for visitors). 2929 Aquitaine Avenue is a residential apartment building located within a 20-minute walk of the Meadowvale GO station. In comparison, the subject site is within a 15-minute walk to Streetsville GO station. The parking supply for the proxy study's building is 2.0 spaces per unit, which is consistent with the Zoning By-law 0225-2007 minimum requirements. Therefore, this survey represents a relatively unconstrained supply for a development within walking and cycling distance of a GO station.

The proxy surveys were conducted on Friday, August 25th, and Saturday, August 26th, 2017 from 5:00 p.m. to 9:00 p.m. and Saturday, August 26th from 11:00 a.m. to 9:00 p.m. at 30-minute intervals.
A summary of peak resident and visitor demand rates for the study period is in **Table 13** below.

Date	Number of Residential Units	Peak Residential Demand	Peak Residential Demand Rate	Peak Visitor Demand	Peak Visitor Demand Rate
Friday, August 25	175	117	0.67	32	0.18
Saturday, August 26		167	0.95	11	0.06

Table 13: Resident and Visitor Parking Demand of Proxy Survey (2929 Aquitaine Avenue)

The proxy survey results show a peak resident demand of 167 spaces (0.95 spaces per unit) and a peak visitor demand of 32 spaces (0.18 spaces per unit). The data from the proxy surveys reveal that the typical parking demand rate is significantly lower than the building provisions, and lower than the By-law 0225-2007 demand rate of 2.0 resident spaces per unit and 0.25 visitor spaces per unit that applies to the given site. Given this difference in demand between the observed and By-law rates, it is recommended that a comparable reduced demand rate be applied to the proposed development.

7.3 PROPOSED PARKING SUPPLY

The total proposed parking supply for the development is 233 residential parking spaces. A breakdown of parking by type is outlined in **Table 14**.

Parking Type	Number of Residential Units	Number of Parking Spaces	Proposed Parking Rate
Residential Parking	155	202	1.30
Visitor Parking		31	0.20
Total		233	-

Table 14: Proposed Parking Supply by Type

Rates of 1.30 for resident parking and 0.20 for visitor parking on the subject site are proposed. Given the proxy data collected from 2929 Aquitaine Avenue and the proximity of the development to Streetsville GO Station, as well as access to a variety of other transit services as mentioned in Section 2.1, the proposed development is expected to be able to accommodate the expected parking demand through the proposed parking supply.

8.0 CONCLUSIONS

- The proposed development will consist of 155 stacked townhouse units. Site access is proposed with a westbound-eastbound movement access driveway off Thomas Street near the southerly limits of the property.

- The traffic analysis study area consisted of three signalized intersections and five unsignalized intersections.

- There were 6 background developments that were incorporated into the future background traffic volumes which included office, residential, commercial and mixed-used buildings.

- Under existing and future background traffic conditions all signalized and unsignalized intersections within the study area were found to be operating at good overall levels of service during both the weekday a.m. and p.m. peak hours.

- The study has found that the proposed development with Emby extension is expected to generate 73 total trips during the weekday a.m. peak hour and 86 total trips during the weekday p.m. peak hour.

- Under future total traffic conditions, all intersections operate at an overall acceptable level of service.

- The proposed development is subjected to the City of Mississauga Zoning By-law (No. 0225-2007). Based on the zoning by-law parking standards, the proposed development is required to provide 310 residential parking spaces and 39 visitor parking spaces.

- Considering the proximity of the site to Streetsville GO Station and a proxy study completed at 2929 Aquitaine Avenue, a supply of 233 total parking spots (202 residential, 31 visitor) is reasonable for the subject site.

- This report concludes that the traffic associated with the proposed development will have minimal impacts to the current local road network configurations.

APPENDIX A

Existing Signal Timings

```
?? SHOW TIMING REPORT,ACT1-3,I520
  SCHEDULED DATA
  INT  TIME          SELECTION PLANS  IN USE         ALTERNATES
             MODE   CYC   OFF  SPLT  SPEC  DUP   MODE CYC  OFF  SPLT SPEC
DUP
                    LEN   NO.  NO.   FUNC  ISEC       LEN  NO.   NO. FUNC
ISEC
   520 00:00   /     /     /     /     /     /    LO  101   2     2    2
   520 07:00  1/1    /     /     /    1/1    /    CC  100   1     1    1
1080

  LOCATION:  MISS (QUEEN)@TANNERY            INTERSECTION NO.:   520
  DATE:      27-JUN-2017                     TIME:              07:00
  SCHEDULE:   1                              SPEC. FUNC.: 1 - Y  2 - N  3
- N

  MAIN ST.:  MISS (QUEEN)                    CONTROLLER TYPE:   S4
  NO. OF PH: 2                               CONTROL MODE:      CC

  2.   NS                            - Walk           =  48 seconds
       MISS (QUEEN)                   - FL. Don't Walk =  12 seconds
                                      - Amber          =   4 seconds
                                      - All Red        =   2 seconds

  4.   EB                            - Walk           =   8 seconds
       TANNERY ST                     - FL. Don't Walk =   8 seconds
                                      - Sd. Don't Walk =  12 seconds
                                      - Maximum        =  28 seconds
                                      - Amber          =   4 seconds
                                      - All Red        =   2 seconds

                                    Total Cycle Length = 100 seconds

  SCHEDULED DATA
  INT  TIME          SELECTION PLANS  IN USE         ALTERNATES
             MODE   CYC   OFF  SPLT  SPEC  DUP   MODE CYC  OFF  SPLT SPEC
DUP
                    LEN   NO.  NO.   FUNC  ISEC       LEN  NO.   NO. FUNC
ISEC
   520 09:00  1/1    /     /     /    1/1    /    CC   70   2     2    2
1080

  LOCATION:  MISS (QUEEN)@TANNERY            INTERSECTION NO.:   520
  DATE:      27-JUN-2017                     TIME:              09:00
  SCHEDULE:   1                              SPEC. FUNC.: 1 - Y  2 - N  3
- N

  MAIN ST.:  MISS (QUEEN)                    CONTROLLER TYPE:   S4
  NO. OF PH: 2                               CONTROL MODE:      CC

  2.   NS                            - Walk           =  24 seconds
       MISS (QUEEN)                   - FL. Don't Walk =  12 seconds
                                      - Amber          =   4 seconds
                                      - All Red        =   2 seconds
```

```
  4.   EB                            - Walk           =   8 seconds
       TANNERY ST                    - FL. Don't Walk =   8 seconds
                                     - Sd. Don't Walk =   6 seconds
                                     - Maximum        =  22 seconds
                                     - Amber          =   4 seconds
                                     - All Red        =   2 seconds

                                   Total Cycle Length =  70 seconds

  SCHEDULED DATA
  INT  TIME          SELECTION PLANS  IN USE         ALTERNATES
             MODE   CYC   OFF  SPLT  SPEC  DUP   MODE CYC  OFF  SPLT SPEC
DUP
                    LEN   NO.  NO.   FUNC  ISEC       LEN  NO.   NO. FUNC
ISEC
   520 16:00  1/1    /     /     /    1/1    /    CC  110   3     3    3
1080

  LOCATION:  MISS (QUEEN)@TANNERY            INTERSECTION NO.:   520
  DATE:      27-JUN-2017                     TIME:              16:00
  SCHEDULE:   1                              SPEC. FUNC.: 1 - Y  2 - N  3
- N

  MAIN ST.:  MISS (QUEEN)                    CONTROLLER TYPE:   S4
  NO. OF PH: 2                               CONTROL MODE:      CC

  2.   NS                            - Walk           =  65 seconds
       MISS (QUEEN)                  - FL. Don't Walk =  12 seconds
                                     - Amber          =   4 seconds
                                     - All Red        =   2 seconds

  4.   EB                            - Walk           =   8 seconds
       TANNERY ST                    - FL. Don't Walk =   8 seconds
                                     - Sd. Don't Walk =   5 seconds
                                     - Maximum        =  21 seconds
                                     - Amber          =   4 seconds
                                     - All Red        =   2 seconds

                                   Total Cycle Length = 110 seconds

  SCHEDULED DATA
  INT  TIME          SELECTION PLANS  IN USE         ALTERNATES
             MODE   CYC   OFF  SPLT  SPEC  DUP   MODE CYC  OFF  SPLT SPEC
DUP
                    LEN   NO.  NO.   FUNC  ISEC       LEN  NO.   NO. FUNC
ISEC
   520 18:30  1/1    /     /     /    1/1    /    CC   70   2     2    2
1080

  LOCATION:  MISS (QUEEN)@TANNERY            INTERSECTION NO.:   520
  DATE:      27-JUN-2017                     TIME:              18:30
  SCHEDULE:   1                              SPEC. FUNC.: 1 - Y  2 - N  3
- N
```

```
  MAIN ST.:  MISS (QUEEN)                    CONTROLLER TYPE:   S4
  NO. OF PH: 2                               CONTROL MODE:      CC

  2.   NS                            - Walk           =  24 seconds
       MISS (QUEEN)                   - FL. Don't Walk =  12 seconds
                                      - Amber          =   4 seconds
                                      - All Red        =   2 seconds

  4.   EB                            - Walk           =   8 seconds
       TANNERY ST                     - FL. Don't Walk =   8 seconds
                                      - Sd. Don't Walk =   6 seconds
                                      - Maximum        =  22 seconds
                                      - Amber          =   4 seconds
                                      - All Red        =   2 seconds

                                    Total Cycle Length =  70 seconds

  SCHEDULED DATA
  INT  TIME          SELECTION PLANS  IN USE         ALTERNATES
            MODE   CYC   OFF  SPLT  SPEC  DUP   MODE CYC  OFF  SPLT SPEC
DUP
                   LEN   NO.  NO.   FUNC  ISEC       LEN  NO.   NO. FUNC
ISEC
   520 21:30   /     /     /     /     /     /    LO  101   2     2    2
1080
  SCHEDULED DATA
  INT  TIME          SELECTION PLANS  IN USE         ALTERNATES
            MODE   CYC   OFF  SPLT  SPEC  DUP   MODE CYC  OFF  SPLT SPEC
DUP
                   LEN   NO.  NO.   FUNC  ISEC       LEN  NO.   NO. FUNC
ISEC
   520 00:00   /     /     /     /     /     /    LO  101   2     2    2
   520 09:00  1/1    /     /     /    1/1    /    CC   70   2     2    2
1080

  LOCATION:  MISS (QUEEN)@TANNERY            INTERSECTION NO.:   520
  DATE:      27-JUN-2017                     TIME:              09:00
  SCHEDULE:   2                              SPEC. FUNC.: 1 - Y  2 - N  3
- N

  MAIN ST.:  MISS (QUEEN)                    CONTROLLER TYPE:   S4
  NO. OF PH: 2                               CONTROL MODE:      CC

  2.   NS                            - Walk           =  24 seconds
       MISS (QUEEN)                   - FL. Don't Walk =  12 seconds
                                      - Amber          =   4 seconds
                                      - All Red        =   2 seconds

  4.   EB                            - Walk           =   8 seconds
       TANNERY ST                     - FL. Don't Walk =   8 seconds
                                      - Sd. Don't Walk =   6 seconds
                                      - Maximum        =  22 seconds
                                      - Amber          =   4 seconds
```

```
                                    - All Red        =   2 seconds

                                  Total Cycle Length =  70 seconds

  SCHEDULED DATA
  INT  TIME          SELECTION PLANS  IN USE         ALTERNATES
            MODE   CYC   OFF  SPLT  SPEC  DUP   MODE CYC  OFF  SPLT SPEC
DUP
                   LEN   NO.  NO.   FUNC  ISEC       LEN  NO.   NO. FUNC
ISEC
   520 21:30   /     /     /     /     /     /    LO  101   2     2    2
1080
  SCHEDULED DATA
  INT  TIME          SELECTION PLANS  IN USE         ALTERNATES
            MODE   CYC   OFF  SPLT  SPEC  DUP   MODE CYC  OFF  SPLT SPEC
DUP
                   LEN   NO.  NO.   FUNC  ISEC       LEN  NO.   NO. FUNC
ISEC
   520 00:00   /     /     /     /     /     /    LO  101   2     2    2
   520 10:00  1/1    /     /     /    1/1    /    CC   70   2     2    2
1080

  LOCATION:  MISS (QUEEN)@TANNERY            INTERSECTION NO.:   520
  DATE:      27-JUN-2017                     TIME:              10:00
  SCHEDULE:   3                              SPEC. FUNC.: 1 - Y  2 - N  3
- N

  MAIN ST.:  MISS (QUEEN)                    CONTROLLER TYPE:   S4
  NO. OF PH: 2                               CONTROL MODE:      CC

  2.   NS                            - Walk           =  24 seconds
       MISS (QUEEN)                   - FL. Don't Walk =  12 seconds
                                      - Amber          =   4 seconds
                                      - All Red        =   2 seconds

  4.   EB                            - Walk           =   8 seconds
       TANNERY ST                     - FL. Don't Walk =   8 seconds
                                      - Sd. Don't Walk =   6 seconds
                                      - Maximum        =  22 seconds
                                      - Amber          =   4 seconds
                                      - All Red        =   2 seconds

                                  Total Cycle Length =  70 seconds

  SCHEDULED DATA
  INT  TIME          SELECTION PLANS  IN USE         ALTERNATES
            MODE   CYC   OFF  SPLT  SPEC  DUP   MODE CYC  OFF  SPLT SPEC
DUP
                   LEN   NO.  NO.   FUNC  ISEC       LEN  NO.   NO. FUNC
ISEC
   520 18:30   /     /     /     /     /     /    LO  101   2     2    2
1080
?? SHOW CDT520
CYCLE DEFINITION TABLE: 520
```

```
 PHASE  DIR  VEH  PED   PED   AMBER  ALL  COMM  SPECIAL  STREET
            MIN  MIN  CLEAR         RED  DELAY FEATURE  NAME
   1                                       1
   2    NS         8    12      4     2     1    C       MISS (QUEEN)
   3                                       1
   4    EB         8     8      4     2     1            TANNERY ST
   5                                       1
   6                                       1
   7                                       1
   8                                       1
     VALID SPECIAL FUNCTIONS(Y/N)
      1   2   3  1&2 1&3 2&3 ALL
      Y   Y   Y   Y   Y   Y   Y
?? SHOW DINTREP,ACT1-3,I520
  DAILY INTERSECTION REPORT FOR ACT SCH  1 ( MON TUE WED THU FRI )
  INT  TIME          SELECTION PLANS  IN USE         ALTERNATES
            MODE   CYC   OFF  SPLT  SPEC  DUP   MODE CYC  OFF  SPLT SPEC
DUP
                   LEN   NO.  NO.   FUNC  ISEC       LEN  NO.   NO. FUNC
ISEC
   520 00:00   /     /     /     /     /     /    LO  101   2     2    2
   520 07:00  1/1    /     /     /    1/1    /    CC  100   1     1    1
1080
   520 09:00  1/1    /     /     /    1/1    /    CC   70   2     2    2
1080
   520 16:00  1/1    /     /     /    1/1    /    CC  110   3     3    3
1080
   520 18:30  1/1    /     /     /    1/1    /    CC   70   2     2    2
1080
   520 21:30   /     /     /     /     /     /    LO  101   2     2    2
1080
  DAILY INTERSECTION REPORT FOR ACT SCH  2 ( SAT )
   520 00:00   /     /     /     /     /     /    LO  101   2     2    2
   520 09:00  1/1    /     /     /    1/1    /    CC   70   2     2    2
1080
   520 21:30   /     /     /     /     /     /    LO  101   2     2    2
1080
  DAILY INTERSECTION REPORT FOR ACT SCH  3 ( SUN HOL )
   520 00:00   /     /     /     /     /     /    LO  101   2     2    2
   520 10:00  1/1    /     /     /    1/1    /    CC   70   2     2    2
1080
   520 18:30   /     /     /     /     /     /    LO  101   2     2    2
1080
?? SHOW SPL1-3,I520
   SPLIT TABLE
    INTERSECTION  520           MISS (QUEEN)@TANNERY
    TABLE     (SPLIT) PHASE NUMBER            (MAX SPLIT) PHASE NUMBER
    NO.    1   2   3   4   5   6   7   8    1   2   3   4   5   6   7   8
              NS      EB
     1        66      34                       0       0
     2        61      39                       0       0
     3        76      24                       0       0
?? SHOW OFF1-3,I520
   OFFSET TABLE
```

```
    INTERSECTION  520           MISS (QUEEN)@TANNERY
    OFFSET #   OFFSET %
        1         84
        2         69
        3         34
?? SHOW SPF1-3,I520
   SPECIAL FUNCTIONS
    INTERSECTION  520   MISS (QUEEN)@TANNERY
    SPECIAL   IN(Y)/OUT(N)
    FUNCTION  #  1   2   3
                NA  NA  CAL   PHASE OMIT
      1          Y   N   N
      2          Y   N   N
      3          Y   N   N
??
```

```
?? SHOW TIMING REPORT,ACT1-3,I524
  SCHEDULED DATA
  INT  TIME          SELECTION PLANS  IN USE         ALTERNATES
             MODE   CYC   OFF  SPLT  SPEC  DUP   MODE CYC  OFF  SPLT SPEC
DUP
                    LEN   NO.  NO.   FUNC  ISEC       LEN  NO.   NO. FUNC
ISEC
   524 00:00   /     /     /     /     /     /    LO  101   2     2    2
   524 07:00  1/1    /     /     /    1/1    /    CC  100   1     1    1
1080

  LOCATION:  MISS (QUEEN)@ THOMAS            INTERSECTION NO.:   524
  DATE:      27-JUN-2017                     TIME:              07:00
  SCHEDULE:   1                              SPEC. FUNC.: 1 - Y  2 - Y  3
- N

  MAIN ST.:  MISS (QUEEN)                    CONTROLLER TYPE:   S4
  NO. OF PH: 2                               CONTROL MODE:      CC

  2.   NS                            - Walk           =  45 seconds
       MISS (QUEEN)                  - FL. Don't Walk =   9 seconds
                                     - Amber          =   4 seconds
                                     - All Red        =   4 seconds

  4.   EB                            - Walk           =   8 seconds
       THOMAS ST                     - FL. Don't Walk =  12 seconds
                                     - Sd. Don't Walk =  12 seconds
                                     - Maximum        =  32 seconds
                                     - Amber          =   4 seconds
                                     - All Red        =   2 seconds

                                   Total Cycle Length = 100 seconds

  SCHEDULED DATA
  INT  TIME          SELECTION PLANS  IN USE         ALTERNATES
             MODE   CYC   OFF  SPLT  SPEC  DUP   MODE CYC  OFF  SPLT SPEC
DUP
                    LEN   NO.  NO.   FUNC  ISEC       LEN  NO.   NO. FUNC
ISEC
   524 09:00  1/1    /     /     /    1/1    /    CC   70   2     2    2
1080

  LOCATION:  MISS (QUEEN)@ THOMAS            INTERSECTION NO.:   524
  DATE:      27-JUN-2017                     TIME:              09:00
  SCHEDULE:   1                              SPEC. FUNC.: 1 - Y  2 - Y  3
- N

  MAIN ST.:  MISS (QUEEN)                    CONTROLLER TYPE:   S4
  NO. OF PH: 2                               CONTROL MODE:      CC

  2.   NS                            - Walk           =  22 seconds
       MISS (QUEEN)                  - FL. Don't Walk =   9 seconds
                                     - Amber          =   4 seconds
                                     - All Red        =   4 seconds
```

```
  4.   EB                            - Walk           =   8 seconds
       THOMAS ST                     - FL. Don't Walk =  12 seconds
                                     - Sd. Don't Walk =   5 seconds
                                     - Maximum        =  25 seconds
                                     - Amber          =   4 seconds
                                     - All Red        =   2 seconds

                                   Total Cycle Length =  70 seconds

  SCHEDULED DATA
  INT  TIME          SELECTION PLANS  IN USE         ALTERNATES
             MODE   CYC   OFF  SPLT  SPEC  DUP   MODE CYC  OFF  SPLT SPEC
DUP
                    LEN   NO.  NO.   FUNC  ISEC       LEN  NO.   NO. FUNC
ISEC
   524 16:00  1/1    /     /     /    1/1    /    CC  110   3     3    3
1080

  LOCATION:  MISS (QUEEN)@ THOMAS            INTERSECTION NO.:   524
  DATE:      27-JUN-2017                     TIME:              16:00
  SCHEDULE:   1                              SPEC. FUNC.: 1 - Y  2 - Y  3
- N

  MAIN ST.:  MISS (QUEEN)                    CONTROLLER TYPE:   S4
  NO. OF PH: 2                               CONTROL MODE:      CC

  2.   NS                            - Walk           =  61 seconds
       MISS (QUEEN)                  - FL. Don't Walk =   9 seconds
                                     - Amber          =   4 seconds
                                     - All Red        =   4 seconds

  4.   EB                            - Walk           =   8 seconds
       THOMAS ST                     - FL. Don't Walk =  12 seconds
                                     - Sd. Don't Walk =   6 seconds
                                     - Maximum        =  26 seconds
                                     - Amber          =   4 seconds
                                     - All Red        =   2 seconds

                                   Total Cycle Length = 110 seconds

  SCHEDULED DATA
  INT  TIME          SELECTION PLANS  IN USE         ALTERNATES
             MODE   CYC   OFF  SPLT  SPEC  DUP   MODE CYC  OFF  SPLT SPEC
DUP
                    LEN   NO.  NO.   FUNC  ISEC       LEN  NO.   NO. FUNC
ISEC
   524 18:30  1/1    /     /     /    1/1    /    CC   70   2     2    2
1080

  LOCATION:  MISS (QUEEN)@ THOMAS            INTERSECTION NO.:   524
  DATE:      27-JUN-2017                     TIME:              18:30
  SCHEDULE:   1                              SPEC. FUNC.: 1 - Y  2 - Y  3
- N
```

```
  MAIN ST.:  MISS (QUEEN)                    CONTROLLER TYPE:   S4
  NO. OF PH: 2                               CONTROL MODE:      CC

  2.   NS                            - Walk           =  22 seconds
       MISS (QUEEN)                   - FL. Don't Walk =   9 seconds
                                      - Amber          =   4 seconds
                                      - All Red        =   4 seconds

  4.   EB                            - Walk           =   8 seconds
       THOMAS ST                      - FL. Don't Walk =  12 seconds
                                      - Sd. Don't Walk =   5 seconds
                                      - Maximum        =  25 seconds
                                      - Amber          =   4 seconds
                                      - All Red        =   2 seconds

                                    Total Cycle Length =  70 seconds

  SCHEDULED DATA
  INT  TIME          SELECTION PLANS  IN USE         ALTERNATES
            MODE   CYC   OFF  SPLT  SPEC  DUP   MODE CYC  OFF  SPLT SPEC
DUP
                   LEN   NO.  NO.   FUNC  ISEC       LEN  NO.   NO. FUNC
ISEC
   524 21:30   /     /     /     /     /     /    LO  101   2     2    2
1080
  SCHEDULED DATA
  INT  TIME          SELECTION PLANS  IN USE         ALTERNATES
            MODE   CYC   OFF  SPLT  SPEC  DUP   MODE CYC  OFF  SPLT SPEC
DUP
                   LEN   NO.  NO.   FUNC  ISEC       LEN  NO.   NO. FUNC
ISEC
   524 00:00   /     /     /     /     /     /    LO  101   2     2    2
   524 09:00  1/1    /     /     /    1/1    /    CC   70   2     2    2
1080

  LOCATION:  MISS (QUEEN)@ THOMAS            INTERSECTION NO.:   524
  DATE:      27-JUN-2017                     TIME:              09:00
  SCHEDULE:   2                              SPEC. FUNC.: 1 - Y  2 - Y  3
- N

  MAIN ST.:  MISS (QUEEN)                    CONTROLLER TYPE:   S4
  NO. OF PH: 2                               CONTROL MODE:      CC

  2.   NS                            - Walk           =  22 seconds
       MISS (QUEEN)                   - FL. Don't Walk =   9 seconds
                                      - Amber          =   4 seconds
                                      - All Red        =   4 seconds

  4.   EB                            - Walk           =   8 seconds
       THOMAS ST                      - FL. Don't Walk =  12 seconds
                                      - Sd. Don't Walk =   5 seconds
                                      - Maximum        =  25 seconds
                                      - Amber          =   4 seconds
```

```
                                    - All Red        =   2 seconds

                                  Total Cycle Length =  70 seconds

  SCHEDULED DATA
  INT  TIME          SELECTION PLANS  IN USE         ALTERNATES
            MODE   CYC   OFF  SPLT  SPEC  DUP   MODE CYC  OFF  SPLT SPEC
DUP
                   LEN   NO.  NO.   FUNC  ISEC       LEN  NO.   NO. FUNC
ISEC
   524 21:30   /     /     /     /     /     /    LO  101   2     2    2
1080
  SCHEDULED DATA
  INT  TIME          SELECTION PLANS  IN USE         ALTERNATES
            MODE   CYC   OFF  SPLT  SPEC  DUP   MODE CYC  OFF  SPLT SPEC
DUP
                   LEN   NO.  NO.   FUNC  ISEC       LEN  NO.   NO. FUNC
ISEC
   524 00:00   /     /     /     /     /     /    LO  101   2     2    2
   524 10:00  1/1    /     /     /    1/1    /    CC   70   2     2    2
1080

  LOCATION:  MISS (QUEEN)@ THOMAS            INTERSECTION NO.:   524
  DATE:      27-JUN-2017                     TIME:              10:00
  SCHEDULE:   3                              SPEC. FUNC.: 1 - Y  2 - Y  3
- N

  MAIN ST.:  MISS (QUEEN)                    CONTROLLER TYPE:   S4
  NO. OF PH: 2                               CONTROL MODE:      CC

  2.   NS                            - Walk           =  22 seconds
       MISS (QUEEN)                 - FL. Don't Walk =   9 seconds
                                    - Amber          =   4 seconds
                                    - All Red        =   4 seconds

  4.   EB                            - Walk           =   8 seconds
       THOMAS ST                    - FL. Don't Walk =  12 seconds
                                    - Sd. Don't Walk =   5 seconds
                                    - Maximum        =  25 seconds
                                    - Amber          =   4 seconds
                                    - All Red        =   2 seconds

                                  Total Cycle Length =  70 seconds

  SCHEDULED DATA
  INT  TIME          SELECTION PLANS  IN USE         ALTERNATES
            MODE   CYC   OFF  SPLT  SPEC  DUP   MODE CYC  OFF  SPLT SPEC
DUP
                   LEN   NO.  NO.   FUNC  ISEC       LEN  NO.   NO. FUNC
ISEC
   524 18:30   /     /     /     /     /     /    LO  101   2     2    2
1080
?? SHOW CDT524
CYCLE DEFINITION TABLE: 524
```

```
 PHASE  DIR  VEH  PED   PED   AMBER  ALL  COMM  SPECIAL  STREET
            MIN  MIN  CLEAR         RED  DELAY FEATURE  NAME
   1    NBL                              1            MISS (QUEEN)
   2    NS         8     9      4     4     1    C       MISS (QUEEN)
   3                                     1
   4    EB         8    12      4     2     1            THOMAS ST
   5                                     1
   6                                     1
   7                                     1
   8                                     1
     VALID SPECIAL FUNCTIONS(Y/N)
      1   2   3  1&2 1&3 2&3 ALL
      Y   Y   Y   Y   Y   Y   Y
?? SHOW DINTREP,ACT1-3,I524
  DAILY INTERSECTION REPORT FOR ACT SCH  1 ( MON TUE WED THU FRI )
  INT  TIME          SELECTION PLANS  IN USE         ALTERNATES
            MODE   CYC   OFF  SPLT  SPEC  DUP   MODE CYC  OFF  SPLT SPEC
DUP
                   LEN   NO.  NO.   FUNC  ISEC       LEN  NO.   NO. FUNC
ISEC
   524 00:00   /     /     /     /     /     /    LO  101   2     2    2
   524 07:00  1/1    /     /     /    1/1    /    CC  100   1     1    1
1080
   524 09:00  1/1    /     /     /    1/1    /    CC   70   2     2    2
1080
   524 16:00  1/1    /     /     /    1/1    /    CC  110   3     3    3
1080
   524 18:30  1/1    /     /     /    1/1    /    CC   70   2     2    2
1080
   524 21:30   /     /     /     /     /     /    LO  101   2     2    2
1080
  DAILY INTERSECTION REPORT FOR ACT SCH  2 ( SAT )
   524 00:00   /     /     /     /     /     /    LO  101   2     2    2
   524 09:00  1/1    /     /     /    1/1    /    CC   70   2     2    2
1080
   524 21:30   /     /     /     /     /     /    LO  101   2     2    2
1080
  DAILY INTERSECTION REPORT FOR ACT SCH  3 ( SUN HOL )
   524 00:00   /     /     /     /     /     /    LO  101   2     2    2
   524 10:00  1/1    /     /     /    1/1    /    CC   70   2     2    2
1080
   524 18:30   /     /     /     /     /     /    LO  101   2     2    2
1080
?? SHOW SPL1-3,I524
   SPLIT TABLE
    INTERSECTION  524           MISS (QUEEN)@ THOMAS
    TABLE     (SPLIT) PHASE NUMBER            (MAX SPLIT) PHASE NUMBER
    NO.    1   2   3   4   5   6   7   8    1   2   3   4   5   6   7   8
          NBL NS      EB
     1        62      38                       0       0
     2        57      43                       0       0
     3        71      29                       0       0
?? SHOW OFF1-3,I524
   OFFSET TABLE
```

```
    INTERSECTION  524           MISS (QUEEN)@ THOMAS
    OFFSET #   OFFSET %
        1         70
        2         63
        3         53
?? SHOW SPF1-3,I524
   SPECIAL FUNCTIONS
    INTERSECTION  524   MISS (QUEEN)@ THOMAS
    SPECIAL   IN(Y)/OUT(N)
    FUNCTION  #  1   2   3
                NA  NA  CAL   PHASE OMIT
      1          Y   Y   N
      2          Y   Y   N
      3          Y   Y   N
??
```

APPENDIX B

Existing Traffic Conditions

Timings
2: Queen St & Tannery St

02/23/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	118	5	4	1	86	461	7	244
Future Volume (vph)	118	5	4	1	86	461	7	244
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	32.0	32.0	32.0	32.0	46.0	46.0	46.0	46.0
Minimum Split (s)	38.0	38.0	38.0	38.0	52.0	52.0	52.0	52.0
Total Split (s)	38.0	38.0	38.0	38.0	52.0	52.0	52.0	52.0
Total Split (%)	42.2%	42.2%	42.2%	42.2%	57.8%	57.8%	57.8%	57.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0		0.0
Total Lost Time (s)	6.0	6.0		6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Ped	Ped	Ped	Ped	Max	Max	Max	Max
Act Effct Green (s)	32.0	32.0		32.0		46.0		46.0
Actuated g/C Ratio	0.36	0.36		0.36		0.51		0.51
v/c Ratio	0.25	0.13		0.03		0.66		0.35
Control Delay	22.3	6.3		12.4		21.0		13.4
Queue Delay	0.0	0.0		0.0		0.0		0.0
Total Delay	22.3	6.3		12.4		21.0		13.4
LOS	C	A		B		C		B
Approach Delay		15.9		12.4		21.0		13.4
Approach LOS		B		B		C		B

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.66	
Intersection Signal Delay: 17.7	Intersection LOS: B
Intersection Capacity Utilization 108.6%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 2: Queen St & Tannery St

HCM Unsignalized Intersection Capacity Analysis
1: Joymar Dr & Tannery St

02/23/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	19	0	2	36	144	0	1	1	381	6	23
Future Volume (vph)	7	19	0	2	36	144	0	1	1	381	6	23
Peak Hour Factor	0.92	0.92	0.92	1.00	0.92	1.00	0.92	1.00	1.00	1.00	1.00	0.92
Hourly flow rate (vph)	8	21	0	2	39	144	0	1	1	381	6	25

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	29	185	2	412
Volume Left (vph)	8	2	0	381
Volume Right (vph)	0	144	1	25
Hadj (s)	0.09	-0.46	-0.30	0.15
Departure Headway (s)	5.2	4.5	4.6	4.6
Degree Utilization, x	0.04	0.23	0.00	0.52
Capacity (veh/h)	619	737	715	760
Control Delay (s)	8.5	8.8	7.6	12.5
Approach Delay (s)	8.5	8.8	7.6	12.5
Approach LOS	A	A	A	B

Intersection Summary			
Delay	11.2		
Level of Service	B		
Intersection Capacity Utilization	48.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
2: Queen St & Tannery St

02/23/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	118	5	72	4	1	10	86	461	14	7	244	67
Future Volume (vph)	118	5	72	4	1	10	86	461	14	7	244	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	6.0	6.0			6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00			1.00			1.00			1.00	
Frpb, ped/bikes	1.00	0.95			0.96			1.00			0.98	
Flpb, ped/bikes	0.96	1.00			0.99			0.99			1.00	
Frt	1.00	0.86			0.91			1.00			0.97	
Flt Protected	0.95	1.00			0.99			0.99			1.00	
Satd. Flow (prot)	1709	1529			1601			1845			1792	
Flt Permitted	0.75	1.00			0.96			0.89			0.99	
Satd. Flow (perm)	1345	1529			1553			1657			1773	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	118	5	72	4	1	10	86	461	14	7	244	67
RTOR Reduction (vph)	0	46	0	0	6	0	0	1	0	0	11	0
Lane Group Flow (vph)	118	31	0	0	9	0	0	560	0	0	307	0
Confl. Peds. (#/hr)	26		21	21		26	32		29	29		32
Confl. Bikes (#/hr)			3			2						2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	32.0	32.0			32.0			46.0			46.0	
Effective Green, g (s)	32.0	32.0			32.0			46.0			46.0	
Actuated g/C Ratio	0.36	0.36			0.36			0.51			0.51	
Clearance Time (s)	6.0	6.0			6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	478	543			552			846			906	
v/s Ratio Prot		0.02										
v/s Ratio Perm	c0.09				0.01			c0.34			0.17	
v/c Ratio	0.25	0.06			0.02			0.66			0.34	
Uniform Delay, d1	20.5	19.1			18.8			16.3			13.0	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	0.3	0.0			0.0			4.1			1.0	
Delay (s)	20.8	19.1			18.8			20.3			14.0	
Level of Service	C	B			B			C			B	
Approach Delay (s)		20.1			18.8			20.3			14.0	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	108.6%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Queues
2: Queen St & Tannery St

02/23/2018

Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	118	77	15	561	318
v/c Ratio	0.25	0.13	0.03	0.66	0.35
Control Delay	22.3	6.3	12.4	21.0	13.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	22.3	6.3	12.4	21.0	13.4
Queue Length 50th (m)	14.2	0.6	0.6	67.9	28.6
Queue Length 95th (m)	27.0	9.2	4.5	103.5	46.2
Internal Link Dist (m)		271.4	49.6	443.9	101.6
Turn Bay Length (m)	35.0				
Base Capacity (vph)	478	590	558	846	916
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.25	0.13	0.03	0.66	0.35

Intersection Summary

Queues
3: Queen St & Thomas St

02/23/2018

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	361	120	59	374	382
v/c Ratio	0.71	0.24	0.11	0.35	0.37
Control Delay	37.7	6.1	9.7	11.5	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	37.7	6.1	9.7	11.5	10.2
Queue Length 50th (m)	55.5	0.0	4.3	31.6	27.6
Queue Length 95th (m)	85.7	11.9	10.1	49.8	46.2
Internal Link Dist (m)	320.4			113.4	443.9
Turn Bay Length (m)			40.0		
Base Capacity (vph)	519	514	521	1071	1023
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.70	0.23	0.11	0.35	0.37

Intersection Summary

Timings
3: Queen St & Thomas St

02/23/2018

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	361	120	59	374	243
Future Volume (vph)	361	120	59	374	243
Turn Type	Prot	Perm	Perm	NA	NA
Protected Phases	4			2	6
Permitted Phases		4	2		
Detector Phase	4	4	2	2	6
Switch Phase					
Minimum Initial (s)	25.0	25.0	5.0	5.0	5.0
Minimum Split (s)	31.0	31.0	23.0	23.0	26.0
Total Split (s)	32.0	32.0	58.0	58.0	58.0
Total Split (%)	35.6%	35.6%	64.4%	64.4%	64.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	7.0	7.0	7.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Ped	Ped	Max	Max	Max
Act Effct Green (s)	25.4	25.4	51.0	51.0	51.0
Actuated g/C Ratio	0.28	0.28	0.57	0.57	0.57
v/c Ratio	0.71	0.24	0.11	0.35	0.37
Control Delay	37.7	6.1	9.7	11.5	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	37.7	6.1	9.7	11.5	10.2
LOS	D	A	A	B	B
Approach Delay	29.8			11.3	10.2
Approach LOS	C			B	B

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 89.4
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 17.8 — Intersection LOS: B
Intersection Capacity Utilization 63.9% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 3: Queen St & Thomas St

HCM Unsignalized Intersection Capacity Analysis
4: Thomas St & Joymar Dr

02/23/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	1223	338	5	1	3
Future Volume (Veh/h)	4	1223	338	5	1	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	4	1223	338	5	1	3
Pedestrians		7	7		4	
Lane Width (m)		3.5	3.5		3.5	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		1	1		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			218			
pX, platoon unblocked						
vC, conflicting volume	347				971	182
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	347				971	182
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1219				251	827

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	412	815	225	118	1	3
Volume Left	4	0	0	0	1	0
Volume Right	0	0	0	5	0	3
cSH	1219	1700	1700	1700	251	827
Volume to Capacity	0.00	0.48	0.13	0.07	0.00	0.00
Queue Length 95th (m)	0.1	0.0	0.0	0.0	0.1	0.1
Control Delay (s)	0.1	0.0	0.0	0.0	19.4	9.4
Lane LOS	A				C	A
Approach Delay (s)	0.0		0.0		11.9	
Approach LOS					B	

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	48.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
3: Queen St & Thomas St

02/23/2018

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	361	120	59	374	243	139
Future Volume (vph)	361	120	59	374	243	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	6.0	6.0	7.0	7.0	7.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.93	1.00	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1785	1479	1747	1879	1754	
Flt Permitted	0.95	1.00	0.50	1.00	1.00	
Satd. Flow (perm)	1785	1479	920	1879	1754	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	361	120	59	374	243	139
RTOR Reduction (vph)	0	86	0	0	23	0
Lane Group Flow (vph)	361	34	59	374	359	0
Confl. Peds. (#/hr)	17	20	28			28
Confl. Bikes (#/hr)		2				
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	25.4	25.4	51.0	51.0	51.0	
Effective Green, g (s)	25.4	25.4	51.0	51.0	51.0	
Actuated g/C Ratio	0.28	0.28	0.57	0.57	0.57	
Clearance Time (s)	6.0	6.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	507	420	524	1071	1000	
v/s Ratio Prot	c0.20			0.20	c0.20	
v/s Ratio Perm		0.02	0.06			
v/c Ratio	0.71	0.08	0.11	0.35	0.36	
Uniform Delay, d1	28.7	23.4	8.8	10.3	10.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.7	0.1	0.4	0.9	1.0	
Delay (s)	33.4	23.5	9.2	11.2	11.4	
Level of Service	C	C	A	B	B	
Approach Delay (s)	30.9			10.9	11.4	
Approach LOS	C			B	B	

Intersection Summary			
HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	89.4	Sum of lost time (s)	13.0
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Queues
5: GO Station & Thomas St

02/23/2018

Lane Group	EBT	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	1224	298	174	80	3
v/c Ratio	0.60	0.22	0.78	0.19	0.01
Control Delay	10.1	4.9	63.3	7.4	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	10.1	4.9	63.3	7.4	0.0
Queue Length 50th (m)	55.7	8.3	32.3	0.0	0.0
Queue Length 95th (m)	80.1	13.2	#58.4	10.1	0.0
Internal Link Dist (m)	194.1	107.3	76.3		58.2
Turn Bay Length (m)					
Base Capacity (vph)	2041	1360	249	665	334
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.60	0.22	0.70	0.12	0.01

Intersection Summary

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

Timings
5: GO Station & Thomas St

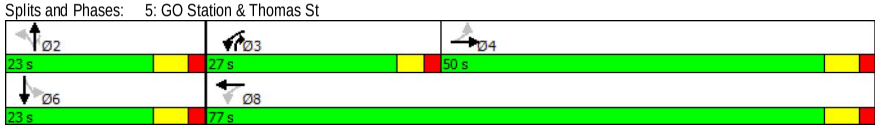
02/23/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	2	657	129	168	174	0	80	2	0
Future Volume (vph)	2	657	129	168	174	0	80	2	0
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	pm+ov	Perm	NA
Protected Phases		4	3	8		2	3		6
Permitted Phases	4		8		2		2	6	
Detector Phase	4	4	3	8	2	2	3	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	50.0	50.0	10.0	77.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	50.0	50.0	27.0	77.0	23.0	23.0	27.0	23.0	23.0
Total Split (%)	50.0%	50.0%	27.0%	77.0%	23.0%	23.0%	27.0%	23.0%	23.0%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0	0.0		0.0
Total Lost Time (s)		6.0		6.0		6.0	5.0		6.0
Lead/Lag	Lag	Lag	Lead				Lead		
Lead-Lag Optimize?	Yes	Yes	Yes				Yes		
Recall Mode	Max	Max	None	Max	Min	Min	None	Min	Min
Act Effct Green (s)		62.7		71.0		15.6	22.2		15.6
Actuated g/C Ratio		0.64		0.72		0.16	0.22		0.16
v/c Ratio		0.60		0.22		0.78	0.19		0.01
Control Delay		10.1		4.9		63.3	7.4		0.0
Queue Delay		0.0		0.0		0.0	0.0		0.0
Total Delay		10.1		4.9		63.3	7.4		0.0
LOS		B		A		E	A		A
Approach Delay		10.1		4.9		45.7			
Approach LOS		B		A		D			

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 98.7
Natural Cycle: 100
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 14.3 — Intersection LOS: B
Intersection Capacity Utilization 78.8% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 5: GO Station & Thomas St



HCM Unsignalized Intersection Capacity Analysis
7: Thomas St & Emby Dr

02/23/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	9	730	295	3	3	3
Future Volume (Veh/h)	9	730	295	3	3	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	9	730	295	3	3	3
Pedestrians		8	1			
Lane Width (m)		3.7	3.7			
Walking Speed (m/s)		1.1	1.1			
Percent Blockage		1	0			
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		131	43			
pX, platoon unblocked	0.99				0.99	0.99
vC, conflicting volume	298				680	157
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	281				666	139
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				99	100
cM capacity (veh/h)	1285				391	877

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	252	487	197	101	6
Volume Left	9	0	0	0	3
Volume Right	0	0	0	3	3
cSH	1285	1700	1700	1700	541
Volume to Capacity	0.01	0.29	0.12	0.06	0.01
Queue Length 95th (m)	0.2	0.0	0.0	0.0	0.3
Control Delay (s)	0.3	0.0	0.0	0.0	11.7
Lane LOS	A				B
Approach Delay (s)	0.1		0.0		11.7
Approach LOS					B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
5: GO Station & Thomas St

02/23/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	657	565	129	168	1	174	0	80	2	0	1
Future Volume (vph)	2	657	565	129	168	1	174	0	80	2	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)		6.0			6.0			6.0	5.0		6.0	
Lane Util. Factor		0.95			0.95			1.00	1.00		1.00	
Frpb, ped/bikes		0.96			1.00			1.00	0.97		0.99	
Flpb, ped/bikes		1.00			1.00			1.00	1.00		0.99	
Frt		0.93			1.00			1.00	0.85		0.95	
Flt Protected		1.00			0.98			0.95	1.00		0.97	
Satd. Flow (prot)		3199			3492			1779	1557		1708	
Flt Permitted		0.95			0.51			0.76	1.00		0.84	
Satd. Flow (perm)		3054			1804			1416	1557		1491	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	2	657	565	129	168	1	174	0	80	2	0	1
RTOR Reduction (vph)	0	103	0	0	0	0	0	0	64	0	3	0
Lane Group Flow (vph)	0	1121	0	0	298	0	0	174	16	0	0	0
Confl. Peds. (#/hr)	17		18	18		17	2		13	13		2
Confl. Bikes (#/hr)			3									3
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases		4		3	8			2	3		6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		62.7			72.1			15.7	20.1		15.7	
Effective Green, g (s)		62.7			72.1			15.7	20.1		15.7	
Actuated g/C Ratio		0.63			0.72			0.16	0.20		0.16	
Clearance Time (s)		6.0			6.0			6.0	5.0		6.0	
Vehicle Extension (s)		3.0			3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		1918			1377			222	313		234	
v/s Ratio Prot					c0.01				0.00			
v/s Ratio Perm		c0.37			0.15			c0.12	0.01		0.00	
v/c Ratio		0.58			0.22			0.78	0.05		0.00	
Uniform Delay, d1		10.9			4.6			40.4	32.2		35.4	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		1.3			0.1			16.4	0.1		0.0	
Delay (s)		12.2			4.6			56.8	32.2		35.4	
Level of Service		B			A			E	C		D	
Approach Delay (s)		12.2			4.6			49.1			35.4	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	16.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	99.8	Sum of lost time (s)	17.0
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
15: Tannery St & Rutledge Rd

02/23/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	400	181	9	2	1
Future Volume (Veh/h)	1	400	181	9	2	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	1	400	181	9	2	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			129			
pX, platoon unblocked						
vC, conflicting volume	190				588	186
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	190				588	186
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1396				475	862

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	401	190	3
Volume Left	1	0	2
Volume Right	0	9	1
cSH	1396	1700	558
Volume to Capacity	0.00	0.11	0.01
Queue Length 95th (m)	0.0	0.0	0.1
Control Delay (s)	0.0	0.0	11.5
Lane LOS	A		B
Approach Delay (s)	0.0	0.0	11.5
Approach LOS			B

Intersection Summary			
Average Delay		0.1	
Intersection Capacity Utilization		31.8%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
13: Broadway St/Crumbie St & Tannery St

02/23/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	160	209	30	120	4	49	14	25	10	12	21
Future Volume (Veh/h)	33	160	209	30	120	4	49	14	25	10	12	21
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.80	0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	41	200	261	30	120	4	49	14	25	10	12	21
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		57			295							
pX, platoon unblocked												
vC, conflicting volume	124			461			622	596	330	626	725	122
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	124			461			622	596	330	626	725	122
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			97			87	96	97	97	96	98
cM capacity (veh/h)	1475			1111			367	397	716	359	335	935

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	502	154	88	43
Volume Left	41	30	49	10
Volume Right	261	4	25	21
cSH	1475	1111	432	499
Volume to Capacity	0.03	0.03	0.20	0.09
Queue Length 95th (m)	0.7	0.6	5.7	2.1
Control Delay (s)	0.9	1.8	15.5	12.9
Lane LOS	A	A	C	B
Approach Delay (s)	0.9	1.8	15.5	12.9
Approach LOS			C	B

Intersection Summary			
Average Delay		3.3	
Intersection Capacity Utilization		42.9%	ICU Level of Service A
Analysis Period (min)		15	

Queues
19: Rail Corridor & Tannery St

02/23/2018

Lane Group
Lane Group Flow (vph)
v/c Ratio
Control Delay
Queue Delay
Total Delay
Queue Length 50th (m)
Queue Length 95th (m)
Internal Link Dist (m)
Turn Bay Length (m)
Base Capacity (vph)
Starvation Cap Reductn
Spillback Cap Reductn
Storage Cap Reductn
Reduced v/c Ratio

Intersection Summary

Timings
19: Rail Corridor & Tannery St

02/23/2018

Lane Group	Ø2	Ø4	Ø6	Ø8
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Turn Type				
Protected Phases	2	4	6	8
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	120.0	1680.0	120.0	1680.0
Total Split (%)	7%	93%	7%	93%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				

Intersection Summary	
Cycle Length: 1800	
Actuated Cycle Length: 1800	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.00	
Intersection Signal Delay: 0.0	Intersection LOS: A
Intersection Capacity Utilization 0.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 19: Rail Corridor & Tannery St

Timings
23: Rail Corridor & Thomas St

02/23/2018

Lane Group	EBT	WBT	Ø2	Ø6
Lane Configurations				
Traffic Volume (vph)	733	298		
Future Volume (vph)	733	298		
Turn Type	NA	NA		
Protected Phases	4	8	2	6
Permitted Phases				
Detector Phase	4	8		
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	1680.0	1680.0	120.0	120.0
Total Split (%)	93.3%	93.3%	7%	7%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		
Total Lost Time (s)	4.5	4.5		
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	1675.5	1675.5		
Actuated g/C Ratio	0.93	0.93		
v/c Ratio	0.24	0.09		
Control Delay	5.7	4.8		
Queue Delay	12.6	2.5		
Total Delay	18.3	7.3		
LOS	B	A		
Approach Delay	18.3	7.3		
Approach LOS	B	A		

Intersection Summary	
Cycle Length: 1800	
Actuated Cycle Length: 1800	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.24	
Intersection Signal Delay: 15.3	Intersection LOS: B
Intersection Capacity Utilization 24.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 23: Rail Corridor & Thomas St

HCM Signalized Intersection Capacity Analysis
19: Rail Corridor & Tannery St

02/23/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)												
Lane Util. Factor												
Frt												
Flt Protected												
Satd. Flow (prot)												
Flt Permitted												
Satd. Flow (perm)												
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type												
Protected Phases		4			8			2			6	
Permitted Phases												
Actuated Green, G (s)												
Effective Green, g (s)												
Actuated g/C Ratio												
Clearance Time (s)												
Lane Grp Cap (vph)												
v/s Ratio Prot												
v/s Ratio Perm												
v/c Ratio												
Uniform Delay, d1												
Progression Factor												
Incremental Delay, d2												
Delay (s)												
Level of Service												
Approach Delay (s)		0.0			0.0			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	0.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.00		
Actuated Cycle Length (s)	1800.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: Rail Corridor & Thomas St

02/23/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	733	0	0	298	0	0	0	0	0	0	0
Future Volume (vph)	0	733	0	0	298	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5							
Lane Util. Factor		0.95			0.95							
Frt		1.00			1.00							
Flt Protected		1.00			1.00							
Satd. Flow (prot)		3579			3579							
Flt Permitted		1.00			1.00							
Satd. Flow (perm)		3579			3579							
Peak-hour factor, PHF	0.92	0.92	0.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	797	0	0	298	0	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	797	0	0	298	0	0	0	0	0	0	0
Turn Type		NA			NA							
Protected Phases		4			8			2			6	
Permitted Phases												
Actuated Green, G (s)		1675.5			1675.5							
Effective Green, g (s)		1675.5			1675.5							
Actuated g/C Ratio		0.93			0.93							
Clearance Time (s)		4.5			4.5							
Lane Grp Cap (vph)		3331			3331							
v/s Ratio Prot		c0.22			0.08							
v/s Ratio Perm												
v/c Ratio		0.24			0.09							
Uniform Delay, d1		5.5			4.7							
Progression Factor		1.00			1.00							
Incremental Delay, d2		0.2			0.1							
Delay (s)		5.7			4.7							
Level of Service		A			A							
Approach Delay (s)		5.7			4.7			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.22		
Actuated Cycle Length (s)	1800.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	24.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues
23: Rail Corridor & Thomas St

02/23/2018

Lane Group	EBT	WBT
Lane Group Flow (vph)	797	298
v/c Ratio	0.24	0.09
Control Delay	5.7	4.8
Queue Delay	12.6	2.5
Total Delay	18.3	7.3
Queue Length 50th (m)	135.0	42.8
Queue Length 95th (m)	130.7	43.7
Internal Link Dist (m)	19.3	320.4
Turn Bay Length (m)		
Base Capacity (vph)	3331	3331
Starvation Cap Reductn	2515	2891
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.98	0.68

Intersection Summary

Timings
2: Queen St & Tannery St

02/23/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	91	5	3	7	42	473	12	440
Future Volume (vph)	91	5	3	7	42	473	12	440
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	25.0	46.0	46.0	46.0	46.0
Minimum Split (s)	31.0	31.0	31.0	31.0	52.0	52.0	52.0	52.0
Total Split (s)	31.0	31.0	31.0	31.0	79.0	79.0	79.0	79.0
Total Split (%)	28.2%	28.2%	28.2%	28.2%	71.8%	71.8%	71.8%	71.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0		0.0
Total Lost Time (s)	6.0	6.0		6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Ped	Ped	Ped	Ped	Max	Max	Max	Max
Act Effct Green (s)	25.0	25.0		25.0		73.0		73.0
Actuated g/C Ratio	0.23	0.23		0.23		0.66		0.66
v/c Ratio	0.31	0.21		0.05		0.46		0.48
Control Delay	38.8	10.2		24.8		10.5		10.3
Queue Delay	0.0	0.0		0.0		0.0		0.0
Total Delay	38.8	10.2		24.8		10.5		10.3
LOS	D	B		C		B		B
Approach Delay		25.1		24.8		10.5		10.3
Approach LOS		C		C		B		B

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 110	
Natural Cycle: 85	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.48	
Intersection Signal Delay: 12.6	Intersection LOS: B
Intersection Capacity Utilization 78.1%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: Queen St & Tannery St

HCM Unsignalized Intersection Capacity Analysis
1: Joymar Dr & Tannery St

02/23/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	1	6	3	63	5	188	2	13	16	185	35	2
Future Volume (vph)	1	6	3	63	5	188	2	13	16	185	35	2
Peak Hour Factor	0.92	0.92	0.92	1.00	0.92	1.00	0.92	1.00	1.00	1.00	1.00	0.92
Hourly flow rate (vph)	1	7	3	63	5	188	2	13	16	185	35	2

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	11	256	31	222
Volume Left (vph)	1	63	2	185
Volume Right (vph)	3	188	16	2
Hadj (s)	-0.11	-0.39	-0.29	0.16
Departure Headway (s)	4.7	4.1	4.5	4.7
Degree Utilization, x	0.01	0.29	0.04	0.29
Capacity (veh/h)	701	820	742	726
Control Delay (s)	7.8	8.9	7.7	9.6
Approach Delay (s)	7.8	8.9	7.7	9.6
Approach LOS	A	A	A	A

Intersection Summary			
Delay	9.1		
Level of Service	A		
Intersection Capacity Utilization	48.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
2: Queen St & Tannery St

02/23/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	5	78	3	7	7	42	473	7	12	440	112
Future Volume (vph)	91	5	78	3	7	7	42	473	7	12	440	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	6.0	6.0			6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00			1.00			1.00			1.00	
Frpb, ped/bikes	1.00	0.92			0.96			1.00			0.98	
Flpb, ped/bikes	0.93	1.00			0.99			1.00			1.00	
Frt	1.00	0.86			0.94			1.00			0.97	
Flt Protected	0.95	1.00			0.99			1.00			1.00	
Satd. Flow (prot)	1660	1491			1676			1862			1792	
Flt Permitted	0.75	1.00			0.97			0.93			0.99	
Satd. Flow (perm)	1304	1491			1634			1729			1771	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	91	5	78	3	7	7	42	473	7	12	440	112
RTOR Reduction (vph)	0	60	0	0	5	0	0	0	0	0	8	0
Lane Group Flow (vph)	91	23	0	0	12	0	0	522	0	0	556	0
Confl. Peds. (#/hr)	26		21	21		26	32		29	29		32
Confl. Bikes (#/hr)			3			2						2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	25.0	25.0			25.0			73.0			73.0	
Effective Green, g (s)	25.0	25.0			25.0			73.0			73.0	
Actuated g/C Ratio	0.23	0.23			0.23			0.66			0.66	
Clearance Time (s)	6.0	6.0			6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	296	338			371			1147			1175	
v/s Ratio Prot		0.02										
v/s Ratio Perm	c0.07				0.01			0.30			c0.31	
v/c Ratio	0.31	0.07			0.03			0.45			0.47	
Uniform Delay, d1	35.3	33.4			33.1			8.9			9.1	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	0.6	0.1			0.0			1.3			1.4	
Delay (s)	35.9	33.4			33.1			10.2			10.4	
Level of Service	D	C			C			B			B	
Approach Delay (s)		34.7			33.1			10.2			10.4	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Queues
2: Queen St & Tannery St

02/23/2018

Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	91	83	17	522	564
v/c Ratio	0.31	0.21	0.05	0.46	0.48
Control Delay	38.8	10.2	24.8	10.5	10.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	38.8	10.2	24.8	10.5	10.3
Queue Length 50th (m)	16.3	0.8	1.7	48.8	51.4
Queue Length 95th (m)	31.1	13.0	7.4	70.3	74.1
Internal Link Dist (m)		271.4	49.6	443.9	101.6
Turn Bay Length (m)	35.0				
Base Capacity (vph)	295	399	376	1147	1182
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.31	0.21	0.05	0.46	0.48

Intersection Summary

Queues
3: Queen St & Thomas St

02/23/2018

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	178	130	138	416	678
v/c Ratio	0.42	0.29	0.38	0.34	0.60
Control Delay	39.3	7.8	12.8	9.8	12.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	39.3	7.8	12.8	9.8	12.6
Queue Length 50th (m)	32.6	0.0	12.7	37.2	68.9
Queue Length 95th (m)	53.3	14.5	25.8	53.9	101.4
Internal Link Dist (m)	320.4			113.4	443.9
Turn Bay Length (m)			40.0		
Base Capacity (vph)	421	447	367	1212	1134
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.42	0.29	0.38	0.34	0.60

Intersection Summary

Timings
3: Queen St & Thomas St

02/23/2018

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	178	130	138	416	392
Future Volume (vph)	178	130	138	416	392
Turn Type	Prot	Perm	Perm	NA	NA
Protected Phases	4			2	6
Permitted Phases		4	2		
Detector Phase	4	4	2	2	6
Switch Phase					
Minimum Initial (s)	26.0	26.0	5.0	5.0	5.0
Minimum Split (s)	32.0	32.0	23.0	23.0	26.0
Total Split (s)	32.0	32.0	78.0	78.0	78.0
Total Split (%)	29.1%	29.1%	70.9%	70.9%	70.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	7.0	7.0	7.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Ped	Ped	Max	Max	Max
Act Effct Green (s)	26.0	26.0	71.0	71.0	71.0
Actuated g/C Ratio	0.24	0.24	0.65	0.65	0.65
v/c Ratio	0.42	0.29	0.38	0.34	0.60
Control Delay	39.3	7.8	12.8	9.8	12.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	39.3	7.8	12.8	9.8	12.6
LOS	D	A	B	A	B
Approach Delay	26.0			10.6	12.6
Approach LOS	C			B	B

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 14.6 — Intersection LOS: B
Intersection Capacity Utilization 85.2% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 3: Queen St & Thomas St

HCM Unsignalized Intersection Capacity Analysis
4: Thomas St & Joymar Dr

02/23/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	464	999	23	6	89
Future Volume (Veh/h)	13	464	999	23	6	89
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	13	464	999	23	6	89
Pedestrians		7	7		4	
Lane Width (m)		3.5	3.5		3.5	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		1	1		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			218			
pX, platoon unblocked	0.92				0.92	0.92
vC, conflicting volume	1026				1280	522
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	858				1133	311
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				97	86
cM capacity (veh/h)	727				179	630

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	168	309	666	356	6	89
Volume Left	13	0	0	0	6	0
Volume Right	0	0	0	23	0	89
cSH	727	1700	1700	1700	179	630
Volume to Capacity	0.02	0.18	0.39	0.21	0.03	0.14
Queue Length 95th (m)	0.4	0.0	0.0	0.0	0.8	3.7
Control Delay (s)	1.0	0.0	0.0	0.0	25.8	11.7
Lane LOS	A				D	B
Approach Delay (s)	0.3		0.0		12.5	
Approach LOS					B	

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	42.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
3: Queen St & Thomas St

02/23/2018

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	178	130	138	416	392	286
Future Volume (vph)	178	130	138	416	392	286
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	6.0	6.0	7.0	7.0	7.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.92	1.00	1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.94	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1785	1474	1785	1879	1721	
Flt Permitted	0.95	1.00	0.31	1.00	1.00	
Satd. Flow (perm)	1785	1474	587	1879	1721	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	178	130	138	416	392	286
RTOR Reduction (vph)	0	99	0	0	24	0
Lane Group Flow (vph)	178	31	138	416	654	0
Confl. Peds. (#/hr)	17	20	28			28
Confl. Bikes (#/hr)		2				
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	26.0	26.0	71.0	71.0	71.0	
Effective Green, g (s)	26.0	26.0	71.0	71.0	71.0	
Actuated g/C Ratio	0.24	0.24	0.65	0.65	0.65	
Clearance Time (s)	6.0	6.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	421	348	378	1212	1110	
v/s Ratio Prot	c0.10			0.22	c0.38	
v/s Ratio Perm		0.02	0.24			
v/c Ratio	0.42	0.09	0.37	0.34	0.59	
Uniform Delay, d1	35.6	32.8	9.0	8.9	11.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.1	2.7	0.8	2.3	
Delay (s)	36.3	32.9	11.8	9.7	13.5	
Level of Service	D	C	B	A	B	
Approach Delay (s)	34.9			10.2	13.5	
Approach LOS	C			B	B	

Intersection Summary			
HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Queues
5: GO Station & Thomas St

02/23/2018

Lane Group	EBT	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	470	701	386	146	9
v/c Ratio	0.37	0.42	0.82	0.20	0.02
Control Delay	18.9	14.3	39.9	3.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	18.9	14.3	39.9	3.0	0.0
Queue Length 50th (m)	23.9	31.6	53.9	0.7	0.0
Queue Length 95th (m)	46.0	60.1	85.4	8.5	0.0
Internal Link Dist (m)	194.1	107.3	76.3		58.2
Turn Bay Length (m)					
Base Capacity (vph)	1270	1709	782	858	915
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.37	0.41	0.49	0.17	0.01

Intersection Summary

Timings
5: GO Station & Thomas St

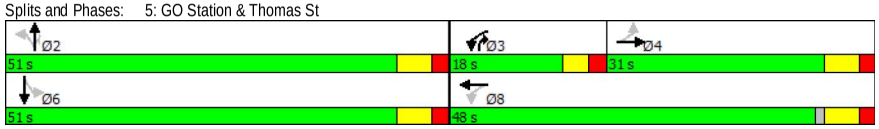
02/23/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	3	358	48	647	367	0	139	1	0
Future Volume (vph)	3	358	48	647	367	0	139	1	0
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	pm+ov	Perm	NA
Protected Phases		4	3	8		2	3		6
Permitted Phases	4		8		2		2	6	
Detector Phase	4	4	3	8	2	2	3	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	21.0	21.0	10.0	21.0	25.0	25.0	10.0	25.0	25.0
Total Split (s)	31.0	31.0	18.0	48.0	51.0	51.0	18.0	51.0	51.0
Total Split (%)	31.0%	31.0%	18.0%	48.0%	51.0%	51.0%	18.0%	51.0%	51.0%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0	0.0		0.0
Total Lost Time (s)		6.0		6.0		6.0	5.0		6.0
Lead/Lag	Lag	Lag	Lead				Lead		
Lead-Lag Optimize?	Yes	Yes	Yes				Yes		
Recall Mode	Max	Max	None	Max	Min	Min	None	Min	Min
Act Effct Green (s)		31.8		42.4		27.2	33.9		27.2
Actuated g/C Ratio		0.39		0.52		0.33	0.41		0.33
v/c Ratio		0.37		0.42		0.82	0.20		0.02
Control Delay		18.9		14.3		39.9	3.0		0.0
Queue Delay		0.0		0.0		0.0	0.0		0.0
Total Delay		18.9		14.3		39.9	3.0		0.0
LOS		B		B		D	A		A
Approach Delay		18.9		14.3		29.8			
Approach LOS		B		B		C			

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 81.8
Natural Cycle: 60
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 20.3 — Intersection LOS: C
Intersection Capacity Utilization 75.4% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 5: GO Station & Thomas St



HCM Unsignalized Intersection Capacity Analysis
7: Thomas St & Emby Dr

02/23/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	490	685	10	11	16
Future Volume (Veh/h)	8	490	685	10	11	16
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	8	490	685	10	11	16
Pedestrians		8	1			
Lane Width (m)		3.7	3.7			
Walking Speed (m/s)		1.1	1.1			
Percent Blockage		1	0			
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		131	43			
pX, platoon unblocked	0.98				0.96	0.98
vC, conflicting volume	695				952	356
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	656				788	311
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				97	98
cM capacity (veh/h)	925				316	674

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	171	327	457	238	27
Volume Left	8	0	0	0	11
Volume Right	0	0	0	10	16
cSH	925	1700	1700	1700	461
Volume to Capacity	0.01	0.19	0.27	0.14	0.06
Queue Length 95th (m)	0.2	0.0	0.0	0.0	1.4
Control Delay (s)	0.5	0.0	0.0	0.0	13.3
Lane LOS	A				B
Approach Delay (s)	0.2		0.0		13.3
Approach LOS					B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	31.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
5: GO Station & Thomas St

02/23/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	358	109	48	647	6	367	0	139	1	0	8
Future Volume (vph)	3	358	109	48	647	6	367	0	139	1	0	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)		6.0			6.0			6.0	5.0		6.0	
Lane Util. Factor		0.95			0.95			1.00	1.00		1.00	
Frpb, ped/bikes		0.98			1.00			1.00	0.98		0.99	
Flpb, ped/bikes		1.00			1.00			1.00	1.00		1.00	
Frt		0.97			1.00			1.00	0.85		0.88	
Flt Protected		1.00			1.00			0.95	1.00		0.99	
Satd. Flow (prot)		3388			3547			1780	1559		1619	
Flt Permitted		0.95			0.89			0.75	1.00		0.97	
Satd. Flow (perm)		3223			3178			1409	1559		1577	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Adj. Flow (vph)	3	358	109	48	647	6	386	0	146	1	0	8
RTOR Reduction (vph)	0	23	0	0	0	0	0	0	82	0	6	0
Lane Group Flow (vph)	0	447	0	0	701	0	0	386	64	0	3	0
Confl. Peds. (#/hr)	17		18	18		17	2		13	13		2
Confl. Bikes (#/hr)			3									3
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases		4		3	8			2	3		6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		31.8			42.4			27.2	32.8		27.2	
Effective Green, g (s)		31.8			42.4			27.2	32.8		27.2	
Actuated g/C Ratio		0.39			0.52			0.33	0.40		0.33	
Clearance Time (s)		6.0			6.0			6.0	5.0		6.0	
Vehicle Extension (s)		3.0			3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		1256			1676			469	626		525	
v/s Ratio Prot					c0.03				0.01			
v/s Ratio Perm		0.14			c0.19			c0.27	0.03		0.00	
v/c Ratio		0.36			0.42			0.82	0.10		0.01	
Uniform Delay, d1		17.6			12.0			25.0	15.2		18.2	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.8			0.2			11.1	0.1		0.0	
Delay (s)		18.4			12.2			36.1	15.3		18.2	
Level of Service		B			B			D	B		B	
Approach Delay (s)		18.4			12.2			30.4			18.2	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	19.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	81.6	Sum of lost time (s)	17.0
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
15: Tannery St & Rutledge Rd

02/23/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	207	256	0	3	0
Future Volume (Veh/h)	0	207	256	0	3	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	207	256	0	3	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			129			
pX, platoon unblocked						
vC, conflicting volume	256				463	256
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	256				463	256
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	1321				561	788

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	207	256	3
Volume Left	0	0	3
Volume Right	0	0	0
cSH	1321	1700	561
Volume to Capacity	0.00	0.15	0.01
Queue Length 95th (m)	0.0	0.0	0.1
Control Delay (s)	0.0	0.0	11.5
Lane LOS			B
Approach Delay (s)	0.0	0.0	11.5
Approach LOS			B

Intersection Summary			
Average Delay		0.1	
Intersection Capacity Utilization		23.5%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
13: Broadway St/Crumbie St & Tannery St

02/23/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	101	87	50	98	13	93	40	55	18	46	65
Future Volume (Veh/h)	22	101	87	50	98	13	93	40	55	18	46	65
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	22	101	87	50	98	13	93	40	55	18	46	65
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		57			295							
pX, platoon unblocked												
vC, conflicting volume	111			188			481	400	144	468	436	104
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	111			188			481	400	144	468	436	104
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			96			78	92	94	96	91	93
cM capacity (veh/h)	1492			1398			415	515	908	433	491	956

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	210	161	188	129
Volume Left	22	50	93	18
Volume Right	87	13	55	65
cSH	1492	1398	519	634
Volume to Capacity	0.01	0.04	0.36	0.20
Queue Length 95th (m)	0.3	0.8	12.5	5.8
Control Delay (s)	0.9	2.6	15.8	12.1
Lane LOS	A	A	C	B
Approach Delay (s)	0.9	2.6	15.8	12.1
Approach LOS			C	B

Intersection Summary			
Average Delay		7.5	
Intersection Capacity Utilization		43.1%	ICU Level of Service A
Analysis Period (min)		15	

Queues
19: Rail Corridor & Tannery St

02/23/2018

Lane Group
Lane Group Flow (vph)
v/c Ratio
Control Delay
Queue Delay
Total Delay
Queue Length 50th (m)
Queue Length 95th (m)
Internal Link Dist (m)
Turn Bay Length (m)
Base Capacity (vph)
Starvation Cap Reductn
Spillback Cap Reductn
Storage Cap Reductn
Reduced v/c Ratio

Intersection Summary

Timings
19: Rail Corridor & Tannery St

02/23/2018

Lane Group	Ø2	Ø4	Ø6	Ø8
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Turn Type				
Protected Phases	2	4	6	8
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	120.0	1680.0	120.0	1680.0
Total Split (%)	7%	93%	7%	93%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				

Intersection Summary	
Cycle Length: 1800	
Actuated Cycle Length: 1800	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.00	
Intersection Signal Delay: 0.0	Intersection LOS: A
Intersection Capacity Utilization 0.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 19: Rail Corridor & Tannery St

Timings
23: Rail Corridor & Thomas St

02/23/2018

Lane Group	EBT	WBT	Ø2	Ø6
Lane Configurations				
Traffic Volume (vph)	501	695		
Future Volume (vph)	501	695		
Turn Type	NA	NA		
Protected Phases	4	8	2	6
Permitted Phases				
Detector Phase	4	8		
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	1680.0	1680.0	120.0	120.0
Total Split (%)	93.3%	93.3%	7%	7%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		
Total Lost Time (s)	4.5	4.5		
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	1675.5	1675.5		
Actuated g/C Ratio	0.93	0.93		
v/c Ratio	0.16	0.21		
Control Delay	5.2	5.5		
Queue Delay	9.7	4.3		
Total Delay	14.9	9.8		
LOS	B	A		
Approach Delay	14.9	9.8		
Approach LOS	B	A		

Intersection Summary	
Cycle Length: 1800	
Actuated Cycle Length: 1800	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.21	
Intersection Signal Delay: 12.0	Intersection LOS: B
Intersection Capacity Utilization 23.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 23: Rail Corridor & Thomas St

HCM Signalized Intersection Capacity Analysis
19: Rail Corridor & Tannery St

02/23/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)												
Lane Util. Factor												
Frt												
Flt Protected												
Satd. Flow (prot)												
Flt Permitted												
Satd. Flow (perm)												
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type												
Protected Phases		4			8			2			6	
Permitted Phases												
Actuated Green, G (s)												
Effective Green, g (s)												
Actuated g/C Ratio												
Clearance Time (s)												
Lane Grp Cap (vph)												
v/s Ratio Prot												
v/s Ratio Perm												
v/c Ratio												
Uniform Delay, d1												
Progression Factor												
Incremental Delay, d2												
Delay (s)												
Level of Service												
Approach Delay (s)		0.0			0.0			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	0.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.00		
Actuated Cycle Length (s)	1800.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: Rail Corridor & Thomas St

02/23/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	501	0	0	695	0	0	0	0	0	0	0
Future Volume (vph)	0	501	0	0	695	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5							
Lane Util. Factor		0.95			0.95							
Frt		1.00			1.00							
Flt Protected		1.00			1.00							
Satd. Flow (prot)		3579			3579							
Flt Permitted		1.00			1.00							
Satd. Flow (perm)		3579			3579							
Peak-hour factor, PHF	0.92	0.92	0.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	545	0	0	695	0	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	545	0	0	695	0	0	0	0	0	0	0
Turn Type		NA			NA							
Protected Phases		4			8			2			6	
Permitted Phases												
Actuated Green, G (s)		1675.5			1675.5							
Effective Green, g (s)		1675.5			1675.5							
Actuated g/C Ratio		0.93			0.93							
Clearance Time (s)		4.5			4.5							
Lane Grp Cap (vph)		3331			3331							
v/s Ratio Prot		0.15			c0.19							
v/s Ratio Perm												
v/c Ratio		0.16			0.21							
Uniform Delay, d1		5.1			5.3							
Progression Factor		1.00			1.00							
Incremental Delay, d2		0.1			0.1							
Delay (s)		5.2			5.5							
Level of Service		A			A							
Approach Delay (s)		5.2			5.5			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.20		
Actuated Cycle Length (s)	1800.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	23.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues
23: Rail Corridor & Thomas St

02/23/2018

Lane Group	EBT	WBT
Lane Group Flow (vph)	545	695
v/c Ratio	0.16	0.21
Control Delay	5.2	5.5
Queue Delay	9.7	4.3
Total Delay	14.9	9.8
Queue Length 50th (m)	84.6	113.6
Queue Length 95th (m)	83.5	110.5
Internal Link Dist (m)	19.3	320.4
Turn Bay Length (m)		
Base Capacity (vph)	3331	3331
Starvation Cap Reductn	2747	2535
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.93	0.87

Intersection Summary

APPENDIX C

Future Background Traffic Conditions

Timings
2: Queen St & Tannery St

02/26/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	171	5	4	1	91	473	7	261
Future Volume (vph)	171	5	4	1	91	473	7	261
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	32.0	32.0	32.0	32.0	46.0	46.0	46.0	46.0
Minimum Split (s)	38.0	38.0	38.0	38.0	52.0	52.0	52.0	52.0
Total Split (s)	38.0	38.0	38.0	38.0	52.0	52.0	52.0	52.0
Total Split (%)	42.2%	42.2%	42.2%	42.2%	57.8%	57.8%	57.8%	57.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0		0.0
Total Lost Time (s)	6.0	6.0		6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Ped	Ped	Ped	Ped	Max	Max	Max	Max
Act Effct Green (s)	32.0	32.0		32.0		46.0		46.0
Actuated g/C Ratio	0.36	0.36		0.36		0.51		0.51
v/c Ratio	0.36	0.16		0.03		0.68		0.38
Control Delay	24.1	5.8		12.4		21.7		13.8
Queue Delay	0.0	0.0		0.0		0.0		0.0
Total Delay	24.1	5.8		12.4		21.7		13.8
LOS	C	A		B		C		B
Approach Delay		17.6		12.4		21.7		13.8
Approach LOS		B		B		C		B

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 18.4	Intersection LOS: B
Intersection Capacity Utilization 113.6%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 2: Queen St & Tannery St

HCM Unsignalized Intersection Capacity Analysis
1: Joymar Dr & Tannery St

02/26/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	19	0	56	36	160	0	38	14	384	13	23
Future Volume (vph)	7	19	0	56	36	160	0	38	14	384	13	23
Peak Hour Factor	0.92	0.92	0.92	1.00	0.92	1.00	0.92	1.00	1.00	1.00	1.00	0.92
Hourly flow rate (vph)	8	21	0	56	39	160	0	38	14	384	13	25

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	29	255	52	422
Volume Left (vph)	8	56	0	384
Volume Right (vph)	0	160	14	25
Hadj (s)	0.09	-0.33	-0.16	0.15
Departure Headway (s)	5.6	4.8	5.0	4.9
Degree Utilization, x	0.04	0.34	0.07	0.57
Capacity (veh/h)	568	690	650	714
Control Delay (s)	8.8	10.3	8.4	14.0
Approach Delay (s)	8.8	10.3	8.4	14.0
Approach LOS	A	B	A	B

Intersection Summary			
Delay	12.2		
Level of Service	B		
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
2: Queen St & Tannery St

02/26/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	171	5	90	4	1	10	91	473	14	7	261	77
Future Volume (vph)	171	5	90	4	1	10	91	473	14	7	261	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	6.0	6.0			6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00			1.00			1.00			1.00	
Frpb, ped/bikes	1.00	0.95			0.96			1.00			0.98	
Flpb, ped/bikes	0.96	1.00			0.99			0.99			1.00	
Frt	1.00	0.86			0.91			1.00			0.97	
Flt Protected	0.95	1.00			0.99			0.99			1.00	
Satd. Flow (prot)	1709	1524			1602			1845			1787	
Flt Permitted	0.75	1.00			0.95			0.89			0.99	
Satd. Flow (perm)	1345	1524			1549			1649			1769	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	171	5	90	4	1	10	91	473	14	7	261	77
RTOR Reduction (vph)	0	58	0	0	6	0	0	1	0	0	12	0
Lane Group Flow (vph)	171	37	0	0	9	0	0	577	0	0	333	0
Confl. Peds. (#/hr)	26		21	21		26	32		29	29		32
Confl. Bikes (#/hr)			3			2						2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	32.0	32.0			32.0			46.0			46.0	
Effective Green, g (s)	32.0	32.0			32.0			46.0			46.0	
Actuated g/C Ratio	0.36	0.36			0.36			0.51			0.51	
Clearance Time (s)	6.0	6.0			6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	478	541			550			842			904	
v/s Ratio Prot		0.02										
v/s Ratio Perm	c0.13				0.01			c0.35			0.19	
v/c Ratio	0.36	0.07			0.02			0.69			0.37	
Uniform Delay, d1	21.4	19.2			18.8			16.6			13.3	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	0.5	0.1			0.0			4.5			1.2	
Delay (s)	21.9	19.2			18.8			21.1			14.4	
Level of Service	C	B			B			C			B	
Approach Delay (s)		20.9			18.8			21.1			14.4	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	19.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	113.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Queues
2: Queen St & Tannery St

02/26/2018

Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	171	95	15	578	345
v/c Ratio	0.36	0.16	0.03	0.68	0.38
Control Delay	24.1	5.8	12.4	21.7	13.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	24.1	5.8	12.4	21.7	13.8
Queue Length 50th (m)	21.5	0.6	0.6	71.2	31.7
Queue Length 95th (m)	38.1	10.0	4.5	108.7	50.5
Internal Link Dist (m)		271.4	49.6	443.9	101.6
Turn Bay Length (m)	35.0				
Base Capacity (vph)	478	600	557	844	916
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.36	0.16	0.03	0.68	0.38

Intersection Summary

Queues
3: Queen St & Thomas St

02/26/2018

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	366	122	62	386	417
v/c Ratio	0.72	0.24	0.12	0.36	0.41
Control Delay	38.3	6.1	9.9	11.6	10.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	38.3	6.1	9.9	11.6	10.8
Queue Length 50th (m)	56.5	0.0	4.5	32.9	31.9
Queue Length 95th (m)	87.2	11.9	10.7	51.6	52.3
Internal Link Dist (m)	320.4			113.4	443.9
Turn Bay Length (m)			40.0		
Base Capacity (vph)	519	516	496	1071	1024
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.71	0.24	0.13	0.36	0.41

Intersection Summary

Timings
3: Queen St & Thomas St

02/26/2018

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	366	122	62	386	272
Future Volume (vph)	366	122	62	386	272
Turn Type	Prot	Perm	Perm	NA	NA
Protected Phases	4			2	6
Permitted Phases		4	2		
Detector Phase	4	4	2	2	6
Switch Phase					
Minimum Initial (s)	25.0	25.0	5.0	5.0	5.0
Minimum Split (s)	31.0	31.0	23.0	23.0	26.0
Total Split (s)	32.0	32.0	58.0	58.0	58.0
Total Split (%)	35.6%	35.6%	64.4%	64.4%	64.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	7.0	7.0	7.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Ped	Ped	Max	Max	Max
Act Effct Green (s)	25.4	25.4	51.0	51.0	51.0
Actuated g/C Ratio	0.28	0.28	0.57	0.57	0.57
v/c Ratio	0.72	0.24	0.12	0.36	0.41
Control Delay	38.3	6.1	9.9	11.6	10.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	38.3	6.1	9.9	11.6	10.8
LOS	D	A	A	B	B
Approach Delay	30.2			11.4	10.8
Approach LOS	C			B	B

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 89.4
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 18.0 — Intersection LOS: B
Intersection Capacity Utilization 65.7% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 3: Queen St & Thomas St

HCM Unsignalized Intersection Capacity Analysis
4: Thomas St & Joymar Dr

02/26/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	54	1242	347	5	1	64
Future Volume (Veh/h)	54	1242	347	5	1	64
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	54	1242	347	5	1	64
Pedestrians		7	7		4	
Lane Width (m)		3.5	3.5		3.5	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		1	1		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			218			
pX, platoon unblocked						
vC, conflicting volume	356				1090	187
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	356				1090	187
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				100	92
cM capacity (veh/h)	1209				201	821

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	468	828	231	121	1	64
Volume Left	54	0	0	0	1	0
Volume Right	0	0	0	5	0	64
cSH	1209	1700	1700	1700	201	821
Volume to Capacity	0.04	0.49	0.14	0.07	0.00	0.08
Queue Length 95th (m)	1.1	0.0	0.0	0.0	0.1	1.9
Control Delay (s)	1.4	0.0	0.0	0.0	23.0	9.8
Lane LOS	A				C	A
Approach Delay (s)	0.5		0.0		10.0	
Approach LOS					A	

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
3: Queen St & Thomas St

02/26/2018

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	366	122	62	386	272	145
Future Volume (vph)	366	122	62	386	272	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	6.0	6.0	7.0	7.0	7.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.93	1.00	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1785	1479	1750	1879	1759	
Flt Permitted	0.95	1.00	0.47	1.00	1.00	
Satd. Flow (perm)	1785	1479	869	1879	1759	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	366	122	62	386	272	145
RTOR Reduction (vph)	0	87	0	0	21	0
Lane Group Flow (vph)	366	35	62	386	396	0
Confl. Peds. (#/hr)	17	20	28			28
Confl. Bikes (#/hr)		2				
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	25.4	25.4	51.0	51.0	51.0	
Effective Green, g (s)	25.4	25.4	51.0	51.0	51.0	
Actuated g/C Ratio	0.28	0.28	0.57	0.57	0.57	
Clearance Time (s)	6.0	6.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	507	420	495	1071	1003	
v/s Ratio Prot	c0.21			0.21	c0.23	
v/s Ratio Perm		0.02	0.07			
v/c Ratio	0.72	0.08	0.13	0.36	0.39	
Uniform Delay, d1	28.8	23.5	8.9	10.4	10.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.0	0.1	0.5	0.9	1.2	
Delay (s)	33.9	23.5	9.4	11.3	11.8	
Level of Service	C	C	A	B	B	
Approach Delay (s)	31.3			11.1	11.8	
Approach LOS	C			B	B	

Intersection Summary			
HCM 2000 Control Delay	18.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	89.4	Sum of lost time (s)	13.0
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues
5: GO Station & Thomas St

02/26/2018

Lane Group	EBT	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	1243	323	174	80	3
v/c Ratio	0.61	0.24	0.78	0.19	0.01
Control Delay	10.4	5.0	63.3	7.4	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	10.4	5.0	63.3	7.4	0.0
Queue Length 50th (m)	58.1	9.0	32.3	0.0	0.0
Queue Length 95th (m)	83.0	14.2	#58.4	10.1	0.0
Internal Link Dist (m)	194.1	107.3	76.3		58.2
Turn Bay Length (m)					
Base Capacity (vph)	2042	1356	249	665	334
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.61	0.24	0.70	0.12	0.01

Intersection Summary

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

Timings
5: GO Station & Thomas St

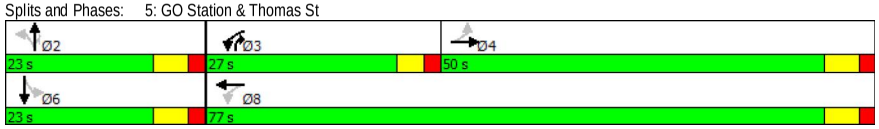
02/26/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	2	676	129	177	174	0	80	2	0
Future Volume (vph)	2	676	129	177	174	0	80	2	0
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	pm+ov	Perm	NA
Protected Phases		4	3	8		2	3		6
Permitted Phases	4		8		2		2	6	
Detector Phase	4	4	3	8	2	2	3	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	50.0	50.0	10.0	77.0	23.0	23.0	10.0	23.0	23.0
Total Split (s)	50.0	50.0	27.0	77.0	23.0	23.0	27.0	23.0	23.0
Total Split (%)	50.0%	50.0%	27.0%	77.0%	23.0%	23.0%	27.0%	23.0%	23.0%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0	0.0		0.0
Total Lost Time (s)		6.0		6.0		6.0	5.0		6.0
Lead/Lag	Lag	Lag	Lead				Lead		
Lead-Lag Optimize?	Yes	Yes	Yes				Yes		
Recall Mode	Max	Max	None	Max	Min	Min	None	Min	Min
Act Effct Green (s)		62.7		71.0		15.6	22.2		15.6
Actuated g/C Ratio		0.64		0.72		0.16	0.22		0.16
v/c Ratio		0.61		0.24		0.78	0.19		0.01
Control Delay		10.4		5.0		63.3	7.4		0.0
Queue Delay		0.0		0.0		0.0	0.0		0.0
Total Delay		10.4		5.0		63.3	7.4		0.0
LOS		B		A		E	A		A
Approach Delay		10.4		5.0		45.7			
Approach LOS		B		A		D			

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 98.7
Natural Cycle: 100
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 14.3 — Intersection LOS: B
Intersection Capacity Utilization 79.3% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 5: GO Station & Thomas St



HCM Unsignalized Intersection Capacity Analysis
7: Thomas St & Emby Dr

02/26/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	9	749	304	3	3	3
Future Volume (Veh/h)	9	749	304	3	3	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	9	749	304	3	3	3
Pedestrians		8	1			
Lane Width (m)		3.7	3.7			
Walking Speed (m/s)		1.1	1.1			
Percent Blockage		1	0			
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		131	43			
pX, platoon unblocked	0.99				0.99	0.99
vC, conflicting volume	307				699	162
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	290				684	143
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				99	100
cM capacity (veh/h)	1276				381	872

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	259	499	203	104	6
Volume Left	9	0	0	0	3
Volume Right	0	0	0	3	3
cSH	1276	1700	1700	1700	530
Volume to Capacity	0.01	0.29	0.12	0.06	0.01
Queue Length 95th (m)	0.2	0.0	0.0	0.0	0.3
Control Delay (s)	0.3	0.0	0.0	0.0	11.9
Lane LOS	A				B
Approach Delay (s)	0.1		0.0		11.9
Approach LOS					B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	39.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
5: GO Station & Thomas St

02/26/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	676	565	129	177	1	174	0	80	2	0	1
Future Volume (vph)	2	676	565	129	177	1	174	0	80	2	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)		6.0			6.0			6.0	5.0		6.0	
Lane Util. Factor		0.95			0.95			1.00	1.00		1.00	
Frpb, ped/bikes		0.96			1.00			1.00	0.97		0.99	
Flpb, ped/bikes		1.00			1.00			1.00	1.00		0.99	
Frt		0.93			1.00			1.00	0.85		0.95	
Flt Protected		1.00			0.98			0.95	1.00		0.97	
Satd. Flow (prot)		3205			3494			1779	1557		1708	
Flt Permitted		0.95			0.50			0.76	1.00		0.84	
Satd. Flow (perm)		3060			1798			1416	1557		1491	
Peak-hour factor, PHF	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	2	676	565	136	186	1	174	0	80	2	0	1
RTOR Reduction (vph)	0	100	0	0	0	0	0	0	64	0	3	0
Lane Group Flow (vph)	0	1143	0	0	323	0	0	174	16	0	0	0
Confl. Peds. (#/hr)	17		18	18		17	2		13	13		2
Confl. Bikes (#/hr)			3									3
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases		4		3	8			2	3		6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		62.7			72.1			15.7	20.1		15.7	
Effective Green, g (s)		62.7			72.1			15.7	20.1		15.7	
Actuated g/C Ratio		0.63			0.72			0.16	0.20		0.16	
Clearance Time (s)		6.0			6.0			6.0	5.0		6.0	
Vehicle Extension (s)		3.0			3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		1922			1373			222	313		234	
v/s Ratio Prot					c0.01				0.00			
v/s Ratio Perm		c0.37			0.16			c0.12	0.01		0.00	
v/c Ratio		0.59			0.24			0.78	0.05		0.00	
Uniform Delay, d1		11.0			4.6			40.4	32.2		35.4	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		1.4			0.1			16.4	0.1		0.0	
Delay (s)		12.4			4.7			56.8	32.2		35.4	
Level of Service		B			A			E	C		D	
Approach Delay (s)		12.4			4.7			49.1			35.4	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	16.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	99.8	Sum of lost time (s)	17.0
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
15: Tannery St & Rutledge Rd

02/26/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	412	239	12	14	12
Future Volume (Veh/h)	5	412	239	12	14	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	412	239	12	14	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			129			
pX, platoon unblocked						
vC, conflicting volume	251				667	245
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	251				667	245
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				97	98
cM capacity (veh/h)	1326				425	799

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	417	251	26
Volume Left	5	0	14
Volume Right	0	12	12
cSH	1326	1700	542
Volume to Capacity	0.00	0.15	0.05
Queue Length 95th (m)	0.1	0.0	1.1
Control Delay (s)	0.1	0.0	12.0
Lane LOS	A		B
Approach Delay (s)	0.1	0.0	12.0
Approach LOS			B

Intersection Summary			
Average Delay			0.5
Intersection Capacity Utilization			35.7%
Analysis Period (min)			15

ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
13: Broadway St/Crumbie St & Tannery St

02/26/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	232	209	30	135	4	49	14	25	10	12	21
Future Volume (Veh/h)	33	232	209	30	135	4	49	14	25	10	12	21
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	33	232	209	30	135	4	49	14	25	10	12	21
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		57			295							
pX, platoon unblocked												
vC, conflicting volume	139			441			626	602	336	632	704	137
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	139			441			626	602	336	632	704	137
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			97			87	96	96	97	97	98
cM capacity (veh/h)	1457			1130			366	396	710	358	346	917

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	474	169	88	43
Volume Left	33	30	49	10
Volume Right	209	4	25	21
cSH	1457	1130	430	503
Volume to Capacity	0.02	0.03	0.20	0.09
Queue Length 95th (m)	0.5	0.6	5.8	2.1
Control Delay (s)	0.7	1.7	15.5	12.8
Lane LOS	A	A	C	B
Approach Delay (s)	0.7	1.7	15.5	12.8
Approach LOS			C	B

Intersection Summary			
Average Delay			3.3
Intersection Capacity Utilization			47.0%
Analysis Period (min)			15

ICU Level of Service A

Queues
19: Rail Corridor & Tannery St

02/26/2018

Lane Group
Lane Group Flow (vph)
v/c Ratio
Control Delay
Queue Delay
Total Delay
Queue Length 50th (m)
Queue Length 95th (m)
Internal Link Dist (m)
Turn Bay Length (m)
Base Capacity (vph)
Starvation Cap Reductn
Spillback Cap Reductn
Storage Cap Reductn
Reduced v/c Ratio

Intersection Summary

Timings
19: Rail Corridor & Tannery St

02/26/2018

Lane Group	Ø2	Ø4	Ø6	Ø8
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Turn Type				
Protected Phases	2	4	6	8
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	120.0	1680.0	120.0	1680.0
Total Split (%)	7%	93%	7%	93%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				

Intersection Summary	
Cycle Length: 1800	
Actuated Cycle Length: 1800	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.00	
Intersection Signal Delay: 0.0	Intersection LOS: A
Intersection Capacity Utilization 0.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 19: Rail Corridor & Tannery St

Timings
23: Rail Corridor & Thomas St

02/26/2018

Lane Group	EBT	WBT	Ø2	Ø6
Lane Configurations				
Traffic Volume (vph)	752	307		
Future Volume (vph)	752	307		
Turn Type	NA	NA		
Protected Phases	4	8	2	6
Permitted Phases				
Detector Phase	4	8		
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	1680.0	1680.0	120.0	120.0
Total Split (%)	93.3%	93.3%	7%	7%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		
Total Lost Time (s)	4.5	4.5		
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	1675.5	1675.5		
Actuated g/C Ratio	0.93	0.93		
v/c Ratio	0.25	0.09		
Control Delay	5.8	4.8		
Queue Delay	12.7	2.5		
Total Delay	18.4	7.3		
LOS	B	A		
Approach Delay	18.4	7.3		
Approach LOS	B	A		

Intersection Summary	
Cycle Length: 1800	
Actuated Cycle Length: 1800	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.25	
Intersection Signal Delay: 15.4	Intersection LOS: B
Intersection Capacity Utilization 24.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 23: Rail Corridor & Thomas St

HCM Signalized Intersection Capacity Analysis
19: Rail Corridor & Tannery St

02/26/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)												
Lane Util. Factor												
Frt												
Flt Protected												
Satd. Flow (prot)												
Flt Permitted												
Satd. Flow (perm)												
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type												
Protected Phases		4			8			2			6	
Permitted Phases												
Actuated Green, G (s)												
Effective Green, g (s)												
Actuated g/C Ratio												
Clearance Time (s)												
Lane Grp Cap (vph)												
v/s Ratio Prot												
v/s Ratio Perm												
v/c Ratio												
Uniform Delay, d1												
Progression Factor												
Incremental Delay, d2												
Delay (s)												
Level of Service												
Approach Delay (s)		0.0			0.0			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	0.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.00		
Actuated Cycle Length (s)	1800.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: Rail Corridor & Thomas St

02/26/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	752	0	0	307	0	0	0	0	0	0	0
Future Volume (vph)	0	752	0	0	307	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5							
Lane Util. Factor		0.95			0.95							
Frt		1.00			1.00							
Flt Protected		1.00			1.00							
Satd. Flow (prot)		3579			3579							
Flt Permitted		1.00			1.00							
Satd. Flow (perm)		3579			3579							
Peak-hour factor, PHF	0.92	0.92	0.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	817	0	0	307	0	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	817	0	0	307	0	0	0	0	0	0	0
Turn Type		NA			NA							
Protected Phases		4			8			2			6	
Permitted Phases												
Actuated Green, G (s)		1675.5			1675.5							
Effective Green, g (s)		1675.5			1675.5							
Actuated g/C Ratio		0.93			0.93							
Clearance Time (s)		4.5			4.5							
Lane Grp Cap (vph)		3331			3331							
v/s Ratio Prot		c0.23			0.09							
v/s Ratio Perm												
v/c Ratio		0.25			0.09							
Uniform Delay, d1		5.6			4.7							
Progression Factor		1.00			1.00							
Incremental Delay, d2		0.2			0.1							
Delay (s)		5.8			4.8							
Level of Service		A			A							
Approach Delay (s)		5.8			4.8			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	1800.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	24.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues
23: Rail Corridor & Thomas St

02/26/2018

Lane Group	EBT	WBT
Lane Group Flow (vph)	817	307
v/c Ratio	0.25	0.09
Control Delay	5.8	4.8
Queue Delay	12.7	2.5
Total Delay	18.4	7.3
Queue Length 50th (m)	139.4	44.2
Queue Length 95th (m)	134.5	45.1
Internal Link Dist (m)	19.3	320.4
Turn Bay Length (m)		
Base Capacity (vph)	3331	3331
Starvation Cap Reductn	2496	2882
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.98	0.68

Intersection Summary

Timings
2: Queen St & Tannery St

02/26/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	110	5	3	7	50	521	12	452
Future Volume (vph)	110	5	3	7	50	521	12	452
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	25.0	46.0	46.0	46.0	46.0
Minimum Split (s)	31.0	31.0	31.0	31.0	52.0	52.0	52.0	52.0
Total Split (s)	31.0	31.0	31.0	31.0	79.0	79.0	79.0	79.0
Total Split (%)	28.2%	28.2%	28.2%	28.2%	71.8%	71.8%	71.8%	71.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0		0.0
Total Lost Time (s)	6.0	6.0		6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Ped	Ped	Ped	Ped	Max	Max	Max	Max
Act Effct Green (s)	25.0	25.0		25.0		73.0		73.0
Actuated g/C Ratio	0.23	0.23		0.23		0.66		0.66
v/c Ratio	0.37	0.22		0.05		0.51		0.50
Control Delay	40.3	9.9		24.8		11.4		10.7
Queue Delay	0.0	0.0		0.0		0.0		0.0
Total Delay	40.3	9.9		24.8		11.4		10.7
LOS	D	A		C		B		B
Approach Delay		26.6		24.8		11.4		10.7
Approach LOS		C		C		B		B

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 110	
Natural Cycle: 85	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.51	
Intersection Signal Delay: 13.4	Intersection LOS: B
Intersection Capacity Utilization 85.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 2: Queen St & Tannery St

HCM Unsignalized Intersection Capacity Analysis
1: Joymar Dr & Tannery St

02/26/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	1	6	3	82	5	194	2	32	38	189	68	2
Future Volume (vph)	1	6	3	82	5	194	2	32	38	189	68	2
Peak Hour Factor	0.92	0.92	0.92	1.00	0.92	1.00	0.92	1.00	1.00	1.00	1.00	0.92
Hourly flow rate (vph)	1	7	3	82	5	194	2	32	38	189	68	2

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	11	281	72	259
Volume Left (vph)	1	82	2	189
Volume Right (vph)	3	194	38	2
Hadj (s)	-0.11	-0.36	-0.31	0.14
Departure Headway (s)	5.0	4.4	4.6	4.8
Degree Utilization, x	0.02	0.34	0.09	0.35
Capacity (veh/h)	649	772	717	707
Control Delay (s)	8.0	9.6	8.1	10.3
Approach Delay (s)	8.0	9.6	8.1	10.3
Approach LOS	A	A	A	B

Intersection Summary			
Delay	9.7		
Level of Service	A		
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
2: Queen St & Tannery St

02/26/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	5	85	3	7	7	50	521	7	12	452	130
Future Volume (vph)	110	5	85	3	7	7	50	521	7	12	452	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	6.0	6.0			6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00			1.00			1.00			1.00	
Frpb, ped/bikes	1.00	0.92			0.96			1.00			0.98	
Flpb, ped/bikes	0.93	1.00			0.99			1.00			1.00	
Frt	1.00	0.86			0.94			1.00			0.97	
Flt Protected	0.95	1.00			0.99			1.00			1.00	
Satd. Flow (prot)	1660	1489			1676			1862			1784	
Flt Permitted	0.75	1.00			0.97			0.91			0.99	
Satd. Flow (perm)	1304	1489			1633			1705			1762	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	110	5	85	3	7	7	50	521	7	12	452	130
RTOR Reduction (vph)	0	66	0	0	5	0	0	0	0	0	9	0
Lane Group Flow (vph)	110	24	0	0	12	0	0	578	0	0	585	0
Confl. Peds. (#/hr)	26		21	21		26	32		29	29		32
Confl. Bikes (#/hr)			3			2						2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	25.0	25.0			25.0			73.0			73.0	
Effective Green, g (s)	25.0	25.0			25.0			73.0			73.0	
Actuated g/C Ratio	0.23	0.23			0.23			0.66			0.66	
Clearance Time (s)	6.0	6.0			6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	296	338			371			1131			1169	
v/s Ratio Prot		0.02										
v/s Ratio Perm	c0.08				0.01			c0.34			0.33	
v/c Ratio	0.37	0.07			0.03			0.51			0.50	
Uniform Delay, d1	35.9	33.4			33.1			9.4			9.3	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	0.8	0.1			0.0			1.6			1.5	
Delay (s)	36.7	33.5			33.1			11.1			10.8	
Level of Service	D	C			C			B			B	
Approach Delay (s)		35.2			33.1			11.1			10.8	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Queues
2: Queen St & Tannery St

02/26/2018

Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	110	90	17	578	594
v/c Ratio	0.37	0.22	0.05	0.51	0.50
Control Delay	40.3	9.9	24.8	11.4	10.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	40.3	9.9	24.8	11.4	10.7
Queue Length 50th (m)	20.1	0.8	1.7	57.2	55.5
Queue Length 95th (m)	36.7	13.4	7.4	82.4	80.3
Internal Link Dist (m)		271.4	49.6	443.9	101.6
Turn Bay Length (m)	35.0				
Base Capacity (vph)	295	403	376	1130	1177
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.37	0.22	0.05	0.51	0.50

Intersection Summary

Queues
3: Queen St & Thomas St

02/26/2018

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	206	140	142	444	697
v/c Ratio	0.49	0.31	0.40	0.37	0.61
Control Delay	40.9	7.7	13.5	10.1	13.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	40.9	7.7	13.5	10.1	13.0
Queue Length 50th (m)	38.3	0.0	13.4	40.5	72.2
Queue Length 95th (m)	61.1	15.1	27.4	58.3	106.4
Internal Link Dist (m)	320.4			113.4	443.9
Turn Bay Length (m)			40.0		
Base Capacity (vph)	421	455	354	1212	1134
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.49	0.31	0.40	0.37	0.61

Intersection Summary

Timings
3: Queen St & Thomas St

02/26/2018

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	206	140	142	444	402
Future Volume (vph)	206	140	142	444	402
Turn Type	Prot	Perm	Perm	NA	NA
Protected Phases	4			2	6
Permitted Phases		4	2		
Detector Phase	4	4	2	2	6
Switch Phase					
Minimum Initial (s)	26.0	26.0	5.0	5.0	5.0
Minimum Split (s)	32.0	32.0	23.0	23.0	26.0
Total Split (s)	32.0	32.0	78.0	78.0	78.0
Total Split (%)	29.1%	29.1%	70.9%	70.9%	70.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	7.0	7.0	7.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Ped	Ped	Max	Max	Max
Act Effct Green (s)	26.0	26.0	71.0	71.0	71.0
Actuated g/C Ratio	0.24	0.24	0.65	0.65	0.65
v/c Ratio	0.49	0.31	0.40	0.37	0.61
Control Delay	40.9	7.7	13.5	10.1	13.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	40.9	7.7	13.5	10.1	13.0
LOS	D	A	B	B	B
Approach Delay	27.5			10.9	13.0
Approach LOS	C			B	B

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.61
Intersection Signal Delay: 15.3 — Intersection LOS: B
Intersection Capacity Utilization 86.5% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 3: Queen St & Thomas St

HCM Unsignalized Intersection Capacity Analysis
4: Thomas St & Joymar Dr

02/26/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	54	482	1046	23	6	141
Future Volume (Veh/h)	54	482	1046	23	6	141
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	54	482	1046	23	6	141
Pedestrians		7	7		4	
Lane Width (m)		3.5	3.5		3.5	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		1	1		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			218			
pX, platoon unblocked	0.91				0.91	0.91
vC, conflicting volume	1073				1418	546
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	878				1257	297
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				96	78
cM capacity (veh/h)	704				138	634

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	215	321	697	372	6	141
Volume Left	54	0	0	0	6	0
Volume Right	0	0	0	23	0	141
cSH	704	1700	1700	1700	138	634
Volume to Capacity	0.08	0.19	0.41	0.22	0.04	0.22
Queue Length 95th (m)	1.9	0.0	0.0	0.0	1.0	6.4
Control Delay (s)	3.3	0.0	0.0	0.0	32.3	12.3
Lane LOS	A				D	B
Approach Delay (s)	1.3		0.0		13.1	
Approach LOS					B	

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
3: Queen St & Thomas St

02/26/2018

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	206	140	142	444	402	295
Future Volume (vph)	206	140	142	444	402	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	6.0	6.0	7.0	7.0	7.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.92	1.00	1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.94	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1785	1474	1785	1879	1720	
Flt Permitted	0.95	1.00	0.30	1.00	1.00	
Satd. Flow (perm)	1785	1474	565	1879	1720	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	206	140	142	444	402	295
RTOR Reduction (vph)	0	107	0	0	24	0
Lane Group Flow (vph)	206	33	142	444	673	0
Confl. Peds. (#/hr)	17	20	28			28
Confl. Bikes (#/hr)		2				
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	26.0	26.0	71.0	71.0	71.0	
Effective Green, g (s)	26.0	26.0	71.0	71.0	71.0	
Actuated g/C Ratio	0.24	0.24	0.65	0.65	0.65	
Clearance Time (s)	6.0	6.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	421	348	364	1212	1110	
v/s Ratio Prot	c0.12			0.24	c0.39	
v/s Ratio Perm		0.02	0.25			
v/c Ratio	0.49	0.10	0.39	0.37	0.61	
Uniform Delay, d1	36.3	32.8	9.2	9.1	11.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.9	0.1	3.1	0.9	2.5	
Delay (s)	37.2	32.9	12.4	9.9	13.8	
Level of Service	D	C	B	A	B	
Approach Delay (s)	35.5			10.5	13.8	
Approach LOS	D			B	B	

Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	86.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Queues
5: GO Station & Thomas St

02/26/2018

Lane Group	EBT	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	488	748	367	139	9
v/c Ratio	0.38	0.44	0.82	0.20	0.02
Control Delay	18.3	13.7	39.9	3.5	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	18.3	13.7	39.9	3.5	0.0
Queue Length 50th (m)	24.4	32.8	50.3	1.2	0.0
Queue Length 95th (m)	46.5	62.0	80.3	9.1	0.0
Internal Link Dist (m)	194.1	107.3	76.3		58.2
Turn Bay Length (m)					
Base Capacity (vph)	1295	1747	798	837	931
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.38	0.43	0.46	0.17	0.01

Intersection Summary

Timings
5: GO Station & Thomas St

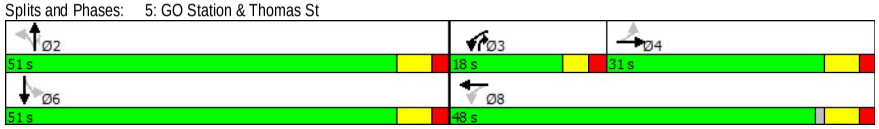
02/26/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	3	376	48	694	367	0	139	1	0
Future Volume (vph)	3	376	48	694	367	0	139	1	0
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	pm+ov	Perm	NA
Protected Phases		4	3	8		2	3		6
Permitted Phases	4		8		2		2	6	
Detector Phase	4	4	3	8	2	2	3	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	21.0	21.0	10.0	21.0	25.0	25.0	10.0	25.0	25.0
Total Split (s)	31.0	31.0	18.0	48.0	51.0	51.0	18.0	51.0	51.0
Total Split (%)	31.0%	31.0%	18.0%	48.0%	51.0%	51.0%	18.0%	51.0%	51.0%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0	0.0		0.0
Total Lost Time (s)		6.0		6.0		6.0	5.0		6.0
Lead/Lag	Lag	Lag	Lead				Lead		
Lead-Lag Optimize?	Yes	Yes	Yes				Yes		
Recall Mode	Max	Max	None	Max	Min	Min	None	Min	Min
Act Effct Green (s)		31.7		42.4		25.6	32.2		25.6
Actuated g/C Ratio		0.40		0.53		0.32	0.40		0.32
v/c Ratio		0.38		0.44		0.82	0.20		0.02
Control Delay		18.3		13.7		39.9	3.5		0.0
Queue Delay		0.0		0.0		0.0	0.0		0.0
Total Delay		18.3		13.7		39.9	3.5		0.0
LOS		B		B		D	A		A
Approach Delay		18.3		13.7		29.9			
Approach LOS		B		B		C			

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 80.1
Natural Cycle: 60
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 19.6 — Intersection LOS: B
Intersection Capacity Utilization 77.1% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 5: GO Station & Thomas St



HCM Unsignalized Intersection Capacity Analysis
7: Thomas St & Emby Dr

02/26/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	508	732	10	11	16
Future Volume (Veh/h)	8	508	732	10	11	16
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	8	508	732	10	11	16
Pedestrians		8	1			
Lane Width (m)		3.7	3.7			
Walking Speed (m/s)		1.1	1.1			
Percent Blockage		1	0			
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		131	43			
pX, platoon unblocked	0.98				0.95	0.98
vC, conflicting volume	742				1008	379
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	700				826	331
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				96	98
cM capacity (veh/h)	890				297	654

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	177	339	488	254	27
Volume Left	8	0	0	0	11
Volume Right	0	0	0	10	16
cSH	890	1700	1700	1700	439
Volume to Capacity	0.01	0.20	0.29	0.15	0.06
Queue Length 95th (m)	0.2	0.0	0.0	0.0	1.5
Control Delay (s)	0.5	0.0	0.0	0.0	13.7
Lane LOS	A				B
Approach Delay (s)	0.2		0.0		13.7
Approach LOS					B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	32.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
5: GO Station & Thomas St

02/26/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	376	109	48	694	6	367	0	139	1	0	8
Future Volume (vph)	3	376	109	48	694	6	367	0	139	1	0	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)		6.0			6.0			6.0	5.0		6.0	
Lane Util. Factor		0.95			0.95			1.00	1.00		1.00	
Frpb, ped/bikes		0.98			1.00			1.00	0.98		0.99	
Flpb, ped/bikes		1.00			1.00			1.00	1.00		1.00	
Frt		0.97			1.00			1.00	0.85		0.88	
Flt Protected		1.00			1.00			0.95	1.00		0.99	
Satd. Flow (prot)		3395			3549			1780	1560		1619	
Flt Permitted		0.95			0.89			0.75	1.00		0.97	
Satd. Flow (perm)		3230			3186			1409	1560		1577	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	3	376	109	48	694	6	367	0	139	1	0	8
RTOR Reduction (vph)	0	21	0	0	0	0	0	0	76	0	6	0
Lane Group Flow (vph)	0	467	0	0	748	0	0	367	63	0	3	0
Confl. Peds. (#/hr)	17		18	18		17	2		13	13		2
Confl. Bikes (#/hr)			3									3
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases		4		3	8			2	3		6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		31.8			42.4			25.6	31.2		25.6	
Effective Green, g (s)		31.8			42.4			25.6	31.2		25.6	
Actuated g/C Ratio		0.40			0.53			0.32	0.39		0.32	
Clearance Time (s)		6.0			6.0			6.0	5.0		6.0	
Vehicle Extension (s)		3.0			3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		1283			1713			450	608		504	
v/s Ratio Prot					c0.03				0.01			
v/s Ratio Perm		0.14			c0.20			c0.26	0.03		0.00	
v/c Ratio		0.36			0.44			0.82	0.10		0.01	
Uniform Delay, d1		17.0			11.5			25.0	15.5		18.5	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.8			0.2			10.9	0.1		0.0	
Delay (s)		17.8			11.7			35.9	15.6		18.5	
Level of Service		B			B			D	B		B	
Approach Delay (s)		17.8			11.7			30.3			18.5	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
15: Tannery St & Rutledge Rd

02/26/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	220	275	12	10	7
Future Volume (Veh/h)	13	220	275	12	10	7
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	13	220	275	12	10	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			129			
pX, platoon unblocked						
vC, conflicting volume	287				527	281
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	287				527	281
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				98	99
cM capacity (veh/h)	1287				510	763

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	233	287	17
Volume Left	13	0	10
Volume Right	0	12	7
cSH	1287	1700	590
Volume to Capacity	0.01	0.17	0.03
Queue Length 95th (m)	0.2	0.0	0.7
Control Delay (s)	0.5	0.0	11.3
Lane LOS	A		B
Approach Delay (s)	0.5	0.0	11.3
Approach LOS			B

Intersection Summary			
Average Delay			0.6
Intersection Capacity Utilization			32.2%
Analysis Period (min)			15

ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
13: Broadway St/Crumbie St & Tannery St

02/26/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	127	87	50	122	13	93	40	55	18	46	65
Future Volume (Veh/h)	22	127	87	50	122	13	93	40	55	18	46	65
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	22	127	87	50	122	13	93	40	55	18	46	65
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		57			295							
pX, platoon unblocked												
vC, conflicting volume	135			214			531	450	170	518	486	128
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	135			214			531	450	170	518	486	128
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			96			76	92	94	95	90	93
cM capacity (veh/h)	1462			1368			382	482	879	398	459	927

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	236	185	188	129
Volume Left	22	50	93	18
Volume Right	87	13	55	65
cSH	1462	1368	483	599
Volume to Capacity	0.02	0.04	0.39	0.22
Queue Length 95th (m)	0.3	0.9	13.9	6.2
Control Delay (s)	0.8	2.3	17.1	12.7
Lane LOS	A	A	C	B
Approach Delay (s)	0.8	2.3	17.1	12.7
Approach LOS			C	B

Intersection Summary			
Average Delay			7.4
Intersection Capacity Utilization			45.0%
Analysis Period (min)			15

ICU Level of Service A

Queues
19: Rail Corridor & Tannery St

02/26/2018

Lane Group
Lane Group Flow (vph)
v/c Ratio
Control Delay
Queue Delay
Total Delay
Queue Length 50th (m)
Queue Length 95th (m)
Internal Link Dist (m)
Turn Bay Length (m)
Base Capacity (vph)
Starvation Cap Reductn
Spillback Cap Reductn
Storage Cap Reductn
Reduced v/c Ratio

Intersection Summary

Timings
19: Rail Corridor & Tannery St

02/26/2018

Lane Group	Ø2	Ø4	Ø6	Ø8
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Turn Type				
Protected Phases	2	4	6	8
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	120.0	1680.0	120.0	1680.0
Total Split (%)	7%	93%	7%	93%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				

Intersection Summary	
Cycle Length: 1800	
Actuated Cycle Length: 1800	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.00	
Intersection Signal Delay: 0.0	Intersection LOS: A
Intersection Capacity Utilization 0.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 19: Rail Corridor & Tannery St

Timings
23: Rail Corridor & Thomas St

02/26/2018

Lane Group	EBT	WBT	Ø2	Ø6
Lane Configurations				
Traffic Volume (vph)	524	742		
Future Volume (vph)	524	742		
Turn Type	NA	NA		
Protected Phases	4	8	2	6
Permitted Phases				
Detector Phase	4	8		
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	1680.0	1680.0	120.0	120.0
Total Split (%)	93.3%	93.3%	7%	7%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		
Total Lost Time (s)	4.5	4.5		
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	1675.5	1675.5		
Actuated g/C Ratio	0.93	0.93		
v/c Ratio	0.17	0.22		
Control Delay	5.2	5.6		
Queue Delay	10.0	4.5		
Total Delay	15.2	10.1		
LOS	B	B		
Approach Delay	15.2	10.1		
Approach LOS	B	B		

Intersection Summary	
Cycle Length: 1800	
Actuated Cycle Length: 1800	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.22	
Intersection Signal Delay: 12.3	Intersection LOS: B
Intersection Capacity Utilization 24.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 23: Rail Corridor & Thomas St

HCM Signalized Intersection Capacity Analysis
19: Rail Corridor & Tannery St

02/26/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)												
Lane Util. Factor												
Frt												
Flt Protected												
Satd. Flow (prot)												
Flt Permitted												
Satd. Flow (perm)												
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type												
Protected Phases		4			8			2			6	
Permitted Phases												
Actuated Green, G (s)												
Effective Green, g (s)												
Actuated g/C Ratio												
Clearance Time (s)												
Lane Grp Cap (vph)												
v/s Ratio Prot												
v/s Ratio Perm												
v/c Ratio												
Uniform Delay, d1												
Progression Factor												
Incremental Delay, d2												
Delay (s)												
Level of Service												
Approach Delay (s)		0.0			0.0			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	0.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.00		
Actuated Cycle Length (s)	1800.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: Rail Corridor & Thomas St

02/26/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	524	0	0	742	0	0	0	0	0	0	0
Future Volume (vph)	0	524	0	0	742	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5							
Lane Util. Factor		0.95			0.95							
Frt		1.00			1.00							
Flt Protected		1.00			1.00							
Satd. Flow (prot)		3579			3579							
Flt Permitted		1.00			1.00							
Satd. Flow (perm)		3579			3579							
Peak-hour factor, PHF	0.92	0.92	0.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	570	0	0	742	0	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	570	0	0	742	0	0	0	0	0	0	0
Turn Type		NA			NA							
Protected Phases		4			8			2			6	
Permitted Phases												
Actuated Green, G (s)		1675.5			1675.5							
Effective Green, g (s)		1675.5			1675.5							
Actuated g/C Ratio		0.93			0.93							
Clearance Time (s)		4.5			4.5							
Lane Grp Cap (vph)		3331			3331							
v/s Ratio Prot		0.16			c0.21							
v/s Ratio Perm												
v/c Ratio		0.17			0.22							
Uniform Delay, d1		5.1			5.4							
Progression Factor		1.00			1.00							
Incremental Delay, d2		0.1			0.2							
Delay (s)		5.2			5.6							
Level of Service		A			A							
Approach Delay (s)		5.2			5.6			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	1800.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	24.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues
23: Rail Corridor & Thomas St

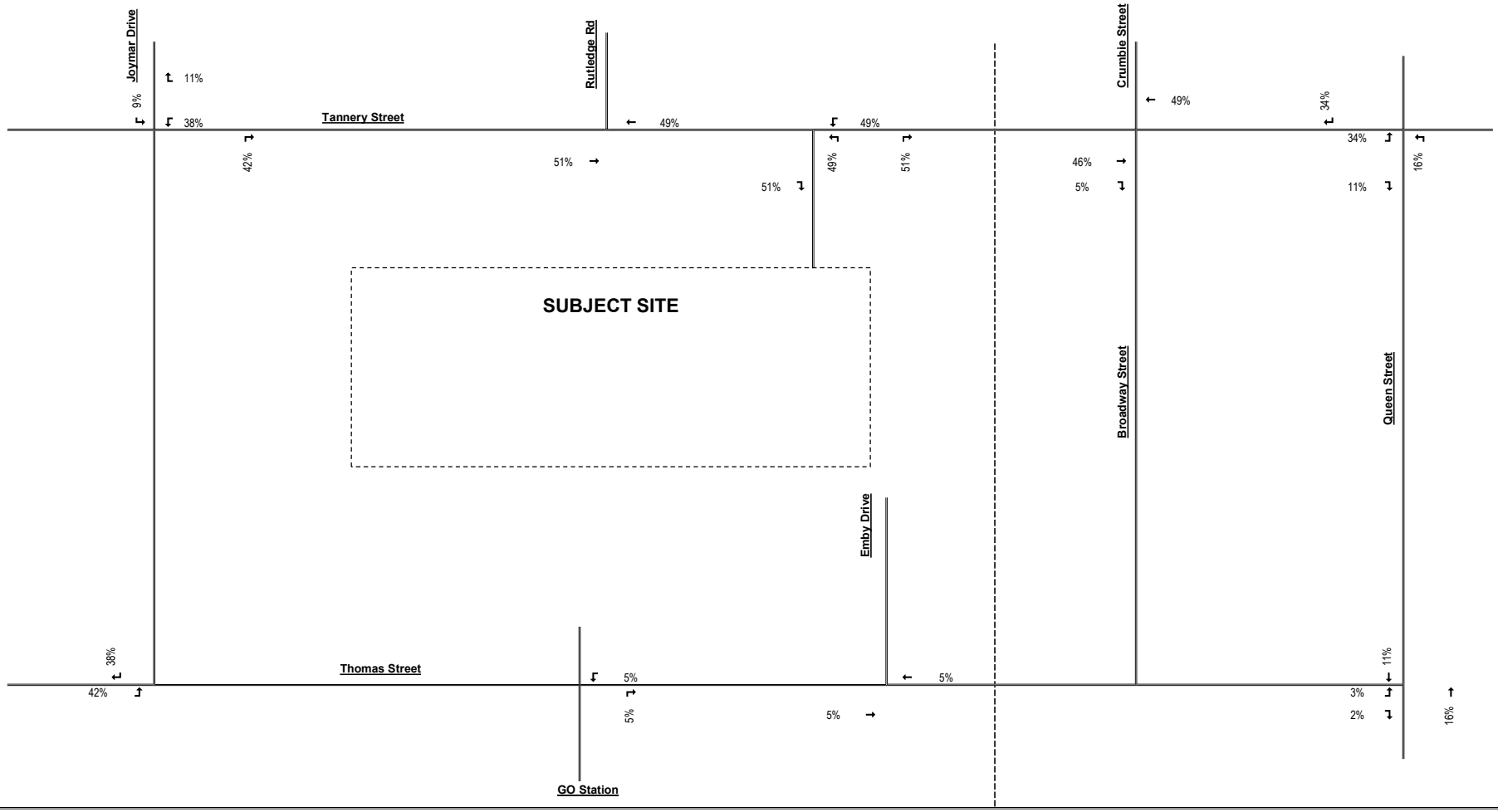
02/26/2018

Lane Group	EBT	WBT
Lane Group Flow (vph)	570	742
v/c Ratio	0.17	0.22
Control Delay	5.2	5.6
Queue Delay	10.0	4.5
Total Delay	15.2	10.1
Queue Length 50th (m)	89.2	123.2
Queue Length 95th (m)	88.0	119.7
Internal Link Dist (m)	19.3	320.4
Turn Bay Length (m)		
Base Capacity (vph)	3331	3331
Starvation Cap Reductn	2724	2493
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.94	0.89

Intersection Summary

APPENDIX D

Trip Distribution and Assignment



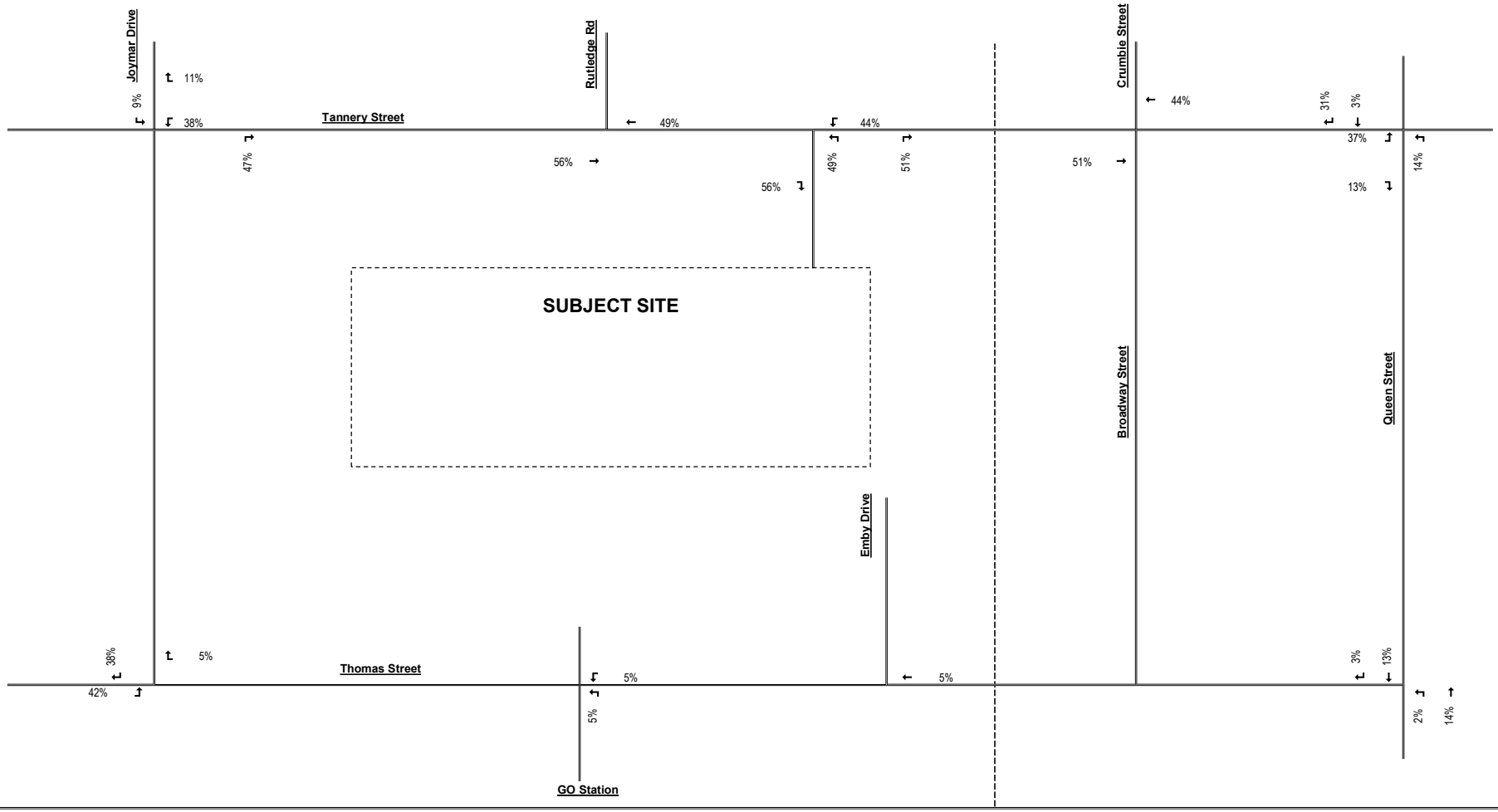
Proposed Development at 51, 57 Tannery Street & 208 Emby Drive

Site Distribution (No Emby Extension)

Figure D.1

Weekday AM Peak Hour

F:\18031\Traffic\[Turn Diagram_v6.xlsx]Dist_NO Emby 15:27 10-Jul-17 Column 50



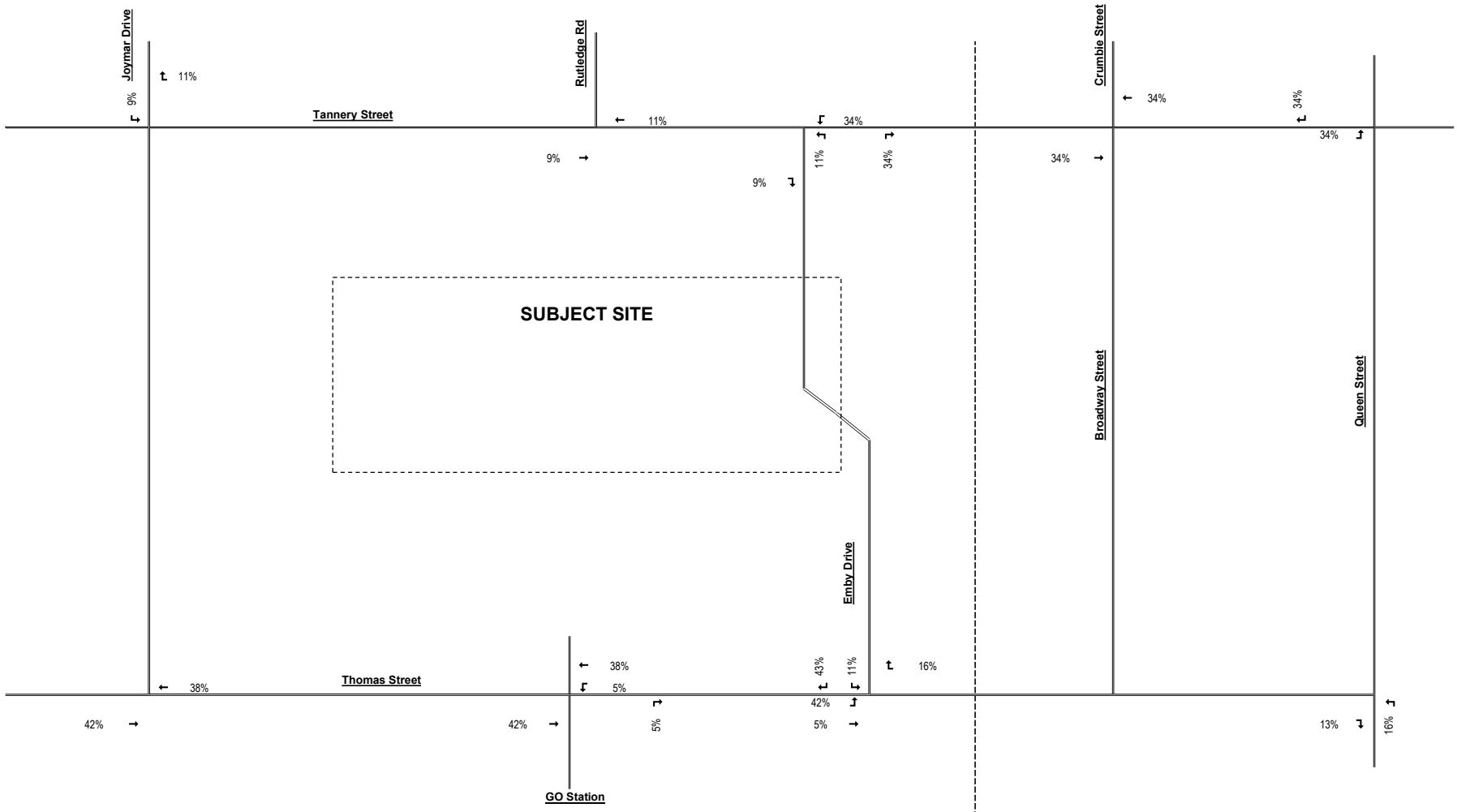
Proposed Development at 51, 57 Tannery Street & 208 Emby Drive

Site Distribution (No Emby Extension)

Figure D.2

Weekday PM Peak Hour

F:\18031\Traffic\[Turn Diagram_v6.xlsx]Dist_NO Emby 15:28 10-Jul-17 Column 51



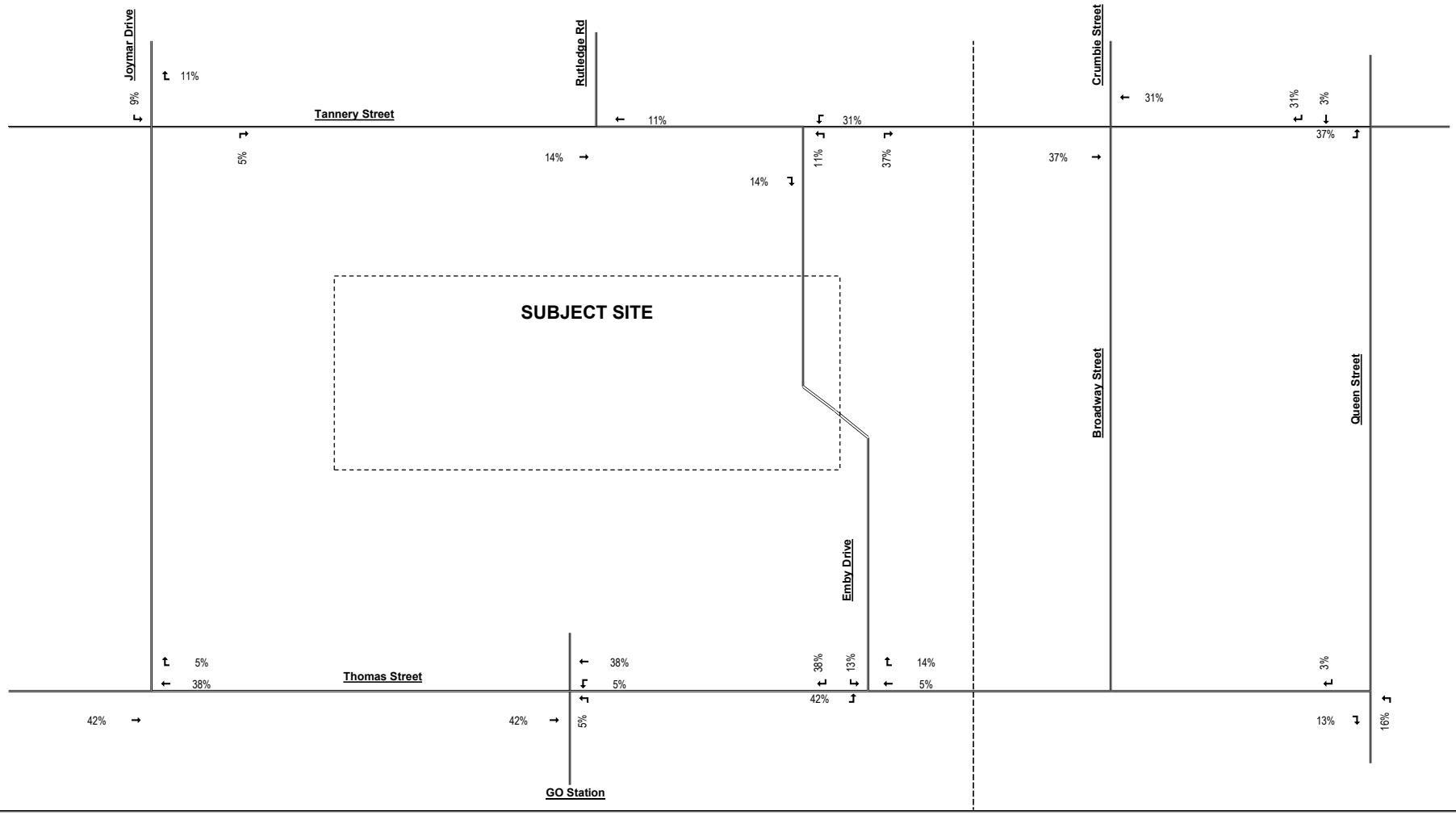
Proposed Development at 51, 57 Tannery Street & 208 Emby Drive

Site Distribution (Emby Extension)

Figure D.3

Weekday AM Peak Hour

F:\18031\Traffic\[Turn Diagram_v6.xlsx]Dist_W Emby 15:29 10-Jul-17 Column 52



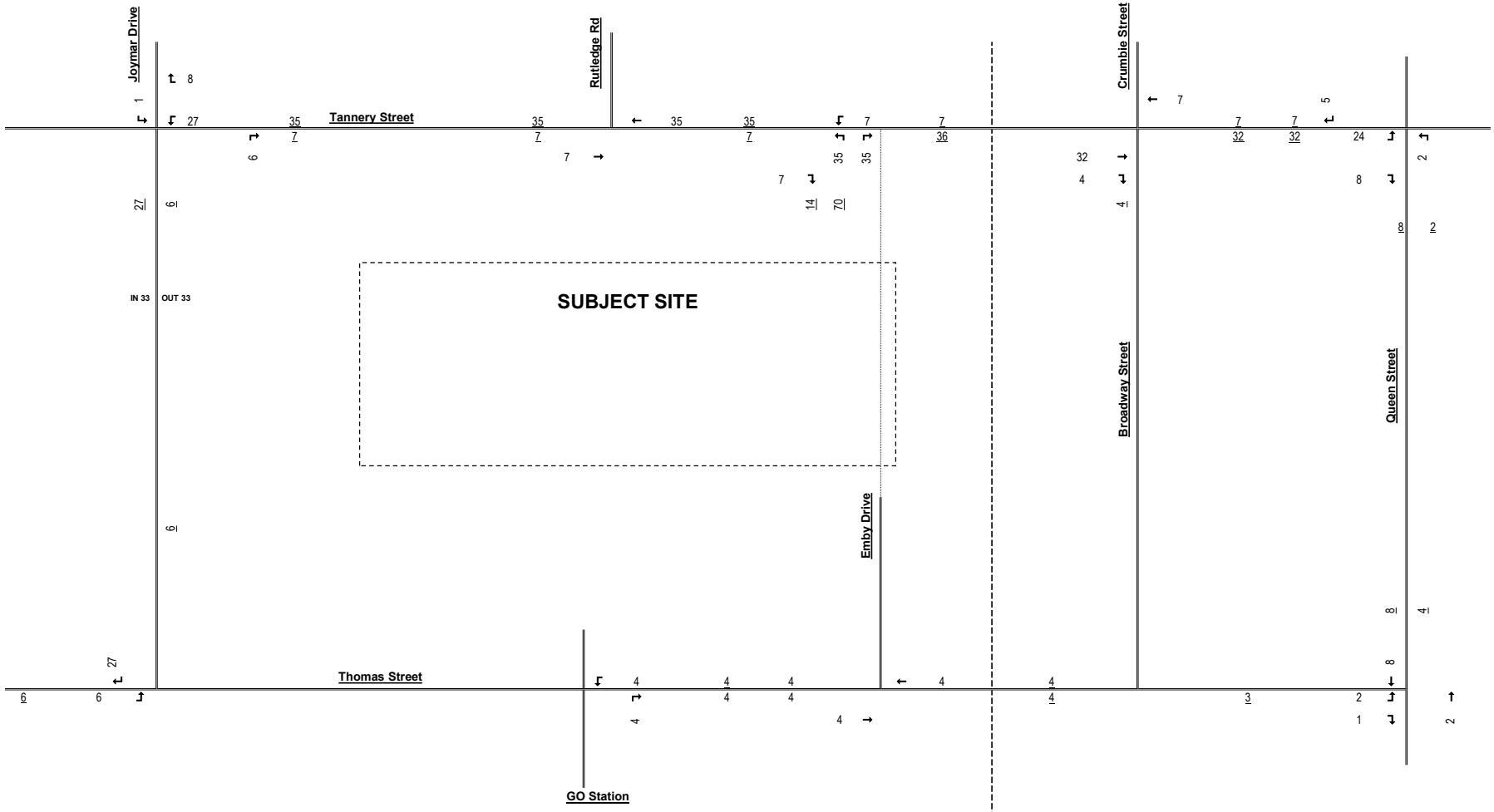
Proposed Development at 51, 57 Tannery Street & 208 Emby Drive

Site Distribution (Emby Extension)

Figure D.4

Weekday PM Peak Hour

F:\18031\Traffic\[Turn Diagram_v6.xlsx]Dist_W Emby 15:29 10-Jul-17 Column 53



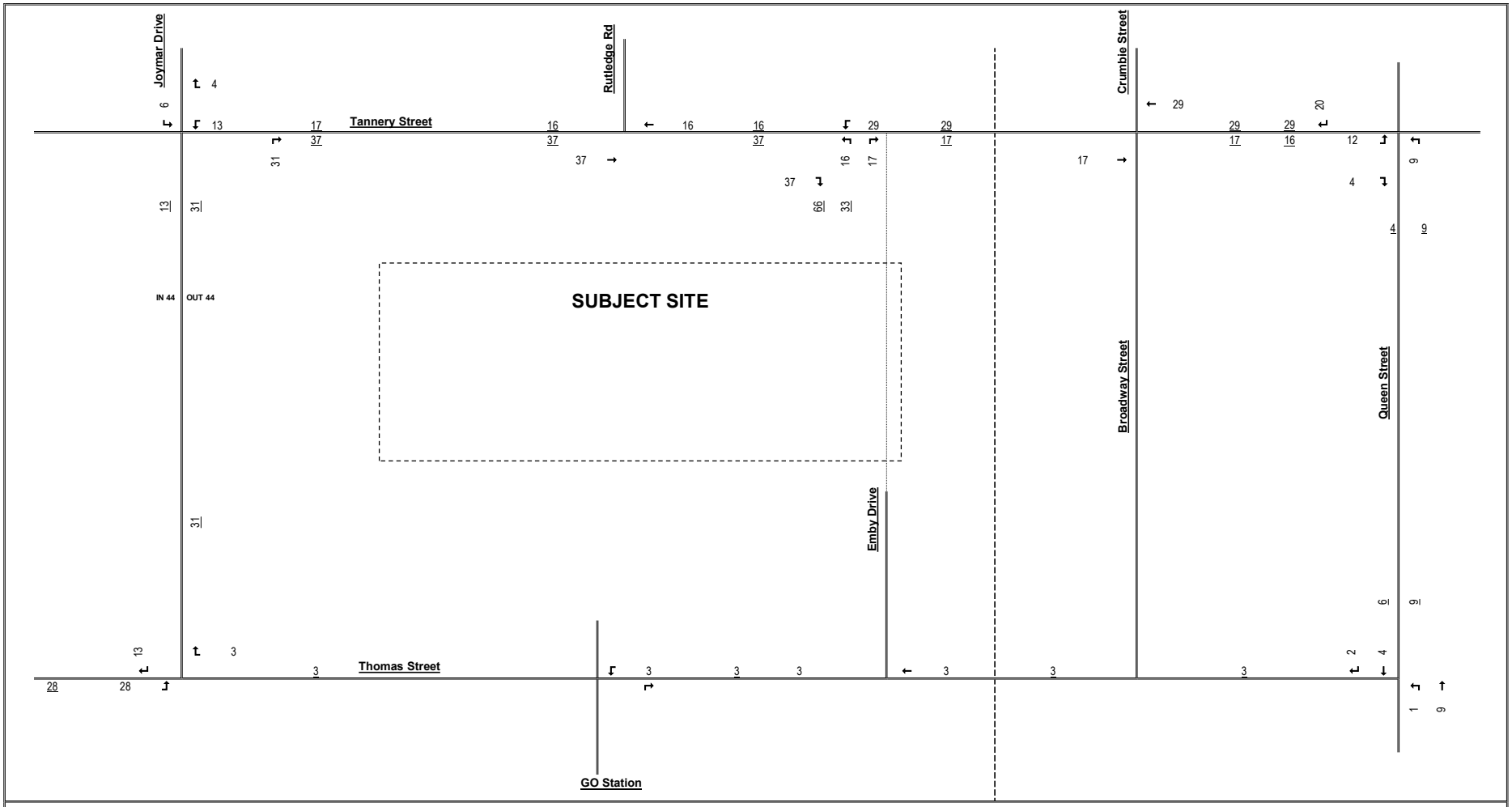
Proposed Development at 51, 57 Tannery Street & 208 Emby Drive

Site Trip Assignment (No Emby Extension)

Figure D.5

Weekday AM Peak Hour

F:\18031\Traffic\Turn Diagram_v6.xlsx]Balance 15:30 10-Jul-17 Column 54



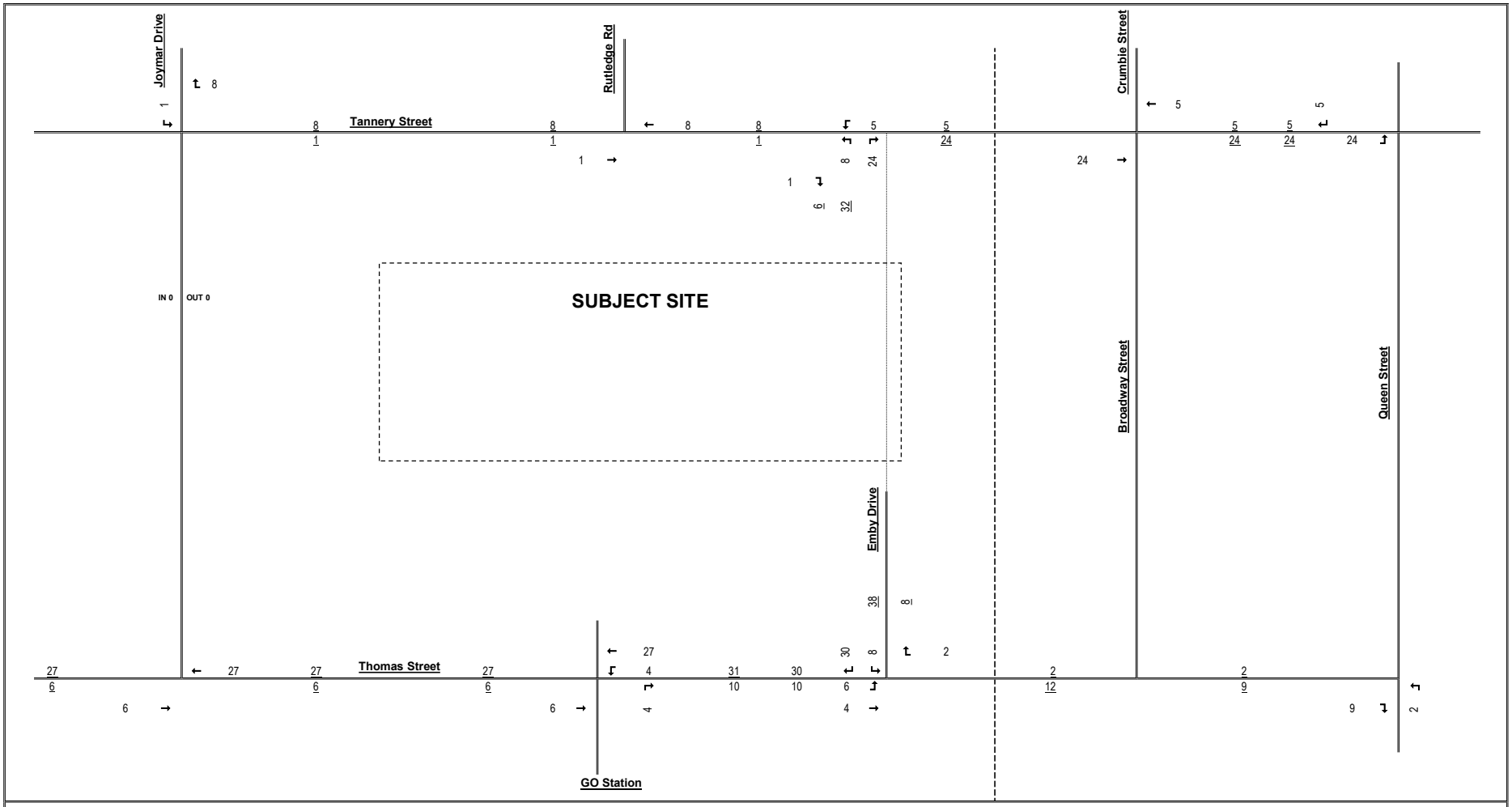
Proposed Development at 51, 57 Tannery Street & 208 Emby Drive

Site Trip Assignment (No Emby Extension)

Figure D.6

Weekday PM Peak Hour

F:\18031\Traffic\Turn Diagram_v6.xlsx]Balance 15:30 10-Jul-17 Column 55



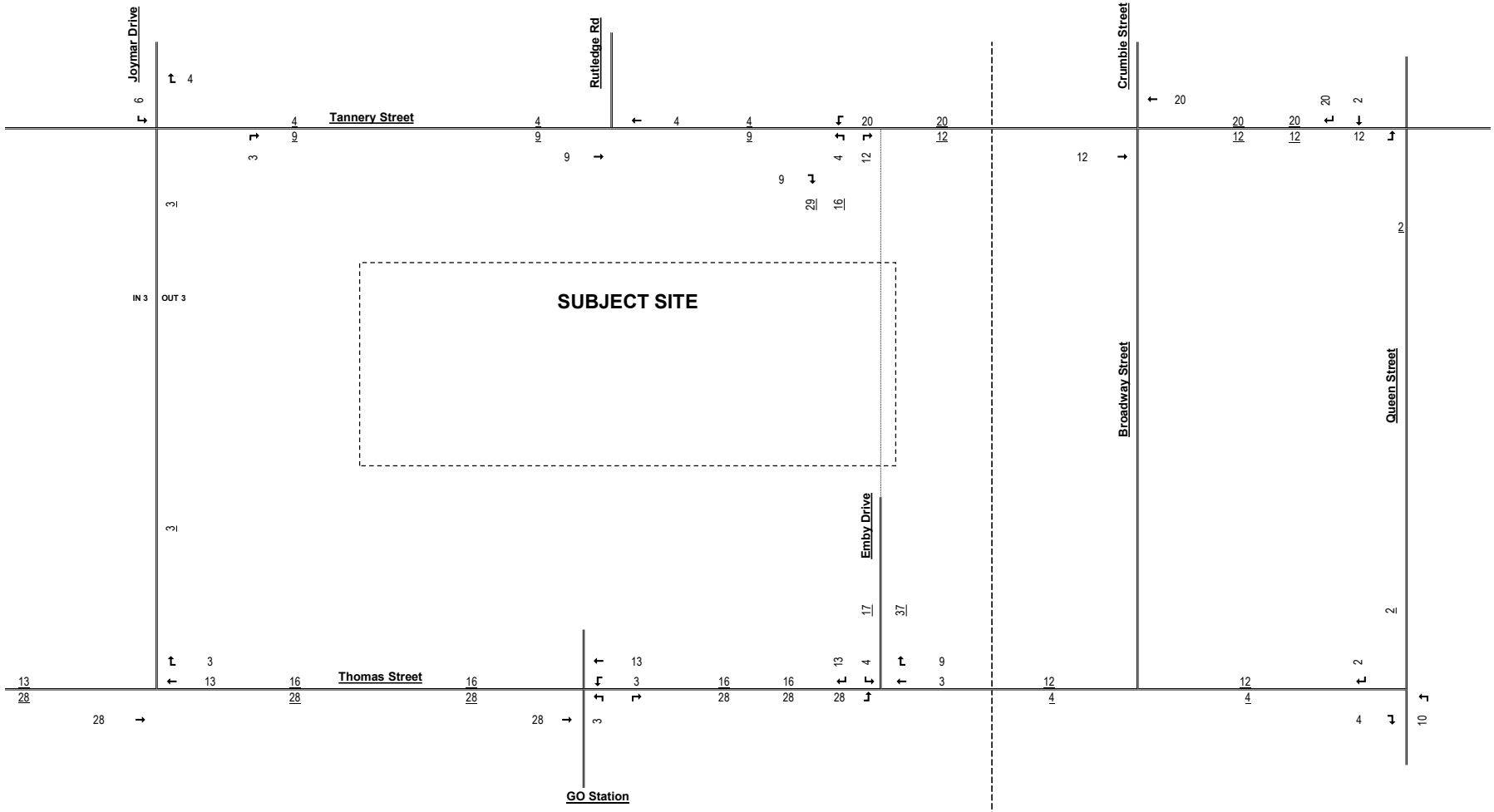
Proposed Development at 51, 57 Tannery Street & 208 Emby Drive

Site Trip Assignment (With Emby Extension)

Figure D.7

Weekday AM Peak Hour

F:\18031\Traffic\Turn Diagram_v6.xlsx]Balance 15:30 10-Jul-17 Column 56



Proposed Development at 51, 57 Tannery Street & 208 Emby Drive

Site Trip Assignment (With Emby Extension)

Figure D.8

Weekday PM Peak Hour

F:\18031\Traffic\Turn Diagram_v6.xlsx]Balance 15:31 10-Jul-17 Column 57

APPENDIX E

Future Total Traffic Conditions

Timings
2: Queen St & Tannery St

03/16/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	192	5	4	1	91	470	7	258
Future Volume (vph)	192	5	4	1	91	470	7	258
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	32.0	32.0	32.0	32.0	46.0	46.0	46.0	46.0
Minimum Split (s)	38.0	38.0	38.0	38.0	52.0	52.0	52.0	52.0
Total Split (s)	38.0	38.0	38.0	38.0	52.0	52.0	52.0	52.0
Total Split (%)	42.2%	42.2%	42.2%	42.2%	57.8%	57.8%	57.8%	57.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0		0.0
Total Lost Time (s)	6.0	6.0		6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Ped	Ped	Ped	Ped	Max	Max	Max	Max
Act Effct Green (s)	32.0	32.0		32.0		46.0		46.0
Actuated g/C Ratio	0.36	0.36		0.36		0.51		0.51
v/c Ratio	0.40	0.16		0.03		0.68		0.38
Control Delay	25.0	5.8		12.4		21.6		13.8
Queue Delay	0.0	0.0		0.0		0.0		0.0
Total Delay	25.0	5.8		12.4		21.6		13.8
LOS	C	A		B		C		B
Approach Delay		18.6		12.4		21.6		13.8
Approach LOS		B		B		C		B

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Natural Cycle: 90	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 18.6	Intersection LOS: B
Intersection Capacity Utilization 113.5%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 2: Queen St & Tannery St

HCM Unsignalized Intersection Capacity Analysis
1: Joymar Dr & Tannery St

03/16/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	19	0	56	36	167	0	38	14	385	13	23
Future Volume (vph)	7	19	0	56	36	167	0	38	14	385	13	23
Peak Hour Factor	0.92	0.92	0.92	1.00	0.92	1.00	0.92	1.00	1.00	1.00	1.00	0.92
Hourly flow rate (vph)	8	21	0	56	39	167	0	38	14	385	13	25

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	29	262	52	423
Volume Left (vph)	8	56	0	385
Volume Right (vph)	0	167	14	25
Hadj (s)	0.09	-0.33	-0.16	0.15
Departure Headway (s)	5.6	4.8	5.1	4.9
Degree Utilization, x	0.05	0.35	0.07	0.57
Capacity (veh/h)	566	690	646	711
Control Delay (s)	8.9	10.4	8.5	14.2
Approach Delay (s)	8.9	10.4	8.5	14.2
Approach LOS	A	B	A	B

Intersection Summary			
Delay	12.3		
Level of Service	B		
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
2: Queen St & Tannery St

03/16/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	192	5	90	4	1	10	91	470	14	7	258	81
Future Volume (vph)	192	5	90	4	1	10	91	470	14	7	258	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	6.0	6.0			6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00			1.00			1.00			1.00	
Frpb, ped/bikes	1.00	0.95			0.96			1.00			0.98	
Flpb, ped/bikes	0.96	1.00			0.99			0.99			1.00	
Frt	1.00	0.86			0.91			1.00			0.97	
Flt Protected	0.95	1.00			0.99			0.99			1.00	
Satd. Flow (prot)	1709	1524			1602			1845			1783	
Flt Permitted	0.75	1.00			0.95			0.89			0.99	
Satd. Flow (perm)	1345	1524			1549			1648			1765	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	192	5	90	4	1	10	91	470	14	7	258	81
RTOR Reduction (vph)	0	58	0	0	6	0	0	1	0	0	12	0
Lane Group Flow (vph)	192	37	0	0	9	0	0	574	0	0	334	0
Confl. Peds. (#/hr)	26		21	21		26	32		29	29		32
Confl. Bikes (#/hr)			3			2						2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	32.0	32.0			32.0			46.0			46.0	
Effective Green, g (s)	32.0	32.0			32.0			46.0			46.0	
Actuated g/C Ratio	0.36	0.36			0.36			0.51			0.51	
Clearance Time (s)	6.0	6.0			6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	478	541			550			842			902	
v/s Ratio Prot		0.02										
v/s Ratio Perm	c0.14				0.01			c0.35			0.19	
v/c Ratio	0.40	0.07			0.02			0.68			0.37	
Uniform Delay, d1	21.8	19.2			18.8			16.5			13.3	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	0.6	0.1			0.0			4.4			1.2	
Delay (s)	22.4	19.2			18.8			20.9			14.4	
Level of Service	C	B			B			C			B	
Approach Delay (s)		21.3			18.8			20.9			14.4	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	19.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	113.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Queues
2: Queen St & Tannery St

03/16/2018

Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	192	95	15	575	346
v/c Ratio	0.40	0.16	0.03	0.68	0.38
Control Delay	25.0	5.8	12.4	21.6	13.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	25.0	5.8	12.4	21.6	13.8
Queue Length 50th (m)	24.6	0.6	0.6	70.6	31.7
Queue Length 95th (m)	42.7	10.0	4.5	108.1	50.6
Internal Link Dist (m)		271.4	49.6	443.9	101.6
Turn Bay Length (m)	35.0				
Base Capacity (vph)	478	600	557	842	913
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.40	0.16	0.03	0.68	0.38

Intersection Summary

Queues
3: Queen St & Thomas St

03/16/2018

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	363	130	63	386	414
v/c Ratio	0.72	0.25	0.13	0.36	0.40
Control Delay	37.9	6.0	9.9	11.6	10.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	37.9	6.0	9.9	11.6	10.8
Queue Length 50th (m)	55.8	0.0	4.6	32.9	31.6
Queue Length 95th (m)	86.3	12.3	10.7	51.6	51.9
Internal Link Dist (m)	320.4			113.4	443.9
Turn Bay Length (m)			40.0		
Base Capacity (vph)	519	521	494	1071	1025
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.70	0.25	0.13	0.36	0.40

Intersection Summary

Timings
3: Queen St & Thomas St

03/16/2018

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	363	130	63	386	272
Future Volume (vph)	363	130	63	386	272
Turn Type	Prot	Perm	Perm	NA	NA
Protected Phases	4			2	6
Permitted Phases		4	2		
Detector Phase	4	4	2	2	6
Switch Phase					
Minimum Initial (s)	25.0	25.0	5.0	5.0	5.0
Minimum Split (s)	31.0	31.0	23.0	23.0	26.0
Total Split (s)	32.0	32.0	58.0	58.0	58.0
Total Split (%)	35.6%	35.6%	64.4%	64.4%	64.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	7.0	7.0	7.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Ped	Ped	Max	Max	Max
Act Effct Green (s)	25.4	25.4	51.0	51.0	51.0
Actuated g/C Ratio	0.28	0.28	0.57	0.57	0.57
v/c Ratio	0.72	0.25	0.13	0.36	0.40
Control Delay	37.9	6.0	9.9	11.6	10.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	37.9	6.0	9.9	11.6	10.8
LOS	D	A	A	B	B
Approach Delay	29.5			11.4	10.8
Approach LOS	C			B	B

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 89.4
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 17.8 — Intersection LOS: B
Intersection Capacity Utilization 65.5% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 3: Queen St & Thomas St

HCM Unsignalized Intersection Capacity Analysis
4: Thomas St & Joymar Dr

03/16/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	54	1236	366	5	1	64
Future Volume (Veh/h)	54	1236	366	5	1	64
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	54	1236	366	5	1	64
Pedestrians		7	7		4	
Lane Width (m)		3.5	3.5		3.5	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		1	1		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			218			
pX, platoon unblocked						
vC, conflicting volume	375				1106	196
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	375				1106	196
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	95				99	92
cM capacity (veh/h)	1190				197	810

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	466	824	244	127	1	64
Volume Left	54	0	0	0	1	0
Volume Right	0	0	0	5	0	64
cSH	1190	1700	1700	1700	197	810
Volume to Capacity	0.05	0.48	0.14	0.07	0.01	0.08
Queue Length 95th (m)	1.1	0.0	0.0	0.0	0.1	2.0
Control Delay (s)	1.4	0.0	0.0	0.0	23.4	9.8
Lane LOS	A				C	A
Approach Delay (s)	0.5		0.0		10.0	
Approach LOS					B	

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
3: Queen St & Thomas St

03/16/2018

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	363	130	63	386	272	142
Future Volume (vph)	363	130	63	386	272	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	6.0	6.0	7.0	7.0	7.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.93	1.00	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1785	1479	1750	1879	1761	
Flt Permitted	0.95	1.00	0.47	1.00	1.00	
Satd. Flow (perm)	1785	1479	873	1879	1761	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	363	130	63	386	272	142
RTOR Reduction (vph)	0	93	0	0	21	0
Lane Group Flow (vph)	363	37	63	386	393	0
Confl. Peds. (#/hr)	17	20	28			28
Confl. Bikes (#/hr)		2				
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	25.4	25.4	51.0	51.0	51.0	
Effective Green, g (s)	25.4	25.4	51.0	51.0	51.0	
Actuated g/C Ratio	0.28	0.28	0.57	0.57	0.57	
Clearance Time (s)	6.0	6.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	507	420	498	1071	1004	
v/s Ratio Prot	c0.20			0.21	c0.22	
v/s Ratio Perm		0.02	0.07			
v/c Ratio	0.72	0.09	0.13	0.36	0.39	
Uniform Delay, d1	28.8	23.5	8.9	10.4	10.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.8	0.1	0.5	0.9	1.2	
Delay (s)	33.5	23.6	9.4	11.3	11.8	
Level of Service	C	C	A	B	B	
Approach Delay (s)	30.9			11.1	11.8	
Approach LOS	C			B	B	

Intersection Summary			
HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	89.4	Sum of lost time (s)	13.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues
5: GO Station & Thomas St

03/16/2018

Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	1235	329	174	83
v/c Ratio	0.57	0.24	0.68	0.21
Control Delay	9.2	4.6	53.4	7.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	9.2	4.6	53.4	7.6
Queue Length 50th (m)	51.5	8.3	31.4	0.0
Queue Length 95th (m)	74.6	13.4	52.7	10.6
Internal Link Dist (m)	194.1	107.3	76.3	
Turn Bay Length (m)				
Base Capacity (vph)	2164	1391	312	652
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.57	0.24	0.56	0.13

Intersection Summary

Timings
5: GO Station & Thomas St

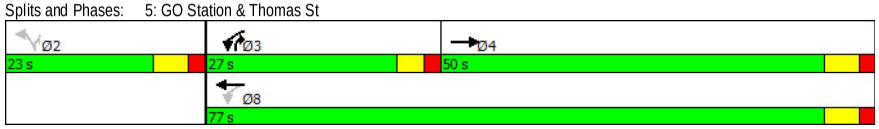
03/16/2018

Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations					
Traffic Volume (vph)	670	132	197	174	83
Future Volume (vph)	670	132	197	174	83
Turn Type	NA	pm+pt	NA	Perm	pm+ov
Protected Phases	4	3	8		3
Permitted Phases		8		2	2
Detector Phase	4	3	8	2	3
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	50.0	10.0	77.0	23.0	10.0
Total Split (s)	50.0	27.0	77.0	23.0	27.0
Total Split (%)	50.0%	27.0%	77.0%	23.0%	27.0%
Yellow Time (s)	4.0	3.0	4.0	4.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	5.0
Lead/Lag	Lag	Lead			Lead
Lead-Lag Optimize?	Yes	Yes			Yes
Recall Mode	Max	None	Max	Min	None
Act Effct Green (s)	62.7		71.1	13.9	20.5
Actuated g/C Ratio	0.65		0.73	0.14	0.21
v/c Ratio	0.57		0.24	0.68	0.21
Control Delay	9.2		4.6	53.4	7.6
Queue Delay	0.0		0.0	0.0	0.0
Total Delay	9.2		4.6	53.4	7.6
LOS	A		A	D	A
Approach Delay	9.2		4.6	38.6	
Approach LOS	A		A	D	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 97
Natural Cycle: 100
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.68
Intersection Signal Delay: 12.5 — Intersection LOS: B
Intersection Capacity Utilization 73.6% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 5: GO Station & Thomas St



HCM Unsignalized Intersection Capacity Analysis
7: Thomas St & Emby Dr

03/16/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	750	303	2	7	26
Future Volume (Veh/h)	5	750	303	2	7	26
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	0.88	0.88	1.00	1.00
Hourly flow rate (vph)	5	750	344	2	7	26
Pedestrians		8	1			
Lane Width (m)		3.7	3.7			
Walking Speed (m/s)		1.1	1.1			
Percent Blockage		1	0			
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		131	43			
pX, platoon unblocked	0.99				0.99	0.99
vC, conflicting volume	346				731	181
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	329				717	163
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				98	97
cM capacity (veh/h)	1234				365	847

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	255	500	229	117	33
Volume Left	5	0	0	0	7
Volume Right	0	0	0	2	26
cSH	1234	1700	1700	1700	662
Volume to Capacity	0.00	0.29	0.13	0.07	0.05
Queue Length 95th (m)	0.1	0.0	0.0	0.0	1.2
Control Delay (s)	0.2	0.0	0.0	0.0	10.7
Lane LOS	A				B
Approach Delay (s)	0.1		0.0		10.7
Approach LOS					B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	36.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
5: GO Station & Thomas St

03/16/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	670	565	132	197	174	83
Future Volume (vph)	670	565	132	197	174	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	6.0			6.0	6.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frpb, ped/bikes	0.96			1.00	1.00	0.98
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.93			1.00	1.00	0.85
Flt Protected	1.00			0.98	0.95	1.00
Satd. Flow (prot)	3204			3500	1779	1559
Flt Permitted	1.00			0.51	0.95	1.00
Satd. Flow (perm)	3204			1813	1779	1559
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	670	565	132	197	174	83
RTOR Reduction (vph)	98	0	0	0	0	68
Lane Group Flow (vph)	1137	0	0	329	174	15
Confl. Peds. (#/hr)		18	18		2	13
Confl. Bikes (#/hr)		3				
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	NA		pm+pt	NA	Perm	pm+ov
Protected Phases	4		3	8		3
Permitted Phases			8		2	2
Actuated Green, G (s)	62.7			72.1	13.9	18.3
Effective Green, g (s)	62.7			72.1	13.9	18.3
Actuated g/C Ratio	0.64			0.74	0.14	0.19
Clearance Time (s)	6.0			6.0	6.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	2049			1409	252	291
v/s Ratio Prot	c0.35			c0.01		0.00
v/s Ratio Perm				0.16	c0.10	0.01
v/c Ratio	0.56			0.23	0.69	0.05
Uniform Delay, d1	9.9			4.1	40.0	32.7
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	1.1			0.1	7.9	0.1
Delay (s)	10.9			4.2	47.9	32.8
Level of Service	B			A	D	C
Approach Delay (s)	10.9			4.2	43.0	
Approach LOS	B			A	D	

Intersection Summary			
HCM 2000 Control Delay	14.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	98.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
14: Emby Extension & Tannery St

03/16/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	12	13	16	3	65	81
Future Volume (Veh/h)	12	13	16	3	65	81
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	14	17	3	71	88
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				48		
pX, platoon unblocked						
vC, conflicting volume			27		57	20
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			27		57	20
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		92	92
cM capacity (veh/h)			1587		940	1058

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	27	20	159
Volume Left	0	17	71
Volume Right	14	0	88
cSH	1700	1587	1002
Volume to Capacity	0.02	0.01	0.16
Queue Length 95th (m)	0.0	0.2	4.3
Control Delay (s)	0.0	6.2	9.3
Lane LOS		A	A
Approach Delay (s)	0.0	6.2	9.3
Approach LOS			A

Intersection Summary			
Average Delay			7.8
Intersection Capacity Utilization			22.9%
Analysis Period (min)			15

ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
13: Broadway St/Crumbie St & Tannery St

03/16/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	253	209	30	139	4	49	14	25	10	12	21
Future Volume (Veh/h)	33	253	209	30	139	4	49	14	25	10	12	21
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	33	253	209	30	139	4	49	14	25	10	12	21
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		57			295							
pX, platoon unblocked												
vC, conflicting volume	143			462			652	626	358	656	729	141
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	143			462			652	626	358	656	729	141
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			97			86	96	96	97	96	98
cM capacity (veh/h)	1452			1110			351	383	691	344	335	912

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	495	173	88	43
Volume Left	33	30	49	10
Volume Right	209	4	25	21
cSH	1452	1110	415	489
Volume to Capacity	0.02	0.03	0.21	0.09
Queue Length 95th (m)	0.5	0.6	6.0	2.2
Control Delay (s)	0.7	1.6	16.0	13.1
Lane LOS	A	A	C	B
Approach Delay (s)	0.7	1.6	16.0	13.1
Approach LOS			C	B

Intersection Summary			
Average Delay			3.3
Intersection Capacity Utilization			48.1%
Analysis Period (min)			15

ICU Level of Service A

Timings
19: Rail Corridor & Tannery St

03/16/2018

Lane Group	Ø2	Ø4	Ø6	Ø8
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Turn Type				
Protected Phases	2	4	6	8
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	120.0	1680.0	120.0	1680.0
Total Split (%)	7%	93%	7%	93%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				

Intersection Summary	
Cycle Length: 1800	
Actuated Cycle Length: 1800	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.00	
Intersection Signal Delay: 0.0	Intersection LOS: A
Intersection Capacity Utilization 0.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 19: Rail Corridor & Tannery St

HCM Unsignalized Intersection Capacity Analysis
15: Tannery St & Rutledge Rd

03/16/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	413	246	12	14	12
Future Volume (Veh/h)	5	413	246	12	14	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	413	246	12	14	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			129			
pX, platoon unblocked						
vC, conflicting volume	258				675	252
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	258				675	252
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				97	98
cM capacity (veh/h)	1318				421	792

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	418	258	26
Volume Left	5	0	14
Volume Right	0	12	12
cSH	1318	1700	537
Volume to Capacity	0.00	0.15	0.05
Queue Length 95th (m)	0.1	0.0	1.2
Control Delay (s)	0.1	0.0	12.0
Lane LOS	A		B
Approach Delay (s)	0.1	0.0	12.0
Approach LOS			B

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	35.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
19: Rail Corridor & Tannery St

03/16/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)												
Lane Util. Factor												
Frt												
Flt Protected												
Satd. Flow (prot)												
Flt Permitted												
Satd. Flow (perm)												
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type												
Protected Phases		4			8			2			6	
Permitted Phases												
Actuated Green, G (s)												
Effective Green, g (s)												
Actuated g/C Ratio												
Clearance Time (s)												
Lane Grp Cap (vph)												
v/s Ratio Prot												
v/s Ratio Perm												
v/c Ratio												
Uniform Delay, d1												
Progression Factor												
Incremental Delay, d2												
Delay (s)												
Level of Service												
Approach Delay (s)		0.0			0.0			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	0.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.00		
Actuated Cycle Length (s)	1800.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues
19: Rail Corridor & Tannery St

03/16/2018

Lane Group
Lane Group Flow (vph)
v/c Ratio
Control Delay
Queue Delay
Total Delay
Queue Length 50th (m)
Queue Length 95th (m)
Internal Link Dist (m)
Turn Bay Length (m)
Base Capacity (vph)
Starvation Cap Reductn
Spillback Cap Reductn
Storage Cap Reductn
Reduced v/c Ratio

Intersection Summary

Queues
23: Rail Corridor & Thomas St

03/16/2018

Lane Group	EBT	WBT
Lane Group Flow (vph)	752	305
v/c Ratio	0.23	0.09
Control Delay	5.6	4.8
Queue Delay	12.0	2.5
Total Delay	17.6	7.3
Queue Length 50th (m)	125.3	43.8
Queue Length 95th (m)	121.6	44.8
Internal Link Dist (m)	19.3	320.4
Turn Bay Length (m)		
Base Capacity (vph)	3331	3331
Starvation Cap Reductn	2556	2884
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.97	0.68

Intersection Summary

Timings
23: Rail Corridor & Thomas St

03/16/2018

Lane Group	EBT	WBT	Ø2	Ø6
Lane Configurations				
Traffic Volume (vph)	752	305		
Future Volume (vph)	752	305		
Turn Type	NA	NA		
Protected Phases	4	8	2	6
Permitted Phases				
Detector Phase	4	8		
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	1680.0	1680.0	120.0	120.0
Total Split (%)	93.3%	93.3%	7%	7%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		
Total Lost Time (s)	4.5	4.5		
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	1675.5	1675.5		
Actuated g/C Ratio	0.93	0.93		
v/c Ratio	0.23	0.09		
Control Delay	5.6	4.8		
Queue Delay	12.0	2.5		
Total Delay	17.6	7.3		
LOS	B	A		
Approach Delay	17.6	7.3		
Approach LOS	B	A		

Intersection Summary

Cycle Length: 1800
Actuated Cycle Length: 1800
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 45
Control Type: Pretimed
Maximum v/c Ratio: 0.23
Intersection Signal Delay: 14.6 — Intersection LOS: B
Intersection Capacity Utilization 24.5% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 23: Rail Corridor & Thomas St

HCM Signalized Intersection Capacity Analysis
23: Rail Corridor & Thomas St

03/16/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	752	0	0	305	0	0	0	0	0	0	0
Future Volume (vph)	0	752	0	0	305	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5							
Lane Util. Factor		0.95			0.95							
Frt		1.00			1.00							
Flt Protected		1.00			1.00							
Satd. Flow (prot)		3579			3579							
Flt Permitted		1.00			1.00							
Satd. Flow (perm)		3579			3579							
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	752	0	0	305	0	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	752	0	0	305	0	0	0	0	0	0	0
Turn Type		NA			NA							
Protected Phases		4			8			2			6	
Permitted Phases												
Actuated Green, G (s)		1675.5			1675.5							
Effective Green, g (s)		1675.5			1675.5							
Actuated g/C Ratio		0.93			0.93							
Clearance Time (s)		4.5			4.5							
Lane Grp Cap (vph)		3331			3331							
v/s Ratio Prot		c0.21			0.09							
v/s Ratio Perm												
v/c Ratio		0.23			0.09							
Uniform Delay, d1		5.5			4.7							
Progression Factor		1.00			1.00							
Incremental Delay, d2		0.2			0.1							
Delay (s)		5.6			4.8							
Level of Service		A			A							
Approach Delay (s)		5.6			4.8			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	1800.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	24.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings
2: Queen St & Tannery St

03/16/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	119	5	3	7	50	513	12	443
Future Volume (vph)	119	5	3	7	50	513	12	443
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	25.0	46.0	46.0	46.0	46.0
Minimum Split (s)	31.0	31.0	31.0	31.0	52.0	52.0	52.0	52.0
Total Split (s)	31.0	31.0	31.0	31.0	79.0	79.0	79.0	79.0
Total Split (%)	28.2%	28.2%	28.2%	28.2%	71.8%	71.8%	71.8%	71.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0		0.0
Total Lost Time (s)	6.0	6.0		6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Ped	Ped	Ped	Ped	Max	Max	Max	Max
Act Effct Green (s)	25.0	25.0		25.0		73.0		73.0
Actuated g/C Ratio	0.23	0.23		0.23		0.66		0.66
v/c Ratio	0.40	0.22		0.05		0.51		0.51
Control Delay	41.1	9.9		24.8		11.3		10.7
Queue Delay	0.0	0.0		0.0		0.0		0.0
Total Delay	41.1	9.9		24.8		11.3		10.7
LOS	D	A		C		B		B
Approach Delay		27.6		24.8		11.3		10.7
Approach LOS		C		C		B		B

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 110	
Natural Cycle: 85	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.51	
Intersection Signal Delay: 13.7	Intersection LOS: B
Intersection Capacity Utilization 85.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 2: Queen St & Tannery St

HCM Unsignalized Intersection Capacity Analysis
1: Joymar Dr & Tannery St

03/16/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	1	6	3	82	5	197	2	32	38	194	68	2
Future Volume (vph)	1	6	3	82	5	197	2	32	38	194	68	2
Peak Hour Factor	0.92	0.92	0.92	1.00	0.92	1.00	0.92	1.00	1.00	1.00	1.00	0.92
Hourly flow rate (vph)	1	7	3	82	5	197	2	32	38	194	68	2

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	11	284	72	264
Volume Left (vph)	1	82	2	194
Volume Right (vph)	3	197	38	2
Hadj (s)	-0.11	-0.36	-0.31	0.14
Departure Headway (s)	5.0	4.4	4.6	4.8
Degree Utilization, x	0.02	0.35	0.09	0.35
Capacity (veh/h)	646	769	714	706
Control Delay (s)	8.1	9.7	8.1	10.4
Approach Delay (s)	8.1	9.7	8.1	10.4
Approach LOS	A	A	A	B

Intersection Summary			
Delay	9.8		
Level of Service	A		
Intersection Capacity Utilization	52.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
2: Queen St & Tannery St

03/16/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	119	5	85	3	7	7	50	513	7	12	443	148
Future Volume (vph)	119	5	85	3	7	7	50	513	7	12	443	148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	6.0	6.0			6.0			6.0			6.0	
Lane Util. Factor	1.00	1.00			1.00			1.00			1.00	
Frpb, ped/bikes	1.00	0.92			0.96			1.00			0.98	
Flpb, ped/bikes	0.93	1.00			0.99			1.00			1.00	
Frt	1.00	0.86			0.94			1.00			0.97	
Flt Protected	0.95	1.00			0.99			1.00			1.00	
Satd. Flow (prot)	1660	1489			1676			1861			1773	
Flt Permitted	0.75	1.00			0.97			0.91			0.99	
Satd. Flow (perm)	1304	1489			1633			1701			1752	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	119	5	85	3	7	7	50	513	7	12	443	148
RTOR Reduction (vph)	0	66	0	0	5	0	0	0	0	0	11	0
Lane Group Flow (vph)	119	24	0	0	12	0	0	570	0	0	592	0
Confl. Peds. (#/hr)	26		21	21		26	32		29	29		32
Confl. Bikes (#/hr)			3			2						2
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	25.0	25.0			25.0			73.0			73.0	
Effective Green, g (s)	25.0	25.0			25.0			73.0			73.0	
Actuated g/C Ratio	0.23	0.23			0.23			0.66			0.66	
Clearance Time (s)	6.0	6.0			6.0			6.0			6.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	296	338			371			1128			1162	
v/s Ratio Prot		0.02										
v/s Ratio Perm	c0.09				0.01			0.33			c0.34	
v/c Ratio	0.40	0.07			0.03			0.51			0.51	
Uniform Delay, d1	36.1	33.4			33.1			9.4			9.4	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	0.9	0.1			0.0			1.6			1.6	
Delay (s)	37.0	33.5			33.1			11.0			11.0	
Level of Service	D	C			C			B			B	
Approach Delay (s)		35.5			33.1			11.0			11.0	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Queues
2: Queen St & Tannery St

03/16/2018

Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	119	90	17	570	603
v/c Ratio	0.40	0.22	0.05	0.51	0.51
Control Delay	41.1	9.9	24.8	11.3	10.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	41.1	9.9	24.8	11.3	10.7
Queue Length 50th (m)	21.9	0.8	1.7	56.1	56.5
Queue Length 95th (m)	39.4	13.4	7.4	80.9	81.8
Internal Link Dist (m)		271.4	49.6	443.9	101.6
Turn Bay Length (m)	35.0				
Base Capacity (vph)	295	403	376	1127	1172
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.40	0.22	0.05	0.51	0.51

Intersection Summary

Queues
3: Queen St & Thomas St

03/16/2018

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	198	140	146	444	688
v/c Ratio	0.47	0.31	0.41	0.37	0.61
Control Delay	40.4	7.7	13.5	10.1	12.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	40.4	7.7	13.5	10.1	12.8
Queue Length 50th (m)	36.7	0.0	13.8	40.5	70.9
Queue Length 95th (m)	58.7	15.1	28.1	58.3	104.2
Internal Link Dist (m)	320.4			113.4	443.9
Turn Bay Length (m)			40.0		
Base Capacity (vph)	421	455	360	1212	1135
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.47	0.31	0.41	0.37	0.61

Intersection Summary

Timings
3: Queen St & Thomas St

03/16/2018

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	198	140	146	444	402
Future Volume (vph)	198	140	146	444	402
Turn Type	Prot	Perm	Perm	NA	NA
Protected Phases	4			2	6
Permitted Phases		4	2		
Detector Phase	4	4	2	2	6
Switch Phase					
Minimum Initial (s)	26.0	26.0	5.0	5.0	5.0
Minimum Split (s)	32.0	32.0	23.0	23.0	26.0
Total Split (s)	32.0	32.0	78.0	78.0	78.0
Total Split (%)	29.1%	29.1%	70.9%	70.9%	70.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	7.0	7.0	7.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Ped	Ped	Max	Max	Max
Act Effct Green (s)	26.0	26.0	71.0	71.0	71.0
Actuated g/C Ratio	0.24	0.24	0.65	0.65	0.65
v/c Ratio	0.47	0.31	0.41	0.37	0.61
Control Delay	40.4	7.7	13.5	10.1	12.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	40.4	7.7	13.5	10.1	12.8
LOS	D	A	B	B	B
Approach Delay	26.9			11.0	12.8
Approach LOS	C			B	B

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.61
Intersection Signal Delay: 15.1 — Intersection LOS: B
Intersection Capacity Utilization 86.1% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 3: Queen St & Thomas St

HCM Unsignalized Intersection Capacity Analysis
4: Thomas St & Joymar Dr

03/16/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	54	497	1034	23	6	141
Future Volume (Veh/h)	54	497	1034	23	6	141
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	54	497	1034	23	6	141
Pedestrians		7	7		4	
Lane Width (m)		3.5	3.5		3.5	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		1	1		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			218			
pX, platoon unblocked	0.93				0.93	0.93
vC, conflicting volume	1061				1413	540
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	915				1294	354
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				96	76
cM capacity (veh/h)	698				133	596

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	220	331	689	368	6	141
Volume Left	54	0	0	0	6	0
Volume Right	0	0	0	23	0	141
cSH	698	1700	1700	1700	133	596
Volume to Capacity	0.08	0.19	0.41	0.22	0.04	0.24
Queue Length 95th (m)	1.9	0.0	0.0	0.0	1.1	6.9
Control Delay (s)	3.3	0.0	0.0	0.0	33.3	12.9
Lane LOS	A				D	B
Approach Delay (s)	1.3		0.0		13.7	
Approach LOS					B	

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
3: Queen St & Thomas St

03/16/2018

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	198	140	146	444	402	286
Future Volume (vph)	198	140	146	444	402	286
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	6.0	6.0	7.0	7.0	7.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.92	1.00	1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.94	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1785	1474	1785	1879	1723	
Flt Permitted	0.95	1.00	0.31	1.00	1.00	
Satd. Flow (perm)	1785	1474	575	1879	1723	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	198	140	146	444	402	286
RTOR Reduction (vph)	0	107	0	0	23	0
Lane Group Flow (vph)	198	33	146	444	665	0
Confl. Peds. (#/hr)	17	20	28			28
Confl. Bikes (#/hr)		2				
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	26.0	26.0	71.0	71.0	71.0	
Effective Green, g (s)	26.0	26.0	71.0	71.0	71.0	
Actuated g/C Ratio	0.24	0.24	0.65	0.65	0.65	
Clearance Time (s)	6.0	6.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	421	348	371	1212	1112	
v/s Ratio Prot	c0.11			0.24	c0.39	
v/s Ratio Perm		0.02	0.25			
v/c Ratio	0.47	0.10	0.39	0.37	0.60	
Uniform Delay, d1	36.1	32.8	9.3	9.1	11.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.8	0.1	3.1	0.9	2.4	
Delay (s)	36.9	32.9	12.4	9.9	13.6	
Level of Service	D	C	B	A	B	
Approach Delay (s)	35.3			10.5	13.6	
Approach LOS	D			B	B	

Intersection Summary			
HCM 2000 Control Delay	17.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Queues
5: GO Station & Thomas St

03/16/2018

Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	500	733	367	138
v/c Ratio	0.34	0.40	0.76	0.22
Control Delay	15.2	10.5	35.6	4.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	15.2	10.5	35.6	4.6
Queue Length 50th (m)	22.0	26.8	46.9	1.9
Queue Length 95th (m)	39.5	47.6	74.1	10.3
Internal Link Dist (m)	194.1	107.3	76.3	
Turn Bay Length (m)				
Base Capacity (vph)	1454	1864	1079	781
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.34	0.39	0.34	0.18

Intersection Summary

Timings
5: GO Station & Thomas St

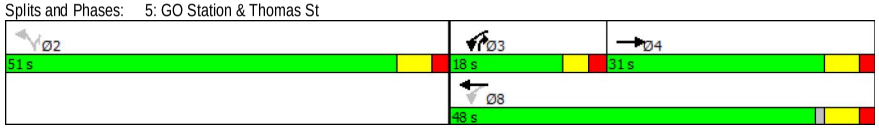
03/16/2018

Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations					
Traffic Volume (vph)	391	51	682	367	138
Future Volume (vph)	391	51	682	367	138
Turn Type	NA	pm+pt	NA	Perm	pm+ov
Protected Phases	4	3	8		3
Permitted Phases		8		2	2
Detector Phase	4	3	8	2	3
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	21.0	10.0	21.0	25.0	10.0
Total Split (s)	31.0	18.0	48.0	51.0	18.0
Total Split (%)	31.0%	18.0%	48.0%	51.0%	18.0%
Yellow Time (s)	4.0	3.0	4.0	4.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		6.0	6.0	5.0
Lead/Lag	Lag	Lead			Lead
Lead-Lag Optimize?	Yes	Yes			Yes
Recall Mode	Max	None	Max	Min	None
Act Effct Green (s)	31.5		42.2	20.2	26.9
Actuated g/C Ratio	0.42		0.57	0.27	0.36
v/c Ratio	0.34		0.40	0.76	0.22
Control Delay	15.2		10.5	35.6	4.6
Queue Delay	0.0		0.0	0.0	0.0
Total Delay	15.2		10.5	35.6	4.6
LOS	B		B	D	A
Approach Delay	15.2		10.5	27.1	
Approach LOS	B		B	C	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 74.5
Natural Cycle: 60
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 16.7 — Intersection LOS: B
Intersection Capacity Utilization 70.3% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 5: GO Station & Thomas St



HCM Unsignalized Intersection Capacity Analysis
7: Thomas St & Emby Dr

03/16/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	27	507	729	8	4	12
Future Volume (Veh/h)	27	507	729	8	4	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	27	507	729	8	4	12
Pedestrians		8	1			
Lane Width (m)		3.7	3.7			
Walking Speed (m/s)		1.1	1.1			
Percent Blockage		1	0			
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		131	43			
pX, platoon unblocked	0.98				0.96	0.98
vC, conflicting volume	737				1042	376
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	696				869	329
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				99	98
cM capacity (veh/h)	893				273	656

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	196	338	486	251	16
Volume Left	27	0	0	0	4
Volume Right	0	0	0	8	12
cSH	893	1700	1700	1700	486
Volume to Capacity	0.03	0.20	0.29	0.15	0.03
Queue Length 95th (m)	0.7	0.0	0.0	0.0	0.8
Control Delay (s)	1.5	0.0	0.0	0.0	12.7
Lane LOS	A				B
Approach Delay (s)	0.6		0.0		12.7
Approach LOS					B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	46.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
5: GO Station & Thomas St

03/16/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	391	109	51	682	367	138
Future Volume (vph)	391	109	51	682	367	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)	6.0			6.0	6.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frpb, ped/bikes	0.99			1.00	1.00	0.98
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.97			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3403			3554	1781	1563
Flt Permitted	1.00			0.89	0.95	1.00
Satd. Flow (perm)	3403			3173	1781	1563
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	391	109	51	682	367	138
RTOR Reduction (vph)	20	0	0	0	0	74
Lane Group Flow (vph)	480	0	0	733	367	64
Confl. Peds. (#/hr)		18	18		2	13
Confl. Bikes (#/hr)		3				
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	NA		pm+pt	NA	Perm	pm+ov
Protected Phases	4		3	8		3
Permitted Phases			8		2	2
Actuated Green, G (s)	31.6			42.2	20.2	25.8
Effective Green, g (s)	31.6			42.2	20.2	25.8
Actuated g/C Ratio	0.42			0.57	0.27	0.35
Clearance Time (s)	6.0			6.0	6.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1445			1828	483	542
v/s Ratio Prot	0.14			c0.03		0.01
v/s Ratio Perm				c0.20	c0.21	0.03
v/c Ratio	0.33			0.40	0.76	0.12
Uniform Delay, d1	14.3			9.0	24.9	16.5
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.6			0.1	6.8	0.1
Delay (s)	15.0			9.2	31.6	16.6
Level of Service	B			A	C	B
Approach Delay (s)	15.0			9.2	27.5	
Approach LOS	B			A	C	

Intersection Summary			
HCM 2000 Control Delay	16.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	74.4	Sum of lost time (s)	17.0
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
14: Tannery St

03/16/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	7	18	30	12	22	28
Future Volume (Veh/h)	7	18	30	12	22	28
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	20	33	13	24	30
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				42		
pX, platoon unblocked						
vC, conflicting volume			28		97	18
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			28		97	18
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		97	97
cM capacity (veh/h)			1585		883	1061

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	28	46	54
Volume Left	0	33	24
Volume Right	20	0	30
cSH	1700	1585	974
Volume to Capacity	0.02	0.02	0.06
Queue Length 95th (m)	0.0	0.5	1.3
Control Delay (s)	0.0	5.3	8.9
Lane LOS		A	A
Approach Delay (s)	0.0	5.3	8.9
Approach LOS			A

Intersection Summary			
Average Delay			5.7
Intersection Capacity Utilization			19.0%
Analysis Period (min)			15

ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
13: Broadway St/Crumbie St & Tannery St

03/16/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	136	87	50	140	13	93	40	55	18	46	65
Future Volume (Veh/h)	22	136	87	50	140	13	93	40	55	18	46	65
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	22	136	87	50	140	13	93	40	55	18	46	65
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		57			295							
pX, platoon unblocked												
vC, conflicting volume	153			223			558	476	180	545	514	146
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	153			223			558	476	180	545	514	146
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			96			74	91	94	95	90	93
cM capacity (veh/h)	1440			1358			364	465	869	380	443	906

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	245	203	188	129
Volume Left	22	50	93	18
Volume Right	87	13	55	65
cSH	1440	1358	465	579
Volume to Capacity	0.02	0.04	0.40	0.22
Queue Length 95th (m)	0.4	0.9	14.7	6.4
Control Delay (s)	0.8	2.1	17.9	13.0
Lane LOS	A	A	C	B
Approach Delay (s)	0.8	2.1	17.9	13.0
Approach LOS			C	B

Intersection Summary			
Average Delay			7.4
Intersection Capacity Utilization			46.1%
Analysis Period (min)			15

ICU Level of Service A

Timings
19: Rail Corridor & Tannery St

03/16/2018

Lane Group	Ø2	Ø4	Ø6	Ø8
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Turn Type				
Protected Phases	2	4	6	8
Permitted Phases				
Detector Phase				
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	120.0	1680.0	120.0	1680.0
Total Split (%)	7%	93%	7%	93%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				

Intersection Summary	
Cycle Length: 1800	
Actuated Cycle Length: 1800	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.00	
Intersection Signal Delay: 0.0	Intersection LOS: A
Intersection Capacity Utilization 0.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 19: Rail Corridor & Tannery St

HCM Unsignalized Intersection Capacity Analysis
15: Tannery St & Rutledge Rd

03/16/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	225	278	12	10	7
Future Volume (Veh/h)	13	225	278	12	10	7
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	13	225	278	12	10	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			129			
pX, platoon unblocked						
vC, conflicting volume	290				535	284
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	290				535	284
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				98	99
cM capacity (veh/h)	1283				504	760

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	238	290	17
Volume Left	13	0	10
Volume Right	0	12	7
cSH	1283	1700	585
Volume to Capacity	0.01	0.17	0.03
Queue Length 95th (m)	0.2	0.0	0.7
Control Delay (s)	0.5	0.0	11.3
Lane LOS	A		B
Approach Delay (s)	0.5	0.0	11.3
Approach LOS			B

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	32.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
19: Rail Corridor & Tannery St

03/16/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Total Lost time (s)												
Lane Util. Factor												
Frt												
Flt Protected												
Satd. Flow (prot)												
Flt Permitted												
Satd. Flow (perm)												
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type												
Protected Phases		4			8			2			6	
Permitted Phases												
Actuated Green, G (s)												
Effective Green, g (s)												
Actuated g/C Ratio												
Clearance Time (s)												
Lane Grp Cap (vph)												
v/s Ratio Prot												
v/s Ratio Perm												
v/c Ratio												
Uniform Delay, d1												
Progression Factor												
Incremental Delay, d2												
Delay (s)												
Level of Service												
Approach Delay (s)		0.0			0.0			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	0.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.00		
Actuated Cycle Length (s)	1800.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	0.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues
19: Rail Corridor & Tannery St

03/16/2018

Lane Group
Lane Group Flow (vph)
v/c Ratio
Control Delay
Queue Delay
Total Delay
Queue Length 50th (m)
Queue Length 95th (m)
Internal Link Dist (m)
Turn Bay Length (m)
Base Capacity (vph)
Starvation Cap Reductn
Spillback Cap Reductn
Storage Cap Reductn
Reduced v/c Ratio

Intersection Summary

Queues
23: Rail Corridor & Thomas St

03/16/2018

Lane Group	EBT	WBT
Lane Group Flow (vph)	541	734
v/c Ratio	0.16	0.22
Control Delay	5.2	5.6
Queue Delay	9.6	4.5
Total Delay	14.7	10.1
Queue Length 50th (m)	83.8	121.6
Queue Length 95th (m)	83.0	118.0
Internal Link Dist (m)	19.3	320.4
Turn Bay Length (m)		
Base Capacity (vph)	3331	3331
Starvation Cap Reductn	2750	2500
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.93	0.88

Intersection Summary

Timings
23: Rail Corridor & Thomas St

03/16/2018

Lane Group	EBT	WBT	Ø2	Ø6
Lane Configurations				
Traffic Volume (vph)	541	734		
Future Volume (vph)	541	734		
Turn Type	NA	NA		
Protected Phases	4	8	2	6
Permitted Phases				
Detector Phase	4	8		
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	1680.0	1680.0	120.0	120.0
Total Split (%)	93.3%	93.3%	7%	7%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		
Total Lost Time (s)	4.5	4.5		
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	1675.5	1675.5		
Actuated g/C Ratio	0.93	0.93		
v/c Ratio	0.16	0.22		
Control Delay	5.2	5.6		
Queue Delay	9.6	4.5		
Total Delay	14.7	10.1		
LOS	B	B		
Approach Delay	14.7	10.1		
Approach LOS	B	B		

Intersection Summary

Cycle Length: 1800
Actuated Cycle Length: 1800
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 45
Control Type: Pretimed
Maximum v/c Ratio: 0.22
Intersection Signal Delay: 12.0 — Intersection LOS: B
Intersection Capacity Utilization 24.0% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 23: Rail Corridor & Thomas St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	541	0	0	734	0	0	0	0	0	0	0
Future Volume (vph)	0	541	0	0	734	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5							
Lane Util. Factor		0.95			0.95							
Frt		1.00			1.00							
Flt Protected		1.00			1.00							
Satd. Flow (prot)		3579			3579							
Flt Permitted		1.00			1.00							
Satd. Flow (perm)		3579			3579							
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	541	0	0	734	0	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	541	0	0	734	0	0	0	0	0	0	0
Turn Type		NA			NA							
Protected Phases		4			8			2			6	
Permitted Phases												
Actuated Green, G (s)		1675.5			1675.5							
Effective Green, g (s)		1675.5			1675.5							
Actuated g/C Ratio		0.93			0.93							
Clearance Time (s)		4.5			4.5							
Lane Grp Cap (vph)		3331			3331							
v/s Ratio Prot		0.15			c0.21							
v/s Ratio Perm												
v/c Ratio		0.16			0.22							
Uniform Delay, d1		5.1			5.4							
Progression Factor		1.00			1.00							
Incremental Delay, d2		0.1			0.2							
Delay (s)		5.2			5.6							
Level of Service		A			A							
Approach Delay (s)		5.2			5.6			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	1800.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	24.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			